Many economies have difficulty financing infrastructure development: Bank loans of the long tenure necessary pose currency and maturity risks, and stable capital markets require robust legal foundations. Shortfalls in infrastructure finance, however, reduce the quality of life for citizens and inhibit the productive capacity of economies. Intermediate financing models therefore must sustain private finance in infrastructure projects in economies in which legal reforms remain ongoing. Previous studies have explored possible structures for these models. The studies, however, have not considered the legal infrastructure necessary to implement and support these financing techniques. This paper analyzes the tradeoffs that intermediate models for financing infrastructure present, in terms of augmenting the availability of long-term capital versus managing its risks. The paper explores potential fault lines in each model, and the necessary role for law in each. The Bank for International Settlements provided grant funding to support the research underlying this paper, and the Bank will use the research to inform its work related to infrastructure finance and advice to central banks.

INTRODUCTION

Many emerging economies urgently require investment in infrastructure. According to a McKinsey study, total infrastructure finance

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* The author is grateful to the Bank for International Settlements for funding this project.

† Group of Thirty, LONG-TERM FINANCE AND ECONOMIC GROWTH 20 (2013), available
must increase from 3.8% of GDP to 5.6% of GDP by 2020. In emerging economies, the G20 has suggested the need for an additional $1 trillion in infrastructure finance per year.

Quality of life depends on sufficient infrastructure, and infrastructure also can generate economic growth. Infrastructure supports services essential to the needs of citizens. Many industries also depend on infrastructure, and shortfalls in infrastructure make production more costly or impossible.

Infrastructure projects have proven difficult to finance. Infrastructure projects typically have a large scale, with large up-front capital requirements, a long initial period without returns, and extended payback periods. Nevertheless, the projects create positive externalities beyond the revenue stream the projects eventually may generate.

Because infrastructure projects demand long-term finance, capital markets can contribute suitable finance, but the risks of this type of finance necessitate a developed legal system. When, for example, investors lack information about the potential risks of bond issuances and the legal system cannot manage the risks in foreseeable ways, investors cannot anticipate losses accurately. As a result, they misprice bonds and overinvest, creating instability that can spread if the law cannot adequately manage the instability.

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4 See, e.g., H. Davis, INFRASTRUCTURE FINANCE 146 (2008).


6 OECD, BOND MARKET DEVELOPMENT IN ASIA 238 (2001).
The countries with the greatest need for infrastructure investment often are the countries without the legal foundations to support capital markets, and most emerging economies have depended on finance by governments and from banks.\textsuperscript{8} Budget limitations constrain government investment\textsuperscript{9} and maturity risk constrains banks from extending long-term loans.\textsuperscript{10} The recent global financial crisis also demonstrated the ability of the banking system to propagate risks and the difficulty of maintaining investment during disruptions to the banking system.

A broader mix of financing models could mobilize untapped sources of private capital.\textsuperscript{11} Previous studies have suggested financing models without considering the legal infrastructure necessary to implement and support the models. Many of the models, including securitization of bank loans, government interventions in bond markets, and credit default swaps on corporate bonds, also pose risks in emerging economies in which legal reforms remain ongoing.\textsuperscript{12} Others, including consortium lending by banks and covered bonds appear easier for emerging economies to implement.\textsuperscript{13}

This paper analyzes the tradeoffs that intermediate models for financing infrastructure present, in terms of augmenting the availability of long-term capital versus managing its risks. The paper uses India as a lens through which to explore the potential fault lines in each model, and the necessary role for law in each.

The analysis suggests that covered bonds could best mobilize investment into infrastructure. Covered bonds enable banks to sell their loans to downstream investors and also ring fence assets on the balance sheets of the banks to provide liquidity against the maturity risk that the bank loans entail.\textsuperscript{14} Although covered bonds do not eliminate the maturity risk or facilitate significantly longer bank loans, and therefore do not attract capital from institutional investors, the assets in the cover pool reduce the

\textsuperscript{8} \textit{use: “only a sixth of debt financing …”}


\textsuperscript{12} \textit{See Section IV}.

\textsuperscript{13} \textit{See Section IV}.

\textsuperscript{14} \textit{See Section IV.A.3.1}. 
risk exposure of investors in the covered bonds, which enables the investors to charge low interest rates on the bonds.\textsuperscript{15} The legal foundations for the model appear easy to implement, even at early stages of legal development, and the model generates minimal risks for the law to contain.\textsuperscript{16}

Section I first anchors the arguments of the paper in financial theory.\textsuperscript{17} The Section explains how bank finance of long-term infrastructure development projects introduces currency and maturity risks and information asymmetries, while, with the proper safeguards, the capital markets may offer a source of finance more suitable to the projects.\textsuperscript{18}

Section II portrays the infrastructure shortfalls that persist in emerging economies including India.\textsuperscript{19} The section argues that bank lending and public finance lack the capacity to eliminate the infrastructure deficits.\textsuperscript{20}

Section III explores the risks of using a long-term bond market to channel capital to infrastructure projects.\textsuperscript{21} The Section presents three case studies that illustrate the difficulties both of predicting the risks and resolving instability in a bond market.\textsuperscript{22}

Section IV sets out five intermediate financing models and evaluates the qualities of a legal system necessary to implement the models and manage their risks.\textsuperscript{23} The Section presents three modifications to bank finance that accommodate maturity risk in different ways but do not offer long-term investment vehicles to attract additional capital from institutional investors.\textsuperscript{24} The Section then presents two modifications to bond finance that provide long-term investment vehicles and attract institutional investors by transferring default risks onto governments and third parties but depend on improvements to macro-level governance and transparency within the financial market.\textsuperscript{25} The Section concludes that covered bonds offer the financing model most appropriate to countries with legal systems at

\textsuperscript{15} See Section IV.A.3.
\textsuperscript{16} See Section IV.A.3.
\textsuperscript{17} See Section I.
\textsuperscript{18} See Section I.
\textsuperscript{19} See Section II.
\textsuperscript{20} See Section II.
\textsuperscript{21} See Section III.
\textsuperscript{22} See Section III.
\textsuperscript{23} See Section IV.
\textsuperscript{24} See Section IV.A.
\textsuperscript{25} See Section IV.B.
equivalent stages of development to India.\textsuperscript{26} While covered bonds do not eliminate maturity risk, the implementation of covered bond structures by banks requires legal foundations that appear easy for countries to implement, and covered bonds appear to pose few risks.\textsuperscript{27}

Currently, when infrastructure investment needs run high, capital-constrained banks are limiting lending\textsuperscript{28} and increasing the interest margins that they charge,\textsuperscript{29} and the Basel III regulations likely will constrain bank lending further.\textsuperscript{30} Capital markets could supplement bank lending, but developing the legal supports necessary to backstop the risks that the markets may produce takes time.\textsuperscript{31} Emerging economies have more realistic options for mobilizing private finance into infrastructure development that pose risks that their legal systems may more easily accommodate. Turning to alternative models could more quickly increase the availability of funding for improvements to infrastructure.

I. VARIETIES OF INFRASTRUCTURE FINANCE

To channel investment into infrastructure, economies may rely on bank-centered financial intermediation, or they may develop domestic capital markets.\textsuperscript{32} While bank finance offers a basic form of funding from the deposits of individual savers, bank finance of longer-term investments introduces risk deriving from currency and maturity mismatches and information asymmetries. By offering contracts to investors which specify payments over extended periods, domestic bond markets provide capital

\textsuperscript{26} See Section IV.A.3.
\textsuperscript{27} See Section IV.A.3.


better suited to long-term finance; however, without the proper safeguards, the introduction of a bond market into an economy also may destabilize the economy. Both bank-based and bond-based funding strategies depend for their performance on legal supports, including reliable property rights and debt enforcement mechanisms. This section examines the risks of bank and bond finance in the context of infrastructure development and argues that with sufficient legal protections bond finance better suits infrastructure development.

A. Bank Finance

Because of its relative simplicity, many less-developed economies have relied on bank finance of infrastructure, but the use of bank finance for long-term investments has restricted the availability of funding and introduced vulnerabilities into the economies. Banks extend loans from short-term deposits generally in domestic currency, but the depositors can withdraw the deposits supporting the loans at any time, and the fluctuation of foreign exchange rates introduces additional risk. Adverse selection problems also can result from the use of bank finance for infrastructure development because of limitations to the ability of banks to distinguish the quality of borrowers. To offload some of these risks, banks have sold loans in the form of asset-backed securities to downstream investors, but the recent financial crisis exposed the potential for the arrangements to destabilize economies. Other banks successfully have collaborated to finance infrastructure projects.

Bank finance currently accounts for roughly 75% of all finance in economies at earlier stages of economic development including, for example, Malaysia and Thailand. By developing relationships with firms and monitoring them over time, banks can sidestep some deficiencies in information about the firms that they lend to and generally can re-contract easily in the event of default. Direct relationships with borrowers enable

33 OECD, BOND MARKET DEVELOPMENT IN ASIA 240 (2001).
35 P 29 of “While banks have historically met a large part of financing needs due to their expertise”
38 H. Levinger, What’s behind recent trends in Asian corporate bond markets?, 

banks to enforce their agreements and reclaim their collateral through reputational pressures and repeat contact. Nevertheless, bank finance of long-term infrastructure projects can create problems in the economies that rely on it.

