
Quarterly Credit Report

Q1/2017

Volume 6, No 4



NUS
National University
of Singapore

RMI
*Advancing Risk Management
for Singapore and Beyond*

Introduction

The Quarterly Credit Report (QCR) is an analysis of credit outlooks across regions, economies and sectors. This analysis incorporates probabilities of default (PD) generated by the Risk Management Institute - Credit Research Initiative's (RMI-CRI) default forecast model, a part of the RMI Credit Research Initiative at the National University of Singapore (NUS). The QCR provides insights on trends in credit outlooks to credit professionals, investors and researchers.

QCR Volume 6, Issue 4 covers the first quarter of 2017. We discuss the general credit outlook for a selection of economies from around the world, based on relevant indicators, and relate this discussion to forecasts provided by RMI-CRI's PD model.

The appendices in this volume include a comprehensive overview of various outputs that are produced by the operational PD system of RMI-CRI. While the PD system output's default forecasts at horizons ranging from one month to five years, the QCR reports only 1-year PDs in order to allow the reader to make consistent comparisons. In addition to the PD produced by the RMI-CRI system, the appendices provide important macroeconomic, corporate credit and sovereign risk indicators. These summarize the credit situation, as well as make detailed data available for reference purposes.

The commentary in the QCR is based on median PD of *exchange-listed firms* within economies and industry sectors. Classification into economies is based on each firm's country of domicile, and classification into industry sectors is based on each firm's Level I Bloomberg Industry Classification. An exception is the banking and real estate sectors, where firms are included based on the Level II Bloomberg Industry Classifications. The daily frequency PD graphs in the written commentary are aggregates of firms that have a PD in both the first ten days and last ten days of the quarter. This prevents, for example, drops in the aggregate PD when high PD firms default and leave the sample.

The economies that are considered in each region are based on a selection of 78 economies covered by RMI's default forecast model.

The developed economies of Asia-Pacific include: Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea and Taiwan.

The emerging economies of Asia-Pacific include: Bangladesh, China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, the Philippines, Sri Lanka, Thailand and Vietnam.

Latin America includes: Argentina, Brazil, Chile, Colombia, Jamaica, Mexico, Peru and Venezuela.

North America includes: Canada and the US.

Eastern Europe includes: Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tunisia, Turkey and Ukraine.

Western Europe includes: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Ireland, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK.

Africa & the Middle East includes: Bahrain, Egypt, Israel, Kuwait, Jordan, Morocco, Oman, Nigeria, Saudi Arabia, South Africa, Tunisia and the United Arab Emirates.

Credit Research Initiative

The QCR is a companion publication to the Global Credit Review and Weekly Credit Brief, with all three publications produced as part of the Credit Research Initiative undertaken by RMI.

These publications supplement RMI-CRI's operational probability of default (PD) model. The model takes financial statements and market data from a database of more than 60,000 listed firms and estimates a PD for each firm, effectively transforming big data into smart data. The outputs from the RMI-CRI PD model are available free for all users at:

www.rmicri.org

As of March 2017, the PD system covers 119 economies in Africa, Asia-Pacific, Latin America, North America, the Middle East and Europe. The probabilities of default include historical data for firms that are now delisted from exchanges or firms that have defaulted. PDs aggregated at the region, economy and sector level are also available. The full list of firms is freely available to users who can give evidence of their professional qualifications to ensure that they will not misuse the data. General users who do not request global access are restricted to a list of 5,000 firms. The PD system operates in a transparent manner, and a detailed description of our model is provided in a [Technical Report](#) available on our website.

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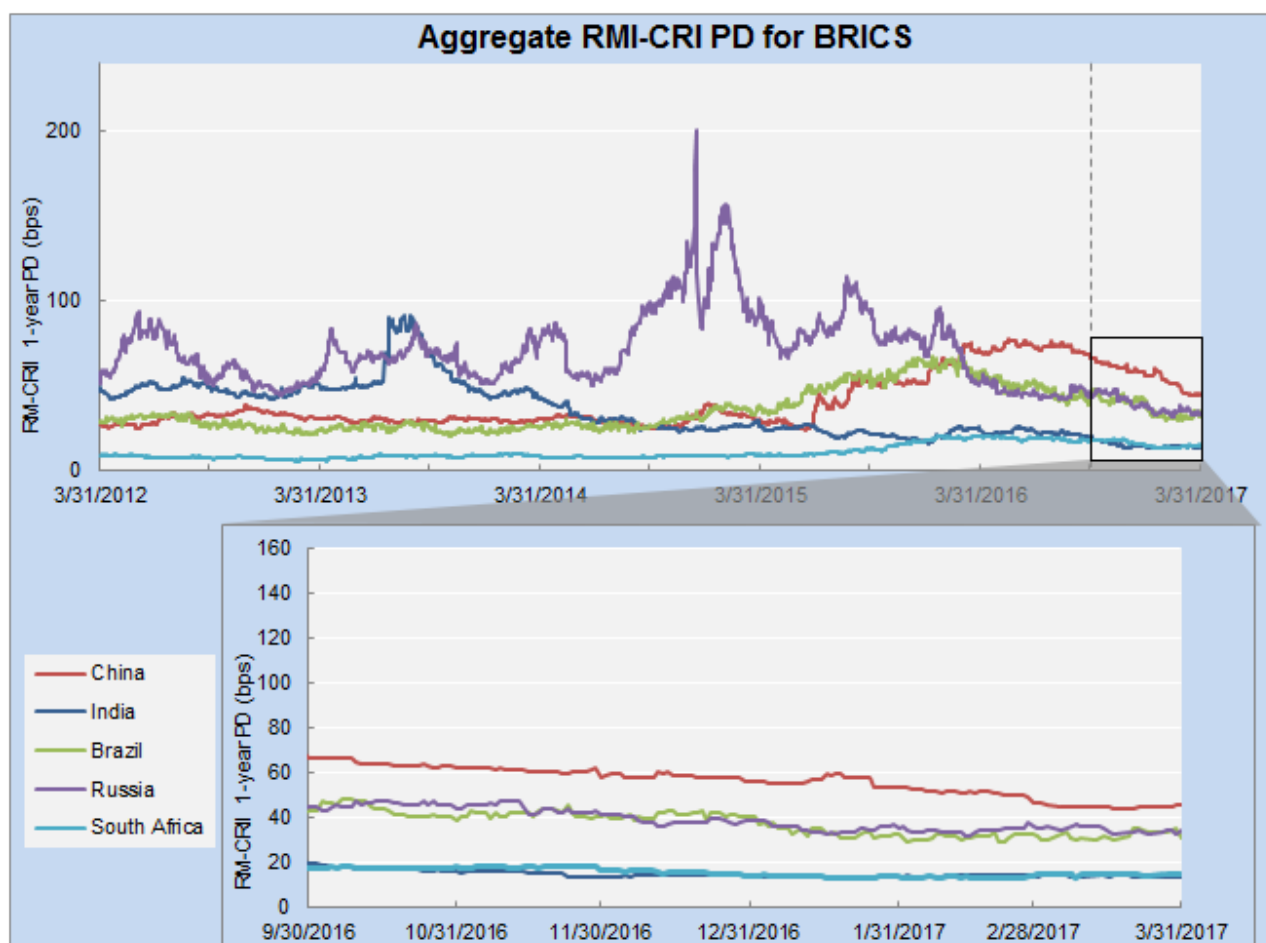
Acronyms

ADR	Average Default Rates
BI	Bank of Indonesia
BOE	The Bank of England
CAD	Current Account Deficit
CDS	Credit Default Swap
CLI	Composite Leading Indicator
CRI	Credit Research Initiative
ECB	European Central Bank
ELA	Emergency Liquidity Assistance
ESI	Economic Sentiment Indicator
ESMA	European Securities and Markets Authority
EU	The European Union
FTV	Financing-to-value
FDI	Foreign Direct Investment
FX	Foreign Exchange
GFC	2008-2009 Global Financial Crisis
INR	Indian Rupee
ISTAT	Italian National Institute of Statistics
LATDB	Liquid assets to deposits and short-term borrowings ratio
LHS	Left-hand side of graph
LTV	Loan-to-value
MAS	Monetary Authority of Singapore
MIDF	Malaysian Industrial Development Finance Berhad
MLF	Medium term Lending Facility
MPC	Monetary Policy Committee
MOM	Ministry of Manpower
MoM	Month on Month

NIM	Net Interest margin
NODX	Non-oil domestic exports
NPA	Non-performing assets
NPL	Non-performing loan
OECD	Organisation for Economic Co-operation and Development
OJK	Otoritas Jasa Keuangan (Financial Services Authority of Indonesia)
OPR	Overnight Policy Rate
PBOC	The People's Bank of China
PCA	Prompt Corrective Action
PD	Probability of Default
PDiR	Probability of Default Implied Ratings
PMI	Purchasing Managers Index
PCI	Performance of Construction Index
PSI	Performance of Services Index
PSL	Pledged Supplementary Lending facility
QCR	Quarterly Credit Report
QoQ	Quarter on Quarter
REITS	Real Estate Investment Trusts
RBA	Reserve Bank of Australia
RBI	Reserve Bank of India
RMI	Risk Management Institute
RMI-CRI	Risk Management Institute Credit Research Initiative
RHS	Right-hand side of graph
RRR	Reserve requirement ratio
Sebi	Securities and Exchange Board of India
SDF	Standing Deposit Facility
SLF	Standing Lending Facility
WAIR	Weighted average interest rate
WMP	Wealth Management Product
YoY	Year On Year

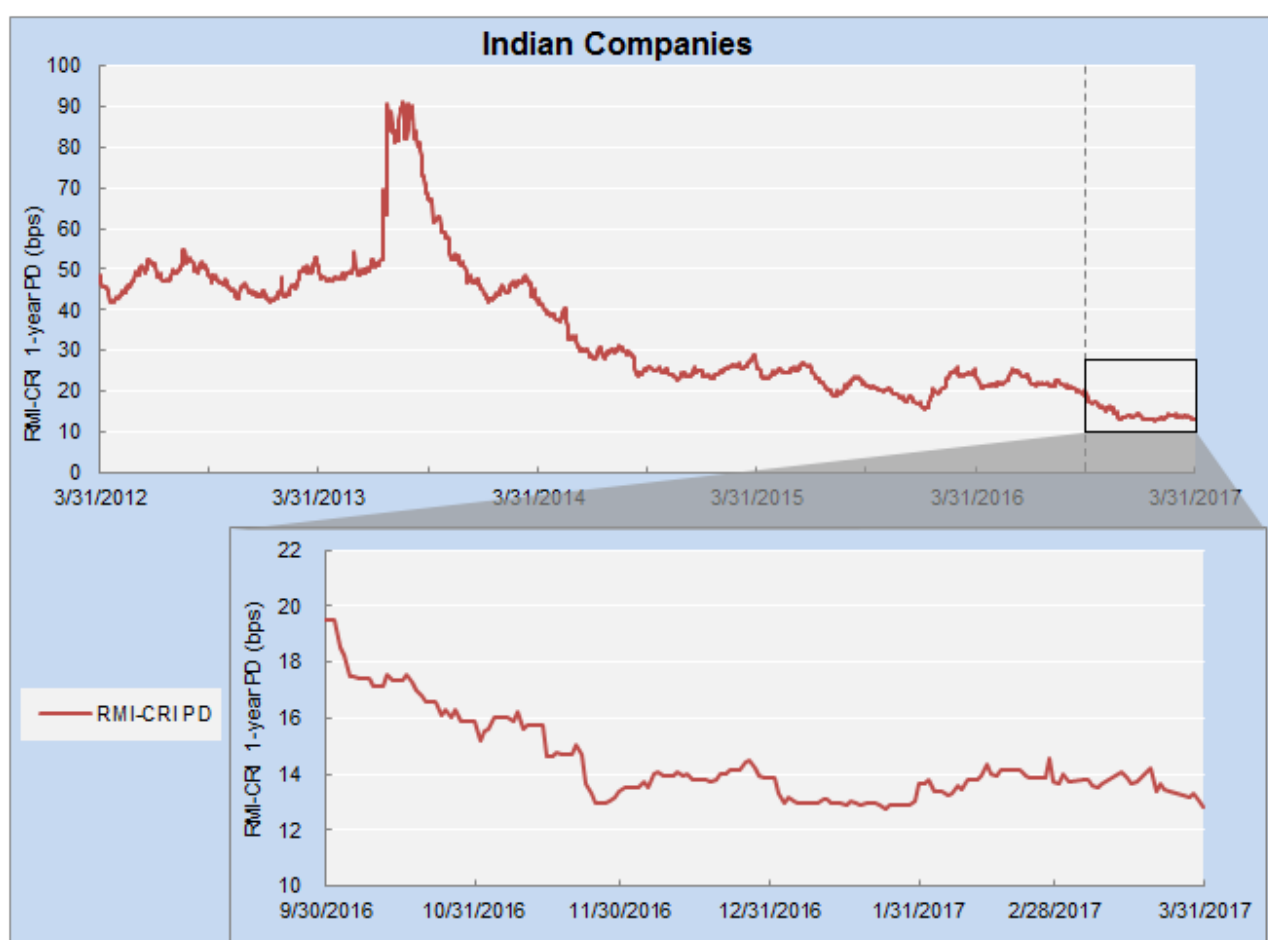
BRICS

Listed companies in the BRICS regions generally witnessed an improvement to their aggregate credit profiles during Q1. The Russian Ruble increased against the US dollar, reaching the highest level in two years despite weaker oil prices. S&P raised the outlook on Russia to positive from stable and kept the credit rating on Russia one notch below its investment grade rating. Russian economic data showed improvements in personal income and retail sales while industrial production remained soft. In Brazil, weak economic data did not affect the credit quality of corporate issuers. The aggregate 1-year PD for Brazilian firms improved slightly on the back of falling interest rates. The aggregate 1-year PDs for Indian and Chinese firms also declined during Q1.



Indian Companies

The aggregate 1-year RMI PD for Indian companies has remained relatively constant during the first quarter of 2017. Economic conditions were generally positive with strong growth in industrial production. Inflation rates have been maintained at a modest level due to falling oil prices. However, current account deficit continues to widen with a strong rupee and this may have negative impacts on the demand of Indian exports, adversely affecting the credit profile of Indian companies. Monetary wise, India has set up a Monetary Policy Committee (MPC) responsible for the forecast of inflation which in turn determines the interest rate. During the first quarter of 2017, the forecast error by the committee had been significant and doubts were raised on whether the MPC is able to accurately determine the optimal interest rate for the India's economy. Funding conditions look to be positive for Indian companies as the RBI and Sebi are pushing for a developed bond market, giving companies more alternatives to funding than simply relying on traditional bank loans.



Economy

- India's real Gross Domestic Product for Q4 grew at an annual rate of 7.0% against a 7.3% expansion in the same quarter last year. Sectors that experienced strong growth YoY include mining (7.5%), manufacturing (8.3%), and public administration and defence (11.9%). The railway and transport sectors are still experiencing negative growth rates of -4.8% and -1.1% respectively even though growth rates have improved compared to the corresponding period in the previous year. Although growth may slow temporarily in India due to business disruptions caused by the withdrawal of high-denomination banknotes, the IMF maintains a positive outlook on the economic growth of India.^{1,2}

- Industrial production increased for the fourth straight month in April as manufacturing conditions improve in India. The Nikkei India Manufacturing PMI reached 52.5, matching that of March's reading. Strong growth of new orders and lengthening delivery times managed to offset the slowing increases in output, purchases and employment. Respondents to the survey attributed phenomenon to improving demand conditions and greater advertising. However, the rate of depletion of finished goods slowed to the weakest in the year-to-date. Despite so, goods producers were optimistic and have plans for capacity expansion to meet the expect growth in output in the year ahead.³
- The annual rate of inflation, based on monthly wholesale price index, declined to an annual rate of 3.85% in April from an annual rate of 5.29% for the month of March. The wholesale price index declined slightly by 0.2% . The decline is mainly due to falling prices in fuel and power group. Crude oil prices have fallen about 7% at the end of March since its high in February 2017.⁴
- India's current account deficit (CAD) widened to USD 7.9bn (1.4% of GDP) in Q4 from USD 3.4bn (0.6% of GDP) in Q3. The YoY increase in the current account deficit was slightly lower from USD 7.1bn (1.4% of GDP). The widening of current account deficit is primarily caused by the decline in net invisible receipts. Net services receipts were affected by a fall in earnings from software, financial services and intellectual property rights. Transfer receipts, mainly representing remittances by Indians employed overseas declined 3.8% from a year ago.⁵
- During Q1, the Indian Rupee (INR) strengthened 3.49% against the US dollar. Despite the hike in the Fed Fund rate, the Indian Rupee reached a 17 month high in March as sustained foreign investments are expected to flow into the Indian equities market. Foreign portfolio inflows during the quarter amount to USD 10.6bn. This has eased previous worries of capital outflows from India due to the Fed rate hike. The Indian Rupee may continue to strengthen despite the possibility of further rate hikes by the Fed for the rest of the year.⁶

Monetary

- According to the bi-monthly monetary policy statement on Apr 06, 2017, the RBI kept the policy rate (repo rate) at 6.25%. The reverse repo rate under the liquidity adjustment facility was increased to 6.0%, while the Bank Rate was reduced to 6.50%.⁷
- The newly formed MPC within the RBI is responsible for the forecast of future interest rates which will in turn affect interest rate decisions. However, there have been large discrepancies between the forecast and the actual inflation rate in Q1 2017. The absolute error in forecast of 1.4% is double the average error over the previous three years. There was a shift to flexible inflation targeting which considers consumer price inflation as the nominal anchor.^{8,9}
- A new liquidity tool known as the Standing Deposit Facility (SDF) has been proposed by the RBI to manage the surplus cash in India's banking system. Cash in Indian banks swelled up after the demonization policy in 2016 and the SDF works by allowing the RBI to absorb extra funds without providing collaterals to the lenders. However, this proposal faced opposition from the Indian government on grounds that it will reduce the MPC's powers to set interest rate.¹⁰
- Inflation is projected to average 4.5% in the first half of 2017 and 5% in the second half of 2017. Upside risks have been noted with the baseline projection due to uncertainty in food inflation as probability of an El Nino event rises.¹¹

Funding & Liquidity

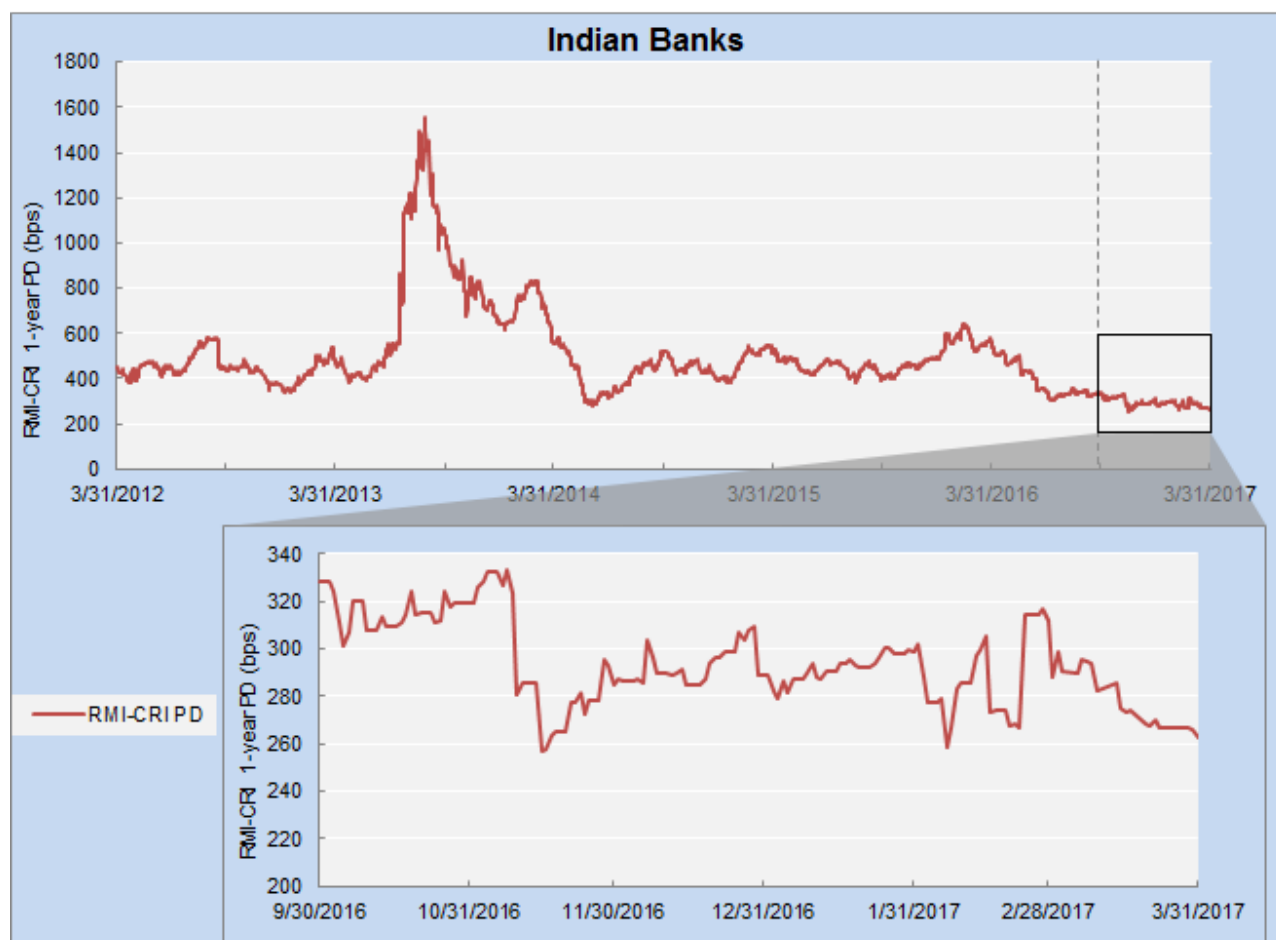
- Yields on India's 10-year government sovereign bonds increased to 6.680% at the end of Q1 from 6.515% as of Dec 30, 2016 under the expectation that US Treasury will continue to rise in the coming months.
- In terms of liquidity, both the RBI and Sebi have initiated measures to boost liquidity in the secondary bond market in order for bonds to be more attractive to investors. The idea is to make bonds as liquid as fixed deposits in banks such that more investors are willing to invest in them. India is actively trying to get companies to raise funds through corporate bonds instead of taking up bank loans and a vibrant secondary market is necessary for this transition to take place.¹²

Sovereign Credit Ratings

- Moody's, Fitch and S&P kept their ratings on the sovereign bonds of India at Baa3, BBB- and BBB- respectively in Q1. Moody's has a positive outlook on the issuer while Fitch and S&P have stable outlooks on the country.
- Fitch has retained its sovereign rating on India despite calls for a rating upgrade due to its strong economic fundamentals and political stability. Weak public finances haven been cited as the main reason hindering the rating upgrade.¹³

Indian Banks

The aggregate 1-year RMI PD for Indian banks remained stable from January to March 2017. Non-performing loans continue to plague both the private and public banks and are depressing the profitability of Indian banks. However, certain banks still managed to post large increases in profits as growth in new loans outweighed losses from bad loans. In this quarter, we also witnessed liquidity levels brought back to normal by the RBI through various liquidity absorption tools. The RBI is performing measures to improve asset quality in banks, but this has instead revealed more underlying issues with asset quality in privately owned banks. As the RBI continues its reforms to shape up the financial health of Indian banks, bank earnings are expected to remain low in the coming quarter. However, the long term outlook is positive if the RBI is successful in making Indian banks more robust.



Profitability

- Gross Non-Performing Assets (NPAs) of all scheduled banks in India increased by 29.1% in Q1. This increase is mainly due to rising bad debt in private sector banks. NPAs in private sector banks shot up by 72.46% while NPAs in state-run banks continue to grow by a magnitude of 25% in the first quarter of 2017. Profitability has been severely impacted with a total net profit of USD 3.14bn across all banks in Q1.¹⁴
- However, India's largest lender by assets, State Bank of India (SBI), stood out and more than doubled its Q4 profits in the first quarter of 2017. The spike in profits is fuelled by accelerating loan growth and falling bad-debt provisions.¹⁵
- Non-financial borrowings decreased 5% to INR 3.23tn on Mar, 17 from INR 3.4tn at the end of Q4. Other liabilities such as time deposits with non-financial institutions increased to INR 5.22tn in Q1 from INR 5.06tn in Q4.¹⁶

- The Credit-Deposit ratio for the banking system increased to 71.77% on Mar 17, 2017 from 69.87% on Dec 23, 2016. This was due to the increase in bank credit from INR 73.5tn to INR 75.6tn during the first quarter.¹⁷

Funding & Liquidity

- The weighted-average call money rate, the interest rate on short-term finance repayable on demand, declined from 6.12% as of Dec 30, 2016 to 5.97% as of Mar 31, 2017. The call money rates were generally lower than the repo rate during Q4, indicating a stable banking system.¹⁸
- The amount of cash on the balance sheet of Indian banks decreased by a large extent from INR 1.41tn in Q3 to INR 566bn on Mar 17. This signals that cash levels are returning to normal after the large surge of deposits shown in the previous quarter in the aftermath of the demonetization policy. It also goes to show that RBI's efforts to absorb liquidity in the market have proved to work.¹⁹
- The 1-year deposit rates generally increased in Q1 2017. According to the State Bank of India's 1 year deposit rate, interest rates were increased to 6.90% on Apr 29, 2017, from 4.25% in Q4.
- During Q4, the RBI withdrew a total of INR 82.89tn from the banking system via liquidity operations, with almost INR 40tn during the month of March. The Reserve Bank of India stepped up its liquidity operations under the liquidity management framework to absorb excess liquidity in the market. Surplus liquidity has been aggressively taken out of the market and liquidity has returned to normal standards as seen from the cash balance.^{20,21,22}

Asset Quality

- Gross non-performing loans amounts increased by 5.25% from the previous quarter. The YoY increase is especially significant at 26.6%. Although RBI has initiated actions such as the prompt corrective action (PCA), asset quality has yet to improve substantially. Much of the problem still lies with public sector banks, and the RBI does not rule out the possibility of even re-privatizing some state-run banks to improve their lending status.²³
- While private banks generally account for a smaller portion of bad loans as compared to the public banks, Q1 saw a huge increase in the amount of bad loans reported by private banks as they are forced to disclose more NPAs. There had been significant divergence in loan-loss provisions between audits by the RBI and what has been reported by the banks. In Q1, private banks are mandated to recognize these NPAs, resulting in higher losses. Although this move provides a more true and fair view of the asset quality in private banks, the share prices of private banks suffered as a result.²⁴

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²Feb 22, 2017, [For India, Strong Growth Persists Despite New Challenges](#), International Monetary Fund, www.imf.org

³May 2, 2017, [Nikkei India Manufacturing PMI](#), Markit Economics, markiteconomics.com

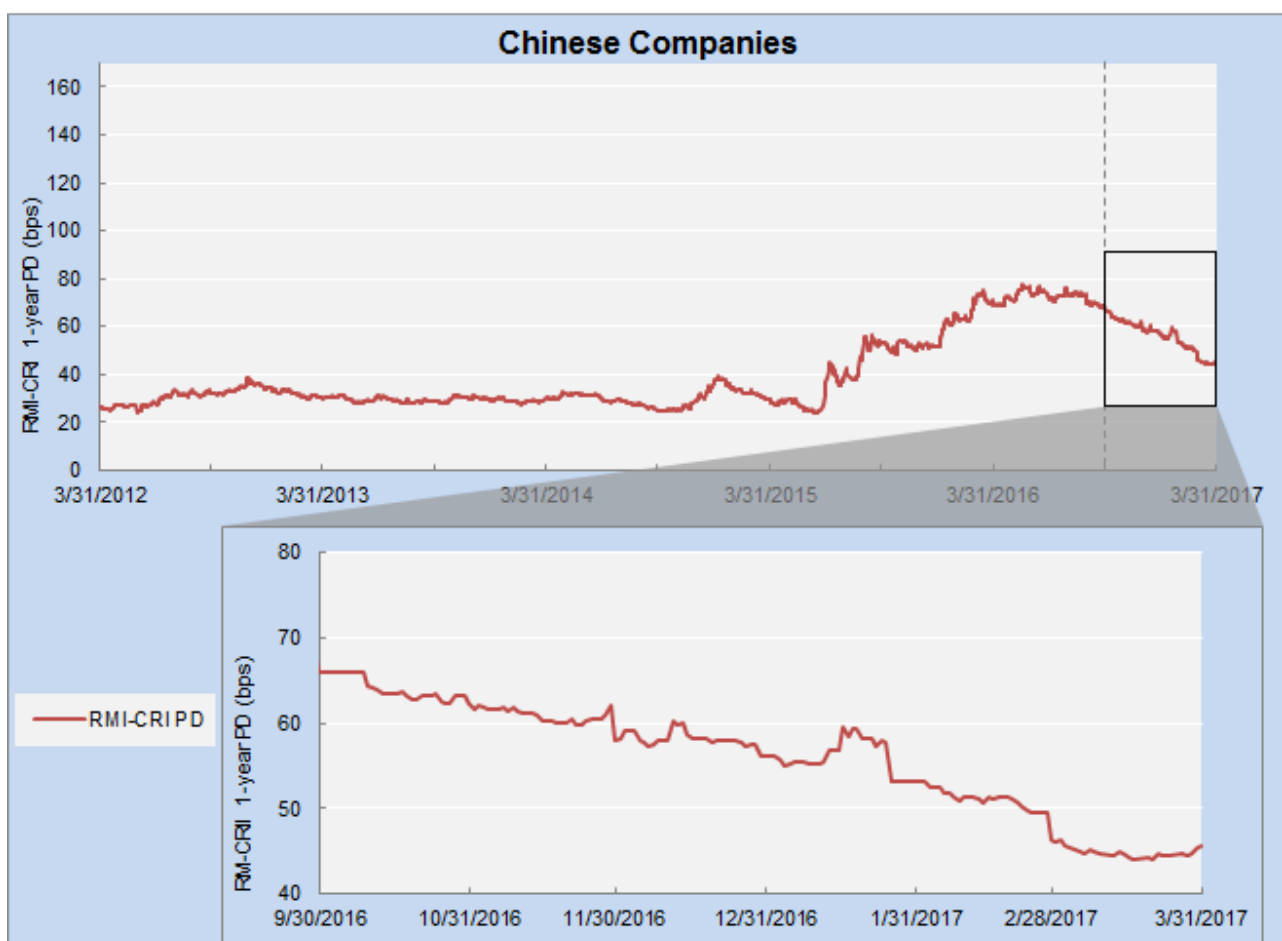
⁴May 14, 2017, [Index Numbers of Wholesale Price in India](#), Ministry of Commerce & Industry Office of The Economic Advisor, eaindustry.nic.in

⁵Mar 23, 2017, [Developments in Indias Balance of Payments during the Third Quarter \(October-December\) of 2016-17](#), The Reserve Bank of India, rbi.org.in

- ⁶ May 24, 2017, [Foreign Portfolio Investors Investment Details \(Calendar Year\)](http://fpi.nsdl.co.in), National Securities Depository Limited (NSDL), fpi.nsdl.co.in
- ⁷ Apr 06, 2017, [First Bi-monthly Monetary Policy Statement, 2017-18 Resolution of the Monetary Policy Committee \(MPC\)](http://rbi.org.in) Reserve Bank of India, The Reserve Bank of India, rbi.org.in
- ⁸ Apr 29, 2017, [No Proof Required: RBI, enough of elevator economics](http://indianexpress.com), Indian Express, <http://indianexpress.com>
- ⁹ May 24, 2017, [Adding heft to inflation targeting](http://www.livemint.com), Livemint, <http://www.livemint.com>
- ¹⁰ May 15, 2017, [India Government Said to Oppose RBI's New Cash Tool Proposal](http://www.bloomberg.com/), Bloomberg, <http://www.bloomberg.com/>
- ¹¹ Apr 06, 2017, [First Bi-monthly Monetary Policy Statement, 2017-18 Resolution of the Monetary Policy Committee \(MPC\)](http://rbi.org.in) Reserve Bank of India, The Reserve Bank of India, rbi.org.in
- ¹² Mar 7, 2017, [Vibrant secondary market, liquidity to help develop bonds](http://www.dnaindia.com), DNA India, <http://www.dnaindia.com>
- ¹³ May 2, 2017, [Fitch keeps India's sovereign rating at lowest investment grade; here's what it means](http://financialexpress.com), Financial Express, financialexpress.com
- ¹⁴ May 25, 2017, [Crisis looms as bad loans in private banks grow by a whopping 72%](http://www.newindianexpress.com), New Indian Express, <http://www.newindianexpress.com>
- ¹⁵ May 20, 2017, [Top bank SBI fourth-quarter profit jumps but outlook clouded after units' merger](http://in.reuters.com), Reuters, <http://in.reuters.com>
- ¹⁶ Mar 17, 2017, [Scheduled Commercial Banks - Business in India](http://rbi.org.in), Reserve Bank of India, rbi.org.in
- ¹⁷ Mar 17, 2017, [Scheduled Commercial Banks - Business in India](http://rbi.org.in), Reserve Bank of India, rbi.org.in
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- ¹⁹ Mar 17, 2017, [Scheduled Commercial Banks - Business in India](http://rbi.org.in), Reserve Bank of India, rbi.org.in
- ²⁰ Mar 2017, [Reserve Bank of India Bulletin - March 2017](http://rbi.org.in), Reserve Bank of India, rbi.org.in
- ²¹ Apr 2017, [Reserve Bank of India Bulletin - April 2017](http://rbi.org.in), Reserve Bank of India, rbi.org.in
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- ²³ May 22, 2017, [Banks asset quality woes not over yet](http://www.livemint.com), Livemint, [http://www.livemint.com/](http://www.livemint.com)
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Chinese Companies

China managed to exceed market expectation by lodging 6.9% GDP growth YoY in the first quarter of 2017 as Chinese firms credit quality improved slightly during the same period. The 1-year aggregate PD for Chinese firms decreased slightly in Q1 2017. Amid global economic slowdown and rising trade protectionism, China's exports and imports grew more than expectations in March. The central bank in China maintained its benchmark interest rate and reserve requirement ratio, while foreign exchange reserves increased as its currency stabilize. In order to maintain growth momentum and contain financial risks at the same time, the central bank moved away from traditional monetary tools such as cutting bank reserve requirements to using medium term lending program which channels low-cost funds into banks. Deleveraging in the financial system continues to be the focus of the central bank especially in the area of off-balance-sheet investments. The impact of regulation has made lenders to exercise more caution which might have ramifications on the economy.



Economy

- The Chinese economy advanced 6.9% YoY in the first quarter of 2017, as compared to a 6.8% growth in the fourth quarter of 2016, while exceeded market expectations of a 6.8% growth. The growth was supported by faster rises in industrial output, retail sales and fixed asset investment while fiscal spending also surged. Fixed assets investments grew by 9.2% while retail sales rose by 10.9%. Consumption accounted for 77.2% of China economy, while investment and net exports contributed 18.3% and 4.5% to growth of the economy. The government expects the country economy to grow 6.5% in 2017.²⁵
- Consumer prices in China rose 0.9% YoY in March 2017, slower than the 2.1% growth in December 2016. Politically sensitive food prices declined by 4.4% while non-food cost rose 2.3%. Cost of consumer goods fell 0.1% while services went up by 2.7%.²⁶

- China's official unemployment rate fell to 3.97% from 4.02% three months earlier. The Ministry of Human Resources and Social Security mentioned that the number of new jobs was 160,000 higher than in the same period a year earlier but 0.05% lower than the previous quarter. A total of 3.34 million new jobs were created in the first quarter.²⁷
- The China Caixin PMI fell to 51.2 in March 2017, from 51.9 in December 2016 and below market consensus of 51.5. Manufacturing PMI in China averaged 49.57 from 2011 until 2016, reaching an all-time high of 52.30 in January of 2013 and a record low of 47.20 in September of 2015.^{28,29}
- Investment in fixed assets, a crucial driver of the economy, went up by 9.2% YoY reaching CNY 9.3tn in the first three months of 2017. The growth rate also exceeded that of the first two months by 0.3 percentage points. Real estate investment continued to deliver increasing growth rate as it went up by 9.1% YoY in the first three months of 2017. The investment in residential buildings, which accounted for 67% of real estate investment, went up by 11.2%.^{30,31}
- China's exports and imports grew more than expected in March as it reverses a decline of 1.3% in February. For the quarter, exports rose 8.2% from the same period last year while imports surged 24%. Trade surplus for the quarter was registered at USD 65.61bn. In terms of CNY, China's imports for the first quarter rose by 31.1% and a 14.8% increase for exports on a YoY basis.³²

Monetary

- China's central bank continued to maintain its interest rate at 4.35% for 18 months. The central banks cut interest rates on 23 October 2015 for the sixth time in less than a year. The central bank continues to use various policy tools to maintain liquidity and ensure reasonable growth in credit financing.³³
- China's primary rates fell after surging to a multi-year high, driven by a liquidity squeeze on worries over the central bank's liquidity check in end March. The central bank has halted the open market operations of reverse repos for the last week in March citing high liquidity in the banking system. The volume-weighted average rate of the benchmark seven-day repo slipped as compared to the rates from a week earlier while the overnight Shanghai Interbank Offered Rate (SHIBOR) was slightly higher. The central bank will continue to pursue a prudent and neutral monetary policy in 2017.³⁴
- The required reserve ratio continued to remain at 17% in Q1 2017 after cutting 0.5% in March 2016. In a series of reductions, the central bank has brought the reserve ratio down from its 2011 peak of 21.5%.^{35,36}

- China's foreign exchange reserves increased by USD 4bn MoM to USD 3.009tn in March 2017, from an increase of USD 7bn to USD 3.005tn in February 2017. This was the second straight month of increase in foreign exchange reserves after declining for the past months bringing the reserves to the lowest level since February 2011 as the central bank slow the CNY depreciation. Meanwhile, gold reserves value had fell from USD 74.3bn in February 2017 to USD 73.7bn in March 2017. Foreign Exchange Reserves in China averaged USD 905bn from 1980 until 2017, reaching an all-time high of USD 3.99tn in June of 2014 and a record low of USD 2.26bn in December of 1980.^{37,38}

Funding & Liquidity

- 10-year government bond yield rose from 3.03% in December to 3.28% at the end of March 2017. 1-year government bill yield increased from 2.64% to 2.86% over the same period.³⁹
- The 3-month 5-day average SHIBOR had increased steadily from 3.26% on 30 December 2016 to 4.41% on 31 March 2017.⁴⁰
- The value of new yuan loans provided by the Chinese banks stood at CNY 1.02tn in March 2017 as compared to CNY 1.17tn in February 2017 and below market expectation of CNY 1.2tn. Bank's balance sheet in China averaged CNY 608.58bn from 2004 to 2017, reaching an all-time high of CNY 2.51tn in January 2016 and a record low of CNY -32.10bn in July 2005.⁴¹

Policy

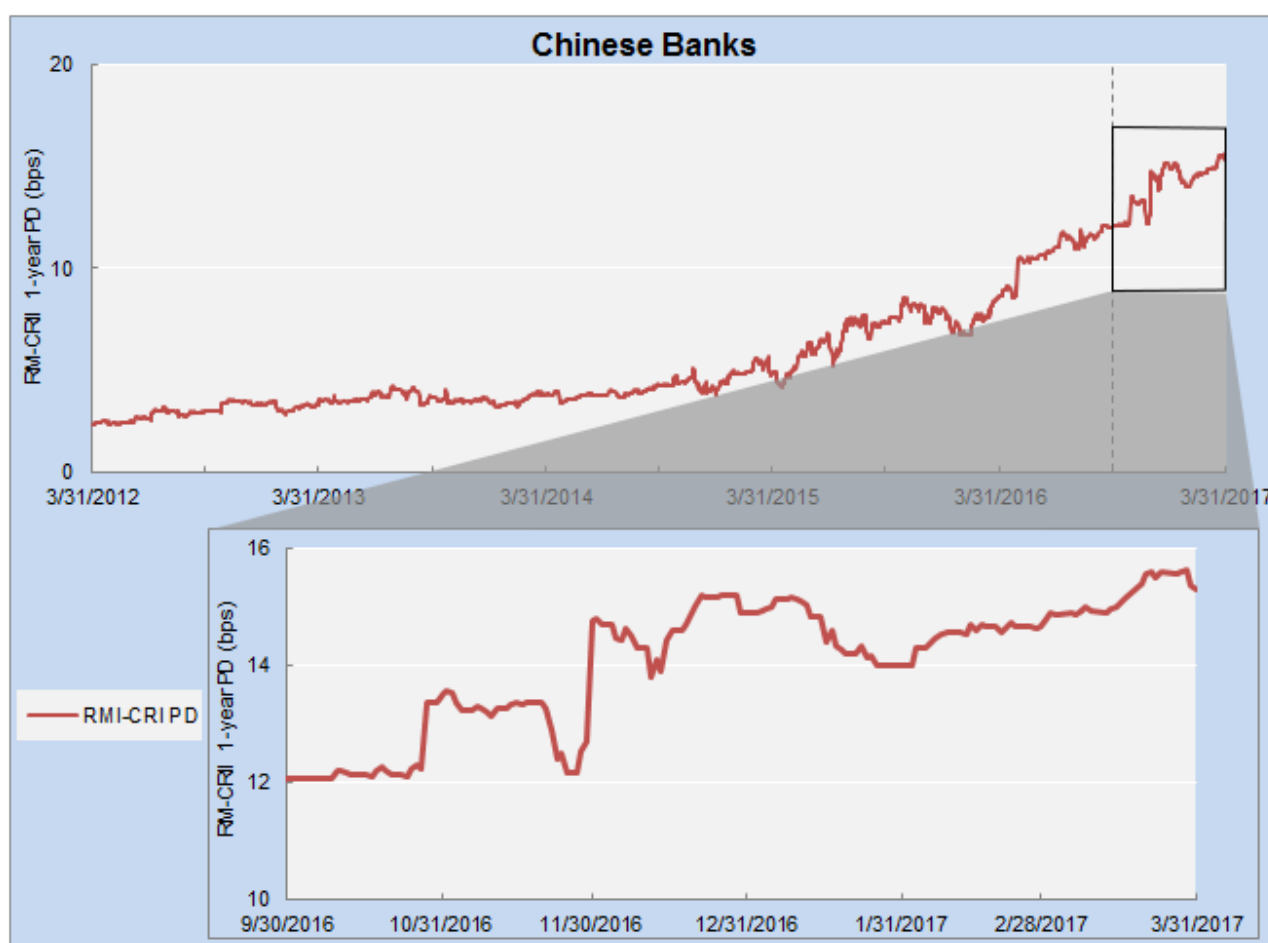
- China's economy accelerated for a second straight quarter at 6.9% in Q1 2017, derived from growth in investments, retail sales and factory output. Increasing credit that fuels investment have led policy makers to adopt a more neutral monetary stance as they seek to lower financial risk as well as to reduce excess industrial capacity. Aggregate financing grew CNY 2.12tn, rose more than estimated in March 2017. Policymakers have vowed repeatedly to push reforms to avert financial risk ahead of a major leadership transition later this year. Preventing and controlling financial risk will continue to be a priority for policymakers to address the debt binge that has inflated asset bubbles. With the US rates continue to rise, this could spark a resurgence in capital outflows from China and cause uncertainty for China's economy.⁴²

Sovereign Credit Ratings

- Fitch maintained rating A+ on the Chinese government with a stable outlook while Moody's and S&P credit rating for China stood at Aa3 and AA- with a negative outlook.

Chinese Banks

The credit quality of Chinese banks continued to weaken in the first quarter of 2017 as more bad loans were written off. Bad loans written off by the top five banks rose by 16% as compared to 2016. Net interest margins continue to be under pressure despite rising loan demand. Nevertheless, profitability at the big banks have improved as compared to the last quarter. Corporate loan demand increased especially in the areas of urban infrastructure construction and transportation. As part of the wider government campaign to restructure state-owned corporate debt and assist in deleveraging, debt-to-equity swaps have been expanded and this has helped banks in reducing their non-performing loans. Reducing risk in the Chinese financial system is still of top priority for the government as it implements measures to limit shadow banking risk. The managements of banks are cautious amidst the uncertainty in the slowing economy even though the banks are widely expected to do better this year.



Profitability

- Despite the increase in bad debt and loan defaults in China's banking system amid slower economic growth, China's largest banks registered near-flat first quarter net profit growth. The banks however reported shrinking interest margins with Bank of China, China Construction Bank and Agricultural Bank of China reporting their lowest level of NIMs since 2011. The decrease in margins will continue to persist as senior bank executives expect 2017 to be a challenging one. Bad debts problems are expected to subside given that the lenders are showing a decline in their non-performing loans ratio. The decrease in NPLs may be a sign that the measures adopted by Chinese banks such as debt for equity swaps are working. However, analysts have been cautious given that the economy is slowing down which will put pressure on the banks' profitability.⁴³

Funding & Liquidity

- China's central bank injected CNY 619bn to financial institutions via its medium-term lending facility (MLF) and CNY 122bn via standing lending facility (SLF) in March. The outstanding amount of MLF and SLF were CNY 4.06tn and CNY 70bn respectively at the end of March. The central bank had also utilised the pledged supplementary lending facility (PSL) programme to boost liquidity to specific sectors by offering low-cost loans to selected lenders. The facility stood at CNY 2.21tn at the end of March.⁴⁴

Regulations

- Following the rise of off balance sheet wealth management products (WMPs) that exceed CNY 26tn at the end of 2016, up 30% a year earlier, the PBOC circulated a draft policy framework that forbid off balance sheet WMPs from investing in illiquid loans known as "non-standard" credit assets. A ban on investment in non-standard assets would reduce non-bank lenders' willingness to lend. The guidelines also set uniform leverage ratios for structured WMPs issued by all types of financial institutions to eliminate regulatory arbitrage as trusts, brokerages and insurers were all subject to different ratios previously. The new guidelines also prevent WMPs from taking other WMPs as underlying assets, a reminiscent of synthetic collateralised debt obligations in the US.⁴⁵
- In the midst of China's growing corporate debt level, the China Banking Regulatory Commission announced the expansion of debt-for-equity swaps and other measures to contain financial risk. China's banks have agreed to exchange a further CNY 400bn of corporate debt for equity stakes in the companies this year. Policies such as the debt-for-equity swaps are in line with the government's policy to encourage deleveraging and mitigating risk in the economy.⁴⁶
- The PBOC has removed a restriction on cross-border capital movement imposed in January 2017 to loosen capital controls which was implemented to shield its currency from downward pressure last year. Financial institutions are no longer required to maintain a balance of inflows and outflows when processing cross-border currency payments. This move suggests that the government is more confident that the country's financial system has weathered the worst of capital outflow and at the same time, to promote internationalization of China's currency.⁴⁷

Asset Quality

- The China Banking Regulatory Commission announced that the non-performing loan ratio of commercial banks in China stayed unchanged at 1.74% from the previous quarter. The banks' loan loss provisions to cover potential loan losses reached CNY 2.82tn, CNY 156bn higher than the previous quarter. The average capital adequacy ratio stood at 13.26%.⁴⁸

²⁵ April 17, 2017, [China GDP Annual Growth Rate](http://www.tradingeconomics.com), Trading Economics, <http://www.tradingeconomics.com>

²⁶ April 12, 2017, [China Inflation Rate](http://www.tradingeconomics.com), Trading Economics, <http://www.tradingeconomics.com>

²⁷ April 25, 2017, [China adds 3.34m jobs in Q1, jobless rate falls](http://english.gov.cn), The State Council, <http://english.gov.cn>

²⁸ April 19, 2017, [China Caixin Manufacturing PMI](http://www.tradingeconomics.com), Trading Economics, <http://www.tradingeconomics.com>

²⁹ April 6, 2017, [Caixin China General Services PMI](https://www.markiteconomics.com), IHS Markit, <https://www.markiteconomics.com>

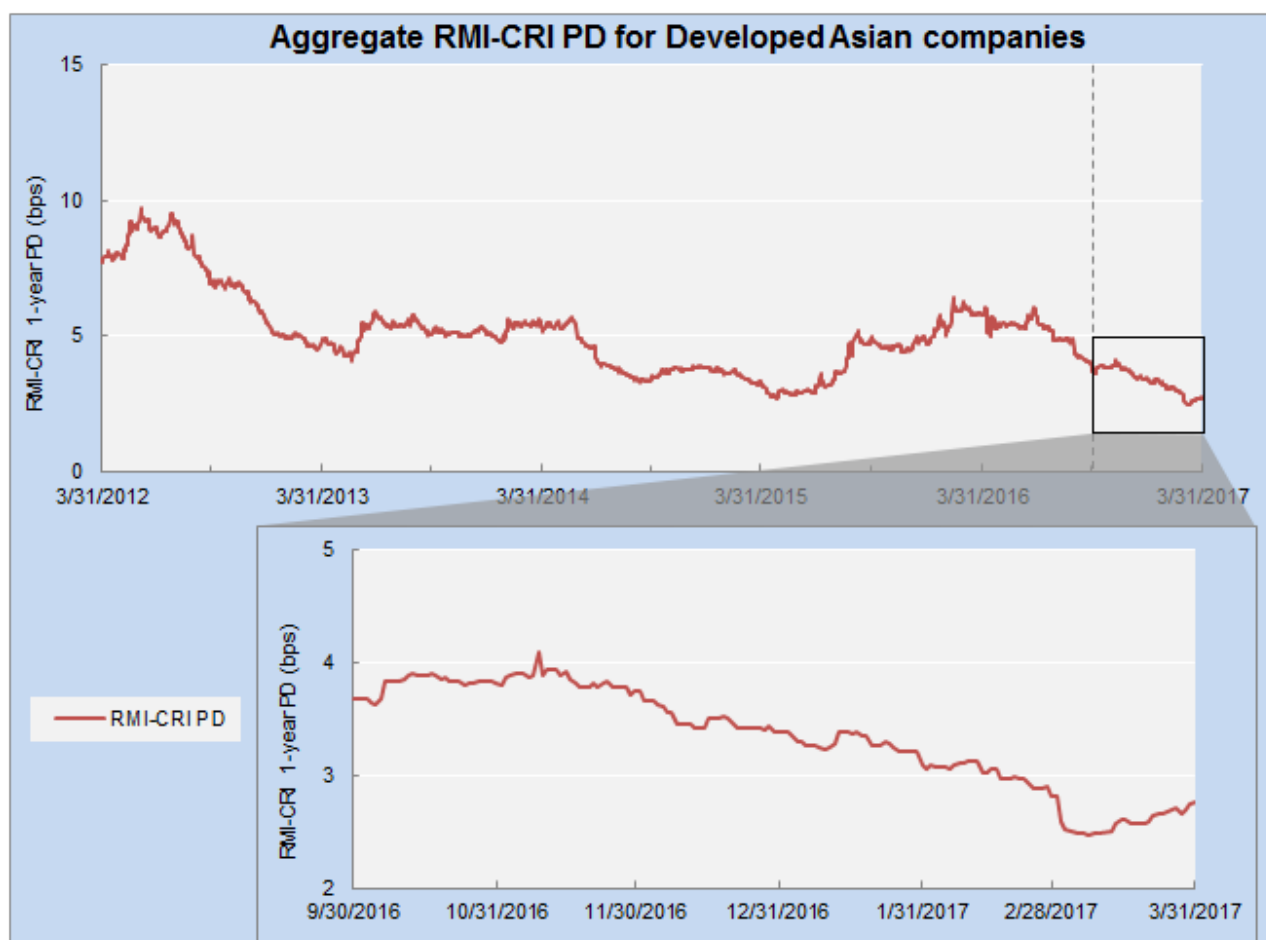
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³¹ April 18, 2017, [National Real Estate Development and Sales in the First Three Months of 2017](http://www.stats.gov.cn), National Bureau of Statistics of China <http://www.stats.gov.cn>

- ³² April 12, 2017, [China March trade balance surplus hits 23.9 billion, higher than expected 10 billion](http://www.cnbc.com), CNBC, <http://www.cnbc.com>
- ³³ April 19, 2017, [PBC base interest rate - Chinese central banks interest rate](http://www.global-rates.com), Global rates, <http://www.global-rates.com>
- ³⁴ March 24, 2017, [China money rates end wild week lower, uneasy ahead of cbank risk report](http://www.reuters.com), Reuters, <http://www.reuters.com>
- ³⁵ April 19, 2017, [China Cash Reserve Ratio Big Banks](http://www.tradingeconomics.com), Trading Economics, <http://www.tradingeconomics.com>
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- ³⁷ April 19, 2017, [China Foreign Exchange Reserves](http://www.tradingeconomics.com), Trading Economics, <http://www.tradingeconomics.com>
- ³⁸ April 7, 2017, [China FX reserves stay above USD 3tn after small March rise](http://www.reuters.com), Reuters, <http://www.reuters.com>
- ³⁹ April 19, 2017, [Yield of Government Securities](http://www.chinamoney.com.cn), China Foreign Exchange Trade System, <http://www.chinamoney.com.cn>
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- ⁴³ April 28, 2017, [Big Five banks report slimmer interest margins in Q1](http://www.businesstimes.com.sg), Business Times, <http://www.businesstimes.com.sg>
- ⁴⁴ April 1, 2017, [China central bank injects USD 89.9bn of liquidity in March, up sharply from Feb](http://www.reuters.com), Reuters, <http://www.reuters.com>
- ⁴⁵ February 22, 2017, [China launches fresh attack on shadow banking risk](https://www.ft.com), Financial Times, <https://www.ft.com>
- ⁴⁶ March 2, 2017, [China bank regulators new chief announces debt-containment measures](https://www.ft.com), Financial Times, <https://www.ft.com>
- ⁴⁷ April 19, 2017, [China lifts renminbi capital controls as outflows pressure eases](http://www.ft.com), Financial Times, <http://www.ft.com>
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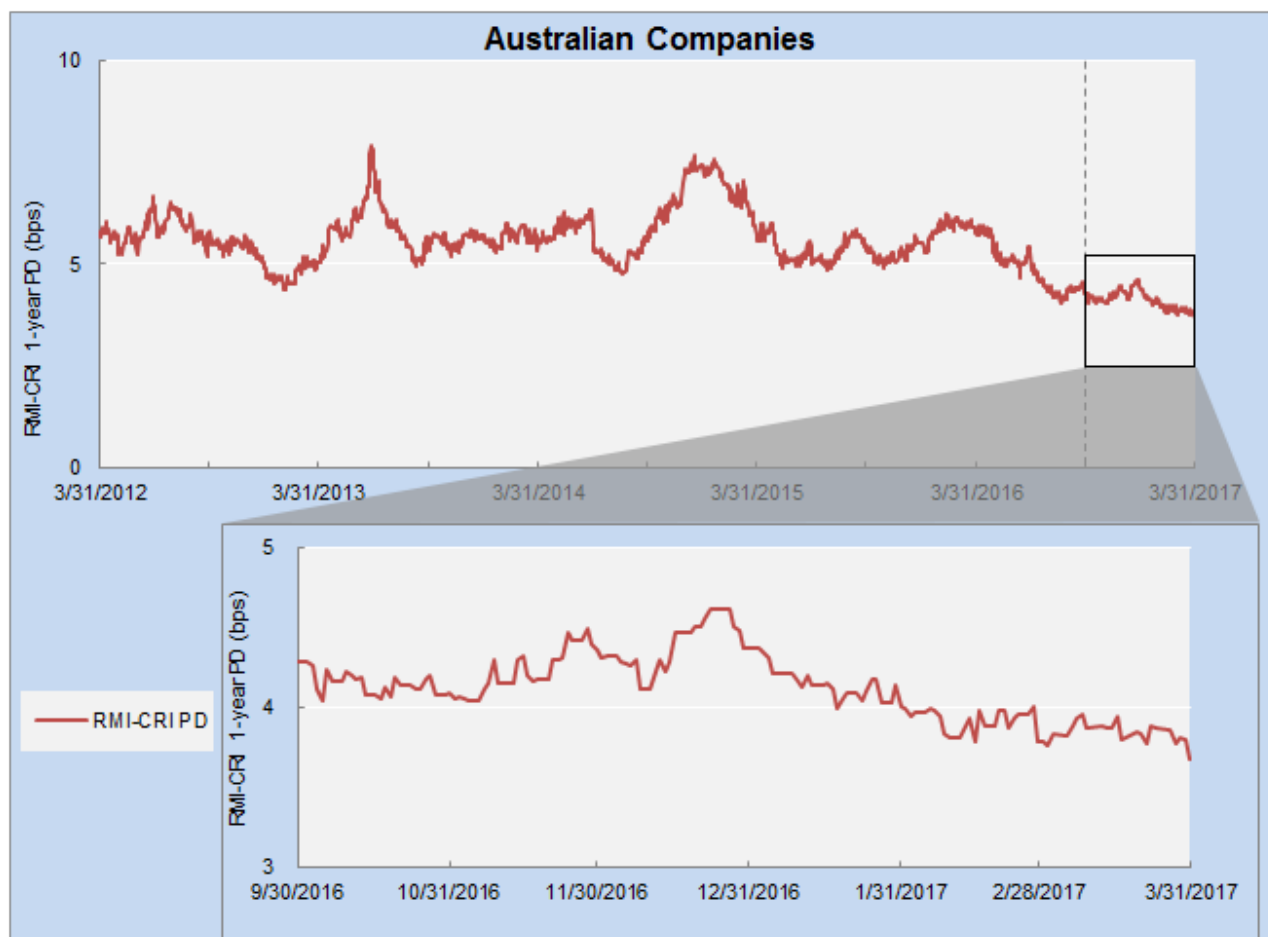
Asia-Pacific - Developed economies

The RMI-CRI aggregate 1-year PD for listed companies in the developed Asia-Pacific improved in Q1 although the credit profiles of companies deteriorated slightly in March. The credit profiles of Japanese firms strengthened together with a stronger Yen against the US dollar. Purchasing manager indices for Japanese manufacturing firms have been improving since the middle of 2016 and global trade volume has picked up. In South Korea, political and geopolitical events did little to dampen the credit quality of Korean companies. North Korea continued missile tests and the Court's decision to impeach former President Park Guen Hye on charges of corruption and cronyism had no impact on market equity values. The credit quality of Singapore firms improved in Q1 keeping in line with a stronger GDP output during the quarter. Singapore consumer prices, total trade and industrial production expanded in Q1. The credit profiles of real estate firms strengthened due to increased residential sales volume as developers offered discounts to attract buyers.



Australian Companies

The aggregate 1-year RMI PD for Australian companies remained stable during Q1 2017. Based on Q4 data, economic growth surprised with an increased in household spending and government investment. Unemployment rate remained relatively flat while the manufacturing sector contracted slightly and the services sector expanded. Going forward, the credit outlook for Australian firms remains dependent on the rebalancing of the economy as the mining sector fades and the concern of inflation in real estate markets. Attempts to support economic growth is also assisted by RBA's loose monetary policy.



Economy

- The economy expanded by 1.1% in Q4, compared to a decline of 0.5% in Q3. The 2016 annual growth rate of 2.4% exceeded the Bloomberg's forecast of 2%, but dropped below the growth rate of 2.4% in 2015.⁴⁹
- The GDP growth in Q4 was driven largely by increased household spending and government investment. Strong household spending contributed 0.5 percentage points to the GDP increase and public investment which surged 7.7% added 0.3 percentage points to the December quarter.⁵⁰
- The Reserve Bank of Australia (RBA) left the cash rate unchanged at 1.5%, amid improvements in the global economy in areas such as trade and industrial production. The Australian economy is in transition, with moderate economic growth and inflation expected to remain low, rising to be above 2% for 2017.⁵¹

- The unemployment rate stood at 5.9% in March, 0.1 percentage points higher than a year before. However, the monthly employment rose by 60,900 between February and March 2017, the biggest gain in full-time employment in almost 30 years. Australia's labour force participation rate was 64.8% in March, up from 64.6% in February.⁵²
- The Australian Performance of Manufacturing Index (PMI), as reported by The Australian Industry Group, stood at 57.5 in March, a decrease of 1.8 points from February. Expansion in the food & beverages, non-metallic mineral products, metal products and machinery and equipment sectors contributed to the rise. The equivalent index for services (PSI) improved by 2.7 points to stand at 51.7 points in March, moving back into modest expansion phase. However, the Australian Performance of Construction Index (PCI) was at 51.2 points in March, down by 1.9 points from February, indicating a slower rate of industry growth.^{53,54,55}
- Key export prices increased 9.4% in Q1 2017, relative to the previous quarter and 29.1% increase from the corresponding 2016 quarter. Crude materials posted the highest increase in prices in this quarter. The rise in export prices was driven by a turn in the commodities cycle with prices for metal ores, gas and coal moving sharply higher.^{56,57}

Monetary Policy

- The Reserve Bank of Australia (RBA) last lowered its benchmark interest rate to a record low of 1.5% in August 2016 to stimulate economic activity, and has since maintained the rate for the past eight months. To sustain Australia's economic growth and amid concerns about below target inflation rate and soft employment growth, monetary policy is largely seen to be on hold for the near future.^{58,59}

Funding & Liquidity

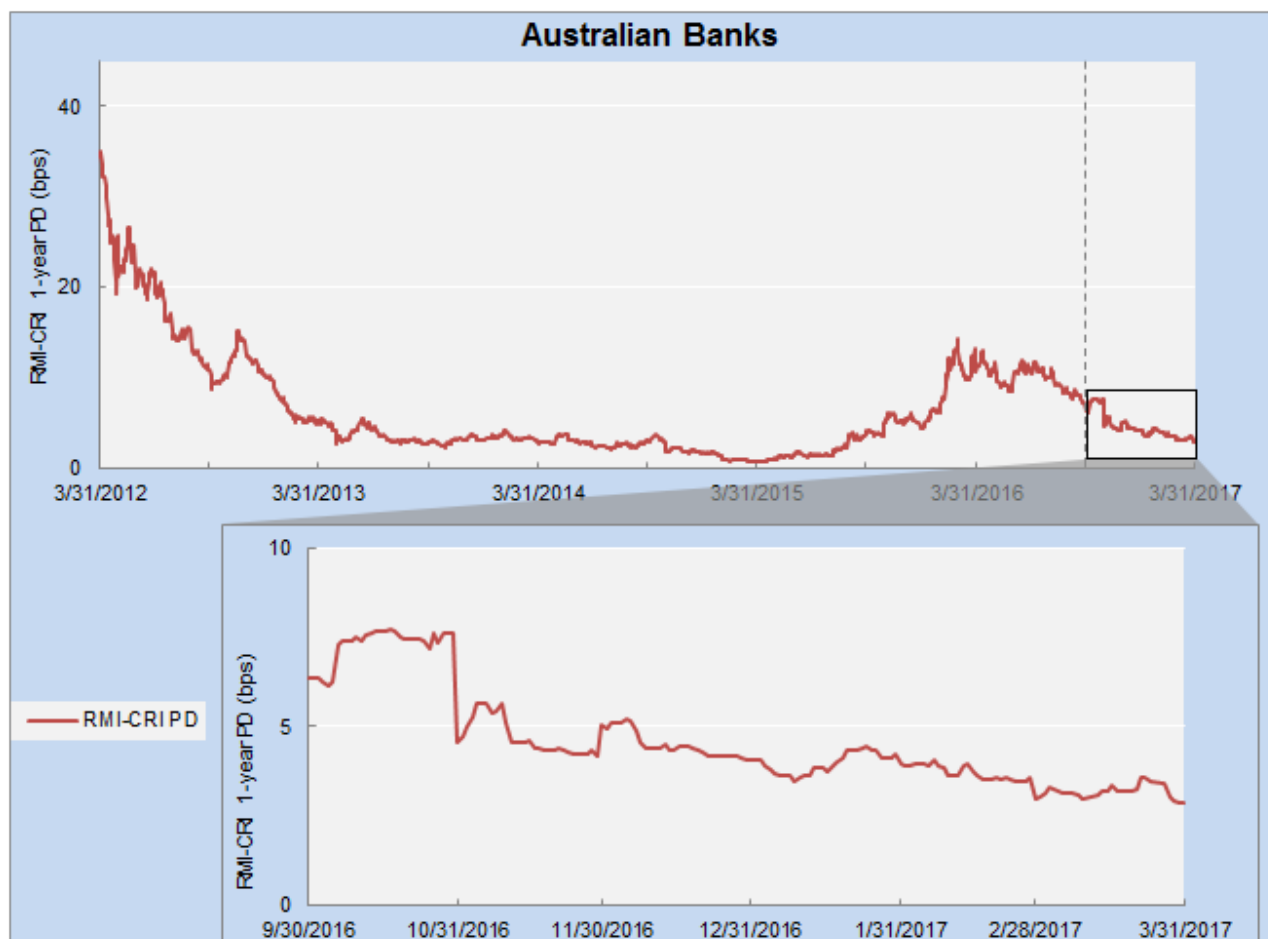
- Yields on 10-year Australian government bonds remained relatively flat throughout the quarter. The previous quarter reported a high of 2.79% in December 2016, while yields in March were 2.81%, 131 basis points higher than the RBA lending rate.⁶⁰
- Indicative lending rates to large businesses decreased, with the last reported figure in Dec 2016 being 3.75% - a dip from 4.05% at the start of the year. 3-year fixed lending rates to small businesses dropped to 5.25% in March 2017, a decrease from 5.35% at the start of 2017. Rates on loans to larger businesses have historically followed fixed rates on small business loans, which are reported monthly.⁶¹
- Average commercial lending during the quarter increased driven mainly by lending to financial intermediaries as total loans to businesses remain flat in Q1 2017. Meanwhile, total lending to individuals was higher by 1.2% quarter-on-quarter.⁶²

Sovereign Credit Ratings

- Standard & Poor's and Fitch Ratings maintained AAA ratings on Australia's sovereign bonds. Moody's also kept Australia's Aaa sovereign rating. All three rating agencies had stable outlooks on the government bonds, with the exception of S&P, which had a negative outlook.⁶³

Australian Banks

The aggregate 1-year RMI PD maintained its downward trend, declining through Q1 2017. Earnings may come under pressure from the increasing cost of regulations. NIMs continue to fall through first half of 2017 and credit growth has also moderated in the past months especially in the business sectors. In states with exposures to the mining sector, economic conditions have been relatively weak with declining housing prices and rents. Asset performances will be influenced by real estate markets and the resources sector in addition to the macroeconomic environment.



Profitability

- The big banks in Australia, ANZ, NAB, Westpac and Commonwealth Bank posted aggregate earnings of AUD 15.6bn for the first half of 2017 financial year, rising by an average of 6.2% on flat revenue. Analysts are forecasting the banks to report record profit for 2017 financial year with the exception of ANZ as it sells assets. The four banks average cost to income ratio on a cash basis fell 160 basis points to 43.41% in the first half which is much lower than banks in the United States and Britain.

Funding & Liquidity

- Increasing funding and capital costs have resulted in net interest margins of 200 basis points during the first half of 2017 financial year. The Liquidity Coverage Ratio of Australian banks was 129%, which was above the requirement of 100%. From the start of 2018, banks will adhere to the Net Stable Funding Ratio requirement to improve the liquidity of banks, which have seen banks moving towards long term wholesale funding and deposits markets.

Asset Quality

- The Australian Prudential Regulation Authority has indicated that banks will need to hold additional capital amidst headwinds from lower economic growth. The aggregate charge for bad and doubtful debts has decreased by AUD 318mn to AUD 2.2bn in the first half of the financial year. Impaired assets have also stabilized over the past months after increasing in second half of 2016. There are still weaknesses related to household debt as it continues to rise.^{64,65}

⁴⁹ March 1st 2017 [5206.0 - Australian National Accounts: National Income, Expenditure and Product, Jun 2016](#), Australian Bureau of Statistics, abs.gov.au

⁵⁰ March 1st 2017 [Australia Avoids Recession as Household Spending, Mining Boost Economy](#), Bloomberg, bloomberg.com

⁵¹ April 4th 2017 [Statement by Philip Lowe, Governor:](#), Reserve Bank of Australia, rba.gov.au

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⁵⁵ March 7th 2017 [Australian PCI: Construction ends 2016 in the red](#), Australian Industry Group, aigroup.com.au

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⁶⁰ April 4th 2017 [Capital Market Yields - Government Bonds - Monthly](#), Reserve Bank of Australia, rba.gov.au

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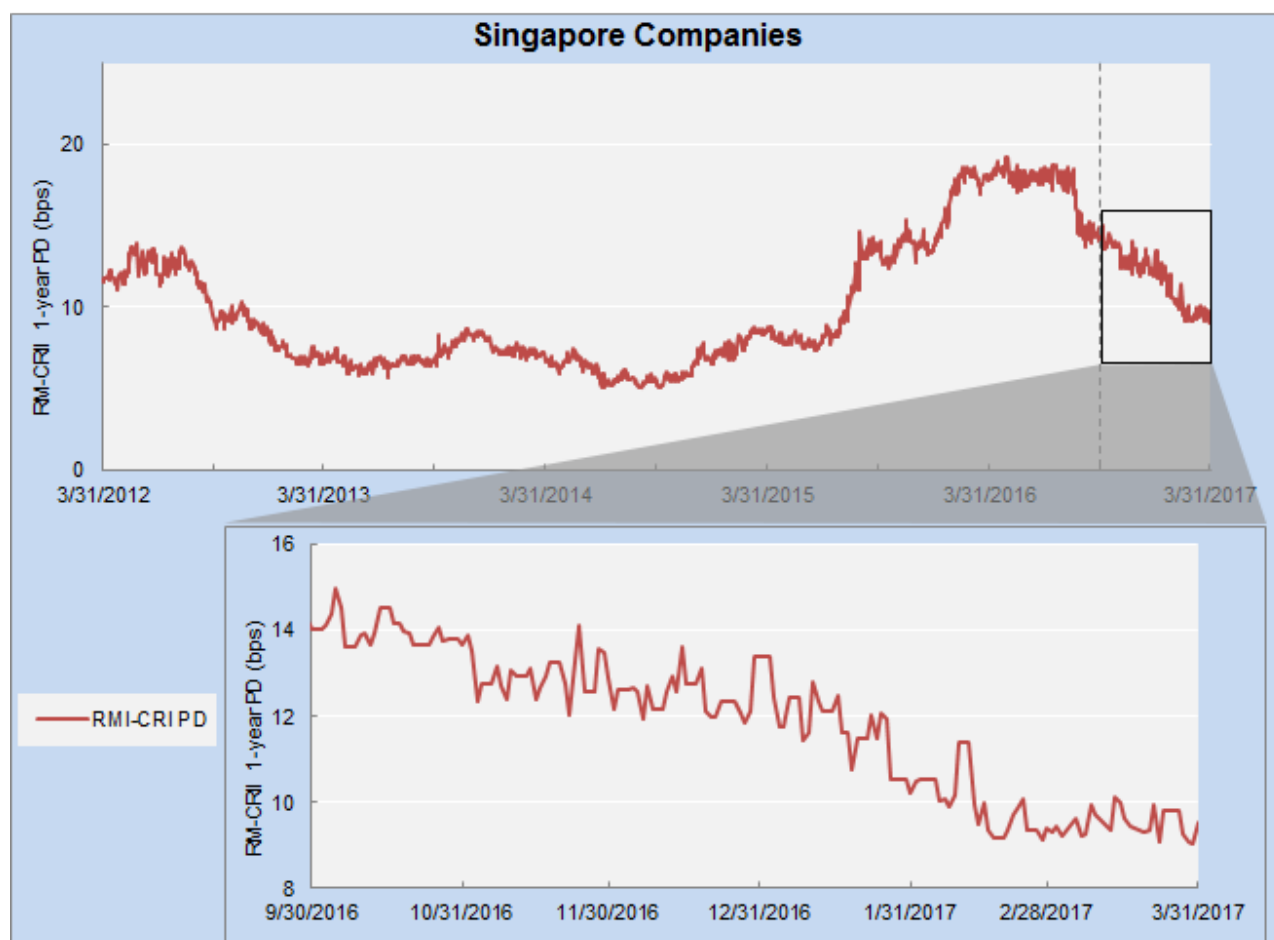
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⁶⁵ May 8th 2017 [Major Australian Banks: Half Year 2017 Results Analysis](#), KPMG, kpmg.com

Singapore Companies

Although the RMI-CRI aggregate PD for Singapore firms marginally improved during the first quarter of 2017, the Singapore economy growth remained slow. The economy contracted by 1.3% QoQ, followed by a strong rebound of 12.3% in the preceding quarter. Another concern falls on the job market. The unemployment rate has further increased and reached the level during 2009 financial crisis. Despite these disappointing results, the PMI and exports keep improving and the economy is well-contained on the backdrop of loose monetary environment.



Economy

- While the Ministry of Trade and Industry announced in May that it has maintained the GDP growth forecast for 2017 between 1% and 3%, the Singapore economy grew by 2.7% YoY in the first quarter of 2017, dropping from 2.9% in the previous quarter. Among all business sectors, manufacturing and accommodation & food services are the major contributors to the decline in growth. The manufacturing grew by 8% YoY, slower than 11.5% in Q4 2016. In addition, the accommodation & food services sector contracted by 1.9% YoY, extending the 0.2% drop last quarter. It was explained by the bad performance of food services segment, which contracted on the back of lower sales volume in restaurants.⁶⁶

- CPI-All Items inflation and MAS Core Inflation came in at 0.7% and 1.2% respectively in March 2017. Food inflation was 1.3% in March. Although the price of restaurant meals increased at a faster pace, non-cooked food inflation slowed. Private road transport inflation eased to 6.9% from 7.1% on a monthly basis, as the faster pace of increase in car and motorcycle prices was offset by the smaller pickup in petrol prices. Services inflation edged up to 1.6% from 1.5% in February, due to a pickup in air fares despite a fall in telecommunication services fees. Accommodation cost fell by 4% in March amid continued softness in the housing rental market.⁶⁷
- The overall unemployment rate including foreigners rose to 2.3% in Q1 2017 from 2.2% in Q4 2016, reaching the highest level since 2009. The unemployment rate for residents and citizens are slightly worse, holding at 3.2% and 3.5%, respectively in Q1 2017. The Ministry of Manpower revealed that the country shed 8,500 jobs in Q1 2017 compared with 2,300 jobs added as employment in manufacturing and construction fell due to a decrease in the number of work permit holders.⁶⁸
- Survey results released by the Singapore Institute of Purchasing and Materials Management showed an increment of 0.3 points to 51.2 from the previous month. The increase in reading was attributed to an expansion in higher new orders and exports, higher factory output, as well as higher inventory and employment.⁶⁹
- Seasonally adjusted retail sales in March 2017 decreased by 0.3% on a MoM basis and 2.1% on a YoY basis in March 2016. Excluding motor vehicles, retail sales fell by 0.2% MoM while rising by 0.7% YoY. The total retail sales value in March 2017 was estimated at SGD 3.7bn, higher than SGD 3.6bn in March last year. The seasonally adjusted sales of food & beverage services in March 2017 fell by 2.1% MoM and 4.8% YoY. The total sales value of food & beverage services in March 2017 was estimated at SGD 665mn, lower than the SGD 698mn last March.⁷⁰
- Singapore's NODX grew by 16.5% YoY in March 2017, following a 21.1% expansion in the previous month, due to an increase in both electronic and non-electronic exports. The top contributors to the NODX increase were China, Taiwan and Hong Kong.⁷¹

Monetary

- MAS announced in April 2017 that it would maintain its monetary policy of halting the appreciation of the Singapore dollar. The width of the policy band and the level at which it is centered will also be unchanged. The policy stance of maintaining zero appreciation of the Singapore dollar came in tandem with a moderate-pace expansion in Singapore economy.⁷²

Funding & Liquidity

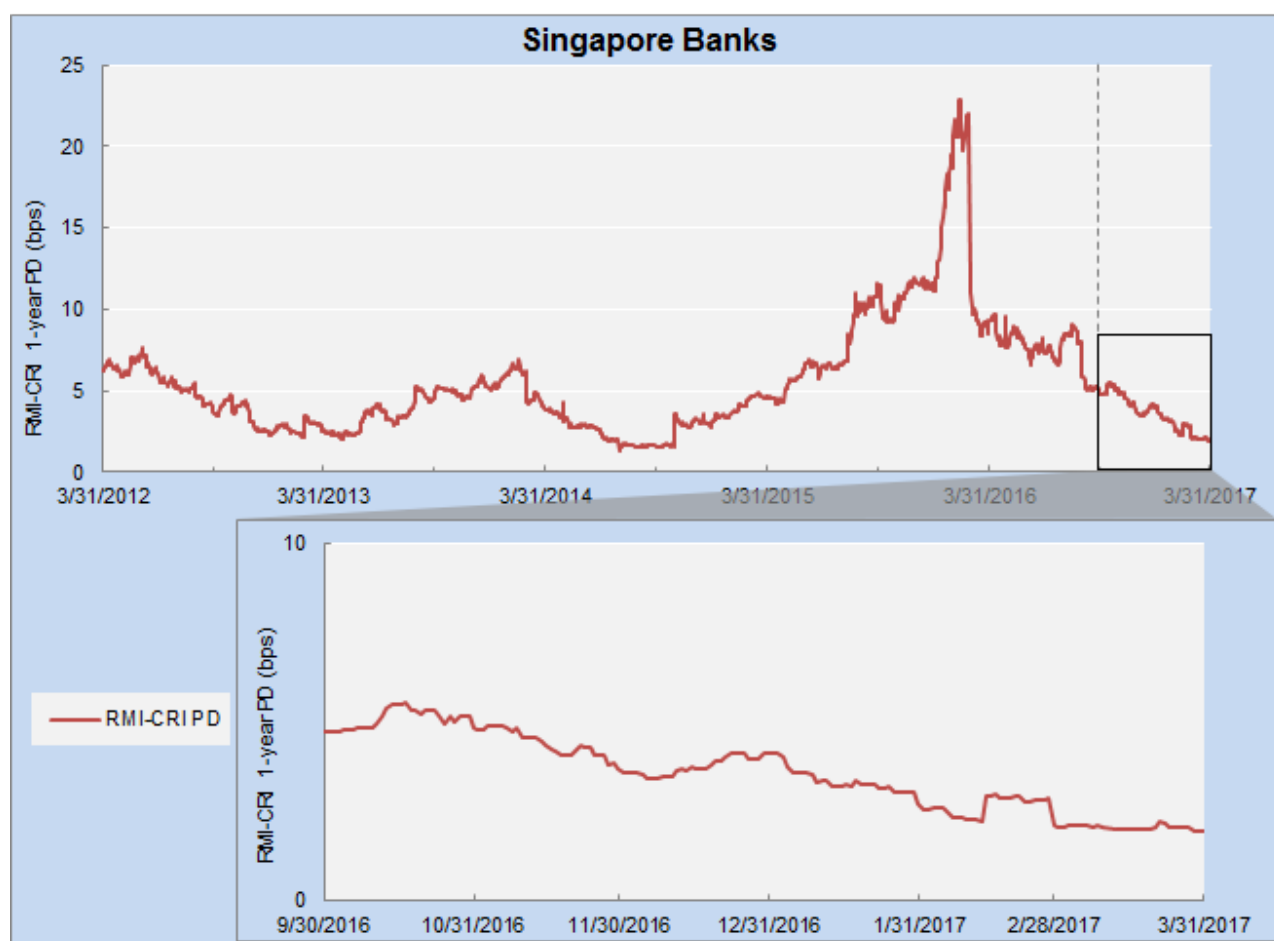
- Yields of 10-year Singapore government bonds declined to 2.244% on Mar 31 2017 from 2.475% on Dec 30 2016.
- Lending to non-bank customers rose from SGD 617bn in Q4 2016 to SGD 628bn in Q1 2017. Total loans to businesses rose by nearly SGD 10bn from a quarter ago while loans to consumers rose marginally from SGD 250bn in Dec 2016 to SGD 251bn in Mar 2017.⁷³
- The amount of outstanding sovereign bonds increased by SGD 4.6bn to SGD 106bn in Q1 2017.⁷⁴
- The prime lending rate had decreased from constant 5.35% to 5.28% since January 2017.⁷⁵

Sovereign Credit Ratings

- All three major rating agencies kept their highest investment grade ratings for Singapore sovereign bonds over Q1 2017.

Singapore Banks

The aggregate 1-year RMI-CRI PD for Singapore banks improved during Q1. NPL ratios remained flat during Q1 2017 from Q4 2016, driven by slower NPL formation rates in the oil and gas services sector. NPL ratios could continue to increase in 2017 as sluggish growth in the Singapore economy could pose business challenges for the lenders. Profits improved on larger net interest margin during Q1 as well as increased income from the wealth management business. The banks recorded improvements in their capital levels in Q1 due to a slower growth in risk weighted assets. The credit outlook for Singapore banks is stable.



Profitability

- Singapore banks reported higher earnings in the first quarter of 2017. Quarterly net profits of DBS, OCBC, and UOB gained by 3%, 14%, and 5%, respectively from the same period last year. Banks reported stronger growth from trade finance as well as lending to Singapore conglomerates and individuals investing overseas in properties. Interest income was nearly unchanged on a YoY basis across the banks while non-interest income was higher from Q1 2016.^{76,77,78}
- Data from MAS showed that the amount of corporate loans issued to non-bank customers increased by 1.17% to SGD 627.9bn at the end of Q1 2017 from the previous quarter.⁷⁹

Funding & Liquidity

- Total deposits in Singapore banks expanded by SGD 13.2bn in Q1 2017. Local currency deposits expanded by SGD 12.58bn, larger than the previous quarter expansion of SGD 9.63bn, whereas foreign currency deposits increased by about SGD 659.4mn during Q1 2017.⁸⁰
- Singapore's fixed deposit rates declined during Q1 2017, as the rates on 3-month deposits and 12-month deposits decreased to 0.14% and 0.33%, respectively. The prime lending rate also declined to 5.28% from 5.35% in the previous quarter.⁸¹

Capital Levels & Regulations

- Singapore banks reported higher Tier 1 Common Equity ratios in Q1, which are well above the recommended Basel III guidelines. The three banks are well positioned for International Accounting Standards Board's IFRS9, which becomes effective in 2018.

Asset Quality

- Loans placed under the "special mention" category declined to 2.3% of total exposure at the end of Q1 2017, from 2.42% in the quarter before. Loans classified as doubtful remained at 0.36% of total exposure. Loans marked as a loss increased to 0.19% in Q1, the highest level on record since Q1 2009. Overall, asset quality in banks deteriorated in Q1 from a QoQ and YoY basis.⁸²
- NPL ratios at DBS, UOB and OCBC remained at an elevated level during Q1. OCBC said the bank's NPL ratio declined slightly to 1.25% at the end of March but remained higher than 1.04% recorded in Q1 last year. UOB's Q1 NPL ratio of 1.48% also exceeded the 1.36% last year. According to Moody's, oil and gas companies will continue to pose asset-quality challenges to banks over the next few quarters should oil prices remain between USD 40 to USD 60 per barrel.^{83,84,85}

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⁶⁷ Mar 2017, [Singapore Consumer Price Index, March 2017](http://www.mas.gov.sg/), MAS Singapore, <http://www.mas.gov.sg/>

⁶⁸ Apr 28, 2017, [Singapore Q1 unemployment rises to highest level since 2009](http://www.ft.com/), Financial Times, <http://www.ft.com/>

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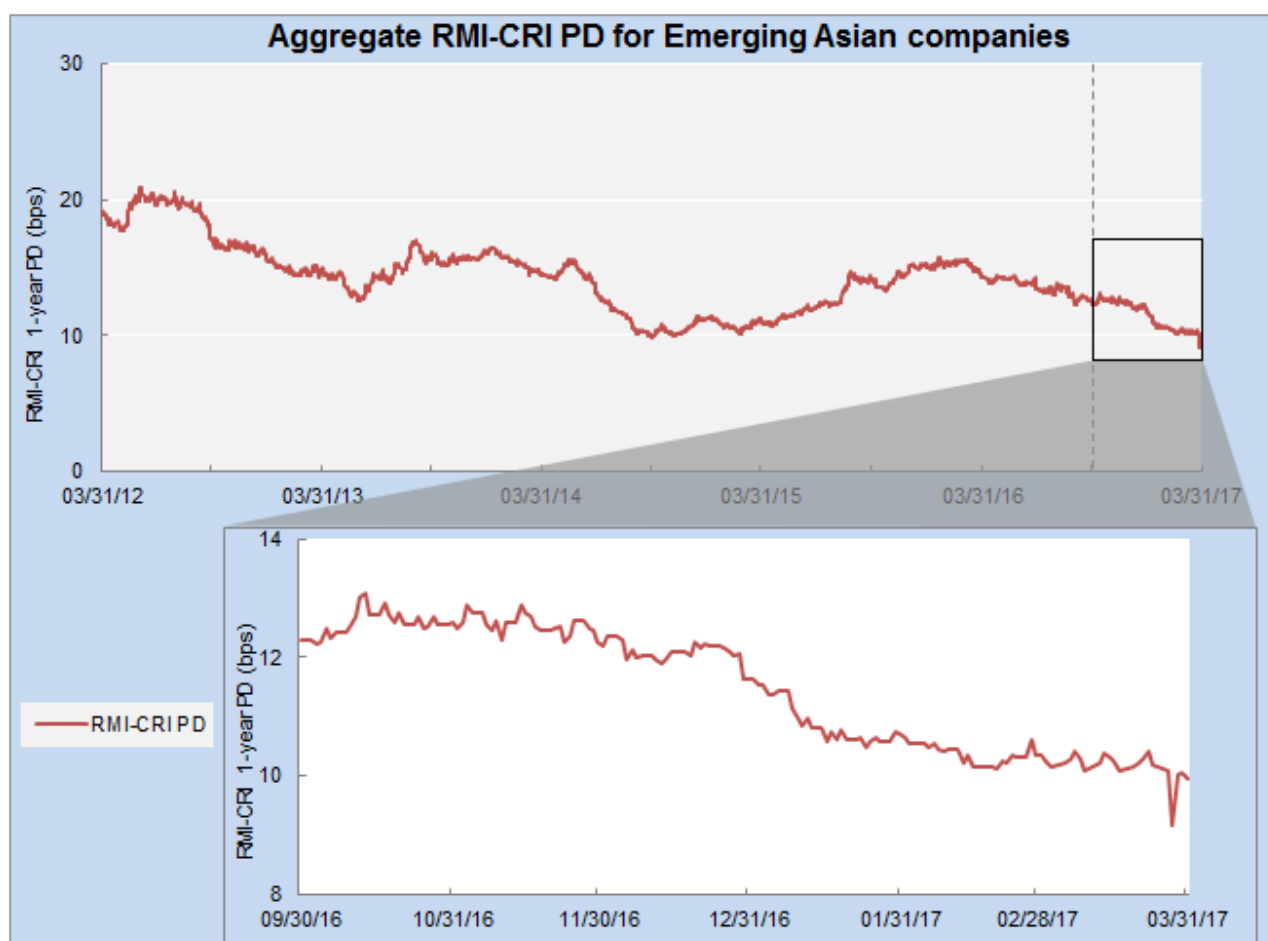
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- ⁷⁴ Mar 2017, [Issuance data](https://secure.sgs.gov.sg/), MAS, <https://secure.sgs.gov.sg/>
- ⁷⁵ Mar 2017, [Interest Rates of Banks and Finance Companies](https://secure.mas.gov.sg/msb/), MAS, <https://secure.mas.gov.sg/msb/>
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- ⁷⁸ May 9, 2017, [OCBC Group first quarter 2017 net profit of SGD 973 million](http://www.ocbc.com), OCBC Group, <http://www.ocbc.com>
- ⁷⁹ Mar 2017, [Banks: Loans and Advances of DBUs to Non-Bank Customers by Industry](https://secure.mas.gov.sg/), MAS, <https://secure.mas.gov.sg/>
- ⁸⁰ Mar 2017, [Deposits \(excluding SGD NCDs\) of DBUs by types of non-bank customers](https://secure.mas.gov.sg/), MAS, <https://secure.mas.gov.sg/>
- ⁸¹ Mar 2017, [Interest rates of banks and finance companies](https://secure.mas.gov.sg/), MAS, <https://secure.mas.gov.sg/>
- ⁸² Dec 2016, [Banks: Classified Exposures](https://secure.mas.gov.sg/), MAS, https://secure.mas.gov.sg
- ⁸³ Apr 28, 2017, [UOB Group Financial Report Q1 2017](http://www.uob.com.sg), UOB, www.uob.com.sg
- ⁸⁴ May 2, 2017, [DBS first-quarter net profit at record SGD 1.21 Billion](http://www.dbs.com.sg), DBS www.dbs.com.sg
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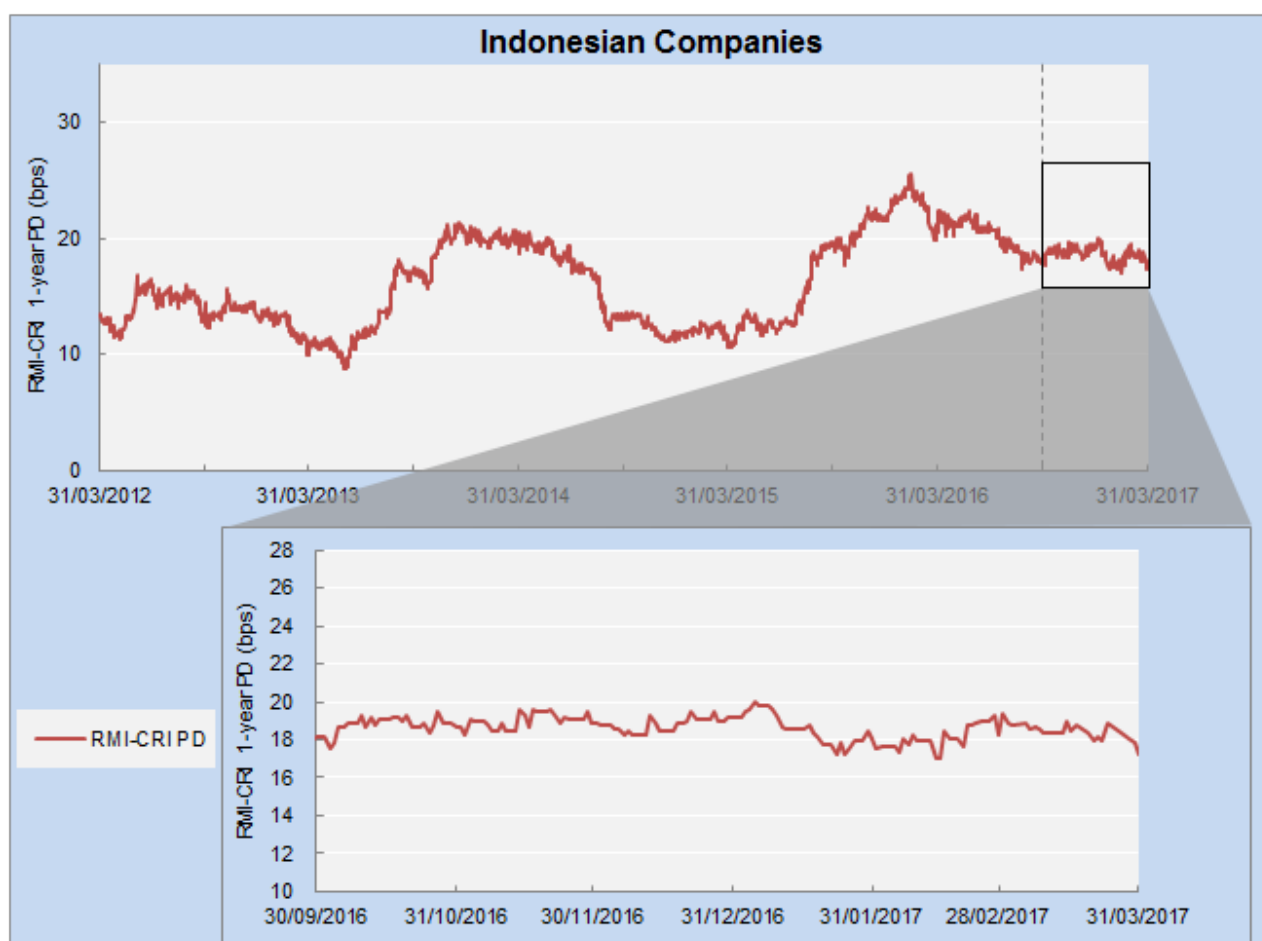
Asia-Pacific - Emerging economies

The RMI-CRI aggregate 1-year PD for listed corporations in emerging Asia, excluding India and China, declined in Q1. The creditworthiness of Thai firms weakened slightly in Q1 as the Thai Baht declined against the US dollar. Health care, financial and telecommunication companies recorded improvements in credit quality while the 1-year PDs for real estate and information technology firms increased in Q1. The aggregate credit profile of Filipino firms improved with the introduction of a government supported infrastructure campaign and potential tax bill progress. Emerging Asian markets continued to record gains in market capitalizations despite weakening commodity prices, evolving geopolitical tensions in the Middle East and the Korean peninsula. The credit outlook for companies that are positioned towards innovation, technology and consumption has improved compared to more traditional industries with large family owned business models.



Indonesian Companies

The RMI-CRI aggregate 1-year PD for Indonesian companies remained at the same level during Q1 from the previous quarter. Indonesia's economy expanded by 5.01% in Q1, faster than the 4.94% growth in Q4 2016. Indonesia's inflation remained under control for the first quarter of 2017, with a CPI of 3.61% while trade surplus in Q1 2017 stood at USD 1.23bn, where most of which was derived from non-oil and gas trade. Political tensions started to cool down a bit after March saw the end of Jakarta's gubernatorial election. Indonesian President Joko Widodo's attempt to bolster and ease foreign and local investment may also be a contributing factor to the decline in the 1-year PD. Investment grew by 13.2% to USD 12.5bn in Q1 2017.



Economy

- Economic growth increased to 5.01% YoY in Q1 from 4.94% in the previous quarter. According to Bank Indonesia (BI), household consumption, the main growth engine, had probably weakened during January-March, but exports and investment had improved. Data from the statistics bureau showed exports were up more than 20 per cent in the first quarter compared to a year ago by value.⁸⁶

- Indonesia's CPI reached 3.61% YoY in March. Respectively, the inflation of volatile food increased 2.89% YoY, core inflation increased 3.30% YoY, while inflation of administered prices reaches 5.50% YoY. Going forward, inflation will remain directed to be within the targeted inflation in 2017 of 3% and 5%. Therefore, coordination of policies adopted by the Government and BI on inflation control needs further reinforcement, primarily to face risks of adjustment to administered prices in line with further policy on energy subsidy reform by the Government as well as the increasing price of volatile food approaching the fasting month.⁸⁷
- Wages of Indonesian workers likely increased in Q4. Nominal wage of farmers per day increased by 1.74% during Q1 2017 from IDR 48,627 in December 2016 to IDR 49,473 in March 2017.⁸⁸
- Indonesia's trade balance recorded another surplus in March 2017, primarily supported by non-oil and gas trade surplus. Trade balance surplus in March 2017 is recorded USD 1.23bn. The non-oil and gas trade surplus stood at USD 2.02bn in March 2017 while the oil and gas trade deficit stood at USD 0.78bn in March. Indonesia's trade balance throughout the first quarter of 2017 recorded a surplus of USD 3.93bn, an increase compared to the surplus of both Q4 2016 of USD 3.12bn and Q1 2016 of USD 1.66bn. Compared to the first quarter of 2016, the improving trade balance in the first quarter of 2017 is boosted by the increasing surplus in non-oil and gas trade balance exceeding the increasing deficit in oil and gas trade balance.⁸⁹
- The Nikkei Indonesia PMI increased from 50.5 in March to a ten-month high of 51.2 in April. This pointed to a more marked improvement in manufacturing operating conditions, with the upward movement in the PMI reading reflecting stronger contributions from four of its five sub-components, the exception being suppliers' delivery times.⁹⁰

Monetary

- In April 2017, the BI Board of Governors agreed to maintain the BI 7-day repo rate, deposit facility rate, and lending facility rate at 4.75%, 4.00%, and 5.50% respectively. The decision is consistent with BI's efforts to maintain macroeconomic and financial system stability by driving the domestic economic recovery process. Looking forward, BI will continue to monitor various global and domestic risks, especially those coming from a change in the US Fed's balance sheet, geopolitical factors and the corporate and banking sector. It will also continue coordinating with Indonesian government to ensure that inflation is within the target level and accelerate structural reforms to support sustainable economic growth.⁹¹

Funding & Liquidity

- The 10 year yield on Indonesia's sovereign bonds dropped to 7.01% in end March 2017 from 7.91% in end December 2016. The drop in yield might be attributed to President Jokowi's stance on accommodating foreign investments during the past few periods, shortly after Saudi Arabia king's visit to Indonesia amid political tensions during Jakarta's gubernatorial election. These events may factor in to the purchases of these medium-term government bond.⁹²

- Indonesia's official reserve assets position stood at USD 121.8bn as of end-March 2017, higher than the end of February 2017 level registered at USD 119.9bn. The increase was primarily attributable to foreign exchange receipts, among other from tax revenues and government oil & gas export proceeds, the issuance of government global bonds, as well as auction of BI foreign exchange bills. Bank Indonesia considers the official reserve assets to be able to strengthen the resilience of the external sector and maintain the sustainability of Indonesian economic growth.⁹³
- Long-term external debt grew 0.8% YoY in February 2017. Long-term external debt remained dominant in Indonesia's external debt and stood at USD 278.1bn or 86.4% of total external debt in February 2017. Long-term external debt consisted of public sector external debt amounted to USD 159.5bn (57.4% of total long-term external debt) and private sector external debt amounted to USD 118.5bn (42.6% of total long-term external debt). Meanwhile, short-term external debt grew 17.0% YoY. Short-term external debt amounted to USD 43.6bn (13.6% of total external debt), comprised of private sector external debt amounted to USD 41.2bn (94.4% of total short-term external debt) and public sector external debt amounted to USD 2.4bn (5.6% of total short-term external debt).⁹⁴

Politics

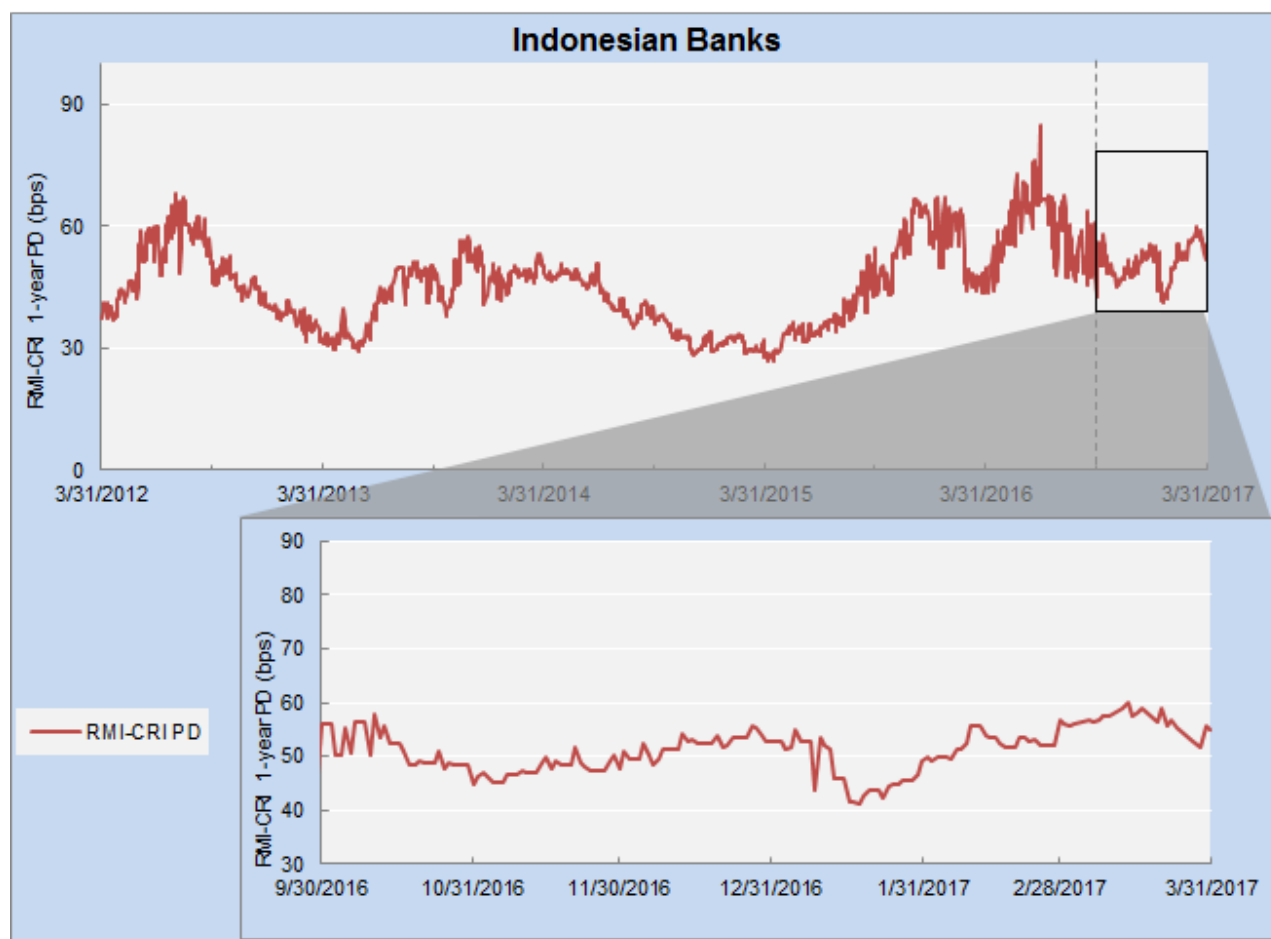
- After a long contentious duel between Jakarta gubernatorial election candidates, conservative party-backed candidate pair Anies Baswedan and Sandiaga Uno emerged victorious, clinching 58% of the votes against the then incumbent pair Basuki Tjahaja Purnama (Ahok) and Djarot Saiful Hidayat, which garnered only 42% of the votes. The election outcome, which Indonesian netizens described as being akin to US presidential election and Brexit results, would be seen as a barometer for the 2019 presidential election, given Jakarta's position as Indonesia's capital and commercial center. Shortly after, Ahok, who would then receive a two-year prison sentence due to a presumed blasphemy case, withdrew his appeal with regards to the decision made by the North Jakarta district court. In a press conference by Ahok's lawyers and family representatives, Ahok's handwritten statement on the recent decision cited great losses in the form of traffic congestion and economic losses the rally might cause if the process were to be continued further.⁹⁵

Sovereign Credit Ratings

- Moody's and Fitch kept their ratings on the local currency long term bonds of Indonesia at Baa3 and BBB- ratings respectively in Q1, with a positive outlook. As of May 19, S&P revised its rating on Indonesia's sovereign bond to BBB- from BB+ with a stable outlook, bringing it to investment grade level. This reflected the government's successful tax amnesty program which generated more than USD 11bn in revenue to push infrastructure and also its new focus on realistic budgeting which brings reduced risk to Indonesia's fiscal metrics.⁹⁶

Indonesian Banks

The RMI-CRI aggregate 1-year PD for Indonesian banks deteriorated in Q1 2017 from Q4 2016. Total loan values witnessed a YoY increase of 9.2% in Q1 2017, above a previously forecasted rate of 8.1%, amid government austerity measures and commitment to allocate budget for productive investment, especially in the infrastructure sector. A previous slump in commodity prices led NPL in the banking sector to climb during the second half of 2016, and most likely prompted Indonesia's bank deposit insurance agency (LPS) to bolster its current IDR 75tn stash of reserves in April 2017.



Profitability

- Indonesian banks in general saw a slight recovery in profitability after a devastating slump in commodity prices which led to increase in NPL. The three largest majority state-owned Indonesian banks (Bank Mandiri, Bank Negara Indonesia and Bank Rakyat Indonesia) reported a QoQ increase in net income of 127.44% and 10.9%, as well as a QoQ decrease in net income of 8.27%, respectively.

Funding & Liquidity

- The liquidity ratio (liquid asset/bank deposit) of Indonesian banks improved from 20.9% at end of Q4 2016 to 22.2% in February 2017.⁹⁷
- The Jakarta 3-month interbank rate decreased from 7.32% at the beginning of Q1 2017 to 6.86% by the end of Q1 2017. Similarly, the 1-month interbank rate decreased from 6.93% at the beginning of Q1 2017 to 5.86% by the end of Q1 2017.⁹⁸

Regulation

- In April, Indonesia's bank deposit insurance agency (LPS) was thinking of ways to bolster its IDR 75tn war chest as there are talks that its current funds are insufficient for its new mandate of restructuring banks in addition to bailing out depositors. Plans are being proposed for LPS to implement a new premium on top of current fees paid by Indonesian banks to the agency. The premiums paid may be dependent on the riskiness of the banks. LPS' new mandate include the ability to restructure troubled banks by transferring their good assets to other institutions and focusing on resolving the bad assets. It can also issue bonds to the central bank in the event of a crisis.⁹⁹

Asset Quality

- According to BI, the financial system remained stable. Capital adequacy ratio and liquidity ratio of Indonesian banks, as of February 2017, stood at 23.0% and 22.2% respectively, while non-performing loans (NPL) stood at 3.2% (gross) or 1.4% (net). The transmission of easing monetary and macroprudential policy continued, albeit restrained by banks' prudence in managing credit risks.¹⁰⁰

⁸⁶Mar 2017, [Indonesia GDP Annual Growth Rate](http://www.tradingeconomics.com/), Trading Economics, <http://www.tradingeconomics.com/>

⁸⁷Mar 4, 2017, [Food supply causes deflation in 2017](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁸⁸April 17, 2017, [Real and nominal wages for farmworker in Indonesia \(IDR\)](http://www.bps.go.id/index.php), Indonesian Statistics Bureau (BPS), <http://www.bps.go.id/index.php>

⁸⁹April 17, 2017, [Surplus in Indonesia's trade balance continues](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁹⁰May 2, 2017, [Strongest rise in manufacturing production since mid-2016](https://www.markiteconomics.com), Markit Economics, <https://www.markiteconomics.com>

⁹¹April 20, 2017, [BI 7-Day reverse repo rate held at 4.75% maintaining stability and promoting sustainable economic recovery](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁹²February 22, 2017, [Jokowi to welcome Saudi Arabia's King Salman, Investment](http://www.thejakartapost.com), The Jakarta Post, <http://www.thejakartapost.com>

⁹³Apr 7, 2017, [Official Reserve Assets Increased to USD 121.8bn at the end of March 2017](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁹⁴April 2017, [External Debt Statistics of Indonesia - April 2017](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁹⁵April 19, 2017, [Indonesian Muslim candidate wins Jakarta election - pollsters](http://www.reuters.com/), Reuters, <http://www.reuters.com/>

⁹⁶May 19, 2017, [Indonesia raised to investment grade by S&P on budget curbs](https://www.bloomberg.com), Bloomberg, <https://www.bloomberg.com>

⁹⁷April 20, 2017, [BI 7-Day reverse repo rate held at 4.75% maintaining stability and promoting sustainable economic recovery](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

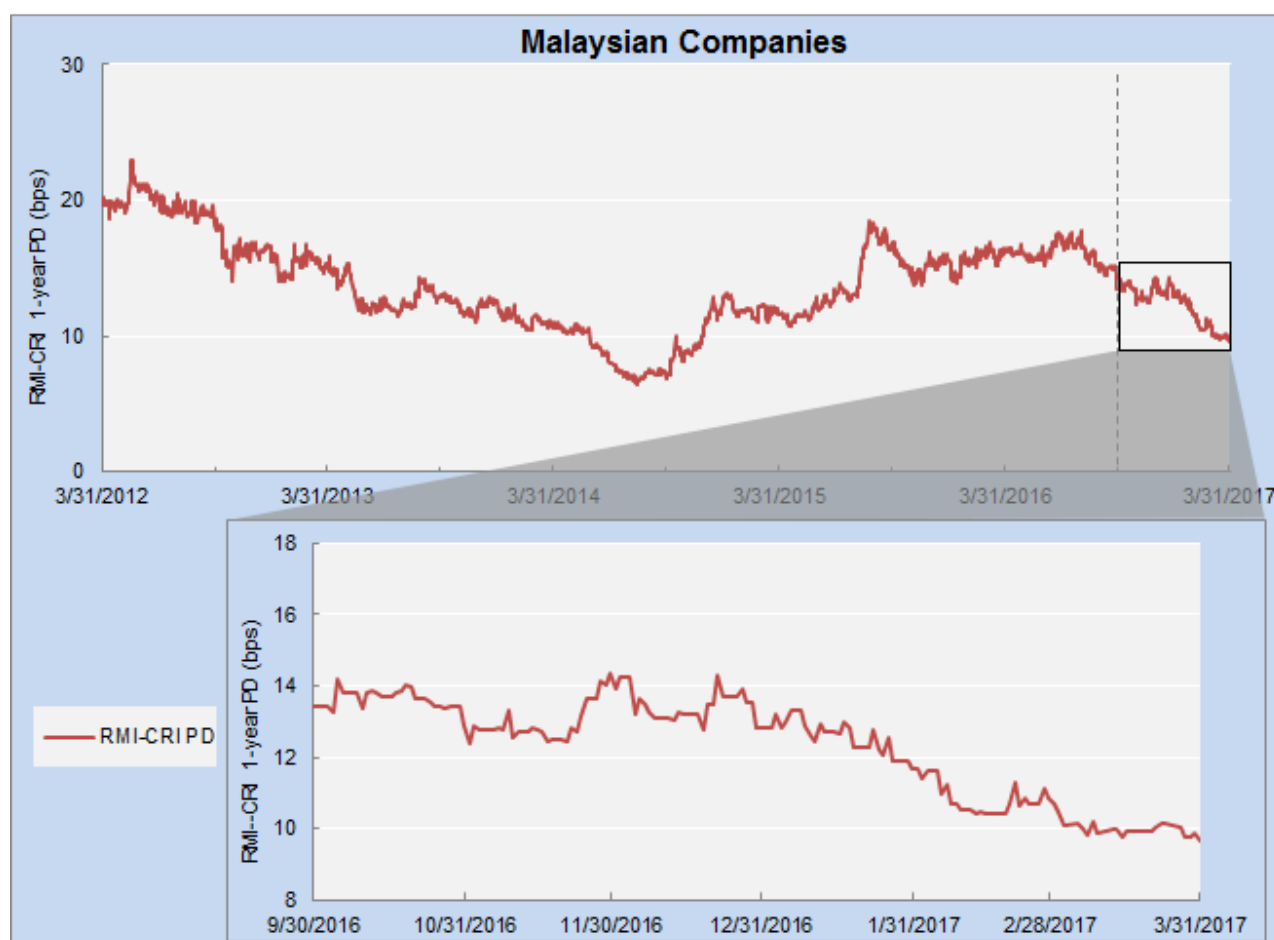
⁹⁸March 31, 2017, [Jakarta Interbank Offered Rate \(JIBOR\)](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

⁹⁹April 12, 2017, [Indonesia bailout fund too small for bank restructuring mandate](http://www.businesstimes.com.sg), Business Times, <http://www.businesstimes.com.sg>

¹⁰⁰Feb 16, 2017, [BI 7-Day reverse repo rate held at 4.75% maintaining stability and promoting sustainable economic recovery](http://www.bi.go.id), Bank Indonesia, <http://www.bi.go.id>

Malaysian Companies

The RMI-CRI aggregate 1-year PD for Malaysian companies decreased over Q1. Malaysia experienced steady economic growth over the past quarter with strong domestic consumption as well as exports. However, a record level of inflation calls for concern after the implementation of GST. Monetary prospects remain stable with the MYR fluctuating slightly against the USD. Malaysia did experience some political disturbances at the start of the year with the death of Kim Jong Nam, but the turmoil did not translate to adversely impact the economy. Tensions between Malaysia and North Korea have since decreased and the outlook of the Malaysian economy looks to be positive if it is able to keep its inflation in check.



Economy

- Malaysia's GDP expanded by 5.6% in Q1 2017 YoY, up from 4.5% in the previous quarter. Malaysia's economy grew at the fastest pace in two years during Q1, buoyed by strong domestic demand, higher exports and a rise in manufacturing activity.

- GDP of Malaysia increased by 5.6% from Q4 last year to MYR 280.1bn in Q1 2017. This expansion is led by higher private consumption which recorded a growth of 6.6%. Exports remained strong in this quarter after increasing 9.8%. However, the rise of imports outpaced that of exports as it expanded at a rate of 12.9% with increased demand for imported goods. Production wise, all sectors of Malaysia expanded in Q1 2017, with agriculture leading the growth at 8.3%. Oil palm and rubber has performed strongly in the first quarter to drive the expansion in agriculture.¹⁰¹
- Malaysia's CPI rose at a higher rate of 5.1% in March 2017 owing to the low base last year and higher retail fuel prices compared to March 2016. Among the major groups which recorded increases were the indices for Transport (+23.0%), Food & Non-Alcoholic Beverages (+4.1%), Recreation Services & Culture (+3.0%), Health (+2.6%), Restaurants and Hotels (+2.3%) and Housing, Water, Electricity, Gas & Other Fuels (+2.1%).¹⁰²
- Malaysia's unemployment rate dropped to 3.4% after remaining at 3.5% for the past three months. According to MIDF Research, 20,000 new jobs were added in March while the number of unemployed declined to 0.51mn.¹⁰³
- The labour force participation rate in Malaysia is stable between 67% to 68% during the first quarter of 2016. Unemployment rate fell slightly to 3.4%. However, this drop in unemployment rate could be due to the reduction of labour force participation rate as more of the unemployed exited the labour force.¹⁰⁴
- In March 2017, Malaysia's export expanded MYR 16.0bn, up by 24.1% YoY to MYR 82.6bn. Imports also recorded a strong increase of MYR 21.8bn (+39.4%) to MYR 77.2bn. Exports increased due to the higher exports to China (+MYR 3.1bn), Singapore (+MYR 2.4bn), European Union (+MYR 1.9bn), United States (+MYR 1.1bn) and Japan (+MYR 740.0bn). Higher imports were mainly from China (+MYR 4.7bn), United States (+MYR 4.3bn), Republic of Korea (+MYR 1.8bn), Singapore (+RM1.5 bn) and European Union (+RM1.4 bn).¹⁰⁵

Monetary

- Bank Negara Malaysia announced that it decided to maintain the Overnight Policy Rate (OPR) at 3%, with ceiling and floor rates unchanged at 3.25% and 2.75% respectively.¹⁰⁶
- In March 2017, broad money (or M3), which measures the money supply, increased by 4.5% YoY to MYR 1.67tn.¹⁰⁷
- In March, the ringgit and most major and regional currencies appreciated against the US dollar amid the broad weakening of the US currency. The ringgit's performance against the currencies of other major trade partners was mixed. The international reserves of Bank Negara Malaysia amounted to USD 95.7bn (equivalent to MYR 423.2bn) as at April 14, 2017.

Funding & Liquidity

- The market indicative yield on the 10-year Malaysia government securities increased to 4.15% in March 2017 from 4.06% in the previous month. The same yield measure on 5-year Malaysia government securities increased to 3.82% from 3.71% over the same period.¹⁰⁸
- Bank lending to finance, insurance and business activities increased to MYR 11.5bn in March 2017 from MYR 11.0bn one year ago. Meanwhile, loans disbursed to the manufacturing and the wholesale, retail trade, restaurants and hotels segments increased to MYR 19.0bn and MYR 18.9bn respectively.¹⁰⁹

Regulations and Politics

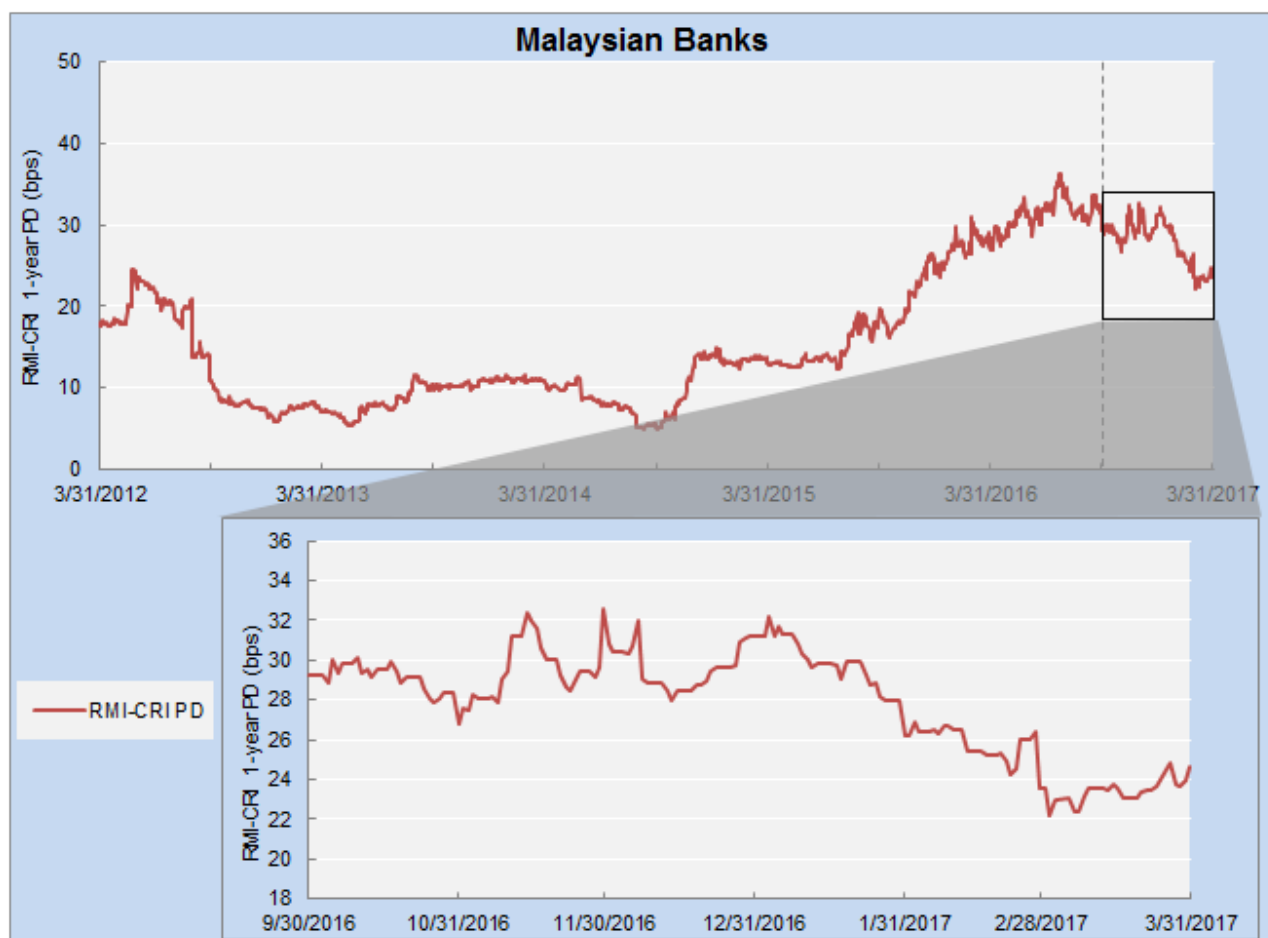
- The central bank of Malaysia has relaxed the capital rules for banks as lenders will no longer have to maintain a reserve fund. Previously, banks had to maintain a percentage of net profit as reserves. Domestic banks should maintain MYR 2bn as minimum capital funds, while Islamic banks and locally incorporated foreign banks are required to maintain MYR 300mn.¹¹⁰
- Bank Negara has issued a draft which sets out the requirements on credit risk management for licensed persons. The proposal addresses the need to manage exceptional credits and elevate credit loss estimation standards in an environment of heightened competition and uncertainty.¹¹¹
- Rising costs of living in Malaysia has undermined the support the Najib government receives from public servants. Inflation was at an eight-year high of 5.1% in Q1 due to the launch of GST. However, wages of public servants grew at 2 to 3% in the same period and are unable to keep up with inflation. Though the next election is only due in 2018, rising costs can spell trouble for Najib's road to getting re-elected.¹¹²
- The death of Kim Jong Nam, brother of North Korea's leader Kim Jong Un, in Malaysia shook the international community. The event occurred in February and had both domestic and international implications for the Najib government. Domestically, the case was considered well-handled with investigations conducted in a transparent manner. The incident served to reverse the falling popularity of Najib due to the 1Malaysia Development Berhad scandal. On the international front, relations with North Korea did turn sour with the eviction of ambassadors on both sides and the ban on citizens of each nation from leaving the country. However, this incident did not have much impact economically and Malaysia's trade figures were not affected during the quarter.¹¹³

Sovereign Credit Ratings

- The Malaysian government maintained its sovereign credit ratings at all three rating agencies. The country was rated at A3, A- and A- respectively by Moody's, S&P and Fitch. Moody's, S&P and all other agencies assigned a stable outlook for their ratings on Malaysia.

Malaysian Banks

The RMI-CRI aggregate 1-year PD for Malaysian banks declined in Q1 as banks remain well capitalized with a surge in the amount of bank loan applications. High levels of deposits also ensured sufficient liquidity in Malaysian banks and capital adequacy levels are high above regulatory requirements. Though asset quality worsened slightly over the quarter, the financials of Malaysian banks are still very healthy.



Lending

- The amount of bank loan applications has increased to MYR 76.6bn in March 2017 from MYR 58.3bn in December 2016. Loan application for finance, insurance and business activities had fallen to MYR 3.5bn in March 2017 from MYR 4.2bn in December 2016.¹¹⁴
- The base lending rate of Malaysian commercial banks increased to 6.66% in Q1 2017 on a QoQ basis. The weighted base rate also increased to 3.62% in Q1 2017 from Q4 2016.¹¹⁵

Funding & Liquidity

- Total bank deposits increased to MYR 17.8bn from December 2016 to March 2017. The repurchase agreement decreased from MYR 15.6bn in December 2016 to MYR 14.6bn in March 2017.¹¹⁶
- Savings deposit in banking system increased to MYR 15.2bn from MYR 14.5bn in December 2016.¹¹⁷

Capital Levels & Regulations

- The Malaysian banking system remained well capitalized. The Common Equity Tier 1 Capital Ratio increased to 17.0% and Tier 1 Capital Ratio had decreased to 13.9% in March 2017 from 13.1% and 14.0% in December 2016, respectively.¹¹⁸
- The aggregate Common Equity Tier 1 Capital ratio for Malaysian banks increased to 17.0% in March 2017 from 13.1% in December 2016 while the Tier 1 Capital Ratio decreased to 13.9% from 14.0% in the same period.

Asset Quality

- The value of impaired loans at Malaysian banks had increased slightly to MYR 24.98bn in March from MYR 24.48bn in December 2016. The ratio of net impaired loans to net total loans decreased to 1.2% on a QoQ basis.¹¹⁹

¹⁰¹ May 19, 2017, [PRESS RELEASE GROSS DOMESTIC PRODUCT FIRST QUARTER 2017](https://www.statistics.gov.my), Department of Statistics Malaysia, <https://www.statistics.gov.my>

¹⁰² Apr 19, 2017, [Consumer Price Index Malaysia March 2017](https://www.statistics.gov.my), Department of Statistics Malaysia, <https://www.statistics.gov.my>

¹⁰³ May 17, 2017, [Unemployment rate dips as economy picks up](http://www.theedgemarkets.com), The Edge Markets, <http://www.theedgemarkets.com>

¹⁰⁴ May 15, 2017, [PRESS RELEASE KEY STATISTICS OF LABOUR FORCE IN MALAYSIA, MARCH 2017](https://www.statistics.gov.my), Department of Statistics Malaysia, <https://www.statistics.gov.my>

¹⁰⁵ Feb 8, 2017, [Monthly External Trade Statistics December 2016](https://www.statistics.gov.my), Department of Statistics Malaysia, <https://www.statistics.gov.my>

¹⁰⁶ Nov 23, 2016, [Monetary Policy Statement](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹⁰⁷ 23 May, 2017, [Economic and Financial Data for Malaysia](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹⁰⁸ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹⁰⁹ May 6, 2017, [After facing down scandal, Malaysia's Najib vulnerable on rising costs](http://www.reuters.com), Reuters, <http://www.reuters.com>

¹¹⁰ May 4, 2017, [Bank Negara removes reserve fund requirement for banks](http://www.theedgemarkets.com), The Edge Markets, <http://www.theedgemarkets.com>

¹¹¹ Jan 21, 2017, [Bank Negara issues draft on credit risk management](http://www.thestar.com.my/), The Star Online, <http://www.thestar.com.my/>

¹¹² May 6, 2017, [After facing down scandal, Malaysia's Najib vulnerable on rising costs](http://www.reuters.com), Reuters, <http://www.reuters.com>

¹¹³ Apr 12, 2017, [Kim Jong Nams Death: What It Means For Malaysia](https://www.rsis.edu.sg), S. Rajaratnam School of International Studies <https://www.rsis.edu.sg>

¹¹⁴ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹¹⁵ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹¹⁶ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

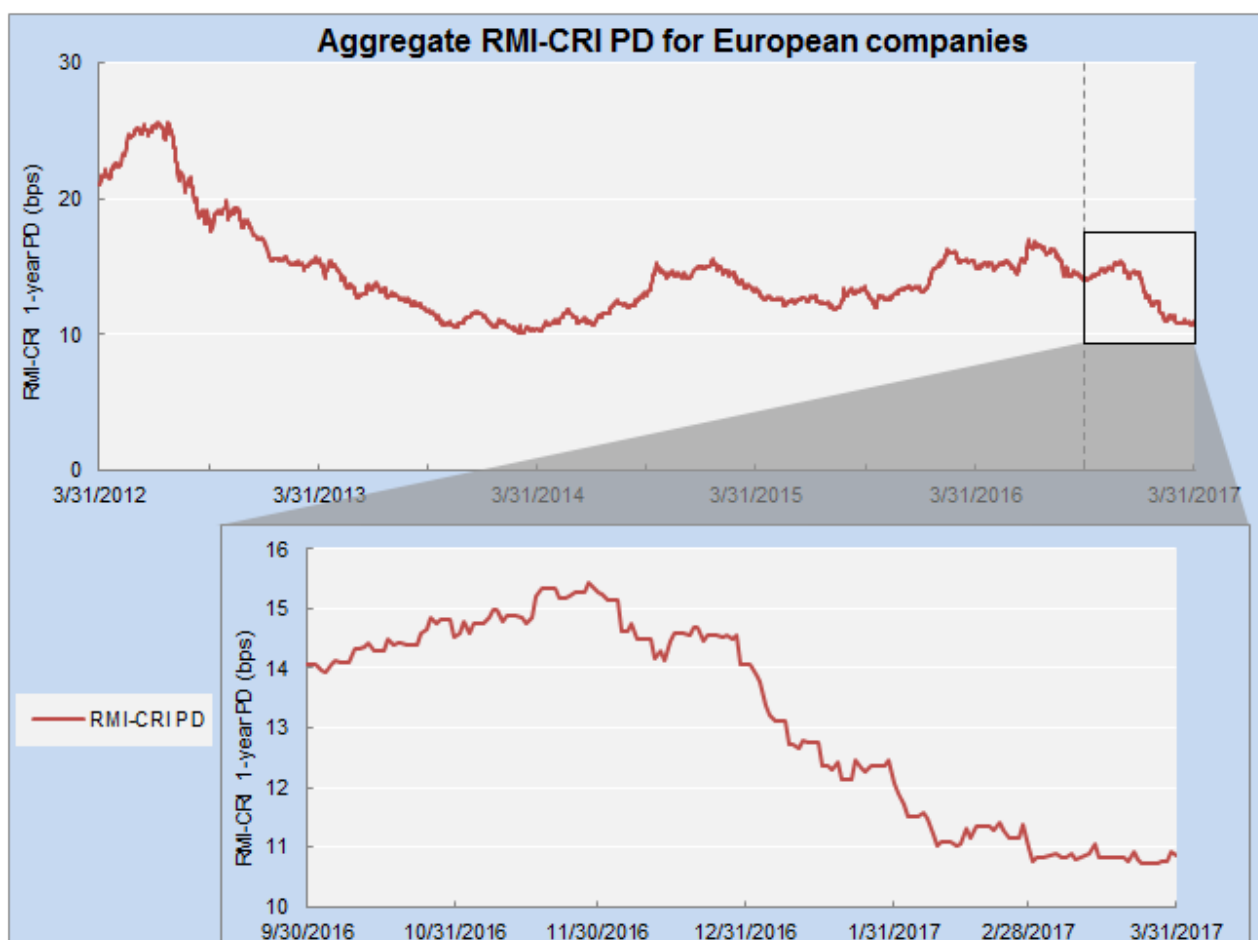
¹¹⁷ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹¹⁸ Apr 28, 2017, [Monetary and Financial Developments March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

¹¹⁹ Mar 31, 2017, [Monthly Statistical Bulletin March 2017](http://www.bnm.gov.my), Bank Negara Malaysia, <http://www.bnm.gov.my>

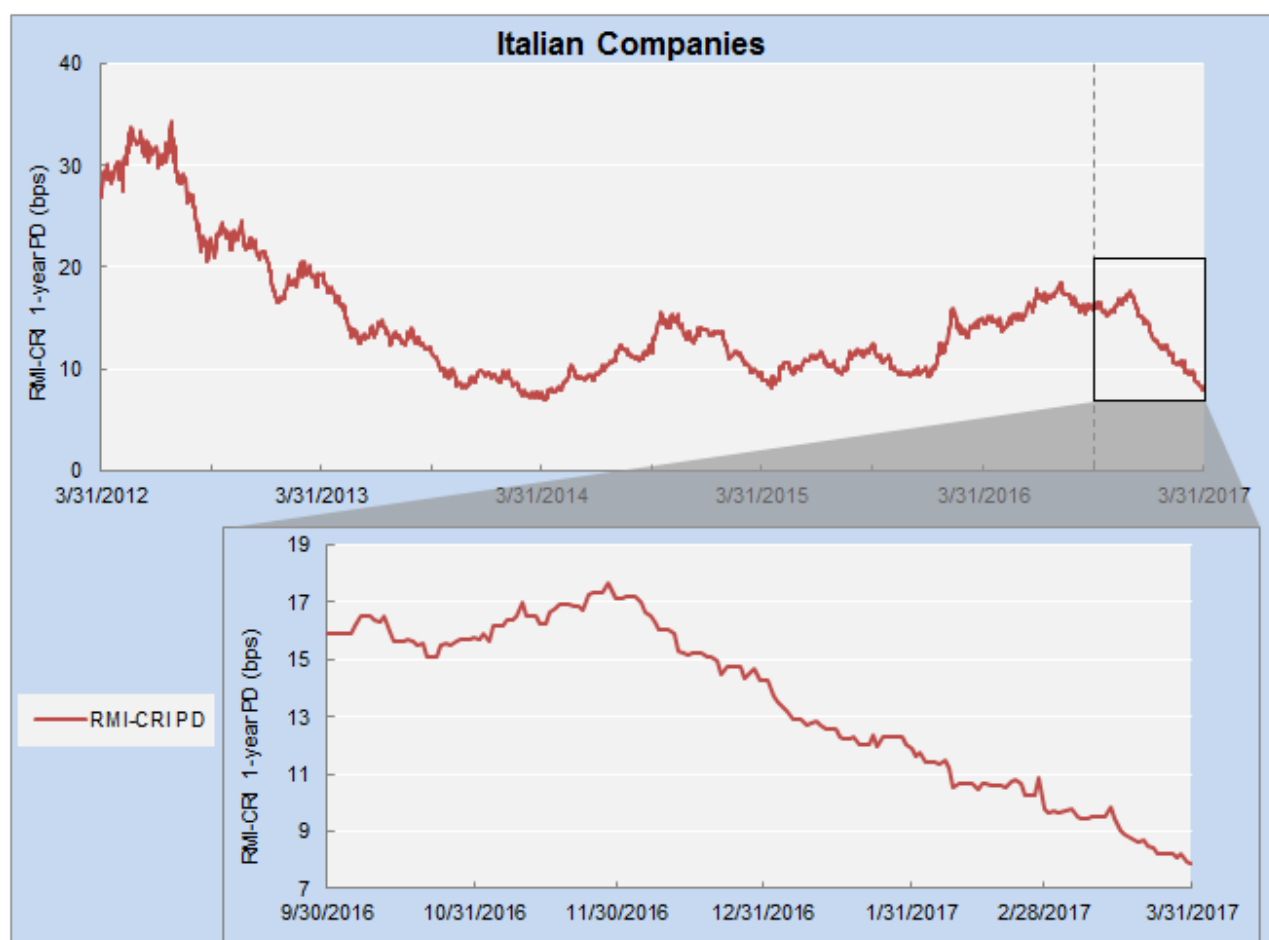
Europe

The RMI-CRI aggregate 1-year PD for European firms continued to decrease in Q1 2017, alongside with the expected 0.5% Eurozone GDP growth in Q1. Unemployment rate and business sentiment performed much better than expected, reaching to a six year high. Although better economic data has been produced in recent months, risks to growth are still present though to a much lesser extent. Concerns about wage growth is strong and unemployment in Italy and France is still relatively high. The European central bank will continue to keep monetary policy loose to help expand economic growth given that inflation rate is still below the target of 2%.



Italian Companies

The aggregate 1-year RMI PD for Italian companies declined during Q1 2017 amid positive sentiments in the market due to the Italian government's continuous effort to deleverage on the country's mounting debt and its commitment to improve economic growth. The economy underwent a YoY growth of 0.8%, and is expected to grow by 1.0% over the year 2017. The manufacturing and services sectors reported stellar performance over the quarter, with the former being driven by increasing inflow of overseas new orders and the latter by strong demand amid rising costs. Economic sentiment indicators were relatively stable with a slightly positive tone, while retail sales improved by a little due to Easter, with a positive outlook. Bond yields increased over the quarter due to the persistently weak banking environment and political uncertainty surrounding the 2018 Italian election. Sovereign credit ratings are pretty much similar to last year's, with currently Moody's upgrading its ratings and adopting a stable from negative outlook. Interest rates for non-financial companies decreased considerably throughout the quarter, while total outstanding loans have been increasing since the start of 2017.



Economy

- The GDP of Italy is estimated to increase by 0.2% moving from Q4 2016 to Q1 2017, keeping the same rate from that in the previous quarter. The economy expanded 0.8% YoY, and is expected to grow by 1.0% over the course of 2017 - an upward revision of the previous Italian National Institute of Statistics' (ISTAT) forecast of 0.9%. It also, however, noted Italy's GDP growth level gap with the rest of the EU, which is 1.9% compared to 3.5% in Q1 2017. ISTAT forecasts the economy to grow moderately in 2017, as it noted that household spending will constitute an important contribution to growth though at a less intense pace due to price hike, followed by investments. Slight

improvements in unemployment and ongoing tensions on the financial markets support ISTAT's reasons to project the economy on a moderate note.^{120,121}

- Italy's unemployment rate was moderately lower at 11.5% in March 2017, down from 11.7% in February and 12.0% in January. The country ended the quarter with 22.78mn people employed. 3.022mn people were unemployed. Youth unemployment (aged 15-24) was 34.1%, down 0.4 percentage points over February.¹²²
- Italy's manufacturing PMI - an index of sentiment in the manufacturing sector - recorded a six-year high reading of 56.2 in April. Growth rate in manufacturing output accelerated for the third month in a row, reaching the highest for six years in April. Increasing inflow of overseas new orders helped create strong demand for Italian manufactured goods, boosting output levels.¹²³
- Italy's services PMI also reported a record high April 2017 reading of 56.2 - marking an eleventh consecutive increase of output in the service sector. April also marked the largest increase in order books for close to ten years, pointing strong demand as the underlying factor. April's increase in backlogs was the most marked since March 2010. Job creation rate remained solid and was among the fastest since 2007-08 GFC. April also recorded marginal decrease in average prices charged by Italian service providers and rising costs for businesses due to input prices and salary pressure. Input cost inflation was at a five-month low. Outlook remained positive as service providers expect a rise in business activity over the next 12 months.¹²⁴
- The European Commission Italy Economic Sentiment Indicator (ESI), which assesses the economic outlook of EU countries as a weighted average of the industrial, services, construction, retail and consumer sectors, reported a reading of 105.6 in March, 105.7 in February and 105.5 in January. These figures are notably higher than the 104.1 average reported over Q4 2016.¹²⁵
- The confidence climate index is relatively stable in April 2017 at 107.5 compared to 107.6 in March. The personal and current components of the index improved from 101.0 to 101.5, and 104.5 to 105.6 respectively. The outlook on unemployment was brighter - the reading improved from 24 to 29, while outlook on the expectations on inflation was negative, increasing to -17 from -11.¹²⁶
- Retail sales, indexed by the Markit Retail PMI climbed to 48.3 in April amid weak demand and marginally increasing sales. Sales hike during Easter for retailers contributed to the slight increase. Average purchase price continued to edge higher, leading to an underperforming sales target below average. This led to a slower decrease in average gross margin across the sector. Retailers also attributed higher raw material costs to lower profitability.¹²⁷

Funding & Liquidity

- Yields on 10-year Italian bonds are on a somewhat increasing trend in Q1 2017, standing at 2.318% on March 31, 2017 compared to the value on December 31, 2016 at 1.613%. Yields at the end of Q4 2016 were 1.815%. The positive 10-year Italian bond yield trend may be attributed to uncertainty in Italy's politics and upcoming election in 2018.
- Interest rates on loans (other than bank overdrafts) to non-financial corporations decreased considerably throughout Q1 2017, down from 2.56% in December 2016 to 2.46% in March 2017. Bank interest rates (including revolving loans, overdrafts and extended credit card credit) to corporations decreased throughout Q1 2017, from 3.65% in December 2016 to 3.28% in March 2017. Loans for house purchases increased from 2.00% to 2.06% in March 2017.¹²⁸

- Preliminary estimates for outstanding loans to non-financial institutions stood at 784,014, the second lowest number in Q1 2017. Total outstanding loans overall increased by 1.66% from the start of 2017.¹²⁹

Politics

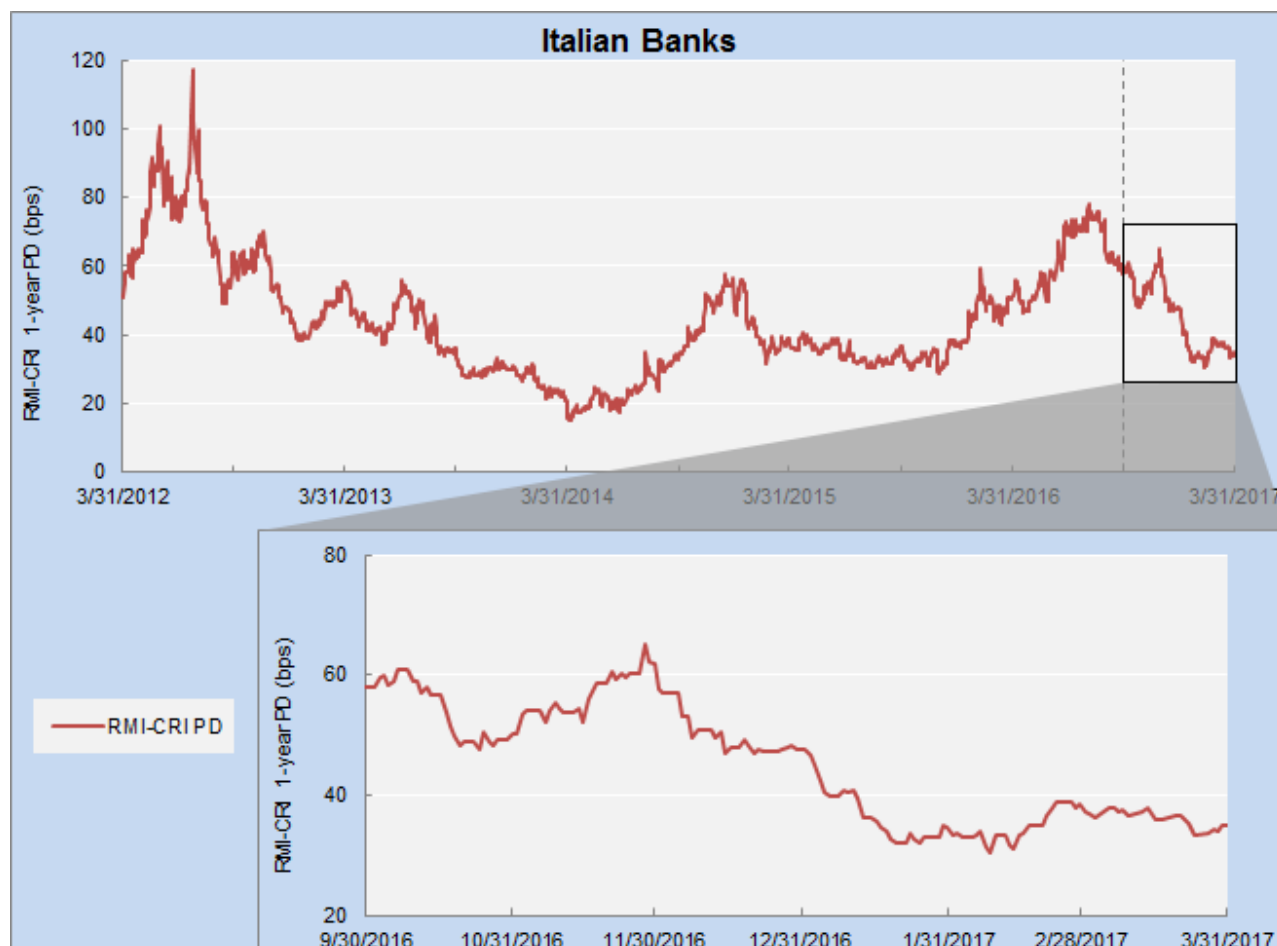
- A recent development on the upcoming 2018 Italian election highlights possible early elections by Italy's constitutional court after changing parts of the country's electoral law. This idea was championed by Matteo Renzi, the former center-left prime minister who stepped down after losing a referendum on constitutional reforms in December, creating political uncertainties and proposals for early election. Five Star Movement, an emerging populist party, is also set to shake up Italian politics as the anti-euro, anti-immigrant Northern League pushes for early election amid rising popularity among voters. Sergio Mattarella, the current Italian president who has power over the parliament, on the other hand may resist outside pressure to kick off an early election due to possible risks incurred during an upcoming G7 summit hosted by Italy in Sicily and possible clashes with Italy's budget law.¹³⁰
- Meanwhile, the Italian banking system remained fragile as regional banks are currently in need of bail outs. After a proposed plan to inject EUR 6.6bn to fill in EUR 8.8bn capital shortfall of Banca Monte dei Paschi di Siena, Italy's fourth biggest bank and the world's oldest surviving bank, Italy, whose government has been trying its best to avoid losses by ordinary Italians who put their savings in the bank, has once again been trapped in a dilemma to save its two regional banks, Banca Popolare di Vicenza and Veneto Banca. The ECB, European Commission and Germany were concerned about this plan as not only this might be interpreted as an attempt to avoid banking resolution, but also the plan is seen to be unlikely sustainable in covering losses already incurred or likely in the near future. This is in light of total writedowns of EUR 10.2bn for the two banks, which is almost double their combined equity capital of EUR 5.7bn and a cost-income ratio of 100% for both of the banks.¹³¹
- Italy's latest published public accounts were that of Q4 2016. Total expenditures and total revenues for Q4 both decreased by 0.9%. The decrease in total expenditures was attributed to an increase in current expenditures by 2.4% and a fall of 30.7% in total capital expenditures. Decreases in total revenues were driven by lower current revenues (-0.7%) and lower capital revenues (-16.7%). The government deficit to GDP ratio was 2.3%, unchanged compared with the second quarter of 2015. Italy's debt-to-GDP ratio is set to stand at 132.5% as of Q4 2016.^{132,133}
- In an attempt to cut 2017 budget deficit, the Italian government would raise taxes on tobacco and gambling and crack down on evasion of value added tax. The proposed cut, which was demanded by the EU and approved by the cabinet, amounted to EUR 3.4bn or 0.2% of GDP. Doing so made the government revise this year's deficit target to 2.1% of GDP from 2.3%, with next year's confirmed at 1.2%. Most of the extra savings came from a change in Value Added Tax (VAT) scheme, where Italian public bodies will pay VAT directly to the Treasury instead of going through the supplier. The Treasury is also set to forecast Italy's economy this year at a stable public debt to GDP ratio of 132.5%, and 131% for 2018.¹³⁴

Sovereign Credit Ratings

- As of January 6, 2017, Moody's rated Italy under Baa2 with a negative outlook amid Italy's banking problems, uncertainty due to upcoming Italian election, and global political risk. Fitch revised its outlook on Italy to stable from negative and downgraded its rating at BBB on April 21, citing weak growth, frail banking sector, high debt and political instability as 2018 Italian election draws near. Standard & Poor's has yet to publish its ratings on Italy.^{135,136}

Italian Banks

The aggregate 1-year RMI PD for Italian banks declined marginally over Q1 2017 as the Italian government has stepped up measures to bail out two of its recently failing regional banks, namely Banca Popolare di Vicenza and Veneto Banca apart from Banca Monte dei Paschi di Siena and save its weakening banking system. The external support from the European Commission and the ECB to save Monte dei Paschi and a recent remarkable performance by Intesa Sanpaolo, the largest bank in Italy in terms of market capitalization, has also helped to reduce upward pressure to the credit risk of Italian banks and improve its credit quality. Not only has Italy seen a fall in the ratio of NPL to outstanding loans since Q4 2016, loans to firms and households are increasingly being controlled to prevent bad loans from sprouting out. A positive current account surplus recorded at the end of Q4 2016 at EUR 249.6bn (or 14.9% of GDP), an improvement of more than 2% of GDP compared to Q3 2016, also suggests that the Italian government will have more budget to improve liquidity across its banking institutions. Looking ahead, with a marginally improving credit performance, household consumption and investment, coupled with increasing political instability as the 2018 Italian election draws near, Italy may need to step up its game even further to get back on track and compete with developed economies.



Profitability

- Italian banks reported higher profits during Q1. Total profits of banks in the FTSE Italia All-Share Banks Index, increased to EUR 10.174bn as of March 31, 2017 from a value of EUR 8.125bn on December 31, 2016. Its corresponding index fund also reported an increase in T12M earnings to EUR -2,647.73mn on Q1 2017 from EUR -1,843.20mn on Q4 2016 amid mounting bad debt problems faced by Italian banks, such as Banca Monte dei Paschi, Banca Popolare di Vicenza and Veneto Banca. Meanwhile, Intesa Sanpaolo, Italy's largest bank by market capitalization, on the other hand, reported

excellent performance where its net income rose 11.8% in Q1 2017 to EUR 901m due to income from fees and commission while still being able to commit to a EUR 10bn cash dividend for its investors. The bank is also going all out to generate higher income overseas through possibly many more loan-organizing, share selling and M&A activities in Russia. This came shortly after it advised on the sale of a stake in sanctioned Russian oil major Rosneft.^{137,138}

Funding & Liquidity

- Coupons on new 5-year euro-denominated Italian bank bond issuances increased to 1.99% during Q1 on the back of a stable 3m Euribor rate during the quarter.
- The 12-month percentage change in deposits of funds by Italian residents was 2.77% in March 2017, while total deposits of non-domestic residents fell by 6.95%. Bank funding from the Eurosystem grew by 70.9% compared to March 2016, while debt securities issued by banks fell 15.71% compared to this month last year. Total deposits and postal savings by residents and non-financial corporations was EUR 1.65tn, based on latest data published in Q4 2016.^{139,140}
- Interest charged on business loans (other than bank overdrafts) of over EUR 1mn to non-financial institutions was 1.221% in March 2017, up from the 1.06% reported in January 2017. Similar loans with collateral and/or guarantees were charged with an interest rate of 1.677%, down from last year's 2.028% during 2016. Bank interest rates on loans to sole proprietors was 3.202% in March 2017, down from 3.582% last year.
- The Bank of Italy's liabilities to Euro-area financial counterparties (overnight deposits including reserve requirements) totaled EUR 88.14bn in March 2017.
- Italian bank liabilities towards the Eurosystem increased to EUR 200bn on February 2017 from EUR 185bn in November 2016. Lenders increased their funds held at the ECB by 31.7% YoY on February 2017 while capital and reserves increased to EUR 462bn during the three months ending February 2017.
- According to the latest bank lending survey, the first quarter of the year has seen credit access conditions differentiated by firm categories and sector of economic activity. Categorically, medium-sized and large manufacturing firms are currently benefitting from accommodative lending firms. Sector wise, credit supply policies for service and manufacturing firms remained relatively constant, while construction firms still have challenging access to financing.

Asset Quality

- The Bank of Italy said that the ratio of new non-performing loans to outstanding declined during Q4 to 2.3% from 2.6% in the preceding quarter. The non-performing ratio for loans to firms dropped from 4.1% to 3.6% while a similar measure for loans to households fell from 1.7% to 1.5%.¹⁴¹
- The percentage of write-downs over non-performing loans increased to 51.7% from 47.3%, where part of which was due to UniCredit's massive write-downs.

¹²⁰ May 16, 2017, [Preliminary estimate of GDP](#), Italian National Institute of Statistics, istat.it

¹²¹ May 22, 2017, [ISTAT revises upwards 2017 GDP to 1.0%](#), Ansa, <http://www.ansa.it>

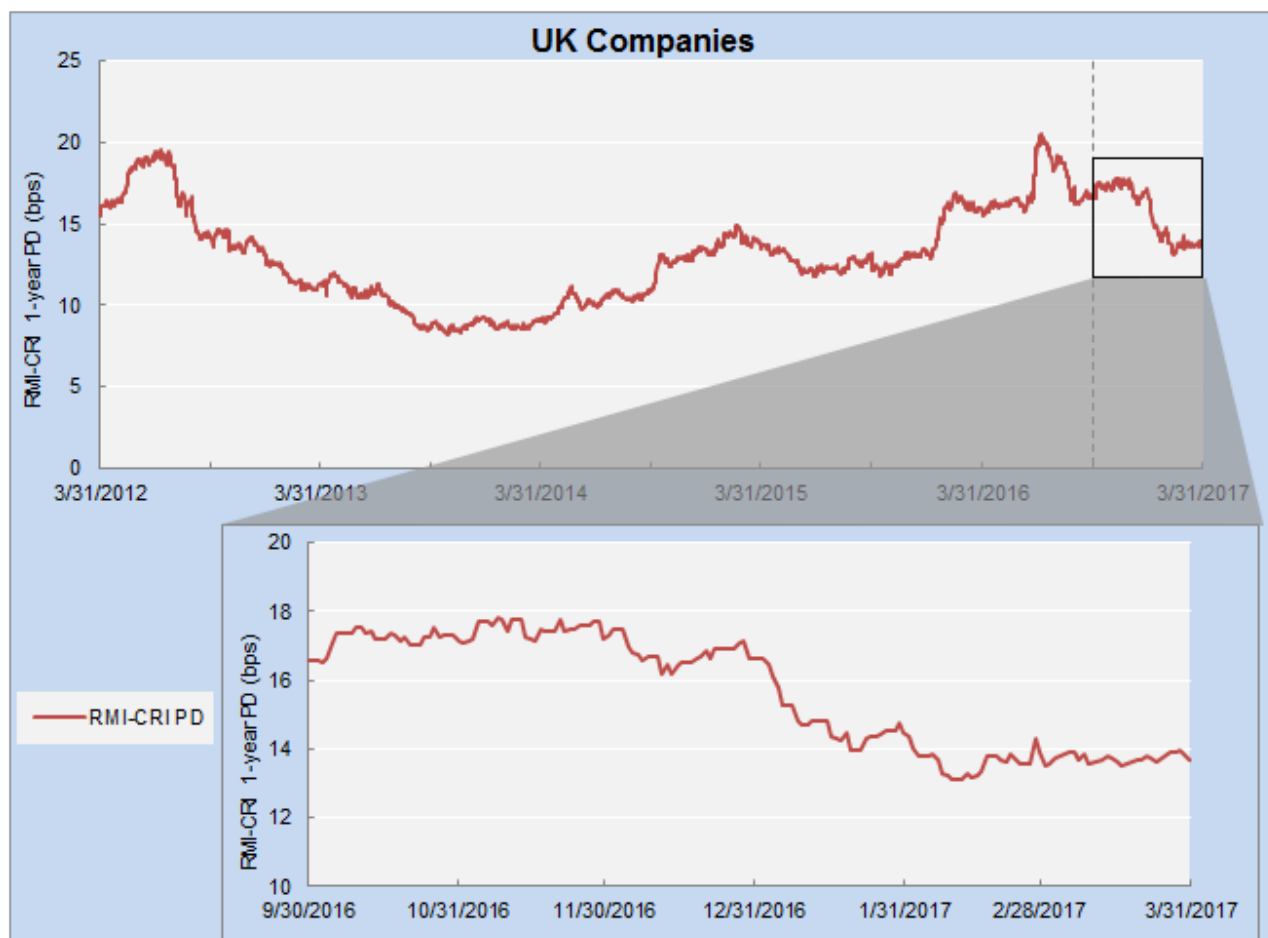
¹²² May 2, 2017, [Employment and unemployment \(provisional estimates\)](#), Italian National Institute of Statistics, istat.it

¹²³ May 2, 2017, [Manufacturing output grows at fastest rate for six years](#), Markit, <https://www.markiteconomics.com/>

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- ¹²⁵ April 27, 2017, [Economic sentiment indicator for Italy](http://ec.europa.eu/eurostat), Eurostat, ec.europa.eu/eurostat
- ¹²⁶ April 27 2017, [Consumer and business confidence](http://www.istat.it), Italian National Institute of Statistics, [istat.it](http://www.istat.it)
- ¹²⁷ May 5, 2017, [Retail PMI shows slowest fall in sales for five months](https://www.markiteconomics.com/), Markit, <https://www.markiteconomics.com/>
- ¹²⁸ May 8, 2017, [Italian MFIs: Interest per annum on new loans to non-financial corporations](http://sdw.ecb.europa.eu), ECB, sdw.ecb.europa.eu
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- ¹³⁰ Jan 26, 2016, [Italian court ruling opens door to early election](https://www.ft.com/), FT, <https://www.ft.com/>
- ¹³¹ March 22, 2017, [Italy to test EU rules again with Veneto banks bailout](http://www.reuters.com/), Reuters, <http://www.reuters.com/>
- ¹³² April 4, 2017, [Quarterly non-financial accounts for General Government, households income and savings and non-financial corporation profits](http://www.istat.it), Italian National Institute of Statistics, [istat.it](http://www.istat.it)
- ¹³³ April 24, 2017, [Quarterly government debt \(unit of measure: Percentage of gross domestic \(GDP\)\)](http://ec.europa.eu/eurostat), Eurostat, ec.europa.eu/eurostat
- ¹³⁴ April 25, 2017, [Italy hikes taxes to rein in 2017 budget deficit](https://www.rte.ie/), RTE, <https://www.rte.ie/>
- ¹³⁵ April 26, 2017, [Frexit makes way for Quitaly atop bond investor worry list](http://www.cnbc.com/), CNBC, <http://www.cnbc.com/>
- ¹³⁶ Dec 7, 2016, [Moody's changes outlook on Italy's Baa2 issuer rating to negative; affirms rating](https://www.moody's.com), Moody's, <https://www.moody's.com>
- ¹³⁷ May 5, 2017, [Intesa posts surprise profit gain as bet on fees pays off](https://www.ft.com/), FT, <https://www.ft.com/>
- ¹³⁸ May 18, 2017, [Intesa set for more Russia deals after winning Putin's favor over Rosneft](http://www.reuters.com/), Reuters, <http://www.reuters.com/>
- ¹³⁹ Mar 2017, [\[TSC40600\] Bank funding \(12-month percentage changes\)](https://infostat.bancaditalia.it), Banca Italia, <https://infostat.bancaditalia.it>
- ¹⁴⁰ Dec 31, 2016, [TDB10163 1041815 - Deposits and postal savings - by customer province and sector](https://infostat.bancaditalia.it), Banca Italia, <https://infostat.bancaditalia.it>
- ¹⁴¹ April 2017, [Economic Bulletin No. 2 - 2017](http://www.bancaditalia.it), Banca Italia, <http://www.bancaditalia.it>

UK Companies

The aggregate RMI-CRI 1-year PD for companies in the UK maintained fairly stable with a slight downtrend amid a slowing economy. GDP growth missed forecasts, growing by 0.3% QoQ, while unemployment dipped. While the manufacturing and construction sectors still posted positive growth, it was slower than the preceding quarter. Rising inflation chipped into the consumer spending, while a sterling depreciation increased exports and narrowed UK's trade deficit. The official triggering of the Brexit process is expected to bring along further economic uncertainty, while a general slowdown in the EU might also weigh on UK's economy.



Economy

- The UK's Q1 2017 GDP missed forecasts, growing by 0.3% QoQ, a slowdown from the 0.6% in Q4 2016, and the slowest rate of growth since Q1 2016. The slower growth was mainly due to slower growth of the services sector, which grew 0.3%, compared to 0.8% in the preceding quarter. Within the services sector, the distribution, hotels and restaurants industries decreased by 0.5% caused in part by prices increasing more than spending, while the transport, storage and communications industries fell by 0.2%, due to a decline in publishing activities, telecommunications, and programming activities. Production, construction and agriculture grew by 0.3%, 0.2% and 0.3% respectively during the quarter. Manufacturing grew by 0.5%, suggesting that the sterling depreciation has boosted export demand. Growth, compared to Q1 2016, was 2.1%.¹⁴²

- The unemployment rate was 4.7% for the period of December 2016 to February 2017, down from 5.1% recorded during this same period one year ago, and lower than the 4.9% recorded in the preceding three months of September to November 2016. The employment rate was 74.6%, 0.1 percentage points higher than the previous three months, and the joint highest since comparable records started in 1971. Estimates indicate that average weekly earnings for employees in real terms increased by 0.1% excluding bonuses, compared to last year. 79.4% of men aged 16 to 64 were in work, while 69.9% of women were in work, higher than the 79.2% and 69.1% respectively one year ago.¹⁴³
- Consumer spending began to slow in Q1 2017 after strong growth seen in the late 2016. The average growth rate of consumer spending was 0.9% – the weakest level in 3 years, compared to 2.7% in Q4 2016, based on Visa's UK Consumer Spending Index. In March 2017, online retailers saw customer spending increase by 8.2%, marking the strongest monthly growth rate since November 2016's Black Friday online shopping festival. High street spending was down 1.3% due to milder weather and longer days.¹⁴⁴
- In the 3 months up to February 2017, the deficit on trade in goods and services narrowed to GBP 8.5bn from a deficit of GBP 8.8bn for the 3 months up to November 2016. The narrowing deficit is attributed to a greater rise in exports (3.1%) than the rise in imports (2.7%). Machinery, transport equipment, oil and chemicals exports saw an increase over the period. Over the same 3 months, the trade deficit of goods to the EU widened by 1.11%, while to non-EU countries, the same number widened by 1.93%. Sterling fluctuations continue to affect trade prices. Export prices decreased by 0.5% while import prices dropped by 0.9%, coinciding with a sterling appreciation of 0.8% compared to its January 2017 average.¹⁴⁵
- The Markit/CIPS PMI for the manufacturing sector declined for a third straight month and stood at 54.2 in March 2017, but it was the eighth month the index stayed above the neutral 50.0 mark. The index read 55.4 in January and 54.5 in February, making the average over the opening quarter of 2017 to read 54.7. The slowdown is centered on consumer goods producers, while intermediate and investment good sectors showed accelerated rates of increase.¹⁴⁶
- In the construction sector, the PMI index read 52.2 for March, after readings of 52.2 and 52.5 in January and February respectively. The general slowdown is attributed to the slowing residential construction sector, but was offset by civil engineering and construction work. The average over the first quarter of 2017 was 52.3.¹⁴⁷

Monetary

- In its most recent meeting on 15 March 2016, the Monetary Policy Committee (MPC) of the Bank of England voted 8-1 to maintain the Bank Rate at 0.25% to meet its 2% inflation target. The Committee also voted unanimously to continue sterling non-financial investment-grade corporate bond purchases totaling up to GBP 10bn, and maintain the stock of UK government bond purchases at GBP 435bn. Both programmes will continue to be financed by the issuance of central bank reserves. The Bank of England expects inflation to rise beyond 2% over the next few months before peaking at 2.75% in early 2018 and dropping gradually back to its 2% target thereafter. The overshoot is said to be reflective effects resulting from the drop in the sterling.¹⁴⁸
- CPI grew by 2.3% YoY in March 2017, unchanged from its growth in February 2017, but higher than the 1.8% increase recorded in January 2017. All broad categories, for the first time since June 2014, contributed to the growth of CPI in March 2017. Housing and housing services (owner occupiers housing costs) and transport categories, driven

by rising fuel prices, were the largest contributors to the uptick in CPI. Food prices also rose by 0.3% on the year, the first positive record since June 2014. The furniture and household goods prices category was the smallest contributor to inflation.¹⁴⁹

Politics

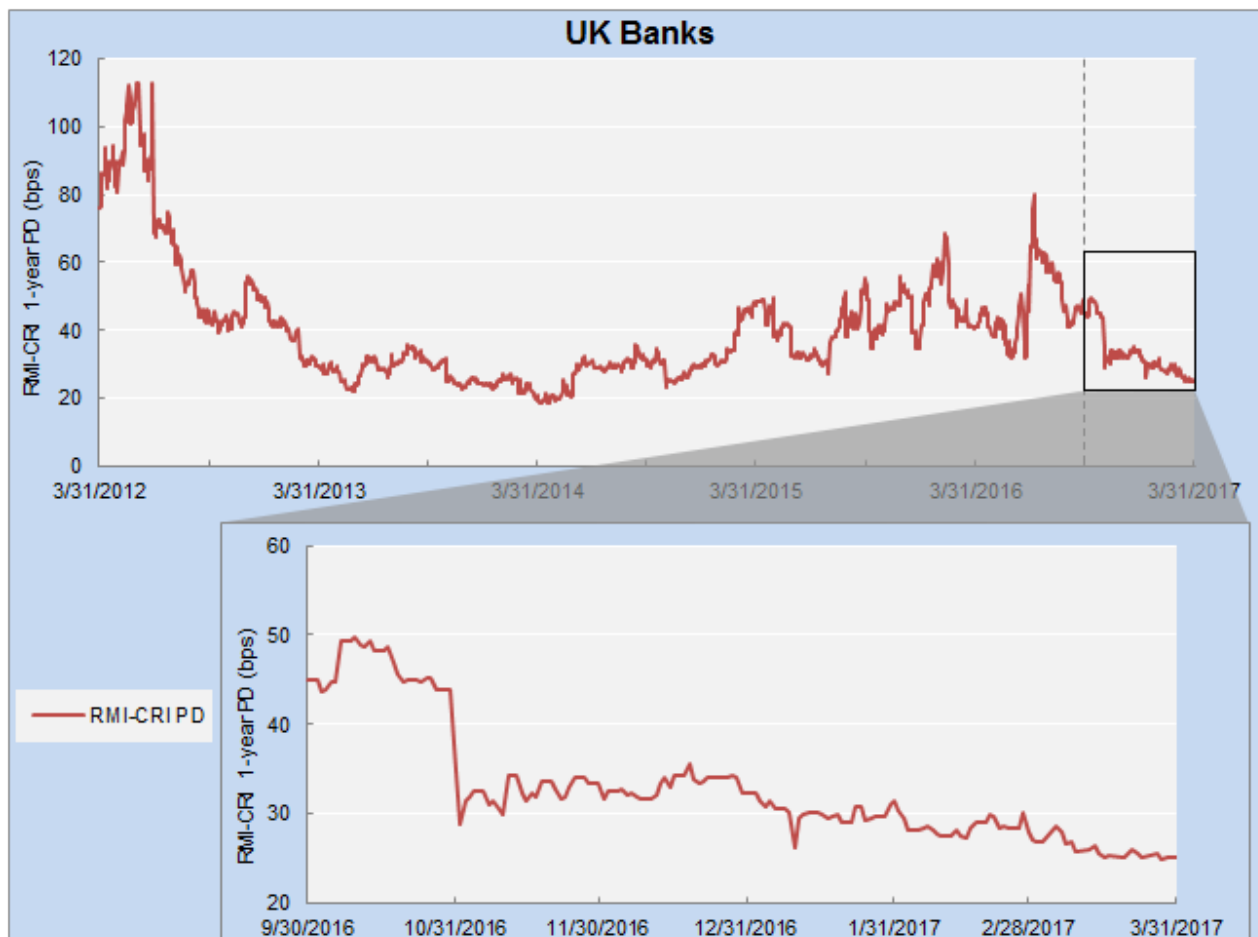
- The Brexit process officially began on March 28, following British Prime Minister (PM) Theresa May's diplomatic letter sent to European Union President Donald Tusk, formally notifying him on Britain's intention to leave the bloc. May has called for unity amidst triggering the Brexit process, and reiterated her intention to seek the best Brexit deal for all of Britain. Her comments come amidst Scotland's intention to hold a second referendum on its independence from the UK. Scotland's previous referendum took place on September 18, 2014, with 55.3% voting against independence from the UK.¹⁵⁰
- In a somewhat shocking move, PM May has announced plans to call for a snap general election on the 8th of June, reasoning that Britain needed stability and strong leadership following the Brexit referendum. Her announcement is a reversal on her previous stance that she will not call an early election as in line with the Fixed-term Parliaments Act 2011, an election had not been due until May 7, 2020. The UK Parliament voted 522-13 in favour of having the election early. Theresa May's Conservative party holds 330 seats, or 36.9%, while Labour, led by Jeremy Corbyn, holds 232 seats, or 30.4%.¹⁵¹
- Under Article 50 of the Lisbon Treaty, any country exiting the EU must agree to a deal and exit the EU within 2 years of formal notification. This means that the UK is scheduled to leave the EU on March 29, 2019, unless all 28 EU members agree to extend the date. Negotiations for Brexit will be headed by a Brexit committee, led by veteran Conservative MP and Leave campaigner David Davis. Former French Foreign Affairs Minister and European Commissioner Michael Barnier will be EU's chief negotiator in the talks.^{152,153}
- The UK Government also published details on a Great Repeal Bill, aimed to ensure European law will no longer apply in the UK. The Bill will repeal the 1972 European Communities Act, the law which took the UK into the EU and put precedence on European law over laws passed in the British Parliament. The Bill will also end the jurisdiction of the European Court of Justice. However, a lower house committee in the Parliament has warned that some UK law will not work after completing the Brexit, as it refers to EU institutions.¹⁵⁴

Sovereign Credit Ratings

- Moody's long term rating on the UK remains unchanged since June 2016 at Aa1, one notch below the highest possible Aaa. S&P's rating was also unchanged on the country's foreign and local currency long term debt at AAu, one notch below the coveted AAA. Fitch Ratings also rated the sovereign long term debt at AA, one rank from its highest rating of AAA. All three rating agencies maintained a negative outlook on the UK, with impending uncertainty over the Brexit process affecting the ratings.

UK Banks

The RMI-CRI aggregate 1-year PD for banks in the United Kingdom improved slightly in Q1 2017 similar to the trend exhibited by the RMI-CRI aggregate 1-year PD for UK companies. In terms of fundamentals, profitability in terms of net income has improved greatly, despite a fall in net interest receivable. The FTSE 350 Banks Index declined by a marginal 0.09% over the quarter.



Profitability

- According to the Monetary financial institutions quarterly income and expenditure tables released by the Bank of England, the net interest receivable fell from GBP 16.58bn in Q3 2016 to GBP 16.53bn in Q4 2016. Interest receivable was GBP 32.3bn, while interest payable was GBP 15.77bn. While interest payable on deposits dropped by over 7%, interest receivable from loans and advances dropped by just under 3%.¹⁵⁵
- Banks reported a surge in net fees and commissions, up to GBP 5.22bn across Q4 2016 from GBP 4.55bn in Q3 2016. Dividends paid by banks fell by over 58%, from GBP 2.86bn in Q3 2016 to GBP 1.19bn in Q4 2016.
- In terms of net income, Barclays reported a net profit of GBP 329mn in Q1 2017, up from GBP 238mn in Q4 2016. Lloyds also reported an increase in net profit, which more than doubled to GBP 871mn in Q1 2017 from GBP 413mn in Q4 2016. HSBC returned to black with a USD 3.465bn net profit in Q1 2017 after bleeding USD 4.229bn in the last quarter of 2016. The Royal Bank of Scotland also reported a net income of GBP 375bn in the first quarter of 2017 after losing GBP 4.28bn in Q4 2016.

Funding & Liquidity

- According to the Bank Liabilities Survey produced by the Bank of England, UK banks and building societies reported that total funding volumes decreased slightly in Q1 2017. More specifically, within the total, retail deposit funding (which includes deposits from households and from private non-financial firms) and other funding, which includes wholesale deposits and wholesale debt funding, had both fallen. Lenders also reported that their average cost of capital decreased significantly in the quarter, and their total capital levels had increased slightly.¹⁵⁶
- Investor demand for wholesale debt increased in Q1 2017, although demand from retail investors decreased by -0.6%. Lenders largely expect demand for wholesale debt to remain broadly unchanged in Q2 2017.
- Wholesale debt funding from commercial paper declined by -10.9% in Q1 2017 but is expected to rise by 27.9% in the next quarter, while funding from short-term repo/securities lending was up 5.8% this quarter.

Asset Quality

- The total write-offs of sterling denominated loans dropped from GBP 1.43bn in Q3 2016 to GBP 1.19bn in Q4 2016, attributed in part to credit-card write-offs to individuals, which decreased from GBP 584mn to GBP 394mn. Write-offs to private non-financial corporations declined from GBP 552mn to GBP 431mn from Q3 to Q4 2016. Write-offs to non-residents increased to GBP 51mn from GBP 13mn in the previous quarter.¹⁵⁷
- Write-offs on loans denominated in foreign currency increased from GBP 218mn in Q3 2016 to GBP 325mn in Q4 2016, driven by a 49% spike in the write-offs on loans to non-residents, which constitute the largest share of the total write-offs.

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¹⁴³April 12th 2017 [UK labour market: Apr 2017](http://www.ons.gov.uk), ONS, <http://www.ons.gov.uk>

¹⁴⁴April 10th 2017 [March rounds off weakest quarter for spending growth since Q4 2013](http://visa.co.uk), Visa, <http://visa.co.uk>

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¹⁴⁶April 3rd 2017 [Expansion of UK manufacturing production and new orders continues in March](https://www.markiteconomics.com/), Markit, <https://www.markiteconomics.com/>

¹⁴⁷April 4th 2017 [Weaker housing activity growth weighs on UK construction sector](https://www.markiteconomics.com/), Markit, <https://www.markiteconomics.com/>

¹⁴⁸March 16th 2017 [Bank Rate held at 0.25%, government bond purchases at GBP 435bn and corporate bond purchases at up to GBP 10bn](http://www.bankofengland.co.uk/), Bank of England, <http://www.bankofengland.co.uk/>

¹⁴⁹April 11th 2017 [UK consumer price inflation: Mar 2017](https://www.ons.gov.uk/), ONS, <https://www.ons.gov.uk/>

¹⁵⁰March 29th 2017 [British PM Theresa May signs Brexit letter to EU](http://straitstimes.com/), Straits Times, <http://straitstimes.com/>

¹⁵¹April 18th 2017 [Theresa May to seek general election on 8 June](http://www.bbc.com), BBC, <http://www.bbc.com>

¹⁵²April 25th 2017 [Brexit: All you need to know about the UK leaving the EU](http://www.bbc.com), BBC, <http://www.bbc.com>

¹⁵³September 28th 2016 [The EUs Brexit Negotiators: Veterans of European Backroom Wars](http://bloomberg.com/), Bloomberg, <http://bloomberg.com/>

¹⁵⁴March 30th 2017 [Great Repeal Bill: All you need to know](http://bbc.com), BBC, <http://bbc.com>

¹⁵⁵May 4th 2017 [Bankstats \(Monetary & Financial Statistics\) - March 2017](http://www.bankofengland.co.uk/), Bank of England, <http://www.bankofengland.co.uk/>

¹⁵⁶April 13th 2017 [Bank Liabilities Survey - Survey Results 2017 Q1](http://www.bankofengland.co.uk/), Bank of England, <http://www.bankofengland.co.uk/>

¹⁵⁷ May 4th 2017 [Bankstats \(Monetary & Financial Statistics\) - March 2017](http://www.bankofengland.co.uk/), Bank of England,
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Appendices

The appendices provide readers with a comprehensive overview of various outputs that are produced by RMI-CRI's operational PD system. While the PD system provides default forecasts at horizons ranging from one month to five years, here only RMI-CRI 1-year PDs are reported. In addition to the PD produced by the RMI-CRI system, important macroeconomic, corporate credit and sovereign risk indicators are provided. These summarize the credit situation at a glance, as well as provide detailed data for reference purposes.

Appendix [A](#) and Appendix [B](#) give RMI-CRI 1-year aggregate PD where the aggregations are by region, economy and sector. In these sections, the RMI-CRI 1-year aggregate PD is based on the median PD of active listed firms. These are given as month-end data, and are based on RMI's default forecast model calibrated on April 05, 2017, using data up to March 31, 2017. For a detailed description of RMI-CRI's default forecast model, the [Technical Report](#) is available on our website.

Appendix [A](#) provides 1-year aggregate PD by economy and sector. For each economy, the graph on the left shows the time series of 1-year aggregate PD for all exchange listed firms within the economy (thick blue, left axis), and the time series of the number of firms with PD (thin orange, right axis). The table on the right provides the median and standard deviation of PDs for firms within ten industry sectors at the end of Q4 2016 and Q1 2017. Note that the statistics are for firms that have a PD at both dates so that consistent comparisons can be made. The median and standard deviation of the difference of individual PD is also given. The industry sectors are based on the Level I Bloomberg Industry Classification.

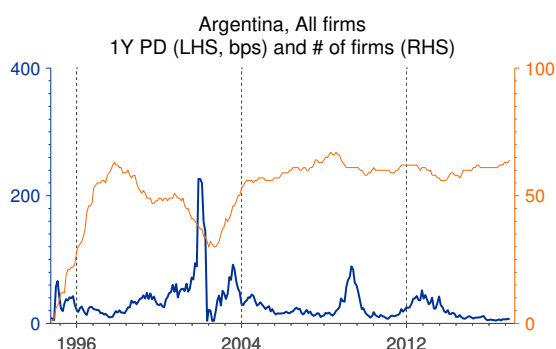
Appendix [B](#) gives 1-year aggregate PD by the seven regions of Asia-Pacific developed, Asia-Pacific emerging, North America, Latin America, Eastern Europe, Western Europe and Africa & the Middle East. The top two graphs of each regions show the time series of the distribution of Probability of Default implied Ratings (PDiR). The PDiR methodology is described in the last section of Appendix [D](#). The different colored areas in the graph indicate different PDiR classes. From the bottom, the blue area indicates the percentage of CCC/C firms, the bottom-most white area indicates B firms, the orange area indicates BB firms, the middle white area indicates BBB firms, the green area indicates A firms, the top-most white area indicates AA firms, and the maroon area indicates AAA firms.

The bottom 12 graphs in each region show the time series of RMI-CRI 1-year aggregate PD for all exchange listed firms in the region, all non-financial firms in the region, and firms in each of the ten industry sectors in the region. Each graph shows the PD in thick blue on the left axis and the count of firms with PD in thin orange on the right axis.

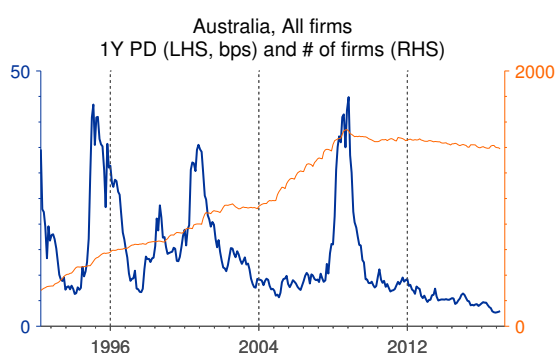
Appendix [C](#) provides common macroeconomic, corporate credit and sovereign risk indicators for each economy along with the RMI-CRI 1-year aggregate PD for financial and non-financial firms. The graphs on the left give historical context to the values, and the table on the right gives the data from the previous five quarters. For variables that are more frequent than quarterly, the last value in the quarter is used. But if a variable is available at a monthly frequency and the end of March data was not available at the time this report was compiled, the previous month's data is given with an asterisk.

Appendix [D](#) gives a more detailed description of the data in Appendix [C](#), along with a description of the PDiR.

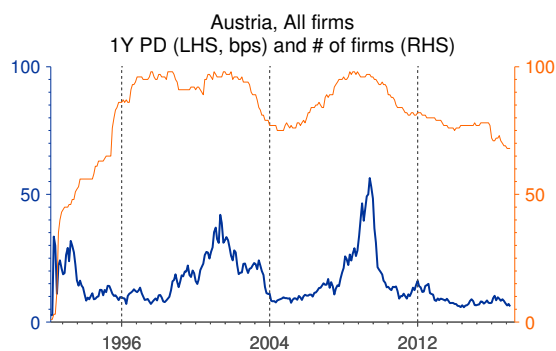
A PD by economies



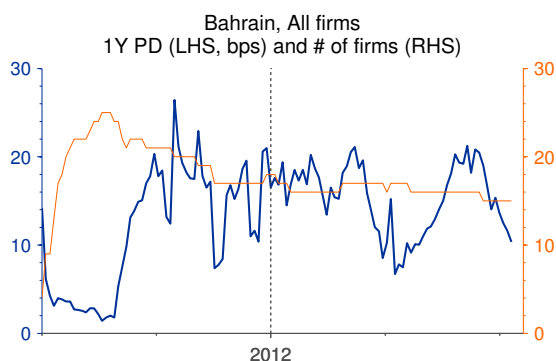
Argentina	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	11	21.8	32.3	20.4	27.0	-4.0	13.5
Basic Materials	6	25.6	39.3	24.3	41.7	-0.6	19.6
Communications	3	2.2	3.6	2.2	1.2	-0.3	2.9
Consumer Cyclical	6	8.5	34.1	11.2	44.1	1.1	23.5
Consumer Non-cyclical	16	5.0	74.0	4.4	19.5	-0.2	55.4
Diversified	2	24.3	5.9	22.8	6.5	-1.6	0.6
Energy	4	8.2	52.0	6.4	28.2	-3.5	24.1
Industrial	7	4.1	2.4	4.1	4.6	-0.4	4.5
Technology	1	0.8	—	0.5	—	-0.3	—
Utilities	10	7.8	9.5	3.3	6.9	-3.1	6.2



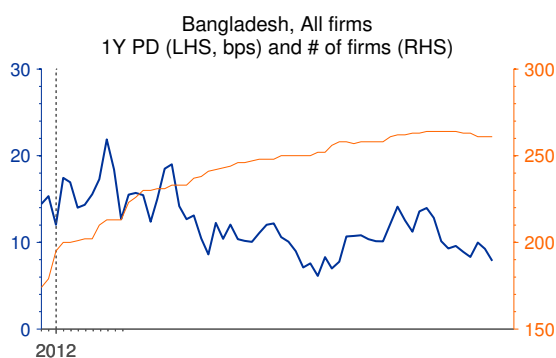
Australia	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	152	1.4	18.4	1.1	16.3	-0.0	7.3
Basic Materials	542	6.1	39.9	5.7	33.8	-0.4	20.2
Communications	99	5.3	26.5	4.8	17.0	-0.1	20.1
Consumer Cyclical	79	2.4	23.4	2.2	41.3	-0.0	20.7
Consumer Non-cyclical	234	2.8	33.8	1.9	34.2	-0.2	17.4
Diversified	8	3.8	8.9	1.1	4.7	-1.6	6.2
Energy	175	11.5	45.6	9.4	51.1	-0.2	35.0
Industrial	112	3.8	39.8	4.1	41.2	-0.1	11.3
Technology	104	4.8	22.0	5.0	19.1	-0.2	11.2
Utilities	13	6.8	17.7	2.2	11.2	-2.5	10.0



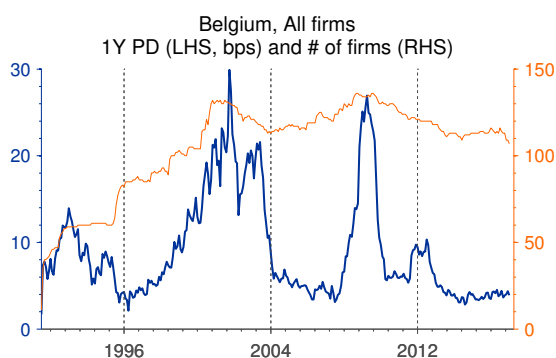
Austria	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	21	4.0	23.4	2.8	13.5	-1.1	11.8
Basic Materials	3	2.2	3.1	1.4	3.0	-0.8	0.2
Communications	1	2.5	—	1.1	—	-1.5	—
Consumer Cyclical	10	7.9	35.5	5.6	26.6	-1.0	9.2
Consumer Non-cyclical	7	10.1	8.3	8.4	8.9	-1.7	4.5
Energy	4	5.8	2.6	5.2	1.7	-1.4	1.3
Industrial	17	7.0	15.4	6.0	8.2	-1.3	9.5
Technology	4	5.9	4.6	3.7	1.4	-1.9	4.3
Utilities	2	2.1	2.2	1.6	1.7	-0.5	0.5



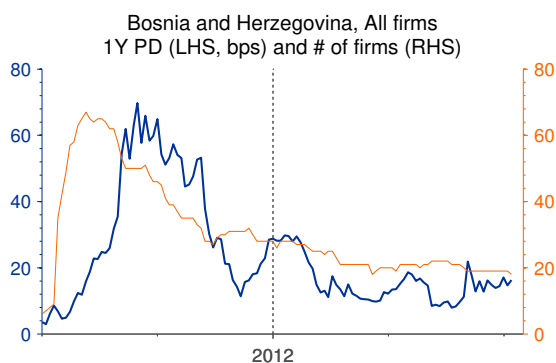
Bahrain	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	11	25.2	71.6	27.4	55.3	0.2	24.6
Basic Materials	1	8.0	—	5.8	—	-2.3	—
Communications	2	1.0	0.1	1.1	0.0	0.0	0.1
Consumer Cyclical	2	0.0	0.0	0.5	0.7	0.4	0.6
Industrial	1	10.5	—	14.6	—	4.1	—



Bangladesh	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	97	24.1	42.0	18.6	30.8	-3.8	17.2
Basic Materials	15	5.2	15.4	4.5	18.1	-0.0	11.5
Communications	7	2.4	14.9	1.7	11.6	-0.2	3.6
Consumer Cyclical	59	12.8	57.0	11.1	50.0	-0.6	16.0
Consumer Non-cyclical	40	11.0	31.8	8.8	34.5	0.3	12.7
Diversified	1	76.8	—	61.5	—	-15.2	—
Energy	5	10.6	12.3	9.2	5.1	-1.8	8.0
Industrial	30	13.3	17.3	11.5	15.9	-0.1	6.0
Technology	1	2.5	—	3.1	—	0.7	—
Utilities	7	4.8	28.9	5.0	28.3	-0.1	0.9



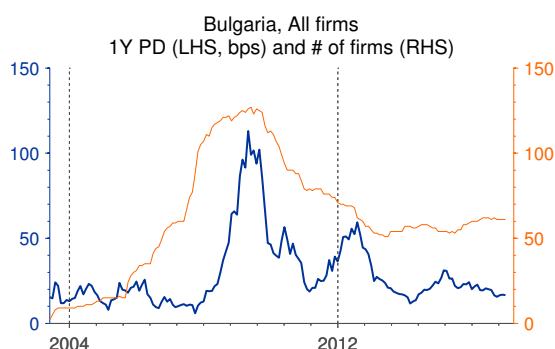
Belgium	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	31	1.5	86.2	1.9	56.9	-0.3	29.9
Basic Materials	7	9.4	9.5	3.0	14.0	-0.4	5.7
Communications	6	4.7	69.2	2.6	10.5	-1.3	59.0
Consumer Cyclical	6	4.4	2.7	2.8	3.3	0.2	1.8
Consumer Non-cyclical	24	4.3	7.2	3.2	8.1	-1.0	5.5
Diversified	4	0.8	1.8	0.2	1.1	-0.6	0.8
Energy	2	43.9	37.8	31.8	19.3	-12.1	18.5
Industrial	24	6.0	19.4	3.5	10.3	-1.4	12.4
Technology	5	3.0	3.6	2.2	5.2	-0.3	2.5
Utilities	2	1.3	0.2	0.9	0.6	-0.4	0.4



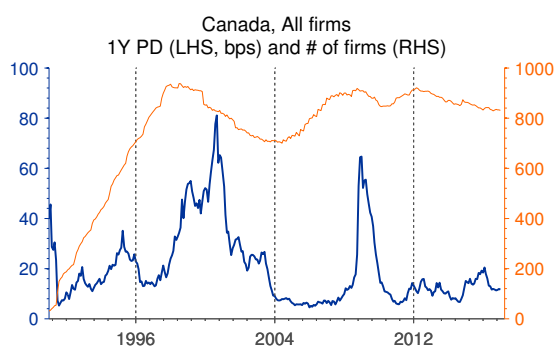
Bosnia and Herzegovina	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	3	66.8	12.4	49.3	31.5	-2.8	25.7
Basic Materials	4	29.7	122.6	23.8	2.1	-5.9	120.6
Communications	2	6.7	5.3	5.0	4.2	-1.7	1.1
Consumer Cyclical	1	40.6	—	69.2	—	28.6	—
Consumer Non-cyclical	2	4.6	5.3	7.9	1.3	3.3	6.6
Energy	2	28.2	26.2	24.6	21.6	-3.6	4.6
Industrial	3	49.6	39.9	40.9	60.4	12.4	28.2
Utilities	4	87.5	209.1	58.6	53.8	-33.8	158.0



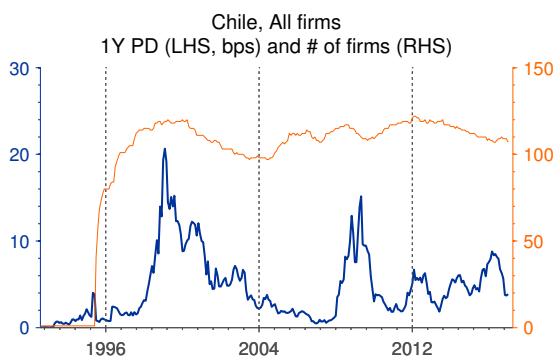
Brazil	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	55	43.0	178.9	34.7	176.2	-2.9	71.2
Basic Materials	20	61.5	131.3	63.8	114.8	7.8	110.8
Communications	8	43.0	298.0	29.0	205.7	-5.2	101.1
Consumer Cyclical	48	32.1	298.1	32.5	315.4	-1.8	170.6
Consumer Non-cyclical	39	19.0	183.3	17.9	180.8	-0.4	78.3
Diversified	7	74.0	90.2	30.6	78.0	-0.2	60.1
Energy	11	20.6	353.3	26.5	725.3	0.3	385.7
Industrial	28	96.7	322.8	99.1	407.7	-2.3	185.9
Technology	5	7.2	47.2	3.5	67.0	0.3	21.3
Utilities	27	26.6	59.4	21.6	63.5	-0.2	32.4



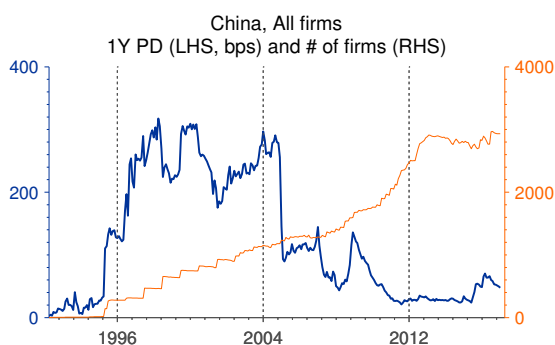
Bulgaria	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	11	17.2	32.0	9.3	19.5	-2.0	20.1
Basic Materials	3	15.1	7.2	10.5	5.6	-4.6	1.8
Communications	1	47.4	—	37.3	—	-10.1	—
Consumer Cyclical	2	10.9	0.5	10.4	5.0	-0.5	4.6
Consumer Non-cyclical	11	25.8	28.0	24.6	21.1	0.0	10.3
Diversified	10	23.4	13.4	16.1	12.6	-3.4	6.4
Energy	2	12.0	3.5	18.2	0.6	6.2	2.8
Industrial	12	6.9	22.1	3.3	16.9	-1.8	6.4
Utilities	1	7.9	—	6.2	—	-1.7	—



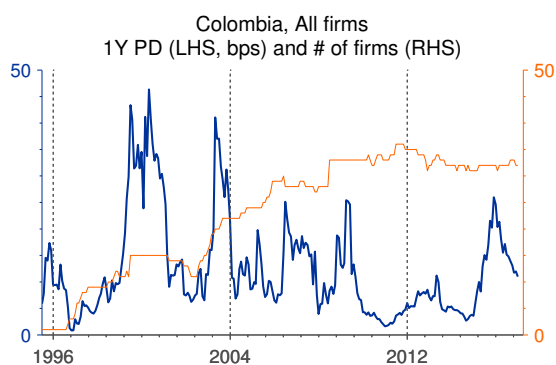
Canada	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	140	3.5	132.5	2.3	194.1	-0.2	81.3
Basic Materials	257	23.0	144.9	18.5	166.7	-1.1	121.7
Communications	47	8.6	657.8	9.6	523.3	-0.1	195.1
Consumer Cyclical	62	4.8	160.9	5.4	167.3	-0.0	61.0
Consumer Non-cyclical	110	11.6	621.5	10.8	427.6	-0.4	209.6
Diversified	6	6.6	47.9	4.4	77.1	-0.5	46.9
Energy	133	12.7	705.8	17.2	710.2	0.4	81.1
Industrial	68	6.1	86.9	6.1	94.0	-0.3	25.6
Technology	39	30.3	377.5	35.2	320.6	-0.3	133.6
Utilities	16	6.4	20.6	6.2	25.5	-0.4	9.1



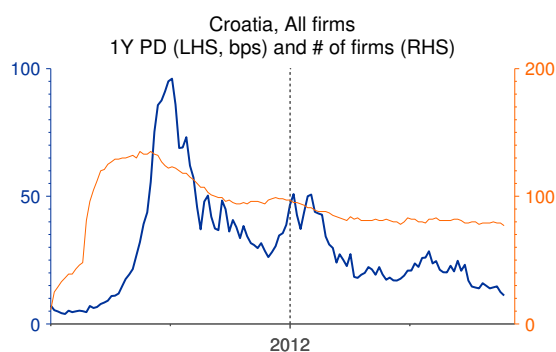
Chile	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	26	4.7	42.1	4.8	51.4	-0.0	12.7
Basic Materials	13	5.3	27.1	2.6	37.4	-0.4	13.1
Communications	3	11.7	23.8	10.4	26.6	1.5	3.3
Consumer Cyclical	11	7.8	20.6	6.0	17.0	-0.5	19.2
Consumer Non-cyclical	24	1.5	42.9	1.3	49.5	-0.2	18.7
Diversified	5	7.6	6.6	9.0	6.2	0.7	2.4
Energy	2	66.6	2.5	33.7	16.9	-32.9	19.4
Industrial	23	3.8	6.4	2.0	7.4	-0.3	4.1
Technology	1	0.6	—	1.4	—	0.8	—
Utilities	13	3.7	32.8	3.0	41.3	0.2	13.2



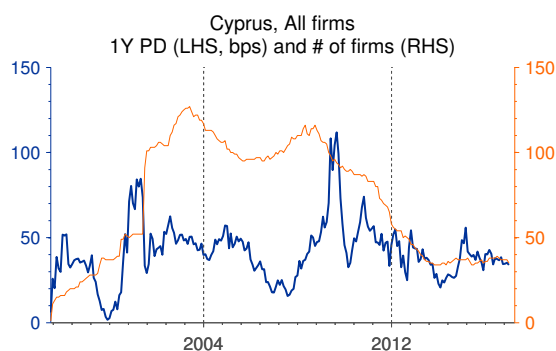
China	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	276	45.7	92.7	36.9	73.7	-4.9	42.0
Basic Materials	395	67.7	84.4	54.0	83.9	-6.6	47.7
Communications	201	26.8	121.5	22.6	226.5	-1.8	119.8
Consumer Cyclical	617	44.9	124.5	35.3	123.4	-5.4	53.6
Consumer Non-cyclical	570	28.0	82.9	21.0	52.3	-4.5	52.1
Diversified	33	90.8	72.8	76.2	64.2	-15.2	37.3
Energy	116	69.6	91.6	49.7	108.6	-8.4	45.9
Industrial	1021	56.0	111.1	44.3	98.6	-7.2	48.2
Technology	215	28.9	54.5	24.4	56.8	-2.1	20.4
Utilities	88	63.2	83.9	50.2	64.0	-10.5	35.5



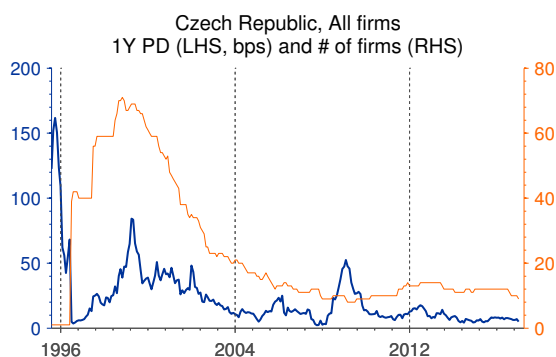
Colombia	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	9	27.4	35.5	33.3	32.2	-1.6	16.8
Basic Materials	2	13.6	7.3	15.1	16.6	1.5	9.3
Communications	1	2.3	—	1.3	—	-1.0	—
Consumer Cyclical	2	91.3	48.4	82.1	66.5	-9.2	18.1
Consumer Non-cyclical	1	0.4	—	0.2	—	-0.2	—
Diversified	2	62.4	58.6	61.0	47.7	-1.4	10.9
Energy	3	23.8	13.7	18.6	8.2	-5.2	5.5
Industrial	9	11.5	8.0	9.6	9.6	0.2	3.5
Utilities	3	14.9	7.5	11.7	6.3	-2.6	1.2



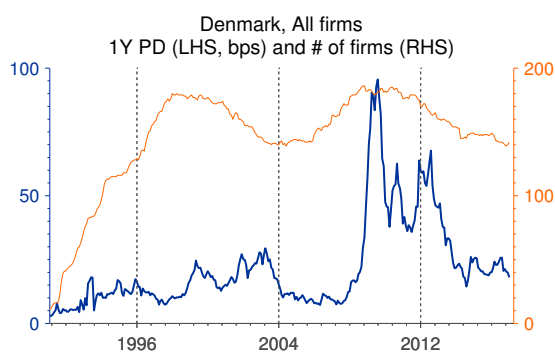
Croatia	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	9	17.4	37.3	17.6	41.1	-0.2	25.3
Basic Materials	3	55.4	41.0	90.4	28.1	12.9	25.4
Communications	4	17.0	62.1	7.1	25.5	-9.9	36.7
Consumer Cyclical	28	7.5	92.0	8.2	40.7	-0.9	52.4
Consumer Non-cyclical	24	16.1	34.0	19.6	38.3	2.0	14.0
Diversified	1	56.5	—	42.0	—	-14.5	—
Energy	2	2.2	2.9	2.0	2.3	-0.2	0.6
Industrial	15	37.3	29.0	24.3	56.8	-7.2	48.0



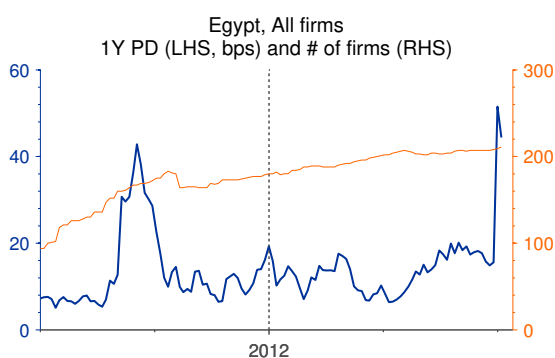
Cyprus	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	14	37.6	131.0	37.1	62.6	-1.1	76.5
Basic Materials	3	32.4	14.3	26.3	5.3	-8.8	10.3
Consumer Cyclical	5	47.5	47.8	48.5	41.4	-6.5	14.2
Consumer Non-cyclical	8	35.1	186.7	23.3	130.2	-5.5	57.0
Energy	4	62.8	292.2	99.0	4128.5	46.9	3836.7
Industrial	5	14.7	74.4	9.3	79.5	0.2	11.2
Technology	2	55.8	68.4	43.3	54.5	-12.6	13.9



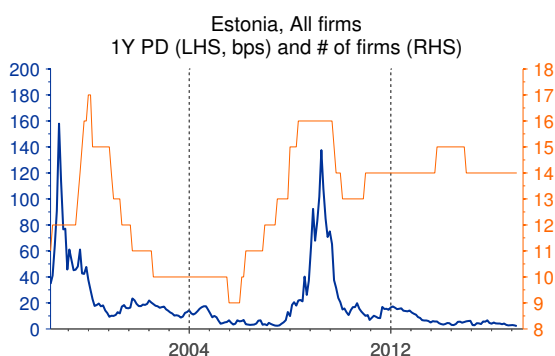
Czech Republic	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	2	14.6	12.4	10.9	5.7	-3.7	6.7
Communications	1	5.3	—	3.7	—	-1.7	—
Consumer Cyclical	2	8.3	5.4	3.6	2.6	-4.7	2.7
Consumer Non-cyclical	2	3.1	1.4	2.5	0.2	-0.6	1.2
Diversified	1	4.0	—	6.3	—	2.3	—
Energy	2	7.8	3.5	6.3	5.3	-1.5	1.9
Industrial	1	7.2	—	3.8	—	-3.4	—
Utilities	1	12.9	—	12.6	—	-0.2	—



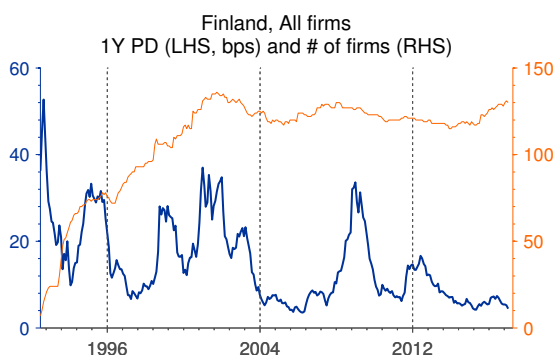
Denmark	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	43	27.9	96.5	23.6	40.9	-4.9	74.1
Basic Materials	1	2.8	—	1.7	—	-1.1	—
Communications	8	23.6	18.3	12.5	28.5	-2.0	15.9
Consumer Cyclical	16	23.1	36.4	13.2	29.5	-9.8	10.5
Consumer Non-cyclical	31	7.3	17.1	6.6	15.8	-0.8	6.0
Diversified	2	2.7	3.7	0.8	1.2	-1.8	2.6
Energy	2	28.4	19.9	16.5	15.6	-11.9	4.3
Industrial	32	23.6	91.0	12.2	63.5	-6.2	31.7
Technology	10	21.0	55.0	19.0	64.7	5.1	14.7
Utilities	2	30.0	34.8	24.4	27.6	-5.7	7.1



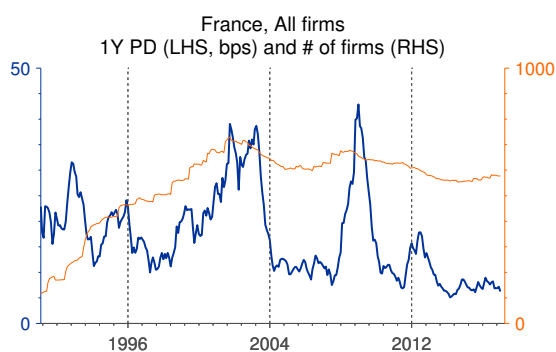
Egypt	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	68	66.4	95.2	45.0	61.2	-18.4	42.8
Basic Materials	21	47.1	90.0	14.3	51.2	-18.9	51.3
Communications	7	54.5	44.1	61.3	50.0	2.2	10.7
Consumer Cyclical	22	55.3	47.6	40.1	38.8	-11.2	27.0
Consumer Non-cyclical	45	34.6	67.6	17.9	39.9	-13.2	49.7
Diversified	1	3.5	—	1.6	—	-1.9	—
Energy	1	108.5	—	99.4	—	-9.2	—
Industrial	36	51.4	71.0	34.9	44.7	-21.1	31.9
Technology	1	30.1	—	26.0	—	-4.1	—
Utilities	1	109.7	—	95.5	—	-14.2	—



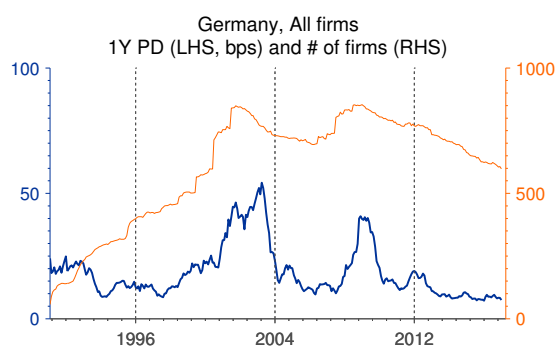
Estonia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	3	16.6	9.6	24.4	16.0	5.4	7.9
Communications	1	2.4	—	2.2	—	-0.1	—
Consumer Cyclical	5	2.0	20.6	2.1	14.8	0.0	6.6
Consumer Non-cyclical	1	19.3	—	4.5	—	-14.8	—
Industrial	4	1.5	2.6	1.4	3.4	-0.1	0.7
Utilities	1	0.3	—	0.2	—	-0.0	—



Finland	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	20	8.2	5.8	5.0	6.0	-0.1	3.4
Basic Materials	7	4.7	1.3	3.7	1.8	-0.1	1.3
Communications	13	5.4	17.7	2.8	11.7	-2.5	11.7
Consumer Cyclical	13	3.6	9.1	3.4	4.9	-1.1	6.1
Consumer Non-cyclical	23	4.5	132.2	4.1	86.2	-0.7	48.3
Energy	2	45.6	62.0	32.2	42.1	-13.5	20.0
Industrial	38	5.1	35.3	4.7	24.7	-1.3	11.8
Technology	14	5.8	23.3	4.1	18.3	-1.1	6.0
Utilities	1	4.0	—	2.1	—	-1.9	—



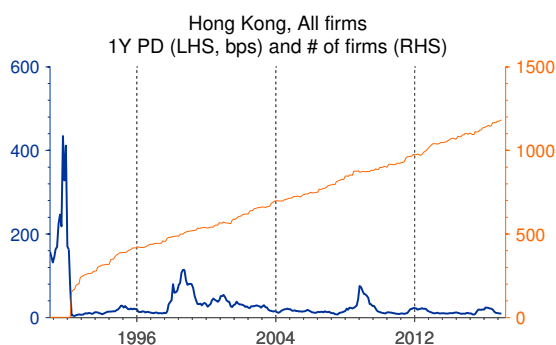
France	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	86	5.6	33.8	5.0	28.0	-0.7	10.4
Basic Materials	19	11.6	47.4	10.5	59.9	-0.0	13.5
Communications	63	8.9	29.7	8.6	20.9	-1.4	12.9
Consumer Cyclical	83	6.7	61.4	5.7	26.4	-0.8	50.3
Consumer Non-cyclical	132	5.0	14.6	3.9	13.0	-0.6	8.0
Diversified	9	24.0	57.2	18.6	42.9	-2.7	29.7
Energy	14	13.3	34.8	7.9	63.4	-1.0	33.4
Industrial	113	6.7	30.3	4.4	29.7	-1.0	17.3
Technology	66	4.2	21.0	4.9	19.8	-0.6	5.2
Utilities	11	8.0	11.9	7.3	9.3	-1.1	3.7



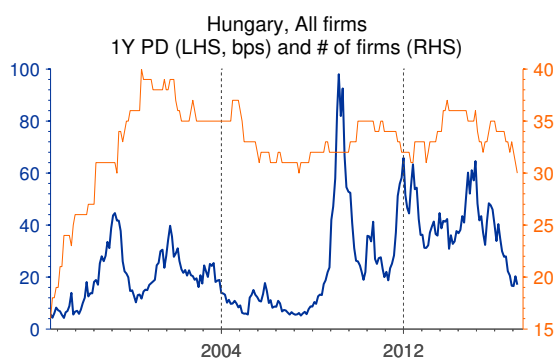
Germany	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	149	10.0	70.5	8.2	29.8	-1.1	49.1
Basic Materials	26	5.9	23.7	5.7	48.3	-0.5	25.4
Communications	61	11.1	71.3	8.3	29.3	-1.4	51.0
Consumer Cyclical	79	8.2	387.5	6.1	361.7	-1.9	52.4
Consumer Non-cyclical	97	7.0	43.2	5.4	33.1	-0.7	27.6
Diversified	4	58.4	38.5	39.8	34.2	-6.8	34.6
Energy	17	12.2	708.1	12.3	689.4	-2.1	43.3
Industrial	127	7.2	298.7	5.4	222.9	-1.6	147.5
Technology	70	5.4	21.2	4.3	20.1	-1.1	10.5
Utilities	10	7.5	41.7	5.7	53.4	-0.6	16.9



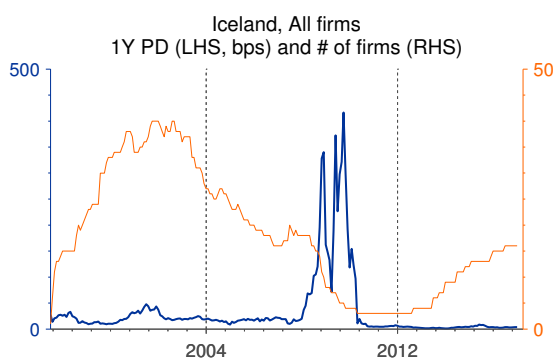
Greece	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	17	33.5	128.4	18.4	83.5	-3.0	96.3
Basic Materials	10	31.8	92.5	17.3	54.0	-2.0	92.2
Communications	11	93.2	495.9	101.3	265.1	-17.7	246.7
Consumer Cyclical	34	40.2	130.1	42.4	85.9	-0.4	92.5
Consumer Non-cyclical	33	48.6	67.0	35.2	39.5	-12.6	48.1
Diversified	1	27.4	-	21.4	-	-6.0	-
Energy	5	25.6	25.0	16.5	32.4	-1.7	11.2
Industrial	49	68.7	202.2	46.4	428.4	-11.9	257.4
Technology	8	28.1	25.3	21.3	25.8	-3.1	19.4
Utilities	4	6.8	14.7	5.5	10.4	-1.4	4.4



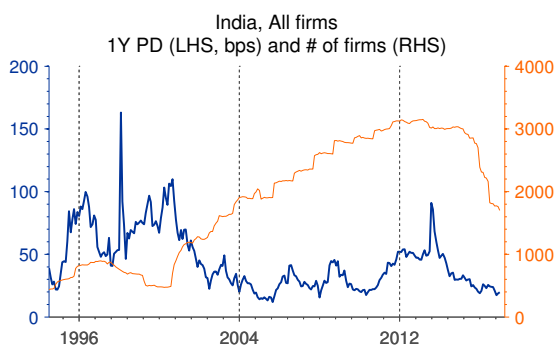
Hong Kong	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	285	8.6	40.6	6.2	37.2	-0.6	19.0
Basic Materials	62	13.8	87.6	8.6	57.1	-0.4	48.9
Communications	78	9.2	31.1	7.4	30.3	-0.9	9.2
Consumer Cyclical	278	5.3	33.3	4.3	32.9	-0.5	10.4
Consumer Non-cyclical	163	5.5	35.0	5.8	46.2	-0.2	26.2
Diversified	40	5.5	33.7	4.6	31.3	-1.1	13.5
Energy	43	24.5	78.9	22.6	82.4	-1.8	26.6
Industrial	230	10.4	71.2	8.7	60.0	-0.4	24.9
Technology	57	11.1	56.6	9.9	35.7	-0.8	32.8
Utilities	21	11.1	13.7	9.3	8.1	-2.7	7.7



Hungary	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	8	13.7	45.5	14.7	32.5	0.1	16.4
Communications	4	58.4	97.0	70.8	119.9	12.4	23.0
Consumer Cyclical	2	31.1	37.5	27.8	31.9	-3.3	5.7
Consumer Non-cyclical	6	23.4	34.5	18.5	19.5	-3.7	23.4
Diversified	2	34.8	4.0	29.0	20.7	-5.8	16.7
Energy	4	30.5	109.9	22.8	16.8	-8.1	98.7
Industrial	1	30.6	—	24.0	—	-6.6	—
Technology	2	22.2	6.9	22.5	18.4	0.3	11.5
Utilities	3	2.5	4.3	1.3	4.1	-0.8	0.5



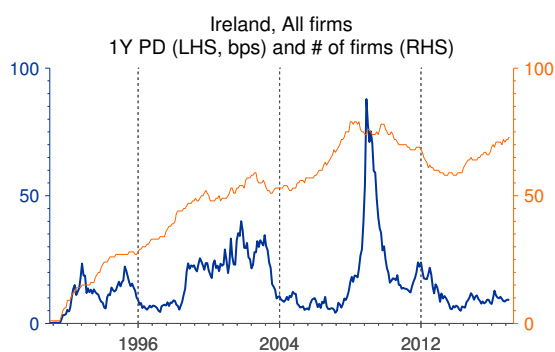
Iceland	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	5	4.5	3.1	3.3	3.5	-1.2	2.0
Communications	2	4.3	0.7	3.1	0.7	-1.2	0.0
Consumer Cyclical	2	6.7	8.7	26.6	35.6	19.9	26.9
Consumer Non-cyclical	2	63.5	74.9	8.4	2.2	-55.1	77.2
Energy	1	3.5	—	10.6	—	7.2	—
Industrial	2	9.1	11.8	5.9	7.0	-3.1	4.7
Technology	1	9.0	—	3.3	—	-5.8	—



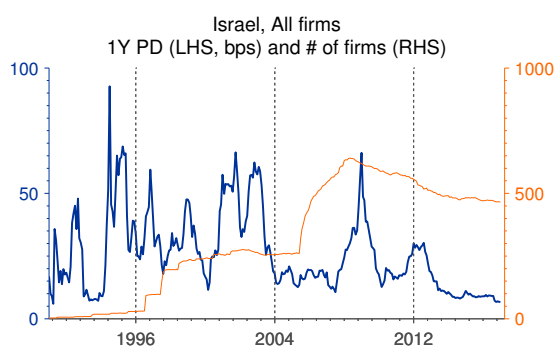
India	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	235	26.3	155.0	25.8	132.2	-1.4	34.4
Basic Materials	244	15.0	71.3	14.7	56.1	-1.0	26.9
Communications	75	16.9	81.5	13.6	61.2	-1.1	24.7
Consumer Cyclical	371	14.8	68.5	12.7	75.1	-1.6	41.9
Consumer Non-cyclical	314	8.9	57.3	7.1	57.0	-0.4	20.0
Diversified	21	20.3	81.8	17.6	114.2	-5.4	106.2
Energy	40	23.7	57.8	20.8	85.6	-0.6	36.5
Industrial	412	16.8	77.9	13.4	85.7	-2.0	31.2
Technology	101	7.7	81.1	7.7	88.1	-0.0	14.5
Utilities	34	35.4	124.2	23.6	169.4	-4.0	79.1