Banks frequently must supplement domestic savings with external borrowing, which exposes the banks to currency risk. The performance of banks depends on both the success of their loans and any changes in the value of the foreign capital relative to the domestic capital. A sharp depreciation in the domestic currency of the infrastructure project revenues can prevent banks from servicing foreign currency lenders.

In addition to the currency risk inherent to banks, which infrastructure finance accentuates, the general problem of duration mismatches within banks becomes severe when banks finance long-term infrastructure projects. Banks lend to borrowers using assets from their depositors, but the depositors retain the right to withdraw the assets at any time. When the time horizon of bank loans increases, the risk increases that banks will become unable to back their loans with sufficient assets, for example because the amount of deposits that a bank holds decreases or the value of the assets that a bank holds falls. Requiring banks to retain more assets or charge higher interest rates to borrowers may decrease the risk, but these rules increase the cost of credit.

In addition to financing long-term investments in a high-risk and expensive way, a large volume of long-term lending by banks can increase the vulnerability of economies to corrections. During periods of economic stress, depositors tend to withdraw their deposits from banks. As a result, banks may lose the assets to support their long-term loan commitments at a time when replacing the assets has become difficult. If depositors withdraw their deposits at once, banks may fail. The failures may spread through the domestic economies of banks and into the economies of other countries in


40 H. Davis, INFRASTRUCTURE FINANCE 147 (2008).


which the banks have conducted business.

Meanwhile, banks cannot perfectly distinguish the quality of potential borrowers, and this information asymmetry becomes important in the context of bank financing of infrastructure. If banks charge high interest rates to compensate for the uncertainty, only lower-quality projects may seek funding from banks, leaving the banks with high-risk lending portfolios.

To circumvent some of these problems, some banks have sold their loans as asset-backed securities, but the recent global financial crisis revealed that new risks can flow from this practice. The process of securitization has enabled banks to transform their loans into tradable notes. The banks have sold their loan books to special-purpose vehicles (“SPVs”), which have pooled the loans and sold rights to the repayment streams of the loans to downstream investors. The crisis, however, demonstrated in part the incentives the securitization process created for banks inadequately to screen and monitor borrowers, among other problems, and the ability of banks to spread risks and the difficulty of resolving instability in the banking sector. The paper discusses securitization more fully in Section IV.

Banks also have provided finance for infrastructure development in cooperation with other banks. Lead investors have arranged consortia of banks that have provided loans secured by project assets and repaid from the revenues produced by the projects. The distribution of the risk of the project among multiple lenders has reduced the cost of capital for the projects and allowed for greater leverage. European banks, for example, extensively have employed joint financing techniques, and many European banks offered infrastructure finance in Latin America prior to the recent financial crisis. The paper discusses this financing technique in greater detail in Section IV.

B. Bond Finance

When an economy has established the safeguards necessary for managing a local bond market, bond finance of infrastructure may

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44 See Section IV.A.2.
45 See Section IV.A.1.
contribute to a lower cost of capital and lower level of economic risk than bank finance. Robust local-currency bond markets insulate economies from bad events that may occur in the banking sector and shift currency risks to foreign investors. Domestic bond markets also match long-term assets to long-term investments in infrastructure, which eliminates the maturity risk endemic to bank loans.

A bond market introduces complexities not present in plain bank lending. Each bond represents a promise from its issuer to repay the investors in the bond, plus interest, by a specific date. The original investors may trade their rights to repayment to downstream investors, spreading the risk of nonpayment to a larger number of secondary investors. Whereas banks assume credit risk from their depositors, who provide the assets that the banks lend to borrowers, and manage the risk of the loans by monitoring the borrowers, numerous investors in the bonds of an issuer accept the risk that the issuer will default in exchange for interest payments. The investors in the bonds may have no direct relationship with the original issuer, which can make bonds more difficult to restructure than bank loans.

Nevertheless, the development of a domestic bond market diversifies the types of finance available in an economy, which in many cases increases economic stability in the economy while also satisfying a broader range of investment needs. Because the bond market may have the ability to continue operating even when banks fail, reducing the dependence of the economy on banks helps to insulate the economy from financial stresses in the banking sector.

Studies have indicated that the ability of the bond market to fulfill such a “spare tire” role may depend on variables including a lack of co-movement between bank lending, and bond and equity finance in the domestic setting, and the absence of contagion in the

47 Use: “reducing transaction costs and facilitating risk management. LCBMs in these countries have”
49 See, e.g., OECD, BOND MARKET DEVELOPMENT IN ASIA 239 (2001);.
51 Studies have indicated that the ability of the bond market to fulfill such a “spare tire” role may depend on variables including a lack of co-movement between bank lending, and bond and equity finance in the domestic setting, and the absence of contagion in the
maintained economic stability during the recent financial crisis because impairments to other financing channels did not affect their domestic bond markets. Several emerging economies including Argentina, Brazil, Russia, and Turkey, however, have succumbed to earlier financial crises, and their domestic bond markets seemed to spread financial contagion rather than limit contagion.

In many instances, a domestic bond market may eliminate the need for external borrowing, which also contributes to increased economic stability. External borrowing introduces exposures to foreign exchange risk and risks related to contagion. A domestic bond market, by contrast, can intermediate local investments in local currency, and sudden changes in foreign exchange rates or reversals in foreign capital flows will not directly affect the domestic bond market. During the recent financial crisis, for example, bond markets in Mexico and several Asian countries contributed to the economic stability of the countries by reducing their reliance on external borrowing in foreign currency. By contrast, other countries without developed bond markets including Hungary, Romania, Estonia, Latvia, and Lithuania remained reliant on foreign currencies and fared poorly during the recent crisis. The development of a robust domestic bond market, however, has not prevented contagion through other channels.

In some economies, codependence between the banking system and capital markets amplified shocks during the recent crisis, and inter-linkages among economies spread the shocks globally. In addition, the development of domestic bond markets may occur in conjunction with increasing integration with other economies, which also can increase vulnerabilities to fluctuations in exchange rates and reversals in the flow of foreign capital.


54 Use: “Domestic institutional investors are another potentially important and growing source of capital in emerging economies. Investing domestically can have several advantages: it avoids foreign exchange exposure and risks, and it can contribute to economic growth and development, not only via infrastructure improvements, but also by helping to develop the local financial sector and capital markets.”

55 Including real sector linkages such as similar macroeconomic fundamentals and trade flows.

With sufficient legal safeguards, however, a domestic bond market can offer finance more suitable for long-term investments than banks can provide. Unlike banks, which must transform their short-term deposits into more long-term loans, bond finance does not entail a maturity transformation. Investors in bonds enter contracts for a specific period of time. Whereas banks, moreover, lose the assets that have supported the loans they have extended if the amount and value of their deposits fall, investors in bonds have committed their capital for the duration of the contract and use the interest rates that they charge to manage the risk of nonpayment.

In particular, the long-term nature of a bond market can offer finance for infrastructure development at a lower cost and fewer risks. Because infrastructure projects typically have a large scale, with large up-front capital requirements, a long initial period without returns, and extended payback periods, infrastructure projects demand long-term finance. A domestic bond market can deploy capital to infrastructure development better than banks can, by providing long-term finance supported by long-term capital, when sufficient legal protections have developed.

Many emerging economies have established government bond markets with minimal default risk but have failed to develop corporate bond markets. Governments generally enjoy inexpensive access to lending markets, since investors often perceive the power of governments to tax citizens and impose losses on them as eliminating the risk of default. By contrast, investors rely on a complicated legal infrastructure to gain the ability to estimate the probability that corporate bond issuers will default and the recoveries they might receive from the liquidation or sale of the issuers if they default. The capacity of investors to predict and manage risk depends on strong disclosure requirements; credible accounting and auditing practices; reliable, independent rating agencies; clear laws setting out the rights of bondholders in the event of default; a strong enforcement mechanism for such rights; and an efficient judiciary to oversee the enforcement of creditor rights. Among the countries that successfully have utilized a domestic bond market to support long-term investments in infrastructure development are China, Japan, Korea, and many other countries in East Asia.

59 See, e.g., OECD, BOND MARKET DEVELOPMENT IN ASIA 239 (2001).
infrastructure, Chile, for example, has financed local road projects with long-term bonds of an average maturity of twenty-one years. The road projects avoided the expense, capital shortfalls, and maturity transformation risks that reliance on bank finance might have introduced.

II. THE INFRASTRUCTURE GAP

Many emerging economies urgently require investment in infrastructure. Quality of life depends on sufficient infrastructure, and infrastructure also can generate economic growth. India, for example, faces an acute need for investment in infrastructure. The country, however, has relied on banks for financing infrastructure, and, though the Indian government has prioritized reducing the infrastructure gap, banks have not had the capacity to fund the infrastructure that India needs. India requires new tools for meeting the challenge of financing the substantial deficits in infrastructure that have persisted in India.

A. Infrastructure and Economic Development

Facilitating investments in infrastructure can help to meet the needs of citizens and expand the productive capacity of an economy. Without sufficient infrastructure, living conditions suffer and economic development may slow.

Infrastructure supports services essential to a basic quality of life. Infrastructure lies behind the provision of health, education, heating, lighting, transportation, and communication, among other services. Disease prevention, for example, depends on clean water and sanitation. Individual welfare depends on easy mobility and the ability to communicate

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over distances. Hospitals and new housing units offer vital services and improve living conditions.