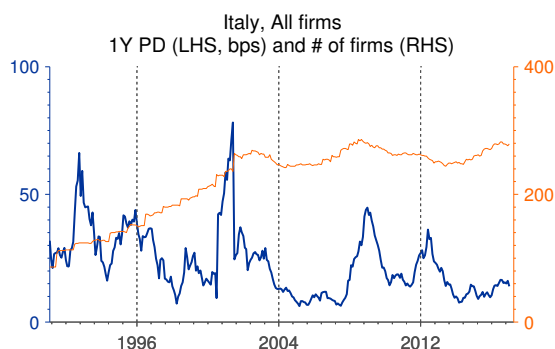
Indonesia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	131	25.2	39.1	28.5	39.8	-0.0	19.9
Basic Materials	45	19.0	67.8	19.4	51.9	0.0	28.1
Communications	28	25.6	82.0	20.8	76.0	-0.8	16.6
Consumer Cyclical	70	15.1	31.5	12.5	31.8	0.0	12.8
Consumer Non-cyclical	77	13.8	34.4	15.0	54.9	-0.0	28.0
Diversified	1	95.7	—	72.2	—	-23.5	—
Energy	33	8.4	73.9	8.1	79.5	-0.0	30.6
Industrial	76	19.3	40.9	15.4	49.9	-0.4	33.3
Technology	7	2.2	27.4	2.8	27.5	0.5	3.4
Utilities	4	20.1	23.9	15.3	16.9	-0.2	14.7



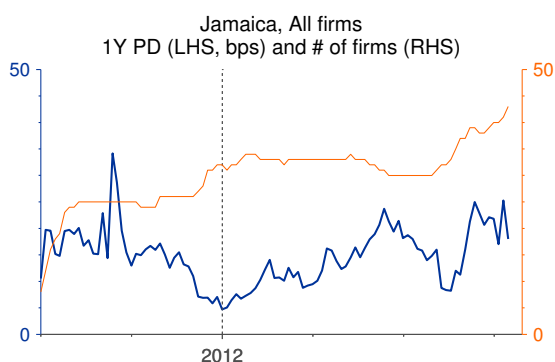
Ireland	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	9	10.8	22.4	7.0	18.3	-0.4	5.5
Basic Materials	11	20.8	39.9	30.5	49.5	1.4	16.8
Communications	4	52.6	96.7	38.2	72.1	-14.4	24.7
Consumer Cyclical	7	9.1	26.7	6.4	5.2	-2.8	29.1
Consumer Non-cyclical	26	6.1	720.6	4.8	269.6	-0.1	488.5
Energy	8	28.2	114.9	52.7	33.5	7.1	104.5
Industrial	6	5.3	13.8	3.0	9.5	-2.0	4.3
Technology	1	0.0	—	0.0	—	-0.0	—



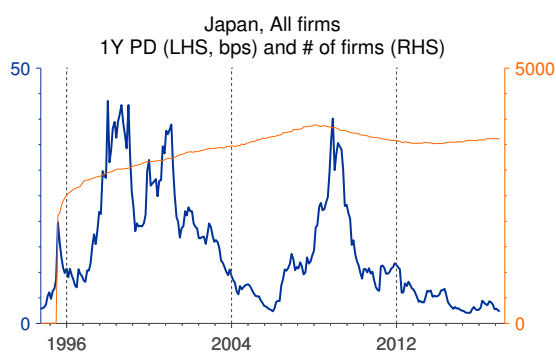
Israel	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	118	9.5	88.7	9.2	74.9	-1.1	24.4
Basic Materials	14	8.6	49.9	7.0	35.4	-0.4	15.2
Communications	33	11.8	71.7	8.6	100.2	-1.3	34.7
Consumer Cyclical	50	7.5	36.6	6.1	27.9	-0.9	19.9
Consumer Non-cyclical	100	10.0	61.0	7.8	63.3	-0.4	26.1
Diversified	9	9.0	9.7	7.1	9.3	-1.5	3.0
Energy	31	7.5	26.3	5.6	27.1	-0.6	4.7
Industrial	80	5.8	39.7	5.8	38.3	-0.5	24.6
Technology	35	3.4	32.4	3.0	36.3	-0.2	17.2



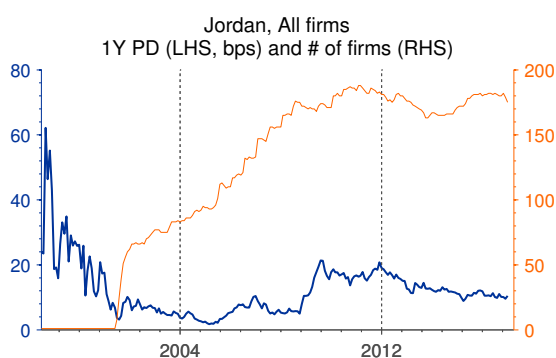
Italy	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	59	26.4	84.1	15.7	61.9	-6.3	27.4
Basic Materials	4	10.7	6.0	7.0	5.0	-4.0	1.3
Communications	37	21.5	22.7	12.6	17.3	-6.4	9.9
Consumer Cyclical	49	12.7	26.6	5.9	24.3	-4.2	9.9
Consumer Non-cyclical	39	10.1	35.4	5.7	21.7	-2.7	19.0
Diversified	3	13.1	12.0	4.9	3.4	-8.3	8.6
Energy	18	12.5	58.8	8.8	22.4	-2.4	40.5
Industrial	51	12.0	38.8	5.4	26.7	-4.6	17.0
Technology	16	11.6	14.5	9.2	7.2	-1.4	10.9
Utilities	12	9.6	15.6	5.2	22.5	-3.7	7.5



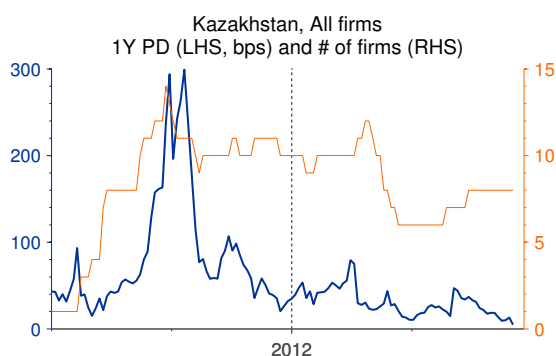
Jamaica	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	15	19.4	35.0	11.4	24.1	-2.6	16.8
Basic Materials	2	58.9	54.9	35.1	45.7	-23.8	9.2
Communications	3	168.0	87.3	120.3	86.1	-4.0	29.0
Consumer Cyclical	6	5.8	15.2	5.1	7.3	-0.2	10.0
Consumer Non-cyclical	13	14.7	29.6	12.5	20.6	-2.4	9.9
Diversified	3	28.5	26.3	35.3	19.5	0.4	12.4
Industrial	4	1.5	8.9	7.9	29.3	-0.1	30.9
Technology	1	0.3	—	0.3	—	-0.1	—



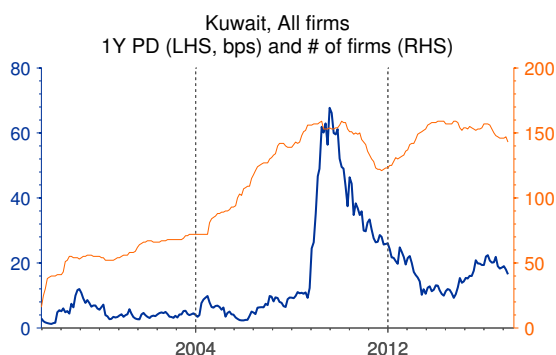
Japan	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	346	7.4	19.4	7.9	24.9	0.1	9.3
Basic Materials	237	2.4	4.6	1.8	4.7	-0.1	2.6
Communications	275	1.4	7.5	1.1	7.1	-0.1	5.6
Consumer Cyclical	854	2.0	24.1	1.7	25.3	-0.1	7.0
Consumer Non-cyclical	620	0.8	5.7	0.7	58.2	-0.0	55.6
Diversified	3	14.3	7.8	9.8	9.2	0.5	3.4
Energy	17	3.0	8.6	3.9	10.5	0.1	5.2
Industrial	966	2.2	8.7	1.9	9.1	-0.1	3.1
Technology	300	1.4	19.2	1.1	19.3	-0.1	3.3
Utilities	21	6.3	16.4	5.0	17.3	-0.4	3.1



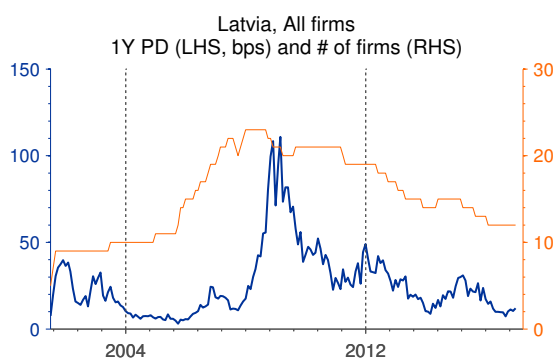
Jordan	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	93	7.7	36.9	6.5	32.5	-0.4	16.8
Basic Materials	16	13.5	33.5	13.0	34.9	-0.6	20.6
Communications	2	38.9	19.4	40.5	27.7	1.6	8.3
Consumer Cyclical	15	13.0	55.5	15.4	60.6	0.4	11.3
Consumer Non-cyclical	29	9.9	38.0	10.7	35.4	-0.3	20.2
Diversified	2	31.9	44.3	22.9	32.1	-9.0	12.2
Energy	2	6.0	8.4	5.0	7.0	-1.0	1.3
Industrial	21	20.1	117.8	18.8	106.9	-0.4	14.6
Technology	1	15.7	—	15.1	—	-0.6	—
Utilities	2	32.3	10.5	33.5	18.8	1.1	8.3



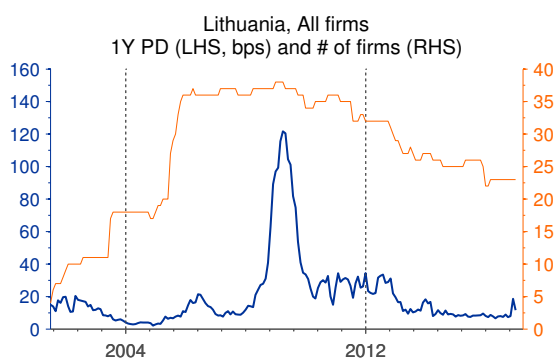
Kazakhstan	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	3	91.5	71.5	108.9	86.6	17.4	15.5
Basic Materials	1	12.2	—	5.7	—	-6.5	—
Communications	1	3.2	—	1.9	—	-1.3	—
Energy	2	2.4	2.6	1.5	1.9	-0.9	0.8
Utilities	1	9.4	—	6.6	—	-2.8	—



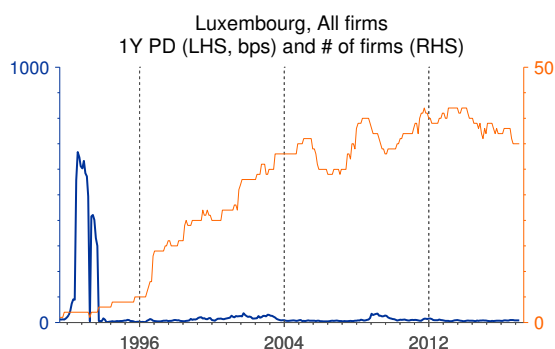
Kuwait	2016Q4			2017Q1		Q1-Q4	
	#	Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	87	23.5	71.1	22.6	69.6	-4.2	15.9
Basic Materials	4	3.9	12.5	3.3	16.3	-0.3	4.0
Communications	6	7.0	23.5	3.9	71.0	-0.5	52.2
Consumer Cyclical	12	26.6	28.9	18.1	28.4	-1.3	13.9
Consumer Non-cyclical	11	5.6	26.6	2.9	15.1	-0.9	13.3
Diversified	5	16.1	10.9	13.6	13.6	-0.1	6.1
Energy	7	48.6	81.4	43.8	93.6	-0.2	59.5
Industrial	23	20.9	21.7	14.9	19.2	-4.1	7.6
Technology	1	0.5	—	0.3	—	-0.2	—



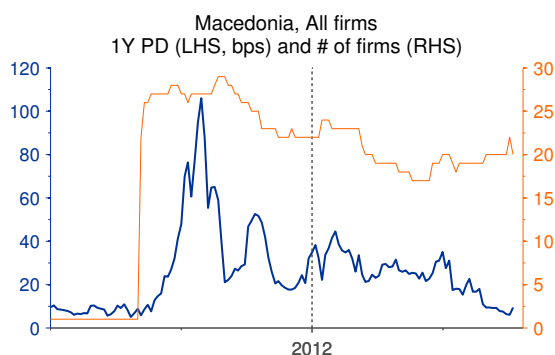
Latvia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Communications	1	2.3	—	1.1	—	-1.2	—
Consumer Cyclical	2	73.9	77.0	64.7	58.0	-9.2	19.0
Consumer Non-cyclical	3	9.7	7.0	6.6	3.5	-3.1	4.0
Industrial	3	25.1	15.4	37.7	18.3	0.1	7.8
Utilities	1	5.5	—	6.2	—	0.7	—



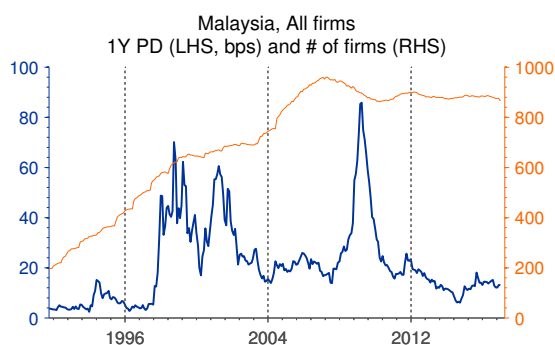
Lithuania	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	6	3.6	18.6	2.4	20.0	-0.3	2.2
Basic Materials	1	1.6	—	2.7	—	1.0	—
Communications	1	9.5	—	13.1	—	3.6	—
Consumer Cyclical	5	21.3	24.0	12.8	27.0	0.0	5.4
Consumer Non-cyclical	9	28.7	22.6	6.2	25.4	0.6	8.6
Energy	1	1.3	—	2.3	—	1.0	—
Industrial	2	36.7	6.1	46.4	2.0	9.7	8.2
Utilities	4	11.2	10.8	9.4	12.2	-0.3	3.4



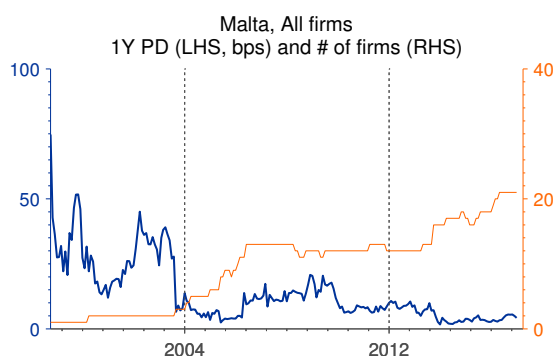
Luxembourg	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	9	11.8	35.9	8.4	137.5	-0.0	106.2
Basic Materials	5	9.8	13.9	8.1	11.7	-1.0	2.9
Communications	4	13.9	640.7	11.4	116.1	-4.4	524.6
Consumer Cyclical	2	109.8	148.1	16.3	18.2	-93.5	129.9
Consumer Non-cyclical	4	4.9	25.2	2.6	20.2	-2.4	5.1
Industrial	7	12.4	61.4	9.9	41.7	-2.5	20.3
Technology	3	1.4	1.5	1.0	1.0	-0.3	0.5
Utilities	1	34.1	—	22.3	—	-11.8	—



Macedonia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	7	9.4	53.5	10.4	44.3	-2.3	10.9
Basic Materials	3	27.8	8.4	30.3	13.4	-0.6	6.1
Communications	1	3.4	—	2.0	—	-1.3	—
Consumer Cyclical	2	6.2	8.7	6.6	9.3	0.4	0.5
Consumer Non-cyclical	4	1.5	2.1	1.2	2.6	-0.2	0.6
Industrial	2	28.1	33.9	21.5	22.7	-6.6	11.2
Utilities	1	29.0	—	36.9	—	7.9	—



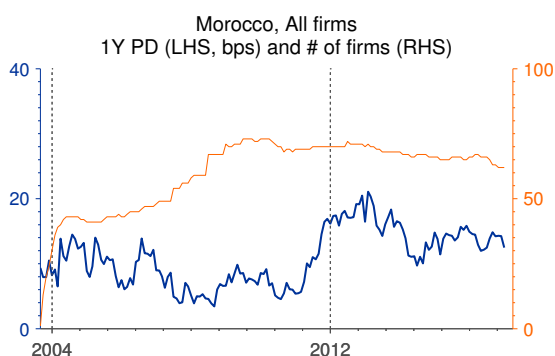
Malaysia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	126	13.5	104.6	11.3	66.5	-1.2	49.0
Basic Materials	67	19.2	192.0	14.9	201.6	-0.9	49.5
Communications	38	13.1	74.4	8.7	40.1	-5.6	39.6
Consumer Cyclical	119	15.3	51.7	10.8	40.8	-1.7	20.5
Consumer Non-cyclical	148	4.7	136.2	3.6	184.5	-0.1	77.6
Diversified	25	8.3	169.5	7.3	89.6	-1.1	82.8
Energy	32	59.6	247.4	39.8	167.1	-7.9	191.1
Industrial	279	18.8	164.7	10.8	114.7	-2.2	107.0
Technology	63	23.7	67.2	16.7	54.8	-1.5	35.0
Utilities	6	5.0	25.0	7.0	27.0	1.6	3.4



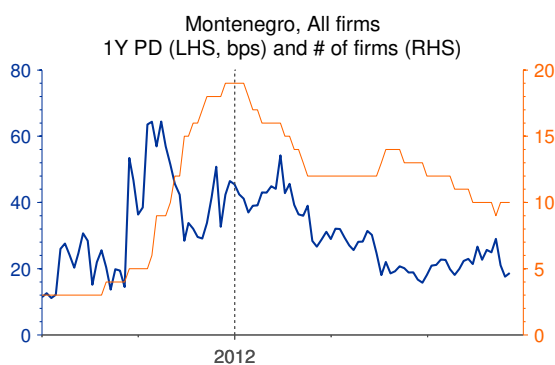
Malta	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	12	4.1	10.3	5.4	10.6	0.6	2.1
Communications	3	6.7	24.0	8.3	12.0	-0.2	12.3
Consumer Cyclical	5	2.8	5.5	3.1	6.0	-1.1	3.5
Consumer Non-cyclical	2	4.5	6.1	5.2	7.1	0.6	1.0
Energy	1	19.9	—	17.0	—	-2.9	—
Industrial	1	0.1	—	0.0	—	-0.1	—



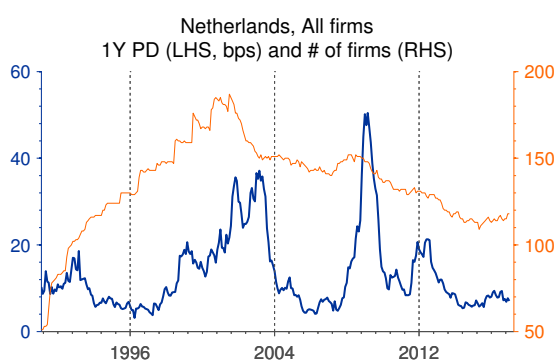
Mexico	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	30	3.9	27.0	5.5	24.9	1.0	12.7
Basic Materials	11	7.6	8.4	5.4	11.5	-0.4	7.0
Communications	5	19.8	62.9	20.0	73.0	0.0	13.5
Consumer Cyclical	24	3.5	49.2	4.8	55.4	0.1	19.3
Consumer Non-cyclical	15	1.3	11.5	2.4	8.0	0.0	4.2
Diversified	5	6.1	9.2	5.0	8.1	0.1	2.5
Industrial	18	2.8	192.7	7.0	471.9	0.2	409.0
Utilities	2	3.3	3.9	8.4	10.3	5.1	6.4



Morocco	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	19	15.9	19.8	15.8	17.0	-0.9	5.3
Basic Materials	9	26.5	19.1	17.6	21.6	-2.3	11.4
Communications	1	0.3	—	0.2	—	-0.1	—
Consumer Cyclical	7	14.1	35.7	14.9	39.3	0.5	6.4
Consumer Non-cyclical	8	3.6	10.3	3.4	5.8	-0.5	5.4
Diversified	1	240.6	—	31.6	—	-209.0	—
Energy	1	1.4	—	1.5	—	0.1	—
Industrial	10	42.5	55.8	45.4	48.3	-1.0	23.7
Technology	4	12.3	7.1	11.2	6.7	-3.7	2.8
Utilities	3	4.9	15.3	4.6	16.8	0.0	1.5



Montenegro	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Communications	1	6.3	—	7.6	—	1.3	—
Consumer Cyclical	4	19.7	16.2	19.5	13.9	-0.7	3.6
Consumer Non-cyclical	5	29.3	6.8	23.8	6.7	-5.5	4.8
Energy	1	51.7	—	31.4	—	-20.3	—
Utilities	2	14.4	10.9	12.7	10.5	-1.7	0.4



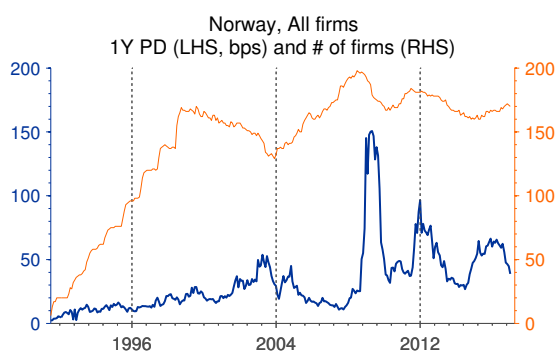
Netherlands	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	22	13.9	47.4	10.1	60.3	-0.8	20.3
Basic Materials	6	2.1	54.2	1.4	43.5	-1.1	10.8
Communications	11	11.5	117.0	8.3	55.8	-3.0	67.9
Consumer Cyclical	12	3.4	197.7	2.1	213.0	-0.8	16.2
Consumer Non-cyclical	33	5.0	28.7	4.8	21.4	-0.5	12.5
Energy	8	12.5	10.5	9.8	17.4	-0.8	12.5
Industrial	19	10.3	15.1	5.6	12.2	-1.3	8.4
Technology	14	4.2	30.0	2.9	13.6	-0.8	26.2



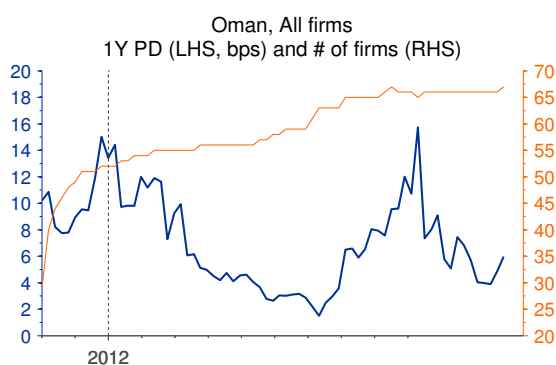
New Zealand	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	20	0.2	64.3	0.1	63.3	-0.0	23.0
Basic Materials	2	19.8	6.7	33.8	10.0	14.0	3.4
Communications	8	11.2	24.6	8.8	12.9	0.0	18.1
Consumer Cyclical	15	1.5	12.2	1.4	13.3	-0.0	3.6
Consumer Non-cyclical	35	0.8	379.4	0.7	463.7	-0.0	84.5
Diversified	2	33.3	46.4	41.5	58.1	8.2	11.7
Energy	4	6.9	5.8	8.0	6.2	-0.2	2.2
Industrial	18	1.9	39.1	2.4	38.2	-0.0	7.8
Technology	13	5.4	21.4	5.2	21.2	-0.0	4.0
Utilities	6	0.6	0.9	0.3	0.8	-0.1	0.3



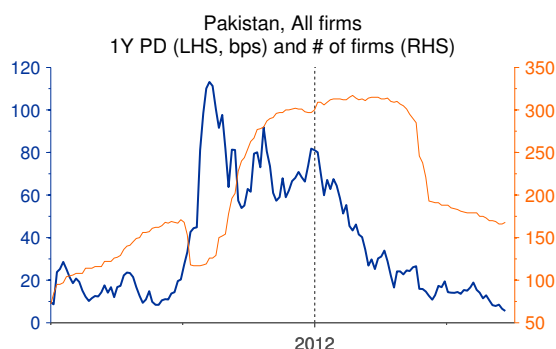
Nigeria	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	51	62.3	173.8	28.8	73.4	-36.7	103.8
Basic Materials	10	80.6	103.3	26.6	49.1	-32.9	58.7
Communications	5	24.8	91.6	16.8	15.0	-8.6	81.4
Consumer Cyclical	13	87.8	162.5	38.1	70.4	-45.6	92.8
Consumer Non-cyclical	31	36.3	108.5	14.9	50.3	-17.1	60.2
Energy	10	40.4	170.6	18.8	64.9	-23.9	106.7
Industrial	19	88.7	296.1	36.3	141.0	-56.3	156.4
Technology	3	55.9	113.4	26.1	33.3	-29.7	80.5



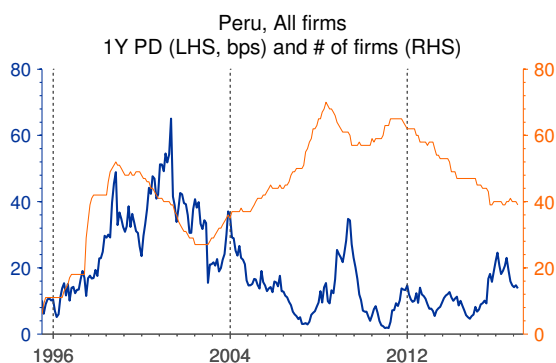
Norway	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	41	26.9	46.3	21.3	38.5	-2.9	22.9
Basic Materials	5	7.0	59.7	5.3	61.4	0.3	2.7
Communications	7	20.4	85.4	14.1	40.3	-4.0	46.4
Consumer Cyclical	7	11.0	24.7	7.5	41.8	-1.6	19.6
Consumer Non-cyclical	22	6.2	54.3	13.0	39.5	0.3	17.1
Diversified	1	2.7	—	18.4	—	15.7	—
Energy	29	49.3	44.3	44.8	44.8	-1.4	37.1
Industrial	48	39.5	177.5	26.4	46.7	-3.3	155.5
Technology	9	13.2	28.1	14.6	86.2	1.5	91.4
Utilities	2	4.9	5.3	5.4	4.0	0.4	1.3



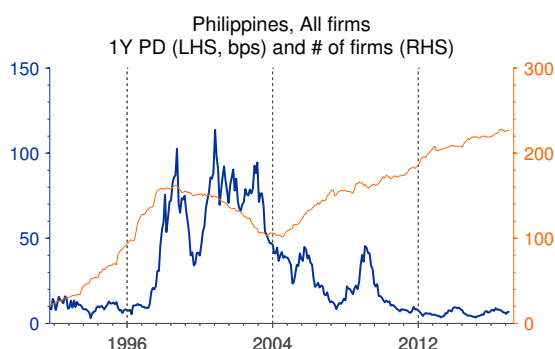
Oman	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	24	23.3	18.2	19.6	19.4	-1.4	7.7
Basic Materials	3	16.0	17.2	9.8	17.4	-0.5	3.4
Communications	2	0.7	0.9	1.2	1.7	0.6	0.8
Consumer Cyclical	1	61.0	—	14.0	—	-47.0	—
Consumer Non-cyclical	7	6.5	8.1	1.8	6.6	-1.4	2.8
Diversified	1	0.0	—	0.0	—	0.0	—
Energy	5	3.5	166.9	3.3	119.1	-0.1	48.0
Industrial	12	1.5	36.9	0.9	39.1	-0.4	12.2
Utilities	9	5.0	13.2	2.0	10.8	-1.1	4.3



Pakistan	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	35	31.4	56.6	32.4	55.2	-0.2	26.2
Basic Materials	22	7.1	50.6	3.9	40.0	-1.9	20.4
Communications	5	25.4	72.4	37.9	83.8	12.4	14.0
Consumer Cyclical	34	10.6	72.2	9.8	71.8	0.1	13.3
Consumer Non-cyclical	28	0.6	10.7	1.1	13.3	0.0	10.0
Energy	10	3.4	15.3	2.5	13.6	-0.6	7.7
Industrial	29	2.3	11.5	2.2	13.0	-0.0	7.6
Technology	1	8.0	—	3.9	—	-4.1	—
Utilities	9	18.0	42.1	15.0	38.7	-3.1	8.1



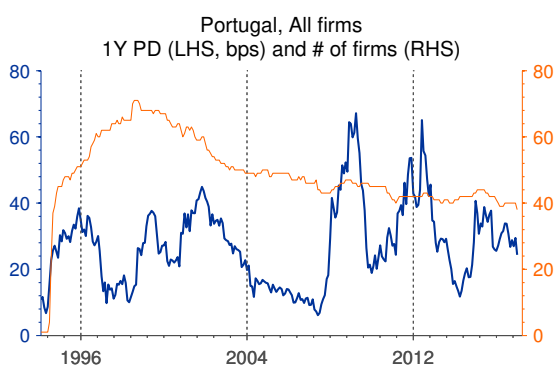
Peru	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	8	11.0	6.2	9.7	5.9	-0.9	1.4
Basic Materials	14	13.8	12.4	9.6	12.6	-1.8	8.8
Communications	2	23.2	1.6	24.3	6.0	1.1	7.6
Consumer Cyclical	1	2.7	—	2.6	—	-0.1	—
Consumer Non-cyclical	7	19.5	22.9	17.7	32.2	0.0	10.1
Diversified	2	30.1	11.3	110.2	126.4	80.1	115.1
Energy	2	73.0	102.2	71.7	99.1	-1.3	3.1
Industrial	2	23.6	2.8	20.0	8.8	-3.6	6.0
Utilities	4	1.7	8.4	2.3	6.6	0.6	1.8



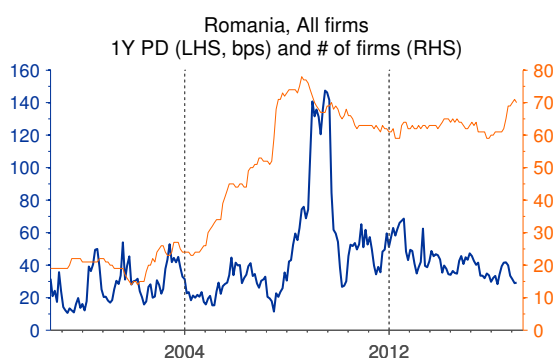
Philippines	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	78	12.6	26.3	10.6	26.9	-0.1	8.5
Basic Materials	26	7.4	42.4	8.3	46.9	-0.0	17.2
Communications	16	11.9	22.0	7.3	17.4	-0.4	6.9
Consumer Cyclical	29	5.7	20.7	5.7	20.2	-0.6	4.9
Consumer Non-cyclical	33	4.5	35.4	4.7	33.6	-0.1	9.4
Diversified	16	1.5	30.8	1.3	31.5	-0.0	8.2
Energy	12	4.6	17.5	5.3	21.0	0.1	14.0
Industrial	13	6.8	27.1	5.5	27.6	-1.1	6.6
Technology	3	4.8	2.6	2.7	1.5	-2.1	1.3
Utilities	14	3.8	10.5	2.8	8.1	-0.0	3.4



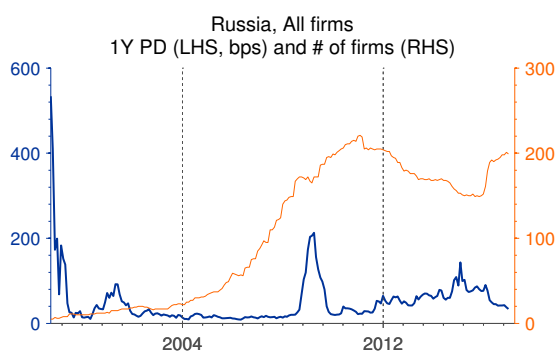
Poland	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	83	34.9	109.9	28.9	85.8	-5.7	48.6
Basic Materials	27	18.4	23.7	12.1	26.3	-1.4	12.8
Communications	33	46.3	224.1	33.7	255.2	-10.5	246.6
Consumer Cyclical	56	25.2	68.9	17.4	48.0	-3.9	38.8
Consumer Non-cyclical	61	31.5	127.2	26.7	121.9	-3.0	30.0
Energy	15	49.6	246.4	50.4	271.6	-4.2	42.9
Industrial	121	35.4	123.6	25.2	127.8	-5.7	46.2
Technology	41	22.5	142.9	19.3	72.0	-2.9	86.7
Utilities	9	39.1	27.0	27.4	20.0	-11.7	18.0



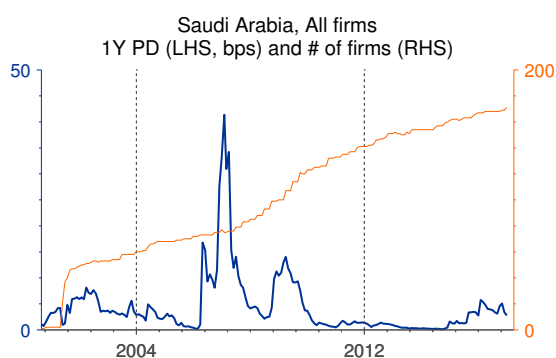
Portugal	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	3	122.5	71.7	26.1	53.7	-8.2	74.7
Basic Materials	6	8.2	24.2	4.1	22.3	-2.6	2.3
Communications	6	20.6	171.7	12.2	42.6	-8.4	130.7
Consumer Cyclical	7	55.4	52.6	27.8	41.6	-7.8	27.9
Consumer Non-cyclical	6	30.1	71.7	18.4	43.6	-8.9	28.9
Diversified	2	51.3	66.2	31.4	41.0	-19.9	25.2
Energy	1	3.3	—	1.9	—	-1.4	—
Industrial	7	51.8	49.7	30.2	48.8	-17.3	22.2
Technology	3	46.7	33.6	57.7	34.1	-1.4	8.8
Utilities	2	5.5	3.3	5.0	4.3	-0.5	1.0



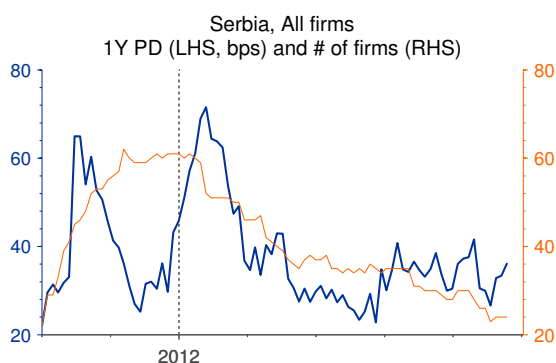
Romania	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	8	29.8	96.8	12.9	50.1	-8.8	48.0
Basic Materials	8	58.9	64.4	43.7	65.1	-11.9	34.6
Communications	1	13.6	—	14.1	—	0.5	—
Consumer Cyclical	11	29.5	25.4	18.1	34.3	-7.1	23.2
Consumer Non-cyclical	12	17.0	68.6	11.9	71.5	-3.7	13.0
Energy	8	21.4	248.6	7.7	82.3	-3.1	168.6
Industrial	25	37.4	54.0	34.2	50.9	-7.0	20.4
Utilities	4	2.8	2.4	2.0	1.6	-1.0	1.4



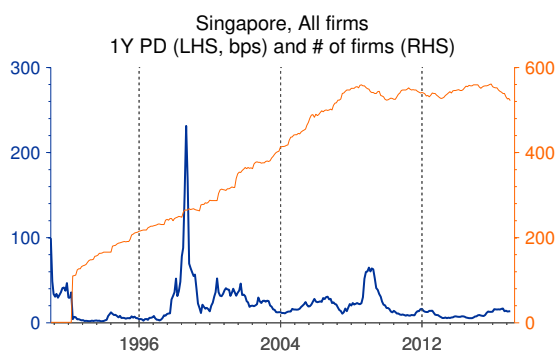
Russia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	20	52.6	30.0	57.3	31.9	-0.4	22.5
Basic Materials	34	18.8	27.3	14.4	28.0	-0.0	10.0
Communications	13	20.5	26.7	21.4	44.8	-1.5	34.4
Consumer Cyclical	18	54.5	242.7	45.9	310.2	-1.1	74.3
Consumer Non-cyclical	27	32.3	61.2	22.4	71.3	-0.4	63.3
Diversified	2	89.5	68.2	82.8	69.2	-6.7	1.0
Energy	20	21.2	88.5	23.9	50.3	-1.2	41.7
Industrial	22	39.1	175.7	34.1	373.2	0.7	200.0
Technology	3	38.0	19.1	42.4	12.3	12.2	27.8
Utilities	55	58.0	44.6	54.4	125.1	-0.9	122.7



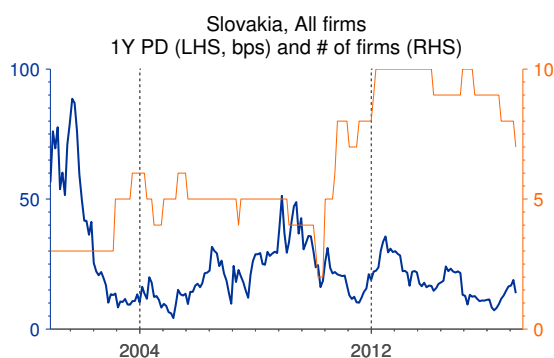
Saudi Arabia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	60	1.6	10.2	0.9	8.7	-0.3	3.2
Basic Materials	18	18.0	22.4	14.9	108.1	-1.6	106.9
Communications	7	43.6	21.4	33.7	59.5	-9.3	55.9
Consumer Cyclical	18	6.2	16.1	2.6	15.4	-0.3	6.1
Consumer Non-cyclical	26	5.9	9.4	4.9	6.1	-0.9	4.7
Diversified	3	20.1	8.4	19.0	10.8	-1.1	2.9
Energy	2	12.3	0.9	10.1	2.2	-2.2	3.1
Industrial	34	6.1	18.7	4.8	19.2	-0.4	2.8
Utilities	1	27.9	—	36.8	—	8.9	—



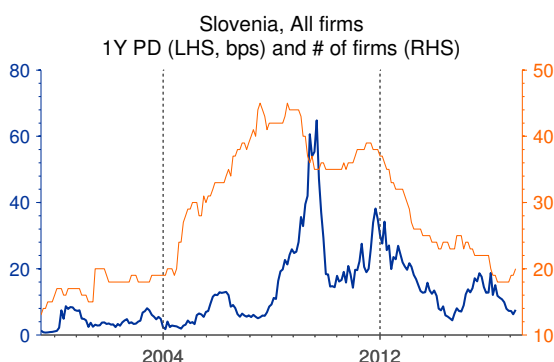
Serbia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	4	43.3	44.6	45.5	33.1	-1.3	12.4
Basic Materials	3	4.2	12.6	4.7	9.1	-0.3	3.7
Consumer Cyclical	3	4.1	44.6	2.9	43.1	-1.1	1.5
Consumer Non-cyclical	5	86.1	120.5	77.7	48.0	-1.6	92.5
Diversified	2	84.0	108.2	62.4	77.2	-21.6	31.0
Energy	1	11.2	—	9.1	—	-2.1	—
Industrial	9	55.9	58.0	37.8	120.9	-2.2	82.6



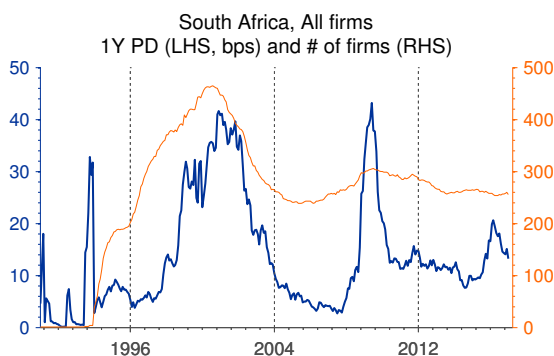
Singapore	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	116	2.8	44.6	2.5	60.4	-0.1	52.2
Basic Materials	28	15.0	68.5	13.3	100.7	-0.2	59.5
Communications	24	12.2	150.9	13.1	107.5	-0.5	73.8
Consumer Cyclical	78	14.2	114.2	10.7	66.6	-1.5	62.3
Consumer Non-cyclical	76	9.6	71.0	8.8	43.7	-0.2	37.5
Diversified	11	13.4	60.6	3.8	20.7	-10.4	43.6
Energy	26	51.1	397.8	30.9	362.4	-13.5	158.5
Industrial	176	27.0	99.0	21.7	238.4	-2.9	194.7
Technology	27	10.4	163.8	8.9	75.4	-1.1	99.2
Utilities	3	29.1	92.2	28.3	44.8	-1.3	48.6



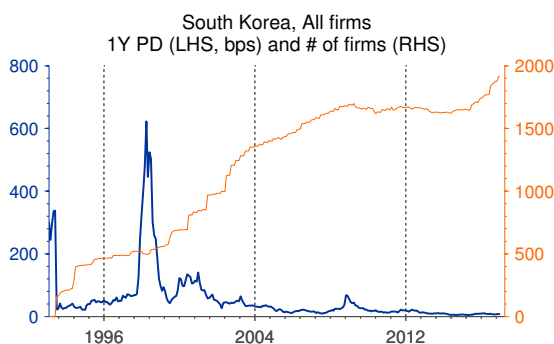
Slovakia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	4	41.0	28.2	29.6	21.8	-2.7	13.0
Basic Materials	1	55.6	—	40.0	—	-15.6	—
Consumer Cyclical	1	0.1	—	0.1	—	0.0	—
Consumer Non-cyclical	2	10.6	10.2	9.7	8.7	-1.0	1.5
Energy	1	10.5	—	11.0	—	0.4	—
Industrial	1	8.3	—	8.6	—	0.3	—
Technology	1	9.1	—	7.1	—	-1.9	—



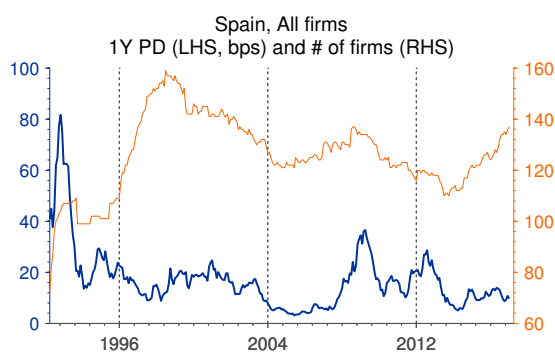
Slovenia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	6	26.6	18.3	21.7	23.9	-2.8	9.9
Basic Materials	2	6.1	8.0	7.1	9.6	1.1	1.5
Communications	1	13.2	—	1.8	—	-11.4	—
Consumer Cyclical	4	20.4	14.3	20.3	11.9	-0.9	3.4
Consumer Non-cyclical	8	3.6	21.1	4.5	30.2	0.2	10.9
Diversified	1	98.3	—	117.1	—	18.8	—
Energy	1	1.0	—	1.4	—	0.4	—
Industrial	3	22.5	30.0	16.1	31.1	0.6	4.2
Technology	1	39.5	—	36.0	—	-3.5	—



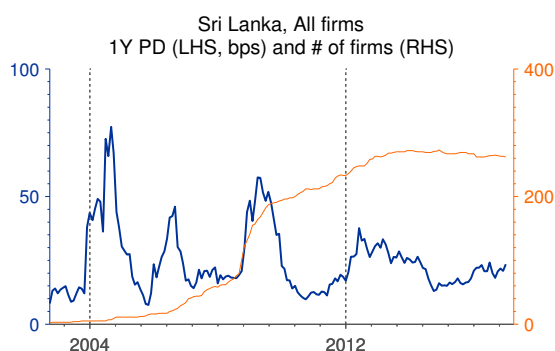
South Africa	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	79	18.8	126.2	14.9	151.2	-0.2	44.9
Basic Materials	38	28.9	93.9	21.7	141.3	-2.6	65.0
Communications	13	3.8	200.9	6.4	299.1	0.0	99.2
Consumer Cyclical	34	10.8	383.4	6.0	549.1	-0.1	200.0
Consumer Non-cyclical	36	6.8	53.3	6.9	46.2	-0.3	13.4
Diversified	9	4.7	40.6	3.2	41.0	-0.2	2.7
Energy	9	27.9	604.6	24.9	248.6	-0.5	356.4
Industrial	42	24.0	96.1	24.6	128.0	0.5	39.3
Technology	11	5.6	50.9	7.0	328.3	0.0	281.1



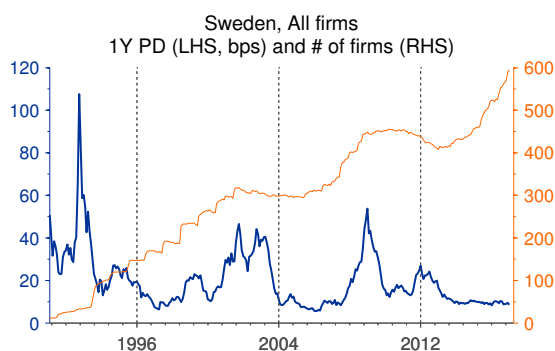
South Korea	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	92	25.2	157.0	22.2	38.6	-2.5	142.2
Basic Materials	192	5.9	23.4	5.8	46.5	0.0	34.4
Communications	199	4.3	43.3	3.7	42.0	-0.2	32.6
Consumer Cyclical	312	9.3	37.6	8.2	62.8	-0.3	40.2
Consumer Non-cyclical	328	4.1	27.3	3.2	29.1	-0.1	24.2
Diversified	50	0.0	9.1	0.0	7.6	0.0	1.5
Energy	13	8.6	54.6	5.4	43.0	-0.6	13.9
Industrial	546	9.5	68.1	8.2	299.3	-0.1	273.9
Technology	247	5.8	34.9	5.5	39.1	-0.0	23.1
Utilities	17	13.5	11.0	11.1	11.1	0.6	8.0



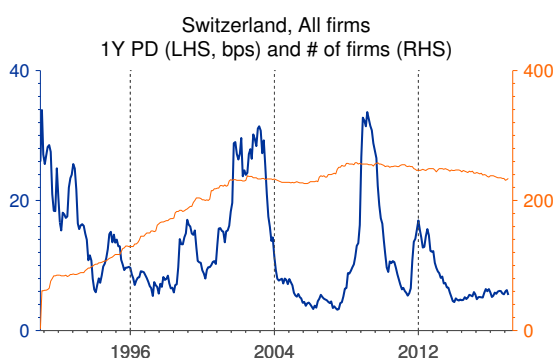
Spain	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	32	16.3	134.4	10.7	85.5	-5.1	50.2
Basic Materials	8	5.7	5.4	3.9	4.2	-2.1	2.1
Communications	18	6.1	8.2	5.9	6.5	-0.5	4.6
Consumer Cyclical	14	6.7	22.1	5.1	25.3	0.0	21.9
Consumer Non-cyclical	33	5.0	16.0	5.0	10.0	-0.2	9.4
Energy	4	7.9	2.7	5.0	1.0	-2.9	1.8
Industrial	31	9.4	14.6	7.4	69.6	-2.0	70.3
Technology	3	0.8	6.6	0.3	3.9	-0.5	2.7
Utilities	7	3.8	29.9	2.3	6.9	-1.4	23.1



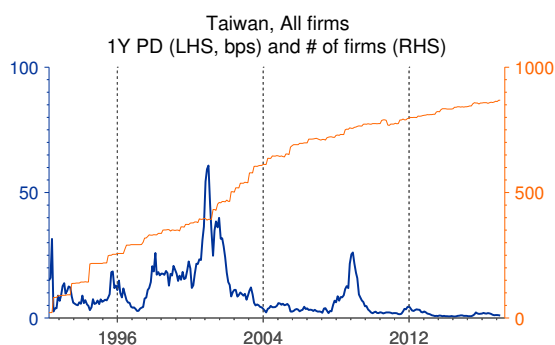
Sri Lanka	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	87	55.7	75.7	56.0	88.8	1.6	25.6
Basic Materials	14	18.0	61.7	15.9	79.2	1.5	18.2
Communications	4	1.7	9.1	1.6	9.9	0.1	0.9
Consumer Cyclical	60	12.6	40.8	13.8	53.3	0.7	16.9
Consumer Non-cyclical	55	20.0	89.6	18.7	65.9	-0.4	32.5
Diversified	14	22.3	44.7	25.4	43.8	-0.4	18.8
Energy	3	3.0	2.5	2.0	2.1	-0.8	0.5
Industrial	23	11.2	144.6	10.1	178.7	0.4	40.4
Technology	2	21.8	26.8	33.4	37.5	11.6	10.6
Utilities	5	14.1	14.0	13.7	14.2	-0.0	7.1



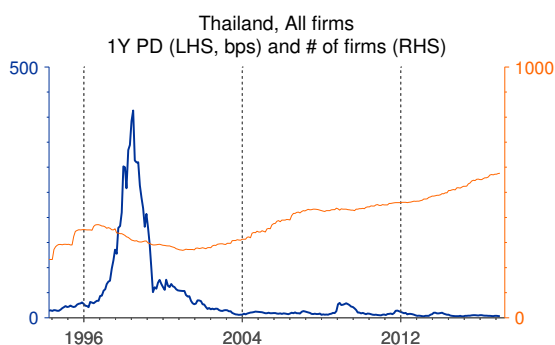
Sweden	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	82	10.5	108.7	9.6	94.7	-0.5	113.6
Basic Materials	28	22.0	36.9	16.8	35.4	-2.7	21.6
Communications	59	19.4	53.5	15.8	40.2	-2.0	29.1
Consumer Cyclical	69	11.8	37.4	9.2	45.3	-1.0	27.4
Consumer Non-cyclical	175	9.4	23.0	10.2	41.4	-0.5	36.0
Diversified	6	23.4	160.0	20.9	107.5	-2.4	55.5
Energy	18	11.2	63.1	10.1	374.7	-2.5	316.7
Industrial	115	13.8	30.2	12.6	34.9	-0.9	25.9
Technology	54	11.8	31.7	10.7	29.1	-0.2	13.7
Utilities	2	9.1	4.3	13.5	7.0	4.4	2.7



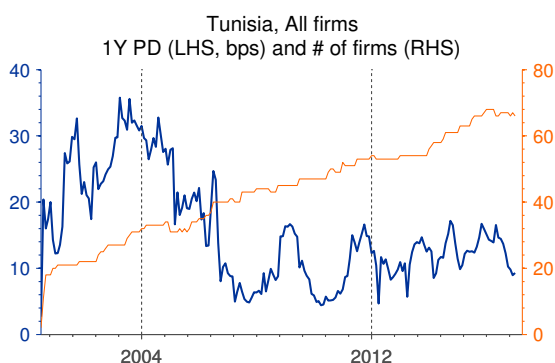
Switzerland	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	69	8.5	509.7	6.3	530.7	-1.1	34.3
Basic Materials	17	4.1	268.2	3.7	164.4	-1.3	116.5
Communications	10	5.9	17.4	4.3	16.4	-1.7	1.6
Consumer Cyclical	20	6.0	45.0	3.5	39.8	-1.2	11.2
Consumer Non-cyclical	41	3.1	411.3	2.5	76.4	-0.6	417.4
Diversified	3	10.6	37.9	3.8	26.8	-6.8	11.3
Energy	5	32.8	108.0	49.2	71.5	-2.8	55.5
Industrial	62	5.3	18.0	2.4	15.1	-0.8	7.7
Technology	11	8.4	14.4	6.4	15.1	-0.9	2.2
Utilities	4	8.1	14.7	6.6	11.8	-1.5	3.0



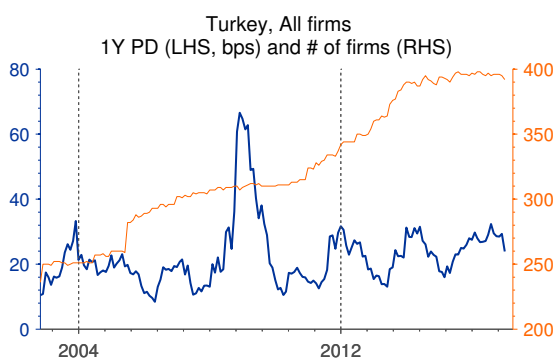
Taiwan	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	79	2.7	14.9	2.0	14.4	-0.4	5.4
Basic Materials	76	0.4	4.2	0.3	4.2	-0.0	1.8
Communications	42	1.2	9.1	0.6	10.4	-0.3	1.8
Consumer Cyclical	147	0.8	8.0	0.7	5.7	-0.1	3.5
Consumer Non-cyclical	60	0.2	3.8	0.1	2.9	-0.0	1.4
Diversified	1	0.0	—	0.0	—	0.0	—
Energy	7	5.4	3.3	4.0	3.1	-0.5	0.7
Industrial	311	1.4	14.6	0.9	13.1	-0.1	5.6
Technology	151	0.9	11.5	0.7	8.0	-0.2	5.2
Utilities	6	0.0	0.1	0.0	0.0	0.0	0.0



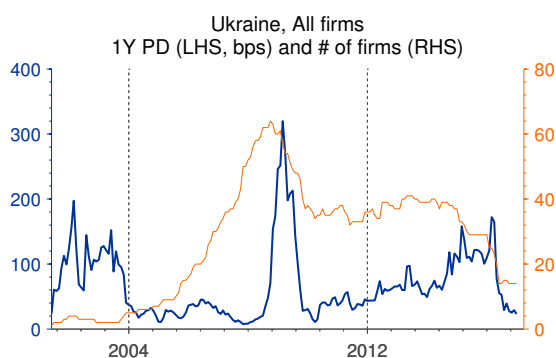
Thailand	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	112	8.2	22.5	7.3	23.6	-0.0	6.3
Basic Materials	55	4.3	21.7	3.0	32.7	0.0	16.5
Communications	47	4.3	21.7	4.1	29.1	-0.2	16.0
Consumer Cyclical	132	2.9	12.7	2.9	14.1	-0.0	7.1
Consumer Non-cyclical	96	1.2	7.2	1.0	7.9	0.0	2.2
Diversified	6	1.0	9.9	0.8	10.3	-0.2	0.5
Energy	19	4.8	59.9	4.4	63.8	-0.0	14.5
Industrial	132	3.9	14.8	3.3	14.8	-0.0	4.5
Technology	13	6.5	29.6	5.1	36.8	-0.3	10.6
Utilities	15	1.3	5.0	1.0	4.1	0.0	2.3



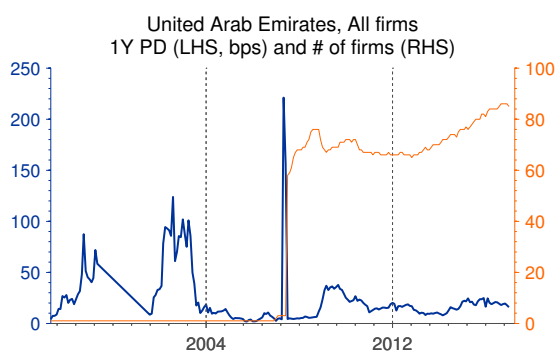
Tunisia	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	24	26.9	46.5	30.6	47.4	0.0	6.4
Basic Materials	4	5.1	6.4	7.4	8.1	1.8	2.0
Communications	4	9.0	34.5	13.7	20.1	0.7	17.1
Consumer Cyclical	10	0.6	52.7	1.0	38.7	0.0	14.0
Consumer Non-cyclical	10	5.5	28.0	7.7	24.1	0.9	6.4
Diversified	1	1.9	—	2.4	—	0.5	—
Energy	1	0.2	—	0.3	—	0.1	—
Industrial	12	7.2	42.8	11.5	35.9	0.1	12.5
Technology	2	70.8	27.8	89.0	11.1	18.2	16.7



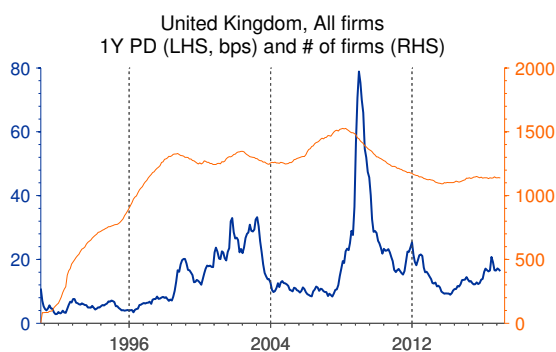
Turkey	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	100	28.8	51.9	26.6	55.7	-0.0	18.7
Basic Materials	37	16.0	22.5	10.9	22.5	-0.7	6.4
Communications	13	25.5	38.0	23.4	33.9	-7.0	14.0
Consumer Cyclical	91	35.2	98.6	25.6	107.2	-2.0	23.2
Consumer Non-cyclical	53	23.2	43.2	15.4	37.2	-1.8	18.8
Diversified	11	49.9	47.1	29.3	55.2	0.1	19.4
Energy	5	14.3	33.1	21.0	27.0	-4.1	8.5
Industrial	70	17.4	33.2	14.4	30.4	-0.3	14.9
Technology	4	19.6	25.6	20.0	30.0	1.2	10.3
Utilities	8	18.0	29.3	23.0	24.9	-2.5	14.8



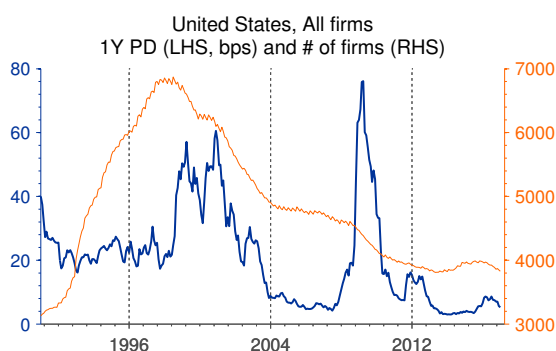
Ukraine	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	1	176.8	—	162.9	—	-13.9	—
Consumer Non-cyclical	8	43.0	189.4	32.3	62.5	-5.3	147.7
Diversified	1	25.0	—	16.0	—	-9.0	—
Energy	2	138.8	78.4	171.5	80.2	32.7	1.9
Industrial	3	22.5	57.6	9.3	7.7	-13.2	50.5
Utilities	1	16.9	—	17.9	—	1.1	—



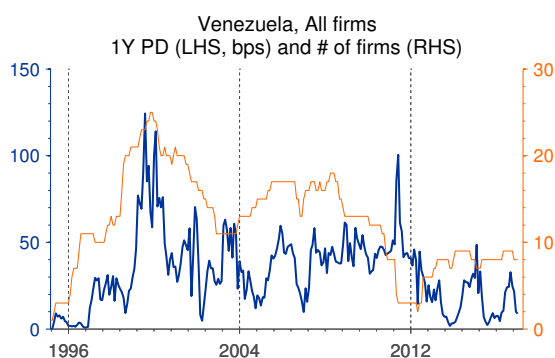
United Arab Emirates	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	43	22.6	23.4	20.5	22.5	-0.8	13.1
Communications	3	0.8	9.4	0.7	14.2	0.0	4.7
Consumer Cyclical	5	8.3	9.8	19.1	9.6	2.5	7.8
Consumer Non-cyclical	10	10.8	45.5	9.3	44.5	-2.6	11.1
Energy	4	42.6	58.6	37.2	13.1	-16.8	51.5
Industrial	18	20.4	32.7	18.4	51.1	-0.5	29.6
Utilities	1	194.4	—	234.8	—	40.4	—



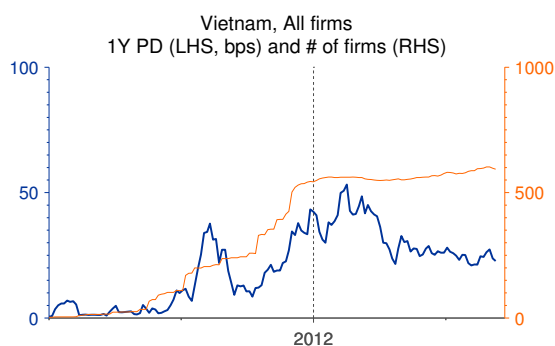
United Kingdom	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	233	16.3	91.4	12.2	55.8	-1.5	50.9
Basic Materials	94	22.6	58.8	17.5	78.4	-1.5	49.7
Communications	104	17.0	81.6	15.5	107.7	-0.7	69.5
Consumer Cyclical	156	15.6	66.9	13.6	41.7	-1.2	49.0
Consumer Non-cyclical	244	11.7	64.3	9.6	38.6	-0.7	53.5
Diversified	8	24.1	114.3	18.0	91.5	-0.9	39.6
Energy	97	28.9	83.8	22.4	68.6	-0.7	85.4
Industrial	171	15.3	61.9	11.5	81.5	-1.2	65.6
Technology	98	9.2	79.6	8.3	111.8	-0.1	36.6
Utilities	11	5.8	32.9	4.8	17.4	-1.1	16.4



United States	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	904	3.6	70.9	3.7	209.8	-0.0	174.2
Basic Materials	133	4.7	61.7	4.2	334.6	-0.2	314.9
Communications	277	5.7	147.8	5.4	417.6	-0.1	332.1
Consumer Cyclical	454	4.2	145.2	4.0	440.7	-0.0	361.7
Consumer Non-cyclical	916	7.0	261.2	5.8	251.1	-0.4	249.9
Diversified	8	11.1	30.3	6.0	103.8	-0.9	76.2
Energy	276	19.9	157.4	18.5	492.2	-0.1	424.4
Industrial	469	2.8	86.9	2.2	214.3	-0.1	158.2
Technology	329	3.1	90.5	2.1	169.5	-0.2	108.0
Utilities	84	0.7	52.7	0.6	34.3	-0.1	30.9



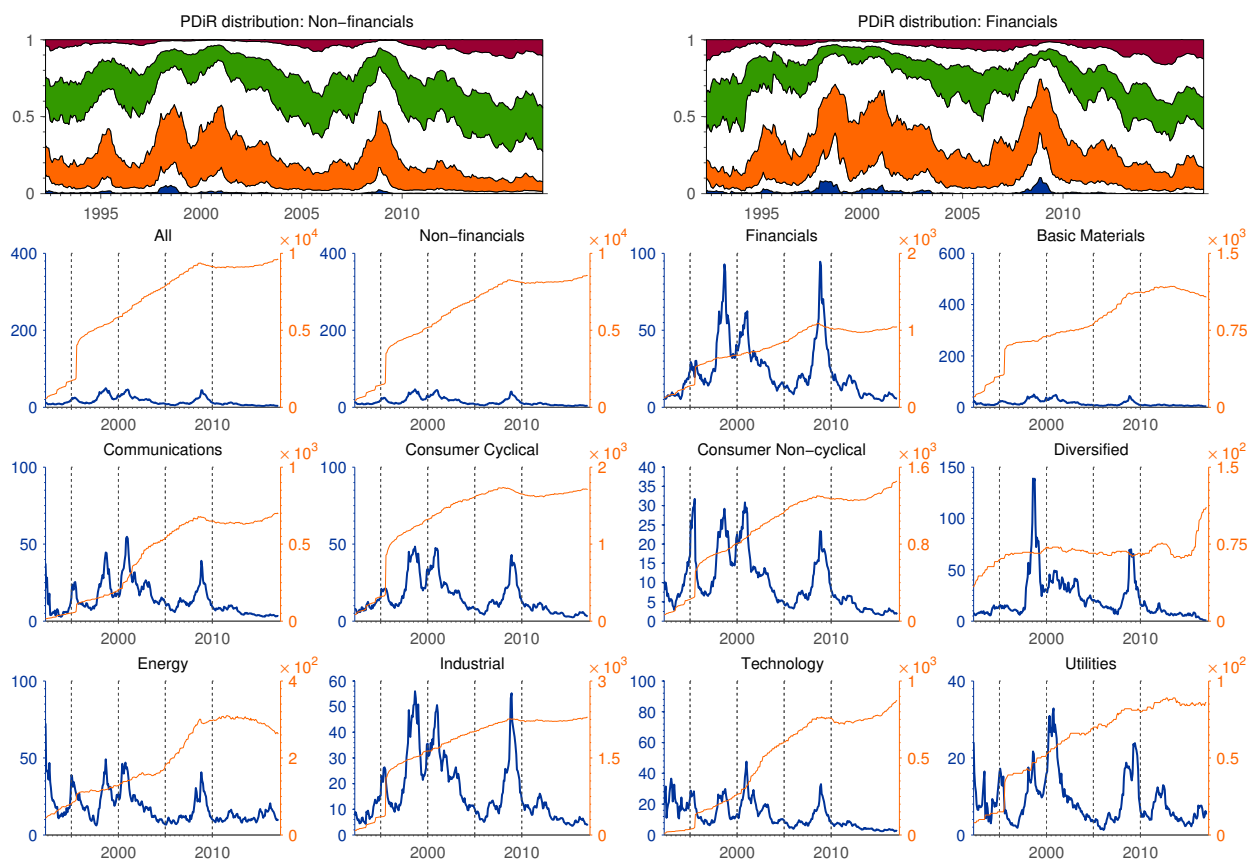
Venezuela	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	5	6.2	7.4	3.5	4.3	-1.2	3.9
Basic Materials	1	73.1	—	101.1	—	28.1	—



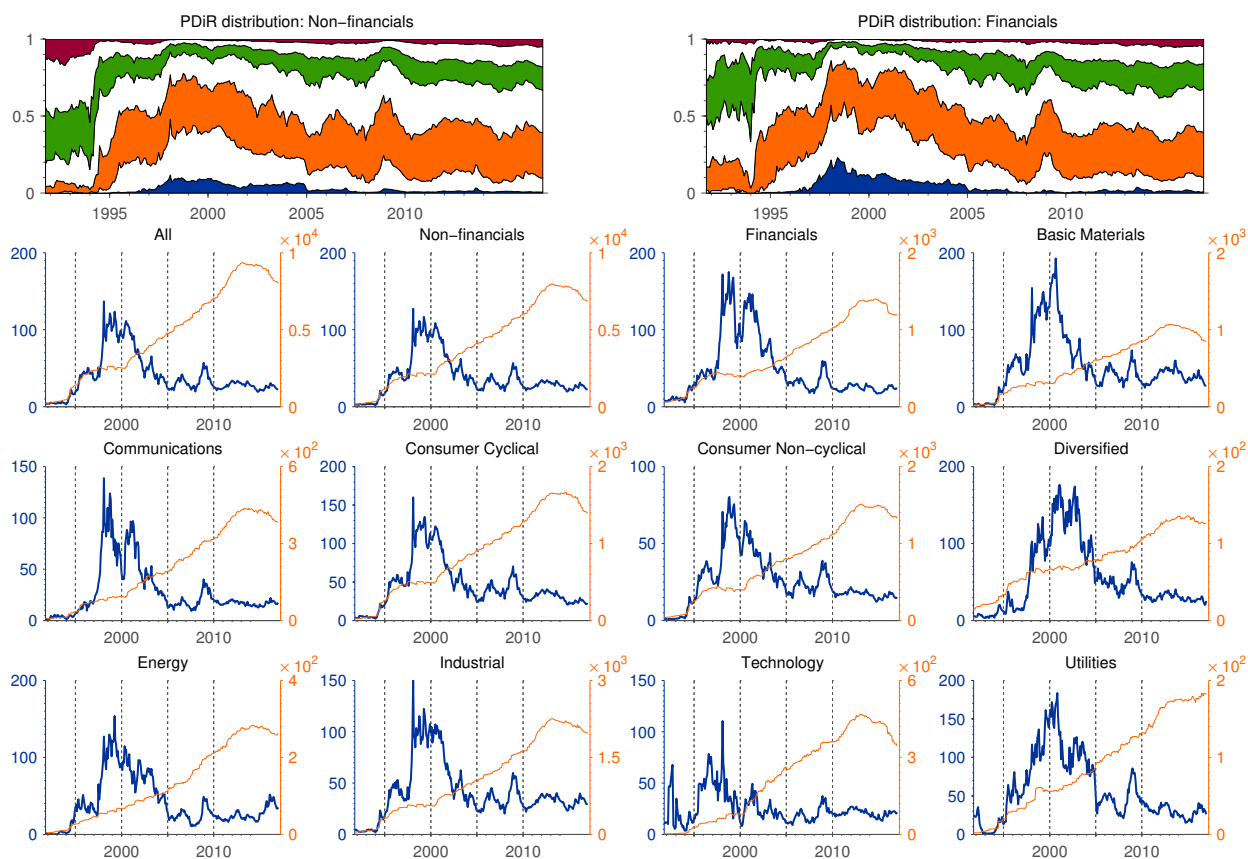
Vietnam	#	2016Q4		2017Q1		Q1-Q4	
		Median	St.Dev.	Median	St.Dev.	Median	St.Dev.
Financials	86	21.4	100.2	19.2	66.8	-2.1	43.0
Basic Materials	66	18.0	98.2	14.8	81.6	-1.1	43.3
Communications	20	18.2	52.5	17.3	87.2	0.3	40.3
Consumer Cyclical	62	24.6	241.6	23.1	128.9	-0.1	124.9
Consumer Non-cyclical	89	15.0	126.5	10.6	80.6	-0.7	85.0
Diversified	16	11.5	57.7	12.9	47.3	0.4	19.9
Energy	22	77.1	69.7	68.4	72.2	-4.2	18.6
Industrial	255	32.2	92.2	29.7	84.6	-1.5	48.4
Technology	6	10.1	27.3	5.1	27.1	-1.8	3.9
Utilities	17	4.3	14.2	5.3	15.9	-0.3	6.9

B PD by regions

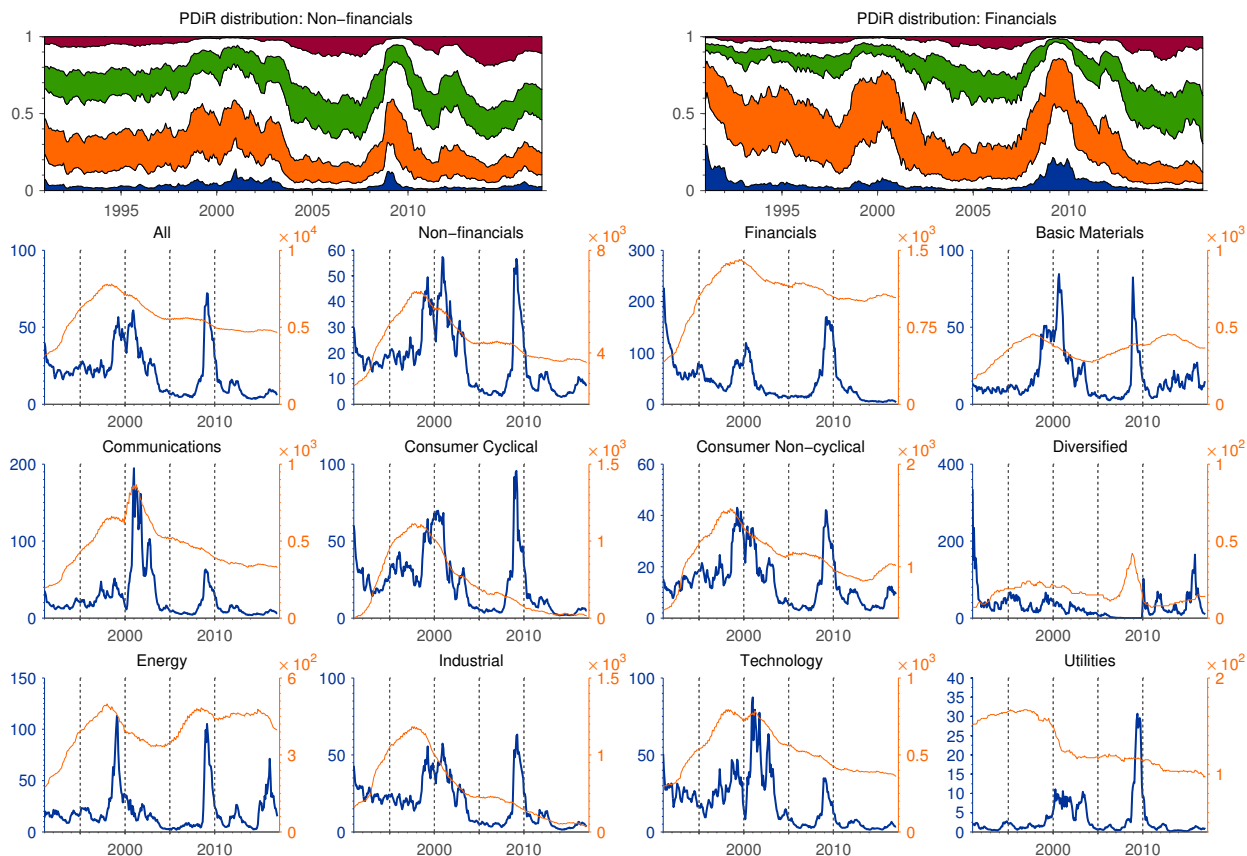
Asia Pacific - developed economies



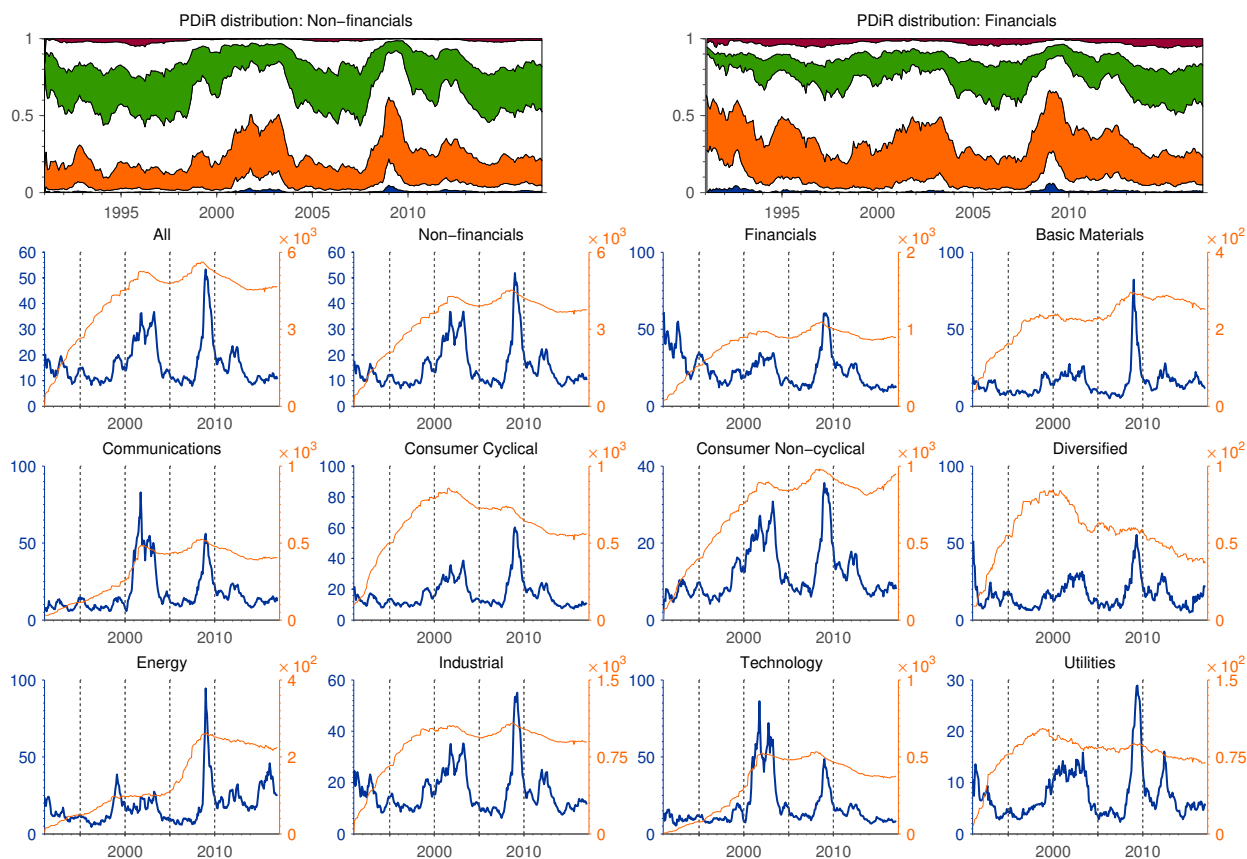
Asia Pacific - emerging economies



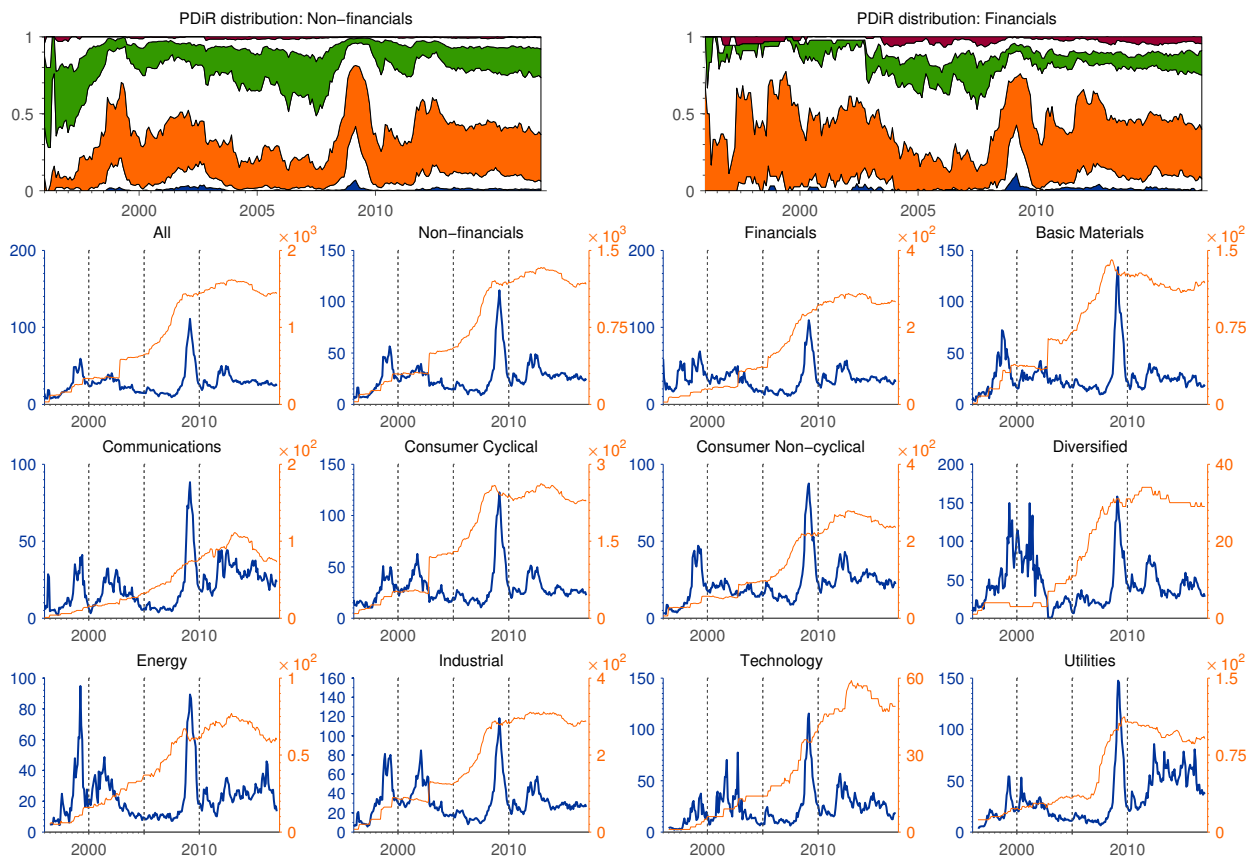
North America



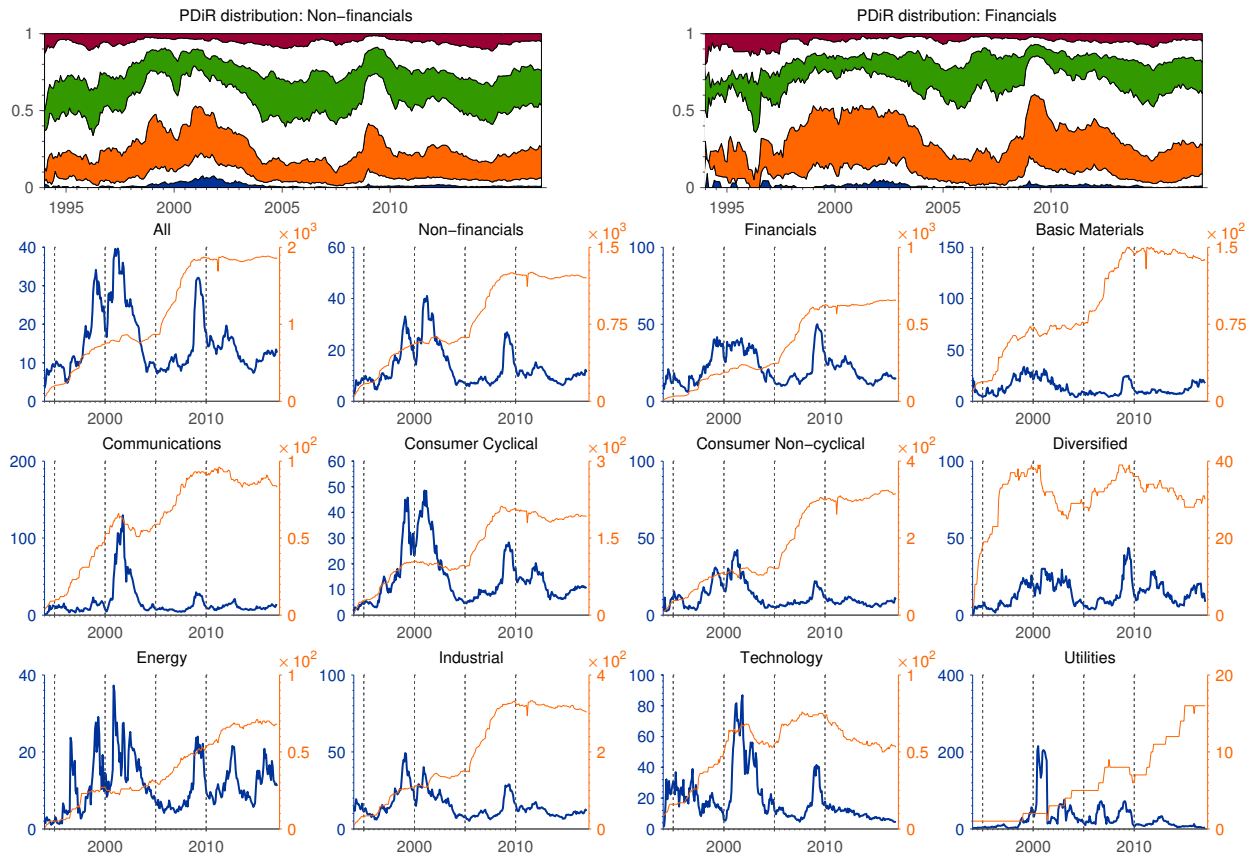
Western Europe



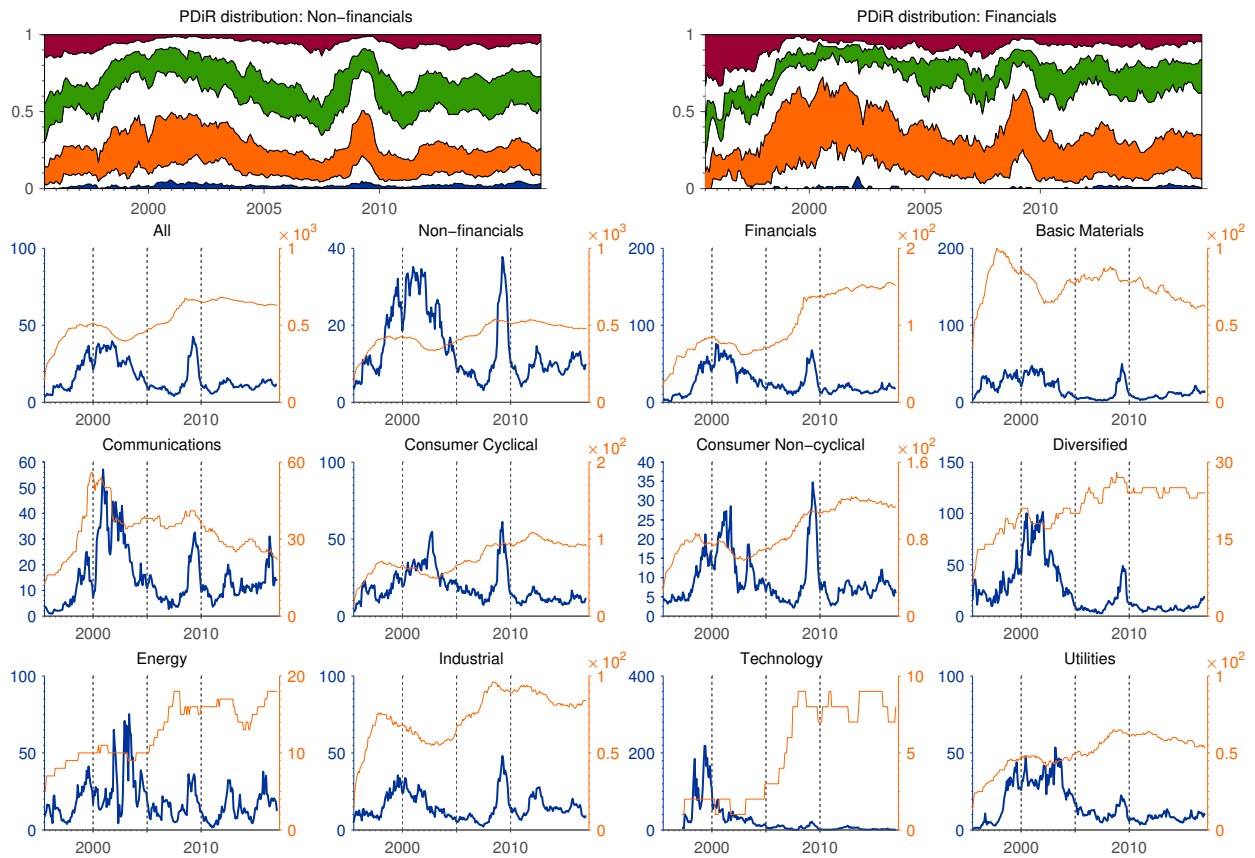
Eastern Europe



Africa ME

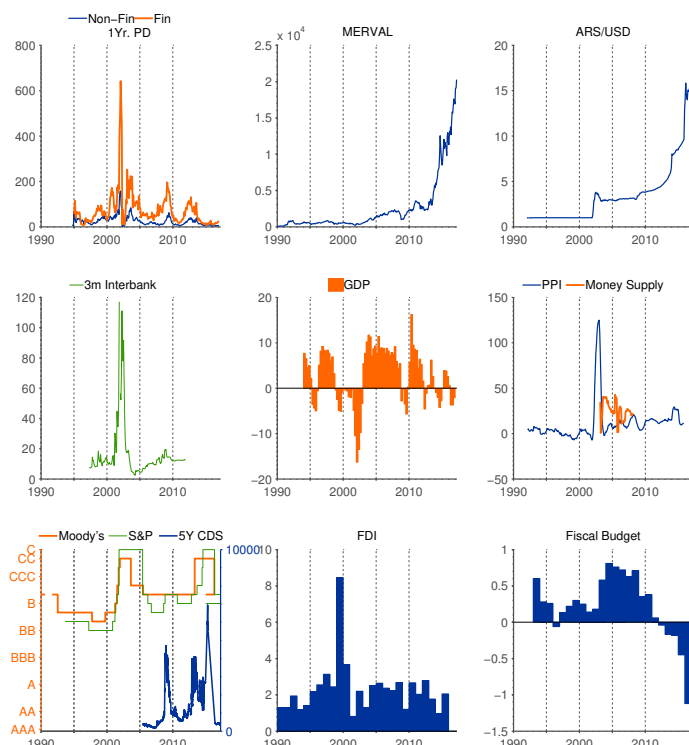


Latin America

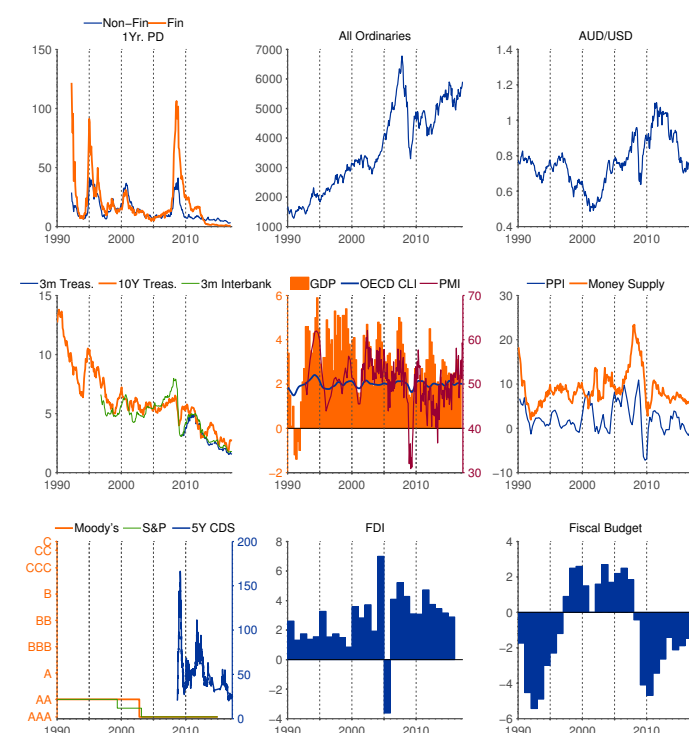


C Macroeconomic Indicators

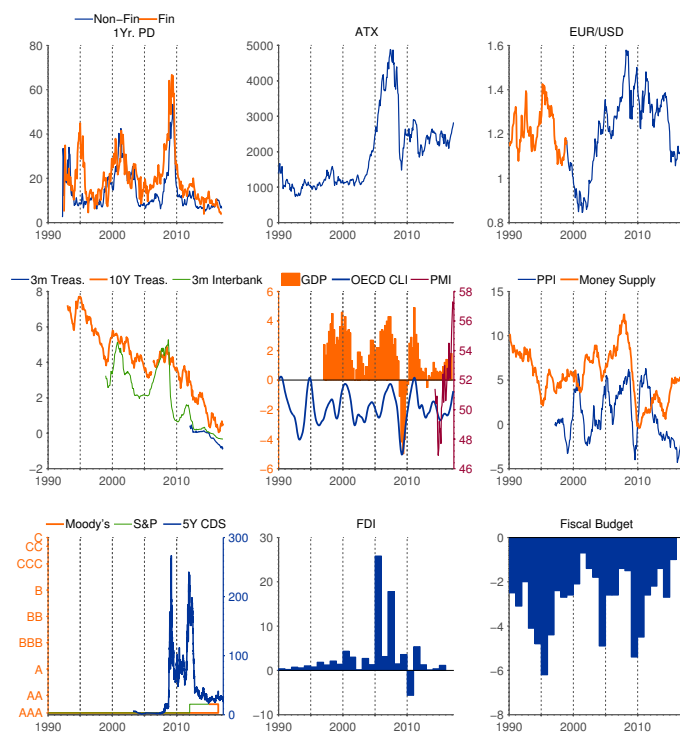
Descriptions of the data contained in this section are provided in Appendix D.