Investing in infrastructure also can contribute to economic development. The World Bank has estimated that an increase in infrastructure investments of 10% would result in an increase in GDP of 1%. Roads, bridges, and ports, for example, reduce transportation and logistics expenses, which decreases the cost of trade. When workers easily can travel to potential jobs, employment levels rise. Access to rural roads also can ameliorate health outcomes such as maternal mortality rates, and the availability of advanced machinery and well-equipped factories can bolster production. In India, for example, the development of railroad services has increased trade.

Conversely, unmet infrastructure needs pose an obstacle to development. One economic study has indicated that if any country in Africa had access to the infrastructure of Mauritius, the GDP of that country would grow by an additional 2.2% per year. In many countries, the absence of power, telecommunications, transportation, and access to water has made industrial production more costly.

B. Indian Infrastructure Needs

The World Economic Forum has estimated a global gap in infrastructure finance of $1 trillion per year, and in India the need for infrastructure development has become acute (Figures 1, 2, 3). A long period of underinvestment has left India with deficits in power, water, housing, rail, roads, ports, airports, and telecommunications relative to its growing population. The Global Competitiveness Report of the World Economic Forum for 2014-15 ranked India 87th out of 144 countries on infrastructure.

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Figure 1. Annual Infrastructure and Investment Needs\textsuperscript{70}

<table>
<thead>
<tr>
<th>Region</th>
<th>Investment and Maintenance Needs (2005 constant S$ billions)</th>
<th>% projected 2010-20 GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and the Pacific\textsuperscript{a}</td>
<td>406.7</td>
<td>5.5</td>
</tr>
<tr>
<td>Central Asia\textsuperscript{a}</td>
<td>12.5</td>
<td>5.2</td>
</tr>
<tr>
<td>Europe</td>
<td>11.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Latin America and the Caribbean\textsuperscript{a}</td>
<td>81.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Middle East and North Africa\textsuperscript{a}</td>
<td>78.5</td>
<td>9.2</td>
</tr>
<tr>
<td>South Asia\textsuperscript{a}</td>
<td>191.2</td>
<td>10.8</td>
</tr>
<tr>
<td>Sub-Saharan Africa\textsuperscript{a}</td>
<td>93.3</td>
<td>9.8</td>
</tr>
<tr>
<td>Weighted average</td>
<td>141.5</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Sources: Various sources as described in notes.
Note: \( -- \) = not available.

Figure 2. Basic Infrastructure Access by Region\textsuperscript{71}

<table>
<thead>
<tr>
<th>Region</th>
<th>Population without electricity (millions)</th>
<th>% total population</th>
<th>Population without improved water (millions)</th>
<th>% total population</th>
<th>Rural population without access (millions)</th>
<th>% rural population</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and the Pacific</td>
<td>186</td>
<td>9.2</td>
<td>237</td>
<td>11.9</td>
<td>57</td>
<td>5.6</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>3</td>
<td>0.2</td>
<td>18</td>
<td>5.1</td>
<td>29</td>
<td>25.1</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>31</td>
<td>6.6</td>
<td>38</td>
<td>6.5</td>
<td>24</td>
<td>46.1</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>24</td>
<td>5.9</td>
<td>107</td>
<td>28.8</td>
<td>26</td>
<td>66.2</td>
</tr>
<tr>
<td>South Asia</td>
<td>612</td>
<td>37.8</td>
<td>149</td>
<td>9.3</td>
<td>410</td>
<td>41.7</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>585</td>
<td>69.5</td>
<td>330</td>
<td>40.2</td>
<td>238</td>
<td>69.5</td>
</tr>
</tbody>
</table>


Figure 3. India Infrastructure Ranking\textsuperscript{72}

\textsuperscript{70} http://www.g20dwg.org/documents/pdf/view/11/ at 7.
\textsuperscript{71} http://www.g20dwg.org/documents/pdf/view/11/ at 15.
\textsuperscript{72} http://www3.weforum.org/docs/WEF_Infrastructure_Investment_Policy_Blueprint.pdf at 10.
The Indian population has surpassed 1.2 billion and continues to grow, but infrastructure in India already fails to meet the needs of its people. The peak power deficit in India, for example, remains roughly 10%. According to the multinational management consulting firm McKinsey, India must also double its water generation capacity by the year 2030. The multinational auditing and advisory firm KPMG has found that nearly 1/5 of Indian households have limited access to housing and that India would need to build 30,000 - 35,000 units of housing per day for the next eight years to meet the demand.

The urgency of upgrading infrastructure in India appears especially critical in its cities. India’s urban population of roughly 375 million is projected to reach 500 million by 2017. By 2030, sixty-eight Indian cities likely will have more than 1 million residents.

Since liberalizing its economy during the 1990s, rapid industrialization in India has intensified the strain on infrastructure. Foreign trade, for example, has more than doubled in India over the last decade, but the country lacks the logistics infrastructure to support the growth. Because the Indian railway system does not have sufficient freight capacity, for
example, most freight is transported by road, where traffic reduces highway speeds to roughly thirty-five kilometers per hour.

C. Finance Landscape in India

Currently, banks finance most infrastructure investments in India, with some supplemental public finance. Bank lending has not provided enough capital at a low cost, and the lending has created risks related to the use of short-term loans to finance long-term projects. Regulators have restricted the concentration of infrastructure loans on bank balance sheets, and most banks have reached the ceilings. Meanwhile, the government has lacked the capacity to fill the remaining shortfalls, and the domestic bond market in India has not developed.

The legacy of the controlled economy that India adopted after independence from Britain has continued to influence the Indian financial market. Upon independence, India created development financial institutions (DFIs) to provide long-term finance to industrial projects, in order to stimulate domestic industry and reduce dependence on foreign imports. The central bank and the government provided the DFIs with access to low-cost funds, so that the DFIs could provide inexpensive long-term finance, and barred commercial banks from extending large, long-term loans to industry.

The Indian central bank and Indian government developed the DFIs into the primary source of long-term investment. Until recently, the central bank fixed the interest rates in the economy, setting them so that the DFIs could charge lower interest rates than commercial banks and the nascent bond market. As a result, industrial firms relied on the DFIs for finance and the corporate bond market in India did not grow.

As the Indian economy liberalized, however, competition increased and the DFIs receded. Banks gained access to cheaper funds and more deposits, and they became able to offer less expensive finance. A more liberal

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import policy subjected industrial firms to global competition, and many of the firms that the DFIs had funded defaulted on their loans. In response to the defaults, the DFIs restricted lending.

Eventually, banks overtook the DFIs to become the primary source of finance in India, but recent defaults on bank loans have made banks less willing to finance long-term projects. Between 2007 and 2013, for example, Indian banks lent roughly $153 billion to develop infrastructure projects including improvements to roads, ports, power, telecoms, and railways. Many of the borrowers, however, have defaulted, and according to the Indian central bank, Indian banks have restructured $22 billion of infrastructure loans. The 2010-2014 Financial Stability Reports published by the Indian central bank have documented consistent declines in the growth of credit from banks.

The Indian government has offered supplementary public finance, but the infrastructure needs of the country have exceeded the capacity of the government to fund them. The 2015 national budget, for example, delayed deficit reductions in order to allocate an additional $11 billion to infrastructure projects including roads, railways, and ports and doubled

(2014).


78 In 2010, India introduced a new category of financial institution, infrastructure finance companies, and gave the infrastructure finance companies more access to borrowing in order to increase the flow of capital to infrastructure. The 2015 budget proposed to improve the access of the infrastructure finance companies to capital by raising their credit rating through investments from a newly-created National Investment in Infrastructure Fund. The National Investment in Infrastructure Fund, however, has failed to attract sufficient funding.

India has approached government partnerships with caution, because of concerns over national security and the risks attending external capital flows, although Prime Minister Modi has increasingly courted investment from foreign government. While India has refused past offers of Chinese investment to protect its national security, last year China invested in Indian rail infrastructure and the development of industrial parks. Japan has financed transportation initiatives, and the U.S. has invested in the development of “smart cities,” which use technology in the delivery of municipal services.

Other external investment carries similar risks and has failed to attract foreign lenders. Between 2007 and 2012, the private sector invested $225 billion in Indian infrastructure, but many of the projects have failed. In 2013, for example, the London-based private equity, infrastructure, and debt management firm 3i, which had the world’s largest India-dedicated infrastructure fund, exited all of its portfolio companies in the country after its investments did not generate adequate returns.

spending on transportation. The budget prioritized the construction of an elevated rail corridor in Mumbai, three airports, two ports, and almost 6,000 miles of new roads. The Indian Planning Commission, however, has estimated that the country needs 180 additional airports over the next ten years, and the Ministry of Road Transport has called for additional road-widening projects and improvements at ports. The government also has identified shortfalls in power generation from coal and gas that wind, solar, and other energy development projects could help to ameliorate.

The long-term bond market in India, meanwhile, has not contributed significantly to infrastructure funding. Few smaller investors have participated in the bond market, and daily trading volumes have remained minimal. The bond market has not developed to the levels that other bond markets in Asian economies such as China, Korea, and Malaysia have attained (Figure 4).\(^{80}\) In India, bank loans represent approximately 36% of GDP, while corporate bonds represent only about 4% of GDP. By contrast, corporate bonds represent 49% of GDP in South Korea.