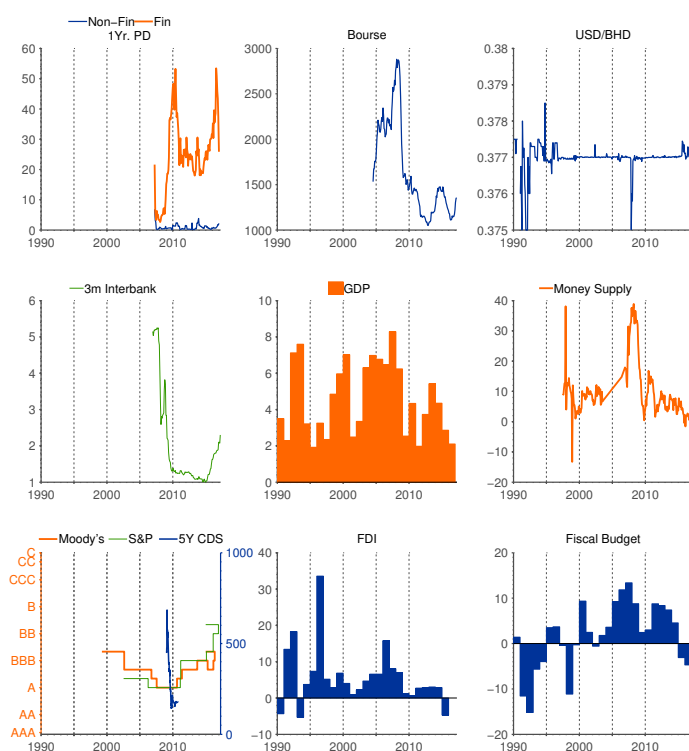
Argentina	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	3.68	4.79	5.47	5.33	4.18
1Yr. PD, Fin.	12.26	17.59	16.81	21.77	20.45
MERVAL	12992	14683	16676	16918	20265
ARS/USD	14.70	15.05	15.31	15.88	15.39
GDP (YoY%)	0.6	-3.7	-3.7	-2.1	-
Sov. Rating, Moody's	B3	B3	B3	B3	B3
Sov. Rating, S&P	B	B	B	B	B
5Y CDS (bps)	-	419.70	381.72	419.36	364.20
Fiscal Budget (%GDP)	-	-	-	-1.12	-



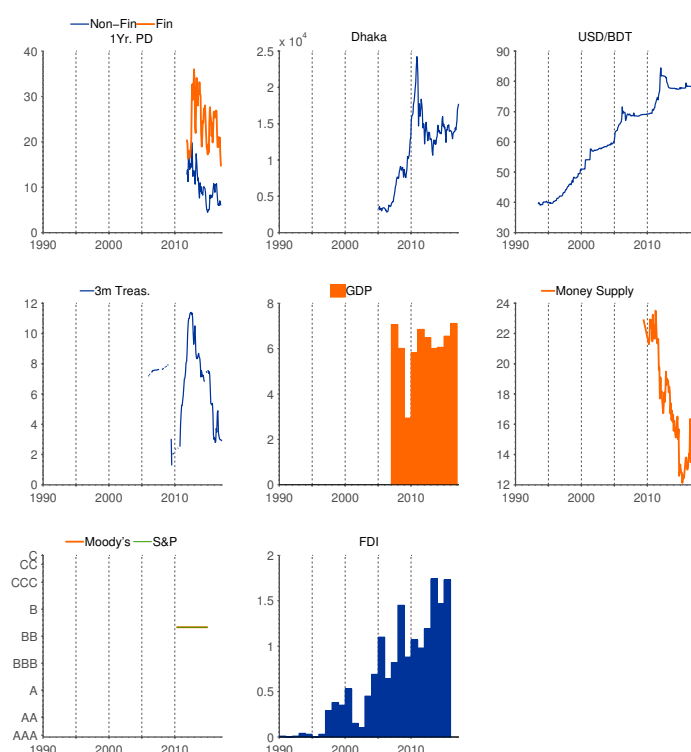
Australia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	6.86	6.39	4.84	5.26	4.50
1Yr. PD, Fin.	1.59	1.61	1.02	1.19	1.22
All Ordinaries	5152	5310	5525	5719	5904
AUD/USD	0.77	0.75	0.77	0.72	0.76
3m Treas. Yield (%)	2.04	1.69	1.53	1.70	1.55
10Y Treas. Yield (%)	2.49	1.98	1.91	2.77	2.70
3m Interbank (%)	2.27	1.94	1.72	1.80	1.79
GDP (YoY%)	2.5	3.1	1.9	2.4	-
OECD CLI	100.04	100.21	100.16	100.04	100.10*
PMI	58.1	51.8	49.8	55.4	57.5
PPI (YoY%)	-1.1	-1.6	-0.7	1.1	-
Money Supply (YoY%)	6.0	5.8	5.6	6.7	7.0*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	35.01	35.00	25.66	24.83	25.51
Fiscal Budget (%GDP)	-	-	-	-1.47	-



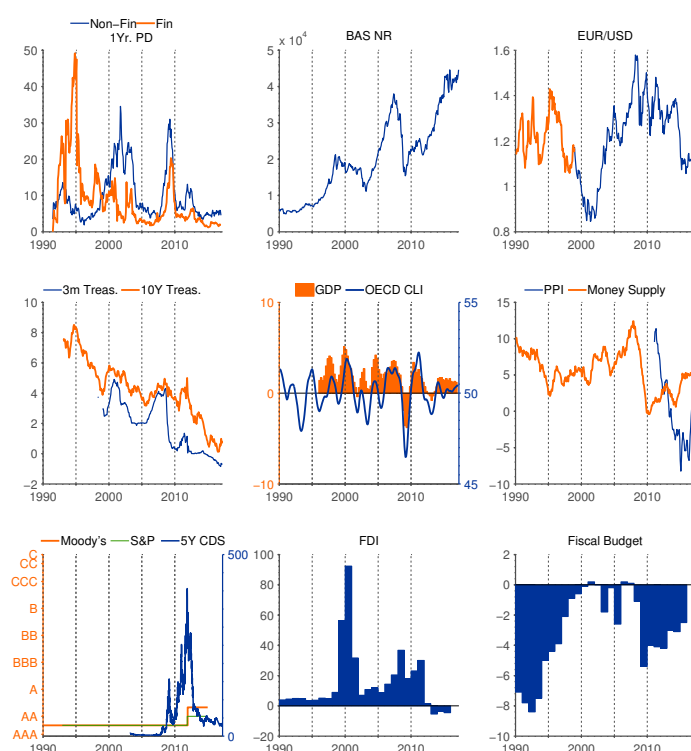
Austria	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	10.85	10.69	9.26	6.95	4.53
1Yr. PD, Fin.	12.80	7.74	4.72	4.16	2.75
ATX	2270	2096	2405	2618	2829
EUR/USD	1.14	1.11	1.12	1.05	1.07
3m Treas. Yield (%)	-0.53	-0.61	-0.70	-0.82	-0.82
10Y Treas. Yield (%)	0.35	0.20	0.10	0.43	0.54
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	1.4	1.2	1.6	1.8	—
OECD CLI	99.59	99.79	100.21	100.84	101.26*
PMI	52.8	54.5	53.5	56.3	56.8
PPI (YoY%)	-4.0	-3.0	-2.0	0.5	3.0*
Money Supply (YoY%)	5.1	5.0	5.1	5.2	4.7*
Sov. Rating, Moody's	Aa1	Aa1	Aa1	Aa1	Aa1
Sov. Rating, S&P	AA+	AA+	AA+	AA+	AA+
5Y CDS (bps)	29.4	31.0	25.9	28.1	22.5



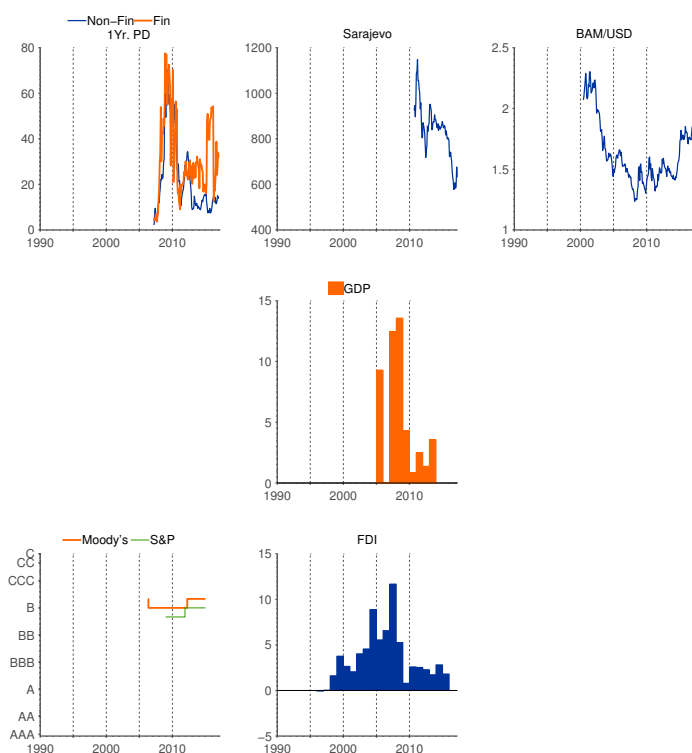
Bahrain	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	0.31	0.74	1.00	1.00	1.06
1Yr. PD, Fin.	25.98	32.08	36.92	15.50	27.45
Bourse	1131	1118	1150	1220	1356
USD/BHD	0.38	0.38	0.38	0.38	0.38
3m Interbank (%)	1.76	1.80	1.88	2.10	2.30
GDP (YoY%)	—	—	—	2.10	—
Money Supply (YoY%)	1.96	2.11	2.70	1.06	1.94*
Sov. Rating, Moody's	Baa3	Baa3	Baa3	Baa3	Baa3
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-
Fiscal Budget (%GDP)	—	—	—	-4.71	—



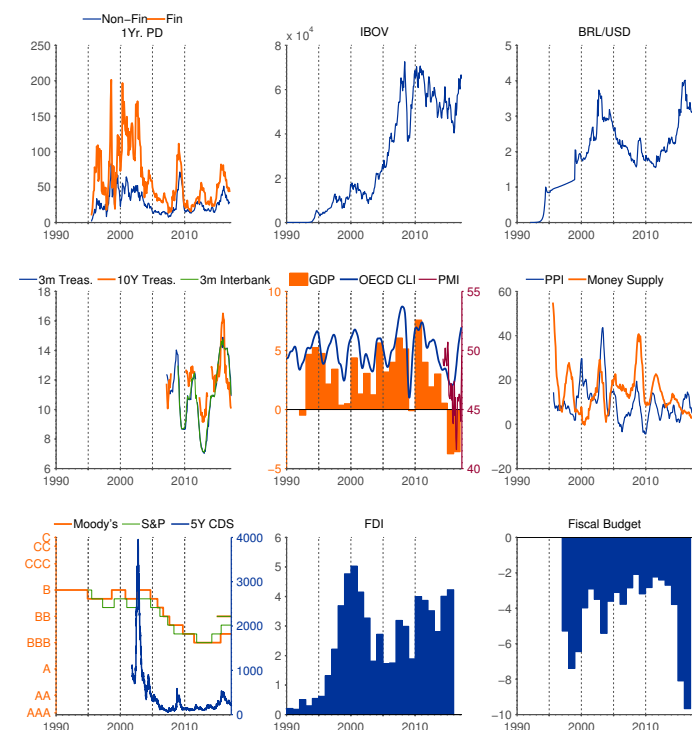
Bangladesh	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	13.61	11.52	9.80	10.99	9.73
1Yr. PD, Fin.	32.83	26.57	32.00	24.14	18.64
Dhaka	13407	13803	14429	15478	17738
USD/BDT	78.38	78.33	78.38	78.92	80.25
3m Treas. Yield (%)	2.83	4.75	3.20	2.98	2.89*
GDP (YoY%)	—	—	—	7.1	—
Money Supply (YoY%)	13.6	16.4	13.4	13.8	13.4*
Sov. Rating, Moody's	Ba3	Ba3	Ba3	Ba3	Ba3
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-



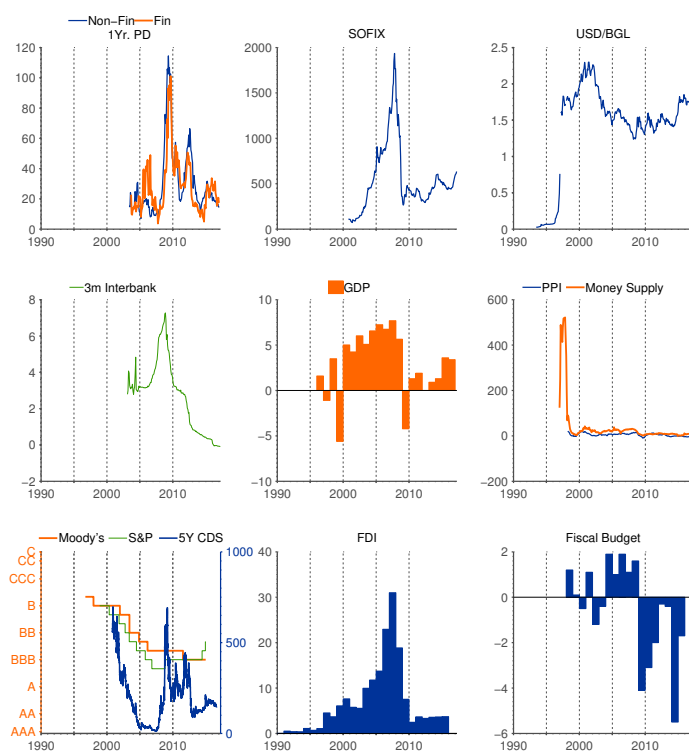
Belgium	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	5.22	5.57	5.17	5.04	2.99
1Yr. PD, Fin.	2.90	2.48	2.19	1.50	1.91
BAS NR	39614.7	41164.2	42424.0	43085.0	44607.4
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.43	-0.65	-0.75	-0.85	-0.66
10Y Treas. Yield (%)	0.51	0.23	0.14	0.53	0.85
GDP (YoY%)	1.3	1.2	1.3	1.2	—
OECD CLI	100.08	100.22	100.33	100.42	100.41*
PPI (YoY%)	-6.5	-3.4	0.8	9.4	13.8*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	5.30
Sov. Rating, Moody's	Aa3	Aa3	Aa3	Aa3	Aa3
Sov. Rating, S&P	AA	AA	AA	AA	AA
5Y CDS (bps)	45.57	49.22*	—	33.66	27.05



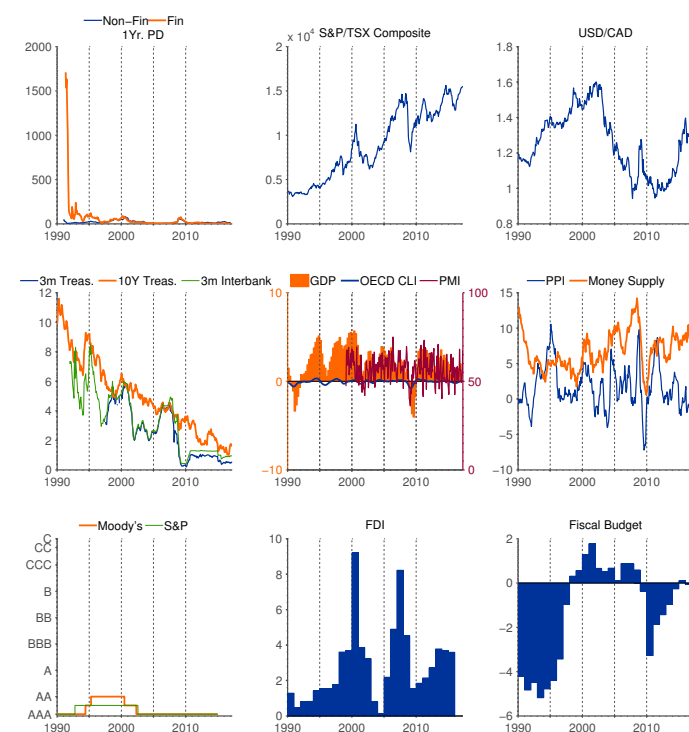
Bosnia and Herzegovina	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	3.69	11.30	8.50	22.11	23.80
1Yr. PD, Fin.	50.52	46.53	50.92	67.47	49.28
Sarajevo	741	652	577	583	631
BAM/USD	1.72	1.76	1.74	1.86	1.83
Sov. Rating, Moody's	B3	B3	B3	B3	B3
Sov. Rating, S&P	B	B	B	B	B



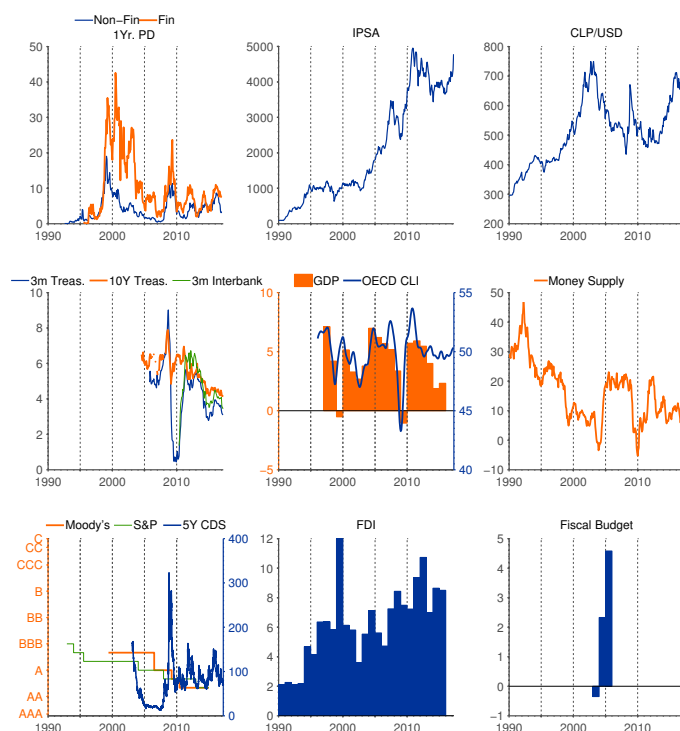
Brazil	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	48.03	48.18	42.18	37.66	38.47
1Yr. PD, Fin.	66.52	60.95	50.70	42.98	36.40
IBOV	50055	51527	58367	60227	64984
BRL/USD	3.59	3.21	3.26	3.25	3.12
3m Treas. Yield (%)	13.99	14.14	13.72	12.94	10.90
10Y Treas. Yield (%)	13.97	12.07	11.58	11.40	10.06
3m Interbank (%)	14.12	14.13	13.80	12.96	11.00
GDP (YoY%)	-	-	-	-3.6	-
OECD CLI	97.91	99.25	100.54	101.42	101.96*
PMI	46.0	43.2	46.0	45.2	49.6
PPI (YoY%)	13.0	14.6	12.3	7.6	4.9
Money Supply (YoY%)	5.6	5.2	5.3	3.7	3.2*
Sov. Rating, Moody's	Ba2	Ba2	Ba2	Ba2	Ba2
Sov. Rating, S&P	BB	BB	BB	BB	BB
5Y CDS (bps)	365.74	316.92	272.81	280.76	226.44
Fiscal Budget (%GDP)	-	-	-	-9.67	-



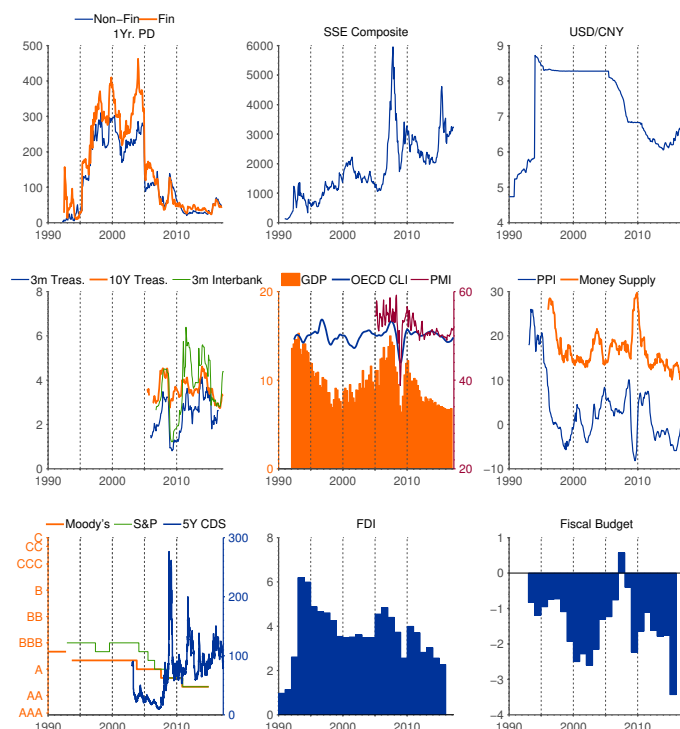
Bulgaria	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	21.29	19.04	17.63	15.00	13.83
1Yr. PD, Fin.	23.20	26.47	19.12	22.85	13.45
SOFIX	446.4	455.6	504.6	586.4	634.0
USD/BGL	1.72	1.76	1.74	1.86	1.84
3m Interbank (%)	-0.02	-0.04	-0.05	-0.07	-0.10
GDP (YoY%)	—	—	—	3.4	—
PPI (YoY%)	-4.1	-4.2	-2.4	0.6	2.9*
Money Supply (YoY%)	6.0	8.9	8.7	7.6	7.6*
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+
5Y CDS (bps)	161.42	162.71	142.88*	—	—



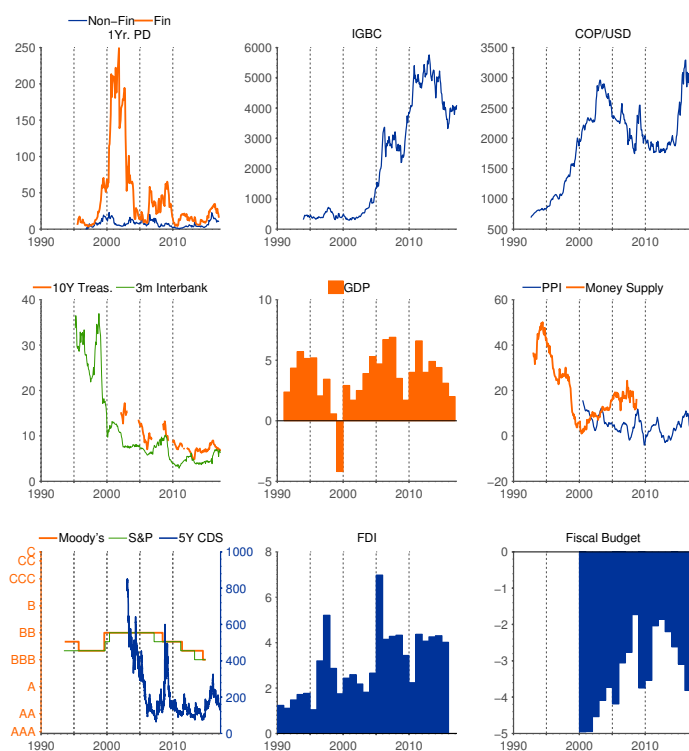
Canada	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	17.64	13.65	13.32	13.77	12.44
1Yr. PD, Fin.	5.14	5.04	3.96	3.57	2.43
S&P/TSX Composite	13494	14065	14726	15288	15548
USD/CAD	1.30	1.29	1.31	1.34	1.33
3m Treas. Yield (%)	0.45	0.49	0.53	0.46	0.55
10Y Treas. Yield (%)	1.23	1.06	1.00	1.72	1.63
3m Interbank (%)	0.90	0.88	0.90	0.94	0.94
GDP (YoY%)	1.3	1.1	1.4	2.0	—
OECD CLI	99.01	99.39	99.81	100.35	100.71*
PMI	57.9	54.7	68.1	49.4	67.6
PPI (YoY%)	-1.9	-0.7	-0.3	2.3	3.5*
Money Supply (YoY%)	8.0	10.5	8.3	8.5	6.7*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
Fiscal Budget (%GDP)	—	—	—	-0.05	—



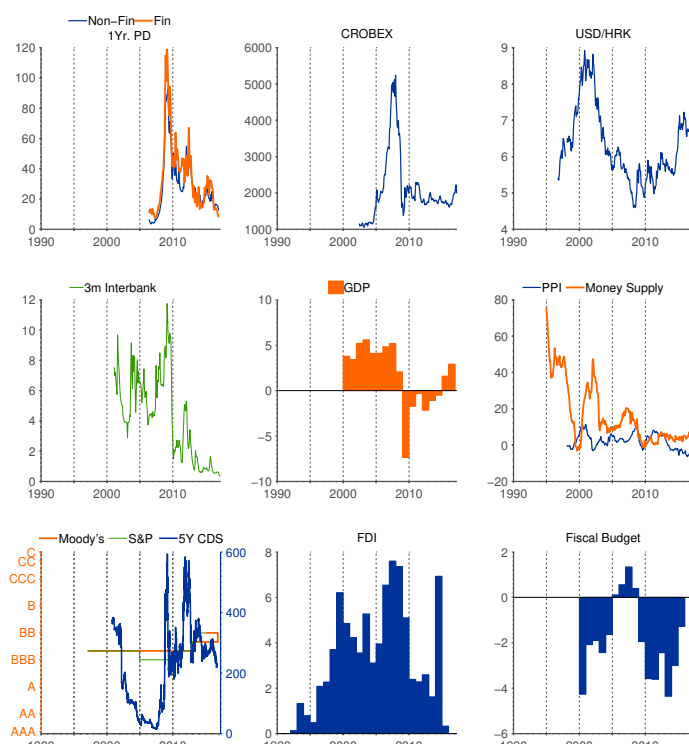
Chile	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	6.46	5.89	5.46	4.24	3.06
1Yr. PD, Fin.	11.48	7.95	7.29	4.82	4.84
IPSA	3937	3996	4015	4151	4783
CLP/USD	667.74	663.26	657.32	670.68	660.25
3m Treas. Yield (%)	3.81	3.73	3.61	3.35	3.09
10Y Treas. Yield (%)	4.44	4.55	4.22	4.37	4.20
3m Interbank (%)	4.23	4.12	4.04	4.09	3.43
OECD CLI	99.72	99.63	99.80	100.17	100.35*
Money Supply (YoY%)	12.5	9.2	8.0	6.3	4.4*
Sov. Rating, Moody's	Aa3	Aa3	Aa3	Aa3	Aa3
Sov. Rating, S&P	AA-	AA-	AA-	AA-	AA-
5Y CDS (bps)	95.00	94.50	86.43	83.25	72.16



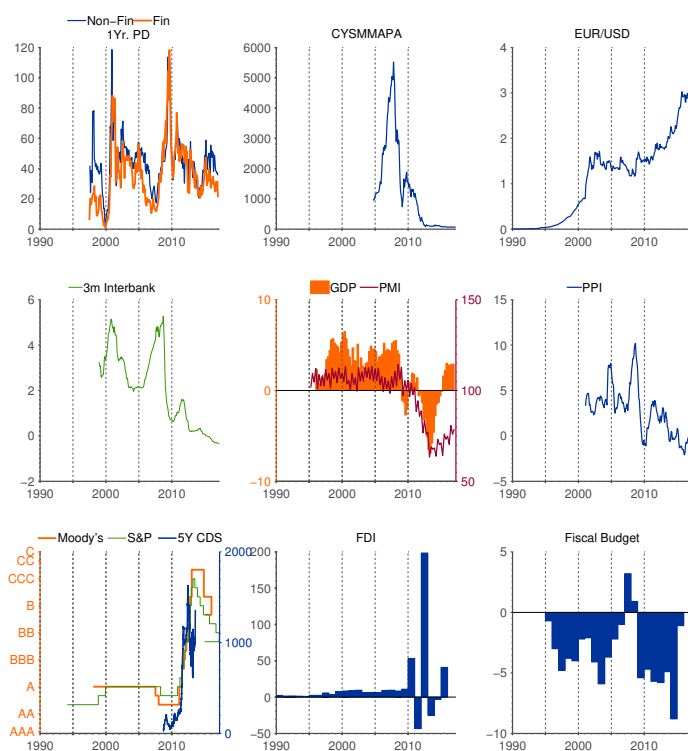
China	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	60.05	61.09	53.75	46.01	36.49
1Yr. PD, Fin.	57.56	61.33	50.69	45.48	36.90
SSE Composite	3003.9	2929.6	3004.7	3103.6	3222.5
USD/CNY	6.5	6.6	6.7	6.9	6.9
3m Treas. Yield (%)	2.05	2.63	2.63*	—	—
10Y Treas. Yield (%)	2.89	2.86	2.74	3.06	3.29
3m Interbank (%)	2.82	2.97	2.80	3.27	4.39
GDP (YoY%)	6.7	6.7	6.7	6.8	—
OECD CLI	98.61	98.63	98.80	99.21	99.64*
PMI	50.2	50.0	50.4	51.4	51.8
PPI (YoY%)	-4.30	-2.60	0.10	5.50	7.60
Money Supply (YoY%)	13.40	11.80	11.50	11.30	11.10*
Sov. Rating, Moody's	Aa3	Aa3	Aa3	Aa3	Aa3
Sov. Rating, S&P	AA-	AA-	AA-	AA-	AA-
5Y CDS (bps)	120.83	122.23	106.50	113.67	81.99



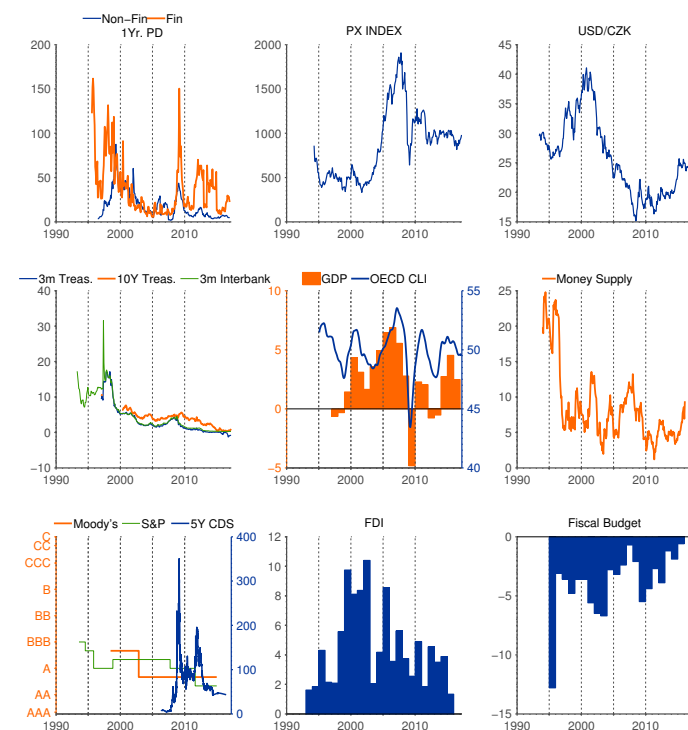
Colombia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	17.25	19.47	17.29	13.79	11.66
1Yr. PD, Fin.	29.30	30.10	25.55	27.43	33.34
IGBC	3979	3925	3939	3995	4097
COP/USD	3002.14	2920.46	2881.30	3000.71	2873.98
10Y Treas. Yield (%)	8.20	7.59	7.00	7.11	6.65
3m Interbank (%)	6.30	6.95	6.97	5.46	6.22
GDP (YoY%)	—	—	—	2.0	—
PPI (YoY%)	8.56	9.64	3.38	1.62	0.55
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BBB	BBB	BBB	BBB	BBB
5Y CDS (bps)	215.66	205.42	169.93	164.22	133.99
Fiscal Budget (%GDP)	—	—	—	-3.82	—



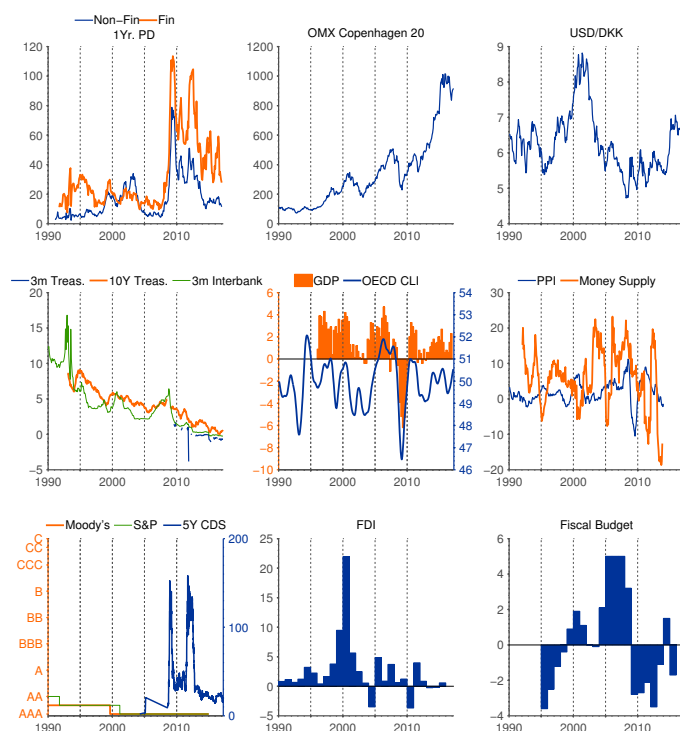
Croatia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	22.85	20.98	19.86	15.97	13.92
1Yr. PD, Fin.	24.12	19.79	16.34	17.43	19.99
CROBEX	1670	1676	1941	1995	1989
USD/HRK	7	7	7	7	7
3m Interbank (%)	0.58	0.55	0.61	0.57	0.33
GDP (YoY%)	—	—	—	2.9	—
PPI (YoY%)	-5.50	-5.50	-3.20	0.00	1.20
Money Supply (YoY%)	3.41	4.60	4.29	4.71	3.31*
Sov. Rating, Moody's	Ba2	Ba2	Ba2	Ba2	Ba2
Sov. Rating, S&P	BB	BB	BB	BB	BB
5Y CDS (bps)	270.0	253.3	225.9	—	—



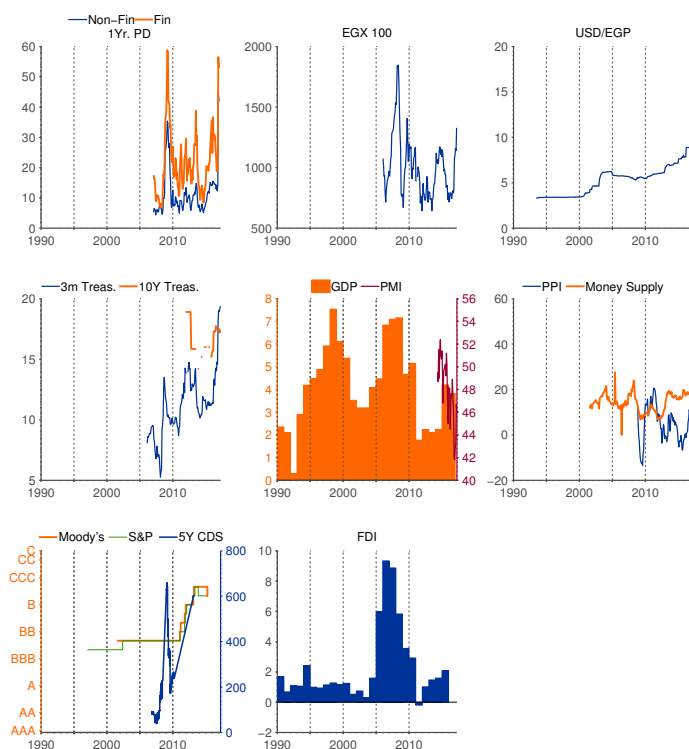
Cyprus	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	38.07	36.22	30.57	31.33	26.29
1Yr. PD, Fin.	37.25	30.41	24.09	32.06	37.09
CYSMMAPA	68	66	66	66	68
EUR/USD	2.82	2.88	3.00	3.52	3.64
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	2.8	2.8	2.9	2.9	—
PMI	70.3	80.7	75.9	78.7	—
PPI (YoY%)	-1.1	-0.8	0.1	0.2	-0.5*
Sov. Rating, Moody's	B1	B1	B1	B1	B1
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+



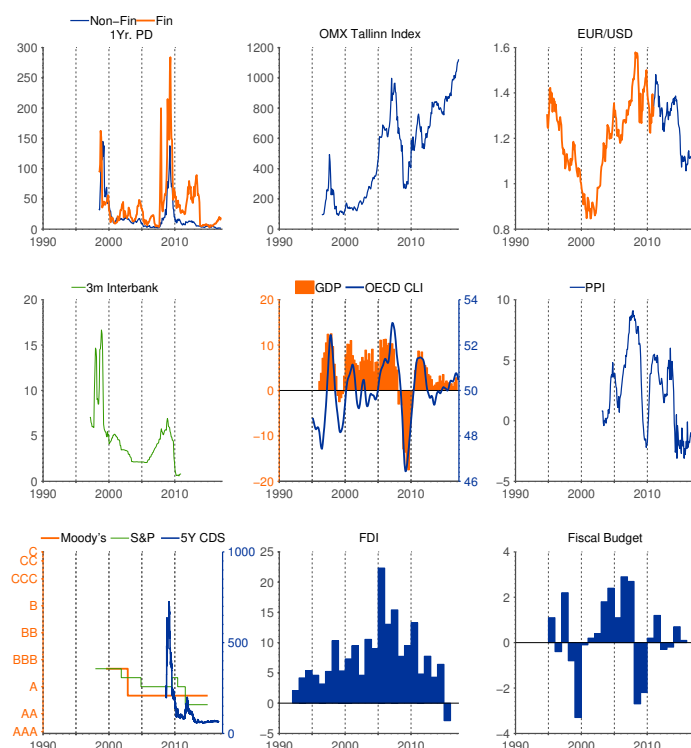
Czech Republic	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	6.94	7.92	6.54	5.34	3.75
1Yr. PD, Fin.	9.81	17.58	13.32	10.42	10.89
PX INDEX	899.9	816.9	863.6	921.6	981.1
USD/CZK	23.76	24.39	24.04	25.70	25.38
3m Treas. Yield (%)	-0.00	-0.07	-0.72	-0.97	-0.89
10Y Treas. Yield (%)	0.44	0.46	0.29	0.55	1.00
3m Interbank (%)	0.29	0.29	0.29	0.28	0.28
GDP (YoY%)	—	—	—	2.48	—
OECD CLI	100.34	99.89	99.55	99.61	99.50*
Money Supply (YoY%)	9.4*	—	—	—	—
Sov. Rating, Moody's	A1	A1	A1	A1	A1
Sov. Rating, S&P	AA-	AA-	AA-	AA-	AA-
5Y CDS (bps)	—	43.34	—	—	—



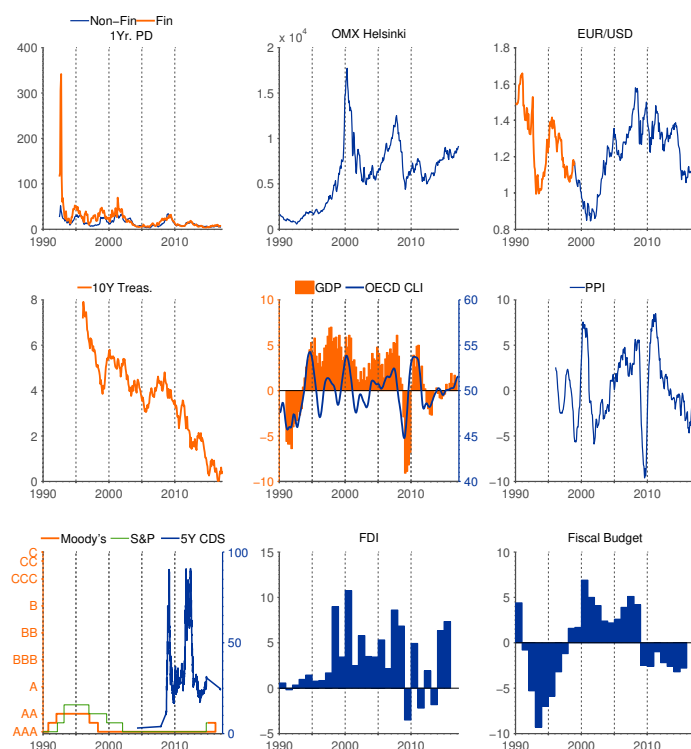
Denmark	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	17.70	18.37	15.07	14.18	9.93
1Yr. PD, Fin.	45.95	47.73	39.49	30.86	23.64
OMX Copenhagen 20	948	958	897	884	916
USD/DKK	6.55	6.70	6.63	7.07	6.98
3m Treas. Yield (%)	-0.48	-0.50*	-0.66	-0.79	-0.69
10Y Treas. Yield (%)	0.44	0.09	0.01	0.33	0.60
3m Interbank (%)	-0.08	-0.21	-0.19	-0.23	-0.26
GDP (YoY%)	0.8	0.6	1.5	2.3	—
OECD CLI	99.46	99.55	99.83	100.27	100.55*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	21.68	23.16	23.69	22.69	17.04



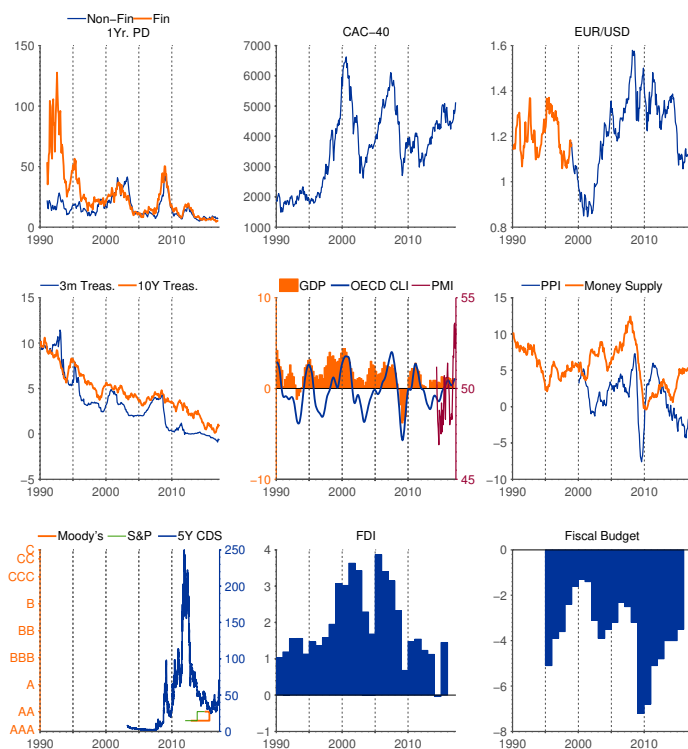
Egypt	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	21.29	19.66	17.28	44.60	28.79
1Yr. PD, Fin.	38.47	47.12	33.10	66.26	45.00
EGX 100	792.2	743.7	790.3	1096.0	1327.7
USD/EGP	8.85	8.88	8.88	18.13	18.17
3m Treas. Yield (%)	13.22	13.96	14.78	19.04	19.38
10Y Treas. Yield (%)	17.30	17.30	17.40*	17.40	17.40
GDP (YoY%)	—	—	—	3.8	—
PMI	44.5	47.5	46.3	42.8	45.9
PPI (YoY%)	0.5	5.7	9.3	28.1	—
Money Supply (YoY%)	18.2	18.6	18.0	39.0	36.6*
Sov. Rating, Moody's	B3	B3	B3	B3	B3
Sov. Rating, S&P	B-	B-	B-	B-	B-



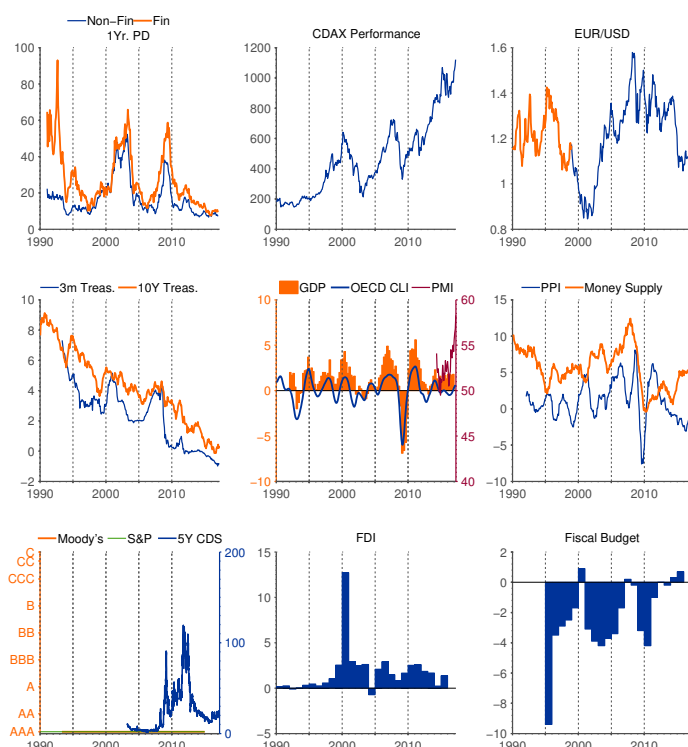
Estonia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	1.37	1.98	2.91	1.76	1.79
1Yr. PD, Fin.	10.69	13.88	20.91	16.59	24.42
OMX Tallinn Index	970.6	985.6	1001.3	1075.5	1122.2
EUR/USD	1.14	1.11	1.12	—	—
GDP (YoY%)	1.5	0.9	1.8	2.8	—
OECD CLI	100.39	100.47	100.74	100.69	100.46*
PPI (YoY%)	-2.0	-1.4	-0.9	2.5	3.9*
Sov. Rating, Moody's	A1	A1	A1	A1	A1
Sov. Rating, S&P	AA-	AA-	AA-	AA-	AA-
5Y CDS (bps)	66.32	64.12	65.66*	—	—



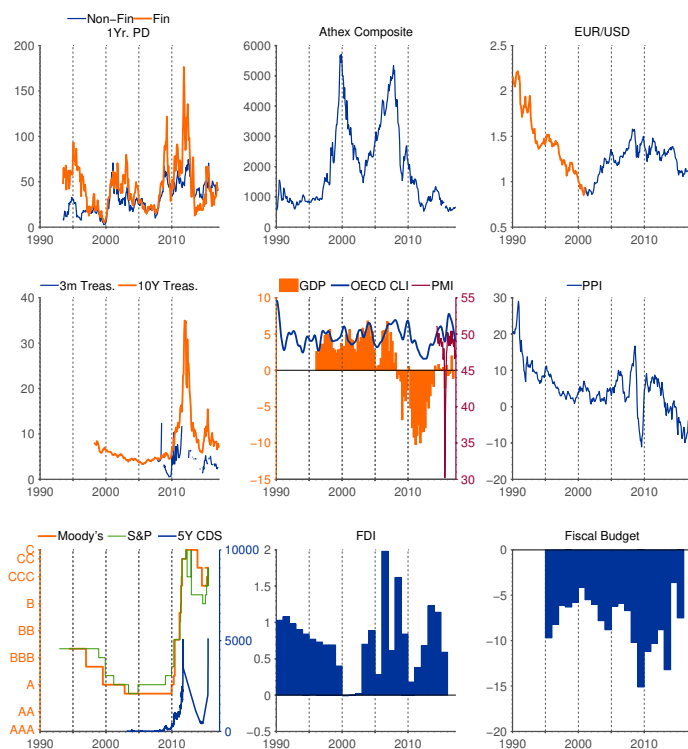
Finland	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	7.39	7.26	5.67	4.86	3.81
1Yr. PD, Fin.	9.09	9.73	7.32	8.18	4.96
OMX Helsinki	8000	7904	8626	8902	9165
EUR/USD	1.14	1.11	1.12	—	—
10Y Treas. Yield (%)	0.44	0.15	0.03	0.35	0.45
GDP (YoY%)	1.9	0.8	1.7	1.2	—
OECD CLI	100.27	100.37	100.94	101.46	101.54*
PPI (YoY%)	-4.1	-3.4	-1.4	2.4	5.3*
Sov. Rating, Moody's	Aa1	Aa1	Aa1	Aa1	Aa1
Sov. Rating, S&P	AA+	AA+	AA+	AA+	AA+
5Y CDS (bps)	—	—	—	24.1	—



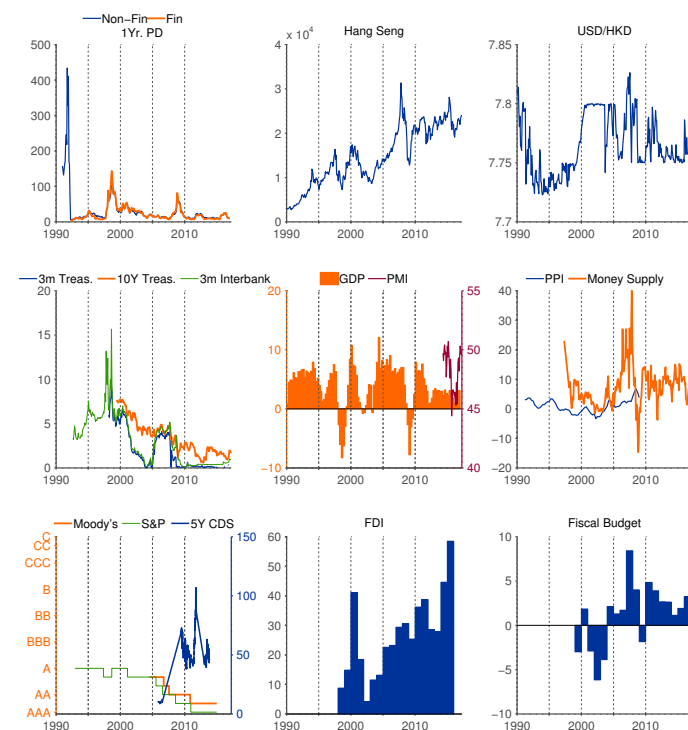
France	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.12	8.52	7.02	6.70	5.38
1Yr. PD, Fin.	7.24	6.29	4.93	5.66	4.96
CAC-40	4385	4237	4448	4862	5123
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.42	-0.57	-0.69	-0.90	-0.57
10Y Treas. Yield (%)	0.49	0.18	0.19	0.69	0.97
GDP (YoY%)	1.2	1.1	0.9	1.1	—
OECD CLI	100.37	100.19	100.23	100.47	100.53*
PMI	49.6	48.3	49.7	53.5	53.3
PPI (YoY%)	-3.9	-3.1	-1.5	1.7	3.9*
Money Supply (YoY%)	5.1	5.0	5.1	5.2	5.3
Sov. Rating, Moody's	Aa2	Aa2	Aa2	Aa2	Aa2
Sov. Rating, S&P	AA	AA	AA	AA	AA
5Y CDS (bps)	33.3	50.5	29.2	37.0	50.4



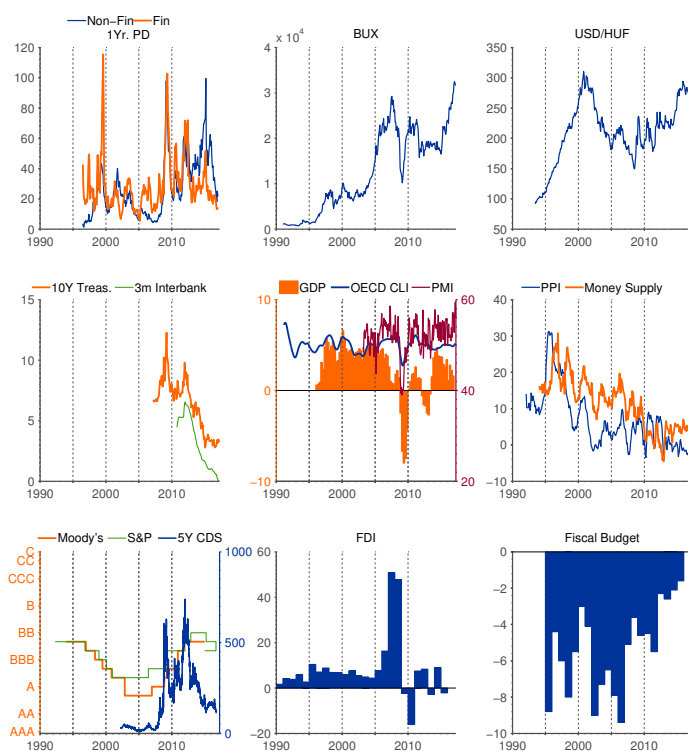
Germany	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.85	9.93	8.30	7.71	5.86
1Yr. PD, Fin.	13.68	12.57	10.82	10.64	8.15
CDAX Performance	915	893	971	1043	1121
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.59	-0.68	-0.80	-0.99	-0.82
10Y Treas. Yield (%)	0.15	-0.13	-0.12	0.21	0.33
GDP (YoY%)	1.8	1.8	1.7	1.8	—
OECD CLI	99.51	99.58	99.89	100.35	100.61*
PMI	50.7	54.5	54.3	55.6	58.3
PPI (YoY%)	-3.0	-2.2	-1.4	1.0	3.0*
Money Supply (YoY%)	5.1	5.0	5.1	5.2	5.3
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	18.69	22.27	19.18	21.78	17.15



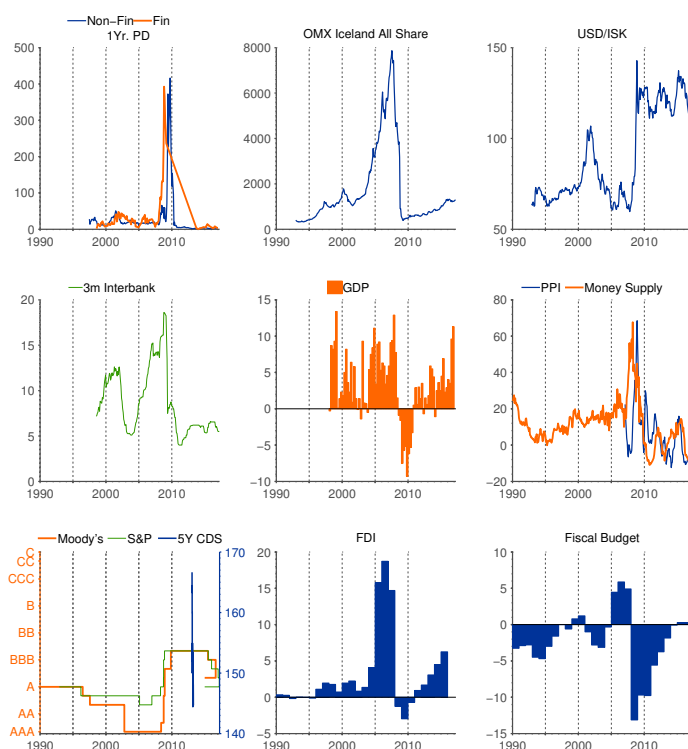
Greece	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	56.24	57.28	50.78	47.06	36.02
1Yr. PD, Fin.	29.75	35.56	38.83	32.12	32.93
Athex Composite	577	542	566	644	666
EUR/USD	1	1	1	—	—
3m Treas. Yield (%)	3.28	3.38	3.34	2.59	2.43*
10Y Treas. Yield (%)	8.59	8.29	8.28	7.11	6.99
GDP (YoY%)	-0.7	-0.4	2.0	-1.1	—
OECD CLI	102.76	102.07	101.28	99.97	98.96*
PMI	49.0	50.4	49.2	49.3	46.7
PPI (YoY%)	-9.0	-7.3	-3.2	3.0	8.8*
Sov. Rating, Moody's	Caa3	Caa3	Caa3	Caa3	Caa3
Sov. Rating, S&P	CCC+	CCC+	CCC+	CCC+	CCC+



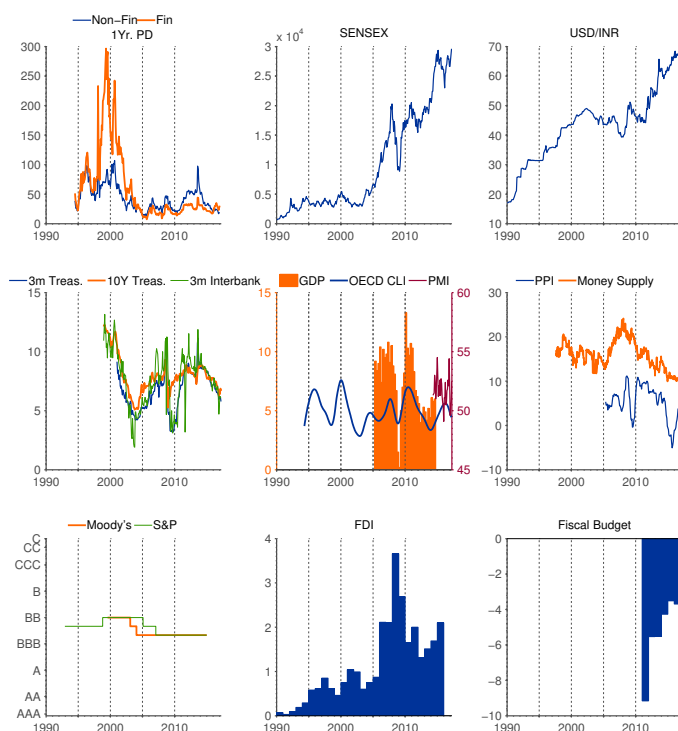
Hong Kong	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	19.45	16.75	9.00	8.77	6.52
1Yr. PD, Fin.	24.67	19.82	10.89	8.63	6.17
Hang Seng	20777	20794	23297	22001	24112
USD/HKD	7.76	7.76	7.76	7.76	7.77
3m Treas. Yield (%)	0.05	0.10*	—	0.33*	—
10Y Treas. Yield (%)	1.28	1.02	1.06	1.97	1.67
3m Interbank (%)	0.56	0.57	0.59	1.02	0.94
GDP (YoY%)	1.0	1.7	2.0	3.1	—
PMI	45.5	45.4	49.3	50.3	49.9
Money Supply (YoY%)	3.6	2.1	7.8	8.9	12.8*
Sov. Rating, Moody's	Aa1	Aa1	Aa1	Aa1	Aa1
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
Fiscal Budget (%GDP)	—	—	—	3.26	—



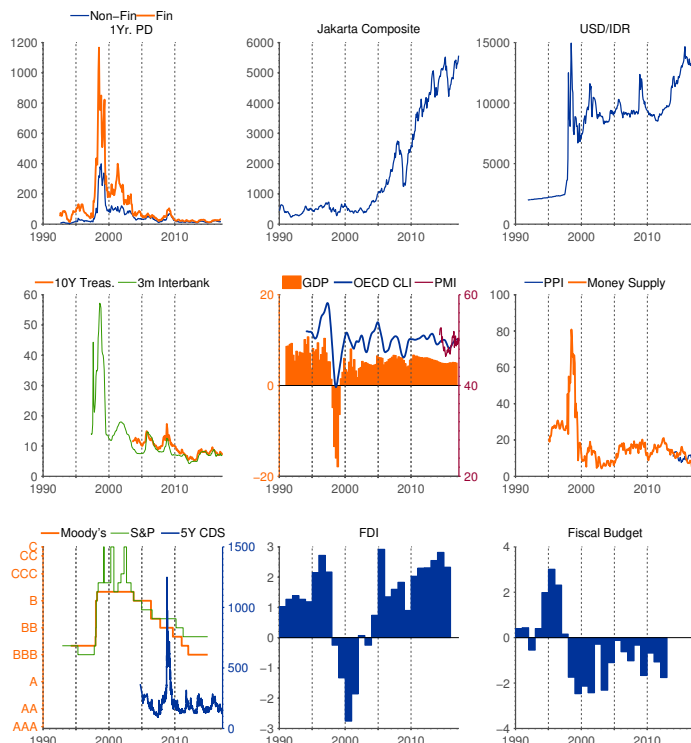
Hungary	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	39.91	32.83	26.21	31.25	19.16
1Yr. PD, Fin.	24.45	25.68	18.98	16.64	14.73
BUX	26451.0	26325.6	27664.3	32003.0	31634.3
USD/HUF	275.92	284.23	274.35	294.36	289.83
10Y Treas. Yield (%)	2.95	3.03	2.88	3.16	3.25
3m Interbank (%)	0.91	0.76	0.59	0.21	0.05
GDP (YoY%)	1.1	2.8	2.2	1.6	—
OECD CLI	100.00	99.92	99.71	99.97	100.35*
PMI	51.7	50.9	57.2	52.8	56.0
PPI (YoY%)	-1.6	-2.6	-2.6	0.5	4.0*
Money Supply (YoY%)	5.03	5.36	4.20	6.88	6.84*
Sov. Rating, Moody's	Ba1	Ba1	Ba1	Ba1	Ba1
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-
5Y CDS (bps)	151.84	158.69	115.11	—	—



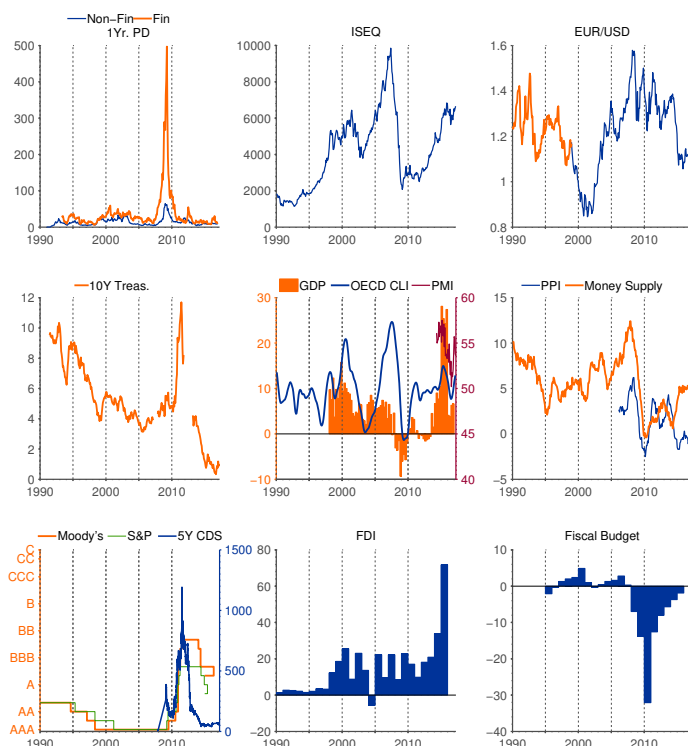
Iceland	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	2.25	4.70	5.30	6.92	4.47
1Yr. PD, Fin.	3.63	9.65	6.62	4.49	3.31
OMX Iceland All Share	1321	1245	1209	1232	1291
USD/ISK	123.42	123.18	113.82	113.34	113.49
3m Interbank (%)	6.55	6.55	5.95	5.60	5.50
GDP (YoY%)	4.0	3.5	9.6	11.3	—
PPI (YoY%)	-10.7	-9.3	-5.5	-6.1	-5.5*
Money Supply (YoY%)	-5.65	-6.98	-8.41	-4.58	1.47*
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	A	A	A	A	A
Fiscal Budget (%GDP)	—	—	—	0.29	—



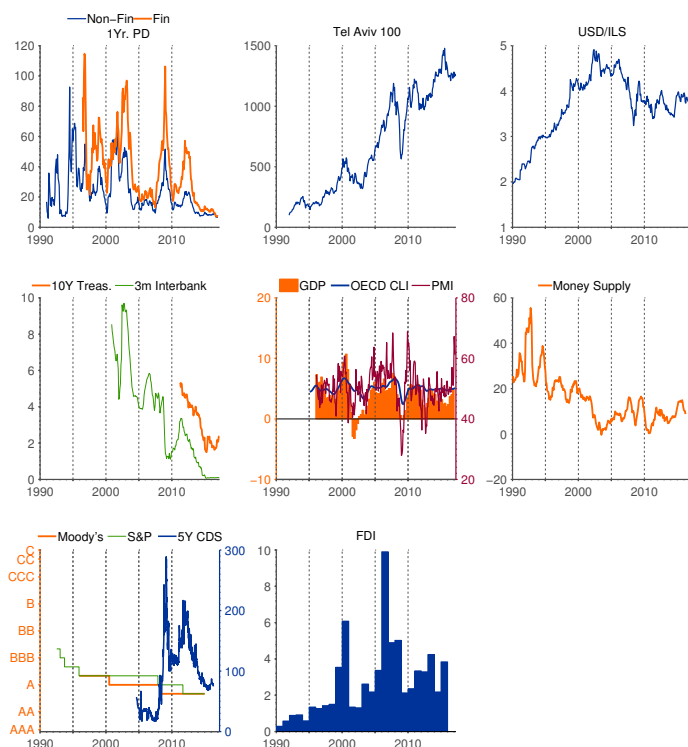
India	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	24.05	21.77	19.00	13.03	12.21
1Yr. PD, Fin.	27.37	25.96	22.83	23.29	25.04
SENSEX	25342	27000	27866	26626	29621
USD/INR	66.25	67.53	66.61	67.92	64.85
3m Treas. Yield (%)	7.13	6.65	6.42	6.20	5.78
10Y Treas. Yield (%)	7.46	7.45	6.82	6.51	6.68
3m Interbank (%)	7.50	6.75	7.04	5.36	6.14
OECD CLI	100.62	100.53	100.20	99.73	99.45*
PMI	52.4	51.7	52.1	49.6	52.5
PPI (YoY%)	-0.5	2.1	3.8	3.7	5.7
Money Supply (YoY%)	10.20	10.40	12.10	6.50	7.70
Sov. Rating, Moody's	Baa3	Baa3	Baa3	Baa3	Baa3
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-
Fiscal Budget (%GDP)	-	-	-	-3.69	-



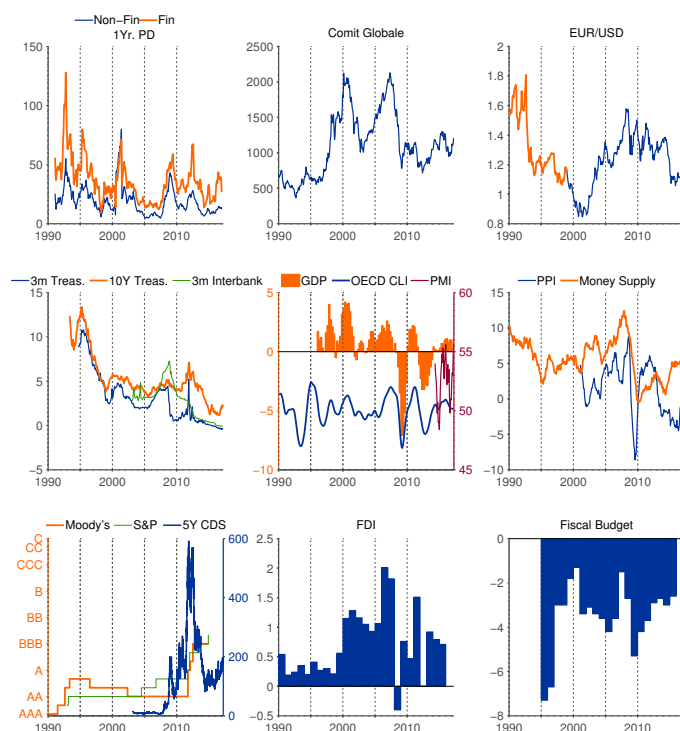
Indonesia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	19.30	19.08	16.69	16.86	14.48
1Yr. PD, Fin.	23.47	24.35	22.06	25.04	28.45
Jakarta Composite	4845	5017	5365	5297	5568
USD/IDR	13239.00	13210.00	13042.00	13473.00	13322.00
10Y Treas. Yield (%)	7.67	7.45	7.06	7.97	7.04
3m Interbank (%)	6.73	7.23	7.10	7.46	6.87
GDP (YoY%)	5.0	5.1	5.0	4.9	-
OECD CLI	99.13	99.66	100.05	100.15	100.04*
PMI	50.6	51.9	50.9	49.0	50.5
PPI (YoY%)	11.10	11.54	10.96	8.65	6.77
Money Supply (YoY%)	7.41	8.69	5.08	10.03	9.30*
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+
5Y CDS (bps)	198.3	185.2	152.1	157.9	127.5



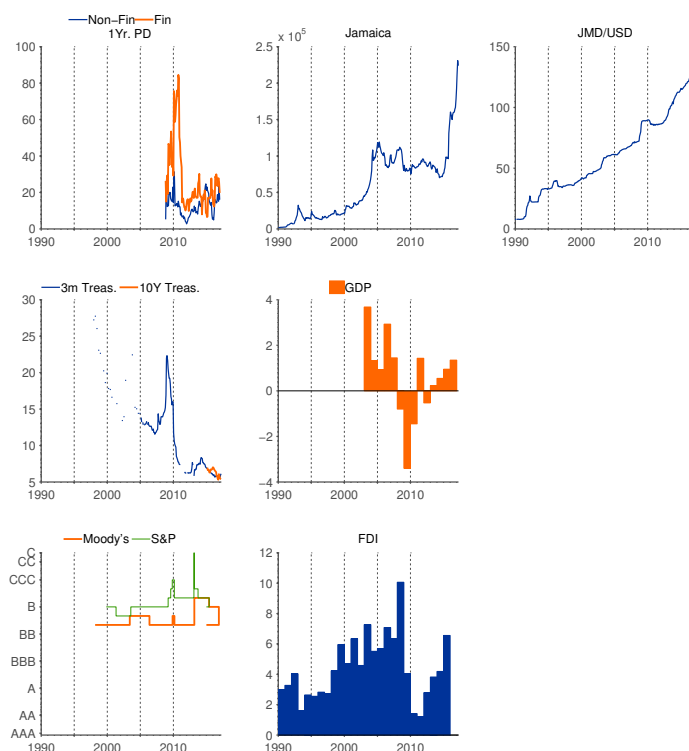
Ireland	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.18	9.24	7.86	8.73	7.68
1Yr. PD, Fin.	18.84	19.37	10.20	10.78	7.03
ISEQ	6309	5642	6035	6517	6659
EUR/USD	1.14	1.11	1.12	—	—
10Y Treas. Yield (%)	0.73	0.52	0.33	0.75	1.00
GDP (YoY%)	4.1	3.8	6.3	6.6	—
OECD CLI	99.79	98.85	99.32	100.65	101.44*
PMI	54.9	53.0	51.3	55.7	53.6
PPI (YoY%)	-0.5	-0.4	-0.7	0.2	1.1*
Money Supply (YoY%)	5.1	5.0	5.1	5.2	5.3
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	A+	A+	A+	A+	A+
5Y CDS (bps)	57.81	64.71*	—	63.75	50.86



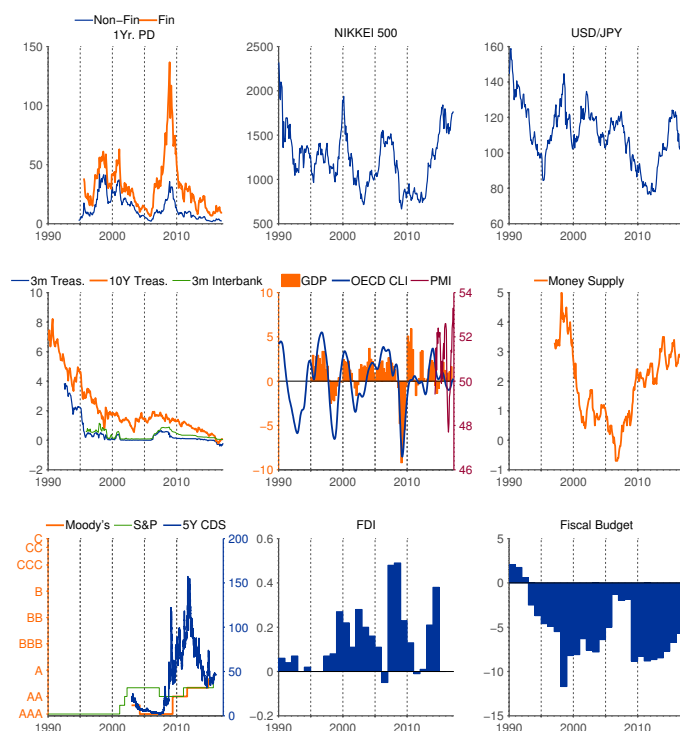
Israel	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	10.08	10.44	8.18	7.97	6.29
1Yr. PD, Fin.	15.90	12.58	9.55	9.41	9.70
Tel Aviv 100	1250	1211	1262	1282	1252
USD/ILS	3.76	3.86	3.76	3.84	3.62
10Y Treas. Yield (%)	1.85	1.63	1.73	2.06	2.36
3m Interbank (%)	0.10	0.08	0.10	0.10	0.10
GDP (YoY%)	2.3	3.7	4.0	4.8	—
OECD CLI	99.70	99.85	99.86	100.04	100.15*
PMI	49.0	48.8	52.1	67.2	61.2*
Money Supply (YoY%)	8.8	—	—	—	—
Sov. Rating, Moody's	A1	A1	A1	A1	A1
Sov. Rating, S&P	A+	A+	A+	A+	A+
5Y CDS (bps)	79.59	75.72*	—	—	—



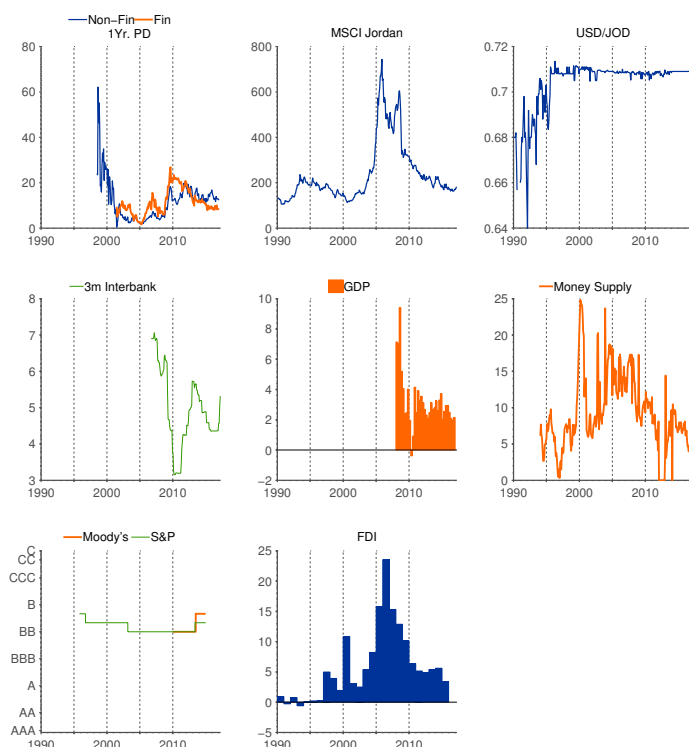
Italy	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	13.11	15.16	14.09	12.53	6.79
1Yr. PD, Fin.	35.42	43.07	38.52	27.44	15.72
Comit Globale	1056	949	965	1124	1208
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.21	-0.28	-0.39	-0.46	-0.33
10Y Treas. Yield (%)	1.22	1.26	1.19	1.81	2.32
3m Interbank (%)	-0.02	-0.04	-0.05	-0.07	-0.10
GDP (YoY%)	1.1	0.8	1.0	1.0	—
OECD CLI	100.72	100.44	100.21	100.18	100.13*
PMI	53.5	53.5	51.0	53.2	55.7
PPI (YoY%)	-3.9	-3.4	-0.8	0.9	3.7*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	5.30
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-
5Y CDS (bps)	126.70	152.05	150.82	157.22	170.09



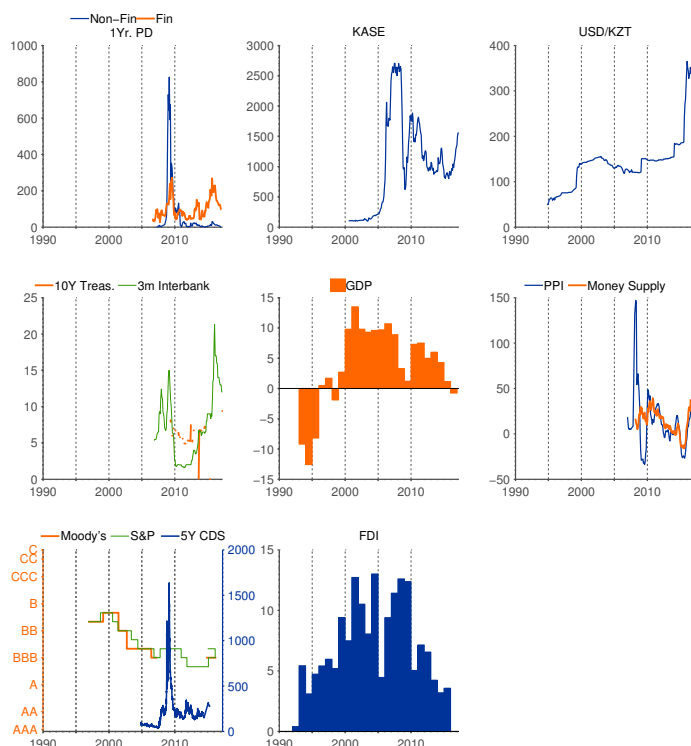
Jamaica	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	7.14	11.36	10.55	13.32	13.58
1Yr. PD, Fin.	16.27	30.31	23.77	19.40	11.43
Jamaica	153911	159717	164474	192274	223834
JMD/USD	121.56	126.55	127.58	128.85	128.13
3m Treas. Yield (%)	5.75	5.86	5.86	5.68	6.13
10Y Treas. Yield (%)	6.66	6.35	5.45	5.84	5.38
GDP (YoY%)	—	—	—	1.4	—
Sov. Rating, Moody's	Ba3	Ba3	Ba3	Ba3	Ba3
Sov. Rating, S&P	B	B	B	B	B



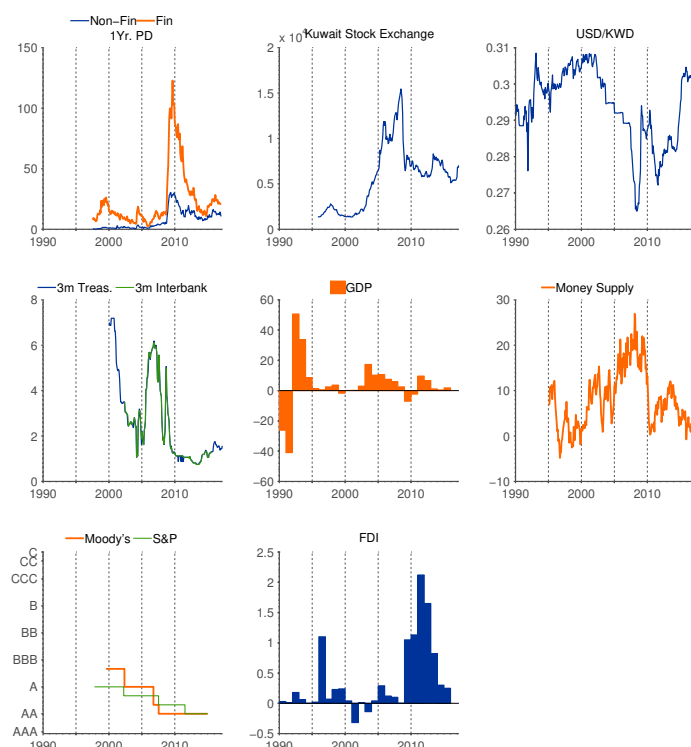
Japan	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	3.32	3.40	2.10	1.74	1.43
1Yr. PD, Fin.	9.84	11.36	8.89	7.34	7.76
NIKKEI 500	1590	1513	1572	1744	1760
USD/JPY	112.57	103.20	101.35	116.96	111.39
3m Treas. Yield (%)	-0.12	-0.27	-0.40	-0.39	-0.20
10Y Treas. Yield (%)	-0.03	-0.22	-0.09	0.05	0.07
3m Interbank (%)	0.10	0.06	0.06	0.06	0.06
GDP (YoY%)	0.4	0.9	1.1	1.6	—
OECD CLI	99.66	99.60	99.73	100.01	100.11*
PMI	49.1	48.1	50.4	52.4	52.4
Money Supply (YoY%)	2.60	2.90	3.00	3.40	3.60
Sov. Rating, Moody's	A1	A1	A1	A1	A1
Sov. Rating, S&P	A+	A+	A+	A+	A+
5Y CDS (bps)	45.79	—	—	—	—
Fiscal Budget (%GDP)	—	—	—	-5.67	—



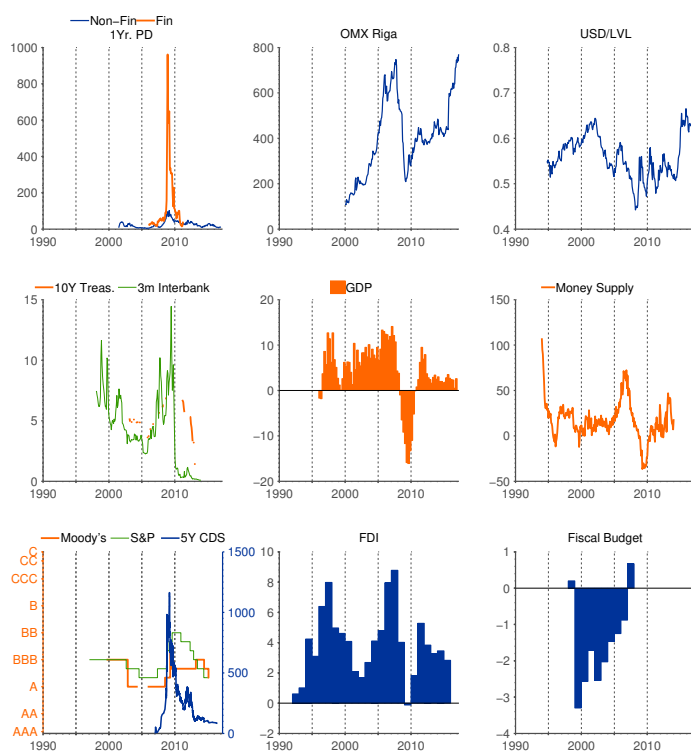
Jordan	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	12.40	12.41	12.69	12.09	13.94
1Yr. PD, Fin.	6.59	8.85	8.71	8.22	6.95
MSCI Jordan	170	166	163	172	182
USD/JOD	0.71	0.71	0.71	0.71	0.71
3m Interbank (%)	4.36	4.36	4.36	4.57	5.32
GDP (YoY%)	2.5	2.1	2.0	2.1	—
Money Supply (YoY%)	6.85	4.58	4.94	4.02	0.38*
Sov. Rating, Moody's	B1	B1	B1	B1	B1
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-



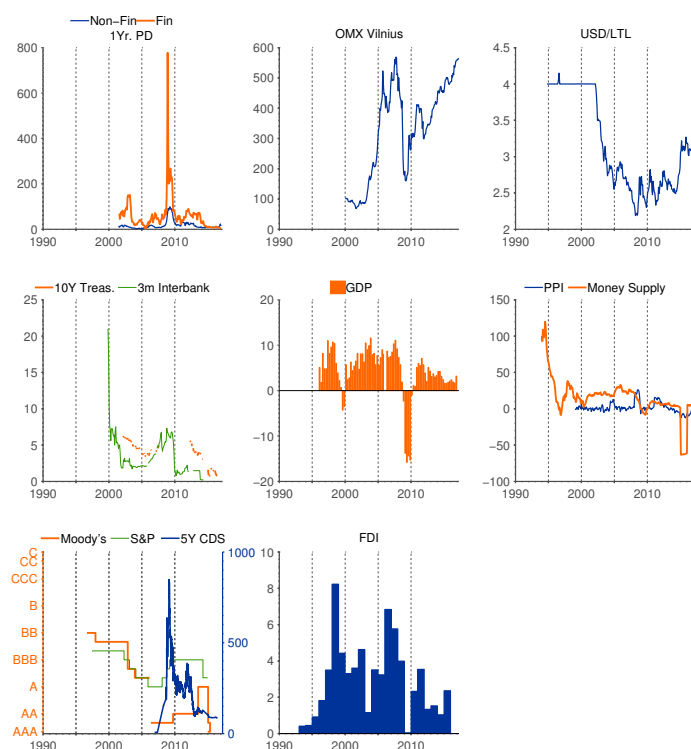
Kazakhstan	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.63	7.60	7.02	3.75	2.83
1Yr. PD, Fin.	97.53	78.44	68.42	91.52	108.87
KASE	971	985	1191	1358	1554
USD/KZT	344.59	339.18	335.84	333.69	313.65
10Y Treas. Yield (%)	—	—	—	—	9.40
3m Interbank (%)	17.00	15.92	14.00	13.00	12.00
GDP (YoY%)	—	—	—	-0.8	—
PPI (YoY%)	8.2	18.7	26.1	15.5	26.7
Money Supply (YoY%)	24.94	25.17	32.54	46.39	36.07*
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-



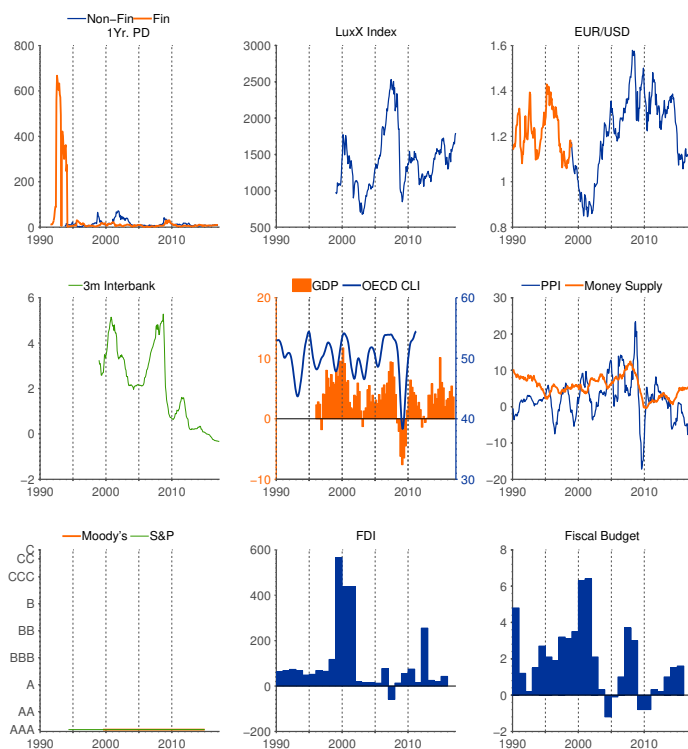
Kuwait	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	17.87	11.64	14.50	15.76	11.64
1Yr. PD, Fin.	30.75	29.07	27.71	23.53	21.54
Kuwait Stock Exchange	5229	5365	5398	5748	7029
USD/KWD	0.30	0.30	0.30	0.31	0.30
3m Treas. Yield (%)	1.63	1.50	1.56	1.44	1.56
Money Supply (YoY%)	4.16	1.67	2.56	3.02	1.39*
Sov. Rating, Moody's	Aa2	Aa2	Aa2	Aa2	Aa2
Sov. Rating, S&P	AA	AA	AA	AA	AA



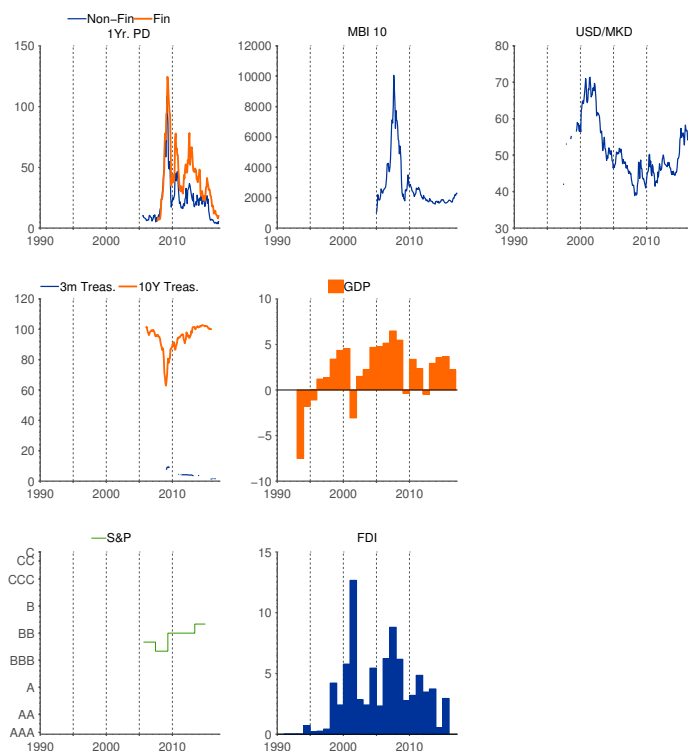
Latvia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	13.34	8.39	6.76	9.78	6.82
OMX Riga	616	621	709	734	770
USD/LVL	0.62	0.63	0.63	0.67	0.66
GDP (YoY%)	2.4	2.3	0.5	2.6	—
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	A-	A-	A-	A-	A-
5Y CDS (bps)	88.57	81.82	—	—	—



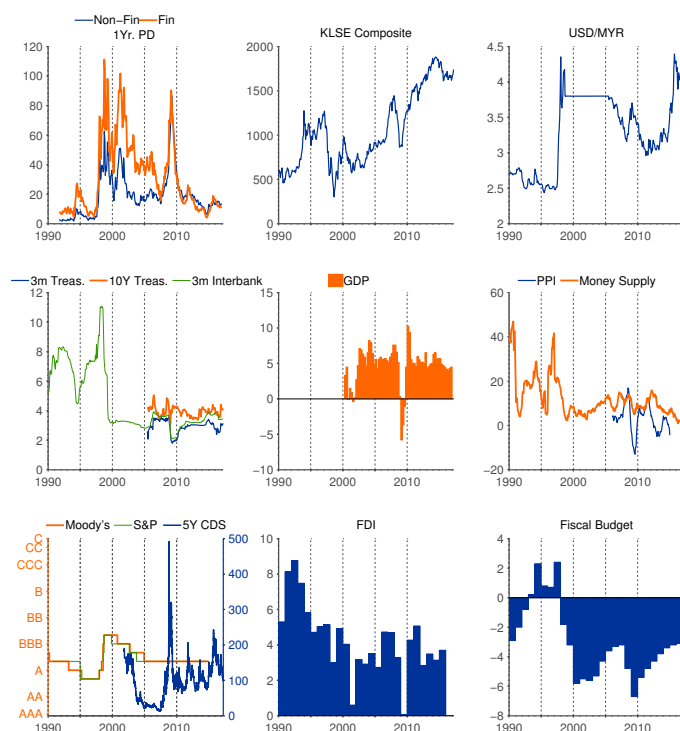
Lithuania	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	6.45	10.41	13.98	18.87	12.95
1Yr. PD, Fin.	10.01	5.94	4.75	3.64	2.36
OMX Vilnius	508	511	544	558	565
USD/LTL	3.03	3.11	3.07	3.28	3.24
10Y Treas. Yield (%)	1.06	0.79	—	—	—
GDP (YoY%)	2.4	1.9	1.7	3.2	—
PPI (YoY%)	-10.0	-6.9	-0.6	5.5	8.2
Money Supply (YoY%)	5.30	5.10	6.60	7.30	7.60*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	A-	A-	A-	A-	A-
5Y CDS (bps)	90.64	83.52	—	—	—



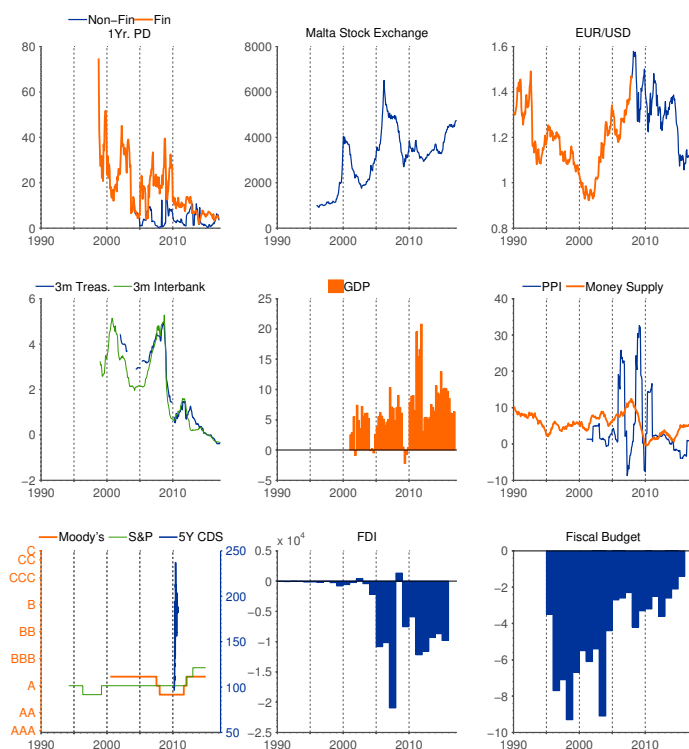
Luxembourg	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	8.40	11.31	8.41	8.61	8.47
1Yr. PD, Fin.	10.86	10.19	7.84	7.15	8.43
LuxX Index	1451	1399	1578	1669	1795
EUR/USD	1.14	1.11	1.12	—	—
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	3.3	4.5	5.4	3.6	—
PPI (YoY%)	-5.2	-4.7	-7.4	-6.1	-3.1*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	5.30
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA



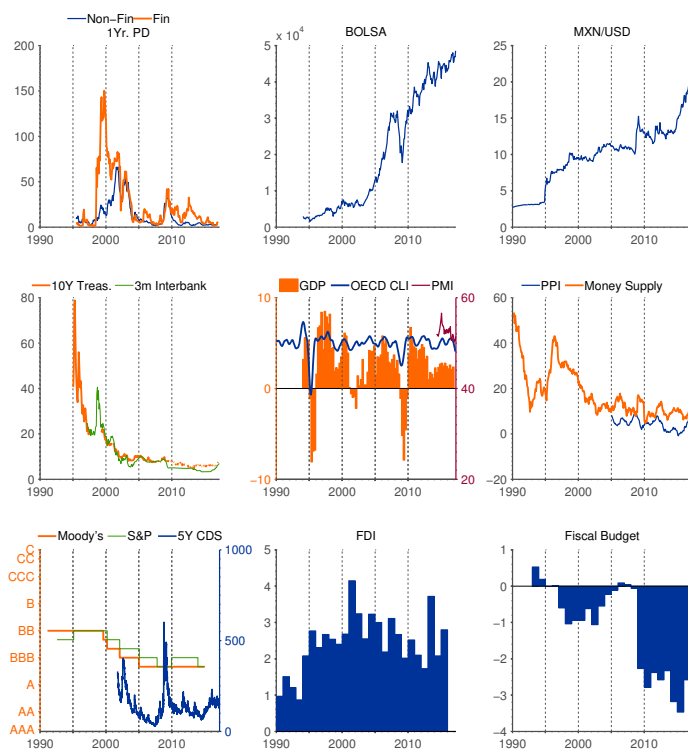
Macedonia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	11.48	6.51	4.33	4.45	10.64
1Yr. PD, Fin.	21.22	25.70	20.80	9.44	10.41
MBI 10	1781	1707	1954	2135	2251
USD/MKD	54.15	55.48	54.69	58.46	57.78
3m Treas. Yield (%)	1.60*	1.60	1.60*	—	—
GDP (YoY%)	—	—	—	2.2	—
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-



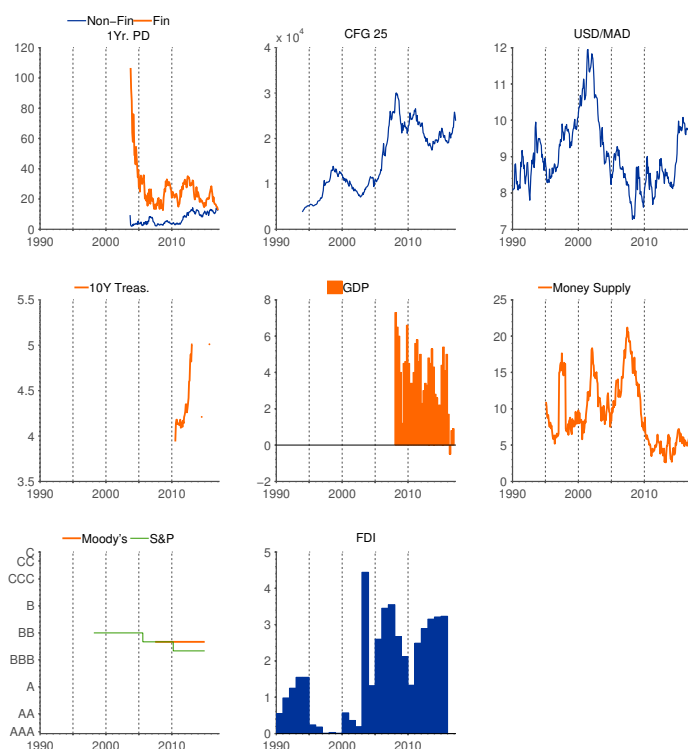
Malaysia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	16.96	18.48	15.22	14.46	9.87
1Yr. PD, Fin.	17.05	15.03	12.31	13.84	11.31
KLSE Composite	1718	1654	1653	1642	1740
USD/MYR	3.90	4.03	4.14	4.49	4.43
3m Treas. Yield (%)	2.39	2.69	2.58	3.06	3.15
10Y Treas. Yield (%)	3.80	3.74	3.55	4.23	4.15
3m Interbank (%)	3.71	3.65	3.40	3.41	3.43
GDP (YoY%)	4.2	4.0	4.3	4.5	—
Money Supply (YoY%)	0.90	1.90	2.20	3.00	3.60*
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	A-	A-	A-	A-	A-
5Y CDS (bps)	153.00	154.51	120.84	138.38	105.21
Fiscal Budget (%GDP)	—	—	—	-3.10	—



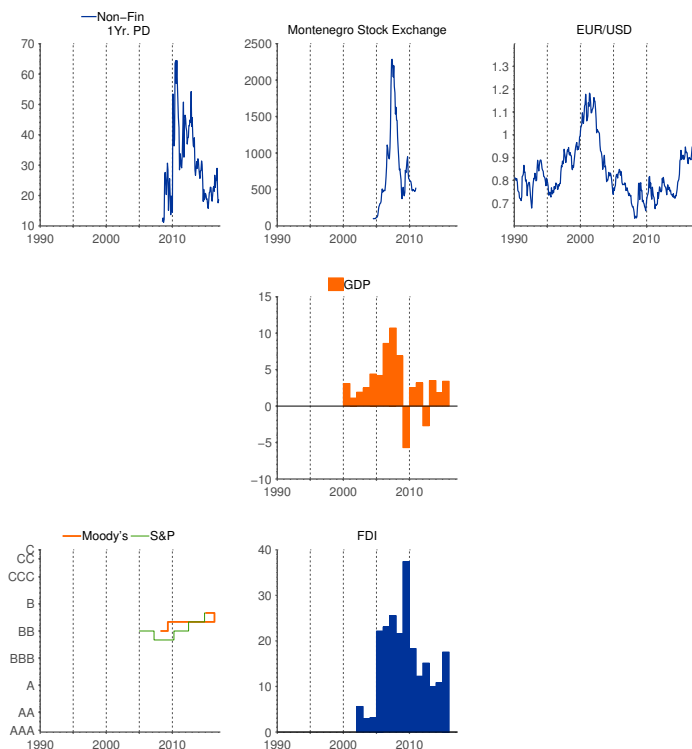
Malta	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	3.63	3.65	4.80	5.64	5.68
1Yr. PD, Fin.	6.38	6.20	11.75	4.13	5.37
Malta Stock Exchange	4563	4561	4467	4631	4718
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.14	-0.28	-0.39	-0.39	-0.35
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	8.5	6.1	6.0	6.3	—
PPI (YoY%)	-3.4	0.9	0.4	0.3	2.4*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	4.70*
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	BBB+	BBB+	BBB+	BBB+	BBB+



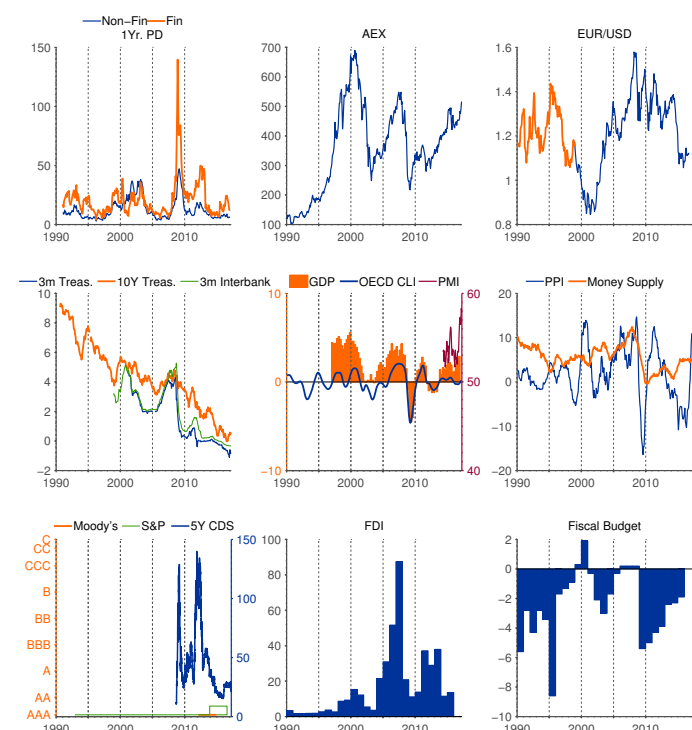
Mexico	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	2.76	3.05	2.83	3.94	4.96
1Yr. PD, Fin.	7.17	4.45	2.26	3.86	5.82
BOLSA	45881	45966	47246	45643	48542
MXN/USD	17.28	18.28	19.39	20.73	18.72
10Y Treas. Yield (%)	6.03	6.08	5.99	7.25	7.60*
3m Interbank (%)	4.12	4.23	5.15	6.19	6.93
GDP (YoY%)	2.2	2.6	2.1	2.4	—
OECD CLI	100.83	101.06	100.66	99.43	98.15*
PMI	53.2	51.1	51.9	50.2	51.5
PPI (YoY%)	2.9	4.9	6.6	10.3	10.7
Money Supply (YoY%)	7.70	8.40	10.10	10.60	8.80*
Sov. Rating, Moody's	Baa1	Baa1	Baa1	Baa1	Baa1
Sov. Rating, S&P	BBB+	BBB+	BBB+	BBB+	BBB+
5Y CDS (bps)	162.36	159.12	166.81	155.91	130.28
Fiscal Budget (%GDP)	—	—	—	-2.58	—



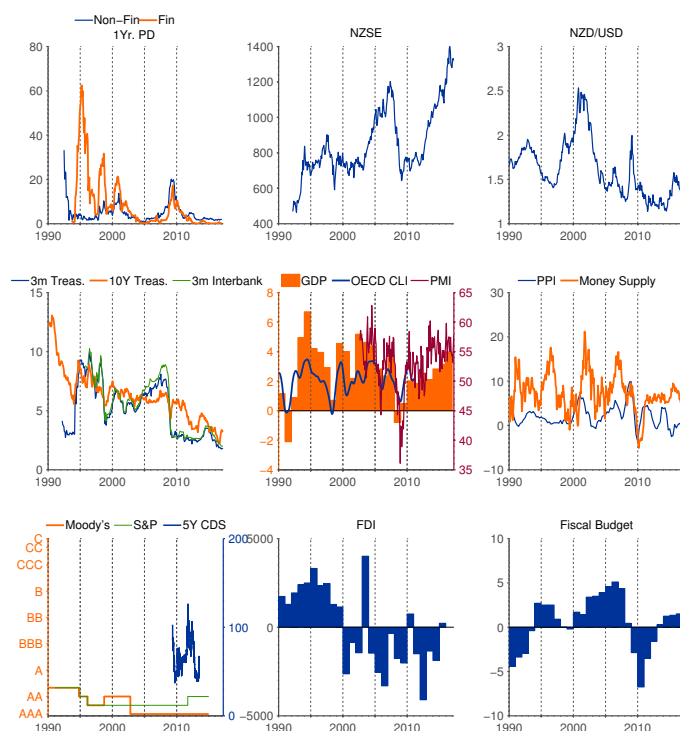
Morocco	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	10.72	11.90	14.91	13.31	12.40
1Yr. PD, Fin.	27.95	19.87	19.51	17.03	15.84
CFG 25	19872	20098	21282	24464	23883
USD/MAD	9.63	9.79	9.73	10.13	10.06
GDP (YoY%)	1.7	-0.5	0.8	0.9	—
Money Supply (YoY%)	5.51	4.90	5.90	4.70	5.40*
Sov. Rating, Moody's	Ba1	Ba1	Ba1	Ba1	Ba1
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-



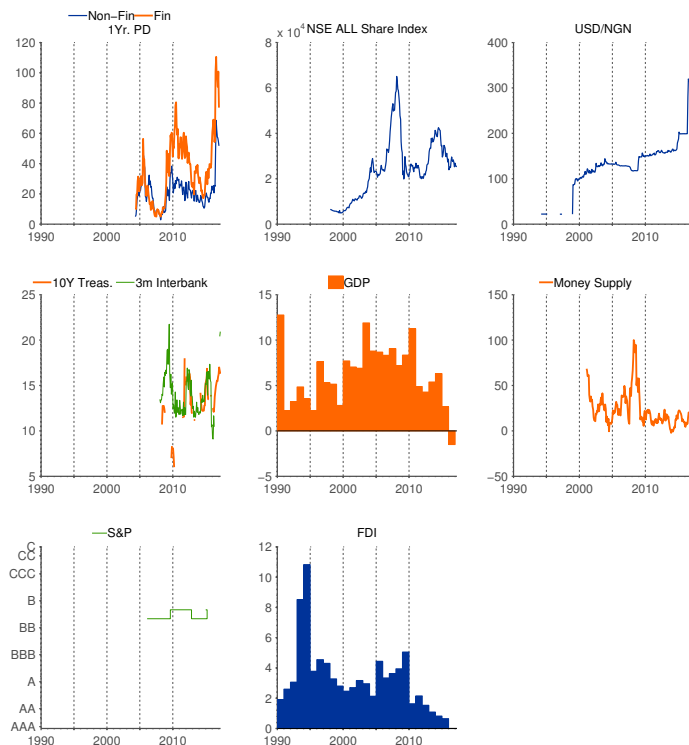
Montenegro	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	22.03	25.43	24.48	24.59	21.44
1Yr. PD, Fin.	20.27	17.41	17.40*	—	—
EUR/USD	0.88	0.90	0.89	0.95	0.94
Sov. Rating, Moody's	B1	B1	B1	B1	B1
Sov. Rating, S&P	B+	B+	B+	B+	B+



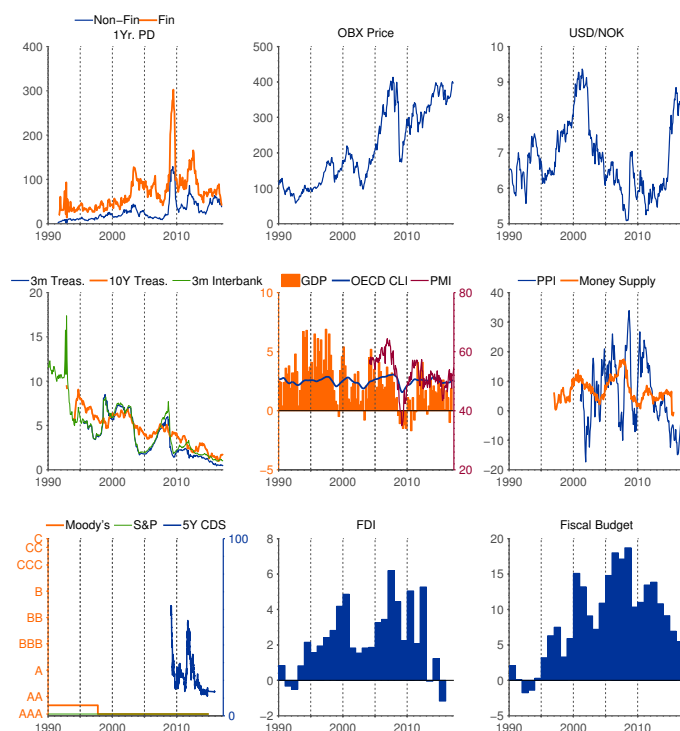
Netherlands	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	8.28	8.11	5.44	5.92	4.56
1Yr. PD, Fin.	17.65	26.72	20.18	13.87	10.09
AEX	440	436	452	483	517
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.53	-0.66	-0.78	-1.11	-0.78
10Y Treas. Yield (%)	0.36	0.09	0.00	0.36	0.58
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	1.2	1.9	2.5	2.9	—
OECD CLI	99.78	99.76	99.75	99.97	100.16*
PMI	53.6	52.0	53.4	57.3	57.8
PPI (YoY%)	-9.5	-6.4	-4.0	4.9	11.0*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	4.70*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	25.60	26.67	25.11	27.65	21.31



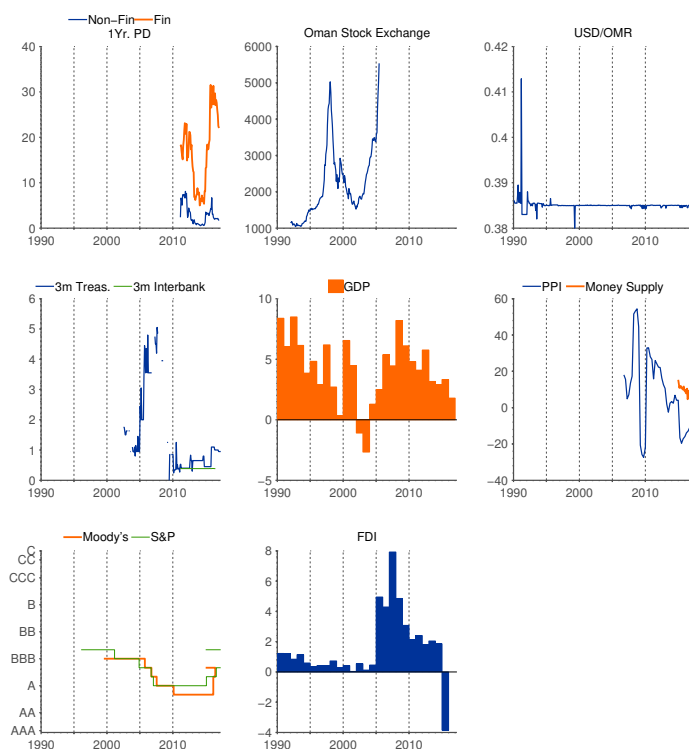
New Zealand	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	1.36	1.46	1.28	1.48	1.63
1Yr. PD, Fin.	1.12	0.92	0.47	0.20	0.14
NZSE	1283	1305	1375	1281	1322
NZD/USD	1.45	1.40	1.37	1.44	1.43
3m Treas. Yield (%)	1.94	2.09	1.91	1.75	1.77
10Y Treas. Yield (%)	2.93	2.35	2.27	3.33	3.19
3m Interbank (%)	2.35	2.42	2.20	2.00	2.00
GDP (YoY%)	—	—	—	4.0	—
PMI	53.4	57.5	57.4	54.5	57.8
PPI (YoY%)	0.1	0.5	0.1	2.5	—
Money Supply (YoY%)	7.80	5.90	4.80	6.40	6.40*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AA	AA	AA	AA	AA
Fiscal Budget (%GDP)	—	—	—	1.51	—



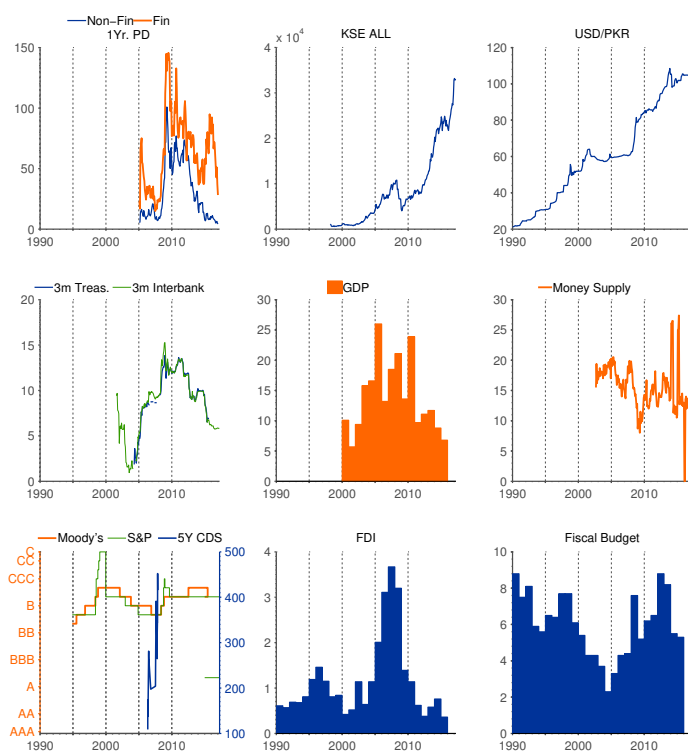
Nigeria	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	24.82	53.16	57.57	52.99	26.28
1Yr. PD, Fin.	36.99	97.39	99.34	76.43	28.79
NSE ALL Share Index	25306	29598	28335	26875	25516
USD/NGN	199.05	280.50	315.00	315.33	314.29
10Y Treas. Yield (%)	12.09	14.40	15.54	16.24	16.29
3m Interbank (%)	11.66	10.45*	—	—	20.93
GDP (YoY%)	—	—	—	-1.5	—
Money Supply (YoY%)	6.94	15.28	18.18	18.45	8.50*
Sov. Rating, S&P	B+	B+	B+	B+	B+



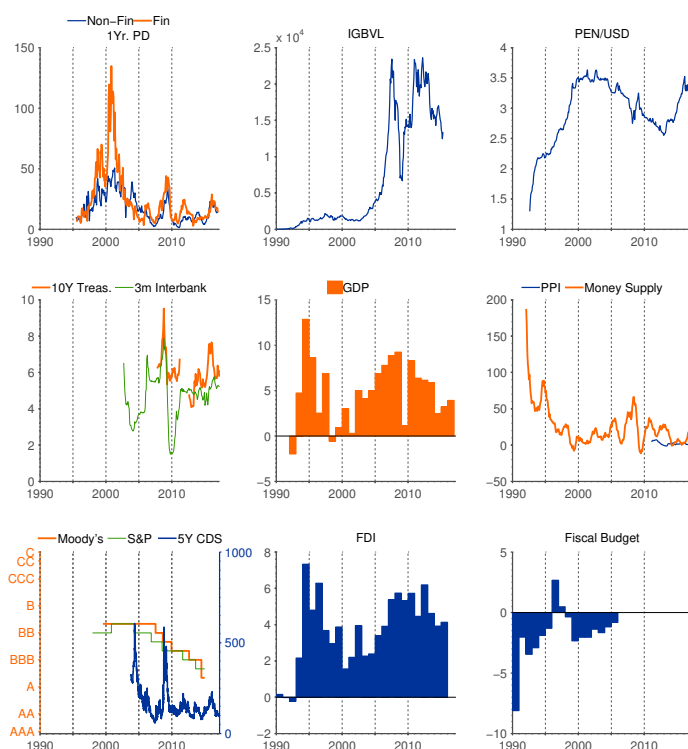
Norway	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	34.97	33.13	28.22	23.83	19.05
1Yr. PD, Fin.	47.46	52.09	35.65	30.34	21.30
OBX Price	346	353	358	397	396
USD/NOK	8.27	8.36	7.98	8.64	8.60
3m Treas. Yield (%)	0.44	0.54	0.48	0.51	0.41
10Y Treas. Yield (%)	1.21	1.01	1.21	1.65	1.64
3m Interbank (%)	1.00	1.01	1.15	1.17	0.97
GDP (YoY%)	1.7	1.1	-1.0	1.9	—
OECD CLI	99.51	99.54	99.81	100.28	100.43*
PMI	46.4	53.4	52.4	52.0	54.7
PPI (YoY%)	-14.9	-9.7	-6.1	7.2	16.1
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
Fiscal Budget (%GDP)	—	—	—	5.48	—



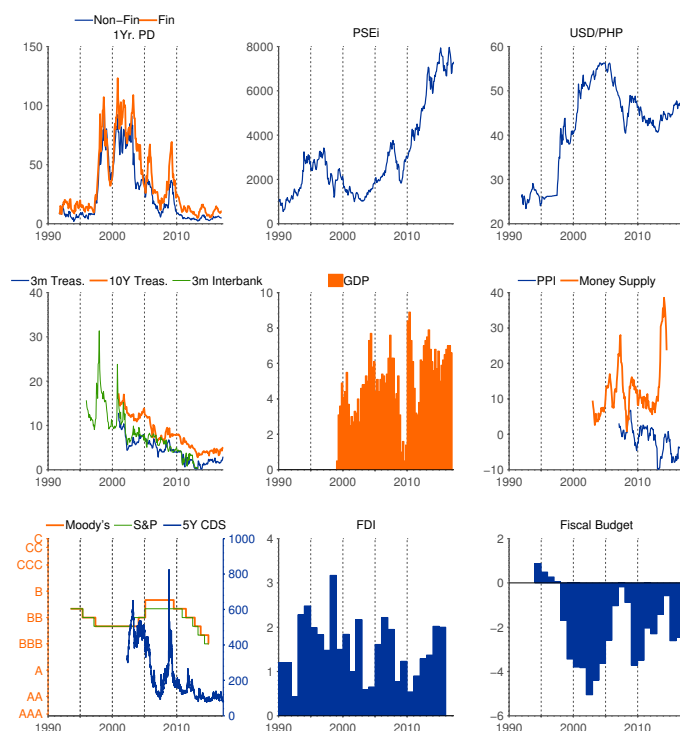
Oman	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	2.06	2.37	2.06	3.17	1.92
1Yr. PD, Fin.	27.77	24.64	24.56	23.29	19.62
USD/OMR	0.39	0.38	0.39	0.39	0.39
3m Treas. Yield (%)	1.10	1.00	1.00	0.95	0.95
3m Interbank (%)	0.39	0.39	—	—	—
GDP (YoY%)	—	—	—	1.8	—
PPI (YoY%)	-13.9	-12.9	-10.8	—	—
Money Supply (YoY%)	7.89	5.35	5.57	1.83	2.60*
Sov. Rating, Moody's	Baa1	Baa1	Baa1	Baa1	Baa1
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-



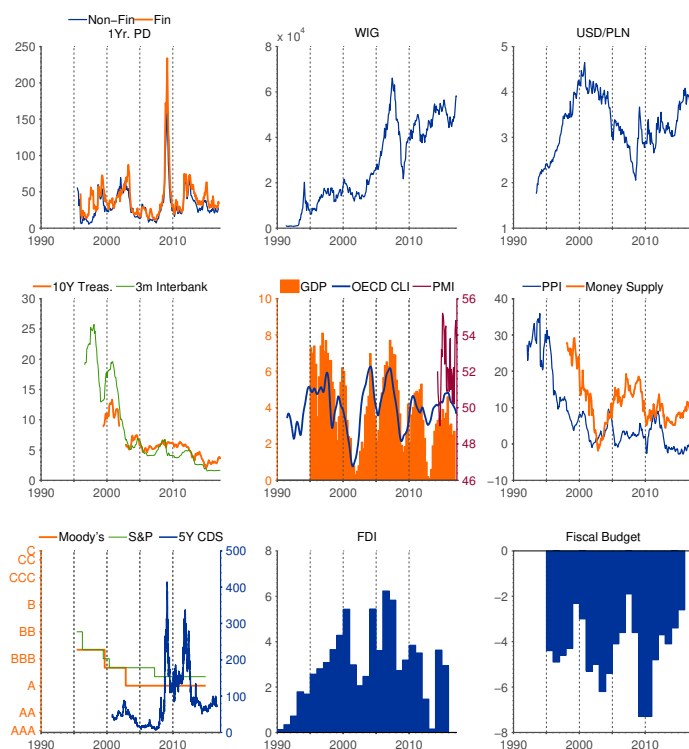
Pakistan	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.95	9.31	6.66	5.43	4.20
1Yr. PD, Fin.	73.85	72.75	55.99	31.39	32.35
KSE ALL	22897	25313	27682	32842	32985
USD/PKR	104.75	104.73	104.66	104.83	104.85
3m Interbank (%)	6.10	5.80	5.79	5.87	5.87
Money Supply (YoY%)	13.50	13.70	12.70	14.50	13.60*
Sov. Rating, Moody's	B3	B3	B3	B3	B3
Sov. Rating, S&P	A-	A-	A-	A-	A-