Figure 4. Comparison of Asian Bond Markets\(^{81}\)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Outstanding Government Bonds (in USD Billions)</th>
<th>Outstanding Corporate Bonds</th>
<th>Total Bond Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>3,072.6</td>
<td>1,651.7</td>
<td>4,724</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>108.5</td>
<td>86.2</td>
<td>195</td>
</tr>
<tr>
<td>Indonesia</td>
<td>89.7</td>
<td>17.9</td>
<td>108</td>
</tr>
<tr>
<td>Japan</td>
<td>9,203.4</td>
<td>786.6</td>
<td>9,990</td>
</tr>
<tr>
<td>South Korea</td>
<td>626.1</td>
<td>1,014.9</td>
<td>1,641</td>
</tr>
<tr>
<td>Malaysia</td>
<td>182.4</td>
<td>129.7</td>
<td>312</td>
</tr>
<tr>
<td>Philippines</td>
<td>87.3</td>
<td>13.3</td>
<td>101</td>
</tr>
<tr>
<td>Singapore</td>
<td>149.6</td>
<td>92.1</td>
<td>242</td>
</tr>
<tr>
<td>Thailand</td>
<td>213.7</td>
<td>61.5</td>
<td>275</td>
</tr>
<tr>
<td>Vietnam</td>
<td>28.01</td>
<td>0.7</td>
<td>29</td>
</tr>
<tr>
<td>India</td>
<td>569.0</td>
<td>242.5</td>
<td>812</td>
</tr>
</tbody>
</table>

Source: ASIAN BONDS ONLINE, SEBI and Ministry of Finance
*Figures are as of December '13 for all countries and as of March '14 for India

III. CASE STUDIES ON RISK AND THE ROLE OF LAW IN THE BOND MARKET

The experience of the recent crisis has underscored the need for

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developing economies to develop domestic financing sources, in order to fund infrastructure projects while insulating their economies from shocks in more developed economies, but domestic bond markets require legal backstops to protect economies from the instability that bond markets can introduce. Bank finance has grown less available due to losses at American and European banks during the recent crisis and regulatory reforms in response to the crisis. In addition, the dependence of other economies on foreign lending spread the crisis to additional countries. While long-term bond markets would offer a new and potentially less expensive source of finance for infrastructure, that also could withstand disruptions in the banking sector, bond markets present risks that legal systems must have the capacity to contain. This section sets out three case studies that illustrate risks from fostering a long-term bond market and the necessity of a robust legal infrastructure to manage the risks. In Korea, the government sought to develop a domestic bond market, but investors expected the government to bail out firms including the Korean conglomerate firm Daewoo if they defaulted. The investors priced the bonds accordingly, but the government allowed Daewoo and other firms to go bankrupt. The investors consequently lost confidence in market prices, and the bond market collapsed. In Dubai, the domestic investment firm Dubai World defaulted on its bonds after raising more bond finance than the firm had developed the capacity to manage. Nevertheless, the Dubai government created a new bankruptcy regime, which supported a fair resolution of the firm, and the domestic bond market rebounded. In Argentina, the public budget became reliant on bond finance without a legal system capable of addressing the risks that the bond market introduced, and the country has become stuck in a cycle of repeated defaults.

A. Korea

The bankruptcy of the Korean conglomerate firm Daewoo has demonstrated the risks that a bond market poses when investors lack the information with which to price bonds correctly. Investors in the bonds of Daewoo assumed that the firm would never go bankrupt and therefore charged interest rates that reflected no possibility of default. After

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83 B. Renaud, Real Estate Bubble and Financial Crisis in Dubai, 20 J. Real Estate Lit. 51, 64, 65 (2012).
Daewoo defaulted, investors stopped investing in the Korean bond market.85

Originally, the Korean government encouraged the growth of a domestic bond market to fund long-term investments by enacting a ceiling on the amount of bank credit that Korean firms could use.86 Large Korean conglomerate firms known as chaebols responded by substituting bond finance for bank lending.87

Investors perceived the bonds that the chaebols issued as risk-free investments and extended to the chaebols artificially cheap bond finance.88 The investors assumed that the large size of the chaebols would cause the government to bail out the chaebols if they failed. The investors set low interest rates on the bonds not because of the stability of the chaebols but because of the expectation that the government would not allow the chaebols to default.89

Bonds therefore offered inexpensive finance, and the chaebols issued numerous bonds. By the end of 1997, leverage ratios among the chaebols had increased to more than 500% of equity.90 The investors did not monitor the firms closely, and the accounting and auditing of the chaebols did not conform to international standards.91 The lack of transparency masked the risks increasing within the chaebols.92 Despite their weak fundamentals, however, the chaebols continued to raise bond finance at rates reflecting zero risk of default.

The access to cheap capital enabled the chaebols to forego restructuring long after restructuring became necessary.93 The chaebols eased any

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93 S. Kim and J. Park, Structural Change in the Corporate Bond Market in Korea after
pressure to restructure that developed by issuing new bonds. Daewoo, for example, attained a leverage ratio of roughly 2,000%. The firm had issued 1 trillion won of bonds during each month of 1998. At current exchange rates 1 trillion won amounts to roughly $900,990,000.

In spite of the expectations of the investors, Daewoo entered bankruptcy in 1999, and the investors suffered losses. At the time it went bankrupt, Daewoo owed 60 trillion won, or roughly $50 billion. The bankruptcy procedures in Korea remained untested and did not appear capable of handling such a large bankruptcy. Between 1990 and 1997, Korean courts had handled fewer than 600 bankruptcy cases, and only 20% of the cases had concluded in successful restructurings. The government therefore entered into settlements with the investors in Daewoo, and paid them little more than market rate on the bonds that they held.

In the wake of the Daewoo settlements, the Korean bond market collapsed. As investors gained awareness of the true risks of default among the chaebols, investors withdrew from the bond market. In addition, pooled investment vehicles known as investment trusts had realized significant losses on Daewoo bonds that the trusts had purchased, and investors in the trusts withdrew from the trusts, afraid that the trusts would also fail. To regain liquidity, the trusts began to sell their

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99 Use: “in the past these formal procedures have rarely been drawn upon.”
103 S. Kim and J. Park, *Structural Change in the Corporate Bond Market in Korea*
remaining bond holdings. As the bonds flooded the market, their value fell, and the trusts had to sell additional bonds to recoup the money. The decreasing value of bonds also caused other investors to sell their bonds, and with more bonds for sale, market prices decreased more rapidly.

B. Dubai

The Dubai investment firm Dubai World sold more bonds than the firm earned revenues to service, but the government created a legal framework that stabilized the risks, and the bond market in Dubai rebounded. Dubai World had issued bonds to finance real estate development projects, but the bonds matured before the projects had generated profits. In response, the Dubai government passed new bankruptcy laws to facilitate the resolution of the claims of investors in the bonds. The new bankruptcy regime seemed to restore confidence in the Dubai bond market.

Dubai World sought long-term finance for real estate development in Dubai, and the influx of foreign bond finance that resulted contributed to a bubble in the Dubai real estate market. After the government allowed foreign investors to participate in the Dubai bond market, speculative investors purchased bonds issued by Dubai World. During 2006, the price of office rentals increased by 55%, and during 2007, prices increased an additional 86%. Housing prices also rose 65% during the first half of 2008.

Initial investors in real estate projects traded their bonds with

\[\text{after the Currency Crisis, BIS Paper No. 11 at 134, available at } \text{http://www.bis.org/publ/bppdf/bispap11l.pdf.}\]

\[104 \text{ S. Kim and J. Park, Structural Change in the Corporate Bond Market in Korea after the Currency Crisis, BIS Paper No. 11 at 134, available at http://www.bis.org/publ/bppdf/bispap11l.pdf.}\]

\[105 \text{ S. Kim and J. Park, Structural Change in the Corporate Bond Market in Korea after the Currency Crisis, BIS Paper No. 11 at 134, available at http://www.bis.org/publ/bppdf/bispap11l.pdf.}\]

\[106 \text{ See, e.g., IMF, United Arab Emirates, Staff Report for the 2009 Article IV Consultation, Jan 22, 2010 at 8.}\]

\[107 \text{ B. Renaud, Real Estate Bubble and Financial Crisis in Dubai, 20 J. Real Estate Lit. 51, 51 (2012).}\]

\[108 \text{ B. Renaud, Real Estate Bubble and Financial Crisis in Dubai, 20 J. Real Estate Lit. 51, 55 (2012).}\]

\[109 \text{ O. Hassler, Housing and Real Estate Finance in Middle East and North African Countries, World Bank, June 2011 at 17.}\]

\[110 \text{ O. Hassler, Housing and Real Estate Finance in Middle East and North African Countries, World Bank, June 2011 at 17.}\]
downstream investors in response to the increasing real estate prices, which left the secondary investors vulnerable when real estate prices suddenly decreased. While the bonds matured within an average of seven years, typically the underlying real estate projects remained unbuilt. The secondary investors gambled on the projects yielding revenues before Dubai World had to make payments on the bonds.\textsuperscript{111} When the global financial services firm Lehman Brothers entered bankruptcy, however, the Dubai real estate market collapsed.\textsuperscript{112} Between September 2008 and September 2009, residential prices fell by more than 50%.\textsuperscript{113} Dubai World could not service its bonds, and the firm announced a standstill on $26 billion in liabilities on November 25, 2009.\textsuperscript{114}