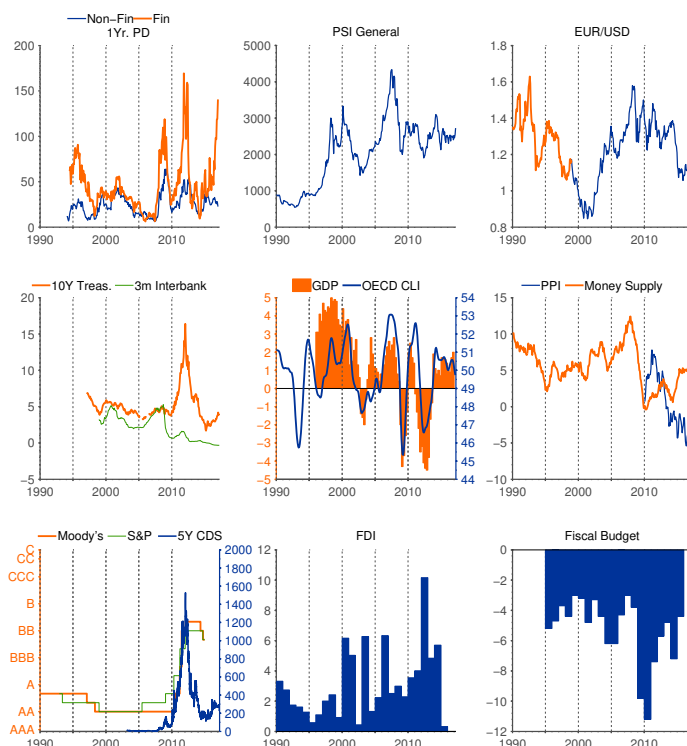
Peru	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	19.48	30.18	18.59	18.98	13.80
1Yr. PD, Fin.	11.63	14.98	12.84	11.03	10.71
PEN/USD	3.31	3.29	3.38	3.36	3.25
10Y Treas. Yield (%)	6.95	6.08	5.77	6.38	5.77
3m Interbank (%)	5.59	5.76	5.24	5.27	5.20
GDP (YoY%)	—	—	—	3.9	—
PPI (YoY%)	1.8	1.0	1.5	1.9	1.8
Money Supply (YoY%)	4.00	8.60	18.00	11.50	13.20*
Sov. Rating, Moody's	A3	A3	A3	A3	A3
Sov. Rating, S&P	BBB+	BBB+	BBB+	BBB+	BBB+
5Y CDS (bps)	162.62	138.66	102.69	108.02	102.15



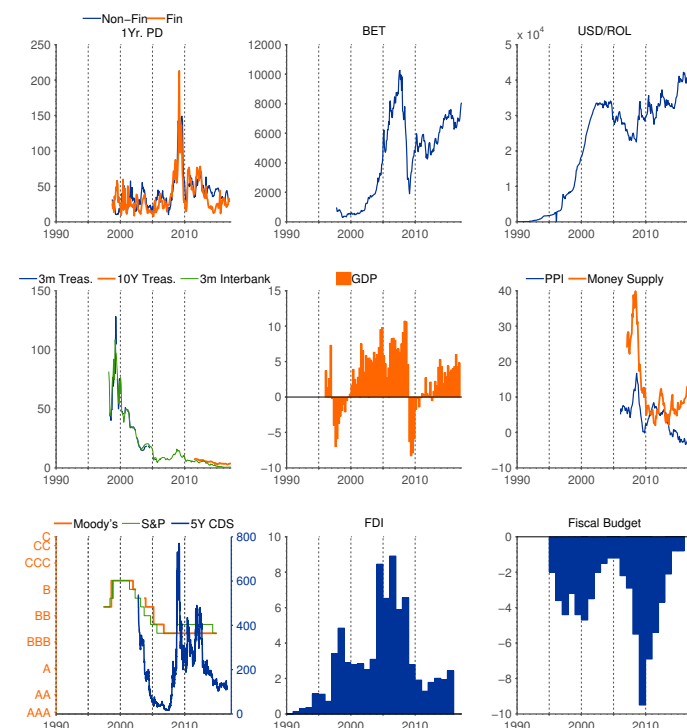
Philippines	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	7.00	8.39	7.01	6.05	5.31
1Yr. PD, Fin.	14.10	14.24	11.43	12.65	10.40
PSEI	7262	7796	7630	6841	7312
USD/PHP	45.97	47.16	48.47	49.60	50.20
3m Treas. Yield (%)	1.76	1.76	1.59	2.15	2.96
10Y Treas. Yield (%)	4.71	4.22	3.65	4.63	5.08
GDP (YoY%)	6.8	7.0	7.0	6.6	—
PPI (YoY%)	-6.9	-3.7	-4.3	-4.2	1.1
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BBB	BBB	BBB	BBB	BBB
5Y CDS (bps)	105.32	114.17	116.82	109.67	81.80
Fiscal Budget (%GDP)	—	—	—	-2.45	—



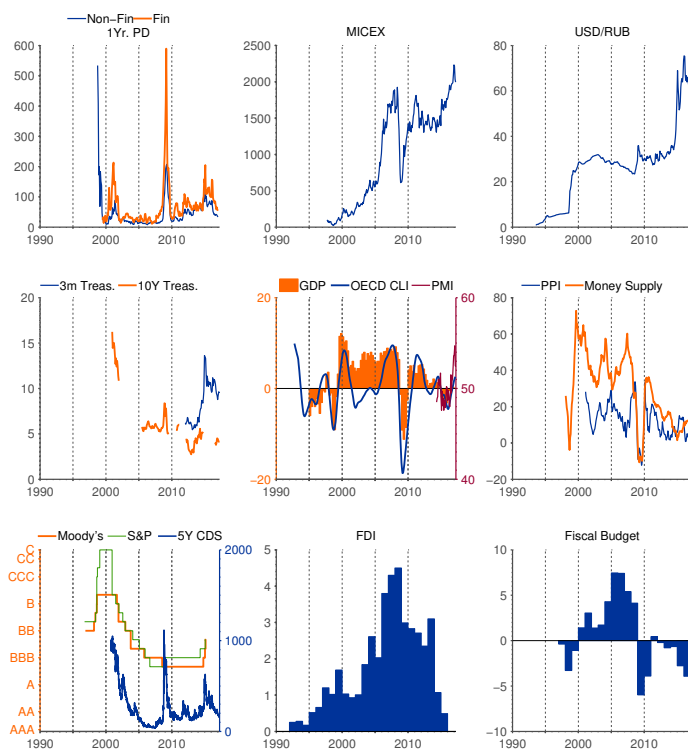
Poland	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	24.03	29.59	23.95	29.75	22.23
1Yr. PD, Fin.	32.78	33.06	30.07	35.31	29.23
WIG	49017	44749	47085	51754	57911
USD/PLN	3.73	3.94	3.82	4.19	3.97
10Y Treas. Yield (%)	2.84	2.91	2.92	3.63	3.49
3m Interbank (%)	1.57	1.61	1.61	1.63	1.63
GDP (YoY%)	3.0	3.1	2.5	2.7	—
OECD CLI	100.41	100.25	100.09	99.91	99.66*
PMI	53.8	51.8	52.2	54.3	53.5
PPI (YoY%)	-1.9	-0.8	0.2	3.2	4.4*
Money Supply (YoY%)	9.10	11.40	9.40	9.60	8.20*
Sov. Rating, Moody's	A2	A2	A2	A2	A2
Sov. Rating, S&P	A-	A-	A-	A-	A-
5Y CDS (bps)	87.14	85.92	70.50	—	—



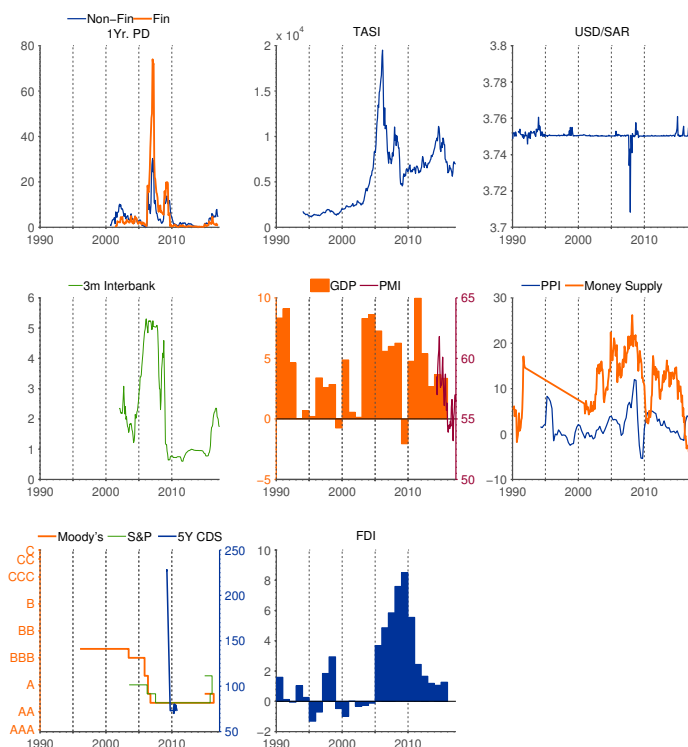
Portugal	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	32.94	34.52	23.63	23.65	20.10
1Yr. PD, Fin.	67.40	79.85	82.34	122.47	26.10
PSI General	2466	2370	2481	2520	2725
EUR/USD	1.14	1.11	1.12	—	—
10Y Treas. Yield (%)	2.94	3.01	3.33	3.76	3.98
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	1.0	0.9	1.7	2.0	—
OECD CLI	100.15	100.49	100.56	100.13	99.74*
PPI (YoY%)	-4.8	-4.2	-1.9	1.5	4.0*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	4.70*
Sov. Rating, Moody's	Ba1	Ba1	Ba1	Ba1	Ba1
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+
5Y CDS (bps)	264.40	310.71	302.70	274.01	238.70



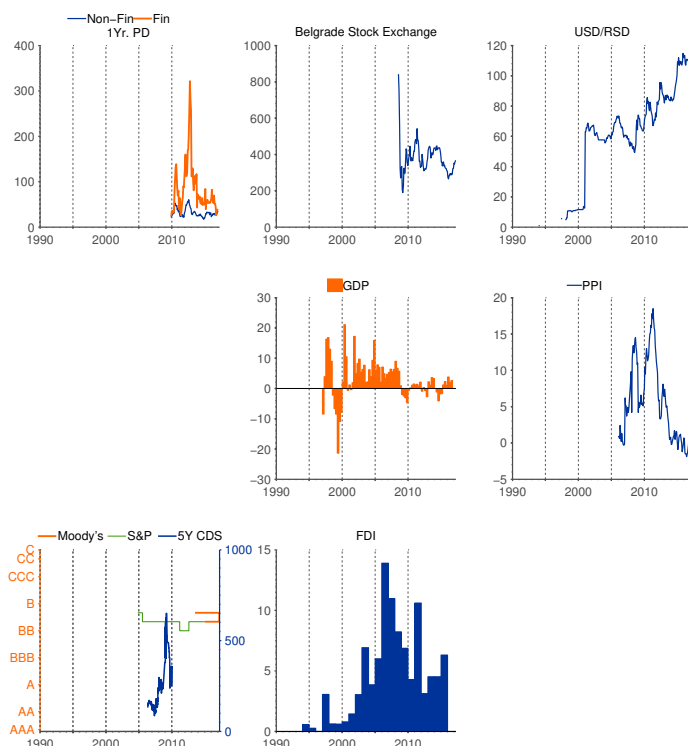
Romania	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	34.74	46.17	40.52	31.71	20.90
1Yr. PD, Fin.	35.39	60.84	33.17	29.82	12.91
BET	6738	6473	6937	7085	8069
USD/ROL	39272.91	40746.75	39525.00	43130.51	42751.51
10Y Treas. Yield (%)	3.32	3.40	2.84	3.47	3.86
3m Interbank (%)	0.57	0.60	0.50	0.68	0.66
GDP (YoY%)	4.3	6.0	4.3	4.8	—
PPI (YoY%)	-3.4	-2.3	-1.5	0.9	3.9*
Money Supply (YoY%)	9.94	13.08	12.24	9.76	10.06*
Sov. Rating, Moody's	Baa3	Baa3	Baa3	Baa3	Baa3
Sov. Rating, S&P	BBB-	BBB-	BBB-	BBB-	BBB-
5Y CDS (bps)	117.02	150.07	111.85*	—	—



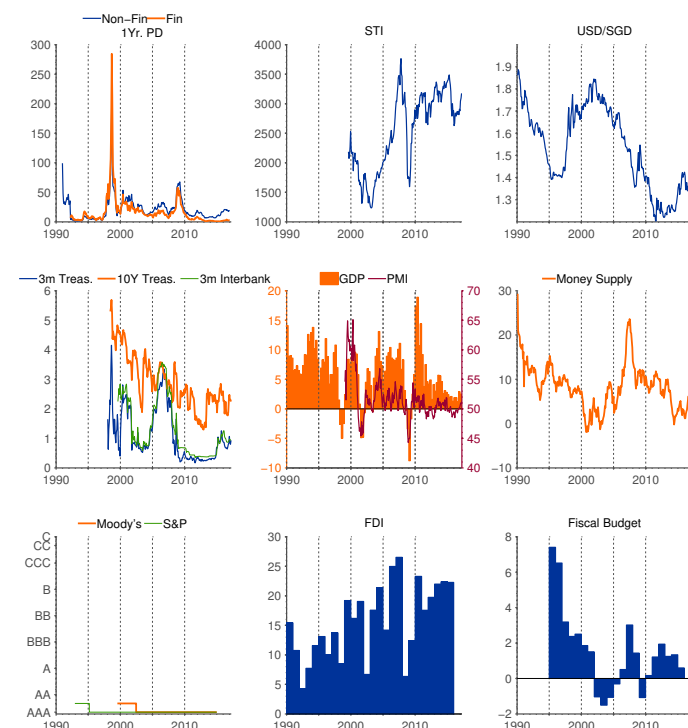
Russia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	48.53	42.62	42.11	36.03	32.83
1Yr. PD, Fin.	82.61	77.14	59.36	53.32	55.81
MICEX	1871	1891	1978	2233	1996
USD/RUB	67.05	63.97	62.85	61.27	56.26
3m Treas. Yield (%)	11.17	10.99	9.80	8.78	9.50
10Y Treas. Yield (%)	—	—	3.79	4.46	4.17
GDP (YoY%)	-0.4	-0.5	-0.4	0.3	—
OECD CLI	98.11	99.18	100.08	100.91	101.29*
PMI	48.3	51.5	51.1	53.7	52.4
PPI (YoY%)	0.8	5.1	5.1	7.4	15.1*
Money Supply (YoY%)	11.80	12.20	12.70	9.20	12.10*
Sov. Rating, Moody's	Ba1	Ba1	Ba1	Ba1	Ba1
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+
5Y CDS (bps)	283.19	232.87	219.66	231.35*	166.70
Fiscal Budget (%GDP)	—	—	—	-3.93	—



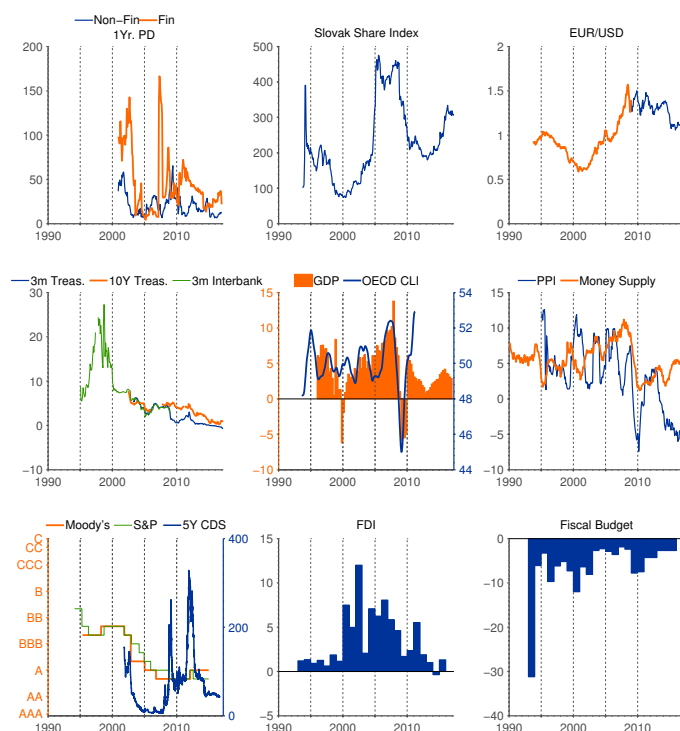
Saudi Arabia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	9.03	8.41	11.19	8.20	6.20
1Yr. PD, Fin.	3.91	2.65	3.63	1.55	0.94
TASI	6223	6500	5623	7210	7002
USD/SAR	3.75	3.75	3.75	3.75	3.75
3m Interbank (%)	1.80	2.22	2.36	2.04	1.74
PMI	54.5	54.4	55.3	55.5	56.4
PPI (YoY%)	2.7	4.0	3.7	2.0	—
Money Supply (YoY%)	-0.40	-2.60	-4.00	0.70	0.10*
Sov. Rating, Moody's	A1	A1	A1	A1	A1
Sov. Rating, S&P	A-	A-	A-	A-	A-



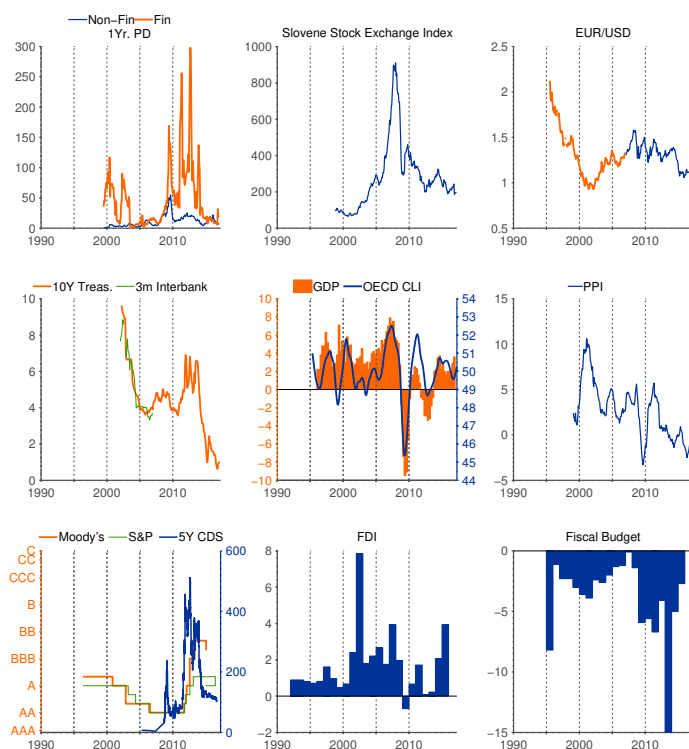
Serbia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	38.20	35.84	35.60	37.74	38.67
1Yr. PD, Fin.	66.42	70.53	43.08	43.26	45.50
Belgrade Stock Exchange	283	288	294	352	368
USD/RSD	107.89	111.02	109.49	117.29	115.97
GDP (YoY%)	3.8	1.9	2.6	—	—
PPI (YoY%)	-1.5	-1.6	0.2	2.2	2.9
Sov. Rating, Moody's	Ba3	Ba3	Ba3	Ba3	Ba3
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-



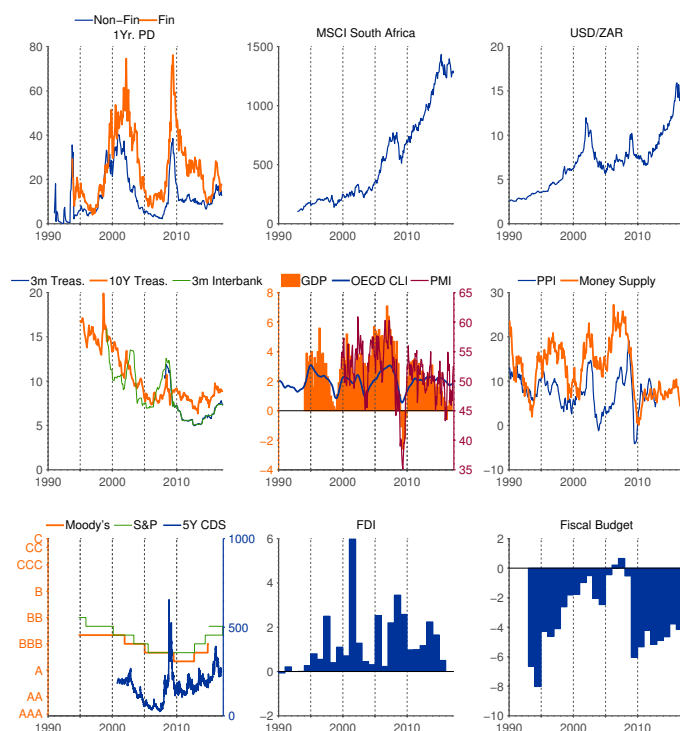
Singapore	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	21.17	22.56	20.31	17.57	13.49
1Yr. PD, Fin.	3.38	4.02	3.11	2.78	2.54
STI	2841	2841	2869	2881	3175
USD/SGD	1.35	1.35	1.36	1.45	1.40
3m Treas. Yield (%)	0.76	0.66	0.71	1.06	0.93
10Y Treas. Yield (%)	1.84	1.91	1.78	2.47	2.25
3m Interbank (%)	1.06	0.93	0.87	0.97	0.95
GDP (YoY%)	1.9	1.9	1.2	2.9	2.5
PMI	49.4	49.6	50.1	50.6	51.2
Money Supply (YoY%)	2.20	4.20	5.00	7.70	7.70*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA



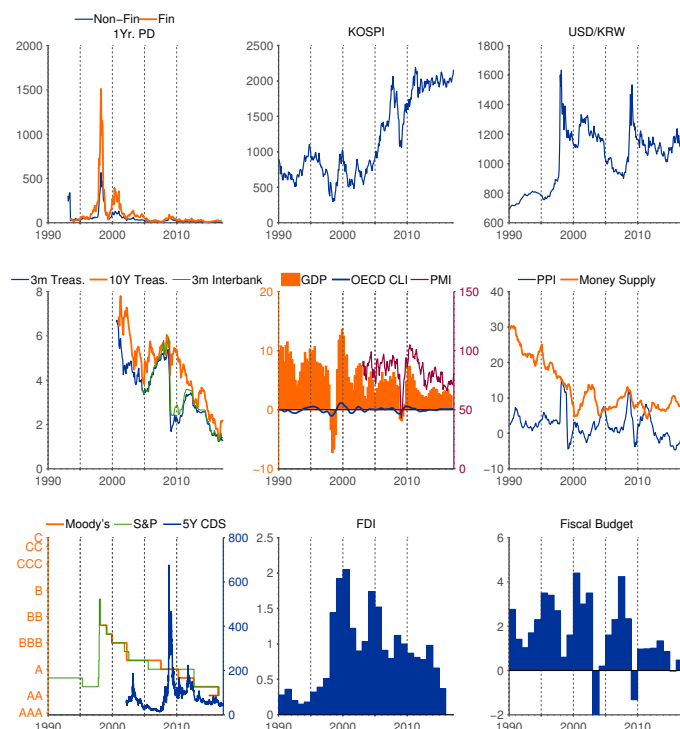
Slovakia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	7.41	11.37	14.65	8.65	8.58
1Yr. PD, Fin.	12.25	22.01	22.80	21.34	29.61
Slovak Share Index	325	313	309	319	305
EUR/USD	1.14	1.11	1.12	—	—
3m Treas. Yield (%)	-0.17	-0.20	-0.29	-0.34	-0.59
10Y Treas. Yield (%)	0.36	0.59	0.27	0.90	1.09
GDP (YoY%)	3.6	3.5	3.1	2.9	—
PPI (YoY%)	-6.0	-4.5	-3.2	-1.8	2.6*
Money Supply (YoY%)	5.40	4.90	5.10	5.00	4.80*
Sov. Rating, Moody's	A2	A2	A2	A2	A2
Sov. Rating, S&P	A+	A+	A+	A+	A+
5Y CDS (bps)	45.56	43.91	44.21	—	—



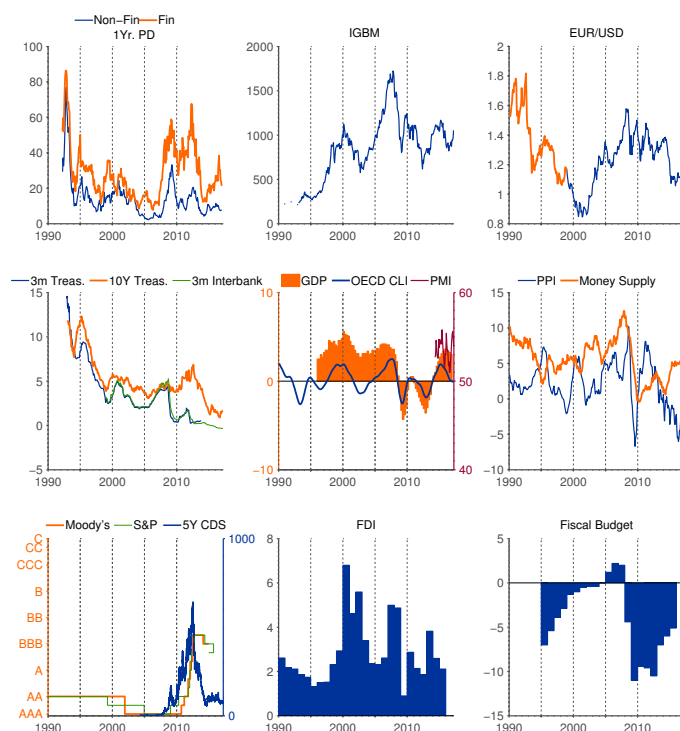
Slovenia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	18.48	14.62	11.78	16.61	13.90
1Yr. PD, Fin.	18.57	18.42	15.14	26.59	21.70
Slovene Stock Exchange Index	216	210	227	192	196
EUR/USD	1.14	1.11	1.12	—	—
10Y Treas. Yield (%)	1.48	1.36	0.75	0.96	1.01*
GDP (YoY%)	2.0	2.1	2.9	3.6	—
OECD CLI	100.09	99.73	99.57	99.83	100.26
PPI (YoY%)	-2.2	-2.0	-0.9	0.5	1.9*
Sov. Rating, Moody's	Baa3	Baa3	Baa3	Baa3	Baa3
Sov. Rating, S&P	A	A	A	A	A
5Y CDS (bps)	115.22	115.14	102.37*	—	—



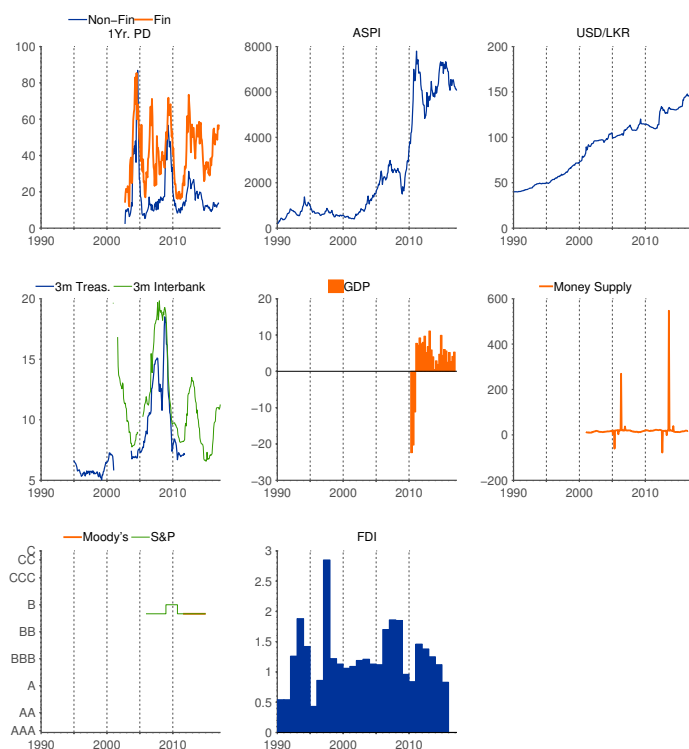
South Africa	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	16.18	17.31	16.86	13.49	14.74
1Yr. PD, Fin.	28.12	23.84	19.75	17.84	14.80
MSCI South Africa	1347	1355	1343	1276	1295
USD/ZAR	14.77	14.73	13.72	13.74	13.41
3m Treas. Yield (%)	7.24	7.35	7.36	7.79	7.42
10Y Treas. Yield (%)	9.18	8.90	8.73	9.02	8.89
3m Interbank (%)	7.23	7.36	7.36	7.36	7.36
GDP (YoY%)	-0.6	0.3	0.7	0.7	-
OECD CLI	99.66	99.34	99.37	99.52	99.55*
PMI	50.5	52.9	48.5	46.7	52.2
Money Supply (YoY%)	8.74	5.58	5.64	6.07	6.63*
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BB+	BB+	BB+	BB+	BB+
5Y CDS (bps)	298.90	281.04	256.33	255.67*	-
Fiscal Budget (%GDP)	-	-	-	-4.14	-



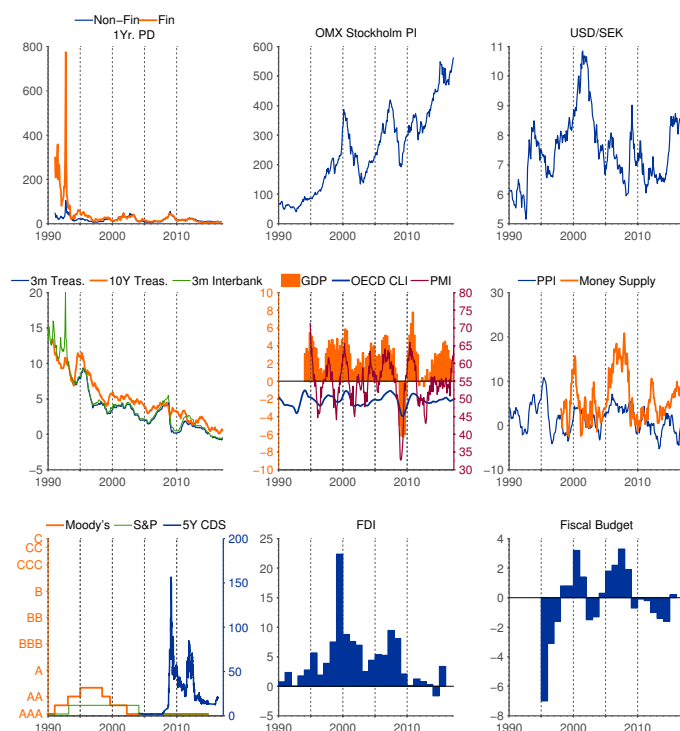
South Korea	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	8.28	8.05	6.10	6.36	5.72
1Yr. PD, Fin.	24.12	25.48	20.45	24.53	22.23
KOSPI	1996	1970	2044	2026	2160
USD/KRW	1143.42	1151.80	1101.13	1205.83	1118.45
3m Treas. Yield (%)	1.50	1.27	1.26	1.32	1.30
10Y Treas. Yield (%)	1.79	1.47	1.42	2.09	2.19
3m Interbank (%)	1.56	1.30	1.32	1.47	1.42
GDP (YoY%)	2.9	3.4	2.6	2.4	-
OECD CLI	100.43	100.46	100.61	100.68	100.73*
PMI	66.0	74.0	74.0	72.0	81.0
PPI (YoY%)	-3.3	-2.7	-1.1	1.8	4.2*
Money Supply (YoY%)	8.60	7.90	7.80	8.10	7.40*
Sov. Rating, Moody's	Aa2	Aa2	Aa2	Aa2	Aa2
Sov. Rating, S&P	AA	AA	AA	AA	AA
5Y CDS (bps)	64.00	56.13	41.84	44.00	50.77
Fiscal Budget (%GDP)	-	-	-	0.47	-



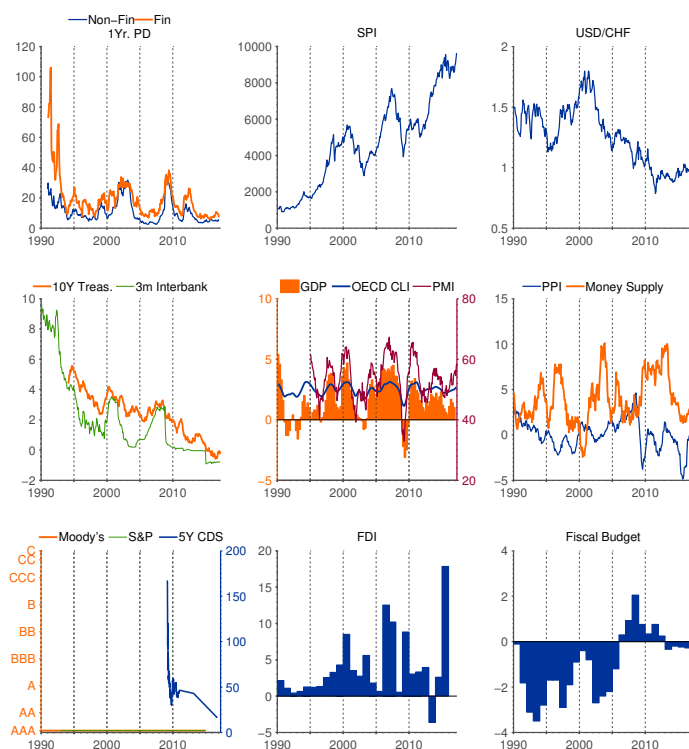
Spain	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	10.37	9.95	7.61	7.54	5.30
1Yr. PD, Fin.	25.32	24.87	21.89	16.34	10.56
IGBM	880	821	884	944	1055
EUR/USD	1.14	1.11	1.12	—	—
10Y Treas. Yield (%)	1.44	1.16	0.88	1.38	1.67
3m Interbank (%)	-0.24	-0.29	-0.30	-0.32	-0.33
GDP (YoY%)	3.4	3.4	3.2	3.0	—
OECD CLI	100.82	100.36	100.07	99.97	99.89*
PMI	53.4	52.2	52.3	55.3	53.9
PPI (YoY%)	-5.4	-4.5	-2.0	2.9	7.3*
Money Supply (YoY%)	5.10	5.00	5.10	5.20	4.70*
Sov. Rating, Moody's	Baa2	Baa2	Baa2	Baa2	Baa2
Sov. Rating, S&P	BBB+	BBB+	BBB+	BBB+	BBB+
5Y CDS (bps)	94.56	111.30	83.61	75.62	77.96



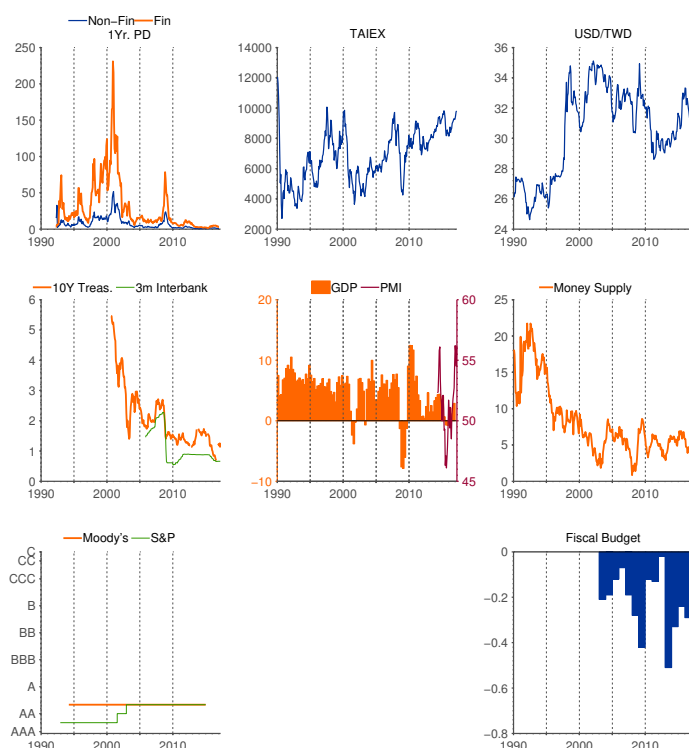
Sri Lanka	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	11.64	12.21	13.07	13.65	14.41
1Yr. PD, Fin.	46.47	47.35	45.17	55.56	55.96
ASPI	6072	6283	6535	6228	6062
USD/LKR	146.05	145.70	146.67	149.71	152.13
3m Interbank (%)	9.33	9.88	11.00	11.01	11.26
GDP (YoY%)	5.2	2.7	4.1	5.3	—
Money Supply (YoY%)	18.40	17.20	—	—	—
Sov. Rating, Moody's	B1	B1	B1	B1	B1
Sov. Rating, S&P	B+	B+	B+	B+	B+



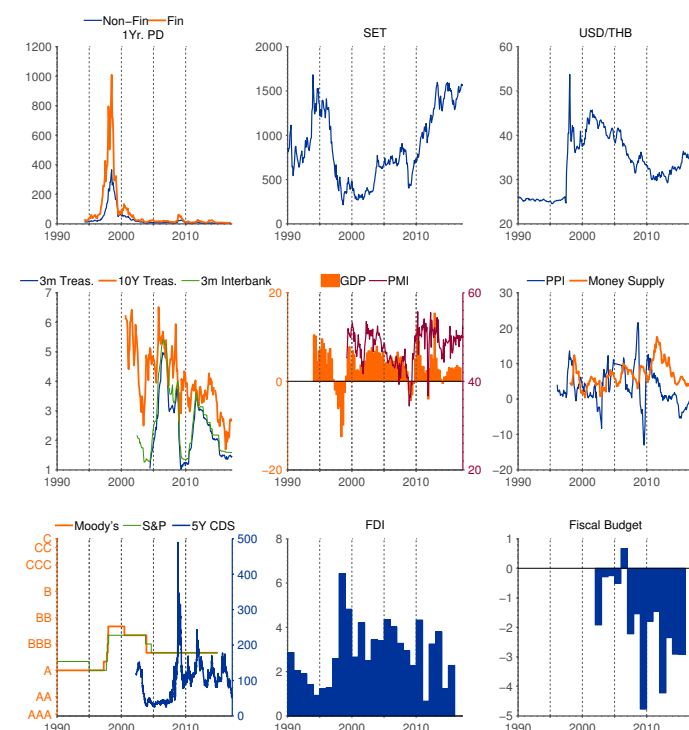
Sweden	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	12.62	13.50	11.56	12.15	10.83
1Yr. PD, Fin.	10.83	11.52	8.46	10.77	9.29
OMX Stockholm PI	483	471	518	535	563
USD/SEK	8.12	8.46	8.57	9.11	8.97
3m Treas. Yield (%)	-0.61	-0.65	-0.75	-0.80	-0.64
10Y Treas. Yield (%)	0.53	0.26	0.17	0.56	0.60
3m Interbank (%)	-0.45	-0.53	-0.51	-0.59	-0.44
GDP (YoY%)	4.0	3.5	2.5	2.3	—
OECD CLI	100.07	99.62	99.42	99.68	99.81*
PMI	53.0	53.0	55.0	60.3	65.2
PPI (YoY%)	-3.7	-1.9	-0.1	6.5	7.5*
Money Supply (YoY%)	8.69	6.73	8.70	7.25	9.25*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	17.57	21.03*	—	—	—



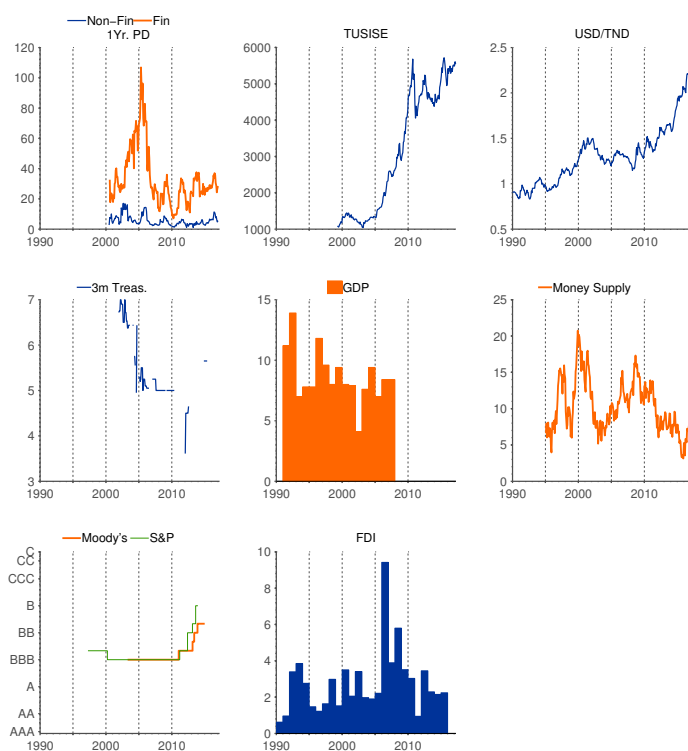
Switzerland	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	5.51	5.91	4.48	5.35	3.42
1Yr. PD, Fin.	11.18	14.33	11.27	8.51	6.29
SPI	8317	8660	8883	8966	9638
USD/CHF	0.96	0.98	0.97	1.02	1.00
10Y Treas. Yield (%)	-0.34	-0.57	-0.55	-0.19	-0.09
3m Interbank (%)	-0.79	-0.84	-0.81	-0.79	-0.79
GDP (YoY%)	1.1	1.7	1.4	1.0	—
OECD CLI	99.48	99.76	99.93	100.35	100.78*
PMI	53.0	51.5	54.4	56.2	58.6
PPI (YoY%)	-3.5	-0.6	0.0	-0.2	0.4*
Money Supply (YoY%)	1.71	2.31	2.95	2.98	3.10*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AAA	AAA	AAA	AAA	AAA
5Y CDS (bps)	—	—	17.01	—	—
Fiscal Budget (%GDP)	—	—	—	-0.28	—



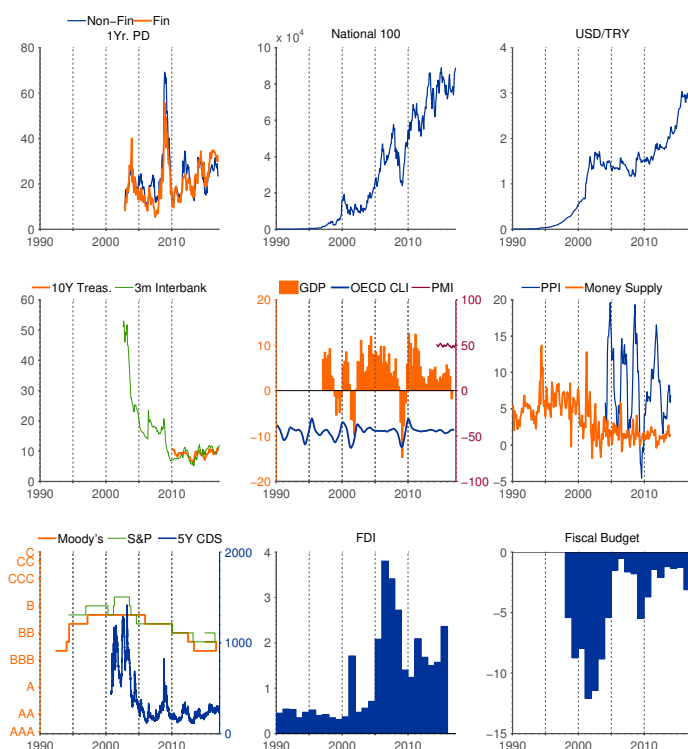
Taiwan	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	1.63	1.50	1.10	0.87	0.65
1Yr. PD, Fin.	4.79	5.13	4.03	2.72	2.14
TAIEX	8745	8667	9167	9254	9812
USD/TWD	32.21	32.26	31.36	32.33	30.35
10Y Treas. Yield (%)	0.84	0.77	0.69*	1.22	1.12
3m Interbank (%)	0.69	0.69	0.66	0.66	0.66
GDP (YoY%)	-0.2	1.1	2.1	2.9	-
PMI	51.1	50.5	52.2	56.2	56.2
Money Supply (YoY%)	4.70	4.65	3.98	3.55	3.49*
Sov. Rating, Moody's	Aa3	Aa3	Aa3	Aa3	Aa3
Sov. Rating, S&P	AA-	AA-	AA-	AA-	AA-
Fiscal Budget (%GDP)	-	-	-	-0.29	-



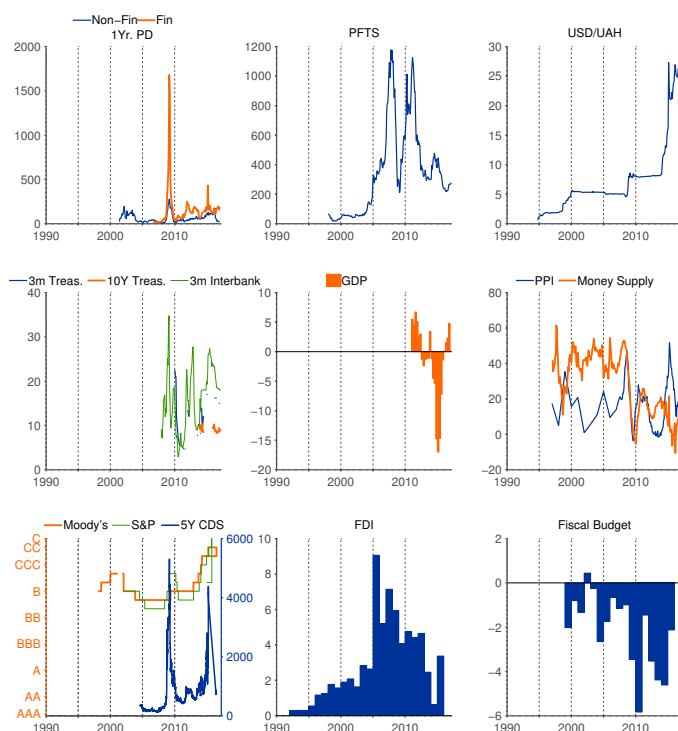
Thailand	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	4.28	3.76	3.67	2.78	2.77
1Yr. PD, Fin.	6.99	9.41	8.99	8.33	7.34
SET	1408	1445	1483	1543	1575
USD/THB	35.13	35.12	34.59	35.84	34.35
3m Treas. Yield (%)	1.38	1.36	1.45	1.50	1.48
10Y Treas. Yield (%)	1.69	1.95	2.10	2.65	2.69
3m Interbank (%)	1.60	1.59	1.59	1.59	1.59
GDP (YoY%)	3.1	3.6	3.2	3.0	-
PMI	51.5	50.4	50.3	50.3	52.6
PPI (YoY%)	-2.4	-1.4	-0.7	1.1	2.6
Money Supply (YoY%)	3.75	4.29	3.93	4.20	3.81*
Sov. Rating, Moody's	Baa1	Baa1	Baa1	Baa1	Baa1
Sov. Rating, S&P	BBB+	BBB+	BBB+	BBB+	BBB+
5Y CDS (bps)	131.34	114.50	86.68	81.59	54.24



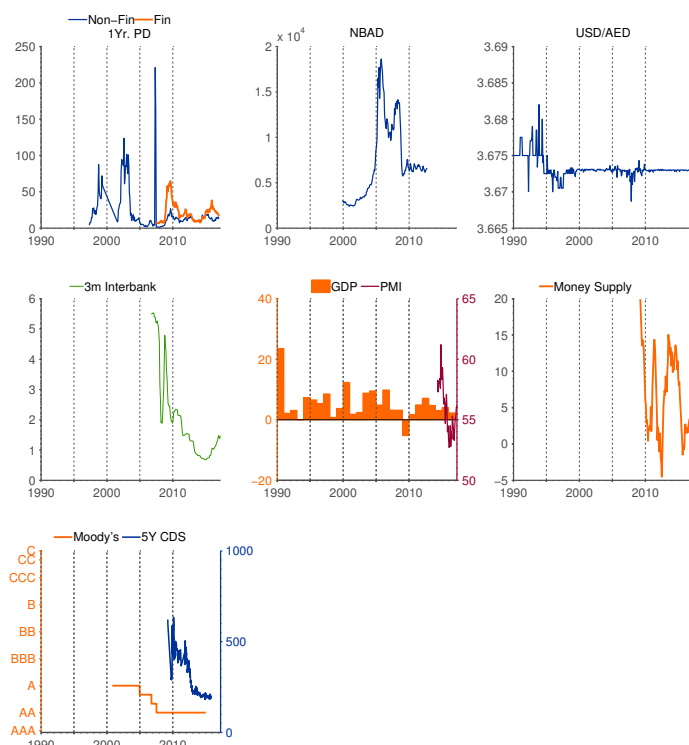
Tunisia	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	5.22	11.33	7.64	5.39	5.24
1Yr. PD, Fin.	33.72	38.79	19.64	26.87	30.65
TUNISE	5421	5290	5342	5489	5543
USD/TND	2.02	2.20	2.20	2.32	2.29
Money Supply (YoY%)	5.81	7.24	7.58	8.05	7.46*
Sov. Rating, Moody's	Ba3	Ba3	Ba3	Ba3	Ba3



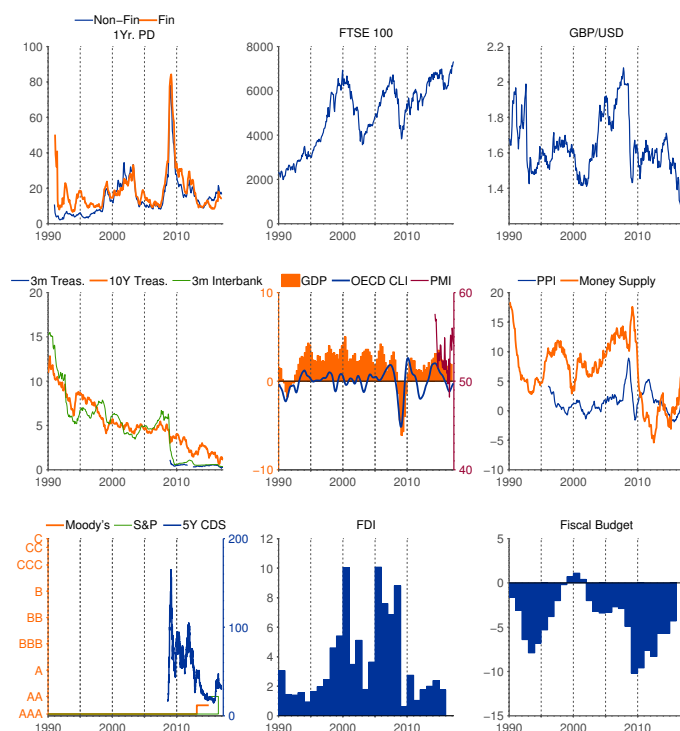
Turkey	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	25.28	28.73	28.02	23.57	20.01
1Yr. PD, Fin.	34.09	35.21	32.12	27.44	26.58
National 100	83268	76817	76488	78139	88947
USD/TRY	2.82	2.88	3.00	3.52	3.64
10Y Treas. Yield (%)	9.71	9.03	9.52	11.08	10.65
3m Interbank (%)	11.07	9.50	8.91	9.90	12.12
GDP (YoY%)	4.7	3.1	-1.8	—	—
OECD CLI	4.94	6.50	6.84	7.23	—
PMI	49.2	47.4	48.3	47.7	52.3
Sov. Rating, Moody's	Ba1	Ba1	Ba1	Ba1	Ba1
Sov. Rating, S&P	BB	BB	BB	BB	BB
5Y CDS (bps)	254.58	242.87	261.62	273.17	239.28
Fiscal Budget (%GDP)	—	—	—	-3.12	—



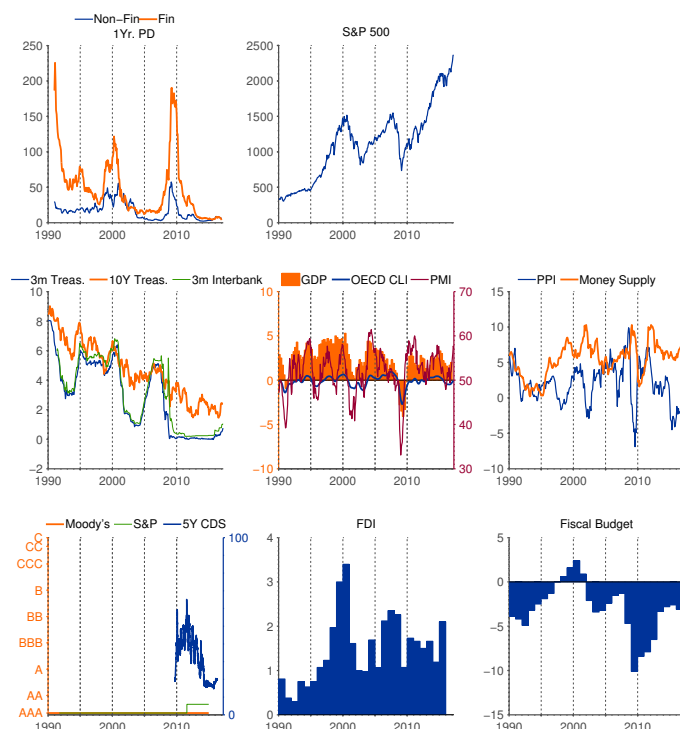
Ukraine	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	182.93	120.65	98.89	25.64	17.95
1Yr. PD, Fin.	151.24	125.23	33.53	95.71	162.87
PFTS	226	223	240	265	272
USD/UAH	26.20	24.83	25.93	27.30	27.06
3m Treas. Yield (%)	—	16.20	—	15.00	—
10Y Treas. Yield (%)	9.54	8.50	8.56	8.76	9.07
3m Interbank (%)	23.00	19.58	18.33	18.00	18.00
GDP (YoY%)	0.1	1.5	2.3	4.8	—
PPI (YoY%)	10.5	15.7	19.6	35.7	38.3
Money Supply (YoY%)	-1.70	6.20	12.60	10.90	4.40*
Sov. Rating, Moody's	Caa3	Caa3	Caa3	Caa3	Caa3
Sov. Rating, S&P	B-	B-	B-	B-	B-
5Y CDS (bps)	—	761.68	757.10*	—	—



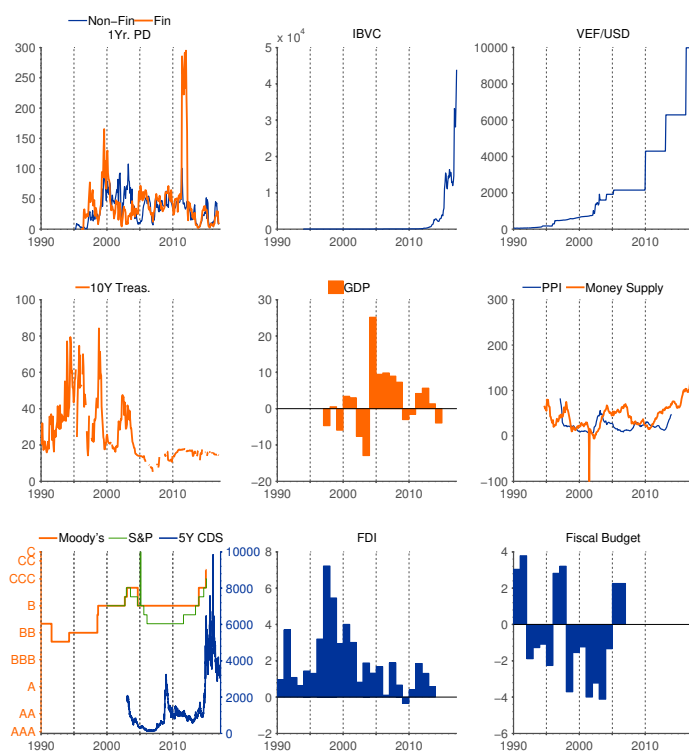
United Arab Emirates	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	14.41	15.33	18.44	13.99	16.62
1Yr. PD, Fin.	24.20	25.64	24.77	19.68	20.54
USD/AED	3.67	3.67	3.67	3.67	3.67
3m Interbank (%)	1.03	1.13	1.27	1.48	1.47
GDP (YoY%)	—	—	—	2.3	—
PMI	54.5	53.4	54.1	55.0	56.2
Money Supply (YoY%)	2.07	2.03	3.52	5.11	6.70
Sov. Rating, Moody's	Aa2	Aa2	Aa2	Aa2	Aa2



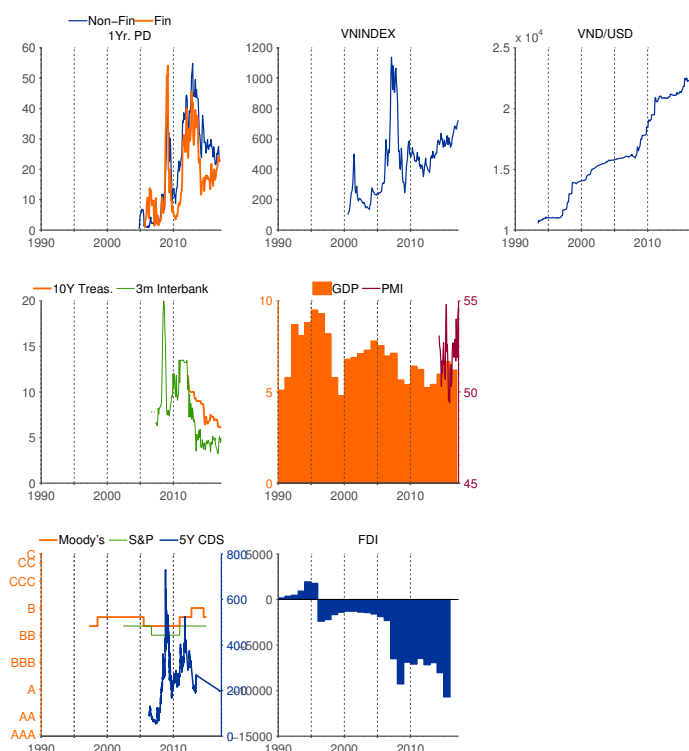
United Kingdom	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	15.37	19.84	15.73	15.34	12.39
1Yr. PD, Fin.	12.66	17.42	17.79	16.52	12.33
FTSE 100	6175	6504	6899	7143	7323
GBP/USD	1.44	1.33	1.30	1.23	1.25
3m Treas. Yield (%)	0.51	0.46	0.32	0.16	0.27
10Y Treas. Yield (%)	1.42	0.87	0.75	1.24	1.14
3m Interbank (%)	0.59	0.56	0.38	0.37	0.34
GDP (YoY%)	1.6	1.7	2.0	1.9	—
OECD CLI	99.28	98.85	99.05	99.49	99.76*
PMI	51.2	52.5	55.2	56.0	54.2
PPI (YoY%)	-0.7	-0.2	1.2	2.9	3.6
Money Supply (YoY%)	1.50	3.60	6.20	6.20	5.70*
Sov. Rating, Moody's	Aa1	Aa1	Aa1	Aa1	Aa1
Sov. Rating, S&P	AA	AA	AA	AA	AA
5Y CDS (bps)	38.81	43.25	32.45	30.73	—



United States	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	7.60	7.83	6.56	5.34	4.34
1Yr. PD, Fin.	7.06	7.71	6.63	3.63	3.67
S&P 500	2060	2099	2168	2239	2363
3m Treas. Yield (%)	0.20	0.26	0.27	0.50	0.75
10Y Treas. Yield (%)	1.77	1.47	1.59	2.44	2.39
3m Interbank (%)	0.57	0.55	0.78	0.78	1.05
GDP (YoY%)	1.6	1.3	1.7	2.0	—
OECD CLI	99.07	99.04	99.11	99.53	99.83*
PMI	51.7	52.8	51.7	54.5	57.2
PPI (YoY%)	-2.3	-2.0	-0.1	1.9	3.7*
Money Supply (YoY%)	6.10	6.90	7.20	7.10	6.40*
Sov. Rating, Moody's	Aaa	Aaa	Aaa	Aaa	Aaa
Sov. Rating, S&P	AA+	AA+	AA+	AA+	AA+
5Y CDS (bps)	19.83	19.89*	—	—	—
Fiscal Budget (%GDP)	—	—	—	-3.10	—



Venezuela	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	12.35	25.09	10.78	3.58	101.14
1Yr. PD, Fin.	6.19	14.82	22.51	6.20	3.53
IBVC	14575	12851	12961	31705	43877
VEF/USD	9987.50	9987.50	9987.50	9987.50	9990.05
10Y Treas. Yield (%)	15.49	14.77	14.62	14.24	—
Money Supply (YoY%)	103.40	96.40	113.30	158.80	206.90
Sov. Rating, Moody's	Caa3	Caa3	Caa3	Caa3	Caa3
Sov. Rating, S&P	CCC	CCC	CCC	CCC	CCC
5Y CDS (bps)	5180.28	3892.00	2946.27	3749.67	3571.02



Vietnam	2016				2017
	Q1	Q2	Q3	Q4	Q1
1Yr. PD, Non-Fin. (bps)	23.00	22.69	26.50	24.18	20.42
1Yr. PD, Fin.	14.30	21.23	20.46	21.28	19.16
VNINDEX	561	632	686	665	722
VND/USD	22293.00	22304.00	22296.00	22761.00	22755.00
10Y Treas. Yield (%)	6.90	6.94	6.50	6.20	6.07
3m Interbank (%)	4.65	3.95	3.25	5.10	4.90
GDP (YoY%)	—	—	—	6.2	—
PMI	50.7	52.6	52.9	52.4	54.6
Sov. Rating, Moody's	B1	B1	B1	B1	B1
Sov. Rating, S&P	BB-	BB-	BB-	BB-	BB-
5Y CDS (bps)	—	—	—	—	197.34*

D Data notes

This Appendix provides a comprehensive list of the macroeconomic and capital market data provided in Appendix C as well as their sources. Most of the data was obtained from Bloomberg. In some cases, the data was not available in Bloomberg and was obtained directly from primary sources. In either case, the primary sources for the data are listed in the tables below. The data was retrieved during April 2017 and every effort has been made to verify its accuracy.

The last section of this Appendix describes the Probability of Default implied Rating (PDiR). The PDiR has been introduced to aid intuition about PD values for individual companies.

Stock index (top-center graph) The one-year return on an economy's stock index is one input variable for RMI's default forecast model. The stock indices used in the model are the ones that are displayed in Appendix C. A list of the stock indices included in Appendix C can be found [here](#).

FX rate (top-right graph) Foreign exchange (FX) rates are quoted by market convention against the US dollar. For Eurozone countries, a fixed official rate is used to convert the domestic currency to the Euro prior to the introduction of the common currency. In the graphs, the FX rate for the domestic currency before the economy adopted the Euro is in orange, and the FX rate for the Euro after the Euro was adopted is in blue. The table below shows the conversion dates and rates. The exchange rate for the Cypriot Pound is excluded due to scaling reasons.

Conversion to Euro

Economy	Conversion Date	Conversion Rate (per Euro)	Economy	Conversion Date	Conversion Rate (Per Euro)
Austria	31/12/1998	13.7603	Italy	31/12/1998	1936.27
Belgium	31/12/1998	40.3399	Luxembourg	31/12/1998	40.3399
Estonia	31/12/2010	15.6466	Malta	31/12/2007	0.4293
Finland	31/12/1998	5.94573	Netherlands	31/12/1998	2.20371
France	31/12/1998	6.55957	Portugal	31/12/1998	200.482
Germany	31/12/1998	1.95583	Slovakia	31/12/2008	30.126
Greece	31/12/2000	340.75	Slovenia	31/12/2006	239.64
Ireland	31/12/1998	0.787564	Spain	31/12/1998	166.386

10-year treasury bond yield (middle-left graph) All 10-year treasury bond yields are based on Bloomberg indices except for the following list: Bank Negara Malaysia for Malaysia, Korea Financial Investment Association for South Korea and Philippine Dealing & Exchange Corp for Philippines.

3-month government bond yield (middle-left graph) The primary sources of the 3-month government bond yields are listed in [here](#).[†]

3-month interbank rate (middle-left graph) The primary sources of the 3-month interbank rates can be found [here](#).

[†]The RMI CRI model uses Germany's three-month Bubill rate for all eurozone countries after their adoption of the euro. For the period before joining the eurozone, their own interest rates are used where available.

GDP (middle-center graph, left axis) Real GDP YoY changes are seasonally-adjusted except for China, Hong Kong, Iceland, India, Malaysia, Philippines, Singapore, South Korea, Taiwan and Thailand. A list of primary sources of the GDP data can be found [here](#).

OECD CLI (middle-center graph, right axis) The OECD Composite Leading Indicator for each economy is intended to provide early signals of turning points between different trends in the economic cycle. For forecasting purposes, peaks in CLI are candidate early signals of downturns in the economic cycle, and troughs in the CLI are candidate early signals of upturns in the economic cycle. More information can be obtained at www.oecd.org/std/clits. The OECD CLI shown in Appendix C is amplitude adjusted with a deduction of 50 for the purpose of presentation along with the PMI.

PMI (middle-center graph, right axis) The Purchasing Manager's Index or similar indices are used to reflect an economy's manufacturing activities. An index reading above 50 indicates an expansion of manufacturing activity while a reading below 50 indicates a contraction. An exception is the Business Survey Index used in South Korea, which has 100 as its benchmark. A list of primary sources of the Purchasing Managers Index data can be found [here](#).

PPI (middle-right graph) The Producers' Price Index or similar indices are presented as YoY changes. A list of primary sources of the Producers' Price Index data can be found [here](#).

Money Supply (middle-right graph) YoY growth of money supply uses M3 when it is available for an economy. The exceptions are: Brazil, Chile, China, Cyprus, the Czech Republic, Indonesia, Jordan, Kazakhstan, Latvia, Lithuania, Mexico, Nigeria, Norway, Pakistan, Peru, Romania, Russia, Sri Lanka, Taiwan, Thailand and the US where M2 is used; and Croatia and the UK where M4 is used. For Eurozone countries, data after the adoption of the Euro represents total money supply growth of the Euro. A list of primary sources of the Money Supply data can be found [here](#).

Sovereign credit ratings (bottom-left graph, left axis) For most of the economies, the Standard & Poor's and Moody's sovereign ratings are for foreign currency long term debt. Moody's ratings for France, Germany, India, Japan, Netherlands, Singapore, Switzerland, Taiwan, United Kingdom and the United States are foreign currency long term issuer ratings instead. Among the above mentioned economies, France, Germany, Switzerland, United Kingdom and the United States ratings are cited from Moody's website directly, with the remainder of the data from Moody's and S&P retrieved from Bloomberg. For graphical purposes, selective or restricted defaults are reflected as C grades in the graphs. For example, according to S&P data, Indonesia had selective default events on March 29, 1999; April 17, 2000 and April 23, 2002, seen as C grades in the graphs above.

5Y CDS spread (bottom-left graph, right axis) 5-year Credit Default Swap spreads are for each economy's long term sovereign debt. All of the CDS data is sourced from Bloomberg.

FDI (bottom-center graph) FDI into each economy is presented as a percentage of GDP. The World Bank is the primary source of all FDI data.

Fiscal budget (bottom-right graph) Fiscal budget is presented as a percentage of GDP. A list of primary sources of the Fiscal Budget data can be found [here](#).

PDiR

The PDiR has been introduced to aid intuition about what different values of 1-year PD from RMI-CRI's default forecast model imply about a firm's credit quality. In short, the 1-year PD for a firm is used to imply a credit rating based on historically observed default rates for credit rating agency ratings.

The table at right classifies firms into S&P-equivalent PDiR based on their 1-year PD. For example, if a firm has a 1-year PD of 50bps, then it will be assigned an S&P-equivalent rating of BB. The upper bounds for each PDiR are derived using default and rating transition data provided by credit rating agencies to the European Securities and Markets Authority (ESMA) Central Ratings Repository.[†] RMI-CRI uses this data to compute issuer-weighted 1-year average default rates (ADR) for each rating's cohort, using ratings data from 2006-2015.

Computing the boundaries between different PDiR classes: The blue circles in the graph below indicate the logarithm of the observed ADR for firms rated by S&P with ratings from AA down to CCC/C.

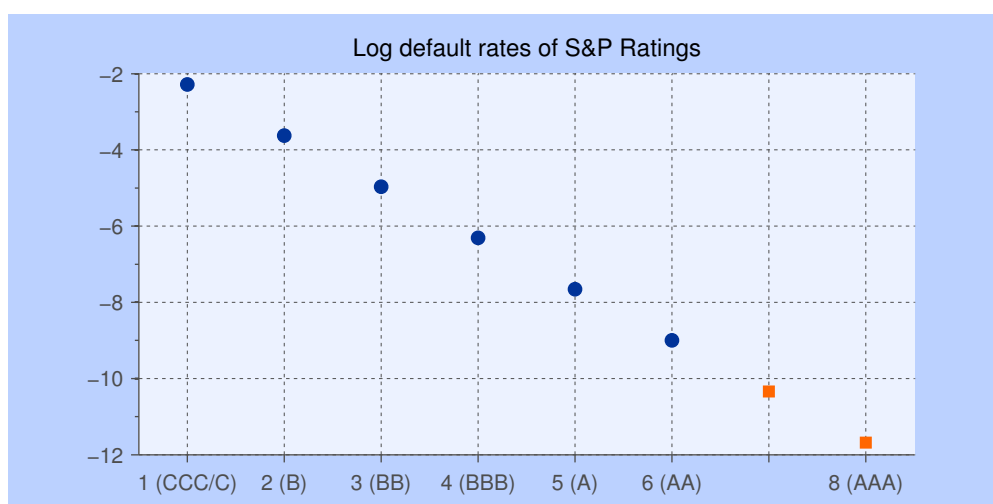
PDiR	Upper bound (bps)
AAA	0.16
AA	2.39
A	9.28
BBB	35.95
BB	139
B	539
CCC/C	–

Given the linear relationship between the observed log default rates and the ratings, we interpolate the log default rate for each rating notch from this result by plotting a line of best fit through the observed points. We then take the boundary between PDiR classes as the mid-point of the interpolated log default rates.

For example, the upper bound for BBB is computed as:

$$UB(BBB) = \exp\left(\frac{\log(ADR(BBB)) + \log(ADR(BB))}{2}\right).$$

For the upper boundary for AAA firms, a mid-point of observed log ADR cannot be taken as the ADR is zero for S&P rated AAA firms. Instead, a line of best fit can be plotted through the six observed points for the other rating classes in order to extrapolate the orange squares. However, taking the default rate based on the first extrapolated orange square results in a boundary that leads to a far larger fraction of PDiR-rated AAA firms as compared to actual rated AAA firms. Thus, the boundary between AA and AAA is taken as the mid-point between the first and second orange square.



[†]Central Ratings Repository, European Securities and Markets Authority (ESMA).

About RMI and the Credit Research Initiative

The NUS RMI was established in August 2006 as a research institute at NUS dedicated to the area of financial risk management. The establishment of RMI was supported by the MAS under its program on Risk Management and Financial Innovation. RMI seeks to complement, support and develop Singapore's financial sector's knowledge and expertise in risk management, and thereby help to take on the challenges arising from globalization, structural change and volatile financial markets.

CRI is a non-profit project undertaken by NUS-RMI in response to the 2008-2009 GFC. The CRI takes a "public good" approach to credit ratings by providing the outputs from our default forecast system in a transparent, non-profit basis. In the current phase, the CRI model generates PDs on a daily basis for corporate entities in 119 economies in Africa, Asia-Pacific, Europe, Latin America, the Middle East and North America. Our PD can serve as a benchmark against traditional rating agencies' systems or internal credit analyses for industry analysts and business professionals. For more information about RMI and the CRI project, please visit our main site at <http://rmicri.org>

Usage, redistribution and publication of data

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RMI-CRI Technical Report

Version: 2017 Update 1



NUS-RMI Credit Research Initiative Technical Report

Version: 2017 update 1

This document describes the implementation of the system which the Credit Research Initiative (CRI) at the Risk Management Institute (RMI) of the National University of Singapore (NUS) uses to produce probabilities of default (PD) and actuarial spread (AS). As of this version of the Technical Report, RMI-CRI covers around 65,000 exchange-listed firms (including delisted ones) in 121 economies around the world (see Table A.1). Of them, over 33,000 firms have sufficient data to release daily updated PD and AS. The PD and AS for all firms are freely available to users who can provide evidence of their professional qualifications to ensure that they will not misuse the data. General users who do not request global access are restricted to a list of 5,000 firms. The individual company PD/AS data, along with aggregate PD/AS at the economy and sector level, can be accessed at <http://rmicri.org>.

The primary goal of this initiative is to drive research and development in the critical area of credit rating systems. As such, a transparent methodology is essential to this initiative. Having the details of the methodology available to everybody means that there is a base from which suggestions and improvements can be made. The objective of this Technical Report is to provide a full exposition of the CRI system. Readers of this document who have access to the necessary data and who have a sufficient level of technical expertise will be able to implement a similar system on their own. For a full exposition of the conceptual framework of the CRI, see Duan and Van Laere [2012].

The system used by the CRI will evolve as new innovations and enhancements are applied. The changes to the 2017 technical report and operational implementation of our model are: (1) Revision to parameter estimation on an intercept and Distance-to-default (DTD) for the Chinese sample, and (2) Statistical inference of the parameters with a structural break for the Chinese sample. This version of the technical report provides an update on the operational implementation of the CRI and includes all changes to the system that had been implemented by February 2017. The latest version of the Technical Report and addenda to the latest version are available via the web portal and will include any changes to the system that have been implemented since the publication of this version.

In the remainder of this Technical Report, the PD model and its computational details will be explained in thorough details. As an application of the model, the computation of AS and CVI will be discussed in a much concise manner. Wherever no confusion is caused, “the model” refers to the PD model. The sections are organized as follows. Section 1 describes the quantitative model that is currently used to compute the PDs. The model was first described in Duan et al. [2012]. The description includes calibration procedures, which are performed on a monthly basis, and individual firm’s PD computations, which are performed on a daily basis.

Section 2 describes the input variables of the model as well as the data used to produce these inputs. This model uses both input variables that are common to all firms in an economy and input variables that are firm-specific. Another critical component in the estimation system is

the default data, and this is also described in this section.

While Section 1 provides a broader description of the model, Section 3 describes the implementation details that are necessary for application, given real world issues of, for example, bad or missing data. The specific technical details needed to develop an operational system are also given, including details on the monthly calibration, daily computation of individual firm's PDs and aggregation of the individual firm's PDs. Distance-to-default (DTD) in a Merton-type model is one of the firm-specific variables. The calculation for DTD is not the standard one, and has been modified to allow a meaningful computation of the DTD for financial firms. While most academic studies on default prediction exclude financial firms from consideration, it is important to include them given that the financial sector is a critical component in every economy. The calculation for DTD is detailed in this section.

Section 4 shows an empirical analysis for those economies that are currently covered. While the analysis shows excellent results in several economies, there is room for improvement in a few others. This is because, at the CRI's current stage of development, the economies all use the variables used in the academic study of US firms in Duan et al. [2012]. Future development within the CRI will deal with variable selection specific to different economies, and the performance is then expected to improve. Sections 5 and 6 explain how the CVI and AS are formulated. A detailed theoretical background can be found in Duan [2014]. Section 7 discusses future developments.

1 Model Description

The quantitative model that is currently being used by the CRI is a forward intensity model that was introduced in Duan et al. [2012]. Certain aspects of the model are taken from Duan and Fulop [2013]. This model allows PD forecasts to be made at a range of horizons. In the current CRI implementation of this model, PDs are forecasted from a horizon of one month up to a horizon of five years. At the RMI-CRI website, for every firm, the probability of that firm defaulting within one month, three months, six months, one year, two years, three years, and five years is given. The ability to assess credit quality for different horizons is a useful tool for risk management, credit portfolio management, policy setting, and regulatory purposes, since short- and long-term credit risk profiles can differ greatly depending on a firm's liquidity, debt structures, and other factors.

The forward intensity model is a reduced form model in which the PD is computed as a function of different input variables. These can be firm-specific or common to all firms within an economy. The other category of the default prediction model is the structural model, whereby the corporate structure of a firm is modeled in order to assess the firm's PD.

A similar reduced form model by Duffie et al. [2007] relies on modeling the time series dynamics of the input variables in order to make PD forecasts for different horizons. However, there is little consensus on assumptions for the dynamics of variables such as accounting ratios, and the model output will be highly dependent on these assumptions. In addition, the time series dynamics will be of very high dimension. For example, with the two common variables and two firm-specific variables that Duffie et al. [2007] use, a sample of 10,000 firms gives a dimension of the state variables of 20,002.

Given the complexity in modeling the dynamics of variables such as accounting ratios, this model will be difficult to implement if different forecast horizons are required. The key innovation of the forward intensity model is that PD for different horizons can be consistently and efficiently computed based only on the value of the input variables at the time the prediction is made. Thus, the model specification becomes far more tractable.

Fully specifying a reduced form model includes the specification of the function that computes a PD from the input variables. This function is parameterized, and finding appropriate

parameter values is called calibrating the model. The forward intensity model can be calibrated by maximizing a pseudo-likelihood function. The calibration is carried out by groups of economies and all firms within a group of economies will use the same parameter values along with each firm's variables in order to compute the firm's PD.

Subsection 1.1 will describe the modeling framework, including the way PDs are computed based on a set of parameter values for the economy and a set of input variables for a firm. Subsection 1.2 explains how the model can be calibrated. Subsection 1.3 details the way parameters are estimated based on the Sequential Monte Carlo (SMC) technique.

1.1 Modeling Framework

While the model can be formulated in a continuous time framework, as done in Duan et al. [2012], an operational implementation requires discretization in time. Since the model is more easily understood in discrete time, the following exposition of the model will begin in a discrete time framework.

Variables for default prediction can have vastly different update frequencies. Financial statement data is updated only once a quarter or even once a year, while market data like stock prices are available at frequencies of seconds. A way of compromising between these two extremes is to have a fundamental time period Δt of one month in the modeling framework. As will be seen later, this does not preclude updating the PD forecasts on a daily basis. This is important since, for example, large daily changes in a firm's stock price can signal changes in credit quality even when there is no change in FS data.

Thus, for the purposes of calibration and subsequently for computing time series of PD, the input variables at the end of each month will be kept for each firm. The input variables associated with the i^{th} firm at the end of the n^{th} month (at time $t = n\Delta t$) is denoted by $X_i(n)$. This is a vector consisting of two parts: $X_i(n) = (W(n), U_i(n))$. Here, $W(n)$ is a vector of variables at the end of month n that is common to all firms in the economy and $U_i(n)$ is a vector of variables specific to firm i .

In the forward intensity model, a firm's default is signaled by a jump in a Poisson process. The probability of a jump in the Poisson process is determined by the intensity of the Poisson process. The forward intensity model draws an explicit dependence of intensities at time periods in the future (that is, forward intensities) to the values of input variables at the time of prediction. With forward intensities, PDs for any forecast horizon can be computed knowing only the values of the input variables at the time of prediction, without needing to simulate future values of the input variables.

There is a direct analogy in interest rate modeling. In spot rate models where dynamics on a short-term spot rate are specified, bond pricing requires expectations on realizations of the short rate. Alternatively, bond prices can be computed directly if the forward rate curve is known.

One issue in default prediction is that firms can exit public exchanges for reasons other than default, such as merge and acquisition (M&A) and OTC. In order to take these other exits into account, defaults and other exits are modeled as two independent Poisson processes, each with their own intensity. While defaults and exits classified as non-defaults are mutually exclusive by definition, the assumption of independent Poisson processes does not pose a problem since the probability of a simultaneous jump in the two Poisson processes is negligible. In the discrete time framework, the probability of simultaneous jumps in the same time interval is non-zero. As a modeling assumption, a simultaneous jump in the same time interval by both the default Poisson process and the non-default type exit Poisson process is considered as a default. In this way, there are three mutually exclusive possibilities during each time interval: survival, default and non-default exit. As with defaults, the forward intensity of the Poisson process for other exits is a function of the input variables. The parameters

of this function can also be calibrated.

To further illustrate the discrete framework, the three possibilities for a firm at each time point are diagrammed. Either the firm survives for the next time period Δt , or it defaults within Δt , or it has a non-default exit within Δt . This setup is pictured in Fig. 1. Information about firm i is known up until time $t = m\Delta t$ and the figure illustrates possibilities in the future between $t = (n-1)\Delta t$ and $(n+1)\Delta t$. Here, m and n are integers with $m < n$.

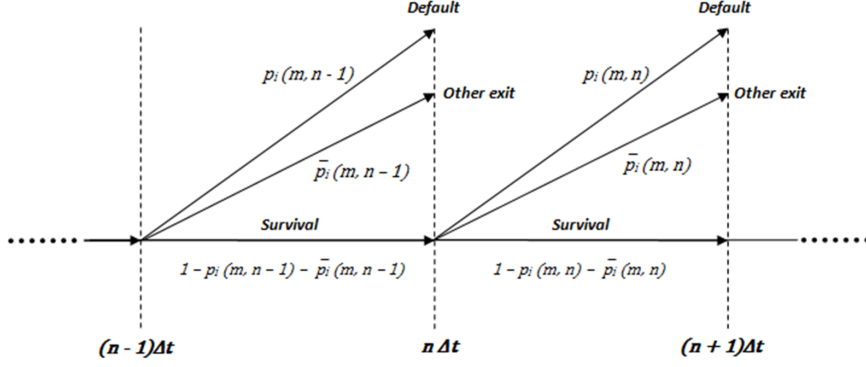


Figure 1: Default-other exit-survival tree for firm i , viewed from time $t = m\Delta t$.

The probabilities of each branch are, for example: $p_i(m, n)$ the conditional probability viewed from $t = m\Delta t$ that firm i will default before $(n+1)\Delta t$, conditioned on firm i surviving up until $n\Delta t$. Likewise, $\bar{p}_i(m, n)$ is the conditional probability viewed from $t = m\Delta t$ that firm i will have a non-default exit before $(n+1)\Delta t$, conditioned on firm i surviving up until $n\Delta t$. It is the modeler's objective to determine $p_i(m, n)$ and $\bar{p}_i(m, n)$, but for now it is assumed that these quantities are known. With the conditional default and other exit probabilities known, the corresponding conditional survival probability of firm i is $1 - p_i(m, n) - \bar{p}_i(m, n)$.

With this diagram in mind, the probability that a particular path will be followed is the product of the conditional probabilities along the path. For example, the probability at time $t = m\Delta t$ of firm i surviving until $(n-1)\Delta t$ and then defaulting between $(n-1)\Delta t$ and $n\Delta t$ is:

$$\text{Prob}_{t=m\Delta t}[\tau_i = n, \tau_i < \bar{\tau}_i] = p_i(m, n-1) \prod_{j=m}^{n-2} [1 - p_i(m, j) - \bar{p}_i(m, j)]. \quad (1)$$

Here, τ_i is the default time for firm i measured in units of months, $\bar{\tau}_i$ is the other exit time measured in units of months, and the product is equal to 1 if there is no term in the product. The condition $\tau_i < \bar{\tau}_i$ is the requirement that the firm defaults before it has a non-default type of exit. Note that by measuring exits in units of months, if, for example, a default occurs at any time in the interval $[(n-1)\Delta t, n\Delta t]$, then $\tau_i = n$.

Using Eq. (1), cumulative default probabilities can be computed. At $m\Delta t$ the probability of firm i defaulting at or before $n\Delta t$ and not having an other exit before $t = n\Delta t$ is obtained by taking the sum of all of the paths that lead to default at or before $n\Delta t$:

$$\text{Prob}_{t=m\Delta t}[m < \tau_i \leq n, \tau_i < \bar{\tau}_i] = \sum_{k=m}^{n-1} \left\{ p_i(m, k) \prod_{j=m}^{k-1} [1 - p_i(m, j) - \bar{p}_i(m, j)] \right\}. \quad (2)$$

While it is convenient to derive the probabilities given in Eqs. (1) and (2) in terms of the conditional probabilities, expressions for these in terms of the forward intensities need to be found, since the forward intensities will be functions of the input variable $X_i(m)$. The forward intensity for the default of firm i that is observed at time $t = m\Delta t$ for the forward time interval from $t = n\Delta t$ to $(n+1)\Delta t$, is denoted by $h_i(m, n)$, where $m \leq n$. The corresponding forward

intensity for a non-default exit is denoted by $\bar{h}_i(m, n)$. Because default is signaled by a jump in a Poisson process, its conditional probability is a simple function of its forward intensity:

$$p_i(m, n) = 1 - \exp[-\Delta t h_i(m, n)]. \quad (3)$$

Since joint jumps in the same time interval are assigned as defaults, the conditional other exit probability needs to take this into account:

$$\bar{p}_i(m, n) = \exp[-\Delta t h_i(m, n)] \times \{1 - \exp[-\Delta t \bar{h}_i(m, n)]\}. \quad (4)$$

The conditional survival probabilities in Eqs. (1) and (2) are computed as the conditional probability that the firm does not default in the period and the firm does not have a non-default exit either:

$$\text{Prob}_{t=m\Delta t}[\tau_i, \bar{\tau}_i > n + 1 | \tau_i, \bar{\tau}_i > n] = \exp\{-\Delta t[h_i(m, n) + \bar{h}_i(m, n)]\}. \quad (5)$$

It remains to be specified the dependence of the forward intensities on the input variable $X_i(m)$. The forward intensities need to be positive so that the conditional probabilities are non-negative. A standard way to impose this constraint is to specify the forward intensities as exponentials of a linear combination of the input variables:

$$\begin{aligned} h_i(m, n) &= \exp[\beta(n - m) \cdot Y_i(m)], \\ \bar{h}_i(m, n) &= \exp[\bar{\beta}(n - m) \cdot Y_i(m)]. \end{aligned} \quad (6)$$

Here, β and $\bar{\beta}$ are coefficient vectors that are functions of the number of months between the observation date and the beginning of the forward period ($n - m$), and $Y_i(m)$ is simply the vector $X_i(m)$ augmented by a preceding unit element: $Y_i(m) = (1, X_i(m))$. The unit element allows the linear combination in the argument of the exponentials in Eq. (6) to have a non-zero intercept.

In the current implementation of the forward intensity model in the CRI, the maximum forecast horizon is 60 months (5 years) and there are 12 input variables plus the intercept, so there are 60 sets of β and $\bar{\beta}$. While this is a large set of parameters, as will be seen in Subsection 1.2 and 1.3, the calibration is tractable because the default parameters can be calibrated separately from the other exit parameters, and the total number of parameters are greatly reduced after constraining the term-structure of the parameter estimates to be Nelson-Siegel functions.

Before expressing the probabilities in Eqs. (1) and (2) in terms of the forward intensities, a notation H is introduced for the forward intensities so that it becomes clear which parameters the forward intensity depends on:

$$H(\beta(n - m), X_i(m)) = \exp[\beta(n - m) \cdot Y_i(m)]. \quad (7)$$

This is the forward default intensity. The corresponding notation for other exit forward intensities is then just $H(\bar{\beta}(n - m), X_i(m))$. So, the probability in Eq. (1) is expressed in terms of the forward intensities, using Eq. (3) as the conditional default probability and Eq. (5) as the conditional survival probability:

$$\begin{aligned} &\text{Prob}_{t=m\Delta t}[\tau_i = n, \tau_i < \bar{\tau}_i] \\ &= \{1 - \exp[-\Delta t H(\beta(n - 1 - m), X_i(m))]\} \\ &\quad \times \prod_{j=m}^{n-2} \exp\{-\Delta t [H(\beta(j - m), X_i(m)) + H(\bar{\beta}(j - m), X_i(m))]\} \\ &= \{1 - \exp[-\Delta t H(\beta(n - m - 1), X_i(m))]\} \\ &\quad \times \exp\left\{-\Delta t \sum_{j=m}^{n-2} [H(\beta(j - m), X_i(m)) + H(\bar{\beta}(j - m), X_i(m))]\right\}. \end{aligned} \quad (8)$$

This probability will be relevant in the next part during the calibration. The cumulative default probability given in Eq. (2) in terms of the forward intensities is then:

$$\begin{aligned} \text{Prob}_{t=m\Delta t}[m < \tau_i \leq n, \tau_i < \bar{\tau}_i] \\ = \sum_{k=m}^{n-1} \left\{ \{1 - \exp[-\Delta t H(\beta(k-m), X_i(m))]\} \right. \\ \left. \times \exp \left\{ -\Delta t \sum_{j=m}^{k-1} [H(\beta(j-m), X_i(m)) + H(\bar{\beta}(j-m), X_i(m))] \right\} \right\}. \end{aligned} \quad (9)$$

This formula is used to compute the main output of the CRI: an individual firm's PD within various time horizons. The β and $\bar{\beta}$ parameters are obtained when the firm's economy is calibrated, and using those together with the firm's input variables yields the firm's PD.

1.2 Pseudo-Likelihood Function

The empirical data set used for calibration can be described as follows. For the economy as a whole, there are N end of month observations, indexed as $n = 1, \dots, N$. Of course, not all firms will have observations for each of the N months as they may start later than the start of the economy's data set or they may exit before the end of the economy's data set. There are a total of I firms in the economy, and they are indexed as $i = 1, \dots, I$. As before, the input variables for the i^{th} firm in the n^{th} month is $X_i(n)$. The set of all observations for all firms is denoted by X .

In addition, the default times τ_i and non-default exit times $\bar{\tau}_i$ for the i^{th} firm are known if the default or other exit occurs after time $t = \Delta t$ and at or before $t = N\Delta t$. The possible values for τ_i and $\bar{\tau}_i$ are integers between 2 and N , inclusive. If a firm exits before the month end, then the exit time is recorded as the first month end after the exit. If the firm does not exit before $t = N\Delta t$, then the convention can be used that both of these values are infinite. If the firm has a default type of exit within the data set, then $\bar{\tau}_i$ can be considered as infinite. If instead the firm has a non-default type of exit within the data set, then τ_i can be considered as infinite. The set of all default times and non-default exit times for all firms is denoted by τ and $\bar{\tau}$, respectively. The first month in which firm i has an observation is denoted by t_{0i} . Except for cases of missing data, these observations continue until the end of the data set if the firm never exits. If the firm does exit, the last needed input variable $X_i(n)$ is for $n = \min(\tau_i, \bar{\tau}_i) - 1$.

The calibration of the β and $\bar{\beta}$ parameters is done by maximizing a pseudo-likelihood function. The function to be maximized violates the standard assumptions of likelihood functions, but Appendix A in Duan et al. [2012] derives the large sample properties of the pseudo-likelihood function.

In formulating the pseudo-likelihood function, the assumption is made that the firms are conditionally independent of each other. In other words, correlations arise naturally from shared common factors $W(n)$ and any correlations between different firms' firm-specific variables. With this assumption, the pseudo-likelihood function for the horizon of ℓ months, a set of parameters β and $\bar{\beta}$ and the data set $(\tau, \bar{\tau}, X)$ is:

$$\mathcal{L}_\ell(\beta, \bar{\beta}; \tau, \bar{\tau}, X) = \prod_{m=1}^{N-1} \prod_{i=1}^I P_{\min(N-m, \ell)}(\beta, \bar{\beta}; \tau_i, \bar{\tau}_i, X_i(m)). \quad (10)$$

Here, $P_{\min(N-m, \ell)}(\beta, \bar{\beta}; \tau_i, \bar{\tau}_i, X_i(m))$ is a probability for the i^{th} firm, with the nature of the probability depending on what happens to the firm during the period from month m to month

$m + \min(N - m, \ell)$. This is defined as:

$$\begin{aligned}
P_\ell(\beta, \bar{\beta}; \tau_i, \bar{\tau}_i, X_i(m)) &= 1_{\{t_{0i} \leq m, \min(\tau_i, \bar{\tau}_i) > m + \ell\}} \\
&\quad \times \exp \left\{ -\Delta t \sum_{j=0}^{\ell-1} [H(\beta(j), X_i(m)) + H(\bar{\beta}(j), X_i(m))] \right\} \\
&+ 1_{\{t_{0i} \leq m, \tau_i \leq \bar{\tau}_i, \tau_i \leq m + \ell\}} \times \{1 - \exp[-\Delta t H(\beta(\tau_i - m - 1), X_i(m))]\} \\
&\quad \times \exp \left\{ -\Delta t \sum_{j=0}^{\tau_i - m - 2} [H(\beta(j), X_i(m)) + H(\bar{\beta}(j), X_i(m))] \right\} \\
&+ 1_{\{t_{0i} \leq m, \bar{\tau}_i \leq \tau_i, \bar{\tau}_i \leq m + \ell\}} \times \{1 - \exp[-\Delta t H(\bar{\beta}(\bar{\tau}_i - m - 1), X_i(m))]\} \\
&\quad \times \exp[-\Delta t H(\beta(\tau_i - m - 1), X_i(m))] \\
&\quad \times \exp \left\{ -\Delta t \sum_{j=0}^{\bar{\tau}_i - m - 2} [H(\beta(j), X_i(m)) + H(\bar{\beta}(j), X_i(m))] \right\} \\
&+ 1_{\{t_{0i} > m\}} + 1_{\{\min(\tau_i, \bar{\tau}_i) \leq m\}}. \tag{11}
\end{aligned}$$

In other words, if the i^{th} firm survives from the observation time at month m for the full horizon ℓ until at least $m + \ell$, then the probability is the model-based survival probability for this period. This is the first term in Eq. (11). The second term handles the cases where the firm has a default within the horizon, in which case the probability is the model-based probability of the firm defaulting at the month that it ends up defaulting, as given in Eq. (8). The third term handles the cases where the firm has a non-default exit within the horizon, in which case the probability is the model-based probability of the firm having a non-default type exit at the month that the exit actually does occur. The expression for this probability uses the conditional non-default type exit probability given in Eq. (4). The final two terms handle the cases where the firm is not in the data set at month m - either the first observation for the firm is after m or the firm has already exited. A constant value is assigned in this case so that this firm will not affect the maximization at this time point.

The pseudo-likelihood function given in Eq. (10) can be numerically maximized to give estimates for the coefficients β and $\bar{\beta}$. Notice though that the sample observations for the pseudo-likelihood function are overlapping if the horizon is longer than one month. For example, when $\ell = 2$, default over the next two periods from month m is correlated to default over the next two periods from month $m + 1$ due to the common month in the two sample observations. However, in Appendix A of Duan et al. [2012], the maximum pseudo-likelihood estimator is shown to be consistent, in the sense that the estimators converge to the “true” parameter value in the large sample limit.

Notice though that each of the terms in Eq. (11) can be written as a product of terms containing only β and terms containing only $\bar{\beta}$. This will allow separate maximizations with respect to β and with respect to $\bar{\beta}$, that is, the defaults and other exits.

The β and $\bar{\beta}$ specific versions of Eq. (11) are:

$$\begin{aligned}
P_\ell^\beta(\beta; \tau_i, \bar{\tau}_i, X_i(m)) &= 1_{\{t_{0i} \leq m, \min(\tau_i, \bar{\tau}_i) > m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\ell-1} H(\beta(j), X_i(m)) \right\} \\
&+ 1_{\{t_{0i} \leq m, \tau_i \leq \bar{\tau}_i, \tau_i \leq m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\tau_i - m - 2} H(\beta(j), X_i(m)) \right\} \\
&\times \{1 - \exp[-\Delta t H(\beta(\tau_i - m - 1), X_i(m))]\} \\
&+ 1_{\{t_{0i} \leq m, \bar{\tau}_i \leq \tau_i, \bar{\tau}_i \leq m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\bar{\tau}_i - m - 2} H(\beta(j), X_i(m)) \right\} \\
&\times \exp[-\Delta t H(\beta(\bar{\tau}_i - m - 1), X_i(m))] \\
&+ 1_{\{t_{0i} > m\}} + 1_{\{\min(\tau_i, \bar{\tau}_i) \leq m\}}, \\
\\
P_\ell^{\bar{\beta}}(\bar{\beta}; \tau_i, \bar{\tau}_i, X_i(m)) &= 1_{\{t_{0i} \leq m, \min(\tau_i, \bar{\tau}_i) > m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\ell-1} H(\bar{\beta}(j), X_i(m)) \right\} \\
&+ 1_{\{t_{0i} \leq m, \tau_i \leq \bar{\tau}_i, \tau_i \leq m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\tau_i - m - 2} H(\bar{\beta}(j), X_i(m)) \right\} \\
&+ 1_{\{t_{0i} \leq m, \bar{\tau}_i \leq \tau_i, \bar{\tau}_i \leq m + \ell\}} \exp \left\{ -\Delta t \sum_{j=0}^{\bar{\tau}_i - m - 2} H(\bar{\beta}(j), X_i(m)) \right\} \\
&\times \{1 - \exp[-\Delta t H(\bar{\beta}(\bar{\tau}_i - m - 1), X_i(m))]\} \\
&+ 1_{\{t_{0i} > m\}} + 1_{\{\min(\tau_i, \bar{\tau}_i) \leq m\}}. \tag{12}
\end{aligned}$$

Then, the β and $\bar{\beta}$ specific versions of the pseudo-likelihood function are given by:

$$\begin{aligned}
\mathcal{L}_\ell^\beta(\beta; \tau, \bar{\tau}, X) &= \prod_{m=1}^{N-\ell} \prod_{i=1}^I P_\ell^\beta(\beta; \tau_i, \bar{\tau}_i, X_i(m)) \\
\mathcal{L}_\ell^{\bar{\beta}}(\bar{\beta}; \tau, \bar{\tau}, X) &= \prod_{m=1}^{N-\ell} \prod_{i=1}^I P_\ell^{\bar{\beta}}(\bar{\beta}; \tau_i, \bar{\tau}_i, X_i(m)). \tag{13}
\end{aligned}$$

With the definitions given in Eqs. (12) and (13), it can be seen that:

$$\mathcal{L}_\ell(\beta, \bar{\beta}; \tau, \bar{\tau}, X) = \mathcal{L}_\ell^\beta(\beta; \tau, \bar{\tau}, X) \mathcal{L}_\ell^{\bar{\beta}}(\bar{\beta}; \tau, \bar{\tau}, X). \tag{14}$$

Thus, \mathcal{L}_ℓ^β and $\mathcal{L}_\ell^{\bar{\beta}}$ can be separately maximized to find their respective parameters. Subsection 1.3 will further explain how the optimum parameters can be estimated.

1.3 Parameter Estimation

Previously, the CRI system produced default predictions to a horizon of two years (CRI [2012]). An extension of the forecast horizon has been implemented as of the PD released on 1 April 2013. With this update, horizons of up to five years are now being computed. Technically speaking, horizons of arbitrary length can be calculated.

This extension to a five-year horizon is done by constraining the term-structure of the parameter estimates to be Nelson-Siegel (Nelson and Siegel [1987]; hereafter NS) functions of the forward-starting time. Horizon-specific parameters β and $\bar{\beta}$ can be obtained from the continuous NS function by using the forward prediction horizon as an input. The term-structures are further constrained so that the effect of risk factors on the forward intensity goes to zero as the horizon increases. This allows tractable and parsimonious extrapolations for horizons beyond five years.

The parameter estimation for the NS functions is based on a new numerical method (a pseudo-Bayesian SMC technique) developed in a working paper by Duan and Fulop [2013]. The remainder of this section details the new parameter estimation. Subsection 1.3.1 describes the parameterization of the parameters by NS functions. Subsection 1.3.2 explains how a structural break applies to the parameter estimation for the Chinese sample. Subsection 1.3.3 gives an overview of the SMC method that is used to estimate the NS functions. Subsection 1.3.4 details the calculation of the confidence intervals for the parameter estimation, and Subsection 1.3.5 describes how the parameters can be re-estimated given new data or updates of old data.

1.3.1 Smoothed parameters

Duan et al. [2012] formulate the forward intensity model in which the forward default intensity for a firm is a function of a number of covariates. The forward default intensities for different forward starting periods are computed using different sets of parameters.

In Duan et al. [2012], the sets of parameters are estimated separately for each forward starting time. Parameters at different forward starting times that are associated with each covariate can be approximated by a function of the forward starting time using NS type term structure functions. Duan et al. [2012] show that this approximation by NS functions does not negatively affect prediction performance. The CRI implementation follows Duan and Fulop [2013] to impose the functional restriction during the estimation as opposed to the method used in Duan et al. [2012] of fitting the curve after parameter estimates have been obtained. This is done for two reasons.

First, it will significantly reduce the number of parameters. For example, using 12 covariates for forward default intensities up to 60 months would require a joint estimation of $13 \times 60 = 780$ parameters. Here, 13 comes from adding an intercept to the intensity function with 12 covariates. If the coefficients corresponding to each covariate are represented by the NS function of 4 parameters, there will be at most $13 \times 4 = 52$ parameters. In fact, there will be fewer parameters as some of the NS parameters will be constrained to zero.

Second, the NS function will allow extrapolation. For example, the 13 NS functions estimated with predictions up to 60 months can be used for prediction, say, over 72 months.

The NS function with four free parameters is:

$$r(t; \varrho_0, \varrho_1, \varrho_2, d) = \varrho_0 + \varrho_1 \frac{1 - \exp(-t/d)}{t/d} + \varrho_2 \left[\frac{1 - \exp(-t/d)}{t/d} - \exp(-t/d) \right], \quad (15)$$

where t is the forecast horizon (measured in years). In the CRI implementation, the horizon is 60 months (5 years) so that t ranges from 0 to 59/12. Once the four NS parameters are estimated, individual horizon-specific parameters β , $\bar{\beta}$ are obtained from the the NS function r using the forecast horizon as input to the NS function. In our current implementation with forecast horizons extending to 60 months (5 years), 120 sets of month specific β and $\bar{\beta}$ are obtained. For all covariates, the restriction $d > 0$ is imposed so that the functions converge to a value for large t . This formulation will be used for forward intensities for both defaults and other types of exit.

For the coefficients of all stochastic covariates, the long-run level ϱ_0 is restricted to zero,

because the current value of a stochastic covariate should be uninformative of default or other exits when the forward starting time goes to infinity. In other words, the coefficient of such a stochastic covariate should approach zero when t goes to infinity.

The intercept of the forward intensity function is of course non-stochastic. Thus, ϱ_0 can have non-zero values for the intercept. With these restrictions on the NS parameters, take the example of 12 covariates, there will be a total of $12 \times 3 + 1 \times 4 = 40$ parameters.

In the CRI implementation, the NS function is further constrained to be non-positive for certain covariates: DTD level and trend, liquidity level and trend, and profitability level and trend. Refer to Section 2 for descriptions of these covariates.

For the Chinese sample, we further revise the parameter estimation on the intercept and the DTD level. Specifically, the total number of parameters used in the Chinese sample is 51 where 12 parameters are added due to a structural break on 31 December 2004, and 39 parameters are reduced from the original 40 parameters. Refer to Subsection 1.3.2.

1.3.2 Structural break

This technical report delivers a better default prediction performance by using the concept of structural breaks. Especially for the Chinese sample, we can improve the accuracy ratios from 55%, 48%, and 35 % for 1-year, 2-year, and 5-year prediction horizons (Technical Report, Version: 2016, Update 1) to 69%, 66%, and 54%, respectively. We briefly explain how to apply a structural break to the parameter estimation.

The new model specification uses a logistic function. We define a parameter for prediction horizon τ which is subject to a structural break at t_0 as

$$\beta(t, \tau; t_0) = \tilde{\beta}(\tau) + \tilde{\gamma}(\tau) \times \frac{1}{1 + e^{-\tilde{\alpha}(\tau)(t-t_0)}}, \quad (16)$$

where $\tilde{\alpha}(\tau)$ is a positive function of τ and is modelled by a three-parameter NS function. For each prediction horizon τ , $\beta(t, \tau; t_0)$ moves in a smooth manner from $\tilde{\beta}(\tau)$ to $\tilde{\beta}(\tau) + \tilde{\gamma}(\tau)$ through $\tilde{\alpha}(\tau)$ when the default prediction time advances toward and then beyond t_0 .

For the Chinese sample, we revise the parameter specification on the CRI-PD model's intercept and the DTD Level. With respect to the intercept term, ϱ_1 in the NS functions for $\tilde{\beta}(\tau)$ and $\tilde{\gamma}(\tau)$ is set to 0, but ϱ_0 is kept free so as to allow for a permanent effect, i.e., the default prediction horizon approaches infinity (see Eq. (15)). With respect to the coefficient on the DTD level, the revised model continues to use a three-parameter NS function where ϱ_0 is set to 0. With these restrictions on the NS parameter, take the example of 12 covariates. There will be (a) the reduced 39 ($= 11 \times 3 + 2 \times 3$) parameters with 11 covariates and two $\tilde{\beta}(\tau)$ s for the intercept and the DTD level, and (b) additional 12 ($= 3 + 3 + 3 + 3$) parameters with two $\tilde{\gamma}(\tau)$ s and $\tilde{\alpha}(\tau)$ s for the two revised terms.

1.3.3 Parameter estimation by SMC

Reliably estimating a system involving 40 parameters presents a numerical challenge. Moreover, the number of parameters can be greater than 40 if there are more than 12 covariates. The CRI implementation follows Duan and Fulop [2013] who use the SMC pseudo-Bayesian method for estimation and self-normalized statistics for inference.

Due to decomposability, the analysis can be performed separately on the forward default and other exit intensities. The data in the CRI implementation are refreshed with monthly frequency, and the sample likelihood used in estimation relies on default predictions running from 1 month to 60 months with a one month increment. Naturally, default prediction is

subject to data availability. Towards the end of the period with available data, the prediction horizon naturally decreases and stops at one-month predictions.

The following exposition closely follows the appendix in Duan and Fulop [2013]. It is important to note that the CRI implementation uses the model described in Duan and Fulop [2013], which does not contain any latent frailty or partial conditioning variable, and hence is technically much simpler in parameter estimation. For example, there is no nonlinear filtering problem.

According to the current modeling framework, where for a particular economy there are N end of the month observations, the input variables of the i th firm in the m th month is given by $X_i(m)$. Let θ denote a set of NS parameters and ℓ denote the forecast horizon ($\ell = 60$). Then the pseudo-likelihood function at step m , denoted by $\mathcal{L}_{m,\min(N-m,\ell)}(\theta)$, takes the form:

$$\mathcal{L}_{m,\min(N-m,\ell)}(\theta) = \prod_{i=1}^I P_{\min(N-m,\ell)}(\beta(\theta), \bar{\beta}(\theta); \tau_i, \bar{\tau}_i, X_i(m)), \quad (17)$$

where I is the number of firms, $\beta(\theta)$ and $\bar{\beta}(\theta)$ are the coefficient vectors from Eq. (6) generated from the NS functions with parameter θ . One may notice that $\mathcal{L}_{m,\min(N-m,\ell)}(\theta)$ is one of the terms in the outer-most product in Eq. (10).

Let $\pi(\theta)$ denote the prior. Following the notation from Section 1.1, consider the following pseudo-posterior distribution at time n after one makes the ℓ -period prediction:

$$\gamma_n(\theta) \propto \prod_{m=1}^{n-1} \mathcal{L}_{m,\min(N-m,\ell)}(\theta) \pi(\theta), \text{ for } n = 2, \dots, N, \quad (18)$$

One can apply the sequential batch-resampling routine of Chopin [2012] together with tempering steps as in Del Moral et al. [2006] to advance the system. For each n , this procedure yields a weighted sample of K particles, $(\theta^{(k,n)}, w^{(k,n)})$ for $k = 1, \dots, K$, whose empirical distribution function will converge to $\gamma_n(\theta)$ as K increases. In the following paragraphs, the superscript k denotes the particle index. Note that in the CRI implementation, $K=1,000$.

Initialization: Draw an initial random sample from the prior: $(\theta^{(k,0)} \sim \pi(\theta), w^{(k,0)} = 1/K)$. Here, the only role of the prior $\pi(\theta)$, is to provide the initial particle cloud from which the algorithm can start. Of course, the support of $\pi(\theta)$ must contain the true parameter value θ_0 . In the CRI implementation, normal/truncated normal priors are used. Truncation applies in order to impose the restriction $d > 0$. To obtain the means of the priors for the SMC method, a least square fit of the MLE parameter estimates to the NS function is conducted. The standard deviations of the priors are set to 5.

Recursions and defining the tempering sequence: Assume there is a particle cloud $(\theta^{(k,n)}, w^{(k,n)})$ whose empirical distribution represents $\gamma_n(\theta)$. Then, a cloud representing $\gamma_{n+1}(\theta)$ will be reached by combining importance sampling and the Markov Chain Monte Carlo (MCMC) steps. Sometimes moving directly from $\gamma_n(\theta)$ to $\gamma_{n+1}(\theta)$ is too ambitious as the two distributions are too far from each other. This will be reflected in highly variable importance weights if one resorts to direct importance sampling. Hence, following Duan and Fulop [2013] which in turn followed Del Moral et al. [2006], a tempered bridge is built between the two densities and the particles are evolved through the resulting sequence of densities. In particular, assume that at time $n+1$, there are P_{n+1} intermediate densities:

$$\bar{\gamma}_{n+1,p}(\theta) \propto \gamma_n(\theta) \mathcal{L}_{n,\min(N-n,\ell)}^{\xi_p}(\theta), \text{ for } p = 1, \dots, P_{n+1}. \quad (19)$$

This construction defines an appropriate bridge: $\xi_0 = 0$ so that $\bar{\gamma}_{n+1,0}(\theta) = \gamma_n(\theta)$, and $\xi_{P_{n+1}} = 1$ so that $\bar{\gamma}_{n+1,P_{n+1}}(\theta) = \gamma_{n+1}(\theta)$. For p between 0 and P_{n+1} , ξ_p is chosen from a grid of points to evenly distribute the weights, as described below. A particle cloud representing $\bar{\gamma}_{n+1,0}(\theta)$ can be initialized as $(\bar{\theta}^{(k,n+1,0)}, \bar{w}^{(k,n+1,0)}) = (\theta^{(k,n)}, w^{(k,n)})$. Then, for $p = 1, \dots, P_{n+1}$ the sequence proceeds as follows:

- *Reweighting Step:* In order to arrive at a representation of $\bar{\gamma}_{n+1,p}(\theta)$, the particles representing $\bar{\gamma}_{n+1,p-1}(\theta)$ and the importance sampling principle can be used. This leads to:

$$\bar{\theta}^{(k,n+1,p)} = \bar{\theta}^{(k,n+1,p-1)}, \quad (20)$$

$$\begin{aligned} \bar{w}^{(k,n+1,p)} &= \bar{w}^{(k,n+1,p-1)} \times \frac{\bar{\gamma}_{n+1,p}(\bar{\theta}^{(k,n+1,p)})}{\bar{\gamma}_{n+1,p-1}(\bar{\theta}^{(k,n+1,p)})} \\ &= \bar{w}^{(k,n+1,p-1)} \times \mathcal{L}_{n,\min(N-n,\ell)}^{\xi_p - \xi_{p-1}}(\bar{\theta}^{(k,n+1,p)}). \end{aligned} \quad (21)$$

To avoid particle impoverishment in sequential importance sampling where most of the weight is concentrated in a small number of particles, a resample-move step is run, which is triggered whenever a measure of particle diversity - the efficient sample size (ESS) defined as

$$\text{ESS} = \frac{\left(\sum_{k=1}^N \bar{w}^{(k,n+1,p)} \right)^2}{\sum_{k=1}^N \left(\bar{w}^{(k,n+1,p)} \right)^2}, \quad (22)$$

falls below some preset value B . Here, resampling directs the particle cloud towards more likely areas of the sampling space, while the move step enriches particle diversity.

In the CRI implementation, B is set to 50% of sample size, which is 500. Thus, if $\text{ESS} < 500$, the following resampling and move steps are performed.

- *Resampling Step:* The particles are resampled proportional to their weights. If $I^{(k,n+1,p)} \in (1, \dots, K)$ are particle indices sampled proportional to $\bar{w}^{(k,n+1,p)}$, the equally weighted particles are obtained as

$$\bar{\theta}^{(k,n+1,p)} = \bar{\theta}^{(I^{(k,n+1,p)}, n+1, p)}, \quad (23)$$

$$\bar{w}^{(k,n+1,p)} = \frac{1}{K}. \quad (24)$$

- *Move Step:* Each particle is passed through a Markov kernel $\mathcal{K}_{n+1,p}(\bar{\theta}^{(k,n+1,p)}, \cdot)$ that leaves $\bar{\gamma}_{n+1,p}(\theta)$ invariant, typically a Metropolis-Hastings kernel:

1. Propose $\theta^{*(k)} \sim \mathcal{Q}_{n+1,p}(\cdot \mid \bar{\theta}^{(k,n+1,p)})$.
2. Compute the acceptance weight α , where:

$$\alpha = \min \left(1, \frac{\bar{\gamma}_{n+1,p}(\theta^{*(k)}) \mathcal{Q}_{n+1,p}(\bar{\theta}^{(k,n+1,p)} \mid \theta^{*(k)})}{\bar{\gamma}_{n+1,p}(\bar{\theta}^{(k,n+1,p)}) \mathcal{Q}_{n+1,p}(\theta^{*(k)} \mid \bar{\theta}^{(k,n+1,p)})} \right). \quad (25)$$

3. With probability α , set $\bar{\theta}^{(k,n+1,p)} = \theta^{*(k)}$, otherwise keep the old particle.

This step will enrich the support of the particle cloud while conserving its distribution. If the particle set is a poor representation of the target distribution, the move step can also help adjust the location of the support. Crucially, given the importance of the sampling setup, the proposal distribution $\mathcal{Q}_{n+1,p}(\cdot \mid \bar{\theta}^{(k,n+1,p)})$ can be adapted using the existing particle cloud.

In the CRI implementation, block independent normal distribution proposals using the means and the standard deviations implied by the particle set are fitted to the particle cloud before the move. Three (or four) NS parameters corresponding to each covariate

form one block. To ensure that the NS parameter d remains positive, any block with a non-positive value for d is discarded. To ensure the smoothness of the term structure of the forward intensity parameters, any block that does not produce an increasing or decreasing structure of the NS function for the first five months is also discarded. Once some block is discarded, the particle is regenerated until it meets the requirements. Note that the likelihood ratio in the Metropolis-Hastings algorithm is not affected by this because the truncated normal creates a common adjustment term in both numerator and denominator.

As mentioned previously, the coefficients for some covariates are also required to be non-positive over all forward starting times. This is achieved by checking whether the NS curve at a particular set of three (or four) parameters meets the condition. If not, the parameter set will be discarded.

To improve the support of the particle cloud, one can execute multiple such Metropolis-Hastings steps each time. In the CRI implementation, such Metropolis-Hastings steps are consecutively performed in each resampling-move step until the number of unique particles exceeds $K/2$.

When $p = P_{n+1}$ is reached, a representation of $\gamma_{n+1}(\theta)$ is:

$$(\theta^{(k,n+1)}, w^{(k,n+1)}) = (\bar{\theta}^{(k,n+1,P_{n+1})}, \bar{w}^{(k,n+1,P_{n+1})}). \quad (26)$$

Following Duan and Fulop [2013], the tempering sequence ξ_p is automatically set to ensure that the efficient sample size stays close to 500. This is done by a grid search, where the ESS is evaluated at a grid of candidate ξ_p and the one that produces the closest ESS to 500 is chosen.

After the recursion procedure (i.e., ξ_p reaches 1), additional moves using the means implied by the particle set but all standard deviations increased by a factor of 30% are further performed to enrich the support and adjust the location of the particle set. The number of such moves is set to 20 for the first time point and exponentially declines to 3 mid-way to the sample period and stays at 3 for the remainder. After that, if the number of unique particles is still below $K/2$, more moves using the means and the standard deviations implied by the particle set (without expansions) are consecutively performed until the particle set meets the requirement. (This case could only happen when $\text{ESS} \geq 500$ for $\xi_p = 1$.)

1.3.4 Statistical inference

The full sample size has N time series data points, but one can only make default prediction at $N - 1$ time points; for example, at time point 2, the data is only available for making one-period default prediction at time point 1. Denote the pseudo-posterior mean of the parameter of the whole sample by $\hat{\theta}_N$. And for $n = 2, \dots, N$,

$$\hat{\theta}_n = \frac{1}{\sum_{k=1}^K w^{(k,n)}} \sum_{k=1}^K w^{(k,n)} \theta^{(k,n)}. \quad (27)$$

Note that $(\bar{\theta}^{(k,n+1,0)}, \bar{w}^{(k,n+1,0)}) = (\theta^{(k,n)}, w^{(k,n)})$ is not a true posterior because the likelihood function in Eq. (18) is not a true likelihood function. Thus, it cannot directly provide valid Bayesian inference. But following Duan and Fulop [2013] - which is in turn based on Shao's self-normalized statistic (Shao [2010]) - inference can be performed using the t -like statistic. To test, for example, the hypothesis of the k th element of $\bar{\theta}^{(k,n+1,p)} = \bar{\theta}^{(I^{(k,n+1,p)}, n+1, p)}$, denoted by $\bar{w}^{(k,n+1,p)} = \frac{1}{K}$, equal to a , one has:

$$t^* = \frac{\sqrt{N-1} (\hat{\theta}_N^{(k)} - a)}{\sqrt{\hat{\delta}_{k,N}}} \xrightarrow{d} \frac{W(1)}{\left[\int_0^1 (W(r) - rW(1))^2 dr \right]^{1/2}}, \quad (28)$$

where $W(r)$ is a Wiener process, $\hat{\delta}_{k,N}$ is the k th diagonal element of \hat{C}_N , and

$$\hat{C}_N = \frac{1}{(N-1)^2} \sum_{n=2}^N n^2 (\hat{\theta}_n - \hat{\theta}_N)(\hat{\theta}_n - \hat{\theta}_N)'. \quad (29)$$

The right-hand-side random variable for t^* does not have a known distribution, but can be easily simulated. Kiefer et al. [2000] reported that the 95% quantile is 5.374 and the 97.5% quantile is 6.811. These values can also be used to set up confidence intervals.

The statistical inference on the structural-break parameters are again based on Shaos self-normalized statistic (see Subsection 1.3.2). Since the parameters in connection with the structural break cannot be identified using the data before the break point, the sequence of parameter estimates used in Shaos self-normalized statistic can only start from the break point onward. In our implementation, all parameter estimates, break or non-break related, start from the break point. Denote by T the endpoint of the data set and t_0 again the structural break point. The number of points in the sequence, N , used to compute the norming matrix and the confidence intervals (see Eq. (29)) therefore equals $T - t_0 + 1$.

1.3.5 Periodic updating

In reality, portfolio credit risk models need to be updated periodically as new data arrive and/or old data are revised. With one new month of data, this means that the final date index N is increased to $N + 1$. A particular strength of Duan and Fulop [2013]'s methodology is that the estimation routine does not need to be re-initialized from the prior as the pseudo-posterior using data up to $N\Delta t$ will provide a much better proposal distribution.

Let the pseudo-posterior at time N (based on the old data set available at time N) be denoted by

$$\gamma_N^{(N)}(\theta) \propto \prod_{m=1}^{N-1} \mathcal{L}_{m, \min(N-m, \ell)}^{(N)}(\theta) \pi(\theta), \quad (30)$$

and the pseudo-posterior at time $N + 1$ (based on the new data set available at time $N + 1$) by

$$\gamma_{N+1}^{(N+1)}(\theta) \propto \prod_{m=1}^N \mathcal{L}_{m, \min((N+1)-m, \ell)}^{(N+1)}(\theta) \pi(\theta). \quad (31)$$

The superscript is introduced to differentiate the data set available at time N and $N + 1$, respectively. It is important to note that $\mathcal{L}_{m,k}^{(N+1)}(\theta) \neq \mathcal{L}_{m,k}^{(N)}(\theta)$ can be caused by revisions to the old data set. More importantly, there is a generic difference between the pseudo-posterior distribution up to time N under the new data set and the corresponding quantity under the old data set specifically due to multiperiod prediction; that is, $\gamma_{N+1}^{(N)}(\theta) \neq \gamma_N^{(N)}(\theta)$ even without any data revisions to the period covered by the old data set. To put it concretely, using the new data set and at, say, one period before the last (i.e., time $N - 1$), one can make default predictions up to two periods, whereas at the same time point, it was only possible to make one-period predictions under the old data set because there were no data beyond time N . Adjustments to the weights are thus necessary to reflect the change in data set before making any sequential updates.

There are several possible ways of advancing the system. The CRI implementation decomposes the move into two steps. First, we take care of data revision up to time N and then act as if we were making predictions with data only up to time N . Doing it this way is meant to maintain the same default prediction setting; that is, for example, only makes one-period default prediction at time $N - 1$ even though the new data set permits predictions up to two periods. Thus, we introduce

$$\gamma_N^{(N+1,N)}(\theta) \propto \prod_{m=1}^{N-1} \mathcal{L}_{m, \min(N-m, \ell)}^{(N+1)}(\theta) \pi(\theta) \quad (32)$$

to denote this pseudo-posterior when the superscript $(N + 1, N)$ stands for the updated data set available at time $N + 1$ but making default predictions as if the data were only available up to time N .

From the previous run up to time N , one already has a weighted set of particles $(\theta^{(k,N)}, w^{(k,N)})$ representing the pseudo-posterior distribution $\gamma_N^{(N)}(\theta)$. Next, perform a reweighting by

$$\theta^{*(k,N)} = \theta^{(k,N)}, \quad (33)$$

$$w^{*(k,N)} = w^{(k,N)} \times \frac{\gamma_N^{(N+1,N)}(\theta^{(k,N)})}{\gamma_N^{(N)}(\theta^{(k,N)})}. \quad (34)$$

Since the denominator is available from the previous run, one only needs to compute the numerator using the new data set up to time N . Then, the weighted set $(\theta^{*(k,N)}, w^{*(k,N)})$ represents the revised pseudo-posterior distribution at time N , i.e., $\gamma_N^{(N+1,N)}(\theta)$, specifically to account for data revisions. From this point onward, one can apply the same recursive procedure described in Subsection 1.3.3, starting from Eq. (19), to complete the updating task.

Reweightings may substantially alter the ESS of the particle set due to a large volume of data changes. If the reweighting leads to a satisfactory ESS, i.e., $\text{ESS} \geq B$, advancing to $N + 1$ continues as usual. Otherwise, the weighted sample will be discarded to prevent the support from degeneration. One can return to the particle set before reweighting and perform resampling to create an equally-weighted particle set. Then, make the Metropolis-Hastings moves by targeting $\gamma_N^{(N+1,N)}(\theta)$ using the Gaussian-type sampler described earlier and starting with the mean and variance implied by the resampled particle set. One should make these Metropolis-Hastings moves until the particle set reaches a desirable level of distinctiveness, and perhaps with a preset minimum number of moves to ensure that the resulting particle set is close enough to the target distribution. In the CRI implementation, the number of moves is set to be 20.

Furthermore, one can update all self-normalized statistics in the way as described earlier to reflect the additional one more pseudo-posterior means to the sequence.

The initial parameter estimation is carried out for all calibration groups using the data up to the end of January 2013. Relevant quantities (parameter estimates, the 1,000 parameter particles and corresponding weights and sample likelihoods) are saved for periodic updating for all future months. Additional implementation details on the calibration are given in Section 3.

2 Input Variables and Data

Subsection 2.1 describes the input variables used in the quantitative model. Currently, the same set of input variables is common to all of the economies under the CRI's coverage. Future enhancements to the CRI system will allow different input variables for different economies. The effect of each of the variables on the PD output will be discussed in the empirical analysis of Section 4.

Subsection 2.2 gives the data sources and relevant details of the data sources. There are two categories of data sources: current and historical. Data sources used for current data need to be updated in a timely manner so that daily updates of PD forecasts are meaningful. They also need to be comprehensive in their current coverage of firms. Data sources that are comprehensive for current data may not necessarily have comprehensive historical coverage for different economies. Thus, other data sources are merged in order to obtain comprehensive coverage of historical and current data.

Subsection 2.3 indicates the fields from the data sources that are used to construct the input variables. For some of the fields, proxies need to be used for a firm if the preferred field is not

available for that firm.

Subsection 2.4 discusses the definition and sources of defaults and of other exits used in the CRI.

2.1 Input Variables

Following the notation that was introduced in Section 1, firm i 's input variables at time $t = n\Delta t$ are represented by the vector $X_i(n) = (W(n), U_i(n))$ consisting of a vector $W(n)$ that is common to all firms in the same economy, and a firm-specific vector $U_i(n)$ which is observable from the date the firm's first FS is released, until the month end before the month in which the firm exits, if it does exit.

In Duan et al. [2012], different variables that are commonly used in the literature were tested as candidates for the elements of $W(n)$ and $U_i(n)$. The 2 common variables and 10 firm-specific variables, as described below, were selected as having the greatest predictive power for corporate defaults in the United States. In the current stage of development, this same set of 12 input variables is used for all economies. Future development will include variable selection for firms in different economies.

- Common variables

The vector $W(n)$ contains two elements, which are:

1. Stock index return: the trailing one-year simple return on a major stock index of the economy;
2. Interest rate: a representative 3-month short-term interest rate.

- Firm-specific variables

The 10 firm-specific input variables are transformations of measures of 6 different firm characteristics. The 6 firm characteristics are:

1. volatility-adjusted leverage;
2. liquidity;
3. profitability;
4. relative size;
5. market mis-valuation/future growth opportunities; and
6. idiosyncratic volatility.

Volatility-adjusted leverage is measured as the DTD in a Merton-type model. The calculation of DTD used by the CRI allows a meaningful DTD for financial firms, a critical sector that must be excluded from most DTD computations. This calculation is detailed in Section 3.

Liquidity is measured as a ratio of cash and short-term investments to total assets. Profitability is measured as a ratio of net income to total assets. Relative size is measured as the logarithm of the ratio of market capitalization to the economy's median market capitalization.

Duan et al. [2012] transformed these first four characteristics into level and trend versions of the measures. For each of these characteristics, the level is computed as the one-year average of the measure, and the trend is computed as the current value of the measure minus the one-year average of the measure. The level and trend of a measure have seldom been used in the academic or industry literature for default prediction, and Duan et al. [2012] found that using the level and trend significantly improves the predictive power of the model for short-term horizons.

To understand the intuition behind using level and trend of a measure as opposed to using just the current value, consider the case of two firms with the same current value for all measures. If the level and trend transformations were not performed, only the current values would be used and the two firms would have identical PD. Suppose that for the first firm the DTD had reached its current level from a high level, and for the second firm the DTD had reached its current level from a lower level (see Fig. 2). The first firm's leverage is increasing (worsening) and the second firm's leverage is decreasing (improving). If there is a momentum effect in DTD, then firm 1 should have a higher PD than firm 2.

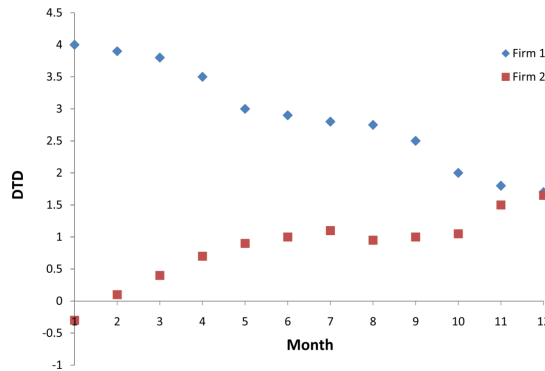


Figure 2: Two firms with all current values equal to each other, but DTD trending in the opposite direction.

Duan et al. [2012] found evidence of the momentum effect in DTD, liquidity, profitability and size. For the other two firm characteristics, applying the level and trend transformation did not improve the predictive power of the model.

One of the remaining two firm characteristics is the market mis-valuation/future growth opportunities characteristic, which is taken as the market-to-book asset ratio and measured as a ratio of market capitalization and total liabilities to total assets. One can see whether the market mis-valuation effect or the future growth opportunities effect dominates this measure by looking at whether the parameter for this variable is positive or negative. This will be further discussed in the empirical analysis of Section 4.

The last firm characteristic is the idiosyncratic volatility which is taken as SIGMA, following Shumway [2001]. SIGMA is computed by regressing the daily returns of the firm's market capitalization against the daily returns of the economy's stock index, for the previous 250 days. SIGMA is defined to be the standard deviation of the residuals of this regression. Using daily returns is to ensure that SIGMA provides an accurate and timely measure of idiosyncratic risk of individual companies. Shumway [2001] reasons that SIGMA should be logically related to bankruptcy since firms with more variable cash flows and therefore more variable stock returns relative to a market index are likely to have a higher probability of bankruptcy.

Finally, the vector $U_i(n)$ contains 10 elements, consisting of:

1. Level of DTD.
2. Trend of DTD.
3. Level of (Cash + Short-term investments) / Total assets, abbreviated as CASH/TA.
4. Trend of CASH/TA.
5. Level of Net income / Total assets, abbreviated as NI/TA.
6. Trend of NI/TA.
7. Level of log (Firm market capitalization / Economy's median market capitalization), abbreviated as SIZE.

8. Trend of SIZE.
9. Current value of $(\text{Market capitalization} + \text{Total liabilities}) / \text{Total asset}$, abbreviated as M/B.
10. Current value of SIGMA.

The data fields that are needed to compute DTD and short-term investments are described in Subsection 2.3. The remaining data fields required are straightforward and standard. The computation for DTD is explained in Section 3.

2.2 Data Sources

There are two data sources that are used for the daily PD forecast updates: Thomson Reuters Datastream and the Bloomberg Data License Back Office Product. Many of the common factors such as short-term interest rates and macroeconomic data are retrieved from Datastream.

Firm-specific data comes from Bloomberg's Back Office Product which delivers daily update files by region via FTP after respective market closes. All relevant data is extracted from the FTP files and uploaded into the CRI database for storage. From this, the necessary fields are extracted and joined with previous months of data.

The Back Office Product includes daily market capitalization data based on closing share prices and also includes new FSes as companies release them. Firms will often have multiple versions of FSes within the same period, with different accounting standards, filing statuses (most recent, preliminary, original, reclassified or restated), currencies or consolidated/unconsolidated indicators. A major challenge lies in prioritizing these FSes to decide which data should be used. The priority rules are described in section 3.

The firm coverage of the Back Office Product is of sufficient quality that over 33,000 firms can be updated on a daily basis in the 121 economies under the CRI's coverage. While the current coverage is quite comprehensive, historical data from the Back Office Product can be sparse for certain economies. For this reason, various other databases are merged in order to fill out the historical data. The other databases used for historical data are: a database from the Taiwan Economics Journal (TEJ) for Taiwanese firms; a database provided by Korea University for South Korean firms; data from Prowess for Indian firms; and the Compustat for United States.

With all of the databases merged together and for the 121 economies under CRI's coverage, around 65,000 exchange-listed firms are in the CRI database. The historical coverage of the firm data goes back to the early 1990s. In order to be included in our coverage, a company needs to have common equity traded on a stock exchange. Of these 121 economies, 78 economies have their own stock exchange (see Table A.2). For the other 43 economies under the CRI coverage, we cover companies domiciled in the economy that are quoted on a foreign exchange, either because those economies do not have a stock exchange or because data issues are preventing us from including the companies listed on the local exchange. For these reasons, we exclude eight economies for the CRI products calibrated on 28 February 2017: Angola, Dominican Republic, Iraq, Madagascar, Niger Republic, Qatar, Republic of Zambia, and Sudan.

2.3 Constructing Input Variables

The chosen stock indices and short-term interest rates for the 78 economies with their own stock exchange under the CRI's current coverage are listed in Tables A.5 and A.6, respectively. All economies are listed by their three letter ISO code given in Table A.4.

Most of the firm-specific variables can be readily constructed from standard fields from firms' FSes in addition to daily market capitalization values. The only two exceptions are the DTD and the liquidity measure.

The calculation for DTD is explained in section 3. In the calculation, several variables are required. One variable is a proxy for a one-year risk-free interest rate, and the choices for each of the 78 economies are listed in Table A.7. Total assets, long-term borrowing and total liabilities are also required, but can be obtained from standard FS fields easily.

Total current liabilities are also required, and due to the relatively large numbers of firms that are missing this value, proxies have to be found. The preferred Bloomberg field for this is BS_CUR.LIAB. If this is missing, then the sum of BS_ST.BORROW, BS_OTHER.ST.LIAB, BS_CUST.ACCEPT.LIAB.CUSTDY.SEC (customers' acceptance and liabilities/custody securities) and BS_SEC.SOLD.REPO.AGRMNT is used. If one, two or three of these are missing, zero is inserted into those fields, but at least one of the four fields is required.

The liquidity measure requires different fields for financial and non-financial firms. For non-financial firms, the numerator of the ratio (Cash + Short-term investments) is taken as the sum of BS_CASH.NEAR.CASH.ITEM and BS_MKT_SEC.OTHER.ST.INVEST (marketable securities and other short-term investments). If BS_MKT_SEC.OTHER.ST.INVEST is missing, substitute zero (but BS_CASH.NEAR.CASH.ITEM is required).

It was found that this sum frequently overstated the liquidity for financial firms. In place of BS_MKT_SEC.OTHER.ST.INVEST, financial firms use the sum of ARD_SEC.PURC.UNDER.AGR.TO.RESELL (securities purchased under agreement to re-sell), ARD.ST.INVEST and BS.INTERBANK.ASSET. If one or two of these are missing, zero is inserted for those fields, but at least one field is required. The "ARD" prefix indicates that these are "as reported" numbers directly from the FSes. As such, for some firms these fields may need to be adjusted to the same units before adding them to other fields.

To summarize, the firm-specific variables include: DTD, Cash/TA, NI/TA, SIZE, M/B, and SIGMA, and the statistics grouped by economy are listed in Table A.8.

2.4 Data for Corporate Events

The CRI database contains 5822 default events and 44641 other exits events from 1990 to the present. The corporate events come from numerous sources, including Bloomberg, Compustat, CRSP, Moodys reports, TEJ, exchange websites and news sources. Moreover, in order to enhance default coverage, from December 2015, the CRI team has started to use "defaults" reported by major credit rating agencies as an additional data source.

The default events that are recognized by the CRI can be classified under one of the following events:

- (1) Bankruptcy filing, receivership, administration, liquidation or any other legal impasse to the timely settlement of interest and/or principal payments;
- (2) A missed or delayed payment of interest and/or principal, excluding delayed payments made within a grace period;
- (3) Debt restructuring/distressed exchange, in which debt holders are offered a new security or package of securities that result in a diminished financial obligation (e.g., a conversion of debt to equity, debt with lower coupon or par amount, debt with lower seniority, debt with longer maturity).

The more precise sub-categories of default corporate actions are listed in Table A.9.

Delisting due to other reasons such as failure to meet listing requirements, inactive stock prices or M&A are counted as "other exits" and are not considered as default. Especially, if a

firm has stale stock price for more than a year but has no record on experiencing any credit events, we will assume that it has been suspended and exited from its stock exchange. If two credit events of the same type happen in a row or a default event happens followed by another event of either type, we only keep the first event assuming that the series of events arise from the same source of financial distress. However, if firms are delisted from an exchange and then experience a default event within 365 calendar days of the delisting, we will only keep the default event, and any information between the two dates won't be used. Technical defaults such as covenant violations are not included in our definition of default. The exit events that are not considered as defaults in the CRI system are listed in Table A.10.

In addition to the aforementioned events, there are still cases that require special attention and will be assessed on a case-by-case basis, e.g., subsidiary default. As a general rule, the CRI does not consider related party-default (e.g., subsidiary bankruptcy) as a default event. However, when a non-operating holding parent company relies heavily on its subsidiary, bankruptcy by the subsidiary will cause a considerable economic impact on the parent company. Such cases will be reviewed, and final classifications will be made.

Complete statistics of the total number of firms, number of defaults, and number of other exits in each of the 78 economies from 1994 to 2015 are listed in Table A.11.

3 Implementation Details

Section 1 described the modeling framework underlying the current implementation of the CRI system. It focused on theory rather than the details encountered in an operational implementation. The present section describes how the CRI system handles more specific issues.

Subsection 3.1 describes implementation details related to data, mainly dealing with data cleaning and missing data. Subsection 3.2 describes the specific computation of DTD used by the CRI system that leads to meaningful DTD for financial firms. Subsection 3.3 explains how the calibration previously described in Subsection 1.2 can be implemented. Subsection 3.4 gives the implementation details relevant to the daily output. This includes an explanation of the various modifications needed to compute daily PDs so that the daily PDs are consistent with the usual month end PD and a description of the computation of the aggregate PDs provided by the CRI.

3.1 Data Treatment for Calibration

Fitting data to monthly frequency: Historical end of month data for every firm in an economy is required to calibrate the model. For daily data such as market capitalization, interest rates and stock index values, the last day of the month for which there is valid data is used.

Up to the October 2012 calibration, FS variables data were used, starting from the period end of the statement lagged by 3 months. This is to ensure that predictions are made based on information that was available at the time the prediction was made. However, this treatment can be over-conservative, and many companies actually release their FSes quicker than 3 months. Therefore, we implement a new logic, and we start using the values in an FS as soon as its latest revision was put into the CRI database, unless the FS' release was delayed for more than 3 months. If there was no revision to an FS, the originally released FS is used. Whenever the latest revision is available more than 3 months after the period end, we revert to the previous logic. We start including the FS before the latest revision is actually available as a compromise, to avoid situations like later minor revisions of the FS holding back more up-to-date information. It should be noted that the new approach was only applied for FS input into the CRI database after February 2011, as the revision dates were not accurately

recorded before this date. The CRI considers FS variables to be valid for one year without restriction, after they were first used.

Priority of FSes with the same period end: As described in Subsection 2.2, data provided in Bloomberg’s Back Office Product can include numerous versions of FSes within the same period. If there are multiple FSes with the same period end, priority rules must be followed in order to determine which to use. The formulation and implementation of these rules are major challenges and areas of continuing development.

The first rule is to prioritize by consolidated/unconsolidated status. This rule applies to all economies, however, special treatment is imposed on firms in the “diversified financial services” sector in South Korea and Taiwan. In this sector of the two economies, firms issue unconsolidated FSes more frequently than consolidated ones. As a result, this prioritization rule can lead to cases where the FSes chosen switch between unconsolidated and consolidated ones on a regular basis. In South Korea and Taiwan, where corporate structures are biased toward large holding companies, this switching may substantially distort the DTD calculation for these holding companies. Therefore, as of October 2013 calibration, in the case of South Korea, and November 2013 calibration, in the case of Taiwan, if a company has released at least one consolidated FS over the last 12 months, all unconsolidated FS will be ignored.

If, after the first prioritization rule has been applied, there are still multiple FSes, the second rule is applied. This is prioritization by fiscal period. In most economies, annual statements are required to be audited, whereas other fiscal periods are not necessarily audited. The order of priority from highest to lowest is, therefore: annual, semi-annual, quarterly, cumulative, and finally other fiscal periods. We have observed that the capital structure breakdown reported by Australian domiciled-banks differs between annual and semi-annual reports, leading to DTD calculations that are not meaningful. Because of this, as of October 2013 calibration, we only use data from annual FSes for Australian banks.

The third prioritization rule is based on filing status. The “Most Recent” statement is used before the “Original” statement, which is used before the “Preliminary” statement.

The final prioritization rule is based on the accounting standard. As more and more countries adopt the International Financial Reporting Standards (IFRS) as their mandatory accounting standard, FSes that are reported using IFRS are given higher priority than they were before. The revised rule is implemented from the 2014 October calibration and is described as follows. For the countries with mandatory IFRS adoption, FSes under IFRS are now given the highest priority after their respective mandatory adoption dates. Before the mandatory adoption dates and for countries without mandatory IFRS adoption, FSes under the Generally Accepted Accounting Principles (GAAP) have the highest priority. If an FS does not indicate its accounting standard, it will not be used.

Having all the prioritization descriptors in place, we rank all the FSes available in the database from the highest priority to the lowest. If there are FSes where all the financial information needed in our model is present, the FS with the highest ranking will be chosen. If instead there is no such FS, we will pick the values variable by variable. For example, the total liability is taken from the highest ranked FS with this information available, while the total asset can be from another FS, which ranks the highest among those bearing this information and having the same FS period end. This treatment is to get as much information as possible and to accommodate the fact that Bloomberg occasionally only revises the variables that have changed values, leaving the other fields NaN.

One variable that requires special attention is the net income. Net income is a flow variable and needs to be adjusted based on the fiscal period of the FS. More specifically we transform the net income into a monthly net income by dividing the net income by the number of months that the FS covers. For example, the monthly net income can be computed from the annual net income divided by 12, the semi-annual net income divided by 6 and the quarterly net income divided by 3. When the monthly net income can be obtained from different sources simultaneously, the quarterly net income will have the highest priority (followed by

the cumulative quarterly, semiannual, annual, and others) because it covers a more recent period of time.

Treatment of stale market capitalization prices: The market capitalization of a firm is required in a few input variables: DTD, SIZE, M/B, and SIGMA. For most firms, the market capitalization is available from Bloomberg on a daily basis.

A check on the trading volume of shares is used to remove stale prices. Specifically, if there are more than two consecutive days of identical market capitalization prices, subsequent identical prices are removed only if the trading volume is equal to zero. This is to avoid, for example, cases where the shares of a company are under a trading suspension but the market capitalization data is incorrectly carried forward.

An exception is for Indian companies, where it is common for some companies to have market capitalizations reported only once a month with several consecutive months having identical prices and positive trading volume. These prices are very likely not to be accurate reflections of the firms' value. So, the trading volume is not checked for Indian firms and market capitalizations are excluded after more than two repeated prices.

For some firms, the market capitalization data is not available for some periods. To fill in the blanks, we use the shares outstanding obtained from the previously available market capitalization divided by the price on that day as a proxy. If the market capitalization data is missing for more than a year, we use the share price multiplied by the shares outstanding listed on the balance sheet and then multiplied again by the adjustment factor that Bloomberg provides to account for splits, dividends, etc. If there is still market capitalization missing in the data, then shares outstanding from other data sources including Compustat and Korean University Database are used.

Currency conversion: Currency conversions are required if the market capitalization or any of the FS variables are reported in a currency different than the currency of the economy. If a currency conversion is required, the foreign exchange rate used is the one reported at the relevant market close. For firms traded in most of the Asian economies and Asia-Pacific, the Tokyo closing rate is used; for firms traded in Europe and Middle East, the London closing rate is used; and for firms traded in North and Latin America, the New York closing rate is used. For market capitalizations, the FX rate used is for the date that the market capitalization is reported. For FS variables, the FX rate used is for the date of the period end of the statement.

Treatment for mergers and acquisitions (M&A): M&A events are common occurrences in the economic world. For our purpose, we define the M&A events as the cases where a firm ("acquirer") acquires partial or full ownership of another firm ("target"). Once an M&A deal is completed, the market capitalization of the acquirer changes immediately, reflecting the restructure of the acquirer. However, its FSes do not usually immediately reflect the new situation due to the fact that they are only released on a periodic basis. As a result, the DTD and market-to-book ratio, which are important inputs for the PD computation, will be distorted due to a mismatch in the market capitalization and the FS variables. In order to ensure the accuracy and reliability of our PD estimates, some special treatments are taken for PD calculations to companies whose financials are presumably significantly affected by the M&A events. The treatments are only applied to the acquirers.

The treatment starts with the screening of the important M&A deals. Only the important M&A deals are treated, assuming that the unimportant ones would not significantly affect a firm's corporate structure. An M&A deal is considered important if it satisfies the following three criteria :

1. Upon the deal's completion, the acquirer owns 20% or more of the target company.
2. The size of the deal is material to the acquirer. This is measured in terms of total assets. If α is the percentage of the target that is being acquired, the size is considered material if the product of α and the total assets of the target is greater than or equal to 20% of the total assets of the acquirer.

3. The change in market capitalization is material, with the largest absolute daily market capitalization return, within 20 days of the M&A completion day, larger than or equal to 5%.

One thing to note in implementation is that some targets stopped producing financial statements years before the M&A events. As a result, they may not have a valid value of total asset (needed for testing criterion 2) on the deal completion date. In this case, we use their last available value within 2 years before the deal completion as a substitute. If the last available value is beyond the 2-year range, we think that the data is not informative enough to reflect the financial situation upon deal completion and thus skip this particular case.

In order to mitigate the mismatching problem between the market capitalization and FS variables, we make the simplest and most conservative treatments, which are in line with the fundamental accounting standards. The treatment period will begin on the deal completion date and end when the first financial statement that reflects the post-M&A situation becomes available, which varies across economies and can range from 3 months to a few years. After identifying the important M&A deals, which must have had an ownership level of equal or more than 20%, we treat them in two different ways:

1. If the acquirer owns 20-50% (excluding 50%) of the target upon deal completion, the "Equity Method" is used to treat the financial statement variables. Under the "Equity Method", the total asset of the acquirer will increase by a proportion, which is the percentage of ownership acquired in this deal, of the targets equity. Its net income will increase by the same proportion of the target's net income. In contrast, other financial statement variables will stay the same.
2. If the acquirer owns 50-100% (including 50%) of the target upon deal completion, the "Acquisition Method" is used to adjust the financial statement variables. By using this method, we assume that the financial manager of the acquirer consolidates the financial statements of both entities. As a consequence, the financial statement variables, including total liability, total asset, and cash and marketable securities, take the simple sum of the values from both entities. The net income will still increase by a proportion (the percentage of ownership acquired in this deal) of the targets net income, simply because it is the profit attributed to the shareholders.

After constructing the hypothetical financial statement data in the above-mentioned way, we use them to compute the DTD and the historical monthly PDs wherever applicable. Note that we do not let the hypothetical values enter the model's calibration process. With enough data points in the database to robustly calibrate the model parameters at the economy or region level, we can afford to disregard a small portion of data for the M&A period during which we believe them to be mismatched. After getting the model parameters, however, we not only use the hypothetical values to re-calibrate the firm-specific DTD parameters and re-calculate the DTD values, we also use them to adjust other variables with financial information. This is to guarantee that the PDs during the treatment period are properly calculated.

Treatment for missing values and outliers: Missing values and outliers are dealt with by a three-step procedure. In the first step, the 10 firm-specific input variables are computed for all firms and all months. In this step, the extreme values will be calculated, and the missing values will be determined. In the second step, outliers are eliminated by winsorization. In the final step, missing values are replaced under certain conditions. Note that the macroeconomic variables do not go through this process.

The first step is to compute the input variables and to determine which are missing. As mentioned previously, FS variables are carried forward for one year after the date that they are first used. The date that they are first used is generally three months after the period end of the statement. If no FS is available for the company within this year, then the FS variable will be missing. For market capitalization, if there is no valid market capitalization value within the calendar month, then the value is set to missing.

For illiquid stocks, if there has been no valid market capitalization value for a firm within the last 90 calendar days, then the market capitalization is deemed to not properly reflect the value of the firm. The firm is considered to have exited with a non-default event. Once the firm starts trading again and a new FS is released, the firm can enter back into the calibration. With regard to historical PDs, the PDs can be reported again once there are enough valid variables.

With regard to the level variables, their values in the current and the last 11 months are averaged to compute the level. A minimum of 6 observations in the 12-month range are required to calculate the level variables. If fewer than 6 observations exist in this case, the level variables will bear missing values. However, this condition is not enforced during the initial 6 months after the firm releases the first financial statement.

To compute the trend variables, the level is subtracted from the current month value. If the current month value is missing, the trend variable is set to be the last valid value during the previous one year.

The value of M/B is set to be missing if any of the following values are missing: market capitalization, total liabilities or total assets of the firm. For the computation of SIGMA, at least 50 valid returns over the last 250 days of possible returns are required for the regression. If there are less than 50 valid returns, SIGMA is set to be missing.

In this way, the 8 trend and level variables as well as M/B and SIGMA are computed and identified as missing or present. Winsorization can then be performed as a second step to eliminate outliers. The volume of outliers is too large to be able to determine whether each one is valid or not, so winsorization applies a floor and a cap on each of the variables. The historical 0.1 percentile and 99.9 percentile for all firms in the economy are recorded for each of the 10 variables. Any values that exceed these levels are set to equal these boundary values.

With a winsorization level of 0.1 and 99.9 percentile, the boundary values still may not be reasonable. For example, NI/TA levels of nearly -25, meaning an annual net income -25 times larger than the total assets of a firm, has been observed at this stage. In these cases, a more aggressive winsorization level is applied, until the boundary values are reasonable. Thus, the winsorization level is economy- and variable-specific, and will depend on the data quality for that economy and variable. Winsorization levels different from the default of 0.1 percentile and 99.9 percentile are indicated in Table A.8.

A third and final step can be taken to deal with missing values. If during a particular month, no variable is missing for a particular firm, the PD can then be computed. If 6 or more of these 10 variables are missing, there is deemed to be too many missing observations and no replacement shall be made.

If between 1 and 5 variables are missing out of the 10, the first step is to trace back for at most 12 months to use previous values of these variables instead. If this does not succeed in replacing all of the variables, a replacement by sector medians is done. A firm's sector during a certain month is classified as either financial or non-financial, which is based on its Bloomberg industry sector code during that month. As of January 2015, the sector median replacement is no longer implemented in the calibration process but still in the PD computation. One special case is that the sector replacement is not done if it results in a relative change in the historical PD of 10% or more when the initial PD was at or above 100 bps, or an absolute change in the historical PD of 10 bps or more when the initial PD was below 100 bps.

One thing to note is that in the initial phase of a company - 6 months or even longer after its IPO - the data availability and quality are relatively low due to, for example, the delay in the issuance of FSes or illiquid trading. As observed in our data, replacing the missing values during this period with a sector median sometimes results in extreme spikes and falls in the company's PD. These extreme values are not easily detected, because in the beginning of a company's history, there are not many previous PD values to compare to as can be done later in the company's history. In order to avoid this, as of the 2015 January calibration, we set the

rule to start treating the missing values only from the month when both the DTD level and trend are available and finite. By doing so, we make the PDs in the beginning of a company's history more reflective of its true credit quality.

Inclusion/exclusion of companies for calibration: Firms are included within an economy for calibration when the primary listing of the firm is on an exchange in the economy. This ensures that all firms within the economy are subject to the same disclosure and accounting rules. There are a relatively small number of firms that are listed in multiple economies. For example, Bank of China Ltd is listed both in Hong Kong Stock Exchange and China's Shanghai Stock Exchange. Based on Bloomberg's classification of its primary listing, Bank of China Ltd is assigned to the calibration group of Asia-Pacific rather than China.

In the US, firms traded on the OTC markets or the Pink Sheets are not considered as exchange listed so are not included in calibration or in the reporting of PD forecasts. Many of these firms are small or start-up firms. Including this large group of companies would skew the calibration and the aggregate results. The TSX Venture Exchange in Canada also contains only small and start-up firms, so firms listed here are also excluded.

Other exclusions include Taiwan's Taipei Exchange, Vietnam's Hanoi UPCoM, Switzerland's OTC-X BEKB, Brazil's Soma and Romania's RASDAQ. To identify the smaller markets outside of the US and Canada is challenging due to data availability. However, continuing work is being done in the CRI system to exclude firms that are not listed on major exchanges within a country.

3.2 Distance-to-Default Computation

The DTD computation used in the CRI system is not a standard one. Standard computations exclude financial firms, which is of course a critical part of any economy. Thus, the standard DTD computation must be extended to give meaningful estimates for financial firms as well. Duan and Wang [2012] have provided a review of different DTD calculations with several examples for financial and non-financial firms.

The description of the specialized DTD computation starts with a brief description of the Merton [1974] model. Merton's model makes the simplifying assumption that firms are financed by equity and a single zero-coupon bond with maturity date T and principal L . The asset value of the firm V_t follows a geometric Brownian motion:

$$dV_t = \mu V_t dt + \sigma V_t dB_t. \quad (35)$$

Here, B_t is the standard Brownian motion, μ is the drift of the asset value in the physical measure, and σ is the volatility of the asset value. Following the Merton [1974] model, the probability of the company's default at time T evaluated at time t is $\Pr_t(V_T \leq L)$, from Eq. (35), we can derive $\Pr_t(V_T \leq L) = N(-\text{DTD}_t)$, where DTD at time t is defined as:

$$\text{DTD}_t = \frac{\log\left(\frac{V_t}{L}\right) + \left(\mu - \frac{\sigma^2}{2}\right)(T - t)}{\sigma\sqrt{T - t}}. \quad (36)$$

The standard KMV assumptions given in Crosbie and Bohn [2003] are to set the time to maturity $T - t$ at a value of one year, and the principal of the zero-coupon bond L to a value equal to the firm's current liabilities plus one half of its long-term debt. Here, the current liabilities and long-term debt are taken from the firm's FSES. If the firm is missing the current liabilities field, then various substitutes for this field can be used, as described in Subsection 2.3.

This is a poor assumption of the debt level for financial firms, since they typically have large liabilities, such as deposit accounts, that are neither classified as current liabilities nor

long-term debt. Thus, using these standard assumptions means ignoring a large part of the debt of financial firms.

To properly account for the debt of financial firms, Duan [2010] included a fraction δ of a firm's other liabilities. The other liabilities are defined as the firm's total liabilities minus both the short and long-term debt. The debt level L then becomes the current liabilities plus half of the long-term debt plus the fraction δ multiplied by the other liabilities, so that the debt level is a function of δ . The standard KMV assumptions are then a special case where $\delta = 0$.

The fraction δ can be optimized along with μ and σ in the transformed-data maximum likelihood estimation method developed in Duan [1994, 2000]. As asset value is unobservable, it has to be implied from market equity value. Noted that equity holders receive the excess value of the firm above the principal of the zero-coupon bond and have limited liability, so the equity value at maturity is: $\max(V_T - L, 0)$. This is just a call option payoff on the asset value with a strike value of L . Thus, the Black-Scholes option pricing formula can be used to calculate the equity value at times t before T ,

$$E_t = V_t N(d_+) - e^{-r(T-t)} L N(d_-), \quad (37)$$

where r is the risk-free rate, $N(\cdot)$ is the standard normal cumulative distribution function, and

$$d_{\pm} = \frac{\log\left(\frac{V_t}{L}\right) + \left(r \pm \frac{\sigma^2}{2}\right)(T-t)}{\sigma\sqrt{T-t}}. \quad (38)$$

Then we can express the likelihood function of the observed equity values by viewing the equity values as the transformed data from pricing formula in Eq. (37). It should be noted that the transformation involves the unknown asset volatility. By standard transformation theory, the likelihood of observed equity values must equal the product of the likelihood of the asset values (implied by equity values) and the Jacobian of the inverse transformation (from the equity value back to the asset value). Moreover, following Duan et al. [2012], the firm's market value of assets is standardized by its book value A_t , so that the scaling effect from a major investment or financing by the firm will not distort the time series from which the parameter values are estimated. Thus, the log-likelihood function based on equity prices is:

$$\begin{aligned} \mathcal{L}(\mu, \sigma, \delta) = & -\frac{n-1}{2} \log(2\pi) - \frac{1}{2} \sum_{t=2}^n \log(\sigma^2 h_t) - \sum_{t=2}^n \log\left(\frac{\hat{V}_t(\sigma, \delta)}{A_t}\right) \\ & - \sum_{t=2}^n \log[N(\hat{d}_+(\hat{V}_t(\sigma, \delta), \sigma, \delta))] \\ & - \frac{1}{2\sigma^2} \sum_{t=2}^n \frac{1}{h_t} \left[\log\left(\frac{\hat{V}_t(\sigma, \delta)}{A_t} \times \frac{A_{t-1}}{\hat{V}_{t-1}(\sigma, \delta)}\right) - \left(\mu - \frac{\sigma^2}{2}\right) h_t \right]^2, \end{aligned} \quad (39)$$

where n is the number of days with observations of the equity value in the sample, \hat{V}_t is the implied asset value found by solving Eq. (37), \hat{d}_+ is computed with Eq. (38) using the implied asset value, and h_t is the number of trading days as a fraction of the year between observations $t-1$ and t . Notice that the implied asset value and \hat{d}_+ are dependent on δ by virtue of the dependence of L on δ .

Implementation of DTD computation: The DTD at the end of each month is needed for every firm in order to calibrate the forward intensity model. A moving window, consisting of the last one year of data before each month end is used to compute the month end DTD. Daily market capitalization data based on closing prices is used for the equity value in the implied asset value computation of Eq. (37). If there are fewer than 50 days of valid observations for the DTD input variables (market capitalization, FS variables, and interest rate), the DTD value is set to be missing. An observation is valid if there is positive trading volume that day. If

the trading volume is not available, the observation is assumed to be valid if the value for the market capitalization changes often enough. The precise criterion is as follows: if the market capitalization does not change for three days or more in a row, the first day is taken as a valid observation, and the remaining days with the same value are set to be missing.

A straightforward idea for the DTD computation is to first estimate the three variables μ , σ and δ via maximizing the log-likelihood function (39) over $\sigma \geq 0$ and $0 \leq \delta \leq 1$, and then to calculate the DTD from Eq. (36). Let $(\hat{\mu}, \hat{\sigma}, \hat{\delta})$ be an optimal solution to the maximization problem. By direct calculation, it is not hard to see that

$$\hat{\mu} = \frac{\hat{\sigma}^2}{2} + \frac{1}{\sum_{t=2}^n h_t} \log \left(\frac{\hat{V}_n(\hat{\sigma}, \hat{\delta})}{A_n} \times \frac{A_1}{\hat{V}_1(\hat{\sigma}, \hat{\delta})} \right). \quad (40)$$

In view of this, maximizing the three-dimensional function $\mathcal{L}(\mu, \sigma, \delta)$ can be equivalently reduced to maximizing the two-dimensional function $\tilde{\mathcal{L}}(\sigma, \delta)$ taking the form

$$\begin{aligned} \tilde{\mathcal{L}}(\sigma, \delta) = & -\frac{n-1}{2} \log(2\pi) - \frac{1}{2} \sum_{t=2}^n \log(\sigma^2 h_t) - \sum_{t=2}^n \log \left(\frac{\hat{V}_t(\sigma, \delta)}{A_t} \right) \\ & - \sum_{t=2}^n \log N(d_+) - \frac{1}{2\sigma^2} \left\{ \sum_{t=2}^n \frac{1}{h_t} \times \left[\log \left(\frac{\hat{V}_t(\sigma, \delta)}{A_t} \times \frac{A_{t-1}}{\hat{V}_{t-1}(\sigma, \delta)} \right) \right]^2 \right. \\ & \left. - \frac{1}{\sum_{t=2}^n h_t} \left[\log \left(\frac{\hat{V}_n(\hat{\sigma}, \hat{\delta})}{A_n} \times \frac{A_1}{\hat{V}_1(\hat{\sigma}, \hat{\delta})} \right) \right]^2 \right\}. \end{aligned} \quad (41)$$

However, with quarterly FSES there will never be more than three changes in the corporate structure (defined in this model by L and A_t) throughout the year, leading to possibly unstable estimates of δ . This problem is mitigated by performing a two-stage optimization for σ and δ .

In the first stage, the maximization of $\tilde{\mathcal{L}}(\sigma, \delta)$ for each firm is performed over both σ and δ . For each firm, at the first month in which DTD can be computed, the maximization is constrained in $\sigma \geq 0$ and $0 \leq \delta \leq 1$. Thereafter, at month n , the maximization is still constrained in $\sigma \geq 0$ while δ is constrained in the interval $[\max(0, \hat{\delta}_{n-1} - 0.05), \min(1, \hat{\delta}_{n-1} + 0.05)]$, where $\hat{\delta}_{n-1}$ is the estimate of δ made in the previous month. In other words, a 10% band around the previous estimate of δ (where that band is floored with 0 and capped with 1) is applied so that the estimates do not fluctuate too much from month to month.

However, for many firms, the estimate of δ would frequently lie on the boundary of the constraining interval, meaning that the estimates of δ were not stable. Therefore, a second stage is implemented to impose greater stability. Within the same calibration group, all firms in the same sector (Bloomberg 10-industry sectors classification) are assumed to share the same estimate of δ , chosen to be the average of all its individual estimates. However, for some small economies, especially in their early years, the average of δ is still observed to be not stable due to some sector or even the whole calibration group has only few individual estimates of δ . To well handle such cases, a threshold rule at each time of estimation is applied under the following conditions: a) If a sector has fewer than 10 individual estimates, the shared estimate of δ will be set to the average of whole calibration group instead of the sector average; b) furthermore, if the whole calibration group still has fewer than 10 individual estimates, the shared estimate of δ is deemed not available. Accordingly, with δ being fixed to be the sector average on the calibration group level, the original maximization of $\tilde{\mathcal{L}}(\sigma, \delta)$ is reduced to a one-dimensional maximization in σ for each firm.

Since the first stage is done to obtain a stable sector-average estimate of δ , the criteria used to include a firm-month is more strict. In the first stage, a two-year window of FS variables, market capitalization, and interest rate is used instead of one year, and a minimum of 250 days of valid observations of the DTD input variables are required instead of 50. If a firm has

less than 250 days of valid observations within the last two years of a particular month end, δ will not be estimated for that firm and that month end.

It was found that after applying the two-stage procedure described above, the estimate of μ was frequently unstable and could lower the explanatory power of DTD. For example, suppose a firm has a large drop in its implied asset value in January 2011, so that the estimated μ is negative for the DTD calculation at the end of December 2011. If there is little change in the company in January 2012, then the drop in implied asset value in January 2011 is no longer within the observation window for the DTD calculation at the end of January 2012. There will be a large increase in the estimated μ , resulting in a substantial improvement of the DTD just because of the moving observation window. To avoid this problem, we now set μ to be equal to $\sigma^2/2$. So in calculating DTD, the second term in the numerator of Eq. (36) is eliminated.

In summary, the DTD for each firm is computed using the sector average within a calibration group for δ in that month, and the estimate of σ based on the last year of data for the firm.

Carrying out this two-stage procedure would take about 70 hours of computation time on a single PC, given the millions of firm months that are required. However, each of the stages is parallelizable. In the first stage, the DTD can be computed independently between firms. In the second stage, once the sector averages of the δ have been computed for each month, the DTD can again be computed independently between firms. In the current CRI system, by using the NUS' high-performance computing facility, the DTD computational time has been greatly reduced thanks to the application of parallel computing.

3.3 Calibration

Implementation: As shown in Section 1, the calibration of the forward intensity model involves multiple maximum pseudo-likelihood estimations, where the pseudo-likelihood functions are given in Eq. (13). The maximizations are on the logarithm of these expressions, and the default parameters' maximization is performed independently from the non-default exit parameters. Parameter estimates for the entire horizon up to five years for the default and non-default exits can be obtained directly from the NS function.

A few input variables have an unambiguous effect on a firm's probability of default. Increments of both the level and trend of DTD, CASH/TA, and NI/TA should indicate that a firm is becoming more creditworthy and should lead to a decreasing PD. For large and relatively clean data sets such as the US, an unconstrained optimization leads to parameter values which mostly have the expected sign. For each of the DTD level and trend, CASH/TA level and trend, and NI/TA level, the default parameters at all horizons are negative. A negative default parameter at a horizon means that if the variable increases, the forward intensity will decrease (based on Eq. (6)), so that the conditional default probability at that horizon will decrease.

Grouping for economies: There are not enough defaults in some small economies and calibrations of these individual economies are not statistically meaningful. In order to ensure that there are enough defaults for calibration, the 78 economies are categorized into groups according to similarities in their stage of development and their geographic locations. Within these groups, the economies are combined and calibrated together.

As of January 2015, Canada and the US remain in the North America calibration group, and the developed economies of Asia-Pacific (Australia, Hong Kong, Japan, Singapore, South Korea, Taiwan and New Zealand) form another calibration group. China and India, the two major emerging economies of Asia Pacific are each calibrated as individual groups. All the European countries covered by the CRI are in a single calibration group, which now includes Bosnia and Herzegovina, Serbia and Montenegro. The other emerging economies of Asia Pacific, Latin America, Middle-East, and Africa form the "emerging markets" calibration group,

which now includes Bangladesh, Oman, Jamaica, and Tunisia. Detailed grouping can be found in Table A.4.

All economies in the same calibration group share the same coefficients for all variables except for the 3-month interest rate variable. The 3-month interest rate variable is entered as the current value minus the historical month-end mean in order to reflect the contemporary change relative to the historical average. Its coefficient is allowed to vary, because different economies with different currencies have different dependencies on their interest rates, the levels of which can also differ significantly across economies.

We allow for a unique coefficient on the interest rate variable for each economy. However, certain treatments and exceptions apply due to various reasons. For New Zealand, it does not have enough default events to identify a separate coefficient. In this case, the actual interest rates are replaced with zeros throughout the whole time series. This is to disable the effect of interest rate in the particular calibration, but it will not induce bias based on the nature of the demeaned interests. For the eurozone economies, all of them use the demeaned Germany's 3-month Bubill rate after the respective dates they joined the eurozone. This aims to reflect more of the monetary rather than the sovereign credit conditions in those economies. Before joining the eurozone, the interest rate variable is set to be 0 for each of those economies except Germany, because none of them has enough default events before that date. Among the non-eurozone economies, Denmark, Norway, Sweden, and UK have their own respective coefficients on the interest rate variable, but Iceland, Switzerland along with all the others share the same one. In the Emerging Markets group, only Indonesia, Malaysia, the Philippines, and Thailand have their own economy-specific coefficients on the interest rate variable. The Latin American subgroup has a universal coefficient for all the member economies, and all the others in the Emerging Markets group share their coefficient.

One thing to note is that in addition to the unique coefficient on the interest rate variable, Indonesia also has its own coefficient for the relative size level as of October 2013.

Relative size: For the calibration data set, the median market cap of firms in an economy for each month end includes the market cap from the last trading day of each firm in the month. If a firm does not trade in a particular month, the firms market cap is not included in the median. For certain economies, many firms are illiquid and the median market cap experiences large variations due to the change in composition of firms rather than the market value of the firms. Another problem is data quality at the beginning of the historical sample: if a data provider starts including the market cap for a large number of firms in one month compared to the previous, there can be a large jump in the median market cap.

To avoid this problem, we use a combination of the economy's stock index and the economy's median market cap as the divisor in the Relative Size variable:

1. We choose a recent month where there is a more complete set of firms in the economy that have trading activity, and calculate the ratio of the economy's median market cap to stock index value at the end of the month.
2. For each month, the divisor for the Relative Size variable of firms in the economy is taken as the month end stock index multiplied by that ratio.

3.4 Daily Output

Individual firms' PD: In computing the pseudo-log-likelihood functions in Eq. (13), only the end of month data is needed. The data needs to be extended to daily values in order to produce daily PDs.

For the level variables, the last 12 end-of-month observations (before averaging) are combined with the current value. The current value is scaled by a fraction equal to the current day of the month divided by the number of calendar days in the month. The earliest monthly

value is scaled by one minus this fraction. The sum is then divided by the number of valid monthly observations, with the current value and the earliest monthly value jointly having the weight of one observation if either or both are not missing. Not performing this scaling can lead to an artificial jump in PD at the beginning of the month. When performing the scaling, the change in level is more gradual throughout the month.

SIGMA is computed by regressing the daily returns of the firm's market capitalization against the daily returns of the economy's stock index for the previous 250 days.

Aggregating PDs: The CRI provides term structures of the probability distributions for the number of defaults as well as the expected number of defaults for different groups of firms. The companies are grouped by economy (using each firm's country of domicile), by sector (using the firm's Bloomberg industrial sector code) and sectors within economies.

To compute the probability distribution of the number of defaults, we use an algorithm which was originally reported in Anderson et al. [2003]. It assumes conditional independence and uses a fast recursive scheme to compute the necessary probability distribution. With the individual firms' PDs, the expected number of defaults is trivial to compute and is simply the sum of the individual PDs within each group. Note that while this algorithm is currently used to produce the probability distribution of the number of defaults within an economy or sector, it can easily be generalized to compute loss distributions for a portfolio manager, in which case the portfolio's exposure to each firm should be aggregated.

As of 8th July 2014, the display of the aggregate PDs on the RMI-CRI website started to adopt the simple median of the individual PDs within each group. This change will mitigate the effect from extreme outliers and synchronize with the aggregate display of the newly launched AS. It should be noted that the aggregate PDs using mean values are still accessible through the data downloading section on the website.

Inclusion of firms in aggregation: As explained in Subsection 3.1, firms are included in an economy for calibration if the firms' primary listing is on an exchange in that economy. This is to ensure that all firms in an economy are subject to the same disclosure and accounting requirements. In contrast, a firm is included in an economy's aggregate results if the firm is domiciled in that economy. This is because users typically associate firms with their economy of domicile rather than the economy where their primary listing is, if they are different. For example, the Bank of China has its primary listing in Hong Kong, but its economy of domicile is China so the Bank of China is included in the aggregation forecasts for China, and is included under China when searching for the individual PDs.

Treatment of companies after a default event: When a company experiences a default event, the CRI system discontinues the PD calculation for that company. However, if the company resumes operations after some time, it will be treated as a new company, and we continue to generate PD. The new company's PDs are not affected by the FS or market cap data prior to the event. So, the PDs calculated are independent of the PDs that were generated before the default event. On our website, the PDs are however displayed on a single graph for the convenience of our users.

4 Empirical Analysis

This section presents an empirical analysis of the CRI outputs for the 78 economies with their own exchange that are currently being covered. In Subsection 4.1, an overview is given of the default parameter estimates. Subsection 4.2 explains and provides the accuracy ratios for the different countries under the CRI coverage.

4.1 Parameter Estimates

With 60 months of forecast horizons, 13 variables and 6 different groups of economies, tables of the parameter estimates occupy over 20 pages and are not included in this Technical Report. In Figs. B.1 and B.2, the parameter estimates are from calibrations performed in March 2017 using data up until the end of February 2017. As an example, plots of the default parameters for the US are given in Figs. B.1 and B.2 in Appendix B. In this part, a brief overview is given of the general traits and patterns seen in the default parameter estimations of the economies covered by the CRI.

Recall that if a default parameter for a variable at a particular horizon is estimated to be positive (negative) from the maximum pseudo-likelihood estimate, then an increasing value in the associated variable will lead to an increasing (decreasing) value of the forward intensity at that horizon, which in turn means an increasing (decreasing) value for the conditional default probability at that horizon.

For the stock index one-year trailing return variable, most groups have default parameters that are slightly negative in the shorter horizons and then become positive in the longer horizons. When the equity market performs well, this is only a short-term positive for firms and in the longer term, firms are actually more likely to default. This seemingly counterintuitive result could be due to correlation between the market index and other firm-specific variables. For example, Duffie et al. [2009] suggested that a firm's DTD can overstate its creditworthiness after a strong bull market. If this is the case, then the stock index return serves as a correction to the DTD levels at these points in time.

As expected we observe a different relationship between the short-term interest rate and default across economies. This observation possibly indicates different lead-lag relationships between credit conditions and the raising and cutting of short-term interest rates.

DTD is a measure of the volatility-adjusted leverage of a firm. Low or negative DTD indicates high leverage and high DTD indicates low leverage. Therefore, PD would be expected to increase with decreasing DTD. Indeed, the DTD level has negative default parameters across calibration groups.

The ratio of the sum of cash and short-term investments to total assets (CASH/TA) measures liquidity of a firm. This indicates the availability of a firm's funds and its ability to make interest and principal payments. For almost all economies, the default parameters for CASH/TA level in shorter horizons are significantly negative. The magnitude of the default parameters typically decreases for longer horizons, indicating that CASH/TA level is a better indicator of a firm's ability to make payments in the short term than the long term.

The ratio of net income to total assets (NI/TA) measures profitability of a firm. The relationship between PD and NI/TA is as expected: the default parameters for NI/TA level is negative for all economies and all horizons.

The logarithm of the market capitalization of a firm over the median market capitalization of firms within the economy (SIZE) does not have a consistent effect on PD across different economies. For example, in the US the default parameters for SIZE level are positive for almost all horizons, suggesting that the complexity of larger firms outweighs the potential benefits, such as diversified business lines and funding sources. On the other hand, in China the default parameters for SIZE level are negative across almost all horizons. These differences may reflect differences in the business environments in the respective economies.

The default parameters associated with DTD Trend, CASH/TA Trend, SIZE Trend and NI/TA Trend are negative across almost all economies and horizons. The trend variables reflect momentum. The momentum effect is a short-term effect, and evidence of this is seen in the lower magnitude of the default parameters at longer horizons than at shorter horizons. The exception is the NI/TA Trend, which for some calibration groups has a higher magnitude at longer horizons.

The ratio of the sum of market capitalization and total liabilities to total assets (M/B) can either indicate the market mis-valuation effect or the future growth effect. This default parameter is negative for the US in the shorter term, indicating that higher M/B implies lower PD, and the future growth effect dominates during this period. On the other hand, in China and in the Developed Asia-Pacific calibration group, the default parameter for M/B is positive, indicating that for these economies, the market mis-valuation effect dominates.

Shumway [2001] argued that a high level of the idiosyncratic volatility (SIGMA) indicates highly variable stock returns relative to the market index, which is equivalent to highly variable cash flows. Empirically, the sign on SIGMA is different across countries and across prediction horizons.

4.2 Prediction Accuracy

In-sample testing: Various tests are carried out to test the prediction accuracy of the RMI-CRI PD forecasts. These tests are conducted in-sample.

A single calibration is conducted for the in-sample tests, using data to the end of the data sample. As an example, one-year PD forecasts are made for 31 December, 2000 by using the data at or before 31 December, 2000 and the parameters from the calibration. These PD forecasts can be compared to actual defaults that occurred at any time in 2001.

Accuracy ratio: The accuracy ratio (AR) is one of the most popular and meaningful tests of the discriminatory power of a rating system (BCBS, 2005). The AR and the equivalent Area Under the Receiver Operating Characteristic (AUROC) are described in Duan and Shrestha [2011]. In short, if defaulting firms had been assigned among the highest PD of all firms before they defaulted, then the model has discriminated well between safe and distressed firms. This leads to higher values of AR and AUROC. The range of possible AR values is in $[0,1]$, where 0 is a completely random rating system and 1 is a perfect rating system. The range of possible AUROC values is in $[0.5, 1]$. AUROC and AR values are related by: $AR = 2 \times AUROC - 1$.

The AR and AUROC values for different horizons are available in Table B.1 of this technical report. Only economies with more than 20 defaults entering into the AR and AUROC computation are listed.

The AUROC values have been provided only for the purpose of comparison, if other rating systems report their results in terms of AUROC. The discussion will focus only on AR. The model is able to achieve strong AR results mostly greater than 0.80 at the one and six-month horizons for developed economies. There is a drop in AR at one and two-year horizons, but the AR are still mostly acceptable.

The AR in some emerging market economies such as China, India, Indonesia, and the Philippines are noticeably weaker than the results in the developed economies. This can be due to a number of issues. The quality of data is worse in emerging markets, in terms of availability and data errors. This may be due to lower reporting and auditing standards. Also, variable selection is likely to play a more important role in emerging markets. The variables were selected based on the predictive power in the US. Performing variable selections specific to the calibration group are expected to improve predictive accuracy, especially in emerging market economies. Finally, there could be structural differences in how defaults and bankruptcies occur in emerging market economies. If the judicial system is weak and there are no repercussions for default, firms may be less reluctant to default.

Aggregate defaults: The time series of aggregate predicted number of defaults and actual number of defaults in each calibration group are also available in Fig. B.3 to B.8. For India in particular, these figures show that there is room for improvement in the predictive power of the model.

5 Corporate Vulnerability Index

In July 2012, CRI launched the Corporate Vulnerability Index (CVI), which is a new suite of indices to produce bottom-up measures of credit risk in economies, regions and portfolios of special interest. The suite of CVIs is available in three distinctive types:

1. Value-weighted CVI (CVI_{vw}) RMI-CRI PDs are aggregated with each firm weighted by its market capitalization so that the size of each firm is taken into account.
2. Equally-weighted CVI (CVI_{ew}) RMI-CRI PDs are aggregated with each firm equally weighted. This captures the prevalence of credit risk by focusing on the number of firms at risk.
3. Tail CVI (CVI_{tail}) In taking the 5th percentile of the highest RMI-CRI PDs, the most vulnerable firms in a group are measured.

The CVIs are a set of indicators that gauge economic and financial environments in a new dimension. They are best viewed as stress indicators that reflect heightened credit risks in the corporate sector from three different angles.

Index Construction The primary inputs to the CVI are RMI-CRI 1-year PDs for individual exchange-listed firms.

- Value-weighted CVI (CVI_{vw}) CVI_{vw} is an aggregation of individual PDs weighted by each firm's market capitalization. In other words, at time t , given an interested group or portfolio G ,

$$CVI_{vw}(t) = \sum_{i=1}^I \omega_{it} p_i(t, 12),$$

where $p_i(t, 12)$ is firm i 's default probability within 12 months viewed from t , $i \in \{1, 2, \dots, I\}$. Also, the weight for firm i at time t is ω_{it} , and $\omega_{it} = \frac{MC_{it}}{\sum_{i=1}^I MC_{it}}$, in which,

MC_{it} is firm i 's market capitalization at time t . If a firm does not trade on a particular day, the market capitalization from the previous valid day (within 20 trading days) is used. The market-capitalization weighting is applied to all economies and groups of economies, but is not applied to portfolios such as the S&P 500 index. The S&P 500 index is a float-adjusted index where the shares available to investors are used instead of the total shares outstanding, and our weighting scheme of $CVI_{vw}(SPP)$ is consistent with the S&P 500 index.

- Equally-weighted CVI (CVI_{ew}) The equally-weighted CVI is computed by aggregating each firm's PD with equal weights applied to each firm. In other words,

$$CVI_{ew} = \frac{1}{I} \sum_{i=1}^I p_i(t, 12).$$

- Tail CVI (CVI_{tail}) The tail CVI provides a measure of the relatively more distressed firms in a group. It is the highest 5th percentile of PDs. The tail CVI can also be interpreted as the conditional median of the 10 percent tail, which is a more robust measure of "tail average" than the conditional mean of the 10 percent tail.

Inclusion of Firms A firm's PD is computed with the model parameters from its primary exchange. The construction of CVI, however, is based on the firm's country of domicile. In regions like the eurozone, some of the public holidays do not coincide. In this case, the aggregation is computed by using PDs from the previous trading day for firms that are listed in

countries that have a public holiday, and PDs from the current trading day for firms that are listed in countries that do not have a public holiday. And firms are included in the eurozone CVI only if their countries of domicile are part of the eurozone at time t . For CVI of the S&P 500 portfolio, the constituents typically coincide with the constituents of the S&P 500 index for each point in time, and missing any PD value for a company in the S&P 500 is filled in with the most recently available PD.

6 Actuarial Spread

In July 2014, CRI launched a new credit risk measure, the Actuarial Spread (AS), which are the counterparts of market credit default swap (CDS) with contract horizons ranging from 1 year to 5 years but valued based on RMI-CRI's PDs in the forward horizons. Since then, the computation and publication of the AS have been implemented on a daily basis in addition to those of the PDs. Much like the par spread in a standard credit default swap (CDS) contract, the AS leverages the term structure of the physical PDs of the CRI and is essentially the premium rate that purely reflects the actuarial present value of a default protection. It provides a new metric of credit risk that the financial practitioners are more familiar with.

The construction of the AS relies on the features of a standard CDS contract. To fulfill a CDS contract, the protection buyer pays premiums on a regular basis to the seller until the contract matures or the reference entity defaults. In exchange, the protection buyer receives at the default time a contingent lump sum payment, the amount of which is based on the recovery rate on the reference instrument. Such a CDS contract terminates on its maturity date if there is no default up to its maturity; otherwise, it ceases on a default day, if any. Note that, if a default occurs during a payment period, the premium for the protection from the first accrual day to the default day is also assumed to be paid by the CDS buyer on the default day. Considering no effect from the market liquidity and using the physical PDs that CRI generates, the AS is calculated in a way that the expected present value of the contingent claim upon default is equal to the expected present value of the series of premiums up until the stop of a CDS contract. To familiarize the details of its theoretical formulation, please refer to Duan [2014]. As opposed to the continuous model introduced in Duan [2014], this technical report provides a discrete representation of the model for implementation purpose. For easy comparison, it adopts the same notations in the journal article as much as it possibly can.

A typical CDS contract adopts one day as the fundamental period of time. For this, we abbreviate the interval $((d-1) \cdot \Delta t, d \cdot \Delta t]$ in a forward time axis by the term day $d \in \mathbb{N}$ where $\Delta t = 1/365$ reflects the 365 day count convention. Consider t is the trading day of a CDS contract terminating on the day $T > t$. If the reference entity defaults at on a random day τ where $t+1 \leq \tau \leq T$, he will in return get a lump sum payment, which is 1 minus the recovery rate R_τ , from a unit-notional CDS and cease to make the scheduled payment beyond the default point. We assume the premiums are scheduled to be paid on the days t_1, t_2, \dots, t_k with $t_k = T$, where each payment period is roughly three months. Note that a payment day t_{i-1} is also the first day of the coming accrual period, which ends on the day before next payment day, denoted and defined by $t'_i = t_i - 1$. However, a trading day t may also occur after a payment day, say t_{i-1} , and we denote the exact start date of its remaining accrual period by $t_{i-1} \vee (t+1) = \max\{t_{i-1}, t+1\}$ for a general purpose.

Another actual/360 day count convention is usually adopted to define the length in year of an accrual period, for which we denote $A(s, q)$ the period length in year from the day s to the day $q > s$ (both inclusive). For example, if a quarterly accrual period from t_{i-1} to t'_i (both inclusive) has 91 days, then $A(t_{i-1}, t'_i) = 91/360$ is applicable.

Compared to the risk-neutral probability measure used in the CDS pricing, the AS is essen-

tially its counterpart based on a physical probability measure P . We denote it by $S_t^{(a)}(T - t)$ with its days to maturity $(T - t)$. Following the assumption that there is no arbitrage for CDS buyer and seller, the AS is defined to satisfy the equation:

$$\begin{aligned} & E_t^P \left[(1 - R_\tau) D_t(\tau - t) \cdot \mathbb{1}_{\{t < \tau \leq t'_k\}} \right] \\ = & S_t^{(a)}(T - t) \sum_{i=1}^k \left\{ A(t_{i-1} \vee (t + 1), t'_i) \cdot E_t^P \left[D_t(t_i - t) \cdot \mathbb{1}_{\{t'_i < \tau\}} \right] \right. \\ & \left. + E_t^P \left[A(t_{i-1} \vee (t + 1), \tau) \cdot D_t(\tau - t) \cdot \mathbb{1}_{\{t'_{i-1} < \tau \leq t'_i\}} \right] \right\}, \end{aligned}$$

where E_t^P is an expectation operator with respect to the physical probability measure P , τ refers to the random default day, $D_t(\tau - t)$ is the random money market discount factor starting from the day t to another day τ and k is the number of the CDS premium payments.

The real-time LIBOR rates up to one year and Swap rates beyond are generally available from the market. With the combination, one can bootstrap the implied LIBOR rates beyond one year. As the AS is calculated based on days, a linear interpolation is further performed to obtain the implied LIBOR rates up to each forward day (in continuously compounded annualized form), which then serve the role of the discount factor $D_t(\cdot)$. Let $r_t(s, q)$ be the day- t risk-free annualized forward discount rate between the day $t + s$ and the day $t + q$ (both inclusive) with $q \geq s \geq 1$. In particular, $r_t(1, q)$ refers to the day- t risk-free spot discount rate covering the days $t + 1, \dots, t + q$. The standard term structure theory implies that

$$r_t(1, q) = -\frac{1}{q} \ln \left(E_t^P [D_t(q)] \right).$$

Further we let $r_t(q, q) = r_t(1, q) \cdot q - r_t(1, q - 1) \cdot (q - 1)$ for $q \geq 2$, which refers to the day- t instantaneous forward rate for the day $t + q$. As will be seen later, defining $r_t(s, q)$ this way is to make it consistent with the definition of the forward default/other exit intensity in terms of the day count convention. With the RMI-CRI PDs serving as the physical probability measure P and the use of a standard recovery rate of $\bar{R}_t = 40\%$, the AS is rewritten as

$$\begin{aligned} S_t^{(a)}(T - t) = & \frac{(1 - \bar{R}_t) \cdot E_t^P \left[e^{-r_t(1, \tau - t)(\tau - t)/365} \cdot \mathbb{1}_{\{t < \tau \leq t'_k\}} \right]}{\sum_{i=1}^k \left\{ A(t_{i-1} \vee (t + 1), t'_i) \cdot e^{-r_t(1, t_i - t)(t_i - t)/365} \cdot E_t^P \left[\mathbb{1}_{\{t'_i < \tau\}} \right] + E_t^P \left[A(t_{i-1} \vee (t + 1), \tau) \right] \cdot e^{-r_t(1, \tau - t)(\tau - t)/365} \cdot \mathbb{1}_{\{t'_{i-1} < \tau \leq t'_i\}} \right\}}, \quad (42) \end{aligned}$$

where the actual/365 day count convention is used for the discount factor and integration.

To obtain the physical probability of defaults and their term structures, we apply CRI's forward intensity model. Define $f_t(u)$ to be the day- t forward default intensity over the day $t + u$, which will be used to calculate the probability of default of a firm conditioning on its survival up to the day $t + (u - 1)$. The forward intensity for other exits, or $h_t(u)$, can be similarly defined. These two intensities are expressed as exponential linear functions of 13 covariates, including an intercept term, 2 macroeconomic variables and 10 firm-specific variables, in the form of

$$f_t(u) = \exp\{\alpha_0(u) + \alpha_1(u)x_{1,t} + \dots + \alpha_{12}(u)x_{12,t}\},$$

and

$$h_t(u) = \exp\{\beta_0(u) + \beta_1(u)x_{1,t} + \dots + \beta_{12}(u)x_{12,t}\}.$$

The coefficients $\alpha_i(u)$ and $\beta_i(u)$ are functions of forward starting time, which are further modelled by Nelson-Siegel term structure functions, such as

$$\alpha_i(u; q_{i,0}, q_{i,1}, q_{i,2}, d_i) = q_{i,0} + q_{i,1} \frac{1 - \exp(-u\Delta t/d_i)}{u\Delta t/d_i} + q_{i,2} \left[\frac{1 - \exp(-u\Delta t/d_i)}{u\Delta t/d_i} - \exp(-u\Delta t/d_i) \right], \quad (43)$$

for $i = 0, 1, 2, \dots, 12$. Recall that, except for the intercept terms $\alpha_0(u)$ and $\beta_0(u)$, the other covariates are stochastic and their long-term levels are restricted to zeros; namely, $\varrho_{i,0} = 0$ for $i = 1, 2, \dots, 12$. With $f_t(u)$ and $h_t(u)$ in place, we are ready to define $\psi_t(s, q) = \frac{\sum_{u=s}^q [f_t(u) + h_t(u)]}{q - (s-1)}$, for $q \geq s \geq 1$, which is a standardized forward termination intensity covering the days $t + s, \dots, t + q$.

One important feature of the CDS is that when the reference entity ceases to exist due to reasons other than default, such as mergers and acquisitions, the CDS protection is typically shifted to the merged or acquiring entity. Naturally, we should take into account the fact that the successor entity will then face subsequent default or other exits. There indeed are a number of ways to model the relationship between the termination probability of the reference entity and the successor entity (see [Duan, 2014]). In CRI's implementation, we further assume that the successor has the forward default and other exit intensities identical to those of the original reference entity.

Let $P_t(s, q; r_t(1, u), s \leq u \leq q)$ denote the day- t discounted forward probability of the reference entity of the CDS being terminated, including successions, over the days $t + s, \dots, t + q$. Under the assumptions above, Duan [2014] has derived its analytical solution, which can be re-written in the discrete form below

$$P_t(s, q; r_t(1, v), s \leq v \leq q) = \sum_{v=s}^q e^{-\sum_{u=s}^v [r_t(u, u) + f_t(u)] \Delta t} f_t(v) \Delta t. \quad (44)$$

By temporarily setting the forward interest rate to 0 in Eq. (44), the first term of denominator in Eq. (42) can be presented in the form of

$$E_t^P(1_{\{t'_i < \tau\}}) = 1 - P_t(1, t'_i - t; r_t(1, u) = 0 \text{ for } 1 \leq u \leq t'_i - t). \quad (45)$$

The solutions to the two remaining two terms of Eq. (42) can be expressed as

$$\begin{aligned} & E_t^P \left[e^{-r_t(1, \tau-t)(\tau-t)/365} \cdot \mathbb{1}_{\{t < \tau \leq t'_k\}} \right] \\ = & \sum_{q=1}^{t'_k-t} e^{-[r_t(1, q) + \psi_t(1, q)] \cdot (q/365)} \cdot f_t(q) \cdot \Delta t \\ & + \sum_{q=1}^{t'_k-t} e^{-[r_t(1, q) + \psi_t(1, q)] \cdot (q/365)} \cdot h_t(q) \cdot P_t(q, t'_k - t; r_t(1, v), q \leq v \leq t'_k - t) \cdot \Delta t \end{aligned}$$

and

$$\begin{aligned}
& E_t^p [A(t_{i-1} \vee (t+1), \tau)] \cdot e^{-r_t(1, \tau-t)(\tau-t)/365} \cdot \mathbb{1}_{\{t'_{i-1} < \tau \leq t'_i\}} \\
= & \sum_{q=t_{i-1} \vee (t+1)}^{t'_i} A(t_{i-1} \vee (t+1), q) \cdot e^{-[r_t(1, q-t) + \psi_t(1, q-t)] \cdot (q-t)/365} \cdot f_t(q-t) \cdot \Delta t \\
& + \sum_{q=t_{i-1} \vee (t+1)}^{t'_i} A(t_{i-1} \vee (t+1), q) \cdot e^{-[r_t(1, q-t) + \psi_t(1, q-t)] \cdot (q-t)/365} \cdot h_t(q-t) \\
& \cdot P_t(q-t, t'_i - t; r_t(1, v), q-t \leq v \leq t'_i - t) \cdot \Delta t
\end{aligned}$$

With the formulas mentioned above, we compute the AS, or $S_t^{(a)}(T-t)$, and provide it to the public on a daily basis.

7 Ongoing Developments

The CRI can develop a number of directions. We now comment on obvious ones that in our view are likely to bring meaningful and measurable benefits. Besides modifications to the current modeling framework of the forward intensity, a change in modeling platform will be undertaken if another model proves more promising in terms of accuracy and robustness of results. For this type of development, we also rely on the collective efforts by the worldwide credit research community to challenge and improve the existing modeling platform.

Within the current modeling framework, future developments involve, for example, the CRI plans to implement DTD estimations by a novel density-tempered expanding-data sequential Monte Carlo method. Another challenging example includes variable and structural-break selections where Artificial Intelligence automatically identifies time window, crucial risk factors, and breakpoints regarding defaults in a way that we would consider “smart”. Also, we are designing a more comprehensive treatment scheme to handle missing data.

Finally, a series of new applications and tools using the RMI-CRI PDs as an input are currently being developed. More specifically, the CRI is actively working with users and exploring different possibilities of taking advantage of the world-class research infrastructure at the institute to propagate real world applications in credit rating and testing. The CRI has developed a tool for stress testing the financial stability for economies around the world. The CRI has also developed a methodology to address default correlations within a portfolio. The CRI remains committed to making its vast resources available for academic research.

Acknowledgements

The RMI Credit Research Initiative is premised on the concept of credit ratings as a “public good”. Being a non-profit undertaking allows a high level of transparency and collaboration that other commercial credit rating systems cannot replicate. The research and support infrastructure is in place and researchers from around the world are invited to contribute to this initiative. Any methodological improvements that researchers develop will be incorporated into the CRI system. In essence, the initiative operates as a “selective wikipedia” where many can contribute but implementation control is retained.

If you have feedback on this technical report or wish to work with us in this endeavor, please contact us at rmicri@nus.edu.sg.

A APPENDIX: DATA

Table A.1: All countries under the CRI coverage

Region	Economy
Asia Pacific (Developed) (7)	Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Taiwan.
Asia Pacific (Emerging) (15)	Bangladesh, Cambodia, China, India, Indonesia, Kazakhstan, Macau, Malaysia, Mongolia, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam.
North America (4)	Bermuda, Canada, Greenland, United States.
Western Europe (28)	Austria, Belgium, Cyprus, Denmark, Faeroe Islands, Finland, France, Germany, Gibraltar, Greece, Guernsey, Iceland, Ireland, Italy, Isle of Man, Jersey, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, Reunion, Spain, Sweden, Switzerland, United Kingdom.
Eastern Europe (20)	Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey, Ukraine.
Latin America & Caribbean (19)	Argentina, Bahamas, Belize, Brazil, British Virgin Islands, Cayman Islands, Chile, Colombia, Curacao, Dominican Republic, Falkland Islands, Jamaica, Mexico, Peru, Panama, Puerto Rico, Uruguay, U.S. Virgin Islands, Venezuela.
Middle East & Africa (28)	Angola, Bahrain, Cameroon, Egypt, Gabon, Ghana, Iraq, Israel, Jordan, Kuwait, Madagascar, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Niger Republic, Oman, Qatar, Saudi Arabia, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, United Arab Emirates, Zambia.

Table A.2: The 78 countries under the CRI coverage for which we cover companies listed on the exchange.

Region	Economy
Asia Pacific (Developed) (7)	Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, Taiwan.
Asia Pacific (Emerging) (11)	Bangladesh, China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam.
North America (2)	Canada, United States.
Western Europe (20)	Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.
Eastern Europe (18)	Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey, Ukraine.
Latin America & Caribbean (8)	Argentina, Brazil, Colombia, Chile, Jamaica, Mexico, Peru, Venezuela.
Middle East & Africa (12)	Bahrain, Egypt, Israel, Jordan, Kuwait, Morocco, Nigeria, Oman, Saudi Arabia, South Africa, Tunisia, United Arab Emirates.

Table A.3: The 43 countries under the CRI coverage for which we cover companies domiciled in the economy but listed on a foreign exchange included in Table A.2. The gray boxes indicate that these economies also have their own local stock exchange.

Angola	Georgia	Namibia	Uruguay
Azerbaijan	Gibraltar	Niger Republic	
Bahamas	Greenland	Panama	
Belize	Guernsey	Papua New Guinea	
Bermuda	Iraq	Puerto Rico	
British Virgin Islands	Isle of Man	Qatar	
Cambodia	Jersey	Republic of Ghana	
Cameroon	Liechtenstein	Republic of Zambia	
Cayman Islands	Macau	Reunion	
Curacao	Madagascar	Sierra Leone	
Dominican Republic	Mauritius	Sudan	
Faeroe Islands	Monaco	Tanzania	
Falkland Islands	Mongolia	Togolese Republic	
Gabon	Mozambique	United States Virgin Islands	

Table A.4: The ISO codes of 78 economies covered by the CRI and the corresponding calibration groups and stock exchanges.

ISO Code	Economy	Calibration Group	Stock Exchange
ARE	United Arab Emirates	Emerging	Abu Dhabi Securities Exchange Dubai Financial Market National Association of Securities Dealers
ARG	Argentina	Emerging	Buenos Aires Stock Exchange
AUS	Australia	Developed Asia-Pacific	Australian Securities Exchange National Stock Exchange of Australia SIM Venture Securities Exchange
AUT	Austria	Europe	Vienna Stock Exchange
BEL	Belgium	Europe	Brussels Stock Exchange
BGD	Bangladesh	Emerging	Dhaka Stock Exchange
BGR	Bulgaria	Europe	Bulgarian Stock Exchange
BHR	Bahrain	Emerging	Bahrain Stock Exchange
BIH	Bosnia and Herzegovina	Europe	Banja Luka Stock Exchange Sarajevo Stock Exchange
BRA	Brazil	Emerging	BM&FBOVESPA
CAN	Canada	North America	Canadian Securities Exchange TSX Venture Exchange Toronto Stock Exchange
CHE	Switzerland	Europe	Berne Stock Exchange Six Swiss Exchange
CHL	Chile	Emerging	Santiago Stock Exchange
CHN	China	China	Shanghai Stock Exchange Shenzhen Stock Exchange
COL	Colombia	Emerging	Colombia Stock Exchange
CYP	Cyprus	Europe	Cyprus Stock Exchange
CZE	Czech Republic	Europe	Prague Stock Exchange
DEU	Germany	Europe	Berlin Stock Exchange BOAG Borsen AG Dusseldorf Stock Exchange Frankfurt Stock Exchange Munich Stock Exchange Stuttgart Stock Exchange
DNK	Denmark	Europe	Copenhagen Stock Exchange First North Denmark
EGY	Egypt	Emerging	Egyptian Exchange Nile Stock Exchange
ESP	Spain	Europe	Barcelona Stock Exchange Madrid Stock Exchange
EST	Estonia	Europe	Tallinn Stock Exchange
FIN	Finland	Europe	Helsinki Stock Exchange NASDAQ OMX NORDIC
FRA	France	Europe	Euronext Paris
GBR	United Kingdom	Europe	Icap Securities and Derivatives Exchange London International Financial Futures and Options Exchange London Stock Exchange

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Table A.4 – Continued from previous page

ISO Code	Economy	Calibration Group	Stock Exchange
GRC	Greece	Europe	Professional Liability Underwriting Society Market Group Alternative Market of Athens Exchange Athens Stock Exchange
HKG	Hong Kong	Developed Asia-Pacific	Hong Kong Exchanges and Clearing Limited
HRV	Croatia	Europe	Zagreb Stock Exchange
HUN	Hungary	Europe	Budapest Stock Exchange
IDN	Indonesia	Emerging	Indonesian Stock Exchange
IND	India	India	Bombay Stock Exchange MCX Stock Exchange Limited National Stock Exchange of India Limited
IRL	Ireland	Europe	Irish Stock Exchange
ISL	Iceland	Europe	Iceland Stock Exchange
ISR	Israel	Europe	Tel Aviv Stock Exchange
ITA	Italy	Europe	Borsa Italiana S.p.A Hi-Multilateral Trading Facilities Sim S.p.A
JAM	Jamaica	Emerging	Jamaica Stock Exchange
JOR	Jordan	Emerging	Amman Stock Exchange
JPN	Japan	Developed Asia-Pacific	Fukuoka Stock Exchange JASDAQ Securities Exchange Nagoya Stock Exchange Osaka Securities Exchange Sapporo Stock Exchange Tokyo Stock Exchange
KAZ	Kazakhstan	Emerging	Kazakhstan Stock Exchange JSC
KOR	South Korea	Developed Asia-Pacific	Korea New Exchange Korea Stock Exchange Korean Securities Dealers Automated Quotations
KWT	Kuwait	Emerging	Kuwait Stock Exchange
LKA	Sri Lanka	Emerging	Colombo Stock Exchange
LTU	Lithuania	Europe	OMX Vilnius Stock Exchange
LUX	Luxembourg	Europe	Luxembourg Stock Exchange
LVA	Latvia	Europe	OMX Riga Stock Exchange
MAR	Morocco	Emerging	Casablanca Stock Exchange
MEX	Mexico	Emerging	Mexican Stock Exchange
MKD	Macedonia	Europe	Macedonian Stock Exchange Inc.
MLT	Malta	Europe	Malta Stock Exchange
MNE	Montenegro	Europe	Montenegro Stock Exchange
MYS	Malaysia	Emerging	Kuala Lumpur Stock Exchange
NGA	Nigeria	Emerging	Nigerian Stock Exchange
NLD	Netherlands	Europe	Euronext Amsterdam Stock Exchange
NOR	Norway	Europe	Oslo Stock Exchange
NZL	New Zealand	Developed Asia-Pacific	New Zealand Exchange
OMN	Oman	Emerging	Muscat Securities Market
PAK	Pakistan	Emerging	Karachi Stock Exchange Pakistan Stock Exchange

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Table A.4 – Continued from previous page

ISO Code	Economy	Calibration Group	Stock Exchange
PER	Peru	Emerging	Lima Stock Exchange
PHL	Philippines	Emerging	Philippine Stock Exchange
POL	Poland	Europe	Warsaw Stock Exchange
PRT	Portugal	Europe	Euronext Lisbon Stock Exchange
ROM	Romania	Europe	Bucharest Stock Exchange Sibiu Stock Exchange
RUS	Russian Federation	Europe	Moscow Exchange Moscow Interbank Currency Exchange Russian Trading System
SAU	Saudi Arabia	Emerging	Saudi Stock Exchange
SGP	Singapore	Developed Asia-Pacific	Singapore Exchange
SRB	Serbia	Europe	Belgrade Stock Exchange
SVK	Slovakia	Europe	Bratislava Stock Exchange
SVN	Slovenia	Europe	Ljubljana Stock Exchange
SWE	Sweden	Europe	AktieTorget Stock Exchange First North Stockholm Nordic Growth Market Stockholm Stock Exchange
THA	Thailand	Emerging	Stock Exchange of Thailand
TUN	Tunisia	Emerging	Tunis Stock Exchange
TUR	Turkey	Europe	Istanbul Stock Exchange
TWN	Taiwan	Developed Asia-Pacific	Taiwan Stock Exchange
UKR	Ukraine	Europe	First Stock Trading System Russian Trading System Ukraine
USA	United States	North America	NASDAQ Capital Market NASDAQ Global Market NASDAQ Global Select Market New York Stock Exchange NYSE Arca NYSE MKT LLC Bats Stock Exchange
VEN	Venezuela	Emerging	Caracas Stock Exchange
VNM	Vietnam	Emerging	Hanoi Stock Exchange Ho Chi Minh City Stock Exchange
ZAF	South Africa	Emerging	Johannesburg Stock Exchange

The stock exchanges covered by the CRI database are collected from Bloomberg system and labeled as primary exchange.

Table A.5: The stock indices used for each economy in computing the first common variable.

Economy	Stock Index	Period Used*
ARE	FTSE NASDAQ DUB UAE 20	06/28/2006 - Present
ARG	Buenos Aires Stock Exchange Merval Index	
AUS	All Ordinaries Index	
AUT	Austrian Traded ATX Index	
BEL	Belgian Stk Mkt Ret Index	
BGD	DSEX Index	01/28/2013 - Present
	Dhaka Stock Exchange General I	- 01/27/2013
BGR	Bulgaria Stock Exchange Sofix Index	10/24/2000 - Present
BHR	BB All Share Index	07/08/2004 - Present
BIH	SASE Free Market 10 Index	12/31/2004 - Present
BRA	Brazil Bovespa Stock Index	
CAN	S&PTSX Composite Index	
CHE	SPI Swiss Performance Index	
CHL	Santiago Stock Exchange IPSA Index	
CHN	Shanghai SE Composite Index	12/19/1990 - Present
COL	FTSE All World Series Colombia Local	01/01/1999 - Present
CYP	Cyprus Stock Exchange General Index	09/03/2004 - Present
	Cyprus Stock Exchange General	04/02/1996 - 09/02/2004
CZE	Prague Stock Exchange Index	04/05/1994 - Present
DEU	CDAX Performance Index	
DNK	OMX Copenhagen 20 Index	
EGY	EGX 100 Index	05/01/2006 - Present
ESP	IBEX 35 Index	
EST	OMX Tallinn OMXT	06/03/1996 - Present
FIN	OMX Helsinki Index	
FRA	CAC 40 Index	
GBR	FTSE 100 Index	
GRC	Athex Composite Share Price Index	
HKG	Hang Seng Index	
HRV	Croatia Zagreb CROBEX	06/14/2002 - Present
HUN	Budapest Stock Exchange Index	01/02/1991 - Present
IDN	Jakarta Composite Index	
IND	BSE Sensex 30 Index	
IRL	ISEQ Overall Index	
ISL	OMX Iceland All-Share PR	12/31/1992 - Present
ISR	Tel Aviv 100 Index	12/31/1991 - Present
ITA	Italy Stock Market BCI Comit Globale	
JAM	Jamaica Stock Exchange Market Index	
JOR	MSCI Jordan Index	
JPN	Nikkei 500	
KAZ	Kazakhstan Stock Exchange Index KASE	07/12/2000 - Present
KOR	KOSPI Index	
KWT	Kuwait SE Weighted Index	01/02/2012 - Present
	Kuwait Global General Index	- 01/01/2012
LKA	Sri Lanka Colombo Stock Exchange All-Share Index	
LTU	OMX Vilnius OMXV	01/04/2000 - Present
LUX	Luxembourg Stock Exchange Luxx Index	01/04/1999 - 01/04/1999
	Luxembourg Stock Exchange 13 'Dead'	01/02/1998 - 01/03/1999
LVA	OMX Riga OMXR	01/03/2000 - Present
MAR	MASI Free Float All Shares Index	03/31/1995 - Present

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Table A.5 – *Continued from previous page*

Economy	Stock Index	Period Used*
	CFG 25 CFG 25	12/31/1993 - 03/30/1995
MEX	Mexico Bolsa Index	01/19/1994 - Present
MKD	Macedonian Stock Exchange MBI 10	12/30/2004 - Present
MLT	Malta Stock Exchange	12/27/1995 - Present
MNE	Montenegro Stock Exchange Index	01/04/2015 - Present
	Montenegro Stock Exchange 20	03/03/2003 - 03/31/2015
MYS	FTSE Bursa Malaysia KLCI	
NGA	Nigeria Stock Exchange All Share	01/30/1998 - Present
NLD	AEX-Index	
NOR	OBX Price Index	
NZL	NZX All Index	03/30/1992 - Present
OMN	MSM30 Index	03/31/1992 - Present
PAK	Karachi All Share Index	03/11/1998 - Present
PER	S&PBVL Peru General Index TR PEN	01/05/2015 - Present
	Bolsa de Valores de Lima General Sector Index	01/02/1990 - 04/30/2015
PHL	Philippine Stock Exchange Index	
POL	WSE WIG Index	04/16/1991 - Present
PRT	PSI General Index	
ROM	Bucharest BET Plus Index	06/23/2014 - Present
	BSE Composite Index	04/17/1998 - 06/22/2014
RUS	MICEX Index	09/22/1997 - Present
SAU	Tadawul All Share Index	01/31/1994 - Present
SGP	Straits Times Index	1/10/2008 - Present
	Straits Times Old Index	01/04/1985 - 01/09/2008
SRB	BELEXline Index	10/01/2004 - Present
SVK	Slovak Share Index	09/14/1993 - Present
SVN	HSBC Slovenia Dollar	12/29/1995 - Present
SWE	OMX Stockholm All-Share	
THA	Stock Exchange Of Thai Index	
TUN	Tunis SE TUNINDEX	04/30/1999 - Present
TUR	Istanbul Stock Exchange National 100 Index	
TWN	Taiwan Stock Exchange Weighted Index	
UKR	Ukraine PFTS Index	01/12/1998 - Present
USA	S&P 500 Index	
VEN	Caracas Stock Exchange Stock Market Index	12/30/1993 - Present
VNM	Ho Chi Minh Stock Index	07/28/2000 - Present
ZAF	MSCI South Africa Index	12/31/1992 - Present

* A blank Period Used column indicates that there is only a single index that is used throughout the whole period.

Table A.6: The interest rates used for each economy as the second common variable.

Economy	Short-Term Interest Rate	Period Used*
ARE	UAE Ibor 3 Month	05/15/2000 - Present
ARG	Argentina Deposit Tate 90 Day	04/01/1991 - Present
AUS	Australia Dealer Bill 90 Day	
AUT	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
BEL	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
BGD	Bangladesh 3 Month Bill Auction Cut Off Yield	
BGR	Bulgaria Interbank 3 Month	02/17/2003 - Present
BHR	Bahrain Ibor 3 Month	12/14/2006 - Present
BIH	-	
BRA	Andima Brazil Govt Bond Fixed Rate 3 Months	04/03/2000 - Present
	Brazil CDB (Up To 30 Days)	10/10/1994 - 04/02/2000
CAN	Canada Treasury Bill 3 Month	01/02/1990 - Present
CHE	Swiss Interbank 3m (ZRC:SNB)	
CHL	Chile TAB UF Interbank Rate 90 Days	11/02/1992 - Present
CHN	China Time Deposit Rate, 3 Month	05/17/1993 - Present
COL	Colombia CD Rate 90-Day	
CYP	Germany 3 Month Bubill	01/01/2008 - Present
	-	- 12/31/2007
CZE	Czech Republic Interbank 3 Month	04/22/1992 - Present
DEU	Germany 3 Month Bubill	05/25/1993 - Present
	Germany Interbank 3 Month	01/02/1986 - 05/24/1993
DNK	Denmark Interbank 3 Month	
EGY	Egypt 91 Day T-Bill	07/06/2004 - Present
ESP	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
EST	Germany 3 Month Bubill	01/01/2011 - Present
	-	- 12/31/2010
FIN	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
FRA	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
GBR	UK Treasury Bill Tender 3 Month	01/04/1995 - Present
GRC	Germany 3 Month Bubill	01/01/2001 - Present
	-	- 12/31/2000
HKG	Hong Kong Exchange Fund Bill 3 Month	06/10/1991 - Present
HRV	Croatia Zibor Rate 3 Month	06/02/1997 - Present
HUN	Hungary Interbank 3 Month	09/07/1995 - Present
IDN	Indonesia Interbank 3 Months	07/10/2003 - Present
	Indonesia SBI/DISC 90 Day'dead'	- 07/09/2003
IND	India Treasury Bill 3 Month	05/20/2013 - Present
	India T-Bill Secondary 91 Day	01/15/1993 - 05/19/2013
IRL	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
ISL	Iceland Interbank 3 - Month	08/04/1998 - Present
	Iceland 90 - Day Cb Notes	- 08/03/1998
ISR	Israel T-Bill Secondary 3 Mnth	05/30/1995 - Present
ITA	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998

Continued on next page

Table A.6 – Continued from previous page

Economy	Short-Term Interest Rate	Period Used*
JAM	Jamaica 3 Months Repo Rate	07/17/2008 - Present
JOR	Jordanian Dinar Interbank Offered Rate 3 Months	09/20/2006 - Present
	Jordan Re-discount rate	03/12/2001 - 09/19/2006
JPN	Japan Treasury Discount Bills 3 Month	07/10/1992 - Present
	Japan Government Bond Interest Rate - 1 Year	- 07/09/1992
KAZ	Kazakhstan KIBOR/KIBID 90 Days Interbank	09/29/2001 - Present
KOR	Korea Commercial Paper 91d	06/14/1993 - Present
KWT	Kuwait Interbank 3 Month	
LKA	Sri Lanka Treasury Bill 3 Month	
LTU	Germany 3 Month Bubill	01/01/2015 - Present
	-	- 12/31/2014
LUX	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
LVA	Germany 3 Month Bubill	01/01/2014 - Present
	-	- 12/31/2013
MAR	Morocco Deposit Rate 3 Month	06/06/2003 - Present
MEX	Mexico Cetes 2nd Mkt. 90 Day	06/26/1996 - Present
	Mexico CETES 91 Day Avg.Ret.At Auc.	- 06/25/1996
MKD	Macedonia Skibor 3 Months	07/02/2007 - Present
MLT	Germany 3 Month Bubill	01/01/2008 - Present
	-	- 12/31/2007
MNE	-	
MYS	Malaysia Deposit 3 Month	
NGA	Nigeria Interbank Offered Rate 3 Month	01/30/2004 - Present
NLD	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
NOR	Norway Govt Treasury Bills 3 Month	06/27/1995 - Present
	Norway Interbank 3 Month (Effective)	- 06/26/1995
NZL	-	
OMN	OMR 3 Month Deposit	07/16/2002 - Present
PAK	PKR 3 Month Repo	10/29/1999 - Present
PER	Peru Savings Rate	07/01/1991 - Present
PHL	Philippine Treasury Bill 91d	
POL	Poland Interbank 3 Month (EOD)	06/04/1993 - Present
PRT	Germany 3 Month Bubill	01/01/1999 - Present
	-	- 12/31/1998
ROM	Romanian Interbank 3 Month	08/01/1995 - Present
RUS	MosPime 3 Months Rate	04/18/2005 - Present
	Russia Moscow Interbank Non Co	08/14/2000 - 04/17/2005
	Russia Interbank 31 To 90 Day	09/01/1994 - 08/13/2000
SAU	Saudi Interbank 3 Month	
SGP	Monetary Authority of Singapore Benchmark Govt Bill Yield 3 Month	09/20/2013 - Present
	Singapore T-Bill 3 Month	- 09/19/2013
SRB	National Bank of Serbia Belibor 3M Rate (Interbank Rate)	01/28/2005 - Present
SVK	Germany 3 Month Bubill	01/01/2009 - Present
	-	- 12/31/2008
SVN	Germany 3 Month Bubill	01/01/2007 - Present
	-	- 12/31/2006
SWE	Sweden T Bill 3 Month	05/25/1993 - Present
	Sweden Treasury Bill 90 Day	- 05/24/1993
THA	Thailand Bibor Fixings 3 Month	05/30/2002 - Present

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Table A.6 – *Continued from previous page*

Economy	Short-Term Interest Rate	Period Used*
	Thailand Repo 3 Month (BOT)'Dead'	03/11/1994 - 05/29/2002
TUN	Tu Policy Rates: TMM (Avg.)	12/15/1994 - Present
TUR	Turkish Interbank 3 Month	08/01/2002 - Present
TWN	Taiwan Money Market 90 Day	
UKR	Ukraine Interbank 3 Months	03/01/2001 - Present
USA	US Generic Govt 3 Month Yield	
VEN	Venezuela 90 Day Deposit Rate	01/10/1997 - Present
	Venezuela Overnight	11/28/1994 - 01/09/1997
VNM	Vietnam Interbank 3 Month	12/11/1998 - Present
ZAF	SA T-Bill 91 Days (Tender Rates)	

* A blank Period Used column indicates that there is only a single interest rate that is used throughout the whole period.