The Dubai legal system appeared incapable of resolving such a large default. To begin with, Dubai World occupied an ambiguous status within the Dubai legal system. Because Dubai World had formed under the decree of the ruler of Dubai, rather than under the federal commercial laws of Dubai,\textsuperscript{115} questions arose regarding whether the firm had access to Dubai bankruptcy law.\textsuperscript{116} Moreover, even if Dubai law applied to the firm, the law seemed incapable of resolving the firm and stabilizing the bond market.\textsuperscript{117} The size and global importance of Dubai World necessitated a speedy resolution, but the number of international investors with claims against the firm threatened a contentious, costly, and protracted process.\textsuperscript{118} When creditors met in 2009 to discuss a potential restructuring, ninety-five different banks participated.\textsuperscript{119} The banks commenced negotiations with seventy other lenders.\textsuperscript{120}

\textsuperscript{111} B. Renaud, \textit{Real Estate Bubble and Financial Crisis in Dubai}, 20 J. Real Estate Lit. 51, 56 (2012).
\textsuperscript{113} B. Renaud, \textit{Real Estate Bubble and Financial Crisis in Dubai}, 20 J. Real Estate Lit. 51, 61 (2012).
\textsuperscript{118} B. Renaud, \textit{Real Estate Bubble and Financial Crisis in Dubai}, 20 J. Real Estate Lit. 51, 64 (2012).
\textsuperscript{119} B. Renaud, \textit{Real Estate Bubble and Financial Crisis in Dubai}, 20 J. Real Estate Lit. 51, 67 (2012).
\textsuperscript{120} B. Renaud, \textit{Real Estate Bubble and Financial Crisis in Dubai}, 20 J. Real Estate Lit. 51, 68 (2012).
To manage the default of Dubai World with more efficiency, the Dubai government created a new bankruptcy law. The new law allocated losses in a way that seemed transparent and fair to investors, and investors regained confidence in the Dubai bond market. Known as Decree No. 57, the new bankruptcy legislation blended best practices from the English and American bankruptcy systems. Within a year, investors unanimously approved a settlement that imposed on them losses of only 16%. By the end of 2010, investors resumed purchasing bonds that Dubai World issued.

C. Argentina

Argentina issued bonds without a legal foundation to support the risks that the bonds introduced to the economy, and the country eventually entered a cycle of persistent default. As investors demanded high interest rates to account for the risks in the Argentinean economy, the country had to issue additional bonds to raise finance with which to service the existing bonds. The additional borrowing triggered additional increases in interest rates, which in turn made it necessary for the country to raise additional finance.

Argentina has defaulted eight times in its history, and it has defaulted most recently in 2001 and 2014. In the lead-up to the 2001 default, bond issues increased substantially the debt that the country held. The debt to GDP ratio in Argentina had risen from 35% in 1995 to nearly 65% in 2001.

Argentina lacked the legal foundation to manage the risks of such extensive borrowing. The law in Argentina did not provide mechanisms to ensure transparency, disclosure, and information sharing in the financial market. The bankruptcy system also did not maximize returns to investors.

121 IMF, United Arab Emirates, Staff Report for the 2009 Article IV Consultation, Jan 22, 2010 at 14.
124 B. Renaud, Real Estate Bubble and Financial Crisis in Dubai, 20 J. Real Estate Lit. 51, 74 (2012).
125 B. Renaud, Real Estate Bubble and Financial Crisis in Dubai, 20 J. Real Estate Lit. 51, 74 (2012).
and instead seemed to insulate bond issuers from the claims of investors. In addition, the economy depended on commodities and agricultural products with volatile prices and remained vulnerable to inflation. The government, moreover, did not impose macroeconomic policies in a stable way.

Consequently, investors could not easily predict the risks of the bonds with accuracy, and the high interest rates that the investors charged in response to the uncertainty made default almost inevitable. As investors grew unsure of their returns, they raised interest rates on bonds to protect themselves against losses. Interest rates rose to 20% during 2001. The increasing interest rates caused debts levels in Argentina to grow, as more borrowing raised interest rates higher. Eventually, Argentina reached a point when it could not repay the debt.

The cycle of default became inescapable. The government broke investment contracts, and raising finance became even more difficult. As investors transitioned from offering bond finance at higher interest rates to exiting the bond market entirely, Argentina could not obtain new capital with which to repay its existing debts.

IV. OTHER MODELS OF INFRASTRUCTURE FINANCE

For economies that lack the legal backstops necessary for maintaining stability in domestic bond markets, what interim financing models exist to facilitate the provision of capital to infrastructure development at a low risk? Can bank finance of infrastructure projects become safer and less expensive, despite the currency and maturity risks and information asymmetries that long-term bank loans introduce? How might nascent bond markets avoid risks that domestic legal systems currently may lack the capacity to manage? This section discusses intermediate financing models that include bank consortia, securitization, covered bonds, government participation in bond markets, and credit default swaps on corporate bonds. The section evaluates the level of legal support that each model requires, highlighting the tradeoff between economic stability and the provision of long-term finance. The section draws on India as an example in order to observe the ability of legal systems in emerging economies to support the risks of each financing technique and concludes that, among the techniques analyzed, covered bonds offer the most suitable means for emerging economies to raise capital for infrastructure investment.

A. Bank-Based Alternative Models
Although intermediate financing models based on bank loans do not eliminate the maturity risk inherent to aggregating short-term deposits into long-term loans, the models contribute various approaches to managing the risk. The models also circumvent shortcomings in specific areas of domestic law; however, they continue to require improvements in other areas of law. Bank consortia, for example, distribute maturity risk among several banks, thereby enabling each bank in the consortium to diversify the maturity risk that it holds. Contracts among the banks and other participants in the arrangements can stipulate any national law for enforcement of the contracts supporting the arrangements, but domestic property rights continue to govern enforcement claims against loan collateral. Second, securitization enables banks to transfer maturity risk to downstream investors. Securitization purports to sidestep domestic bankruptcy law but may introduce moral hazard risks at banks and, if problems develop, maintaining economic stability may depend on the availability of a robust resolution mechanism. Finally, covered bonds retain the maturity risk within banks but ensures liquidity at the banks to manage the risk. Like securitization, covered bonds purport to avoid domestic bankruptcy processes; however, they also diminish the moral hazard that securitization may generate. Nevertheless, covered bonds also necessitate legal implementation and management. While the models mitigate maturity risk connected to bank loans and may reduce pressure on certain legal backstops, each model poses risks that legal systems must accommodate. In addition, because maturity risk continues to constrain the duration of the underlying bank loans, none of the models attracts greater investment from institutional investors, including pension funds, insurance funds, and mutual funds, that could contribute long-term capital to long-term investments. In light of the tradeoffs, covered bonds appear to offer emerging economies, such as India, that have deficits in their legal systems, the most benefits relative to their risks.

1. Bank Consortia

Pooling arrangements among banks diversify maturity risks through contracts among the banks and their borrowers. Because the banks can draft the contracts under foreign law, the pooling arrangements can avoid shortfalls in domestic law related to contract enforcement. The banks, however, continue to depend on the domestic law of the project to enforce their security rights. Bank finance through a consortium of banks therefore may require legal reforms to domestic law related to secured credit and high

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transaction costs also may negate any reductions in the cost of capital that diversifying risks otherwise could attain.

a. Structure

In bank consortia, groups of banks jointly finance borrowers. The collective arrangements enable the banks to extend larger loans than each participating bank individually could extend. The banks base the loans on the project revenues they predict. Dividing the loans among more than one bank allows each bank to diversify the risks it undertakes and tailor its compliance with regulations on lending.

Banks that join consortia cooperate on loans. The banks share due diligence, drafting, and monitoring tasks. Each bank retains a portion of each loan on its balance sheet (Figure 5).

Figure 5. Bank Consortia

![Diagram of Bank Consortia](image)

Typically, bank consortia offer non-recourse loans, which depend on the revenues of the infrastructure projects, rather than the financial position of the companies developing the projects. When borrowers default, the banks seize their collateral but do not have access to other assets of the

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borrower to make up deficiencies. The structuring may be helpful in encouraging relatively new companies, prevalent in less-developed economies, to contribute to infrastructure development.

The collaboration among the banks also facilitates compliance with concentration and sector limits on banks that regulators including those in India impose. In India, banks may extend only 15-20% of their capital to a single borrower\textsuperscript{133} and must lend 40% of their credit to priority sectors, which principally include agriculture, education, housing, and underprivileged groups.\textsuperscript{134} Banks in India also must hold a quarter of their deposits in government bonds.\textsuperscript{135} By aggregating their unrestricted assets, bank finance through consortia of banks enables each bank to comply with the regulations and also extend a large loan.

b. Implementation

Some aspects of consortium-based bank lending sidestep common shortcomings in the domestic law of emerging economies while other do not, and, overall, the implementation of the consortium structure may be very expensive. Complexities make the contracts supporting the arrangements difficult to draft, and, though the contracts may specify foreign contract law and a foreign jurisdiction for enforcement, the banks still must enforce their rights to collateral under domestic law. Nevertheless, the banks retain the ability to monitor borrowers.

Implementing lending by bank consortia carries high transaction costs.\textsuperscript{136} The banks must negotiate with individual borrowers and also among themselves and document the numerous agreements that they make. In some instances, the closing costs of the arrangements nearly have equaled the size of the loans.\textsuperscript{137}

\textsuperscript{133} Lending to a single borrower is limited to 15% of the bank’s capital funds (tier 1 and tier 2 capital), which may be extended to 20% in the case of infrastructure projects.