Table A.7: The interest rates used for each economy in the DTD calculation.

Economy	Interest Rate Name	Period Used*
ARE	UAE IBOR 1 Year	05/15/2000 - Present
ARG	Argentina Deposit 90 Day (PA.)	04/01/1991 - Present
AUS	Australia Govt Bonds Generic Mid Yield 1 Year	
AUT	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Austria VIBOR 12 Month	06/10/1991 - 12/31/1998
BEL	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Belgium Treasury Bill 1 Year	04/02/1991 - 12/31/1998
BGD	Bangladesh 12 Month Bill Auction Cut Off Yield	
BGR	Bulgaria Interbank 3 Month	02/17/2003 - Present
BHR	Bahrain IBOR 1 Year	12/14/2006 - Present
BIH	BP Real Interest Rate (%) NADJ	06/30/1998 - Present
BRA	Andima Brazil Govt Bond Fixed Rate 1 Year	04/03/2000 - Present
	Brazil CDB (Up To 30 Days)	10/10/1994 - 04/02/2000
CAN	Canada Treasury Bill 1 Year	01/02/1990 - Present
CHE	Swiss Interbank 1 Year (ZRC:SNB)	
CHL	Chile Tab UF Interbank Rates 360 Days	08/01/1996 - Present
	Chile Tab UF Interbank Rate 90 Days	11/02/1992 - 07/31/1996
CHN	China Household Savings Deposits 1 Year Rate	01/02/1992 - Present
COL	Colombia Government Generic Bond 1 Year Yield	01/03/2001 - Present
	Colombia CD Rate 360-Day	07/12/1993 - 01/02/2001
CYP	German Government Bonds 1 Year BKO	01/01/2008 - Present
	Cyprus, Treasury Bill Rate - 13 Week	01/15/1993 - 12/31/2007
CZE	Czech Republic Interbank 3 Month	04/22/1992 - Present
DEU	German Government Bonds 1 Year BKO	01/10/1995 - Present
	Germany Interbank 12 Month	11/02/1990 - 01/09/1995
DNK	Denmark Government Bonds 1 Year Note Generic Bid Yield	06/19/2008 - Present
	Denmark Euro-Krone 1 Year (FT/ICAP/TR)	06/14/1985 - 06/18/2008
EGY	Egypt 364 Day T-Bill	07/06/2004 - Present
ESP	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Spain 12 Month Treasury Bill Yield	11/30/1992 - 12/31/1998
	Spain Interbank 12 Month	12/19/1991 - 11/29/1992
EST	German Government Bonds 1 Year BKO	01/01/2011 - Present
	Estonia, Interest Rates, Prices, Production, & LABOUR, Interest Rates, Deposit Rate	02/15/1993 - 12/31/2010
FIN	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Finland Interbank Close 12 Month	04/02/1992 - 12/31/1998
FRA	German Government Bonds 1 Year BKO	01/01/1999 - Present
	France Treasury Bill 1 Year Intraday	- 12/31/1998
GBR	UK Govt Bonds 1 Year Note Gene	09/12/2001 - Present
	UK Govt. Liab. Nom. Spot Curve 12 Month	- 09/11/2001
GRC	German Government Bonds 1 Year BKO	01/01/2001 - Present
	Greece Treasury Bill 1 Year	01/02/1990 - 12/31/2000
HKG	HKMA Hong Kong Exchange Fund Bills 12 Month	10/28/1991 - Present
HRV	Croatia ZIBOR Rate 3 Month	06/02/1997 - Present
HUN	Hungary Central Bank Base Rate	10/15/1990 - Present
IDN	INDONESIA SBI 90 DAY	07/10/2003 - Present
	INDONESIA SBI/DISC 90 DAY'DEAD'	01/01/1985 - 07/09/2003
IND	India Treasury Bill 1 Year	05/20/2013 - Present
	INDIA T-BILL SECONDARY 1 YEAR	01/01/1993 - 05/19/2013
IRL	German Government Bonds 1 Year BKO	01/01/1999 - Present

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Table A.7 – Continued from previous page

Economy	Interest Rate Name	Period Used*
ISL	Dublin Interbank Offered Rates	04/10/1991 - 12/31/1998
	Iceland Interbank 12 - Month	02/01/2000 - Present
	Iceland Interbank 3 - Month	08/04/1998 - 01/31/2000
	Iceland 90 - Day CD Notes	- 08/03/1998
ISR	Israel T-Bill Secondary 1 Year	11/15/1994 - Present
ITA	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Italy Bots Treasury Bill 12 Month Gross Yields	09/05/1994 - 12/31/1998
	Italy T-Bill Auct. Gross 12 Month	- 09/04/1994
JAM	Jamaica 12 Months Repo Rate	07/17/2008 - Present
JOR	Jordan Re-Discount Rate	03/12/2001 - Present
JPN	Japan Treasury Bills 12 Month	12/14/1999 - Present
KAZ	Kazakhstan KIBOR/KIBID 90 Days Interbank	09/29/2001 - Present
KOR	Korea Monetary Stab. Bonds 1 Year	01/03/1992 - Present
KWT	Kuwait Interbank 1 Year	
LKA	Sri Lanka Fixed Deposit 1 Year	
LTU	German Government Bonds 1 Year BKO	01/01/2015 - Present
	Vilnius Interbank 12 Month	03/29/2000 - 12/31/2014
LUX	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Long Term Government Bond Yields - Maastricht Definition (Avg.)	- 12/31/1998
LVA	German Government Bonds 1 Year BKO	01/01/2014 - Present
	Treasury Bill Rate 1 Year	04/03/1996 - 12/31/2013
MAR	Morocco Deposit Rate 1 Year	06/06/2003 - Present
MEX	Mexico Cetes 2nd Mkt. 360 Day	06/26/1996 - Present
	Mexico Cetes 91 Day Avg.Ret.At Auc.	- 06/25/1996
MKD	Macedonia SKIBOR 3 Months	07/02/2007 - Present
MLT	German Government Bonds 1 Year BKO	01/01/2008 - Present
	Long Term Government Bond Yields - Maastricht Definition (Avg.)	01/15/1985 - 12/31/2007
MNE	Treasury Bill Rate - 182-Day (EP)	07/16/2004 - Present
MYS	Bank Negara Malaysia 1 Year Govt Securities Indicative YTM	06/21/2005 - Present
	Malaysia Deposit 1 Year	- 06/20/2005
NGA	Nigeria Interbank Offered Rate 12 Month	09/29/2011 - Present
	Nigeria Interbank Offered Rate 3 Month	01/30/2004 - 09/28/2011
NLD	German Government Bonds 1 Year BKO	01/01/1999 - Present
	Netherlands Interbank 1 Year	- 12/31/1998
NOR	Norway Govt Treasury Bills 12 Month	07/01/1997 - Present
	Norway Interbank 1 Year	- 06/30/1997
NZL	New Zealand Dollar Deposit 1 Year	
OMN	OMR 12 Month Deposit	07/16/2002 - Present
PAK	PKR 12 Month Repo	10/29/2004 - Present
PER	Peru Savings Rate	07/01/1991 - Present
PHL	Philippine Treasury Bill 364d	
POL	Poland Interbank 1 Year (EOD)	10/11/1995 - Present
PRT	German Government Bonds 1 Year BKO	01/01/1999 - Present
ROM	Romanian Interbank 12 Month	08/01/1995 - Present
RUS	Mospime 3 Months Rate	04/18/2005 - Present
	Russia Moscow Interbank Non Co	08/14/2000 - 04/17/2005
	Russia Interbank 31 To 90 Day	09/01/1994 - 08/13/2000
SAU	Saudi Interbank 1 Year	

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Table A.7 – Continued from previous page

Economy	Interest Rate Name	Period Used*
SGP	Monetary Authority of Singapore Benchmark Govt Bill Yield 3 Month	09/20/2013 - Present
	Singapore T-Bill 3 Month	- 09/19/2013
SRB	Serbia Treasury Bill Auction Results 12 Months Average Accepted Yield	08/26/2009 - Present
SVK	German Government Bonds 1 Year BKO	01/01/2009 - Present
	Slovak Rep. Interbank 1 Year	08/09/1994 - 12/31/2008
SVN	German Government Bonds 1 Year BKO	01/01/2007 - Present
	Slovenia Treasury Bill 3 Month 'dead'	10/29/1998 - 12/31/2006
SWE	Sweden T Bill 3 Month	05/25/1993 - Present
	Sweden Treasury Bill 90 Day	- 05/24/1993
THA	Thailand Govt Bond 1 Year Note	08/07/2000 - Present
	Thailand Deposit 12 Month (KT)	01/02/1991 - 08/06/2000
TUN	TU BCT Key Interest Rate	12/15/1994 - Present
TUR	Turkish Interbank 12 Month	08/01/2002 - Present
TWN	Taiwan Deposit 12 Month	
UKR	Ukraine Interbank 3 Months	03/01/2001 - Present
USA	US Treasury Constant Maturities 1 Year	
VEN	Venezuela Savings Deposit Rate	01/03/2000 - Present
	Venezuela Overnight	11/28/1994 - 01/02/2000
VNM	Vietnam Interbank 3 Month	12/11/1998 - Present
ZAF	South African Prime Overdraft 1 Year Rate	

* A blank Period Used column indicates that there is only a single interest rate that is used throughout the whole period.

Table A.8: Summary Statistics of input variables (based on data from January 1990 to February 2017).

	DTD Level							# Observations
	Min	25%	Median	75%	Max	Mean	StdDev	
Argentina	-1.69	1.11	2.45	3.93	30.85	2.8	2.51	15535
Australia	-1.43	1.74	3	4.56	25.75	3.44	2.46	331788
Austria	-3.07	2.01	3.49	5.62	41.6	4.89	6.28	23663
Bahrain	-0.82	1.74	3.23	6.27	25.48	4.53	3.93	2019
Bangladesh	-2.02	1.61	2.66	4.09	20.25	3.04	2.11	15774
Belgium	-3.07	2.65	4.63	7.31	41.6	5.41	4.37	34321
Bosnia and Herzegovina	-3.07	1.53	2.67	4.94	41.22	3.7	3.65	3816
Brazil	-2.02	0.62	2.08	4.01	30.85	2.64	3.03	56167
Bulgaria	-1.93	1.12	2.15	3.77	41.6	2.91	3.17	9739
Canada	-1.18	1.92	3.37	5.29	25.52	3.91	2.85	251073
Chile	-2.02	3.36	5.53	8.28	30.85	6.46	4.79	28221
China	0.11	3.11	4.22	5.77	17.34	4.68	2.3	345298
Colombia	-2.02	2.19	4.1	6.47	30.85	4.61	3.34	6172
Croatia	-2.9	1.12	2.51	4.37	23.5	3.01	2.65	12594
Cyprus	-1.4	0.88	1.73	2.98	41.6	2.42	2.74	15378
Czech Republic	-3.07	1.38	2.72	4.65	41.6	3.23	2.92	5908
Denmark	-3.07	1.84	3.36	5.3	41.6	4.02	3.64	46966
Egypt	-2.02	1.63	2.62	3.88	16.11	2.96	2	21804
Estonia	-0.54	1.9	3.45	5.96	21.62	4.37	3.54	3030
Finland	-3.07	2.41	3.75	5.38	41.6	4.05	2.52	33346
France	-3.07	1.91	3.32	5.16	41.6	3.88	3.28	182732
Germany	-3.07	1.66	3.1	4.88	41.6	3.62	3.12	206128
Greece	-3.07	1.24	2.33	3.78	41.6	2.69	2.44	62131
Hong Kong	-1.43	1.72	2.83	4.39	25.75	3.39	2.57	260221
Hungary	-3.07	1.29	2.65	4.3	27.56	3.14	2.72	8219
Iceland	-1.49	1.93	3.32	4.99	17.98	3.72	2.57	4363
India	-3.3	0.79	1.81	3.14	26.16	2.33	2.59	556306
Indonesia	-2.02	0.87	2.02	3.62	30.85	2.69	3.26	74237
Ireland	-1.44	1.91	3.45	5.3	35.26	3.88	2.89	9866
Israel	-3.07	1.11	2.27	3.68	41.6	2.63	2.3	83880
Italy	-3.07	1.6	2.97	4.66	41.6	3.39	2.86	70922
Jamaica	-0.87	1.13	2.59	3.83	15.18	2.76	2.17	3189
Japan	-1.43	2.23	3.36	4.89	25.75	3.83	2.43	928880
Jordan	-1.07	2.6	3.92	5.89	24.77	4.54	2.79	27458
Kazakhstan	-1.48	0.17	1.45	3.45	30.85	2.76	4.6	1017
Kuwait	-2.02	2.04	3.05	4.43	19.86	3.51	2.2	25666
Latvia	-1.14	1.08	2.54	4.26	37.28	3.07	2.9	2692
Lithuania	-1.3	1.45	3.22	5.54	20.73	3.86	3.31	5156
Luxembourg	-3.07	2.99	5.29	8.37	35.53	6.62	5.13	2910
Macedonia	-1.59	1.39	2.26	4.37	24.9	3.58	3.77	2462
Malaysia	-2.02	1.7	3.06	5.07	30.85	3.87	3.3	221380
Malta	-0.63	2.81	4.47	7.12	17.85	5.39	3.62	1767
Mexico	-2.02	2	3.97	6.64	30.85	4.68	3.9	21588
Montenegro	-1	1.34	2.47	3.86	41.6	3.27	3.95	1531
Morocco	-1.04	2.52	3.76	5.68	24.85	4.31	2.85	9557
Netherlands	-3.07	2.48	4.17	6.23	41.6	4.64	3.33	39713
New Zealand	-1.09	2.89	5.3	7.88	25.75	5.8	3.9	21536
Nigeria	-2.02	0.83	2.18	3.63	30.85	2.89	3.74	17632
Norway	-2.82	1.27	2.55	4.12	29.21	2.86	2.29	48266
Oman	-0.18	2.96	4.5	7.27	30.85	5.56	3.89	4344
Pakistan	-2.02	0.58	2.09	3.87	30.85	2.44	2.5	32442
Peru	-2.02	1.88	3.41	5.31	29.75	4.07	3.24	11341
Philippines	-2.02	1.35	2.74	4.68	30.85	3.39	3.23	45423
Poland	-2.86	1.34	2.47	3.75	41.6	2.75	2.12	75745
Portugal	-3.07	1.01	2.37	4.21	41.6	2.91	2.97	14650
Romania	-3.07	0.85	1.98	3.56	33.06	2.44	2.54	10874
Russian Federation	-3.07	0.58	1.78	3.39	41.6	2.29	2.87	22943
Saudi Arabia	-0.91	3.28	4.8	6.97	30.85	5.5	3.08	20693
Serbia	-3.07	0.46	1.54	3.17	41.6	2.36	3.65	3731
Singapore	-1.43	1.6	2.86	4.68	25.75	3.48	2.73	138500
Slovakia	-2.78	1.16	2.25	3.84	41.6	4.89	8.91	1421
Slovenia	-2.57	1.72	3.76	6.38	41.6	4.56	4.81	6209
South Africa	-2.02	1.26	2.92	5.19	30.85	3.65	3.49	85369
South Korea	-1.43	1.39	2.42	3.77	25.75	2.9	2.69	363279
Spain	-3.07	1.97	3.58	5.48	41.6	4.34	4.47	39390
Sri Lanka	-2.02	1.64	2.77	4.32	30.85	3.29	2.57	26540
Sweden	-3.07	1.79	3.27	5.07	41.6	3.71	2.85	97716
Switzerland	-3.07	2.7	4.41	6.53	40.7	4.9	3.29	61268
Taiwan	-1.24	2.96	4.15	5.73	25.75	4.68	2.85	169915
Thailand	-1.75	1.89	3.23	5.08	30.85	3.81	2.96	119259
Tunisia	-1.41	2.21	3.58	5.86	23.62	4.36	3.2	8874
Turkey	-3.07	1.58	2.87	4.77	41.6	3.67	3.58	56711
Ukraine	-3.07	0.37	1.37	2.49	28.11	1.62	2.12	4586
United Arab Emirates	-0.79	1.82	2.8	4.05	19.28	3.28	2.25	8040
United Kingdom	-3.07	2.27	3.94	6.31	41.6	4.79	3.98	416497
United States	-1.18	1.9	3.25	5.04	25.52	3.77	2.76	1642497
Venezuela	-1.8	0.67	1.51	2.76	18.63	2.41	3.24	3555
Vietnam	-1.85	1.21	2.08	3.33	30.85	2.54	2.08	55139

DTD Trend								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	-9.89	-0.51	0	0.45	8.85	-0.04	1.13	15535
Australia	-7.05	-0.55	-0.03	0.44	6.14	-0.07	1.07	331788
Austria	-13.77	-0.69	-0.05	0.52	9.35	-0.22	2.3	23663
Bahrain	-9.89	-0.53	0.02	0.52	8.85	-0.03	1.36	2019
Bangladesh	-4.89	-0.28	0.02	0.38	8.85	0.08	0.76	15774
Belgium	-13.77	-0.7	-0.02	0.64	9.35	-0.07	1.7	34321
Bosnia and Herzegovina	-13.77	-0.55	-0.03	0.33	9.35	-0.07	1.39	3816
Brazil	-9.89	-0.44	0	0.41	8.85	-0.03	1.09	56167
Bulgaria	-13.77	-0.49	0	0.42	9.35	-0.07	1.32	9739
Canada	-7.03	-0.6	-0.03	0.48	5.53	-0.09	1.18	251073
Chile	-9.89	-0.88	0	0.79	8.85	-0.05	2.13	28221
China	-6.13	-0.64	-0.02	0.55	5.46	-0.08	1.15	345298
Colombia	-9.89	-0.65	0	0.68	8.85	-0.02	1.53	6172
Croatia	-7.88	-0.56	-0.02	0.42	9.35	-0.05	1.04	12594
Cyprus	-13.77	-0.41	-0.06	0.26	9.35	-0.14	1.03	15378
Czech Republic	-13.77	-0.57	-0.06	0.38	9.35	-0.15	1.28	5908
Denmark	-13.77	-0.6	-0.01	0.52	9.35	-0.05	1.46	46966
Egypt	-9.29	-0.5	-0.05	0.39	8.85	-0.07	0.92	21804
Estonia	-11.26	-0.68	0.02	0.69	9.35	-0.02	1.46	3030
Finland	-13.77	-0.51	0.03	0.6	9.35	0.03	1.11	33346
France	-13.77	-0.55	0	0.51	9.35	-0.03	1.3	182732
Germany	-13.77	-0.56	-0.03	0.46	9.35	-0.06	1.28	206128
Greece	-13.77	-0.53	-0.08	0.34	9.35	-0.1	1.05	62131
Hong Kong	-7.05	-0.54	0	0.5	6.14	-0.04	1.1	260221
Hungary	-13.77	-0.41	0.01	0.46	9.35	-0.02	1.06	8219
Iceland	-9.69	-0.77	-0.06	0.44	6.81	-0.17	1.39	4363
India	-8.66	-0.37	-0.01	0.37	6.6	-0.01	0.94	556306
Indonesia	-9.89	-0.43	0	0.41	8.85	-0.05	1.27	74237
Ireland	-13.77	-0.6	0	0.52	8.73	-0.08	1.23	9866
Israel	-13.77	-0.43	0	0.44	9.35	0	1.02	83880
Italy	-13.77	-0.6	-0.04	0.48	9.35	-0.08	1.19	70922
Jamaica	-9.89	-0.38	0	0.43	6.07	0.02	0.95	3189
Japan	-7.05	-0.5	0	0.47	6.14	-0.01	0.96	928880
Jordan	-9.89	-0.53	0	0.5	8.85	-0.04	1.21	27458
Kazakhstan	-9.89	-0.52	-0.05	0.36	8.85	-0.21	1.83	1017
Kuwait	-9.05	-0.47	0	0.43	8.85	-0.04	1.02	25666
Latvia	-13.77	-0.48	0	0.44	6.76	-0.06	1.24	2692
Lithuania	-10.09	-0.64	0	0.62	9.35	-0.01	1.45	5156
Luxembourg	-11.05	-0.75	0.01	0.69	8.6	-0.05	1.7	2910
Macedonia	-12.69	-0.54	-0.06	0.39	6.93	-0.09	1.24	2462
Malaysia	-9.89	-0.52	0	0.47	8.85	-0.04	1.22	221380
Malta	-11.01	-0.81	-0.02	0.71	9.35	-0.06	1.9	1767
Mexico	-9.89	-0.6	0.02	0.65	8.85	-0.02	1.5	21588
Montenegro	-13.77	-0.38	0	0.26	9.35	-0.16	1.44	1531
Morocco	-9.89	-0.55	-0.03	0.43	8.85	-0.1	1.15	9557
Netherlands	-13.77	-0.7	-0.02	0.59	9.35	-0.07	1.32	39713
New Zealand	-7.05	-0.76	0	0.71	6.14	-0.04	1.62	21536
Nigeria	-9.89	-0.53	-0.04	0.39	8.85	-0.1	1.65	17632
Norway	-13.77	-0.53	-0.01	0.44	9.35	-0.06	1.02	48266
Oman	-9.89	-0.66	0.04	0.71	8.85	0.02	1.9	4344
Pakistan	-8.12	-0.29	0.04	0.42	7.78	0.06	0.81	32442
Peru	-9.89	-0.6	0	0.58	8.85	0	1.54	11341
Philippines	-9.89	-0.46	0	0.47	8.85	-0.02	1.32	45423
Poland	-13.77	-0.48	-0.03	0.39	9.35	-0.06	0.92	75745
Portugal	-13.77	-0.52	-0.04	0.41	9.35	-0.06	1.09	14650
Romania	-10.08	-0.36	0.03	0.44	9.35	0.04	0.96	10874
Russian Federation	-13.77	-0.5	0	0.45	9.35	-0.1	1.31	22943
Saudi Arabia	-9.89	-0.81	-0.02	0.7	8.85	-0.06	1.51	20693
Serbia	-11.53	-0.31	0	0.28	9.35	-0.04	1.01	3731
Singapore	-7.05	-0.53	-0.02	0.44	6.14	-0.06	1.09	138500
Slovakia	-13.77	-0.43	0.01	0.43	9.35	-0.34	2.97	1421
Slovenia	-13.77	-0.76	-0.1	0.45	9.35	-0.27	1.86	6209
South Africa	-9.89	-0.58	-0.04	0.44	8.85	-0.11	1.31	85369
South Korea	-7.05	-0.43	0	0.44	6.14	-0.01	0.99	363279
Spain	-13.77	-0.56	0	0.58	9.35	-0.04	1.71	39390
Sri Lanka	-9.89	-0.4	0.01	0.48	8.85	0.05	1.07	26540
Sweden	-13.77	-0.52	0	0.49	9.35	-0.02	1.13	97716
Switzerland	-13.77	-0.67	0.01	0.68	9.35	0	1.41	61268
Taiwan	-7.05	-0.59	0	0.59	6.14	0	1.15	169915
Thailand	-9.89	-0.57	0	0.54	8.85	-0.02	1.19	119259
Tunisia	-9.89	-0.65	-0.09	0.48	8.85	-0.1	1.3	8874
Turkey	-13.77	-0.58	0	0.59	9.35	0	1.42	56711
Ukraine	-13.77	-0.52	-0.02	0.37	5.1	-0.13	1.06	4586
United Arab Emirates	-7.22	-0.48	-0.03	0.35	8.85	-0.11	0.9	8040
United Kingdom	-13.77	-0.82	-0.06	0.57	9.35	-0.2	1.82	416497
United States	-7.03	-0.52	0	0.48	5.53	-0.04	1.04	1642497
Venezuela	-8.54	-0.4	-0.01	0.4	8.85	-0.01	1.1	3555
Vietnam	-9.89	-0.38	0	0.36	8.85	-0.01	0.8	55139

CASH/TA Level								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	0	0.02	0.06	0.11	0.98	0.08	0.08	17652
Australia	0	0.04	0.13	0.36	0.98	0.24	0.26	370859
Austria	0	0.03	0.07	0.15	1	0.12	0.14	25738
Bahrain	0	0.09	0.18	0.26	0.91	0.2	0.14	5039
Bangladesh	0	0.01	0.07	0.2	0.82	0.14	0.17	19991
Belgium	0	0.03	0.07	0.17	1.04	0.14	0.18	38458
Bosnia and Herzegovina	0	0.01	0.02	0.08	0.78	0.07	0.12	11278
Brazil	0	0.02	0.08	0.17	0.98	0.12	0.14	71656
Bulgaria	0	0.01	0.04	0.1	0.92	0.08	0.12	15416
Canada	0	0.01	0.06	0.21	1	0.16	0.21	261550
Chile	0	0.01	0.04	0.08	0.98	0.07	0.1	39466
China	0	0.08	0.14	0.25	0.88	0.19	0.15	352359
Colombia	0	0.02	0.06	0.1	0.98	0.09	0.12	8924
Croatia	0	0.01	0.02	0.06	0.62	0.06	0.09	19786
Cyprus	0	0.01	0.05	0.15	0.92	0.11	0.14	20058
Czech Republic	0	0.02	0.05	0.11	1	0.09	0.13	8200
Denmark	0	0.03	0.08	0.18	1.04	0.14	0.17	53452
Egypt	0	0.04	0.1	0.21	0.98	0.15	0.14	23413
Estonia	0	0.03	0.05	0.12	0.52	0.09	0.09	3078
Finland	0	0.04	0.08	0.16	1.04	0.13	0.15	35449
France	0	0.04	0.09	0.18	1.04	0.14	0.16	193095
Germany	0	0.03	0.08	0.2	1.04	0.15	0.18	218426
Greece	0	0.02	0.05	0.13	0.91	0.1	0.12	64956
Hong Kong	0	0.07	0.14	0.26	0.98	0.19	0.17	267799
Hungary	0	0.02	0.06	0.13	0.65	0.09	0.1	9383
Iceland	0	0.02	0.04	0.08	0.56	0.06	0.06	5825
India	0	0.01	0.03	0.07	0.92	0.07	0.1	803706
Indonesia	0	0.03	0.08	0.17	0.93	0.11	0.12	88802
Ireland	0	0.05	0.1	0.24	0.97	0.17	0.18	11032
Israel	0	0.04	0.11	0.23	1.04	0.19	0.23	91274
Italy	0	0.03	0.07	0.14	1.04	0.11	0.12	73617
Jamaica	0	0.05	0.12	0.28	0.97	0.2	0.21	7184
Japan	0	0.08	0.14	0.23	0.98	0.18	0.14	948510
Jordan	0	0.01	0.05	0.18	0.98	0.13	0.16	37303
Kazakhstan	0	0.08	0.12	0.18	0.98	0.14	0.1	2114
Kuwait	0	0.03	0.07	0.19	0.98	0.14	0.17	31600
Latvia	0	0.01	0.03	0.12	0.46	0.07	0.09	4917
Lithuania	0	0.01	0.03	0.08	0.48	0.06	0.08	5611
Luxembourg	0	0.04	0.1	0.14	0.96	0.12	0.13	3975
Macedonia	0	0.01	0.06	0.18	0.77	0.11	0.13	4184
Malaysia	0	0.03	0.08	0.17	0.98	0.12	0.14	227460
Malta	0	0.03	0.07	0.17	0.5	0.12	0.13	2271
Mexico	0	0.03	0.06	0.12	0.81	0.09	0.09	26949
Montenegro	0	0	0.01	0.07	0.47	0.06	0.09	4140
Morocco	0	0.01	0.05	0.11	0.72	0.08	0.1	13921
Netherlands	0	0.02	0.05	0.13	1.04	0.1	0.14	40789
New Zealand	0	0.01	0.03	0.12	0.98	0.11	0.19	23806
Nigeria	0	0.02	0.08	0.21	0.98	0.14	0.16	22902
Norway	0	0.04	0.09	0.19	1.04	0.16	0.19	54273
Oman	0	0.02	0.07	0.16	0.98	0.12	0.15	17977
Pakistan	0	0.01	0.05	0.14	0.98	0.1	0.13	38664
Peru	0	0.02	0.04	0.13	0.98	0.09	0.11	17828
Philippines	0	0.02	0.09	0.19	0.98	0.14	0.16	54410
Poland	0	0.03	0.07	0.14	1.04	0.11	0.14	78974
Portugal	0	0.01	0.03	0.07	0.69	0.06	0.08	17765
Romania	0	0.01	0.03	0.1	0.7	0.08	0.11	14644
Russian Federation	0	0.02	0.07	0.15	1.04	0.12	0.14	36369
Saudi Arabia	0	0.04	0.1	0.21	0.98	0.17	0.2	20371
Serbia	0	0.03	0.11	0.26	1.04	0.17	0.18	19859
Singapore	0	0.06	0.13	0.24	0.98	0.18	0.15	146998
Slovakia	0	0.02	0.05	0.13	0.64	0.09	0.11	3255
Slovenia	0	0.01	0.03	0.08	0.99	0.06	0.07	9278
South Africa	0	0.03	0.08	0.16	0.98	0.12	0.14	92825
South Korea	0	0.04	0.09	0.19	0.98	0.14	0.14	362718
Spain	0	0.02	0.05	0.11	1.04	0.09	0.11	47115
Sri Lanka	0	0.02	0.05	0.11	0.98	0.09	0.13	28130
Sweden	0	0.04	0.1	0.23	1.04	0.17	0.2	103891
Switzerland	0	0.05	0.11	0.2	1.04	0.16	0.16	65541
Taiwan	0	0.05	0.11	0.21	0.98	0.15	0.13	171384
Thailand	0	0.02	0.06	0.14	0.98	0.11	0.12	126061
Tunisia	0	0.03	0.06	0.13	0.74	0.1	0.12	9714
Turkey	0	0.02	0.06	0.15	1.04	0.11	0.14	77136
Ukraine	0	0.01	0.02	0.06	1	0.06	0.12	9631
United Arab Emirates	0	0.07	0.14	0.23	0.98	0.17	0.14	11306
United Kingdom	0	0.03	0.1	0.23	1.04	0.18	0.21	455825
United States	0	0.03	0.08	0.25	1	0.18	0.23	1736181
Venezuela	0	0.04	0.08	0.2	0.98	0.14	0.15	5180
Vietnam	0	0.03	0.08	0.19	0.97	0.14	0.16	58732

CASH/TA Trend								
	Min	25%	Median	75%	Max	Mean	StdDev	#Observations
Argentina	-0.38	-0.01	0	0.01	0.44	0	0.04	17652
Australia	-0.44	-0.03	0	0.01	0.48	-0.01	0.1	370859
Austria	-0.54	-0.01	0	0.01	0.54	0	0.04	25738
Bahrain	-0.38	-0.02	0	0.01	0.44	0	0.06	5039
Bangladesh	-0.38	-0.01	0	0	0.44	0	0.05	19991
Belgium	-0.54	-0.01	0	0.01	0.54	0	0.05	38458
Bosnia and Herzegovina	-0.36	0	0	0	0.43	0	0.03	11278
Brazil	-0.38	-0.01	0	0.01	0.44	0	0.05	71656
Bulgaria	-0.52	0	0	0	0.54	0	0.05	15416
Canada	-0.45	-0.02	0	0.01	0.46	0	0.07	261550
Chile	-0.38	-0.01	0	0.01	0.44	0	0.04	39466
China	-0.31	-0.03	0	0.01	0.33	-0.01	0.05	352359
Colombia	-0.38	-0.01	0	0.01	0.44	0	0.05	8924
Croatia	-0.54	0	0	0	0.54	0	0.03	19786
Cyprus	-0.54	-0.01	0	0	0.54	0	0.05	20058
Czech Republic	-0.54	0	0	0.01	0.54	0	0.04	8200
Denmark	-0.54	-0.01	0	0.01	0.54	0	0.06	53452
Egypt	-0.38	-0.02	0	0.01	0.44	0	0.05	23413
Estonia	-0.25	-0.01	0	0.01	0.16	0	0.03	3078
Finland	-0.54	-0.01	0	0.01	0.54	0	0.05	35449
France	-0.54	-0.01	0	0.01	0.54	0	0.05	193095
Germany	-0.54	-0.01	0	0.01	0.54	0	0.06	218426
Greece	-0.54	-0.01	0	0.01	0.54	0	0.05	64956
Hong Kong	-0.44	-0.02	0	0.01	0.48	0	0.07	267799
Hungary	-0.37	-0.01	0	0.01	0.54	0	0.05	9383
Iceland	-0.33	-0.01	0	0.01	0.24	0	0.03	5825
India	-0.39	0	0	0	0.4	0	0.04	803706
Indonesia	-0.38	-0.01	0	0.01	0.44	0	0.04	88802
Ireland	-0.54	-0.01	0	0.01	0.54	0	0.06	11032
Israel	-0.54	-0.02	0	0.01	0.54	0	0.09	91274
Italy	-0.54	-0.01	0	0.01	0.54	0	0.04	73617
Jamaica	-0.38	-0.01	0	0.01	0.44	0	0.06	7184
Japan	-0.44	-0.01	0	0.01	0.48	0	0.04	948510
Jordan	-0.38	-0.01	0	0.01	0.44	0	0.05	37303
Kazakhstan	-0.27	-0.02	0	0.02	0.44	0	0.05	2114
Kuwait	-0.38	-0.01	0	0.01	0.44	0	0.06	31600
Latvia	-0.21	-0.01	0	0.01	0.32	0	0.04	4917
Lithuania	-0.31	-0.01	0	0.01	0.31	0	0.03	5611
Luxembourg	-0.26	-0.01	0	0.01	0.31	0	0.04	3975
Macedonia	-0.54	0	0	0	0.48	0	0.04	4184
Malaysia	-0.38	-0.01	0	0.01	0.44	0	0.05	227460
Malta	-0.31	-0.01	0	0.01	0.2	0	0.03	2271
Mexico	-0.38	-0.01	0	0.01	0.44	0	0.04	26949
Montenegro	-0.23	0	0	0	0.29	0	0.03	4140
Morocco	-0.38	-0.01	0	0.01	0.44	0	0.04	13921
Netherlands	-0.54	-0.01	0	0.01	0.54	0	0.05	40789
New Zealand	-0.44	-0.01	0	0	0.48	0	0.06	23806
Nigeria	-0.38	-0.01	0	0.01	0.44	0	0.06	22902
Norway	-0.54	-0.02	0	0.01	0.54	0	0.07	54273
Oman	-0.38	-0.01	0	0.01	0.44	0	0.06	17977
Pakistan	-0.38	-0.01	0	0	0.44	0	0.04	38664
Peru	-0.38	-0.01	0	0.01	0.44	0	0.04	17828
Philippines	-0.38	-0.01	0	0.01	0.44	0	0.06	54410
Poland	-0.54	-0.01	0	0.01	0.54	0	0.06	78974
Portugal	-0.53	-0.01	0	0	0.54	0	0.03	17765
Romania	-0.49	-0.01	0	0.01	0.51	0	0.04	14644
Russian Federation	-0.54	-0.01	0	0.01	0.54	0	0.07	36369
Saudi Arabia	-0.38	-0.02	0	0.01	0.44	0	0.07	20371
Serbia	-0.54	-0.01	0	0	0.54	-0.01	0.07	19859
Singapore	-0.44	-0.02	0	0.01	0.48	0	0.06	146998
Slovakia	-0.3	-0.01	0	0	0.16	0	0.03	3255
Slovenia	-0.23	0	0	0	0.26	0	0.03	9278
South Africa	-0.38	-0.01	0	0.01	0.44	0	0.06	92825
South Korea	-0.44	-0.02	0	0.01	0.48	0	0.06	362718
Spain	-0.54	-0.01	0	0.01	0.54	0	0.04	47115
Sri Lanka	-0.38	-0.01	0	0.01	0.44	0	0.05	28130
Sweden	-0.54	-0.02	0	0.01	0.54	0	0.08	103891
Switzerland	-0.54	-0.01	0	0.01	0.54	0	0.05	65541
Taiwan	-0.44	-0.01	0	0.01	0.48	0	0.04	171384
Thailand	-0.38	-0.01	0	0.01	0.44	0	0.05	126061
Tunisia	-0.28	-0.01	0	0.01	0.25	0	0.03	9714
Turkey	-0.54	-0.02	0	0.01	0.54	0	0.06	77136
Ukraine	-0.37	0	0	0	0.43	0	0.03	9631
United Arab Emirates	-0.38	-0.02	0	0.01	0.44	-0.01	0.06	11306
United Kingdom	-0.54	-0.02	0	0.01	0.54	-0.01	0.08	455825
United States	-0.45	-0.02	0	0.01	0.46	0	0.06	1736181
Venezuela	-0.38	-0.01	0	0.01	0.44	0	0.04	5180
Vietnam	-0.38	-0.02	0	0.02	0.44	0	0.05	58732

NI/TA Level								
	Min	25%	Median	75%	Max	Mean	StdDev	#Observations
Argentina	-0.04	0	0	0.01	0.03	0	0.01	17652
Australia	-0.72	-0.02	0	0	0.12	-0.02	0.08	369029
Austria	-0.64	0	0	0	0.1	0	0.02	25841
Bahrain	-0.04	0	0	0.01	0.03	0	0.01	5039
Bangladesh	-0.04	0	0	0.01	0.03	0	0.01	19917
Belgium	-0.68	0	0	0.01	0.1	0	0.02	38404
Bosnia and Herzegovina	-0.13	0	0	0	0.09	0	0.01	11370
Brazil	-0.04	0	0	0.01	0.03	0	0.01	71628
Bulgaria	-0.32	0	0	0.01	0.1	0	0.02	15463
Canada	-0.53	-0.01	0	0	0.18	-0.01	0.05	262138
Chile	-0.04	0	0	0.01	0.03	0	0.01	39526
China	-0.08	0	0	0.01	0.12	0	0.01	352048
Colombia	-0.04	0	0	0.01	0.03	0	0.01	8924
Croatia	-0.27	0	0	0	0.1	0	0.01	19801
Cyprus	-0.93	-0.01	0	0	0.1	-0.01	0.03	20117
Czech Republic	-0.29	0	0	0	0.04	0	0.01	8200
Denmark	-0.93	0	0	0	0.1	0	0.04	53605
Egypt	-0.04	0	0	0.01	0.03	0.01	0.01	23413
Estonia	-0.09	0	0	0.01	0.05	0	0.01	3081
Finland	-0.48	0	0	0.01	0.1	0	0.01	35497
France	-0.93	0	0	0	0.1	0	0.03	193584
Germany	-0.93	0	0	0	0.1	0	0.03	218686
Greece	-0.93	0	0	0.01	0.1	0	0.02	65027
Hong Kong	-0.72	0	0	0.01	0.12	0	0.03	267764
Hungary	-0.93	0	0	0.01	0.04	0	0.04	9372
Iceland	-0.13	0	0	0.01	0.02	0	0.01	5837
India	-0.04	0	0	0.01	0.03	0	0.01	803680
Indonesia	-0.04	0	0	0.01	0.03	0	0.01	88774
Ireland	-0.81	0	0	0.01	0.1	0	0.03	11025
Israel	-0.93	0	0	0	0.1	-0.01	0.08	91215
Italy	-0.24	0	0	0	0.1	0	0.01	73833
Jamaica	-0.04	0	0	0.01	0.03	0.01	0.01	7246
Japan	-0.72	0	0	0	0.12	0	0.01	948591
Jordan	-0.04	0	0	0	0.03	0	0.01	37316
Kazakhstan	-0.04	0	0	0.01	0.03	0	0.01	2114
Kuwait	-0.04	0	0	0.01	0.03	0	0.01	31600
Latvia	-0.12	0	0	0.01	0.1	0	0.01	4917
Lithuania	-0.04	0	0	0.01	0.04	0	0.01	5611
Luxembourg	-0.04	0	0	0.01	0.1	0	0.01	3915
Macedonia	-0.5	0	0	0	0.04	0	0.03	4184
Malaysia	-0.04	0	0	0.01	0.03	0	0.01	227465
Malta	-0.02	0	0	0	0.04	0	0	2313
Mexico	-0.04	0	0	0.01	0.03	0	0.01	26955
Montenegro	-0.06	0	0	0	0.02	0	0.01	4168
Morocco	-0.04	0	0	0.01	0.03	0	0.01	13925
Netherlands	-0.93	0	0	0.01	0.1	0	0.05	40882
New Zealand	-0.72	0	0	0.01	0.12	-0.01	0.06	23798
Nigeria	-0.04	0	0	0.01	0.03	0	0.01	22915
Norway	-0.93	0	0	0	0.1	0	0.03	54313
Oman	-0.04	0	0	0.01	0.03	0	0.01	17977
Pakistan	-0.04	0	0	0.01	0.03	0	0.01	38529
Peru	-0.04	0	0	0.01	0.03	0	0.01	17828
Philippines	-0.04	0	0	0.01	0.03	0	0.01	53743
Poland	-0.93	0	0	0.01	0.1	0	0.03	79068
Portugal	-0.21	0	0	0	0.1	0	0.01	17800
Romania	-0.93	0	0	0.01	0.1	0	0.04	14625
Russian Federation	-0.23	0	0	0.01	0.1	0	0.01	36378
Saudi Arabia	-0.04	0	0	0.01	0.03	0	0.01	21572
Serbia	-0.12	0	0	0.01	0.07	0	0.01	20447
Singapore	-0.72	0	0	0.01	0.12	0	0.03	146717
Slovakia	-0.03	0	0	0	0.05	0	0.01	3321
Slovenia	-0.07	0	0	0	0.02	0	0.01	9278
South Africa	-0.04	0	0	0.01	0.03	0	0.01	92677
South Korea	-0.72	0	0	0.01	0.12	0	0.02	370628
Spain	-0.93	0	0	0	0.1	0	0.03	47175
Sri Lanka	-0.04	0	0	0.01	0.03	0	0.01	28142
Sweden	-0.93	-0.01	0	0.01	0.1	-0.01	0.04	103937
Switzerland	-0.93	0	0	0.01	0.1	0	0.02	65644
Taiwan	-0.37	0	0	0.01	0.06	0	0.01	171399
Thailand	-0.04	0	0	0.01	0.03	0	0.01	126063
Tunisia	-0.04	0	0	0	0.02	0	0.01	9748
Turkey	-0.93	0	0	0.01	0.1	0	0.03	77075
Ukraine	-0.1	0	0	0.01	0.1	0	0.01	9579
United Arab Emirates	-0.04	0	0	0.01	0.03	0	0.01	11306
United Kingdom	-0.93	-0.01	0	0.01	0.1	-0.01	0.06	455942
United States	-0.53	0	0	0.01	0.18	0	0.03	1736278
Venezuela	-0.04	0	0	0	0.03	0	0.01	5180
Vietnam	-0.04	0	0	0.01	0.03	0.01	0.01	58713

NI/TA Trend								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	-0.03	0	0	0	0.03	0	0.01	17652
Australia	-0.55	0	0	0	0.42	0	0.06	369029
Austria	-0.48	0	0	0	0.44	0	0.02	25841
Bahrain	-0.03	0	0	0	0.03	0	0	5039
Bangladesh	-0.03	0	0	0	0.03	0	0	19917
Belgium	-0.27	0	0	0	0.44	0	0.01	38404
Bosnia and Herzegovina	-0.19	0	0	0	0.13	0	0.01	11370
Brazil	-0.03	0	0	0	0.03	0	0.01	71628
Bulgaria	-0.48	0	0	0	0.44	0	0.02	15463
Canada	-0.36	0	0	0	0.3	0	0.04	262138
Chile	-0.03	0	0	0	0.03	0	0.01	39526
China	-0.11	0	0	0	0.09	0	0.01	352048
Colombia	-0.03	0	0	0	0.03	0	0	8924
Croatia	-0.46	0	0	0	0.44	0	0.02	19801
Cyprus	-0.48	0	0	0	0.44	0	0.02	20117
Czech Republic	-0.27	0	0	0	0.26	0	0.01	8200
Denmark	-0.48	0	0	0	0.44	0	0.02	53605
Egypt	-0.03	0	0	0	0.03	0	0.01	23413
Estonia	-0.31	0	0	0	0.11	0	0.02	3081
Finland	-0.48	0	0	0	0.44	0	0.01	35497
France	-0.48	0	0	0	0.44	0	0.02	193584
Germany	-0.48	0	0	0	0.44	0	0.02	218686
Greece	-0.48	0	0	0	0.44	0	0.02	65027
Hong Kong	-0.55	0	0	0	0.42	0	0.03	267764
Hungary	-0.27	0	0	0	0.44	0	0.02	9372
Iceland	-0.12	0	0	0	0.13	0	0.01	5837
India	-0.15	0	0	0	0.13	0	0.01	803680
Indonesia	-0.03	0	0	0	0.03	0	0.01	88774
Ireland	-0.48	0	0	0	0.44	0	0.03	11025
Israel	-0.48	0	0	0	0.44	0	0.06	91215
Italy	-0.48	0	0	0	0.44	0	0.01	73833
Jamaica	-0.03	0	0	0	0.03	0	0.01	7246
Japan	-0.55	0	0	0	0.42	0	0.01	948591
Jordan	-0.03	0	0	0	0.03	0	0.01	37316
Kazakhstan	-0.03	0	0	0	0.03	0	0.01	2114
Kuwait	-0.03	0	0	0	0.03	0	0.01	31600
Latvia	-0.29	0	0	0	0.1	0	0.02	4917
Lithuania	-0.12	0	0	0	0.12	0	0.01	5611
Luxembourg	-0.12	0	0	0	0.15	0	0.01	3915
Macedonia	-0.43	0	0	0	0.34	0	0.02	4184
Malaysia	-0.03	0	0	0	0.03	0	0.01	227465
Malta	-0.04	0	0	0	0.03	0	0	2313
Mexico	-0.03	0	0	0	0.03	0	0.01	26955
Montenegro	-0.05	0	0	0	0.06	0	0	4168
Morocco	-0.03	0	0	0	0.03	0	0	13925
Netherlands	-0.48	0	0	0	0.44	0	0.03	40882
New Zealand	-0.55	0	0	0	0.42	0	0.05	23798
Nigeria	-0.03	0	0	0	0.03	0	0.01	22915
Norway	-0.48	0	0	0	0.44	0	0.03	54313
Oman	-0.03	0	0	0	0.03	0	0.01	17977
Pakistan	-0.03	0	0	0	0.03	0	0	38529
Peru	-0.03	0	0	0	0.03	0	0.01	17828
Philippines	-0.03	0	0	0	0.03	0	0.01	53743
Poland	-0.48	0	0	0	0.44	0	0.02	79068
Portugal	-0.48	0	0	0	0.44	0	0.01	17800
Romania	-0.48	0	0	0	0.44	0	0.03	14625
Russian Federation	-0.48	0	0	0	0.33	0	0.01	36378
Saudi Arabia	-0.03	0	0	0	0.03	0	0.01	21572
Serbia	-0.13	0	0	0	0.1	0	0.01	20447
Singapore	-0.55	0	0	0	0.42	0	0.03	146717
Slovakia	-0.06	0	0	0	0.07	0	0.01	3321
Slovenia	-0.07	0	0	0	0.06	0	0.01	9278
South Africa	-0.03	0	0	0	0.03	0	0.01	92677
South Korea	-0.55	0	0	0	0.42	0	0.02	370628
Spain	-0.48	0	0	0	0.44	0	0.02	47175
Sri Lanka	-0.03	0	0	0	0.03	0	0.01	28142
Sweden	-0.48	0	0	0	0.44	0	0.03	103937
Switzerland	-0.48	0	0	0	0.44	0	0.01	65644
Taiwan	-0.55	0	0	0	0.37	0	0.01	171399
Thailand	-0.03	0	0	0	0.03	0	0.01	126063
Tunisia	-0.03	0	0	0	0.02	0	0	9748
Turkey	-0.48	0	0	0	0.44	0	0.02	77075
Ukraine	-0.14	0	0	0	0.16	0	0.01	9579
United Arab Emirates	-0.03	0	0	0	0.03	0	0	11306
United Kingdom	-0.48	0	0	0	0.44	0	0.04	455942
United States	-0.36	0	0	0	0.3	0	0.02	1736278
Venezuela	-0.03	0	0	0	0.03	0	0	5180
Vietnam	-0.03	0	0	0	0.03	0	0.01	58713

	SIZE Level							
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	-5.79	-1.29	0.23	1.64	6.4	0.19	2.01	17836
Australia	-4.36	-1.29	-0.16	1.48	7.02	0.25	2.09	389840
Austria	-6.61	-0.88	0.46	1.95	4.93	0.48	2.02	28424
Bahrain	-3.66	-0.87	0	1.41	3.36	0.13	1.44	4261
Bangladesh	-5.77	-1.35	-0.3	1.07	4.97	-0.19	1.73	24005
Belgium	-6.61	-1.21	0.33	1.88	7.99	0.34	2.3	46105
Bosnia and Herzegovina	-6.61	-1.39	-0.14	0.96	5.21	-0.12	1.87	13502
Brazil	-5.79	-1.71	-0.07	1.31	6.4	-0.2	2.35	70894
Bulgaria	-6.61	-1.57	-0.18	1.05	7.99	-0.24	1.84	22530
Canada	-6.27	-1.67	-0.3	1.24	6.02	-0.2	2.19	294256
Chile	-5.79	-1.03	0.12	1.36	6.38	0.08	1.8	38366
China	-2.43	-0.61	-0.12	0.46	4.13	-0.02	0.9	391310
Colombia	-4.75	-1.36	0.14	1.26	4.43	-0.11	1.71	8792
Croatia	-6.61	-0.88	0.27	1.46	5.87	0.32	1.78	19141
Cyprus	-4.72	-0.99	0.12	1.22	7.98	0.19	1.78	21634
Czech Republic	-6.61	-1.85	-0.51	0.64	4.95	-0.52	2	8855
Denmark	-6.61	-0.34	0.85	2.26	7.39	1	2	55875
Egypt	-5.64	-1.26	-0.09	1.45	5.4	0.09	1.82	25619
Estonia	-3.63	-0.66	0.24	1.33	5.17	0.3	1.69	3351
Finland	-6.37	-1.69	-0.34	1.21	6.39	-0.22	1.99	37020
France	-6.61	-1.28	0.18	1.98	7.67	0.44	2.36	227996
Germany	-6.61	-0.54	1.14	2.9	7.99	1.14	2.71	266382
Greece	-6.61	-0.47	0.51	1.67	7.56	0.69	1.71	67665
Hong Kong	-4.36	-1.41	-0.39	1	7.02	-0.1	1.85	303874
Hungary	-6.61	-1.29	0.43	2.21	6.23	0.47	2.45	9976
Iceland	-6.61	-2.13	-1.17	-0.16	2.49	-1.17	1.52	6242
India	-5.11	-1.49	-0.02	1.83	8.14	0.3	2.36	669992
Indonesia	-5.79	-1.01	0.19	1.49	6.09	0.29	1.85	88561
Ireland	-6.38	-1.78	-0.53	1.11	5.09	-0.34	2.04	11899
Israel	-6.61	-0.73	0.35	1.68	7.99	0.55	1.86	108949
Italy	-6.61	-0.94	0.24	1.74	6.35	0.41	1.96	78892
Jamaica	-5.79	-1.58	-0.01	1.06	6.4	-0.23	1.78	7761
Japan	-4.36	-0.81	0.25	1.54	7.02	0.47	1.74	998584
Jordan	-3.88	-0.81	0	1.18	6.25	0.27	1.54	37312
Kazakhstan	-5.61	-1.79	0.04	1.22	3.14	-0.28	1.84	1911
Kuwait	-5	-0.42	0.49	1.37	5.15	0.59	1.39	31084
Latvia	-5.34	-1.15	0.04	2.34	5.89	0.57	2.21	5071
Lithuania	-4.75	-0.87	0.2	1.22	4.2	0.16	1.6	6935
Luxembourg	-6.61	-1.93	-0.37	0.53	4.83	-0.54	2.14	4623
Macedonia	-6.61	-1.08	0.23	1.38	5.28	0.18	1.82	5921
Malaysia	-4.96	-0.27	0.65	1.76	6.4	0.81	1.6	241541
Malta	-4.05	-0.97	-0.09	1.14	2.31	0	1.34	2652
Mexico	-5.79	-1.07	0.22	1.61	5.11	0.17	1.93	27020
Montenegro	-6.13	-1.18	0.24	1.4	4.74	0.18	1.89	4266
Morocco	-5.79	-1.2	0.08	1.76	4.9	0.2	1.85	14324
Netherlands	-6.61	-2.02	-0.38	1.21	5.84	-0.29	2.3	43852
New Zealand	-4.36	-1.43	0.04	1.2	5.23	-0.09	1.91	25136
Nigeria	-5.79	-1.45	-0.34	1.51	6.21	-0.05	2.11	24989
Norway	-6.61	-0.96	0.14	1.43	6.64	0.27	1.78	57329
Oman	-5.57	-0.99	-0.01	1.16	4.41	-0.01	1.61	16181
Pakistan	-5.79	-0.99	0.81	2.76	6.4	0.83	2.45	65560
Peru	-5.79	-1.09	0.22	1.76	5.41	0.27	1.97	16918
Philippines	-5.79	-1.42	-0.26	1.21	5.32	-0.03	1.85	54384
Poland	-6.19	-1.59	-0.16	1.33	7.99	-0.06	2.18	102807
Portugal	-6.61	-1.69	-0.07	1.62	4.82	-0.14	2.45	18732
Romania	-6.61	-1.23	-0.01	1.29	7.99	0.1	2.07	20794
Russian Federation	-6.61	-1.88	-0.19	1.48	7.99	-0.16	2.43	33941
Saudi Arabia	-4.53	-0.75	0.15	1.48	5.34	0.44	1.56	23191
Serbia	-6.61	-1.2	0.02	1.35	6.44	0.12	1.86	20034
Singapore	-4.36	-0.68	0.32	1.6	7.02	0.56	1.73	154483
Slovakia	-4.37	-0.08	1.26	3.88	7.57	1.81	2.52	4195
Slovenia	-6.61	-1.09	0.22	1.71	7.99	0.51	2.44	11915
South Africa	-5.79	-1.43	0.27	1.97	6.4	0.27	2.29	100477
South Korea	-4.36	-0.47	0.31	1.34	7.02	0.56	1.52	430765
Spain	-6.61	-1.65	-0.19	1.34	5.53	-0.2	2.15	48438
Sri Lanka	-5.79	-0.97	-0.03	1.18	5.87	0.14	1.55	30819
Sweden	-6.61	-0.82	0.89	2.64	7.99	1.04	2.45	112533
Switzerland	-6.61	-1.11	0.17	1.44	6.36	0.23	1.97	68303
Taiwan	-4.36	-0.8	0.03	0.91	6.49	0.13	1.42	188095
Thailand	-5.35	-0.76	0.19	1.34	6.4	0.4	1.6	133542
Tunisia	-3.79	-0.8	0.18	1.31	3.32	0.25	1.32	10521
Turkey	-5.09	-1.3	-0.08	1.24	6.06	0.04	1.88	82317
Ukraine	-6.61	-0.8	0.25	1.13	6.33	0.13	1.57	8807
United Arab Emirates	-4.81	-1.01	0.03	1.11	4.25	0.07	1.57	10430
United Kingdom	-6.61	-1.19	0.22	1.88	7.99	0.45	2.27	489146
United States	-6.27	-1.92	-0.57	0.88	6.02	-0.45	2.01	1811311
Venezuela	-5.79	-1.4	0.03	1.41	6.4	-0.05	2.06	5734
Vietnam	-4.69	-1.13	-0.22	0.91	6.4	-0.02	1.66	62318

SIZE Trend								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	-1.61	-0.16	-0.02	0.13	1.92	-0.01	0.32	17836
Australia	-1.58	-0.19	0	0.18	1.85	0.01	0.4	389840
Austria	-2.13	-0.11	-0.01	0.09	2.2	-0.02	0.28	28424
Bahrain	-0.8	-0.06	0.01	0.09	1.92	0.02	0.17	4261
Bangladesh	-1.61	-0.12	-0.02	0.09	1.92	-0.01	0.25	24005
Belgium	-2.13	-0.11	-0.02	0.07	2.2	-0.02	0.27	46105
Bosnia and Herzegovina	-2.13	-0.1	0	0.13	2.2	0.03	0.28	13502
Brazil	-1.61	-0.17	-0.01	0.14	1.92	-0.01	0.32	70894
Bulgaria	-2.13	-0.15	-0.01	0.14	2.2	0	0.38	22530
Canada	-1.9	-0.16	0	0.16	1.81	0	0.37	294256
Chile	-1.61	-0.1	-0.01	0.09	1.92	0	0.22	38366
China	-0.86	-0.09	0	0.12	1.22	0.03	0.2	391310
Colombia	-1.61	-0.09	0.01	0.1	1.92	0.01	0.23	8792
Croatia	-2.13	-0.14	-0.01	0.1	2.2	-0.01	0.26	19141
Cyprus	-2.13	-0.17	0	0.18	2.2	0.01	0.35	21634
Czech Republic	-2.13	-0.14	0	0.13	2.2	-0.01	0.26	8855
Denmark	-2.13	-0.14	-0.02	0.09	2.2	-0.03	0.28	55875
Egypt	-1.61	-0.16	-0.04	0.09	1.92	-0.03	0.29	25619
Estonia	-2.06	-0.13	-0.02	0.1	2.2	-0.01	0.29	3351
Finland	-2.13	-0.12	0	0.13	2.2	0	0.26	37020
France	-2.13	-0.12	0	0.12	2.2	0	0.29	227996
Germany	-2.13	-0.17	-0.04	0.09	2.2	-0.06	0.36	266382
Greece	-2.13	-0.18	-0.03	0.13	2.2	-0.02	0.32	67665
Hong Kong	-1.58	-0.16	-0.02	0.14	1.85	0.01	0.34	303874
Hungary	-2.13	-0.2	-0.05	0.08	2.2	-0.06	0.3	9976
Iceland	-2.13	-0.12	0	0.12	2.2	0.01	0.3	6242
India	-1.71	-0.21	-0.03	0.15	1.99	-0.02	0.36	669992
Indonesia	-1.61	-0.18	-0.03	0.13	1.92	-0.01	0.34	88561
Ireland	-2.13	-0.11	0.01	0.13	2.2	0	0.3	11899
Israel	-2.13	-0.15	-0.01	0.11	2.2	-0.02	0.32	108949
Italy	-2.13	-0.11	-0.01	0.09	2.2	0	0.24	78892
Jamaica	-1.61	-0.12	0	0.12	1.92	0.01	0.3	7761
Japan	-1.58	-0.12	-0.01	0.09	1.85	-0.01	0.21	998584
Jordan	-1.61	-0.1	0.01	0.12	1.92	0.02	0.24	37312
Kazakhstan	-1.61	-0.17	0	0.15	1.92	0.02	0.47	1911
Kuwait	-1.61	-0.13	-0.02	0.09	1.92	-0.01	0.23	31084
Latvia	-2.13	-0.14	0	0.16	2.2	0.01	0.31	5071
Lithuania	-2.13	-0.13	-0.02	0.11	2.2	-0.01	0.31	6935
Luxembourg	-2.13	-0.1	0	0.1	2.2	0.01	0.29	4623
Macedonia	-2.06	-0.12	-0.01	0.09	1.92	0	0.23	5921
Malaysia	-1.61	-0.13	-0.02	0.09	1.92	-0.01	0.25	241541
Malta	-1.42	-0.06	0.01	0.09	1.92	0.02	0.21	2652
Mexico	-1.61	-0.12	-0.01	0.09	1.92	-0.01	0.25	27020
Montenegro	-2.13	-0.13	0	0.14	2.2	0	0.4	4266
Morocco	-1.61	-0.1	-0.01	0.07	1.92	-0.01	0.19	14324
Netherlands	-2.13	-0.1	0	0.11	2.2	-0.01	0.27	43852
New Zealand	-1.58	-0.09	0.01	0.11	1.85	0.01	0.26	25136
Nigeria	-1.61	-0.18	-0.03	0.11	1.92	-0.01	0.33	24989
Norway	-2.13	-0.13	0	0.13	2.2	0	0.34	57329
Oman	-1.61	-0.1	0	0.11	1.92	0.01	0.24	16181
Pakistan	-1.61	-0.18	-0.04	0.11	1.92	-0.02	0.29	65560
Peru	-1.61	-0.14	-0.01	0.12	1.92	0	0.29	16918
Philippines	-1.61	-0.15	-0.02	0.13	1.92	0.01	0.32	54384
Poland	-2.13	-0.21	-0.04	0.12	2.2	-0.04	0.37	102807
Portugal	-2.13	-0.14	-0.02	0.09	2.2	-0.02	0.26	18732
Romania	-2.13	-0.15	0	0.16	2.2	0.03	0.38	20794
Russian Federation	-2.13	-0.19	-0.03	0.13	2.2	-0.04	0.36	33941
Saudi Arabia	-1.61	-0.11	-0.01	0.09	1.92	0	0.21	23191
Serbia	-2.13	-0.13	0	0.17	2.2	0.03	0.32	20034
Singapore	-1.58	-0.14	-0.02	0.09	1.85	-0.02	0.27	154483
Slovakia	-2.13	-0.1	0.01	0.13	2.2	0.02	0.35	4195
Slovenia	-2.13	-0.16	-0.03	0.08	2.2	-0.05	0.31	11915
South Africa	-1.61	-0.16	0	0.13	1.92	-0.02	0.35	100477
South Korea	-1.58	-0.16	-0.02	0.13	1.85	-0.01	0.33	430765
Spain	-2.13	-0.1	0	0.11	2.2	0.01	0.27	48438
Sri Lanka	-1.61	-0.11	-0.01	0.09	1.92	0	0.22	30819
Sweden	-2.13	-0.14	0	0.14	2.2	0	0.34	112533
Switzerland	-2.13	-0.1	-0.01	0.08	2.2	-0.01	0.23	68303
Taiwan	-1.58	-0.12	-0.02	0.09	1.85	-0.01	0.21	188095
Thailand	-1.61	-0.14	-0.02	0.12	1.92	0	0.27	133542
Tunisia	-1.61	-0.12	-0.03	0.05	1.77	-0.02	0.19	10521
Turkey	-2.13	-0.16	-0.03	0.12	2.2	-0.01	0.29	82317
Ukraine	-2.13	-0.23	-0.01	0.19	2.2	-0.02	0.47	8807
United Arab Emirates	-1.61	-0.13	-0.02	0.09	1.92	-0.01	0.23	10430
United Kingdom	-2.13	-0.15	0	0.13	2.2	-0.02	0.35	489146
United States	-1.9	-0.15	-0.01	0.12	1.81	-0.02	0.32	1811311
Venezuela	-1.61	-0.19	-0.03	0.12	1.92	-0.01	0.35	5734
Vietnam	-1.61	-0.15	-0.02	0.11	1.92	-0.02	0.25	62318

M/B								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	0.18	0.85	1.05	1.39	19.85	1.56	2.33	16677
Australia	0.16	0.91	1.32	2.4	16.45	2.33	2.9	358981
Austria	0.13	0.94	1.06	1.37	23.17	1.32	1.18	25265
Bahrain	0.33	0.9	1.03	1.21	6.26	1.13	0.44	3995
Bangladesh	0.29	1.02	1.36	2.14	19.85	2.08	2.34	19793
Belgium	0.13	0.94	1.09	1.46	23.17	1.47	1.57	37296
Bosnia and Herzegovina	0.13	0.42	0.68	0.99	23.17	0.81	0.83	7249
Brazil	0.18	0.83	1.05	1.53	19.85	1.91	3.29	65460
Bulgaria	0.13	0.66	0.94	1.32	23.17	1.25	1.63	13914
Canada	0.2	0.96	1.28	2.02	65.04	2.32	4.94	259626
Chile	0.18	0.85	1.11	1.62	19.85	1.51	1.88	35458
China	0.67	1.5	2.17	3.35	60.34	2.97	3.36	343601
Colombia	0.18	0.8	1.03	1.26	7.53	1.16	0.7	7762
Croatia	0.13	0.7	0.92	1.15	23.17	1.06	1.09	17041
Cyprus	0.13	0.6	0.8	1.04	23.17	1.09	1.71	18162
Czech Republic	0.15	0.67	0.92	1.17	23.17	1.05	0.69	7021
Denmark	0.13	0.96	1.05	1.44	23.17	1.57	1.84	51770
Egypt	0.21	0.93	1.15	1.68	19.85	1.52	1.37	22732
Estonia	0.17	0.94	1.15	1.7	23.17	1.67	2.05	3054
Finland	0.19	1.01	1.23	1.75	23.17	1.67	1.69	34963
France	0.13	0.95	1.13	1.58	23.17	1.59	1.88	188375
Germany	0.13	1	1.22	1.71	23.17	1.74	2.07	214275
Greece	0.14	0.85	1.07	1.54	23.17	1.58	1.92	63696
Hong Kong	0.16	0.73	1.01	1.59	16.45	1.59	2.07	264568
Hungary	0.13	0.76	1	1.34	23.17	1.22	1.08	9051
Iceland	0.13	1.08	1.25	1.57	23.17	1.43	0.83	5331
India	0.19	0.77	1	1.54	14.63	1.58	1.97	585180
Indonesia	0.18	0.86	1.07	1.51	19.85	1.45	1.48	82083
Ireland	0.14	0.99	1.22	1.73	23.17	1.72	1.88	10794
Israel	0.13	0.91	1.04	1.37	23.17	1.64	2.55	88633
Italy	0.19	0.95	1.06	1.36	23.17	1.31	1.06	72985
Jamaica	0.18	0.87	1.04	1.41	19.85	1.35	1.13	6892
Japan	0.16	0.85	1	1.25	16.45	1.24	1.1	946203
Jordan	0.18	0.8	1.02	1.35	19.85	1.22	0.9	33908
Kazakhstan	0.23	0.87	0.98	1.15	19.85	1.23	1.31	1538
Kuwait	0.18	0.82	1.06	1.44	19.85	1.25	0.81	29329
Latvia	0.13	0.56	0.76	0.99	9.24	0.87	0.63	4210
Lithuania	0.34	0.8	0.98	1.32	7.38	1.15	0.62	5517
Luxembourg	0.29	0.73	0.98	1.35	23.17	2.28	4.98	3663
Macedonia	0.13	0.61	0.86	1	23.17	1.2	2.52	3539
Malaysia	0.18	0.77	0.99	1.4	19.85	1.35	1.4	225774
Malta	0.45	0.98	1.08	1.58	15.76	1.48	1.11	2199
Mexico	0.18	0.82	1.06	1.47	11.81	1.25	0.71	25210
Montenegro	0.13	0.3	0.47	0.84	23.17	0.76	1.42	2732
Morocco	0.25	1.06	1.25	1.82	15.95	1.6	0.93	13306
Netherlands	0.13	1	1.23	1.71	23.17	1.78	2.27	40572
New Zealand	0.16	0.99	1.29	2.04	16.45	2.06	2.5	23125
Nigeria	0.18	0.87	1.09	1.69	19.85	1.66	1.81	21590
Norway	0.13	0.95	1.12	1.68	23.17	1.74	2.13	52920
Oman	0.19	0.98	1.15	1.48	6.7	1.31	0.58	14845
Pakistan	0.18	0.86	1.03	1.42	19.85	1.39	1.36	37512
Peru	0.18	0.76	1.06	1.53	19.85	1.4	1.19	15086
Philippines	0.18	0.79	1.08	1.82	19.85	2.16	3.55	50503
Poland	0.13	0.84	1.09	1.6	23.17	1.6	2	78300
Portugal	0.13	0.89	1.02	1.25	23.17	1.14	0.66	16775
Romania	0.13	0.63	0.86	1.15	23.17	1.18	2	13743
Russian Federation	0.13	0.71	1	1.41	23.17	1.36	1.78	30334
Saudi Arabia	0.19	1.17	1.71	2.81	19.85	2.41	2.09	21341
Serbia	0.13	0.63	0.83	1.07	23.17	0.97	0.94	13684
Singapore	0.16	0.8	1.01	1.41	16.45	1.35	1.36	144699
Slovakia	0.14	0.69	0.9	1.05	3.2	0.89	0.3	2459
Slovenia	0.13	0.67	0.85	1.02	8.11	0.92	0.5	8292
South Africa	0.18	0.9	1.19	1.82	19.85	1.72	2.05	90921
South Korea	0.16	0.82	1	1.36	16.45	1.37	1.43	366943
Spain	0.13	0.96	1.11	1.47	23.17	1.4	1.15	44227
Sri Lanka	0.24	0.91	1.09	1.48	19.85	1.48	1.55	27691
Sweden	0.13	1.05	1.43	2.36	23.17	2.3	2.69	102616
Switzerland	0.16	1	1.15	1.66	23.17	1.61	1.53	64355
Taiwan	0.28	0.92	1.13	1.59	16.45	1.42	0.94	171157
Thailand	0.18	0.88	1.1	1.54	19.85	1.41	1.15	123050
Tunisia	0.2	0.96	1.08	1.41	7.85	1.34	0.72	9499
Turkey	0.13	0.93	1.18	1.76	23.17	2.11	3.67	76377
Ukraine	0.13	0.83	1.14	1.83	23.17	1.78	2.27	7305
United Arab Emirates	0.34	0.86	1.02	1.25	10.02	1.13	0.54	9965
United Kingdom	0.13	0.97	1.33	2.1	23.17	2.11	2.77	443173
United States	0.2	1.02	1.31	2.08	65.04	2.07	3.08	1732375
Venezuela	0.18	0.63	0.95	1.21	19.85	2.73	5.49	4440
Vietnam	0.18	0.82	0.95	1.18	19.85	1.11	0.69	57851

SIGMA								
	Min	25%	Median	75%	Max	Mean	StdDev	# Observations
Argentina	0.02	0.09	0.11	0.15	0.69	0.13	0.06	14774
Australia	0.02	0.12	0.23	0.34	1.1	0.26	0.17	320140
Austria	0.01	0.06	0.09	0.13	1.21	0.12	0.1	24303
Bahrain	0.03	0.07	0.1	0.14	0.39	0.11	0.05	2076
Bangladesh	0.03	0.1	0.13	0.16	0.7	0.14	0.06	22914
Belgium	0.01	0.06	0.08	0.12	1.44	0.1	0.08	36892
Bosnia and Herzegovina	0.02	0.11	0.16	0.21	0.77	0.17	0.09	4216
Brazil	0.02	0.09	0.13	0.21	1.15	0.17	0.13	52421
Bulgaria	0.02	0.12	0.17	0.27	1.11	0.21	0.13	10593
Canada	0.03	0.1	0.17	0.27	1.05	0.21	0.16	266199
Chile	0.02	0.06	0.08	0.11	0.83	0.1	0.07	25261
China	0.03	0.09	0.11	0.14	0.43	0.12	0.05	389292
Colombia	0.02	0.06	0.08	0.11	0.56	0.1	0.06	5634
Croatia	0.03	0.1	0.14	0.2	1.02	0.16	0.1	12469
Cyprus	0.01	0.14	0.2	0.28	1.44	0.25	0.19	15467
Czech Republic	0.03	0.09	0.12	0.16	0.65	0.13	0.05	6400
Denmark	0.01	0.07	0.1	0.16	1.29	0.13	0.11	43613
Egypt	0.03	0.1	0.13	0.18	0.68	0.15	0.08	23751
Estonia	0.01	0.07	0.11	0.18	0.68	0.14	0.09	3059
Finland	0.01	0.08	0.11	0.15	1.44	0.13	0.09	32635
France	0.01	0.08	0.11	0.16	1.44	0.13	0.09	192512
Germany	0.01	0.09	0.14	0.26	1.44	0.24	0.25	244245
Greece	0.01	0.1	0.14	0.19	0.9	0.16	0.09	64858
Hong Kong	0.02	0.11	0.15	0.23	1.09	0.18	0.1	294913
Hungary	0.02	0.09	0.13	0.2	0.74	0.16	0.1	8167
Iceland	0.03	0.07	0.09	0.14	0.61	0.11	0.07	3829
India	0.04	0.14	0.18	0.23	1.03	0.21	0.12	601167
Indonesia	0.02	0.11	0.16	0.25	1.15	0.2	0.13	71102
Ireland	0.03	0.08	0.11	0.19	1.44	0.16	0.14	9184
Israel	0.01	0.1	0.15	0.22	1.04	0.17	0.1	96086
Italy	0.01	0.07	0.09	0.12	0.69	0.11	0.05	76288
Jamaica	0.03	0.12	0.16	0.21	0.84	0.18	0.08	5250
Japan	0.02	0.08	0.11	0.15	1.1	0.12	0.07	946366
Jordan	0.02	0.1	0.12	0.15	0.88	0.13	0.06	28885
Kazakhstan	0.02	0.1	0.14	0.21	0.95	0.19	0.14	858
Kuwait	0.02	0.11	0.14	0.18	0.57	0.15	0.06	25686
Latvia	0.03	0.09	0.13	0.22	0.85	0.17	0.11	2416
Lithuania	0.02	0.08	0.12	0.17	1.02	0.14	0.09	5771
Luxembourg	0.02	0.08	0.1	0.13	0.52	0.11	0.05	2851
Macedonia	0.01	0.08	0.12	0.17	0.65	0.14	0.08	2170
Malaysia	0.02	0.09	0.14	0.2	1.15	0.16	0.1	230396
Malta	0.02	0.05	0.07	0.09	0.59	0.09	0.08	1089
Mexico	0.02	0.07	0.09	0.13	1.15	0.11	0.07	19681
Montenegro	0.01	0.13	0.19	0.28	0.87	0.22	0.13	1503
Morocco	0.02	0.07	0.1	0.12	0.52	0.1	0.04	11555
Netherlands	0.01	0.06	0.09	0.13	1.44	0.11	0.1	41315
New Zealand	0.02	0.06	0.08	0.14	1.1	0.12	0.11	20431
Nigeria	0.02	0.1	0.14	0.17	0.6	0.14	0.06	19053
Norway	0.03	0.09	0.14	0.21	1.26	0.17	0.11	46297
Oman	0.02	0.07	0.1	0.13	1.08	0.11	0.07	10941
Pakistan	0.03	0.11	0.15	0.23	1.15	0.21	0.18	54503
Peru	0.02	0.08	0.12	0.17	0.57	0.13	0.07	9366
Philippines	0.02	0.1	0.16	0.24	0.97	0.19	0.12	43117
Poland	0.02	0.11	0.16	0.26	1.44	0.21	0.15	96024
Portugal	0.01	0.07	0.1	0.15	1.18	0.13	0.1	14088
Romania	0.01	0.12	0.18	0.25	1.27	0.2	0.13	13401
Russian Federation	0.01	0.1	0.15	0.23	1.25	0.18	0.12	22498
Saudi Arabia	0.03	0.08	0.11	0.16	0.79	0.13	0.07	22323
Serbia	0.01	0.13	0.2	0.27	0.81	0.21	0.1	7064
Singapore	0.02	0.09	0.14	0.23	1.1	0.19	0.15	137623
Slovakia	0.01	0.08	0.12	0.18	0.55	0.14	0.09	1263
Slovenia	0.01	0.07	0.1	0.16	1.34	0.14	0.14	7301
South Africa	0.02	0.09	0.13	0.23	1.15	0.19	0.18	86881
South Korea	0.02	0.11	0.15	0.21	1.1	0.17	0.08	420952
Spain	0.01	0.06	0.09	0.13	0.95	0.1	0.06	40981
Sri Lanka	0.02	0.1	0.14	0.19	1.15	0.15	0.08	28564
Sweden	0.01	0.09	0.14	0.25	1.44	0.2	0.16	103719
Switzerland	0.01	0.06	0.09	0.12	1.44	0.11	0.08	59557
Taiwan	0.02	0.08	0.1	0.12	0.62	0.1	0.04	184783
Thailand	0.02	0.09	0.12	0.18	1.15	0.15	0.09	122910
Tunisia	0.02	0.06	0.07	0.09	0.52	0.08	0.04	9015
Turkey	0.01	0.1	0.13	0.18	1.25	0.15	0.07	81112
Ukraine	0.01	0.13	0.18	0.28	1.18	0.23	0.16	3815
United Arab Emirates	0.02	0.09	0.12	0.17	0.43	0.14	0.06	7554
United Kingdom	0.01	0.08	0.12	0.19	1.44	0.15	0.1	424906
United States	0.03	0.09	0.14	0.22	1.05	0.17	0.12	1736945
Venezuela	0.02	0.13	0.18	0.25	1.15	0.2	0.11	3496
Vietnam	0.02	0.11	0.14	0.19	0.62	0.15	0.06	57995

Table A.9: Exits classified as "Defaults".

Default	
Action Type	Subcategory
Bankruptcy filing	Administration, Arrangement, Canadian Companies' Creditors Arrangement Act (CCAA), Chapter 7,11,15 (United States bankruptcy code), Conservatorship, Insolvency, Japanese Corporate Reorganization Law (CRL), Judicial management, Liquidation, Pre-negotiation Chapter 11, Protection, Receivership, Rehabilitation, Rehabilitation (Thailand 1997), Reorganization, Restructuring, Section 304, Supreme Court declaration, Winding up, Work out, Sued by creditor, Petition withdrawn
Delisting	Due to bankruptcy
Default corporate action	Bankruptcy, Coupon & principal payment, Coupon payment only, Debt restructuring, Interest payment, Loan payment, Principal payment, Alternative Dispute Resolution (ADR, Japan only), Declared sick (India only), Regulatory action (Taiwan only), Financial difficulty and shut-down (Taiwan only), Buyback option

Table A.10: Exits classified as "Other Exits".

Other Exits	
Action Type	Subcategory
Delisting	Acquired/merged, Assimilated with underlying shares, Bid price below minimum, Cancellation of listing, Failure to meet listing requirements, Failure to pay listing fees, Inactive security, Insufficient assets, Insufficient capital and surplus, Insufficient number of market makers, Issue postponed, Lack of market maker interest, Lack of public interest, Liquidated, Not current in required filings, NP/FP finished, Privatized, Reorganization, Security called for redemptions, the company's request, Scheme of arrangement, Selective capital reduction of the company, From exchange to Over-the-Counter (OTC), Privatised

Table A.11: Number of defaults and other exits of 78 economics from 1990 to 2016.

Economy: Argentina						Economy: Australia					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	760	0	0.00	39	5.13
1991	0	0	NaN	0	NaN	1991	741	4	0.54	26	3.51
1992	1	0	0.00	0	0.00	1992	765	0	0.00	20	2.61
1993	1	0	0.00	0	0.00	1993	847	0	0.00	11	1.30
1994	25	0	0.00	1	4.00	1994	950	0	0.00	12	1.26
1995	97	0	0.00	4	4.12	1995	985	1	0.10	24	2.44
1996	100	0	0.00	5	5.00	1996	1034	1	0.10	29	2.80
1997	97	0	0.00	12	12.37	1997	1085	2	0.18	56	5.16
1998	89	1	1.12	8	8.99	1998	1081	3	0.28	66	6.11
1999	85	1	1.18	12	14.12	1999	1132	3	0.27	50	4.42
2000	79	1	1.27	5	6.33	2000	1259	10	0.79	58	4.61
2001	75	2	2.67	12	16.00	2001	1259	27	2.14	63	5.00
2002	79	7	8.86	3	3.80	2002	1253	8	0.64	59	4.71
2003	76	2	2.63	3	3.95	2003	1286	8	0.62	53	4.12
2004	72	0	0.00	1	1.39	2004	1393	4	0.29	46	3.30
2005	73	0	0.00	1	1.37	2005	1522	5	0.33	55	3.61
2006	75	0	0.00	0	0.00	2006	1658	3	0.18	76	4.58
2007	80	0	0.00	1	1.25	2007	1839	4	0.22	78	4.24
2008	80	0	0.00	5	6.25	2008	1834	25	1.36	73	3.98
2009	75	1	1.33	6	8.00	2009	1784	26	1.46	64	3.59
2010	73	1	1.37	0	0.00	2010	1815	5	0.28	76	4.19
2011	73	0	0.00	0	0.00	2011	1853	1	0.05	98	5.29
2012	74	0	0.00	1	1.35	2012	1814	3	0.17	92	5.07
2013	73	0	0.00	4	5.48	2013	1785	4	0.22	69	3.87
2014	70	0	0.00	4	5.71	2014	1800	7	0.39	93	5.17
2015	68	0	0.00	1	1.47	2015	1817	2	0.11	96	5.28
2016	73	1	1.37	0	0.00	2016	1864	1	0.05	57	3.06

Economy: Austria						Economy: Bahrain					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	1	0	0.00	1	100.00	1990	0	0	NaN	0	NaN
1991	78	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	89	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	100	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	111	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	118	0	0.00	1	0.85	1995	0	0	NaN	0	NaN
1996	120	0	0.00	3	2.50	1996	0	0	NaN	0	NaN
1997	123	0	0.00	4	3.25	1997	0	0	NaN	0	NaN
1998	121	0	0.00	8	6.61	1998	0	0	NaN	0	NaN
1999	119	0	0.00	10	8.40	1999	0	0	NaN	0	NaN
2000	125	0	0.00	8	6.40	2000	0	0	NaN	0	NaN
2001	127	2	1.57	6	4.72	2001	0	0	NaN	0	NaN
2002	123	0	0.00	9	7.32	2002	0	0	NaN	0	NaN
2003	122	0	0.00	13	10.66	2003	0	0	NaN	0	NaN
2004	113	0	0.00	10	8.85	2004	32	0	0.00	0	0.00
2005	111	0	0.00	8	7.21	2005	36	0	0.00	0	0.00
2006	111	0	0.00	4	3.60	2006	39	0	0.00	0	0.00
2007	115	0	0.00	5	4.35	2007	40	0	0.00	1	2.50
2008	114	2	1.75	3	2.63	2008	41	1	2.44	2	4.88
2009	111	1	0.90	3	2.70	2009	38	0	0.00	1	2.63
2010	110	1	0.91	9	8.18	2010	39	0	0.00	1	2.56
2011	102	0	0.00	9	8.82	2011	38	1	2.63	2	5.26
2012	95	1	1.05	6	6.32	2012	35	0	0.00	3	8.57
2013	91	0	0.00	4	4.40	2013	32	0	0.00	0	0.00
2014	89	0	0.00	0	0.00	2014	35	0	0.00	0	0.00
2015	91	0	0.00	11	12.09	2015	35	0	0.00	2	5.71
2016	83	0	0.00	7	8.43	2016	37	0	0.00	3	8.11

Economy: Bangladesh						Economy: Belgium					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	114	0	0.00	1	0.88
1991	0	0	NaN	0	NaN	1991	138	0	0.00	2	1.45
1992	0	0	NaN	0	NaN	1992	139	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	143	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	149	0	0.00	1	0.67
1995	0	0	NaN	0	NaN	1995	157	0	0.00	0	0.00
1996	0	0	NaN	0	NaN	1996	170	0	0.00	5	2.94
1997	0	0	NaN	0	NaN	1997	180	0	0.00	15	8.33
1998	0	0	NaN	0	NaN	1998	191	0	0.00	16	8.38
1999	161	0	0.00	0	0.00	1999	198	2	1.01	5	2.53
2000	171	0	0.00	37	21.64	2000	200	0	0.00	6	3.00
2001	144	0	0.00	30	20.83	2001	198	2	1.01	8	4.04
2002	126	0	0.00	12	9.52	2002	190	3	1.58	11	5.79
2003	125	0	0.00	22	17.60	2003	186	1	0.54	9	4.84
2004	111	0	0.00	4	3.60	2004	181	1	0.55	10	5.52
2005	208	0	0.00	1	0.48	2005	182	1	0.55	10	5.49
2006	216	0	0.00	2	0.93	2006	192	2	1.04	6	3.13
2007	226	0	0.00	2	0.88	2007	223	1	0.45	10	4.48
2008	235	0	0.00	6	2.55	2008	225	0	0.00	10	4.44
2009	237	0	0.00	42	17.72	2009	220	1	0.45	6	2.73
2010	233	0	0.00	9	3.86	2010	218	0	0.00	11	5.05
2011	231	0	0.00	3	1.30	2011	208	0	0.00	10	4.81
2012	241	0	0.00	0	0.00	2012	204	1	0.49	3	1.47
2013	256	0	0.00	1	0.39	2013	207	2	0.97	11	5.31
2014	273	0	0.00	0	0.00	2014	197	1	0.51	16	8.12
2015	285	0	0.00	0	0.00	2015	190	0	0.00	8	4.21
2016	294	0	0.00	1	0.34	2016	196	1	0.51	7	3.57

Economy: Bosnia and Herzegovina						Economy: Brazil					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	266	0	0.00	0	0.00
1995	0	0	NaN	0	NaN	1995	298	0	0.00	5	1.68
1996	0	0	NaN	0	NaN	1996	309	0	0.00	6	1.94
1997	0	0	NaN	0	NaN	1997	324	1	0.31	22	6.79
1998	0	0	NaN	0	NaN	1998	357	1	0.28	32	8.96
1999	0	0	NaN	0	NaN	1999	349	1	0.29	26	7.45
2000	0	0	NaN	0	NaN	2000	335	2	0.60	29	8.66
2001	0	0	NaN	0	NaN	2001	314	0	0.00	34	10.83
2002	0	0	NaN	0	NaN	2002	296	1	0.34	23	7.77
2003	0	0	NaN	0	NaN	2003	287	2	0.70	14	4.88
2004	0	0	NaN	0	NaN	2004	284	0	0.00	14	4.93
2005	0	0	NaN	0	NaN	2005	286	1	0.35	17	5.94
2006	287	0	0.00	0	0.00	2006	301	0	0.00	14	4.65
2007	326	0	0.00	1	0.31	2007	356	0	0.00	14	3.93
2008	338	0	0.00	27	7.99	2008	355	1	0.28	21	5.92
2009	316	0	0.00	114	36.08	2009	343	0	0.00	14	4.08
2010	211	0	0.00	39	18.48	2010	344	0	0.00	19	5.52
2011	186	0	0.00	50	26.88	2011	338	0	0.00	14	4.14
2012	150	0	0.00	20	13.33	2012	334	6	1.80	22	6.59
2013	144	0	0.00	18	12.50	2013	323	7	2.17	8	2.48
2014	149	0	0.00	16	10.74	2014	315	6	1.90	10	3.17
2015	189	0	0.00	11	5.82	2015	319	2	0.63	14	4.39
2016	248	0	0.00	4	1.61	2016	322	3	0.93	13	4.04

Economy: Bulgaria					
Year	Active	Defaults		Others	
		#	%	#	%
1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN
1997	0	0	NaN	0	NaN
1998	0	0	NaN	0	NaN
1999	0	0	NaN	0	NaN
2000	14	0	0.00	0	0.00
2001	25	0	0.00	0	0.00
2002	32	0	0.00	0	0.00
2003	36	0	0.00	1	2.78
2004	39	0	0.00	0	0.00
2005	141	1	0.71	1	0.71
2006	218	0	0.00	0	0.00
2007	242	0	0.00	8	3.31
2008	256	0	0.00	16	6.25
2009	243	0	0.00	21	8.64
2010	228	1	0.44	25	10.96
2011	208	0	0.00	20	9.62
2012	199	0	0.00	18	9.05
2013	189	0	0.00	13	6.88
2014	185	2	1.08	15	8.11
2015	179	0	0.00	10	5.59
2016	194	0	0.00	5	2.58

Economy: Canada					
Year	Active	Defaults		Others	
		#	%	#	%
1990	925	0	0.00	63	6.81
1991	927	0	0.00	52	5.61
1992	984	1	0.10	22	2.24
1993	1167	0	0.00	6	0.51
1994	1335	0	0.00	8	0.60
1995	1469	0	0.00	15	1.02
1996	1658	0	0.00	35	2.11
1997	1893	6	0.32	101	5.34
1998	1992	7	0.35	202	10.14
1999	1920	13	0.68	706	36.77
2000	1340	8	0.60	182	13.58
2001	1233	20	1.62	227	18.41
2002	1052	6	0.57	95	9.03
2003	1048	13	1.24	85	8.11
2004	1078	6	0.56	77	7.14
2005	1120	2	0.18	82	7.32
2006	1167	3	0.26	93	7.97
2007	1225	3	0.24	108	8.82
2008	1206	12	1.00	98	8.13
2009	1155	13	1.13	114	9.87
2010	1147	3	0.26	82	7.15
2011	1168	5	0.43	84	7.19
2012	1154	6	0.52	89	7.71
2013	1137	3	0.26	82	7.21
2014	1148	7	0.61	88	7.67
2015	1165	7	0.60	93	7.98
2016	1142	11	0.96	73	6.39

Economy: Chile						Economy: China					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	8	0	0.00	0	0.00
1991	0	0	NaN	0	NaN	1991	10	0	0.00	0	0.00
1992	0	0	NaN	0	NaN	1992	45	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	159	0	0.00	0	0.00
1994	145	0	0.00	0	0.00	1994	271	1	0.37	0	0.00
1995	167	0	0.00	1	0.60	1995	308	6	1.95	0	0.00
1996	177	0	0.00	0	0.00	1996	518	10	1.93	0	0.00
1997	190	0	0.00	0	0.00	1997	730	15	2.05	1	0.14
1998	193	0	0.00	4	2.07	1998	870	34	3.91	1	0.11
1999	192	0	0.00	9	4.69	1999	948	23	2.43	3	0.32
2000	184	0	0.00	6	3.26	2000	1093	27	2.47	5	0.46
2001	181	1	0.55	6	3.31	2001	1190	49	4.12	13	1.09
2002	179	1	0.56	5	2.79	2002	1252	51	4.07	12	0.96
2003	176	0	0.00	7	3.98	2003	1305	43	3.30	12	0.92
2004	180	0	0.00	2	1.11	2004	1457	106	7.28	14	0.96
2005	185	0	0.00	5	2.70	2005	1445	93	6.44	16	1.11
2006	186	0	0.00	7	3.76	2006	1462	62	4.24	32	2.19
2007	181	0	0.00	3	1.66	2007	1538	51	3.32	32	2.08
2008	181	0	0.00	5	2.76	2008	1583	39	2.46	13	0.82
2009	181	0	0.00	5	2.76	2009	1687	38	2.25	18	1.07
2010	181	0	0.00	8	4.42	2010	2013	39	1.94	16	0.79
2011	178	0	0.00	6	3.37	2011	2263	14	0.62	11	0.49
2012	182	0	0.00	7	3.85	2012	2416	15	0.62	9	0.37
2013	183	0	0.00	5	2.73	2013	2431	14	0.58	8	0.33
2014	181	0	0.00	2	1.10	2014	2543	5	0.20	11	0.43
2015	186	0	0.00	9	4.84	2015	2759	2	0.07	12	0.43
2016	188	0	0.00	7	3.72	2016	2972	1	0.03	4	0.13

Economy: Colombia						Economy: Croatia					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	1	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	48	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	51	0	0.00	4	7.84	1996	0	0	NaN	0	NaN
1997	52	0	0.00	6	11.54	1997	0	0	NaN	0	NaN
1998	62	0	0.00	12	19.35	1998	0	0	NaN	0	NaN
1999	53	0	0.00	4	7.55	1999	0	0	NaN	0	NaN
2000	51	0	0.00	5	9.80	2000	0	0	NaN	0	NaN
2001	54	0	0.00	6	11.11	2001	0	0	NaN	0	NaN
2002	50	0	0.00	1	2.00	2002	30	0	0.00	0	0.00
2003	53	0	0.00	2	3.77	2003	47	0	0.00	2	4.26
2004	53	0	0.00	2	3.77	2004	56	0	0.00	2	3.57
2005	60	0	0.00	7	11.67	2005	61	0	0.00	2	3.28
2006	53	0	0.00	8	15.09	2006	202	0	0.00	3	1.49
2007	52	0	0.00	4	7.69	2007	224	0	0.00	4	1.79
2008	48	0	0.00	4	8.33	2008	221	0	0.00	30	13.57
2009	49	0	0.00	3	6.12	2009	192	0	0.00	23	11.98
2010	49	0	0.00	1	2.04	2010	172	1	0.58	13	7.56
2011	48	0	0.00	1	2.08	2011	163	0	0.00	10	6.13
2012	50	1	2.00	2	4.00	2012	157	1	0.64	14	8.92
2013	49	0	0.00	1	2.04	2013	145	0	0.00	14	9.66
2014	50	0	0.00	3	6.00	2014	147	1	0.68	14	9.52
2015	47	0	0.00	1	2.13	2015	138	0	0.00	11	7.97
2016	51	0	0.00	3	5.88	2016	139	0	0.00	8	5.76

Economy: Cyprus						Economy: Czech Republic					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	1	0	0.00	0	0.00
1995	0	0	NaN	0	NaN	1995	51	0	0.00	1	1.96
1996	37	0	0.00	1	2.70	1996	148	0	0.00	0	0.00
1997	43	0	0.00	0	0.00	1997	586	0	0.00	319	54.44
1998	50	0	0.00	2	4.00	1998	268	1	0.37	30	11.19
1999	59	0	0.00	1	1.69	1999	238	3	1.26	85	35.71
2000	120	0	0.00	3	2.50	2000	152	7	4.61	24	15.79
2001	144	0	0.00	5	3.47	2001	122	2	1.64	39	31.97
2002	149	0	0.00	0	0.00	2002	82	1	1.22	21	25.61
2003	150	0	0.00	3	2.00	2003	60	0	0.00	15	25.00
2004	149	0	0.00	5	3.36	2004	48	0	0.00	11	22.92
2005	146	0	0.00	6	4.11	2005	37	0	0.00	15	40.54
2006	142	0	0.00	3	2.11	2006	24	0	0.00	8	33.33
2007	144	0	0.00	7	4.86	2007	17	0	0.00	2	11.76
2008	140	0	0.00	11	7.86	2008	16	0	0.00	0	0.00
2009	129	0	0.00	9	6.98	2009	17	0	0.00	4	23.53
2010	124	0	0.00	10	8.06	2010	16	0	0.00	0	0.00
2011	114	0	0.00	11	9.65	2011	19	1	5.26	1	5.26
2012	105	0	0.00	22	20.95	2012	17	0	0.00	1	5.88
2013	86	2	2.33	21	24.42	2013	17	0	0.00	3	17.65
2014	67	0	0.00	9	13.43	2014	15	0	0.00	1	6.67
2015	67	0	0.00	4	5.97	2015	15	0	0.00	0	0.00
2016	79	0	0.00	1	1.27	2016	19	0	0.00	2	10.53

Economy: Denmark						Economy: Egypt					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	105	0	0.00	1	0.95	1990	0	0	NaN	0	NaN
1991	145	0	0.00	1	0.69	1991	0	0	NaN	0	NaN
1992	167	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	173	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	182	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	208	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	221	0	0.00	0	0.00	1996	0	0	NaN	0	NaN
1997	226	0	0.00	5	2.21	1997	0	0	NaN	0	NaN
1998	233	0	0.00	11	4.72	1998	0	0	NaN	0	NaN
1999	227	0	0.00	12	5.29	1999	0	0	NaN	0	NaN
2000	225	0	0.00	10	4.44	2000	0	0	NaN	0	NaN
2001	219	5	2.28	15	6.85	2001	0	0	NaN	0	NaN
2002	199	2	1.01	10	5.03	2002	0	0	NaN	0	NaN
2003	191	1	0.52	9	4.71	2003	0	0	NaN	0	NaN
2004	184	2	1.09	10	5.43	2004	0	0	NaN	0	NaN
2005	180	0	0.00	9	5.00	2005	0	0	NaN	0	NaN
2006	198	0	0.00	6	3.03	2006	172	0	0.00	4	2.33
2007	223	1	0.45	3	1.35	2007	194	0	0.00	4	2.06
2008	228	1	0.44	9	3.95	2008	205	0	0.00	2	0.98
2009	219	4	1.83	6	2.74	2009	208	0	0.00	8	3.85
2010	213	0	0.00	13	6.10	2010	218	0	0.00	20	9.17
2011	202	2	0.99	10	4.95	2011	214	0	0.00	3	1.40
2012	191	2	1.05	11	5.76	2012	217	0	0.00	5	2.30
2013	181	4	2.21	10	5.52	2013	223	0	0.00	1	0.45
2014	170	2	1.18	13	7.65	2014	231	0	0.00	4	1.73
2015	159	1	0.63	6	3.77	2015	236	1	0.42	3	1.27
2016	156	0	0.00	13	8.33	2016	240	0	0.00	1	0.42

Economy: Estonia						Economy: Finland					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	17	0	0.00	1	5.88
1991	0	0	NaN	0	NaN	1991	27	0	0.00	0	0.00
1992	0	0	NaN	0	NaN	1992	92	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	95	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	99	0	0.00	1	1.01
1995	0	0	NaN	0	NaN	1995	106	0	0.00	0	0.00
1996	0	0	NaN	0	NaN	1996	111	0	0.00	0	0.00
1997	17	0	0.00	0	0.00	1997	124	0	0.00	0	0.00
1998	19	0	0.00	0	0.00	1998	134	1	0.75	5	3.73
1999	20	0	0.00	0	0.00	1999	156	0	0.00	9	5.77
2000	21	0	0.00	3	14.29	2000	165	0	0.00	11	6.67
2001	18	0	0.00	3	16.67	2001	162	1	0.62	9	5.56
2002	15	0	0.00	3	20.00	2002	153	1	0.65	5	3.27
2003	12	0	0.00	0	0.00	2003	148	1	0.68	5	3.38
2004	12	0	0.00	0	0.00	2004	144	0	0.00	9	6.25
2005	15	0	0.00	1	6.67	2005	140	0	0.00	5	3.57
2006	16	0	0.00	2	12.50	2006	141	0	0.00	7	4.96
2007	17	0	0.00	0	0.00	2007	138	0	0.00	5	3.62
2008	18	0	0.00	0	0.00	2008	134	1	0.75	3	2.24
2009	18	0	0.00	2	11.11	2009	131	1	0.76	2	1.53
2010	17	0	0.00	1	5.88	2010	129	0	0.00	3	2.33
2011	16	0	0.00	0	0.00	2011	126	1	0.79	1	0.79
2012	17	0	0.00	0	0.00	2012	126	0	0.00	5	3.97
2013	17	0	0.00	0	0.00	2013	127	2	1.57	1	0.79
2014	17	0	0.00	1	5.88	2014	131	0	0.00	4	3.05
2015	17	0	0.00	0	0.00	2015	141	3	2.13	3	2.13
2016	18	0	0.00	0	0.00	2016	142	0	0.00	4	2.82

Economy: France						Economy: Germany					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	260	0	0.00	4	1.54	1990	195	0	0.00	2	1.03
1991	414	0	0.00	15	3.62	1991	385	0	0.00	0	0.00
1992	651	0	0.00	6	0.92	1992	413	0	0.00	3	0.73
1993	674	0	0.00	9	1.34	1993	439	0	0.00	5	1.14
1994	733	0	0.00	9	1.23	1994	610	0	0.00	2	0.33
1995	764	0	0.00	6	0.79	1995	631	0	0.00	1	0.16
1996	822	0	0.00	15	1.82	1996	661	4	0.61	9	1.36
1997	888	1	0.11	61	6.87	1997	696	3	0.43	19	2.73
1998	951	0	0.00	112	11.78	1998	770	2	0.26	15	1.95
1999	928	0	0.00	55	5.93	1999	954	2	0.21	18	1.89
2000	998	2	0.20	54	5.41	2000	1101	2	0.18	24	2.18
2001	1014	9	0.89	52	5.13	2001	1144	27	2.36	26	2.27
2002	987	6	0.61	58	5.88	2002	1152	39	3.39	75	6.51
2003	943	5	0.53	37	3.92	2003	1063	18	1.69	52	4.89
2004	933	2	0.21	55	5.89	2004	1029	8	0.78	30	2.92
2005	935	4	0.43	45	4.81	2005	1064	4	0.38	39	3.67
2006	983	3	0.31	37	3.76	2006	1217	7	0.58	33	2.71
2007	1038	4	0.39	44	4.24	2007	1377	5	0.36	45	3.27
2008	1029	9	0.87	59	5.73	2008	1488	17	1.14	59	3.97
2009	996	6	0.60	51	5.12	2009	1479	11	0.74	76	5.14
2010	979	4	0.41	76	7.76	2010	1528	1	0.07	80	5.24
2011	932	1	0.11	60	6.44	2011	1694	4	0.24	243	14.34
2012	897	1	0.11	66	7.36	2012	1488	10	0.67	411	27.62
2013	865	3	0.35	58	6.71	2013	1099	16	1.46	66	6.01
2014	853	2	0.23	46	5.39	2014	1049	7	0.67	74	7.05
2015	877	2	0.23	36	4.10	2015	1010	7	0.69	81	8.02
2016	894	3	0.34	23	2.57	2016	954	3	0.31	46	4.82

Economy: Greece						Economy: Hong Kong					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	238	0	0.00	4	1.68
1991	0	0	NaN	0	NaN	1991	318	0	0.00	4	1.26
1992	90	0	0.00	0	0.00	1992	364	0	0.00	2	0.55
1993	97	0	0.00	0	0.00	1993	432	0	0.00	2	0.46
1994	162	0	0.00	0	0.00	1994	482	0	0.00	7	1.45
1995	183	0	0.00	1	0.55	1995	509	0	0.00	5	0.98
1996	202	0	0.00	6	2.97	1996	553	0	0.00	10	1.81
1997	211	0	0.00	3	1.42	1997	632	0	0.00	8	1.27
1998	233	0	0.00	4	1.72	1998	659	2	0.30	9	1.37
1999	269	0	0.00	6	2.23	1999	698	7	1.00	6	0.86
2000	316	0	0.00	7	2.22	2000	786	5	0.64	9	1.15
2001	327	0	0.00	13	3.98	2001	873	10	1.15	16	1.83
2002	333	0	0.00	18	5.41	2002	971	4	0.41	18	1.85
2003	328	0	0.00	9	2.74	2003	1025	5	0.49	28	2.73
2004	329	0	0.00	10	3.04	2004	1061	0	0.00	30	2.83
2005	325	0	0.00	20	6.15	2005	1103	3	0.27	30	2.72
2006	307	0	0.00	15	4.89	2006	1143	2	0.17	21	1.84
2007	298	0	0.00	13	4.36	2007	1222	2	0.16	13	1.06
2008	295	0	0.00	15	5.08	2008	1252	7	0.56	15	1.20
2009	284	0	0.00	12	4.23	2009	1302	3	0.23	12	0.92
2010	273	0	0.00	12	4.40	2010	1380	1	0.07	19	1.38
2011	261	0	0.00	14	5.36	2011	1444	1	0.07	19	1.32
2012	247	0	0.00	23	9.31	2012	1494	1	0.07	22	1.47
2013	224	0	0.00	16	7.14	2013	1591	4	0.25	18	1.13
2014	209	0	0.00	12	5.74	2014	1689	1	0.06	19	1.12
2015	199	1	0.50	11	5.53	2015	1808	8	0.44	20	1.11
2016	193	0	0.00	5	2.59	2016	1905	7	0.37	11	0.58

Economy: Hungary						Economy: Iceland					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	32	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	37	0	0.00	1	2.70	1996	24	0	0.00	0	0.00
1997	43	0	0.00	4	9.30	1997	34	0	0.00	0	0.00
1998	46	0	0.00	1	2.17	1998	51	0	0.00	0	0.00
1999	55	0	0.00	0	0.00	1999	59	0	0.00	1	1.69
2000	57	1	1.75	4	7.02	2000	70	0	0.00	5	7.14
2001	53	0	0.00	4	7.55	2001	69	0	0.00	7	10.14
2002	49	0	0.00	8	16.33	2002	66	0	0.00	11	16.67
2003	43	0	0.00	2	4.65	2003	57	0	0.00	16	28.07
2004	43	0	0.00	3	6.98	2004	41	0	0.00	10	24.39
2005	41	0	0.00	3	7.32	2005	32	0	0.00	7	21.88
2006	41	0	0.00	5	12.20	2006	29	0	0.00	3	10.34
2007	37	0	0.00	3	8.11	2007	29	0	0.00	3	10.34
2008	36	0	0.00	0	0.00	2008	26	2	7.69	9	34.62
2009	39	0	0.00	0	0.00	2009	16	1	6.25	2	12.50
2010	44	0	0.00	0	0.00	2010	13	0	0.00	3	23.08
2011	48	0	0.00	3	6.25	2011	11	0	0.00	0	0.00
2012	51	1	1.96	3	5.88	2012	15	0	0.00	0	0.00
2013	48	0	0.00	2	4.17	2013	18	0	0.00	0	0.00
2014	48	0	0.00	2	4.17	2014	19	0	0.00	1	5.26
2015	47	0	0.00	5	10.64	2015	21	0	0.00	0	0.00
2016	43	1	2.33	3	6.98	2016	23	0	0.00	0	0.00