\textsuperscript{134} The lending target of 40% of adjusted net bank credit (outstanding bank credit minus certain bills and non-SLR bonds) – or the credit equivalent of off-balance sheet exposure (sum of current credit exposure + potential future credit exposure that is calculated using a credit conversion factor), whichever is higher – has been set for domestic commercial banks and foreign banks with greater than 20 branches, while a target of 32% exists for foreign banks with less than 20 branches.\textsuperscript{135}


\textsuperscript{137} C. Groobey, John Pierce, M. Faber, and G. Broome, Project Finance Primer for
The banks and borrowers, however, may draft the contracts under any law that they choose, which benefits economies in which deficiencies in domestic contract law and in the enforcement of contracts persist (Figure 6). India, for example, ranks 182nd out of 183 countries in “enforcing contracts,” according to the annual Doing Business Reports issued by the World Bank. Enforcing a contract in India entails forty-six separate procedures, takes roughly 1,420 days, and costs 39.6% of the value of the disputed contract on average.

Figure 6. Contract Enforcement by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>Time (days)</th>
<th>Cost (% of claim)</th>
<th>Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>182</td>
<td>1,420.0</td>
<td>39.6</td>
<td>46</td>
</tr>
<tr>
<td>Brazil</td>
<td>Depends on city</td>
<td>731.0</td>
<td>16.5</td>
<td>43</td>
</tr>
<tr>
<td>China</td>
<td>35</td>
<td>452.8</td>
<td>16.2</td>
<td>37</td>
</tr>
<tr>
<td>Germany</td>
<td>13</td>
<td>394.0</td>
<td>14.4</td>
<td>31</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
<td>150</td>
<td>25.8</td>
<td>21</td>
</tr>
<tr>
<td>U.S.</td>
<td>Depends on city</td>
<td>370</td>
<td>22.9</td>
<td>32</td>
</tr>
</tbody>
</table>

In addition to diversifying the risks of bank loans and allowing a flexible choice of law, financing infrastructure through bank consortia preserves the monitoring capabilities of banks and the ability of banks to intervene relatively quickly when defaults seem likely. The banks in a consortium have direct relationships with borrowers and may contract for provisions that enable them to assess the on-going position of the borrowers. The banks share information within the consortium and exercise contractual rights to terminate loans or force early repayments. The relatively small number of banks that participate in individual consortia helps to facilitate restructuring of the loans.

Banks in consortia, however, typically claim security from borrowers to protect themselves against losses, and weaknesses in domestic law related to the enforcement of security therefore may reduce the relevance of consortium-based bank lending in some countries. The banks generally

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*139 C. Groobey, John Pierce, M. Faber, and G. Broome, Project Finance Primer for*
demand project assets as collateral, so that the banks can assume control of a project if a borrower defaults on a loan.\footnote{Association for Financial Markets in Europe, \textit{Guide to Infrastructure Financing}, Jun 2015 at 16.} Domestic law normally governs the enforcement of security, and in some countries, including India, security enforcement remains time-consuming and costly (Figure 7). Although the Indian Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002, made the enforcement of security interests easier for banks in India by allowing banks, public financing institutions, and housing financing companies to bypass court enforcement processes by seizing and selling assets themselves,\footnote{These creditors can take over, without court participation, the assets of any debtor that has defaulted on payments for more than six months by giving a notice of 60 days. The debtors can appeal only if they deposit 75\% of the defaulted amount.} appeals of the creditor actions still cause significant delays.

Figure 7. Out-of-Court Enforcement of Security\footnote{https://www.wbginvestmentclimate.org/uploads/SecuredTransactionsSystems.pdf.}

<table>
<thead>
<tr>
<th>Country</th>
<th>Allowed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>Yes</td>
</tr>
<tr>
<td>Brazil</td>
<td>Yes</td>
</tr>
<tr>
<td>China</td>
<td>No</td>
</tr>
<tr>
<td>Germany</td>
<td>Yes</td>
</tr>
<tr>
<td>Singapore</td>
<td>Yes</td>
</tr>
<tr>
<td>U.S.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

c. Risks

While financing infrastructure through consortia of banks introduces few new risks not already present in plain bank finance of infrastructure, the financing model also eliminates few of the risks of lending by individual banks, including maturity and liquidity risk.

include revolvers to facilitate subsequent rounds of financing, but projects nevertheless may fail to attract additional capital.

Because of the specificity of the consortium structure, banks in a consortium also must commit to funding projects for the duration of the loans. The lack of flexibility and liquidity causes the banks to charge high interest rates.\textsuperscript{145}

2. Originate to Distribute Model

Securitization enables banks to shift maturity risk to downstream investors by selling their loans to special purpose vehicles, which pool the loans and resell them. By sheltering assets in bankruptcy-remote structures, securitization may bypass the domestic bankruptcy system, which in some countries may lack a sufficient legal foundation. Most countries also relatively easily can institute laws that respect the formal separation of SPVs and regulations to ensure accurate ratings of the repackaged loans by credit rating agencies. Nevertheless, securitization introduces significant risks that demand bankruptcy and crisis resolution frameworks, as well as protections for depositors, which appear difficult quickly to establish.

a. Structure

When banks securitize infrastructure loans, the banks transfer the right to the payments due on the loans to separate legal entities.\textsuperscript{146} The separate entities in turn package the payment streams and sell rights to the payments to downstream investors.\textsuperscript{147} The downstream investors assume exposure to the risks of the loans from the banks.

Through securitization, the rights to future loan repayments are separated from the risk that the borrowers might not pay, grouped together, and sold to other investors (Figure 8).\textsuperscript{148} The securitization of an


A infrastructure loan in its most basic form involves three principal steps: First, a bank that originates a loan to an infrastructure project transfers assets in the form of future payments on the loan to a separate legal entity, the SPV. Second, the SPV sells rights to the assets to outside investors in exchange for capital. Third, the bank that originated the loan takes the money that the SPV earned from the sales as compensation for the original transfer of the assets.

Figure 8. Securitization Structure

Securitization of an infrastructure loan can occur at various stages of repayment of the loan. For example, after a project has been constructed and has begun to perform, an SPV can purchase the original loan from the bank and use it to issue securities. Alternatively, the SPV simply can use the future payments on the loan to refinance the project at a lower rate. In

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152 S. Bahl, Emerging Risks in Securitization of Infrastructure and Other Project Financing, 1 Asia Pacific J. Marketing & Management Rev. 211, 211 (2012).

153 S. Bahl, Emerging Risks in Securitization of Infrastructure and Other Project Financing, 1 Asia Pacific J. Marketing & Management Rev. 211, 211 (2012).

154 S. Bahl, Emerging Risks in Securitization of Infrastructure and Other Project Financing, 1 Asia Pacific J. Marketing & Management Rev. 211, 211 (2012).
this instance, the SPV acts as a new borrower and issues new securities.\textsuperscript{155}

Securitization purports to eliminate dependence on the domestic bankruptcy system, which in many countries, including India, may not operate effectively (Figure 9). When a bank that extends a loan to an infrastructure project has securitized the loan and the borrower defaults on the loan, the bank no longer has a claim against the borrower. The SPV already has paid the bank, and the risk of the default has shifted to the investors in the securities derived from the loan. In India, where the bankruptcy process has appeared lengthy and complex, the ability of the bank to sidestep the bankruptcy process to recoup assets has significance.\textsuperscript{156} Bankruptcy in India lasts, on average, for ten years and recovery rates average below 13%. Because of insufficient staffing, judges in India review only about forty bankruptcy cases per month. Managers and employees of bankrupt companies often withhold financial records, refuse to support concessions, and file appeals in order to postpone the loss of their jobs. While bankruptcy procedures pend, the costs of the bankruptcy process increase, and the value of assets held by the borrower falls. Currently, investors in India expect no recovery in bankruptcy because of the inefficiencies in the bankruptcy process, and their expectations have driven interest rates to very high levels.

Figure 9. Bankruptcy by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Rank</th>
<th>Time (years)</th>
<th>Cost (% of claim)</th>
<th>Recovery (e/$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>121</td>
<td>4.3</td>
<td>9</td>
<td>25.6</td>
</tr>
<tr>
<td>Brazil</td>
<td>135</td>
<td>4.0</td>
<td>12</td>
<td>19.5</td>
</tr>
<tr>
<td>China</td>
<td>53</td>
<td>1.7</td>
<td>22</td>
<td>36.0</td>
</tr>
<tr>
<td>Germany</td>
<td>13</td>
<td>1.2</td>
<td>8</td>
<td>82.9</td>
</tr>
<tr>
<td>Singapore</td>
<td>4</td>
<td>0.8</td>
<td>3</td>
<td>89.4</td>
</tr>
<tr>
<td>U.S.</td>
<td>4</td>
<td>1.5</td>
<td>8.2</td>
<td>80.4</td>
</tr>
</tbody>
</table>

b. Implementation

Though ostensibly avoiding domestic bankruptcy law, the introduction

\textsuperscript{155} S. Bahl, Emerging Risks in Securitization of Infrastructure and Other Project Financing, 1 Asia Pacific J. Marketing & Management Rev. 211, 211 (2012).

\textsuperscript{156} The Companies Act 1956, The Sick Industrial Companies (Special Provisions) Act 1985, and the Recovery of Debts Due to Banks and Financial Institutions Act 1993, as modified by the SARFAESI Act, provide for three separate bankruptcy frameworks.
of securitization requires other legal supports. To implement securitization, an economy must have rules related to the transfer of assets from banks to separate legal entities and regulations on credit rating agencies that ensure the accurate assessment of the default risk of the original bank loans.

The law must recognize the separate legal status of the SPV and set out clear rules for when courts can reverse the separation. In the U.S., for example, court decisions and regulatory rules have supported the ability of banks to make “true sales” of assets to SPVs; if a bank does not meet the conditions of a “true sale,” then the bank retains the assets and their risks on its balance sheet. Recognition of the transfer of assets to the SPV requires a statutory or common law legal foundation that generally will be easy to implement, and in India, the Supreme Court ruled in 2010 that banks legally could transfer credit risk to separate entities.

Because the risk of securities based on bank loans depends on the default risk of the loans, investors in securities rely on credit rating agencies to evaluate the ability of the borrowers to repay the loans. The investors base the interest rates that they charge on the ratings; however, in the wake of the recent financial crisis, evidence of inaccurate ratings of mortgage-backed securities emerged. Many commentators have faulted the practice of the rating agencies to charge the issuers of the securities for the ratings when the securities sell, a practice that Indian rating agencies share. To discourage domestic rating agencies from increasing the marketability of securities by inflating their ratings, the U.S. Securities and Exchange Commission, the European Commission, and the British House of Lords have considered changes to regulation of the agencies. In other economies, however, rating agencies already may operate with greater integrity. In India, for example, regulators have supervised rating agencies aggressively. The Securities and Exchange Board of India has overseen the evaluations by the agencies of most financial products since 1999.

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comparison, the SEC actively began monitoring the agencies in 2007, and the EU recently drafted its first mandatory provisions. The Indian agencies must renew their licenses every three years, unlike in the U.S., where the SEC grants permanent recognition of the agencies. The Indian central bank also supervises ratings of securitized products and must consent before agencies can evaluate bank loans. In addition, the Indian rating agencies have broadened their sources of revenue, potentially blunting some of the conflicts of interest that charging the issuers of securities for ratings introduce. The managing director of the Indian rating agency ICRA, for example, has estimated that less than 60% of the revenues of the agency derive from its credit ratings.

c. Risks

The recent financial crisis highlighted the need for regulation surrounding securitization to ensure economic stability and the continuing need for effective bankruptcy law and frameworks for resolving failed banks that appear difficult for countries to implement. Though infrastructure loans in emerging economies differ from the mortgages that played a contributing role in the recent crisis, infrastructure loans may hold more risk than mortgages. Even if domestic financial institutions engaged with securitization differently from financial institutions in developed financial markets prior to the recent crisis, securitization could unleash risks difficult for emerging economies to contain. While current regulations in India, for example, would appear to prevent the exposure of domestic financial institutions to concentrated securities risk and to prevent harm to


individual savings, changes to the regulations would leave banks vulnerable to more significant losses and depositors would have few protections.

Securitization seemed to increase economic instability in the lead up to the recent financial crisis in several ways. First, securitization appeared to cause banks to lower their lending standards.\textsuperscript{168} Banks typically decide to lend based on their evaluations of the likelihood that borrowers will default, but securitization transferred the risk of default from banks to investors in securities based on the loans, and the banks had less reason for caution in lending.\textsuperscript{169}\textsuperscript{170} Second, securitization appeared to lead investors in securities to underestimate risks.\textsuperscript{171} Investors in the securities assumed the risk of default of the underlying loans, including maturity risk, but the investors had less information than the banks that extended the loans,\textsuperscript{172} particularly as the securitization structures grew more complex.\textsuperscript{173} Third, securitization seemed to increase the challenges of market regulation.\textsuperscript{174} Attenuated links between banks and investors in the securities made financial markets increasingly opaque.\textsuperscript{175} Financial institutions also bought securities from each other, leaving the risk of the securities within banks and concentrating the vulnerability of the banks to losses in the securities markets.\textsuperscript{176}

Securitization markets, however, entail diverse assets that may not carry the same risks as the risks that the crisis revealed.\textsuperscript{177} Securitized mortgages in Italy, for example, have demonstrated a lower rate of default than non-securitized mortgages in Italy, and asset-backed securities based on American auto loans, credit cards, student loans, and equipment leases

\textsuperscript{168} S. Schwarcz, \textit{Disintermediating Avarice}, 4 Ill. L. Rev. 1165, 1178 (2011) (“Because lenders to subprime borrowers did not have to live with the credit consequences of their loans, the argument goes, their loan underwriting standards fell.”).


\textsuperscript{170} W. Buiter, \textit{Lecture on Lessons from the Global Financial Crisis for Regulations and Supervisors} (June 13, 2009), available at http://eprints.lse.ac.uk/29048/1/Lessons\_from\_the\_global\_financial\_crisis.pdf.


\textsuperscript{172} Id.

\textsuperscript{173} Id.


\textsuperscript{175} Id.


performed well during the recent crisis. In some instances, securitized loans to American companies have performed better than non-securitized loans of equal credit quality.

Regulation also can inhibit some of the practices that contributed to the crisis, but only for as long as the regulation remains in effect. India, for example, strictly regulates its financial market; however, relaxation of the regulations could allow the practices that contributed to the crisis to begin. Banks in India must comply with the lending rules discussed above in subsection 1, which could reduce the number of loans to infrastructure projects available to securitize. The Indian central bank also has acted to restrict exposures to concentrated risk. The central bank, for example, recently imposed limits on the exposure of banks to gold because the central bank had witnessed a “concentration risk” in gold loans. Other Indian regulations also potentially limit the concentration of investments in securitized assets: Central bank guidelines have restricted banks in India from investing in asset-backed and mortgage-backed securities with low ratings. When they have invested in securities with high ratings, they have had to account for the risk by amortizing their profits over the life of the security, rather than recognizing potential profits upfront, when the actual risk remains unknown. U.S. General Accounting Accepted Principals, by contrast, authorized the originators of securitized products to account for their projected future cash flows at the time of the sale of the securities, although this approach became illegal in response to the crisis. Indian institutional investors also face restrictions on the debt instruments in which they can invest and must devote a portion of their portfolios to investments in government debt. Finally, in order to invest in securitized debt, foreign institutions have to register as “Qualified Institutional Buyers.” As recently as 2009, foreign private equity funds and venture capital funds were ineligible. The criteria for “Qualified Institutional Buyers” have since expanded to include them, although they still may purchase only listed securities.

Nevertheless, the loans that banks have extended to infrastructure projects in India have defaulted at a high rate and may carry greater risks than mortgages. As discussed above in section II, banks in India have had to restructure large volumes of distressed infrastructure loans. In comparison

with mortgage loans, infrastructure projects appear idiosyncratic, making the default risk of the projects more difficult to model and predict than the risk posed by individual homebuyers. In some categories of infrastructure projects, such as water systems and electricity plants, lenders cannot foreclose on a project in the way that they can foreclose on a house.

If the use of securitization propagated large losses among Indian banks, individuals with savings accounts at the banks would have limited protection, and neither an effective bankruptcy system nor an effective resolution authority would exist to manage instability among banks. Deposit insurance in India only covers depositors up to 100,000 rupees, the equivalent of about $2,000. By comparison, the insured limit in the U.S. is US$250,000 per person per bank and in Singapore S$50,000, the equivalent of about US$39,965 (Figure 10). In 2013, the Deposit Insurance and Credit Guarantee Corporation of India, which runs the deposit insurance program, held assets to compensate only about 1.7% of insured deposits. Moreover, while in the wake of the recent crisis the U.S. has drawn upon its existing bankruptcy law as a model for a bank resolution authority, India does not have effective bankruptcy law, and the development of a resolution regime in India would require the creation of an entirely new and untested legal framework. India has proposed a new authority that, though ostensibly aligning the country with international standards, appears in fact to fall short of the standards. A report published by the Financial Stability Board, an international body that monitors and makes recommendations about the global financial system, concluded that the planned resolution regime would not have the capacity to resolve a failing bank. India, however, successfully drew upon state control of the domestic economy to resolve the Indian bank GTB in 2004. The central government issued an order staying actions against GTB and then merged GTB into a state-owned bank. The depositors recovered all of the money owed to them, and the failure of the bank did not destabilize the economy.

Figure 10. Deposit insurance by country

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3. Originate to Hold Model

The originate to hold financing model retains the maturity risks inherent to bank loans to infrastructure projects but ring fences assets on bank balance sheets to preserve liquidity within banks to manage the risks. Similar to securitization, the banks sell assets in the form of future payments on loans called “covered bonds” to downstream investors, but unlike securitization, the banks retain a “cover pool” of assets, in which the investors have first priority in the event of default. So long as the cover pool provides adequate security to the investors upon a default, like securitization purported to do the originate to hold model bypasses domestic bankruptcy law, but the model also eliminates the risks of securitization that relate to the off-balance sheet treatment of securitized loans. The cover pool requires a legal foundation more complicated than securitization demands, but the legal arrangements appear easy to implement, particularly in light of the overall low risk of the financing model.

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a. Structure

The originate to hold model enables the pooling of small loans into larger, more liquid securities in order to attract investors, while avoiding some of the risks of securitization. Instead of transferring the projected payments on a loan to an SPV that pools the rights to the payments and resells them to investors, the bank retains the projected payments in a cover pool of assets on its balance sheet, and uses the cover pool to secure covered bonds based on the loans. The assets in the cover pool remain separate from the rest of the assets of the bank and must be updated continually to ensure that the cover pool will provide adequate collateral for investors in the bonds. If the bonds default, the investors have recourse to both the cover pool and the general assets of the bank.