Economy: India						Economy: Indonesia					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	250	0	0.00	1	0.40	1990	0	0	NaN	0	NaN
1991	1284	0	0.00	0	0.00	1991	110	0	0.00	0	0.00
1992	1527	1	0.07	6	0.39	1992	140	0	0.00	0	0.00
1993	1961	0	0.00	38	1.94	1993	163	0	0.00	2	1.23
1994	2949	0	0.00	33	1.12	1994	208	0	0.00	5	2.40
1995	4219	2	0.05	45	1.07	1995	231	0	0.00	1	0.43
1996	4680	5	0.11	244	5.21	1996	250	1	0.40	0	0.00
1997	4501	11	0.24	772	17.15	1997	283	2	0.71	4	1.41
1998	3809	9	0.24	523	13.73	1998	301	19	6.31	2	0.66
1999	3573	11	0.31	479	13.41	1999	297	24	8.08	5	1.68
2000	3354	0	0.00	197	5.87	2000	298	12	4.03	12	4.03
2001	3312	2	0.06	139	4.20	2001	316	14	4.43	8	2.53
2002	3345	4	0.12	822	24.57	2002	326	7	2.15	14	4.29
2003	2645	6	0.23	168	6.35	2003	319	3	0.94	7	2.19
2004	2669	5	0.19	134	5.02	2004	324	4	1.23	13	4.01
2005	2760	3	0.11	243	8.80	2005	322	1	0.31	13	4.04
2006	2756	5	0.18	54	1.96	2006	327	0	0.00	6	1.83
2007	2997	4	0.13	30	1.00	2007	351	2	0.57	7	1.99
2008	3168	6	0.19	57	1.80	2008	365	0	0.00	16	4.38
2009	3256	19	0.58	41	1.26	2009	377	4	1.06	14	3.71
2010	3445	19	0.55	67	1.94	2010	391	2	0.51	10	2.56
2011	3577	18	0.50	46	1.29	2011	414	0	0.00	10	2.42
2012	3776	47	1.24	83	2.20	2012	441	1	0.23	5	1.13
2013	3834	60	1.56	101	2.63	2013	474	1	0.21	12	2.53
2014	3901	43	1.10	35	0.90	2014	490	2	0.41	4	0.82
2015	4110	45	1.09	235	5.72	2015	508	1	0.20	10	1.97
2016	4100	11	0.27	24	0.59	2016	518	2	0.39	0	0.00

Economy: Ireland						Economy: Israel					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	30	0	0.00	0	0.00	1990	0	0	NaN	0	NaN
1991	31	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	31	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	35	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	37	0	0.00	3	8.11	1994	9	0	0.00	0	0.00
1995	35	0	0.00	0	0.00	1995	84	0	0.00	0	0.00
1996	39	0	0.00	0	0.00	1996	629	0	0.00	6	0.95
1997	49	0	0.00	2	4.08	1997	647	0	0.00	19	2.94
1998	50	0	0.00	2	4.00	1998	647	0	0.00	22	3.40
1999	52	0	0.00	3	5.77	1999	640	0	0.00	17	2.66
2000	55	0	0.00	1	1.82	2000	665	0	0.00	38	5.71
2001	55	0	0.00	6	10.91	2001	637	0	0.00	59	9.26
2002	49	0	0.00	6	12.24	2002	589	1	0.17	70	11.88
2003	43	0	0.00	5	11.63	2003	536	0	0.00	39	7.28
2004	40	0	0.00	3	7.50	2004	535	0	0.00	16	2.99
2005	39	0	0.00	2	5.13	2005	550	0	0.00	23	4.18
2006	44	0	0.00	2	4.55	2006	567	0	0.00	17	3.00
2007	49	0	0.00	1	2.04	2007	613	0	0.00	17	2.77
2008	49	0	0.00	3	6.12	2008	599	0	0.00	25	4.17
2009	47	1	2.13	5	10.64	2009	578	0	0.00	18	3.11
2010	41	0	0.00	4	9.76	2010	580	1	0.17	23	3.97
2011	37	0	0.00	2	5.41	2011	570	1	0.18	36	6.32
2012	36	0	0.00	3	8.33	2012	537	0	0.00	49	9.12
2013	37	1	2.70	1	2.70	2013	496	2	0.40	31	6.25
2014	38	0	0.00	1	2.63	2014	469	1	0.21	32	6.82
2015	39	0	0.00	3	7.69	2015	442	1	0.23	20	4.52
2016	36	0	0.00	2	5.56	2016	429	0	0.00	12	2.80

Economy: Italy						Economy: Jamaica					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	170	0	0.00	2	1.18	1990	0	0	NaN	0	NaN
1991	183	0	0.00	2	1.09	1991	0	0	NaN	0	NaN
1992	187	0	0.00	2	1.07	1992	0	0	NaN	0	NaN
1993	186	0	0.00	2	1.08	1993	32	0	0.00	0	0.00
1994	198	0	0.00	2	1.01	1994	35	0	0.00	0	0.00
1995	216	0	0.00	6	2.78	1995	36	0	0.00	0	0.00
1996	222	0	0.00	6	2.70	1996	36	0	0.00	1	2.78
1997	228	0	0.00	13	5.70	1997	35	0	0.00	5	14.29
1998	238	0	0.00	11	4.62	1998	30	0	0.00	0	0.00
1999	258	0	0.00	7	2.71	1999	31	0	0.00	0	0.00
2000	296	0	0.00	16	5.41	2000	33	0	0.00	0	0.00
2001	298	0	0.00	18	6.04	2001	33	0	0.00	1	3.03
2002	295	1	0.34	12	4.07	2002	32	0	0.00	0	0.00
2003	292	6	2.05	24	8.22	2003	33	0	0.00	0	0.00
2004	270	2	0.74	10	3.70	2004	33	0	0.00	0	0.00
2005	277	0	0.00	11	3.97	2005	34	0	0.00	0	0.00
2006	291	0	0.00	15	5.15	2006	36	0	0.00	1	2.78
2007	308	0	0.00	13	4.22	2007	36	0	0.00	2	5.56
2008	303	1	0.33	15	4.95	2008	38	0	0.00	2	5.26
2009	299	3	1.00	16	5.35	2009	37	0	0.00	0	0.00
2010	289	0	0.00	11	3.81	2010	45	0	0.00	0	0.00
2011	294	0	0.00	11	3.74	2011	49	0	0.00	4	8.16
2012	294	3	1.02	15	5.10	2012	46	0	0.00	4	8.70
2013	298	2	0.67	16	5.37	2013	49	0	0.00	2	4.08
2014	308	1	0.32	13	4.22	2014	50	0	0.00	1	2.00
2015	327	1	0.31	18	5.50	2015	54	0	0.00	1	1.85
2016	330	0	0.00	14	4.24	2016	63	0	0.00	2	3.17

Economy: Japan						Economy: Jordan					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	2405	0	0.00	5	0.21	1990	0	0	NaN	0	NaN
1991	2529	0	0.00	2	0.08	1991	0	0	NaN	0	NaN
1992	2557	3	0.12	3	0.12	1992	0	0	NaN	0	NaN
1993	2646	4	0.15	6	0.23	1993	0	0	NaN	0	NaN
1994	2786	0	0.00	5	0.18	1994	0	0	NaN	0	NaN
1995	2971	2	0.07	5	0.17	1995	0	0	NaN	0	NaN
1996	3133	5	0.16	7	0.22	1996	71	0	0.00	1	1.41
1997	3267	7	0.21	16	0.49	1997	105	0	0.00	0	0.00
1998	3338	15	0.45	22	0.66	1998	119	0	0.00	1	0.84
1999	3411	8	0.23	40	1.17	1999	122	0	0.00	0	0.00
2000	3581	12	0.34	54	1.51	2000	128	0	0.00	2	1.56
2001	3709	16	0.43	59	1.59	2001	133	0	0.00	7	5.26
2002	3808	30	0.79	96	2.52	2002	130	0	0.00	4	3.08
2003	3846	19	0.49	96	2.50	2003	139	0	0.00	3	2.16
2004	3939	13	0.33	87	2.21	2004	148	0	0.00	2	1.35
2005	4029	9	0.22	88	2.18	2005	164	0	0.00	2	1.22
2006	4149	2	0.05	83	2.00	2006	195	0	0.00	4	2.05
2007	4208	6	0.14	99	2.35	2007	210	0	0.00	3	1.43
2008	4201	36	0.86	108	2.57	2008	228	0	0.00	3	1.32
2009	4118	28	0.68	135	3.28	2009	233	0	0.00	8	3.43
2010	4017	9	0.22	129	3.21	2010	231	0	0.00	6	2.60
2011	3932	4	0.10	100	2.54	2011	230	0	0.00	4	1.74
2012	3896	6	0.15	98	2.52	2012	228	0	0.00	7	3.07
2013	3868	3	0.08	74	1.91	2013	222	0	0.00	2	0.90
2014	3882	0	0.00	44	1.13	2014	225	0	0.00	11	4.89
2015	3951	4	0.10	68	1.72	2015	216	0	0.00	6	2.78
2016	3983	0	0.00	66	1.66	2016	211	0	0.00	0	0.00

Economy: Kazakhstan						Economy: Kuwait					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN	1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN	1996	51	0	0.00	0	0.00
1997	0	0	NaN	0	NaN	1997	65	0	0.00	0	0.00
1998	0	0	NaN	0	NaN	1998	67	0	0.00	0	0.00
1999	0	0	NaN	0	NaN	1999	75	0	0.00	4	5.33
2000	0	0	NaN	0	NaN	2000	72	0	0.00	2	2.78
2001	1	0	0.00	0	0.00	2001	72	0	0.00	0	0.00
2002	7	0	0.00	0	0.00	2002	80	0	0.00	2	2.50
2003	7	0	0.00	0	0.00	2003	92	0	0.00	0	0.00
2004	8	0	0.00	2	25.00	2004	103	0	0.00	0	0.00
2005	6	0	0.00	0	0.00	2005	140	0	0.00	1	0.71
2006	6	0	0.00	4	66.67	2006	158	0	0.00	0	0.00
2007	24	0	0.00	0	0.00	2007	178	0	0.00	2	1.12
2008	26	0	0.00	0	0.00	2008	187	0	0.00	5	2.67
2009	28	4	14.29	5	17.86	2009	196	1	0.51	6	3.06
2010	22	1	4.55	4	18.18	2010	200	0	0.00	8	4.00
2011	18	0	0.00	1	5.56	2011	196	0	0.00	8	4.08
2012	22	2	9.09	0	0.00	2012	199	0	0.00	6	3.02
2013	20	0	0.00	3	15.00	2013	194	0	0.00	5	2.58
2014	19	0	0.00	5	26.32	2014	195	0	0.00	6	3.08
2015	17	0	0.00	1	5.88	2015	194	0	0.00	7	3.61
2016	29	0	0.00	0	0.00	2016	195	0	0.00	14	7.18

Economy: Latvia						Economy: Lithuania					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN	1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN	1996	0	0	NaN	0	NaN
1997	0	0	NaN	0	NaN	1997	0	0	NaN	0	NaN
1998	0	0	NaN	0	NaN	1998	0	0	NaN	0	NaN
1999	0	0	NaN	0	NaN	1999	0	0	NaN	0	NaN
2000	18	0	0.00	0	0.00	2000	35	0	0.00	1	2.86
2001	34	0	0.00	3	8.82	2001	36	0	0.00	0	0.00
2002	33	0	0.00	1	3.03	2002	42	0	0.00	1	2.38
2003	32	0	0.00	7	21.88	2003	44	0	0.00	4	9.09
2004	30	0	0.00	0	0.00	2004	42	0	0.00	0	0.00
2005	33	0	0.00	0	0.00	2005	42	0	0.00	0	0.00
2006	34	0	0.00	2	5.88	2006	43	0	0.00	2	4.65
2007	36	0	0.00	0	0.00	2007	42	0	0.00	3	7.14
2008	36	0	0.00	1	2.78	2008	40	0	0.00	0	0.00
2009	35	0	0.00	2	5.71	2009	40	0	0.00	2	5.00
2010	33	0	0.00	0	0.00	2010	41	0	0.00	2	4.88
2011	33	0	0.00	1	3.03	2011	40	1	2.50	5	12.50
2012	33	0	0.00	1	3.03	2012	34	0	0.00	0	0.00
2013	33	0	0.00	2	6.06	2013	35	1	2.86	1	2.86
2014	31	0	0.00	1	3.23	2014	37	1	2.70	2	5.41
2015	32	1	3.13	3	9.38	2015	36	0	0.00	5	13.89
2016	29	0	0.00	1	3.45	2016	32	0	0.00	0	0.00

Economy: Luxembourg						Economy: Macedonia					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	1	0	0.00	0	0.00	1990	0	0	NaN	0	NaN
1991	1	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	1	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	1	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	1	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	24	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	25	0	0.00	0	0.00	1996	0	0	NaN	0	NaN
1997	30	0	0.00	2	6.67	1997	0	0	NaN	0	NaN
1998	30	0	0.00	1	3.33	1998	0	0	NaN	0	NaN
1999	32	0	0.00	4	12.50	1999	0	0	NaN	0	NaN
2000	32	0	0.00	3	9.38	2000	0	0	NaN	0	NaN
2001	29	0	0.00	2	6.90	2001	0	0	NaN	0	NaN
2002	27	0	0.00	2	7.41	2002	0	0	NaN	0	NaN
2003	26	0	0.00	0	0.00	2003	0	0	NaN	0	NaN
2004	26	0	0.00	0	0.00	2004	11	0	0.00	0	0.00
2005	27	0	0.00	1	3.70	2005	68	0	0.00	0	0.00
2006	27	0	0.00	3	11.11	2006	88	0	0.00	0	0.00
2007	25	0	0.00	3	12.00	2007	101	0	0.00	7	6.93
2008	23	0	0.00	2	8.70	2008	98	0	0.00	7	7.14
2009	21	0	0.00	3	14.29	2009	91	1	1.10	6	6.59
2010	19	0	0.00	1	5.26	2010	85	0	0.00	14	16.47
2011	19	0	0.00	2	10.53	2011	72	0	0.00	4	5.56
2012	18	0	0.00	2	11.11	2012	72	0	0.00	10	13.89
2013	16	0	0.00	1	6.25	2013	67	0	0.00	6	8.96
2014	18	0	0.00	2	11.11	2014	72	0	0.00	4	5.56
2015	18	0	0.00	2	11.11	2015	88	0	0.00	3	3.41
2016	18	0	0.00	1	5.56	2016	128	2	1.56	0	0.00

Economy: Malaysia						Economy: Malta					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	271	0	0.00	0	0.00	1990	0	0	NaN	0	NaN
1991	314	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	361	0	0.00	1	0.28	1992	0	0	NaN	0	NaN
1993	405	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	472	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	524	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	615	0	0.00	0	0.00	1996	5	0	0.00	0	0.00
1997	703	0	0.00	1	0.14	1997	6	0	0.00	0	0.00
1998	738	14	1.90	19	2.57	1998	7	0	0.00	0	0.00
1999	739	8	1.08	11	1.49	1999	7	0	0.00	0	0.00
2000	775	13	1.68	8	1.03	2000	9	0	0.00	0	0.00
2001	791	15	1.90	15	1.90	2001	11	0	0.00	0	0.00
2002	828	13	1.57	24	2.90	2002	12	0	0.00	1	8.33
2003	881	7	0.79	15	1.70	2003	11	0	0.00	0	0.00
2004	951	6	0.63	8	0.84	2004	11	0	0.00	0	0.00
2005	1027	5	0.49	26	2.53	2005	11	0	0.00	0	0.00
2006	1053	14	1.33	26	2.47	2006	12	0	0.00	0	0.00
2007	1055	13	1.23	60	5.69	2007	13	0	0.00	0	0.00
2008	1027	23	2.24	40	3.89	2008	16	0	0.00	2	12.50
2009	996	19	1.91	30	3.01	2009	14	0	0.00	2	14.29
2010	999	22	2.20	28	2.80	2010	12	0	0.00	0	0.00
2011	990	11	1.11	33	3.33	2011	15	0	0.00	0	0.00
2012	976	9	0.92	35	3.59	2012	20	0	0.00	0	0.00
2013	953	5	0.52	27	2.83	2013	21	0	0.00	0	0.00
2014	939	2	0.21	16	1.70	2014	21	0	0.00	0	0.00
2015	935	1	0.11	14	1.50	2015	22	0	0.00	2	9.09
2016	936	1	0.11	14	1.50	2016	22	0	0.00	0	0.00

Economy: Mexico						Economy: Montenegro					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	96	0	0.00	3	3.13	1994	0	0	NaN	0	NaN
1995	100	0	0.00	1	1.00	1995	0	0	NaN	0	NaN
1996	115	0	0.00	3	2.61	1996	0	0	NaN	0	NaN
1997	132	1	0.76	8	6.06	1997	0	0	NaN	0	NaN
1998	126	0	0.00	15	11.90	1998	0	0	NaN	0	NaN
1999	119	1	0.84	11	9.24	1999	0	0	NaN	0	NaN
2000	113	1	0.88	6	5.31	2000	0	0	NaN	0	NaN
2001	110	1	0.91	4	3.64	2001	0	0	NaN	0	NaN
2002	110	1	0.91	8	7.27	2002	0	0	NaN	0	NaN
2003	108	2	1.85	4	3.70	2003	40	0	0.00	1	2.50
2004	109	0	0.00	4	3.67	2004	69	0	0.00	3	4.35
2005	114	0	0.00	6	5.26	2005	101	0	0.00	2	1.98
2006	113	0	0.00	2	1.77	2006	132	0	0.00	3	2.27
2007	117	0	0.00	9	7.69	2007	150	0	0.00	5	3.33
2008	116	2	1.72	8	6.90	2008	147	0	0.00	29	19.73
2009	108	2	1.85	2	1.85	2009	126	0	0.00	27	21.43
2010	116	3	2.59	2	1.72	2010	101	0	0.00	3	2.97
2011	116	0	0.00	8	6.90	2011	100	0	0.00	26	26.00
2012	114	0	0.00	3	2.63	2012	75	0	0.00	18	24.00
2013	126	5	3.97	2	1.59	2013	61	0	0.00	13	21.31
2014	124	3	2.42	2	1.61	2014	52	0	0.00	7	13.46
2015	132	1	0.76	3	2.27	2015	57	0	0.00	0	0.00
2016	139	0	0.00	4	2.88	2016	106	0	0.00	0	0.00

Economy: Morocco						Economy: Netherlands					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	137	0	0.00	3	2.19
1991	0	0	NaN	0	NaN	1991	154	0	0.00	1	0.65
1992	0	0	NaN	0	NaN	1992	157	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	165	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	168	0	0.00	1	0.60
1995	0	0	NaN	0	NaN	1995	178	0	0.00	0	0.00
1996	16	0	0.00	0	0.00	1996	187	1	0.53	0	0.00
1997	43	0	0.00	0	0.00	1997	201	0	0.00	11	5.47
1998	49	0	0.00	0	0.00	1998	210	1	0.48	8	3.81
1999	52	0	0.00	1	1.92	1999	221	0	0.00	16	7.24
2000	53	0	0.00	0	0.00	2000	213	0	0.00	18	8.45
2001	55	0	0.00	1	1.82	2001	203	8	3.94	19	9.36
2002	54	0	0.00	0	0.00	2002	186	8	4.30	9	4.84
2003	54	0	0.00	2	3.70	2003	171	5	2.92	12	7.02
2004	54	0	0.00	1	1.85	2004	156	0	0.00	6	3.85
2005	55	0	0.00	2	3.64	2005	156	0	0.00	8	5.13
2006	63	0	0.00	1	1.59	2006	153	1	0.65	7	4.58
2007	72	0	0.00	0	0.00	2007	150	0	0.00	9	6.00
2008	78	0	0.00	1	1.28	2008	143	1	0.70	8	5.59
2009	77	0	0.00	1	1.30	2009	140	4	2.86	2	1.43
2010	78	0	0.00	4	5.13	2010	135	0	0.00	5	3.70
2011	77	0	0.00	1	1.30	2011	132	0	0.00	7	5.30
2012	77	0	0.00	0	0.00	2012	127	0	0.00	5	3.94
2013	78	0	0.00	3	3.85	2013	124	1	0.81	8	6.45
2014	76	0	0.00	2	2.63	2014	122	2	1.64	6	4.92
2015	76	0	0.00	3	3.95	2015	127	2	1.57	7	5.51
2016	74	0	0.00	1	1.35	2016	124	0	0.00	5	4.03

Economy: New Zealand						Economy: Nigeria					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	30	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	33	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	41	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	43	0	0.00	1	2.33	1995	0	0	NaN	0	NaN
1996	47	0	0.00	1	2.13	1996	0	0	NaN	0	NaN
1997	49	0	0.00	0	0.00	1997	0	0	NaN	0	NaN
1998	51	0	0.00	0	0.00	1998	0	0	NaN	0	NaN
1999	56	0	0.00	0	0.00	1999	0	0	NaN	0	NaN
2000	64	0	0.00	0	0.00	2000	0	0	NaN	0	NaN
2001	72	0	0.00	0	0.00	2001	0	0	NaN	0	NaN
2002	77	0	0.00	0	0.00	2002	102	0	0.00	0	0.00
2003	89	0	0.00	0	0.00	2003	107	0	0.00	5	4.67
2004	104	0	0.00	0	0.00	2004	130	0	0.00	4	3.08
2005	108	0	0.00	0	0.00	2005	140	0	0.00	2	1.43
2006	114	0	0.00	0	0.00	2006	157	0	0.00	3	1.91
2007	122	0	0.00	0	0.00	2007	170	0	0.00	1	0.59
2008	123	0	0.00	1	0.81	2008	197	0	0.00	12	6.09
2009	123	0	0.00	0	0.00	2009	198	0	0.00	9	4.55
2010	128	0	0.00	3	2.34	2010	193	0	0.00	7	3.63
2011	130	0	0.00	2	1.54	2011	189	0	0.00	12	6.35
2012	131	0	0.00	5	3.82	2012	180	0	0.00	2	1.11
2013	135	2	1.48	7	5.19	2013	186	0	0.00	6	3.23
2014	143	0	0.00	6	4.20	2014	183	0	0.00	4	2.19
2015	142	0	0.00	5	3.52	2015	180	0	0.00	1	0.56
2016	148	1	0.68	7	4.73	2016	184	1	0.54	10	5.43

Economy: Norway						Economy: Oman					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	38	0	0.00	3	7.89	1990	0	0	NaN	0	NaN
1991	61	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	82	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	98	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	112	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	134	0	0.00	0	0.00	1995	0	0	NaN	0	NaN
1996	157	0	0.00	0	0.00	1996	52	0	0.00	0	0.00
1997	209	0	0.00	8	3.83	1997	71	0	0.00	0	0.00
1998	228	0	0.00	11	4.82	1998	84	0	0.00	5	5.95
1999	226	0	0.00	22	9.73	1999	80	0	0.00	6	7.50
2000	228	1	0.44	29	12.72	2000	77	0	0.00	2	2.60
2001	238	3	1.26	18	7.56	2001	76	0	0.00	13	17.11
2002	224	4	1.79	9	4.02	2002	86	0	0.00	0	0.00
2003	218	4	1.83	26	11.93	2003	95	0	0.00	2	2.11
2004	211	0	0.00	13	6.16	2004	99	0	0.00	2	2.02
2005	253	0	0.00	17	6.72	2005	103	0	0.00	5	4.85
2006	288	0	0.00	30	10.42	2006	105	0	0.00	2	1.90
2007	298	0	0.00	33	11.07	2007	105	0	0.00	4	3.81
2008	278	2	0.72	28	10.07	2008	103	0	0.00	11	10.68
2009	251	5	1.99	21	8.37	2009	93	0	0.00	1	1.08
2010	242	1	0.41	18	7.44	2010	94	0	0.00	6	6.38
2011	237	1	0.42	11	4.64	2011	89	0	0.00	4	4.49
2012	230	1	0.43	13	5.65	2012	89	0	0.00	3	3.37
2013	227	3	1.32	22	9.69	2013	92	0	0.00	0	0.00
2014	220	0	0.00	14	6.36	2014	96	0	0.00	5	5.21
2015	221	4	1.81	14	6.33	2015	95	0	0.00	6	6.32
2016	223	6	2.69	5	2.24	2016	97	0	0.00	1	1.03

Economy: Pakistan						Economy: Peru					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	1	0	0.00	0	0.00
1992	0	0	NaN	0	NaN	1992	1	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	1	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	59	0	0.00	0	0.00
1995	0	0	NaN	0	NaN	1995	90	0	0.00	0	0.00
1996	0	0	NaN	0	NaN	1996	102	0	0.00	2	1.96
1997	0	0	NaN	0	NaN	1997	126	0	0.00	8	6.35
1998	347	0	0.00	0	0.00	1998	127	0	0.00	17	13.39
1999	420	0	0.00	2	0.48	1999	117	0	0.00	19	16.24
2000	446	0	0.00	0	0.00	2000	106	2	1.89	18	16.98
2001	461	0	0.00	7	1.52	2001	92	0	0.00	10	10.87
2002	491	0	0.00	3	0.61	2002	91	2	2.20	8	8.79
2003	508	0	0.00	0	0.00	2003	88	2	2.27	9	10.23
2004	523	0	0.00	2	0.38	2004	88	1	1.14	5	5.68
2005	538	0	0.00	7	1.30	2005	89	0	0.00	3	3.37
2006	543	0	0.00	10	1.84	2006	94	0	0.00	4	4.26
2007	557	0	0.00	6	1.08	2007	99	1	1.01	1	1.01
2008	563	0	0.00	9	1.60	2008	98	0	0.00	4	4.08
2009	572	0	0.00	30	5.24	2009	97	0	0.00	3	3.09
2010	551	0	0.00	26	4.72	2010	96	0	0.00	4	4.17
2011	531	0	0.00	48	9.04	2011	93	0	0.00	5	5.38
2012	491	0	0.00	26	5.30	2012	91	0	0.00	7	7.69
2013	474	0	0.00	10	2.11	2013	86	0	0.00	6	6.98
2014	475	1	0.21	10	2.11	2014	83	0	0.00	3	3.61
2015	474	0	0.00	12	2.53	2015	88	0	0.00	5	5.68
2016	472	0	0.00	12	2.54	2016	104	0	0.00	3	2.88

Economy: Philippines					
Year	Active	Defaults		Others	
		#	%	#	%
1990	66	0	0.00	0	0.00
1991	71	0	0.00	0	0.00
1992	94	0	0.00	1	1.06
1993	115	1	0.87	0	0.00
1994	139	0	0.00	4	2.88
1995	161	0	0.00	1	0.62
1996	183	0	0.00	0	0.00
1997	194	0	0.00	2	1.03
1998	197	1	0.51	5	2.54
1999	200	4	2.00	3	1.50
2000	200	2	1.00	6	3.00
2001	198	2	1.01	5	2.53
2002	204	6	2.94	9	4.41
2003	202	5	2.48	2	0.99
2004	206	6	2.91	5	2.43
2005	204	3	1.47	3	1.47
2006	208	2	0.96	4	1.92
2007	221	1	0.45	8	3.62
2008	219	3	1.37	0	0.00
2009	224	2	0.89	1	0.45
2010	229	0	0.00	1	0.44
2011	240	0	0.00	1	0.42
2012	247	1	0.40	9	3.64
2013	247	0	0.00	3	1.21
2014	253	0	0.00	2	0.79
2015	256	0	0.00	13	5.08
2016	247	0	0.00	2	0.81

Economy: Poland					
Year	Active	Defaults		Others	
		#	%	#	%
1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN
1994	31	0	0.00	0	0.00
1995	58	0	0.00	0	0.00
1996	76	0	0.00	0	0.00
1997	138	0	0.00	1	0.72
1998	193	0	0.00	3	1.55
1999	214	0	0.00	3	1.40
2000	224	1	0.45	6	2.68
2001	226	1	0.44	5	2.21
2002	226	1	0.44	20	8.85
2003	210	3	1.43	14	6.67
2004	222	0	0.00	8	3.60
2005	244	1	0.41	9	3.69
2006	263	0	0.00	9	3.42
2007	339	0	0.00	9	2.65
2008	433	0	0.00	2	0.46
2009	467	1	0.21	9	1.93
2010	559	0	0.00	9	1.61
2011	748	0	0.00	13	1.74
2012	855	9	1.05	18	2.11
2013	882	5	0.57	32	3.63
2014	887	6	0.68	28	3.16
2015	902	12	1.33	38	4.21
2016	883	5	0.57	28	3.17

Economy: Portugal						Economy: Romania					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	1	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	1	0	0.00	0	0.00	1992	0	0	NaN	0	NaN
1993	78	0	0.00	1	1.28	1993	0	0	NaN	0	NaN
1994	89	0	0.00	3	3.37	1994	0	0	NaN	0	NaN
1995	97	0	0.00	1	1.03	1995	0	0	NaN	0	NaN
1996	98	0	0.00	1	1.02	1996	0	0	NaN	0	NaN
1997	105	0	0.00	7	6.67	1997	50	0	0.00	0	0.00
1998	104	0	0.00	11	10.58	1998	75	0	0.00	0	0.00
1999	105	0	0.00	14	13.33	1999	140	0	0.00	1	0.71
2000	98	0	0.00	13	13.27	2000	152	0	0.00	15	9.87
2001	86	0	0.00	11	12.79	2001	147	0	0.00	26	17.69
2002	75	0	0.00	7	9.33	2002	123	0	0.00	4	3.25
2003	70	0	0.00	3	4.29	2003	120	0	0.00	12	10.00
2004	72	0	0.00	2	2.78	2004	119	0	0.00	7	5.88
2005	72	0	0.00	3	4.17	2005	149	1	0.67	12	8.05
2006	71	0	0.00	4	5.63	2006	163	0	0.00	21	12.88
2007	70	0	0.00	6	8.57	2007	157	0	0.00	9	5.73
2008	67	0	0.00	2	2.99	2008	155	0	0.00	17	10.97
2009	65	0	0.00	3	4.62	2009	139	0	0.00	21	15.11
2010	63	0	0.00	2	3.17	2010	120	0	0.00	5	4.17
2011	61	0	0.00	3	4.92	2011	121	0	0.00	7	5.79
2012	60	0	0.00	3	5.00	2012	122	0	0.00	5	4.10
2013	59	0	0.00	1	1.69	2013	121	2	1.65	7	5.79
2014	59	1	1.69	1	1.69	2014	117	1	0.85	4	3.42
2015	59	2	3.39	1	1.69	2015	287	2	0.70	27	9.41
2016	57	0	0.00	0	0.00	2016	304	0	0.00	0	0.00

Economy: Russian Federation						Economy: Saudi Arabia					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN	1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN	1996	0	0	NaN	0	NaN
1997	58	0	0.00	0	0.00	1997	0	0	NaN	0	NaN
1998	62	2	3.23	4	6.45	1998	0	0	NaN	0	NaN
1999	64	0	0.00	10	15.63	1999	0	0	NaN	0	NaN
2000	68	0	0.00	5	7.35	2000	62	0	0.00	0	0.00
2001	76	0	0.00	4	5.26	2001	65	0	0.00	0	0.00
2002	92	0	0.00	26	28.26	2002	68	0	0.00	1	1.47
2003	94	0	0.00	2	2.13	2003	69	0	0.00	0	0.00
2004	131	2	1.53	3	2.29	2004	72	0	0.00	0	0.00
2005	175	0	0.00	6	3.43	2005	76	0	0.00	0	0.00
2006	249	2	0.80	20	8.03	2006	86	0	0.00	0	0.00
2007	287	0	0.00	14	4.88	2007	111	0	0.00	2	1.80
2008	327	1	0.31	26	7.95	2008	126	0	0.00	0	0.00
2009	327	7	2.14	15	4.59	2009	135	0	0.00	1	0.74
2010	329	1	0.30	13	3.95	2010	145	0	0.00	0	0.00
2011	331	0	0.00	41	12.39	2011	149	0	0.00	0	0.00
2012	298	2	0.67	60	20.13	2012	157	0	0.00	1	0.64
2013	254	0	0.00	52	20.47	2013	162	1	0.62	0	0.00
2014	205	2	0.98	33	16.10	2014	167	0	0.00	4	2.40
2015	238	2	0.84	21	8.82	2015	167	1	0.60	0	0.00
2016	231	2	0.87	4	1.73	2016	171	0	0.00	0	0.00

Economy: Serbia						Economy: Singapore					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	162	0	0.00	8	4.94
1991	0	0	NaN	0	NaN	1991	168	0	0.00	3	1.79
1992	0	0	NaN	0	NaN	1992	181	0	0.00	4	2.21
1993	0	0	NaN	0	NaN	1993	201	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	231	0	0.00	0	0.00
1995	0	0	NaN	0	NaN	1995	252	1	0.40	0	0.00
1996	0	0	NaN	0	NaN	1996	276	2	0.72	1	0.36
1997	0	0	NaN	0	NaN	1997	309	1	0.32	6	1.94
1998	0	0	NaN	0	NaN	1998	329	3	0.91	3	0.91
1999	0	0	NaN	0	NaN	1999	376	4	1.06	11	2.93
2000	0	0	NaN	0	NaN	2000	444	0	0.00	10	2.25
2001	0	0	NaN	0	NaN	2001	471	2	0.42	22	4.67
2002	0	0	NaN	0	NaN	2002	481	2	0.42	21	4.37
2003	0	0	NaN	0	NaN	2003	519	1	0.19	11	2.12
2004	1	0	0.00	0	0.00	2004	589	2	0.34	7	1.19
2005	183	0	0.00	0	0.00	2005	643	4	0.62	8	1.24
2006	317	0	0.00	11	3.47	2006	693	1	0.14	19	2.74
2007	449	0	0.00	29	6.46	2007	731	0	0.00	15	2.05
2008	467	0	0.00	104	22.27	2008	748	4	0.53	23	3.07
2009	386	0	0.00	101	26.17	2009	755	13	1.72	16	2.12
2010	305	0	0.00	62	20.33	2010	762	2	0.26	31	4.07
2011	273	0	0.00	68	24.91	2011	751	1	0.13	34	4.53
2012	228	0	0.00	46	20.18	2012	739	0	0.00	28	3.79
2013	205	0	0.00	36	17.56	2013	738	1	0.14	25	3.39
2014	183	1	0.55	35	19.13	2014	740	0	0.00	27	3.65
2015	173	0	0.00	29	16.76	2015	734	6	0.82	26	3.54
2016	203	0	0.00	18	8.87	2016	724	7	0.97	24	3.31

Economy: Slovakia						Economy: Slovenia					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN	1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN	1996	0	0	NaN	0	NaN
1997	0	0	NaN	0	NaN	1997	0	0	NaN	0	NaN
1998	10	0	0.00	0	0.00	1998	74	0	0.00	1	1.35
1999	12	0	0.00	0	0.00	1999	98	0	0.00	3	3.06
2000	13	0	0.00	0	0.00	2000	118	0	0.00	4	3.39
2001	18	0	0.00	1	5.56	2001	131	0	0.00	17	12.98
2002	27	0	0.00	0	0.00	2002	124	0	0.00	19	15.32
2003	41	0	0.00	0	0.00	2003	116	0	0.00	8	6.90
2004	42	0	0.00	0	0.00	2004	126	0	0.00	12	9.52
2005	44	0	0.00	6	13.64	2005	119	0	0.00	25	21.01
2006	39	0	0.00	2	5.13	2006	96	0	0.00	16	16.67
2007	39	0	0.00	6	15.38	2007	83	0	0.00	9	10.84
2008	38	0	0.00	2	5.26	2008	81	0	0.00	2	2.47
2009	49	0	0.00	7	14.29	2009	80	3	3.75	8	10.00
2010	47	0	0.00	1	2.13	2010	70	0	0.00	5	7.14
2011	51	0	0.00	2	3.92	2011	65	1	1.54	6	9.23
2012	50	0	0.00	5	10.00	2012	59	1	1.69	3	5.08
2013	46	0	0.00	3	6.52	2013	57	2	3.51	7	12.28
2014	43	0	0.00	6	13.95	2014	52	2	3.85	4	7.69
2015	38	0	0.00	9	23.68	2015	46	0	0.00	5	10.87
2016	37	0	0.00	0	0.00	2016	42	0	0.00	6	14.29

Economy: South Africa						Economy: South Korea					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	617	0	0.00	0	0.00
1991	0	0	NaN	0	NaN	1991	634	0	0.00	0	0.00
1992	388	0	0.00	0	0.00	1992	638	1	0.16	0	0.00
1993	400	0	0.00	0	0.00	1993	645	0	0.00	0	0.00
1994	429	0	0.00	2	0.47	1994	675	0	0.00	0	0.00
1995	474	0	0.00	3	0.63	1995	704	1	0.14	0	0.00
1996	501	0	0.00	7	1.40	1996	760	6	0.79	1	0.13
1997	548	0	0.00	12	2.19	1997	1112	52	4.68	2	0.18
1998	631	2	0.32	58	9.19	1998	1125	81	7.20	12	1.07
1999	637	3	0.47	53	8.32	1999	1161	32	2.76	39	3.36
2000	591	6	1.02	85	14.38	2000	1294	17	1.31	44	3.40
2001	509	9	1.77	79	15.52	2001	1430	17	1.19	27	1.89
2002	428	7	1.64	65	15.19	2002	1574	14	0.89	37	2.35
2003	363	1	0.28	41	11.29	2003	1612	11	0.68	30	1.86
2004	329	3	0.91	36	10.94	2004	1646	8	0.49	53	3.22
2005	309	2	0.65	21	6.80	2005	1694	8	0.47	53	3.13
2006	319	0	0.00	17	5.33	2006	1720	2	0.12	14	0.81
2007	360	0	0.00	15	4.17	2007	1793	1	0.06	15	0.84
2008	356	0	0.00	18	5.06	2008	1846	10	0.54	27	1.46
2009	344	1	0.29	16	4.65	2009	1895	7	0.37	81	4.27
2010	339	2	0.59	18	5.31	2010	1924	10	0.52	91	4.73
2011	326	1	0.31	17	5.21	2011	1912	4	0.21	69	3.61
2012	318	5	1.57	17	5.35	2012	1881	5	0.27	74	3.93
2013	324	3	0.93	21	6.48	2013	1903	11	0.58	46	2.42
2014	323	0	0.00	19	5.88	2014	1960	5	0.26	38	1.94
2015	324	2	0.62	24	7.41	2015	2087	2	0.10	42	2.01
2016	309	0	0.00	10	3.24	2016	2178	4	0.18	26	1.19

Economy: Spain						Economy: Sri Lanka					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	104	0	0.00	0	0.00	1990	0	0	NaN	0	NaN
1991	156	0	0.00	0	0.00	1991	0	0	NaN	0	NaN
1992	164	0	0.00	1	0.61	1992	0	0	NaN	0	NaN
1993	191	0	0.00	5	2.62	1993	1	0	0.00	0	0.00
1994	257	0	0.00	1	0.39	1994	1	0	0.00	0	0.00
1995	273	0	0.00	4	1.47	1995	132	0	0.00	0	0.00
1996	283	0	0.00	5	1.77	1996	145	0	0.00	0	0.00
1997	290	0	0.00	7	2.41	1997	152	0	0.00	0	0.00
1998	299	0	0.00	47	15.72	1998	164	0	0.00	1	0.61
1999	265	0	0.00	33	12.45	1999	167	0	0.00	1	0.60
2000	245	0	0.00	14	5.71	2000	174	0	0.00	1	0.57
2001	246	0	0.00	20	8.13	2001	178	0	0.00	1	0.56
2002	240	2	0.83	18	7.50	2002	186	0	0.00	1	0.54
2003	226	0	0.00	40	17.70	2003	193	0	0.00	3	1.55
2004	194	0	0.00	15	7.73	2004	197	0	0.00	0	0.00
2005	186	0	0.00	8	4.30	2005	211	0	0.00	0	0.00
2006	194	0	0.00	26	13.40	2006	219	0	0.00	0	0.00
2007	186	1	0.54	13	6.99	2007	220	0	0.00	1	0.45
2008	178	2	1.12	8	4.49	2008	222	0	0.00	3	1.35
2009	173	0	0.00	12	6.94	2009	223	0	0.00	0	0.00
2010	174	1	0.57	11	6.32	2010	234	0	0.00	0	0.00
2011	170	0	0.00	12	7.06	2011	261	0	0.00	2	0.77
2012	165	2	1.21	5	3.03	2012	277	0	0.00	1	0.36
2013	171	6	3.51	7	4.09	2013	277	0	0.00	1	0.36
2014	174	0	0.00	9	5.17	2014	282	0	0.00	5	1.77
2015	195	1	0.51	9	4.62	2015	279	0	0.00	3	1.08
2016	217	1	0.46	2	0.92	2016	282	0	0.00	5	1.77

Economy: Sweden						Economy: Switzerland					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	41	0	0.00	0	0.00	1990	140	0	0.00	0	0.00
1991	62	0	0.00	0	0.00	1991	158	0	0.00	6	3.80
1992	121	0	0.00	0	0.00	1992	157	0	0.00	1	0.64
1993	145	0	0.00	1	0.69	1993	174	0	0.00	0	0.00
1994	173	0	0.00	2	1.16	1994	184	0	0.00	1	0.54
1995	184	0	0.00	0	0.00	1995	194	0	0.00	2	1.03
1996	238	0	0.00	0	0.00	1996	209	0	0.00	1	0.48
1997	307	0	0.00	36	11.73	1997	221	2	0.90	3	1.36
1998	320	1	0.31	20	6.25	1998	231	0	0.00	5	2.16
1999	365	1	0.27	26	7.12	1999	247	0	0.00	8	3.24
2000	402	1	0.25	34	8.46	2000	262	0	0.00	6	2.29
2001	392	4	1.02	26	6.63	2001	268	2	0.75	9	3.36
2002	382	6	1.57	21	5.50	2002	260	1	0.38	9	3.46
2003	365	2	0.55	21	5.75	2003	253	2	0.79	10	3.95
2004	379	1	0.26	21	5.54	2004	245	1	0.41	7	2.86
2005	406	2	0.49	13	3.20	2005	250	1	0.40	6	2.40
2006	457	0	0.00	21	4.60	2006	260	0	0.00	13	5.00
2007	519	1	0.19	13	2.50	2007	259	0	0.00	6	2.32
2008	542	2	0.37	28	5.17	2008	260	0	0.00	8	3.08
2009	530	4	0.75	24	4.53	2009	260	0	0.00	6	2.31
2010	535	2	0.37	28	5.23	2010	260	0	0.00	8	3.08
2011	536	3	0.56	32	5.97	2011	258	2	0.78	10	3.88
2012	524	0	0.00	41	7.82	2012	251	1	0.40	8	3.19
2013	515	3	0.58	21	4.08	2013	247	0	0.00	5	2.02
2014	572	3	0.52	26	4.55	2014	249	1	0.40	7	2.81
2015	639	2	0.31	21	3.29	2015	245	1	0.41	13	5.31
2016	703	1	0.14	22	3.13	2016	239	0	0.00	8	3.35

Economy: Taiwan						Economy: Thailand					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	147	0	0.00	0	0.00
1991	193	0	0.00	0	0.00	1991	190	0	0.00	1	0.53
1992	234	0	0.00	2	0.85	1992	279	0	0.00	0	0.00
1993	255	0	0.00	0	0.00	1993	330	0	0.00	0	0.00
1994	287	0	0.00	0	0.00	1994	377	0	0.00	0	0.00
1995	332	0	0.00	0	0.00	1995	408	1	0.25	4	0.98
1996	367	0	0.00	0	0.00	1996	445	6	1.35	1	0.22
1997	395	0	0.00	1	0.25	1997	449	21	4.68	29	6.46
1998	428	3	0.70	3	0.70	1998	407	12	2.95	31	7.62
1999	465	7	1.51	6	1.29	1999	379	15	3.96	19	5.01
2000	540	7	1.30	9	1.67	2000	371	20	5.39	9	2.43
2001	602	8	1.33	12	1.99	2001	362	8	2.21	8	2.21
2002	674	7	1.04	28	4.15	2002	379	4	1.06	9	2.37
2003	686	1	0.15	10	1.46	2003	404	4	0.99	6	1.49
2004	753	5	0.66	8	1.06	2004	446	0	0.00	10	2.24
2005	763	3	0.39	21	2.75	2005	494	3	0.61	16	3.24
2006	760	2	0.26	14	1.84	2006	500	0	0.00	5	1.00
2007	784	2	0.26	18	2.30	2007	510	2	0.39	11	2.16
2008	794	3	0.38	10	1.26	2008	513	2	0.39	11	2.14
2009	806	1	0.12	4	0.50	2009	527	10	1.90	8	1.52
2010	831	1	0.12	9	1.08	2010	525	4	0.76	10	1.90
2011	847	0	0.00	5	0.59	2011	528	2	0.38	11	2.08
2012	866	0	0.00	4	0.46	2012	535	1	0.19	6	1.12
2013	878	0	0.00	4	0.46	2013	560	1	0.18	4	0.71
2014	893	2	0.22	6	0.67	2014	594	0	0.00	5	0.84
2015	901	0	0.00	3	0.33	2015	633	1	0.16	10	1.58
2016	909	1	0.11	7	0.77	2016	650	0	0.00	3	0.46

Economy: Tunisia						Economy: Turkey					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	9	0	0.00	0	0.00
1993	0	0	NaN	0	NaN	1993	15	0	0.00	0	0.00
1994	0	0	NaN	0	NaN	1994	34	0	0.00	0	0.00
1995	0	0	NaN	0	NaN	1995	201	0	0.00	0	0.00
1996	0	0	NaN	0	NaN	1996	223	1	0.45	2	0.90
1997	0	0	NaN	0	NaN	1997	257	0	0.00	1	0.39
1998	0	0	NaN	0	NaN	1998	277	0	0.00	2	0.72
1999	33	0	0.00	0	0.00	1999	284	0	0.00	9	3.17
2000	37	0	0.00	0	0.00	2000	313	0	0.00	17	5.43
2001	41	0	0.00	0	0.00	2001	298	0	0.00	13	4.36
2002	43	0	0.00	0	0.00	2002	293	0	0.00	7	2.39
2003	43	0	0.00	0	0.00	2003	290	0	0.00	6	2.07
2004	43	0	0.00	1	2.33	2004	296	0	0.00	0	0.00
2005	45	0	0.00	0	0.00	2005	305	0	0.00	2	0.66
2006	48	0	0.00	0	0.00	2006	320	0	0.00	6	1.88
2007	51	0	0.00	0	0.00	2007	323	0	0.00	5	1.55
2008	53	0	0.00	4	7.55	2008	320	0	0.00	4	1.25
2009	51	0	0.00	0	0.00	2009	319	0	0.00	4	1.25
2010	55	0	0.00	1	1.82	2010	337	0	0.00	0	0.00
2011	55	0	0.00	0	0.00	2011	364	0	0.00	2	0.55
2012	56	0	0.00	0	0.00	2012	401	0	0.00	5	1.25
2013	65	0	0.00	0	0.00	2013	422	0	0.00	6	1.42
2014	75	0	0.00	1	1.33	2014	431	0	0.00	13	3.02
2015	77	0	0.00	0	0.00	2015	426	0	0.00	13	3.05
2016	78	0	0.00	0	0.00	2016	418	0	0.00	11	2.63

Economy: Ukraine						Economy: United Arab Emirates					
Year	Active	Defaults		Others		Year	Active	Defaults		Others	
		#	%	#	%			#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	0	0	NaN	0	NaN	1993	0	0	NaN	0	NaN
1994	0	0	NaN	0	NaN	1994	0	0	NaN	0	NaN
1995	0	0	NaN	0	NaN	1995	0	0	NaN	0	NaN
1996	0	0	NaN	0	NaN	1996	0	0	NaN	0	NaN
1997	0	0	NaN	0	NaN	1997	0	0	NaN	0	NaN
1998	30	0	0.00	1	3.33	1998	0	0	NaN	0	NaN
1999	38	0	0.00	0	0.00	1999	0	0	NaN	0	NaN
2000	39	0	0.00	5	12.82	2000	0	0	NaN	0	NaN
2001	34	0	0.00	12	35.29	2001	0	0	NaN	0	NaN
2002	27	0	0.00	5	18.52	2002	0	0	NaN	0	NaN
2003	29	0	0.00	7	24.14	2003	0	0	NaN	0	NaN
2004	44	0	0.00	0	0.00	2004	0	0	NaN	0	NaN
2005	75	0	0.00	1	1.33	2005	0	0	NaN	0	NaN
2006	118	0	0.00	2	1.69	2006	76	0	0.00	0	0.00
2007	133	0	0.00	2	1.50	2007	87	0	0.00	2	2.30
2008	138	0	0.00	9	6.52	2008	92	0	0.00	5	5.43
2009	135	1	0.74	39	28.89	2009	89	0	0.00	1	1.12
2010	98	0	0.00	44	44.90	2010	92	0	0.00	2	2.17
2011	67	0	0.00	13	19.40	2011	94	0	0.00	2	2.13
2012	65	0	0.00	8	12.31	2012	95	1	1.05	2	2.11
2013	79	0	0.00	11	13.92	2013	95	0	0.00	2	2.11
2014	72	0	0.00	14	19.44	2014	105	0	0.00	1	0.95
2015	62	0	0.00	27	43.55	2015	108	0	0.00	5	4.63
2016	41	0	0.00	6	14.63	2016	110	0	0.00	1	0.91

Economy: United Kingdom						Economy: United States					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	260	0	0.00	2	0.77	1990	3829	5	0.13	83	2.17
1991	1056	1	0.09	5	0.47	1991	4130	18	0.44	102	2.47
1992	1112	0	0.00	6	0.54	1992	5394	18	0.33	88	1.63
1993	1201	0	0.00	5	0.42	1993	6159	25	0.41	143	2.32
1994	1308	0	0.00	2	0.15	1994	6904	17	0.25	222	3.22
1995	1460	0	0.00	2	0.14	1995	7387	17	0.23	361	4.89
1996	1656	0	0.00	10	0.60	1996	7937	16	0.20	401	5.05
1997	1799	0	0.00	36	2.00	1997	8307	51	0.61	558	6.72
1998	1859	0	0.00	147	7.91	1998	8283	80	0.97	879	10.61
1999	1809	3	0.17	200	11.06	1999	7993	77	0.96	918	11.49
2000	1881	2	0.11	171	9.09	2000	7629	117	1.53	778	10.20
2001	1839	12	0.65	114	6.20	2001	6967	167	2.40	756	10.85
2002	1800	14	0.78	109	6.06	2002	6257	114	1.82	532	8.50
2003	1763	5	0.28	126	7.15	2003	5836	82	1.41	472	8.09
2004	1916	2	0.10	96	5.01	2004	5668	31	0.55	370	6.53
2005	2186	2	0.09	120	5.49	2005	5653	38	0.67	384	6.79
2006	2364	0	0.00	175	7.40	2006	5589	16	0.29	380	6.80
2007	2429	3	0.12	169	6.96	2007	5612	28	0.50	462	8.23
2008	2332	24	1.03	231	9.91	2008	5285	65	1.23	382	7.23
2009	2106	32	1.52	216	10.26	2009	5000	93	1.86	320	6.40
2010	1940	2	0.10	172	8.87	2010	4860	29	0.60	313	6.44
2011	1833	9	0.49	131	7.15	2011	4713	35	0.74	303	6.43
2012	1755	18	1.03	127	7.24	2012	4601	38	0.83	264	5.74
2013	1700	10	0.59	107	6.29	2013	4626	25	0.54	238	5.14
2014	1715	7	0.41	97	5.66	2014	4777	27	0.57	211	4.42
2015	1746	7	0.40	128	7.33	2015	4863	42	0.86	274	5.63
2016	1710	3	0.18	106	6.20	2016	4787	62	1.30	360	7.52

Economy: Venezuela						Economy: Vietnam					
		Defaults		Others				Defaults		Others	
Year	Active	#	%	#	%	Year	Active	#	%	#	%
1990	0	0	NaN	0	NaN	1990	0	0	NaN	0	NaN
1991	0	0	NaN	0	NaN	1991	0	0	NaN	0	NaN
1992	0	0	NaN	0	NaN	1992	0	0	NaN	0	NaN
1993	7	0	0.00	0	0.00	1993	0	0	NaN	0	NaN
1994	12	0	0.00	0	0.00	1994	0	0	NaN	0	NaN
1995	16	0	0.00	1	6.25	1995	0	0	NaN	0	NaN
1996	15	0	0.00	0	0.00	1996	0	0	NaN	0	NaN
1997	49	0	0.00	2	4.08	1997	0	0	NaN	0	NaN
1998	47	0	0.00	4	8.51	1998	0	0	NaN	0	NaN
1999	46	0	0.00	9	19.57	1999	0	0	NaN	0	NaN
2000	38	0	0.00	4	10.53	2000	5	0	0.00	0	0.00
2001	37	1	2.70	4	10.81	2001	10	0	0.00	0	0.00
2002	34	0	0.00	5	14.71	2002	18	0	0.00	0	0.00
2003	32	0	0.00	3	9.38	2003	20	0	0.00	0	0.00
2004	32	0	0.00	2	6.25	2004	23	0	0.00	0	0.00
2005	31	0	0.00	0	0.00	2005	29	0	0.00	0	0.00
2006	32	0	0.00	3	9.38	2006	87	0	0.00	0	0.00
2007	29	0	0.00	0	0.00	2007	209	0	0.00	3	1.44
2008	32	0	0.00	1	3.13	2008	272	0	0.00	2	0.74
2009	31	0	0.00	1	3.23	2009	400	0	0.00	25	6.25
2010	30	0	0.00	2	6.67	2010	596	0	0.00	10	1.68
2011	29	0	0.00	7	24.14	2011	643	1	0.16	13	2.02
2012	23	0	0.00	4	17.39	2012	652	0	0.00	10	1.53
2013	19	0	0.00	1	5.26	2013	656	0	0.00	24	3.66
2014	21	0	0.00	0	0.00	2014	656	0	0.00	17	2.59
2015	23	0	0.00	0	0.00	2015	689	0	0.00	17	2.47
2016	24	0	0.00	0	0.00	2016	701	0	0.00	5	0.71

B APPENDIX: PERFORMANCE ANALYSIS

Table B.1: Accuracy ratios (AR) and Area Under Receiver Operating Characteristic (AUROC) for three calibration groups and different economies.

Economy	AR				AUROC			
	1mth	1yr	2yr	5yr	1mth	1yr	2yr	5yr
Australia	0.83246	0.67209	0.56095	0.39794	0.91624	0.83644	0.78156	0.70273
Brazil	0.87197	0.80106	0.71095	0.49877	0.93600	0.90087	0.85644	0.75299
Canada	0.95304	0.82627	0.70260	0.49930	0.97653	0.91340	0.85218	0.75294
China	0.70164	0.69218	0.65805	0.53890	0.85095	0.84756	0.83214	0.77971
Germany	0.86694	0.69298	0.57753	0.46766	0.93350	0.84729	0.79090	0.73943
Denmark	0.82046	0.76551	0.61542	0.53745	0.91025	0.88313	0.80902	0.77238
France	0.85554	0.72841	0.63541	0.55865	0.92777	0.86437	0.81818	0.78071
Hong Kong	0.77080	0.53696	0.42181	0.23816	0.88541	0.7688	0.71172	0.62184
India	0.72501	0.65636	0.60090	0.47297	0.86254	0.82876	0.80183	0.74053
Indonesia	0.73299	0.69022	0.60649	0.41965	0.86655	0.84599	0.80578	0.71957
Italy	0.87879	0.82573	0.66153	0.46295	0.93940	0.91300	0.83130	0.73359
Japan	0.91234	0.85442	0.79959	0.66773	0.95617	0.92731	0.90009	0.83519
Malaysia	0.84062	0.78735	0.71994	0.53608	0.92034	0.89419	0.86133	0.77391
Mexico	0.82134	0.79538	0.73614	0.56559	0.91070	0.89822	0.86944	0.78851
Netherlands	0.88257	0.83564	0.68133	0.55146	0.94130	0.91814	0.84190	0.77934
Norway	0.95316	0.82900	0.60700	0.29491	0.97659	0.91482	0.80479	0.65201
Philippines	0.72890	0.65725	0.64384	0.57070	0.86449	0.82928	0.82343	0.79093
Poland	0.87899	0.75093	0.59734	0.34276	0.93951	0.87586	0.79996	0.67558
Russian Federation	0.79778	0.42557	0.19024	0.083178	0.89892	0.71382	0.59783	0.54766
Singapore	0.81505	0.71364	0.54761	0.32252	0.90754	0.85714	0.77481	0.66464
South Africa	0.92794	0.85689	0.74132	0.46368	0.96398	0.92866	0.87148	0.73559
South Korea	0.87184	0.73760	0.66442	0.55799	0.93593	0.86914	0.83311	0.78194
Sweden	0.90945	0.79508	0.68702	0.41611	0.95473	0.89776	0.84413	0.71050
Taiwan	0.87882	0.77457	0.70024	0.61224	0.93942	0.88747	0.85065	0.80799
Thailand	0.81878	0.78254	0.73483	0.61134	0.90942	0.89188	0.86903	0.8118
United Kingdom	0.88910	0.77209	0.62690	0.43333	0.94456	0.88628	0.81424	0.71930
United States	0.94433	0.83615	0.72316	0.53831	0.97217	0.91844	0.86279	0.77353
Developed Asia-Pacific	0.86693	0.74847	0.66370	0.53063	0.93347	0.87446	0.83248	0.76757
Emerging MKT	0.82510	0.77456	0.70990	0.55807	0.91257	0.88765	0.85595	0.78320
Europe	0.87762	0.75037	0.61715	0.45191	0.93882	0.87546	0.80943	0.72860
North America	0.94531	0.83533	0.72152	0.53539	0.97266	0.91802	0.86193	0.77194

Note: *This table only shows the economies with more than 20 defaults in the testing period.

Figure B.1: Plots of US default parameters across all horizons for the Stock index one-year return, Short-term interest rate, DTD Level, DTD Trend, CASH/TA Level and CASH/TA Trend. Solid lines are the parameter estimates and dashed lines are the 90% confidence level. Horizontal axis is the horizon in months.

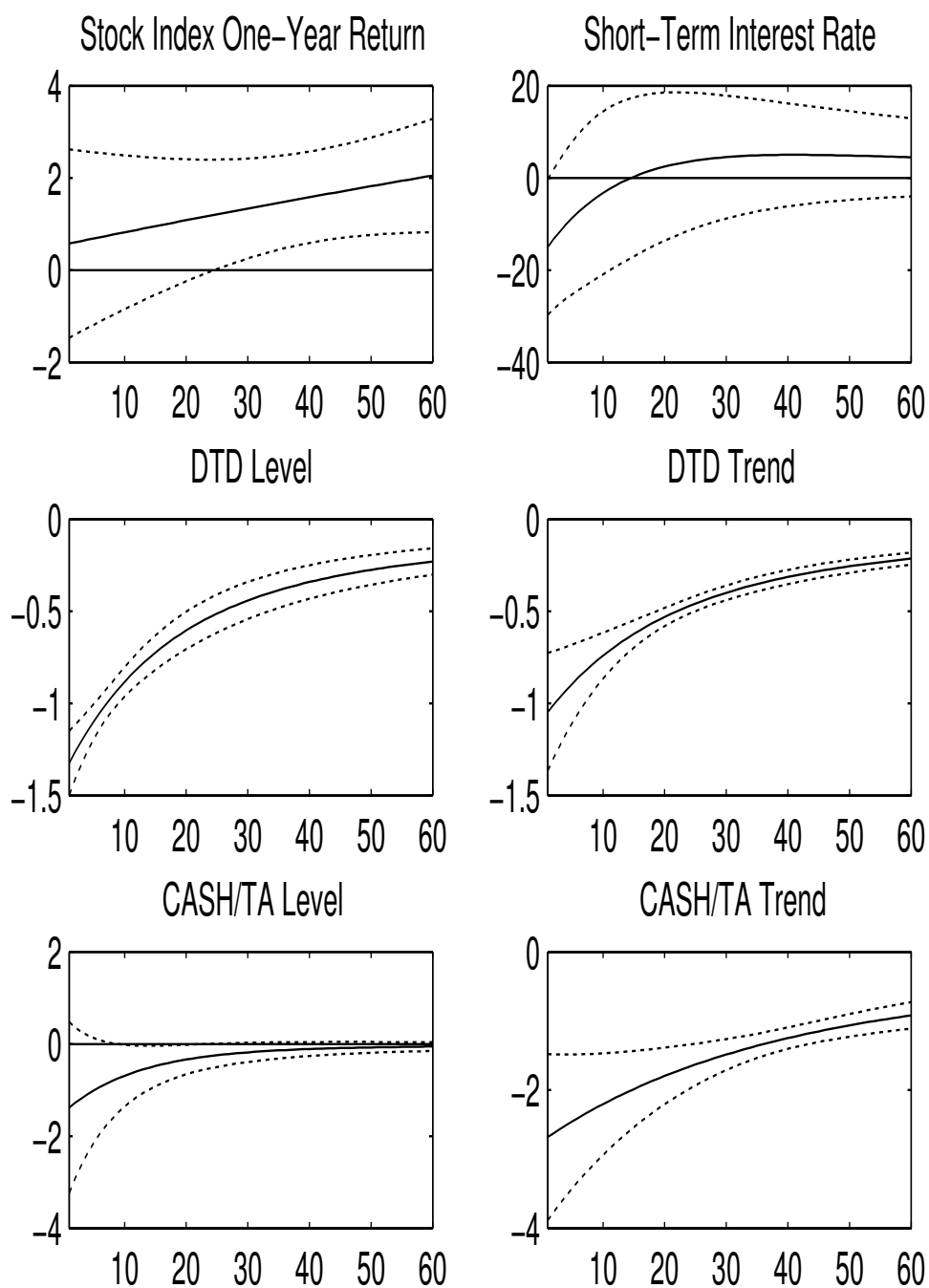


Figure B.2: Plots of US default parameters across all horizons for the NI/TA Level, NI/TA Trend, SIZE Level, SIZE Trend, M/B and SIGMA. Solid lines are the parameter estimates and dashed lines are the 90% confidence level. Horizontal axis is the horizon in months.

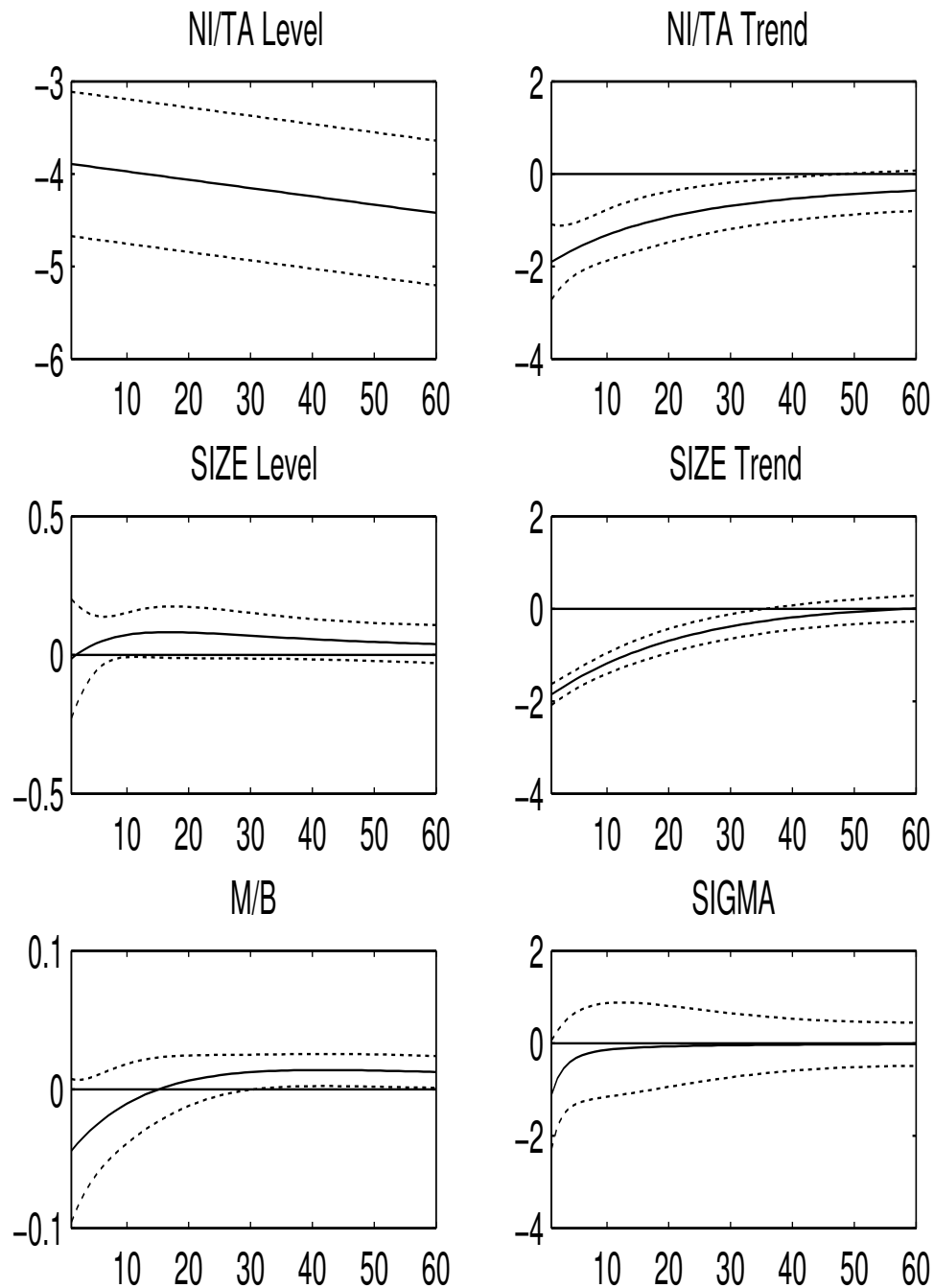
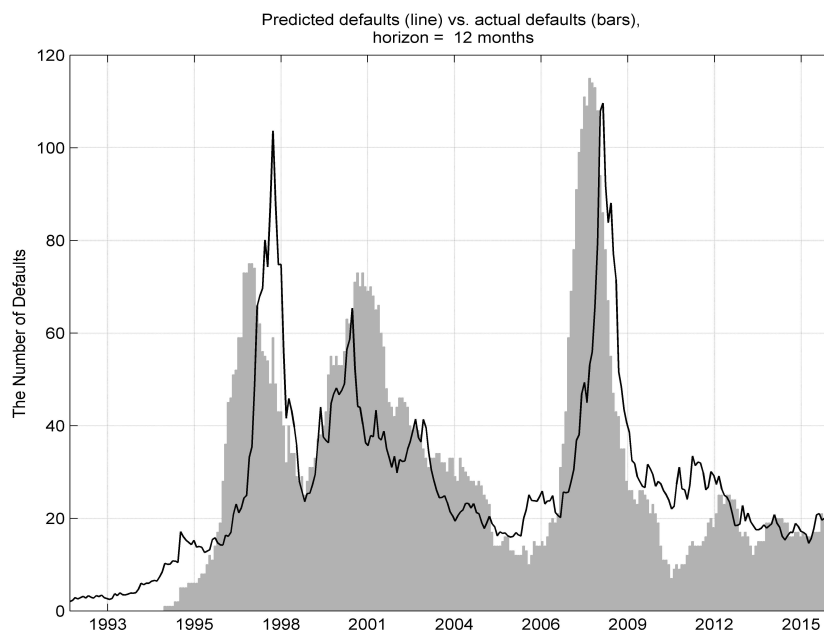
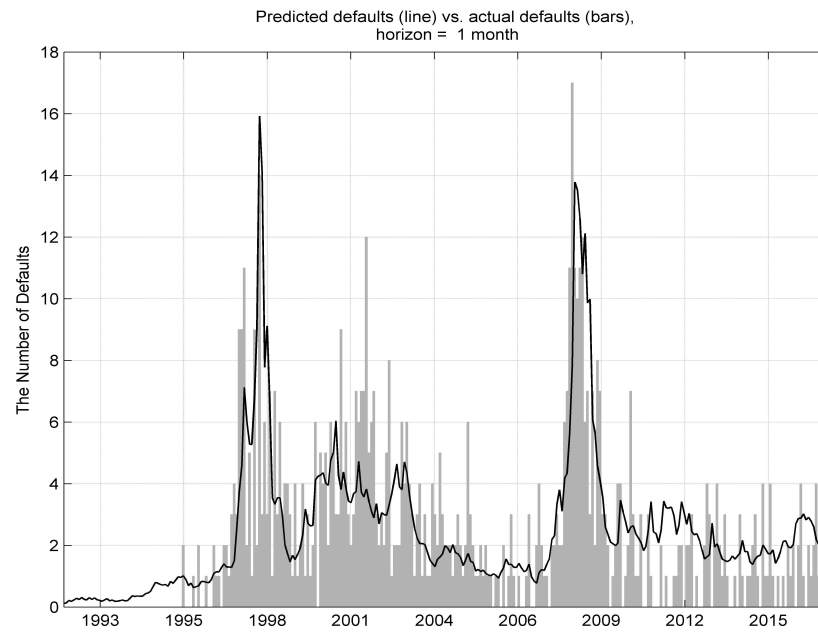


Figure B.3: Performance test for the Developed Asia, in sample.



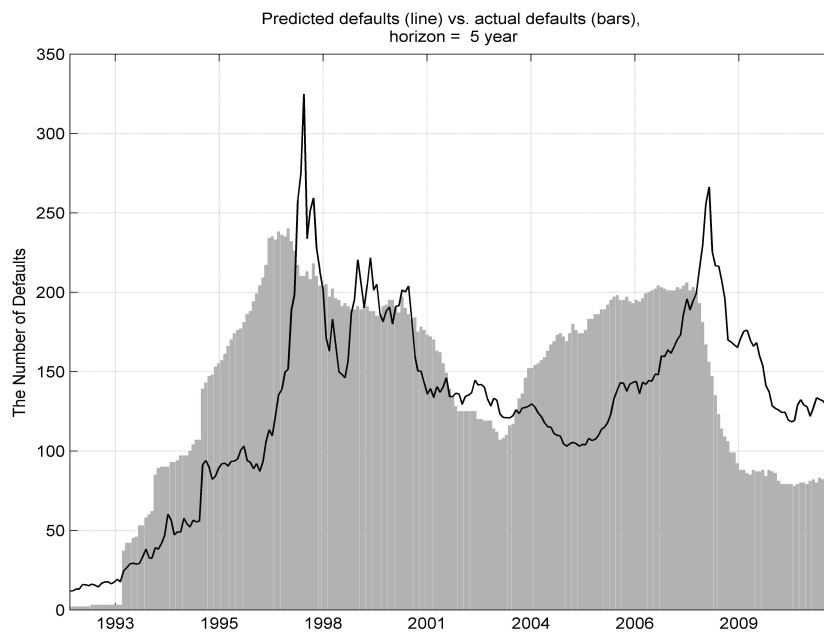
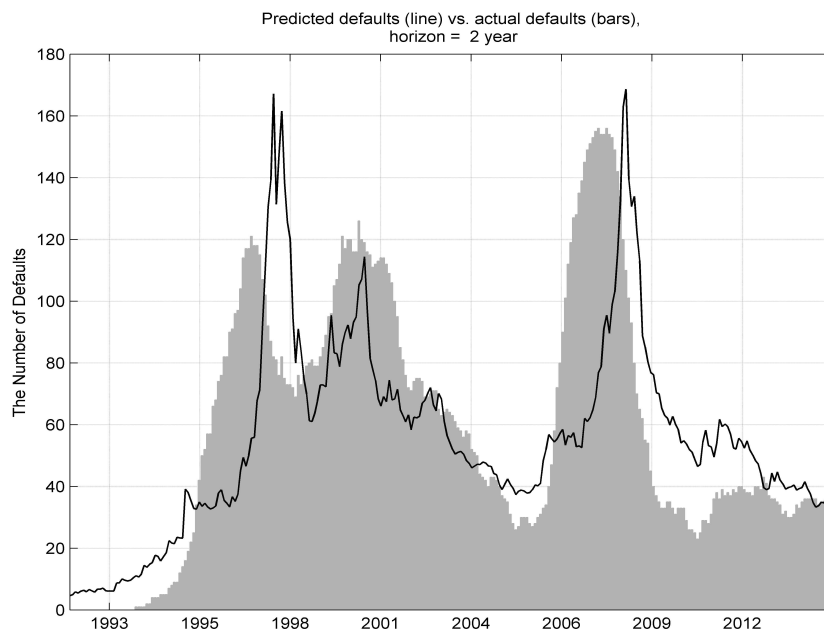
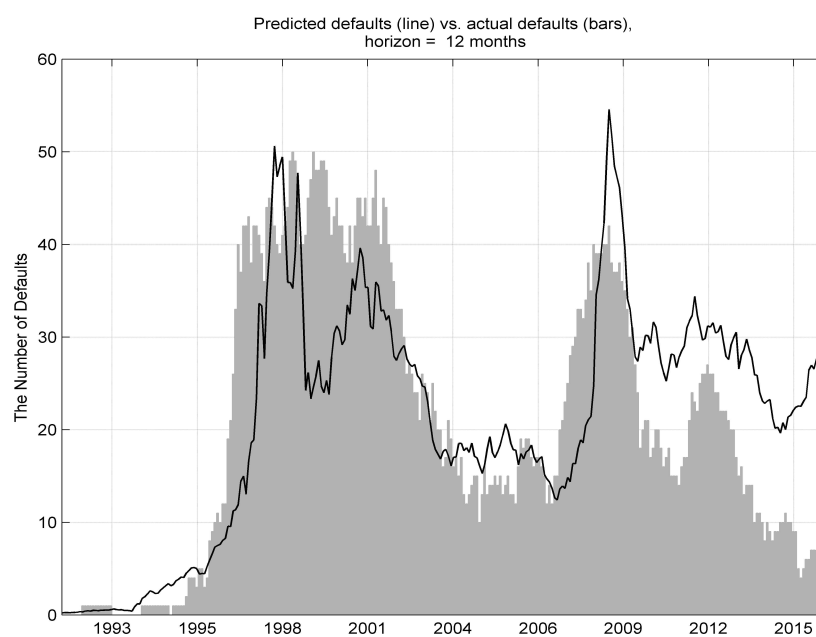
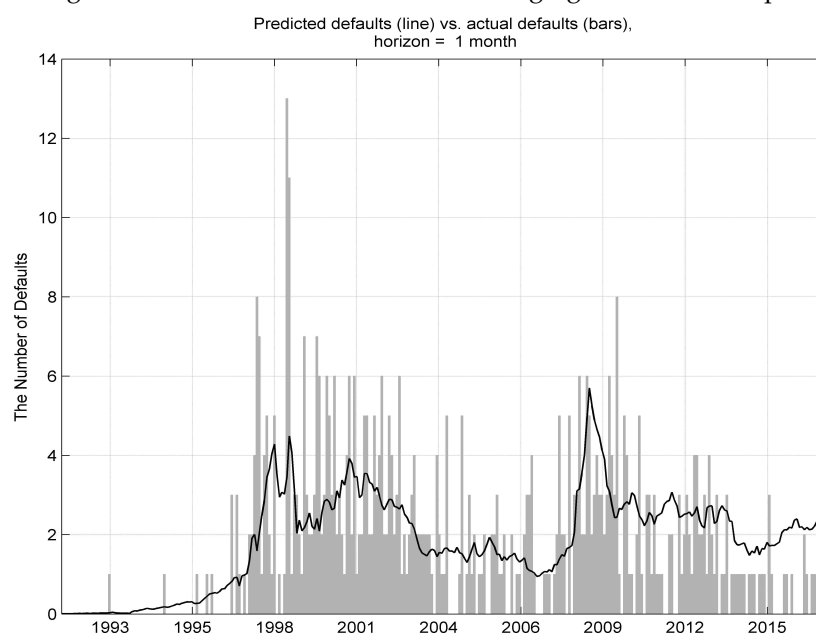


Figure B.4: Performance test for the Emerging Market, in sample.



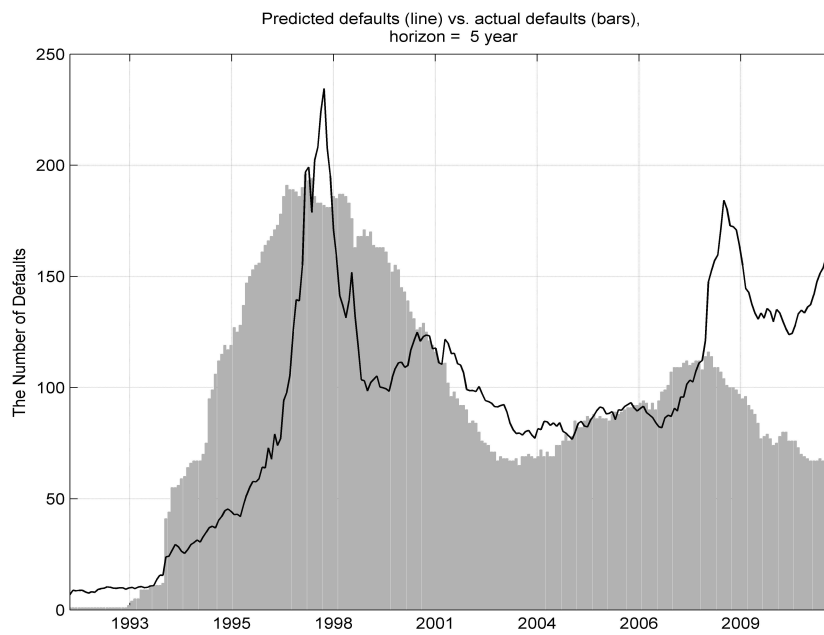
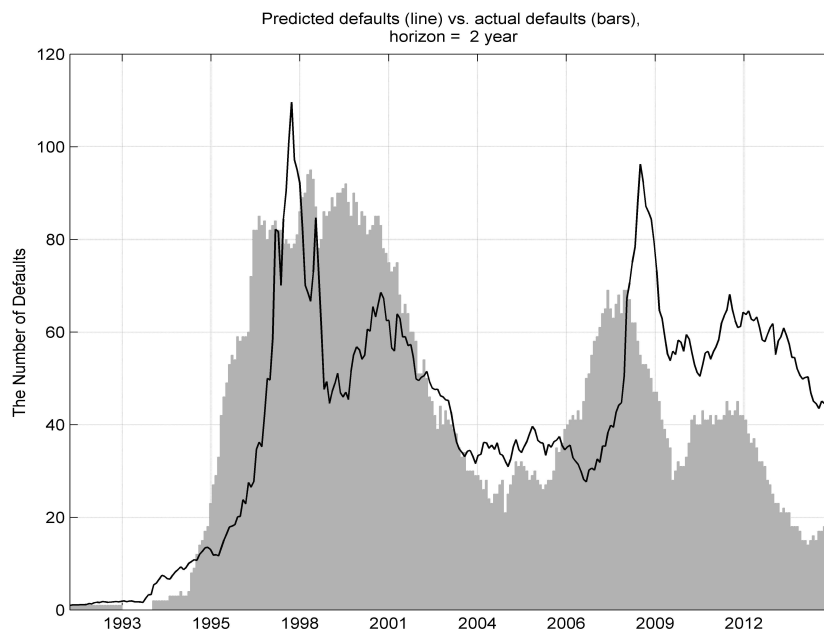
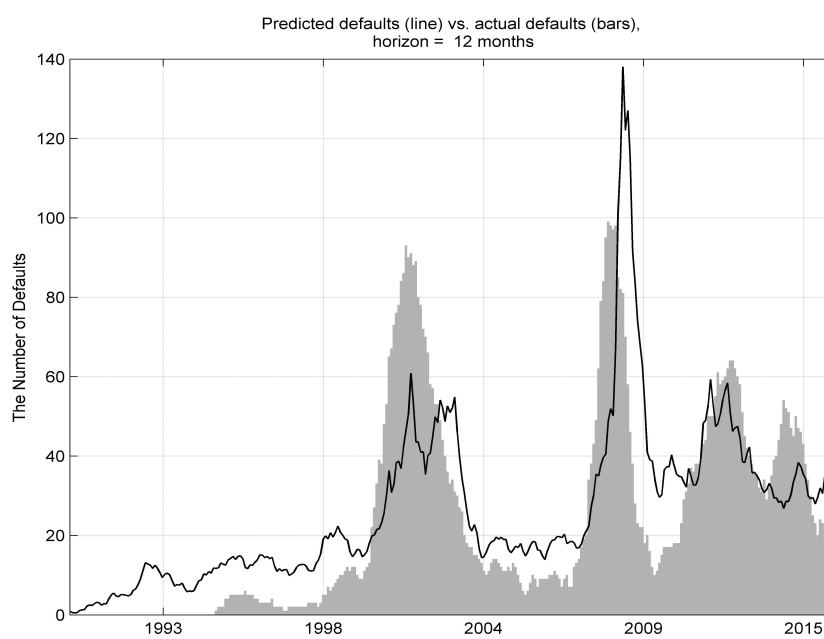
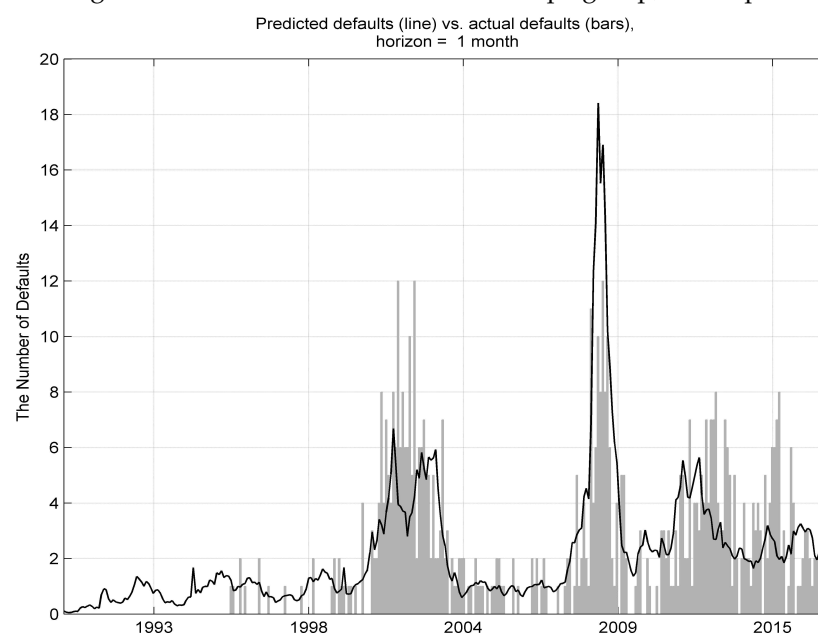


Figure B.5: Performance test for the Europe group, in sample.



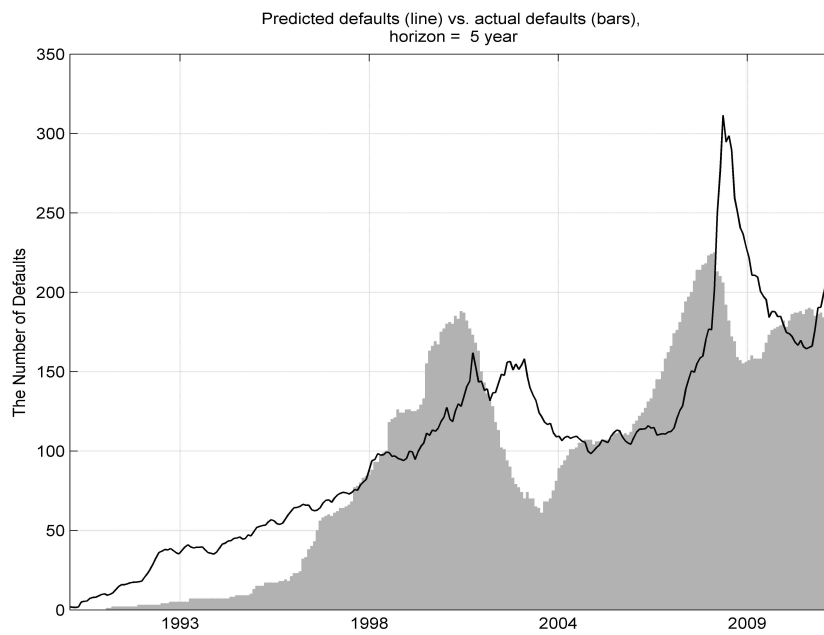
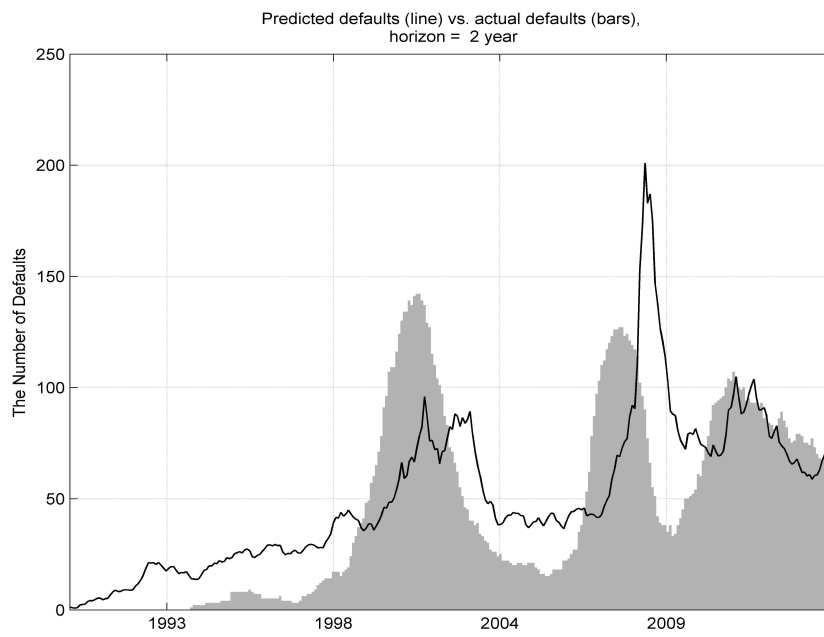
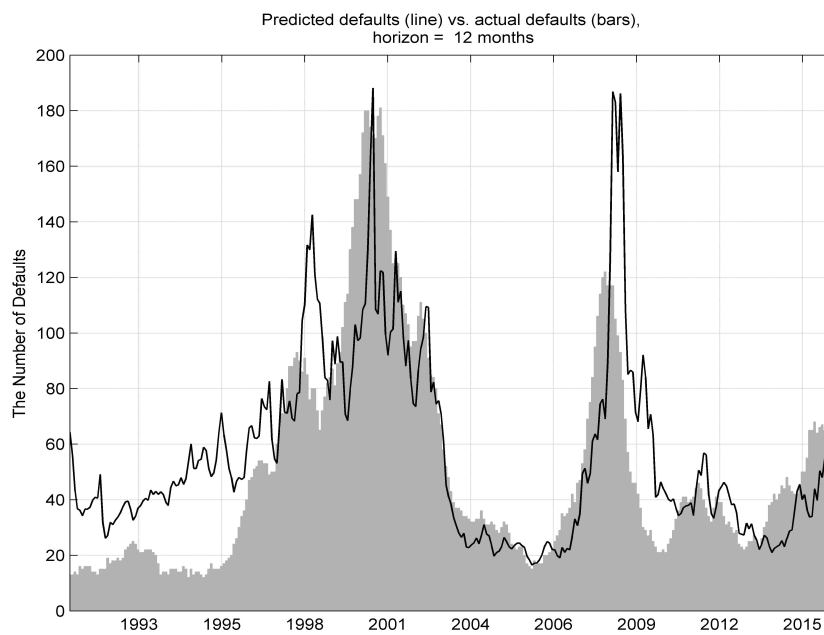
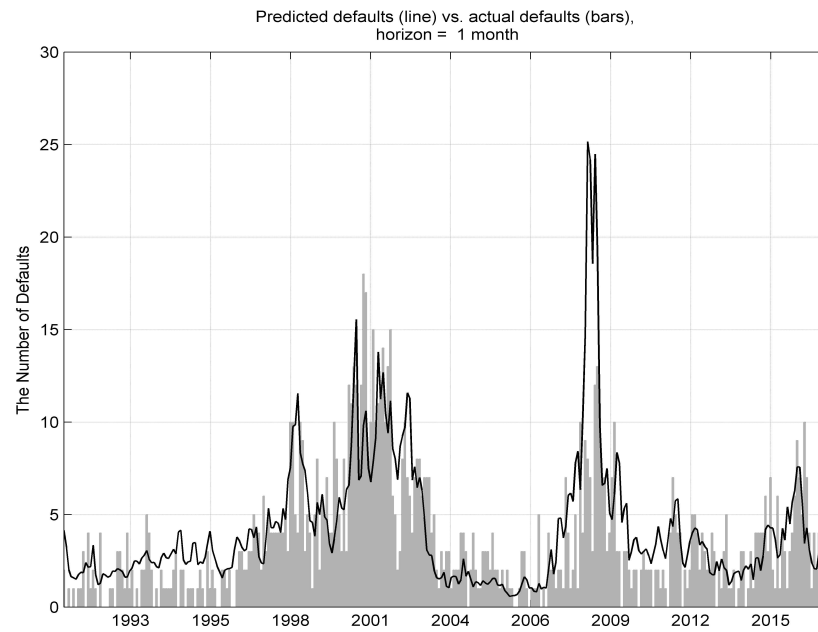


Figure B.6: Performance test for North America group, in sample.



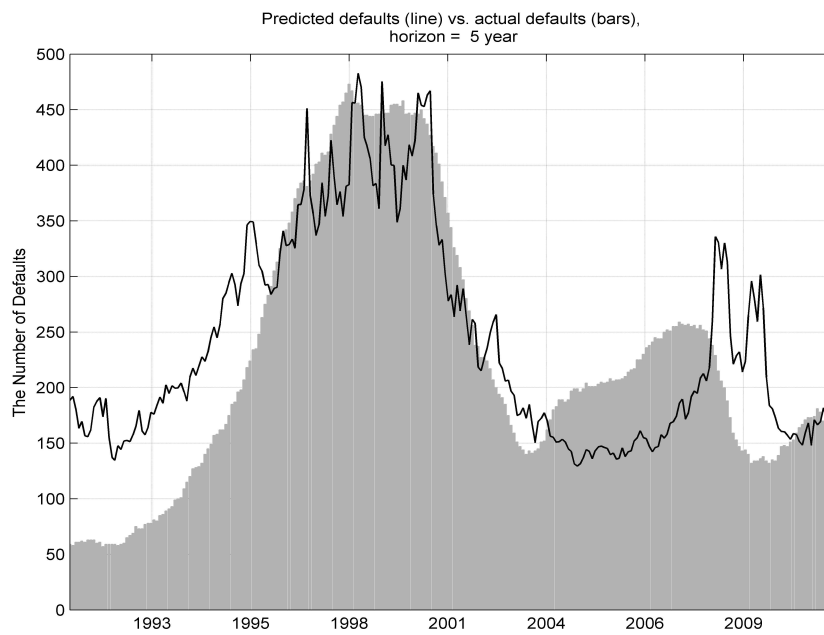
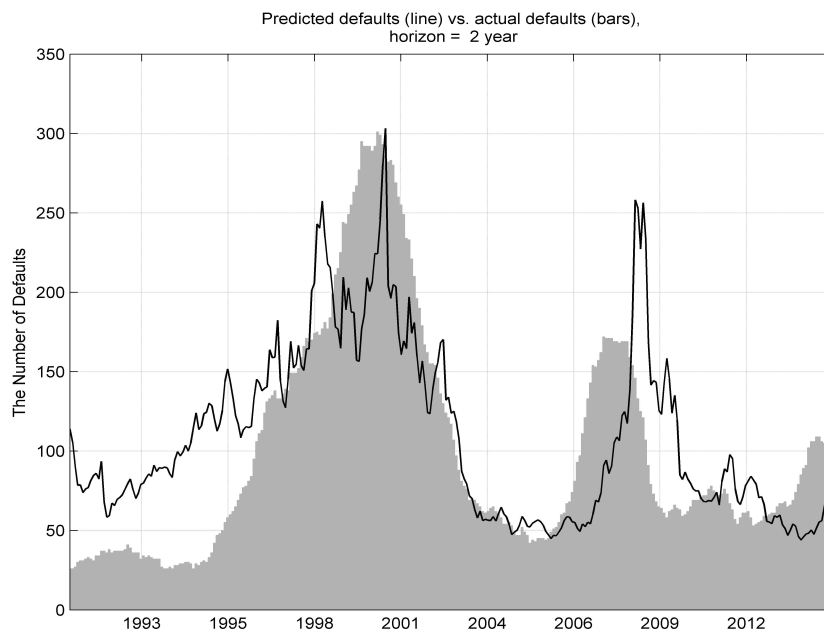
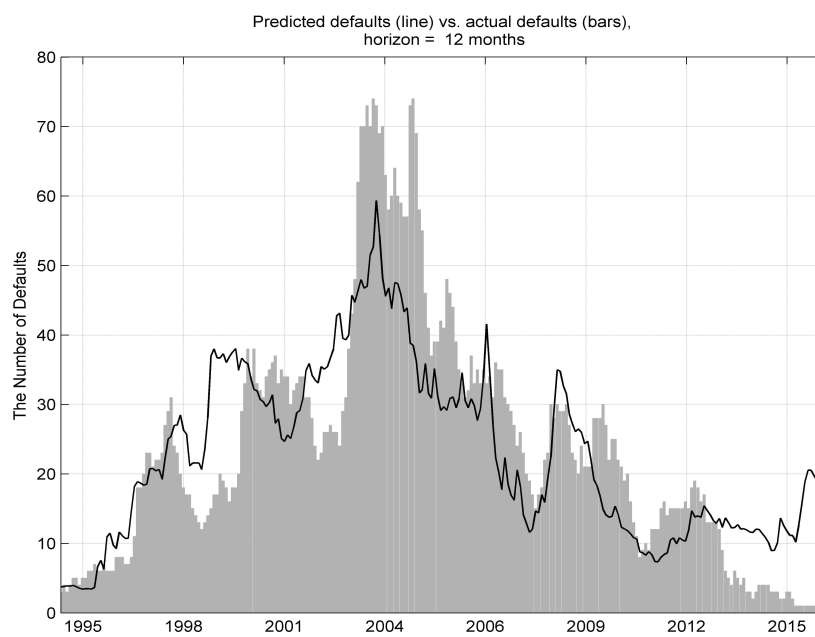
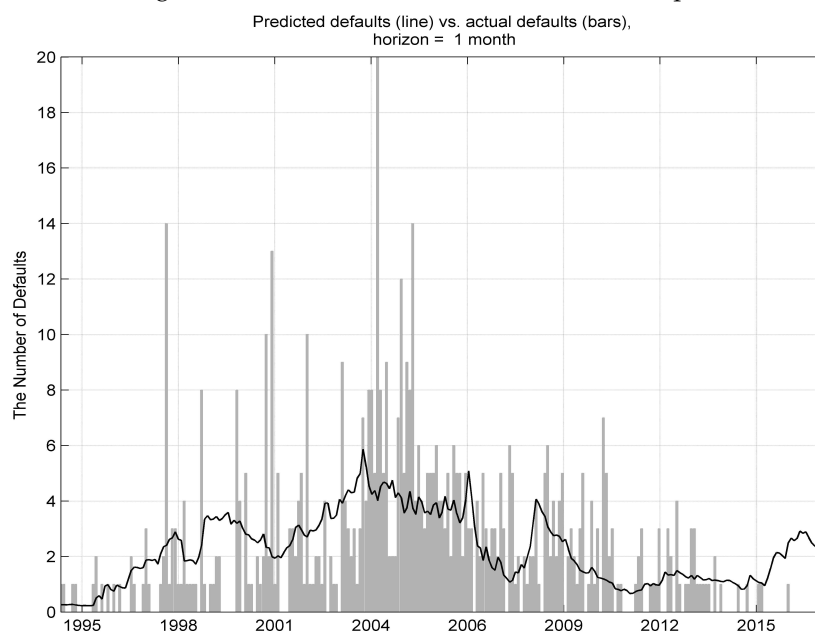


Figure B.7: Performance test for China, in sample.



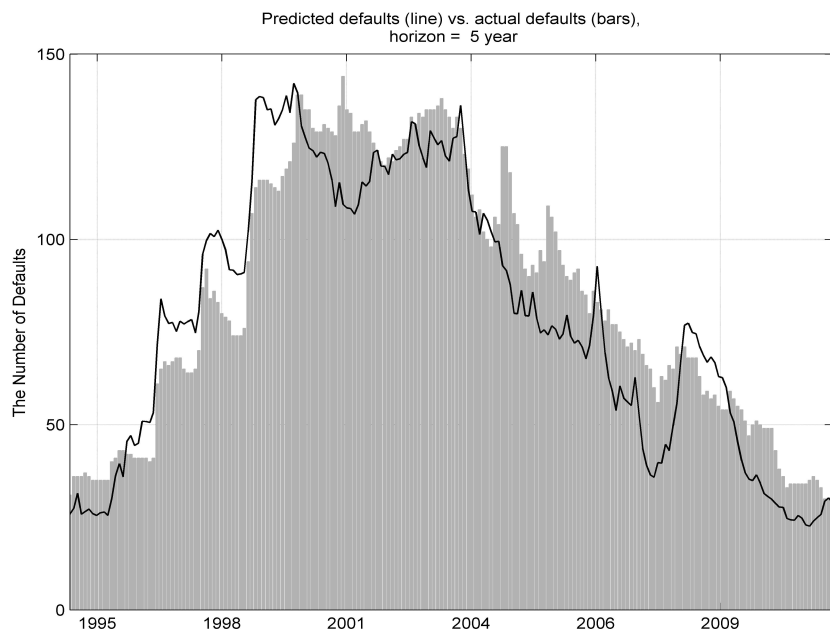
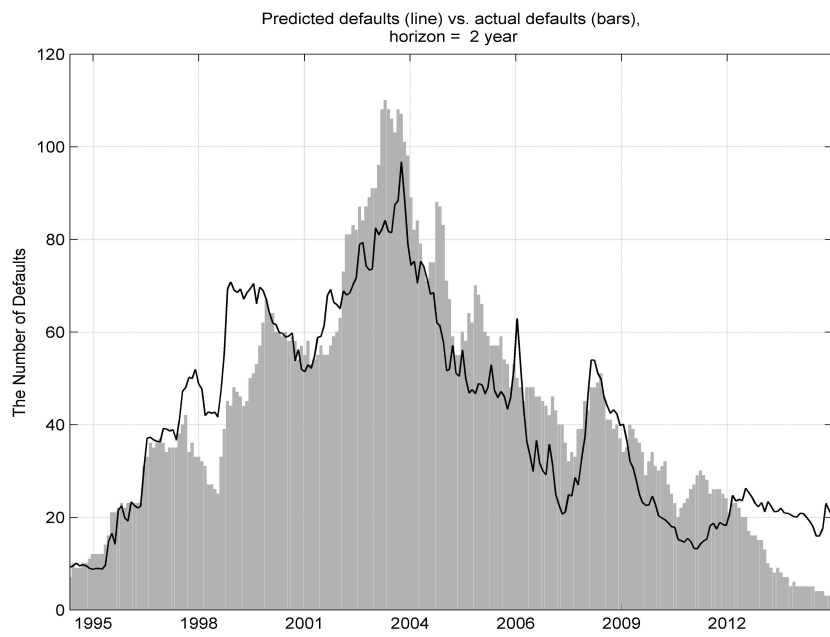
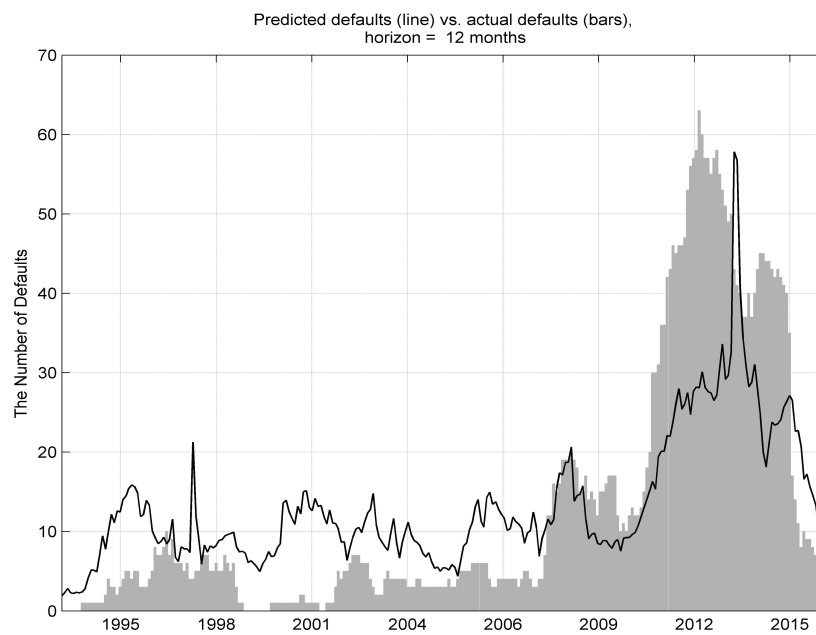
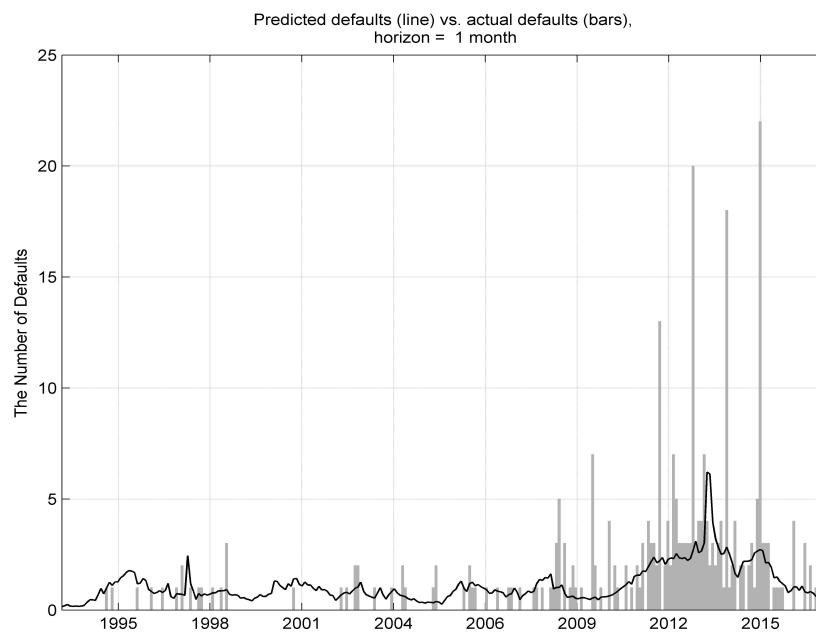
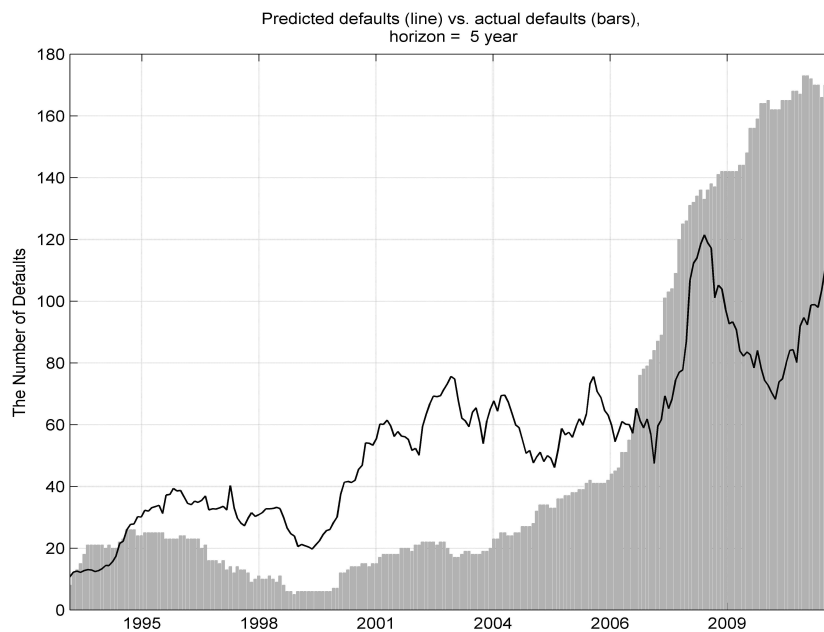
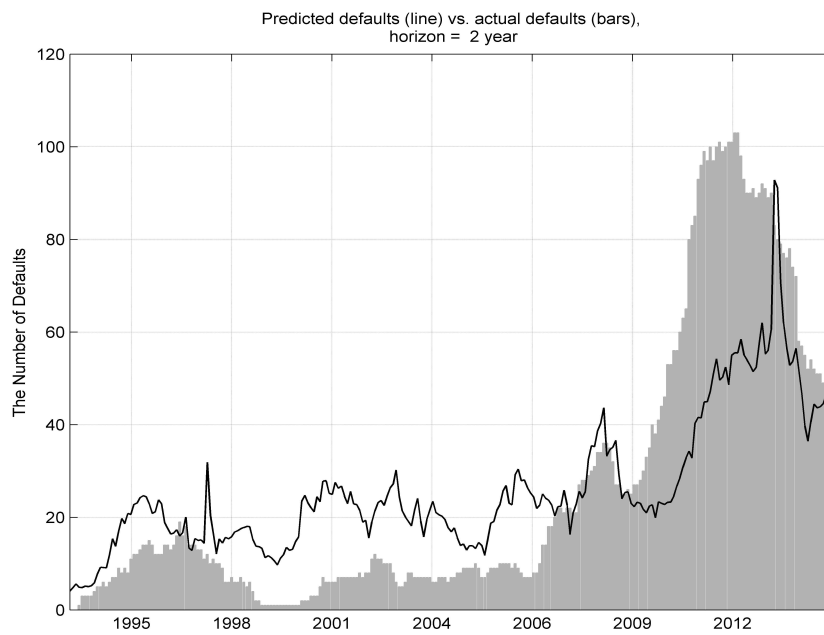


Figure B.8: Performance test for India, in sample.





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