Maintaining the loans underlying the bonds on the balance sheet of the bank may discourage the bank from relaxing its lending standards in the way that securitization affected mortgage standards in the lead up to the recent crisis. Because in the originate to hold model the bank continues to bear some of the risks of its loans, the bank has greater incentives to extend loans with low probabilities of default. The U.S. and Europe have begun to introduce requirements for banks that securitize loans to retain some of the loans on their balance sheets, an approach that mimics the basic structure of the originate to hold model (Figure 11).

Figure 11. Originate to Manage Structure.

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The assets in the cover pool that secure the covered bonds protect investors from losses if the bonds default. The assets in the cover pool are insulated from claims by general creditors, and the bank must maintain the value of the cover pool to meet the claims of investors in the covered bonds. The bank consistently must update the assets in the cover pool to maintain the level of collateral that the bank provides to investors in the covered bonds.

Because the investors have protection against most losses, the investors likely charge low interest rates for the bonds.\(^{190}\) If the bonds default, the investors have recourse to the cover pool assets, and, if the cover pool assets become deficient, the investors also have unsecured claims against the general assets of the bank.\(^ {191}\) Because the assets in the cover pool provide collateral for investors, rather than providing cash flows to repay the investors, investors in covered bonds have no direct exposure to the loans underlying the covered bonds.

b. Implementation

The implementation of a covered bond program necessitates specific legal supports, particularly surrounding the cover pool. The program depends on timely enforcement, robust supervision and disclosure standards, and the insulation of the cover pool assets from bankruptcy. While some economies may lack such legal foundations, implementing them does not appear likely to pose significant difficulties or to introduce significant delays.


National legislation has implemented the originate to hold model in some countries, while in other countries originate to hold takes place through private contracting.\textsuperscript{192} Enforcing either the statutory or the contractual rights supporting the model requires efficient legal processes, and enforcement therefore may prove challenging in countries like India where delays in the judicial system persist. A typical case in India lasts fifteen years between filing and resolution, and approximately 38 million cases currently are pending in India. If every case currently filed in India received a fair trial, it would still take over 300 years to work through the backlog. India employs about eleven judges per million citizens, among the lowest ratio of judges to population of any country. The U.S., by comparison, employs more than 100 judges for every million people. The delays in India have bred corruption, as litigants have resorted to bribes and influence peddling to hasten the resolution of their cases. In a poll conducted by Transparency International, the nongovernmental organization that monitors and publicizes corporate and political corruption, 45\% of respondents who had dealt with the judiciary between July 2009 and July 2010 reported that they had paid a bribe, and most commonly they had paid the bribe to “speed things up.”

The establishment of the cover pool depends on regulation, and also may challenge the legal systems of some countries. Specific regulations must define the assets eligible for the cover pool, how many assets the cover pool must include, the quality of assets required, and the status of the assets in bankruptcy.\textsuperscript{193} The cover pool also must be managed to ensure that it continues to meet the standards.

In most jurisdictions that have introduced covered bonds, independent monitors supervise the cover pool. Sweden, for example, utilizes independent investigators.\textsuperscript{194} In other countries, existing supervisory structures may lack the capacity to manage the cover pool, but the deficiencies may easily be reformed. In India, for example, regulatory agencies with responsibility over different aspects of the financial market have had difficulty coordinating among each other, and some government ministers have proposed unifying the regulation of the financial market

\textsuperscript{192} PWC, Uncovering Covered Bonds, June 2012 at 6.
within one agency to reduce uncertainty surrounding the responsibilities of
the different agencies and the standards for potential regulatory actions.

To maintain collateralization, deteriorating loans in the cover pool must
be realized and replaced with assets of greater value. To accomplish this,
many jurisdictions have set out rules for disclosing the assets in the cover
pool, and some jurisdictions have required registries of cover pool assets.
New Zealand, for example, mandates cover pool registries that report the
assets included in a pool. In Sweden, the independent inspector
periodically samples the assets in cover pool registries to ensure the
accuracy of reporting. Other countries, however, would have to institute a
disclosure system, and India, for example has demonstrated a poor record in
creating equivalent registries. The Indian Companies Act established a
system for registering security interests, but the system has proved
complicated, and lenders have had to register security interests at multiple
registries. The process of registering a property interest also has
consumed excessive time and investment. On average, registering a
property interest in India takes sixty-two days and costs 7.7% of the value
of the property. In China, by comparison, registering a property interest in
secured collateral takes an average of twenty-nine days and costs only 3.6%
of the value of the property.

To implement the originate to hold model, countries like India would
have to establish and enforce rules to protect cover pool assets against the
claims of general creditors in bankruptcy, but such rules also do not appear
difficult to implement. The assets in the cover pool must remain separate
from the general assets of the banks, available only to investors in covered
bonds, for the assets to protect investors against potential losses and to
disincentivize banks from extending excessively-risky loans. Shielding the
investors from the general bankruptcy process encourages the investors to
buy the bonds at low interest rates even in countries with ineffective
bankruptcy regimes such as India.

196 PWC, Uncovering Covered Bonds, June 2012 at 10.
198 For example, state registries collect information on immovable property, while the federal Registrar of Companies registers charges against equipment.
c. Risks

The treatment of covered bonds by regulators reflects the low overall risks of covered bonds. Nevertheless, covered bonds may inflict losses on unsecured creditors, and, if banks invest in the covered bonds of other banks in significant amounts, covered bonds may pose risks to the broader economy. The risks of using covered bonds, however, appear lower than the risks that other intermediate financing models introduce.

The disclosure requirements surrounding cover pool assets, as well as the supervision of the cover pool, increases transparency, and regulations have acknowledged the transparency in their treatment of covered bonds. The Solvency II regulations, for example, discourage European insurers from investing in long-term assets by requiring the insurers to back assets with long maturities with additional capital holdings. The regulations, however, require less capital to back covered bonds than regular bonds of the same issuer. In addition, the Basel III regulations that govern banks incentivize banks to hold covered bonds by assigning covered bonds a higher status in the liquidity coverage ratio that the regulations require than the regulations assign to regular bonds.

Nevertheless, the ring fencing of the cover pool assets also threatens losses among unsecured creditors of the banks that issue the bonds, in the absence of additional protections. Though the assets in the cover pool reduce risk exposures among investors in the covered bonds, the encumbrance of those assets decreases the assets available to unsecured creditors if the banks default.

203 Investors in covered bonds have limited exposure to potential losses and therefore charge low interest rates on the bonds. The investors have recourse both to the assets in the cover pool, which must remain sufficiently collateralized, and they also have general deficiency claims against the bank that issued the bonds when the cover pool fails to secure the investors fully. In addition, the bank has incentives to maintain the quality of the loans underlying the bonds because the bank must keep the loans on its balance sheet.
cover the claims of depositors, depositors fall within this category of creditors. 205 Many countries that have implemented the originate to hold model protect unsecured creditors by limiting the total issuance of covered bonds. 206 For example, Canada restricts banks from issuing covered bonds in amounts greater than 4% of the assets of the banks. 207 Italy, the Netherlands, and Germany tie the permissible amount of covered bonds to the equity held by banks. 208 India and other countries easily could establish similar restrictions.

In addition, covered bonds still may introduce systemic risks into economies. 209 If, for example, the value of the loans underlying the bonds falls, the value of the cover pool also will decrease and the cover pool will require additional assets. 210 Investors in the covered bonds, however, may become less certain that they will profit from the bonds, and the cost of the bonds will rise, making it harder for a bank to add assets to the cover pool. 211 When banks have bought covered bonds from each other, the bank will have to add more assets to its cover pool at the same time that other banks also require more assets. 212 If the other banks try to sell additional covered bonds, the simultaneous sales will decrease the value of the bonds.


211 Id.

212 Id.
and the banks eventually will need alternative sources of capital. This scenario occurred in Sweden during the recent financial crisis, but the Swedish government successfully contained the instability that it threatened. As the value of covered bonds fell, banks sought to sell more covered bonds to generate additional assets for their cover pools. Some banks served as market makers and had to buy covered bonds from other banks. The banks that bought the bonds in turn had difficulty selling them on and could not get back the money they spent. The Swedish National Debt Office responded by loaning capital to the banks and taking the covered bonds as collateral for the loans.

**B. Bond-Based Alternative Models**

Government participation in bond markets and credit default swaps transfer the default risk of bonds onto the government or third parties, which may attract investors into the bond market. Whereas banks could use the previous financing models to manage maturity risk but not eliminate it, which increased the cost and constrained the duration of the finance that the models provided, modifications to funding mechanisms within the capital markets could facilitate the provision of low-cost, long-term capital and also increase the amount of capital available by attracting long-term investors, such as pension funds, insurance funds, and mutual funds into the market. These investors have access to long-term funds and provide a stable source of investment in long-term projects. Because they do not need immediate returns, these investors also may sustain investment during economic downturns. Many emerging markets including India, however, restrict the participation of institutional investors in the bond market. In addition, government bonds and guarantees rely on government fundamentals, difficult for countries quickly to improve, and may place government budgets at risk. Credit default swaps (“CDS”) allow hedging but attract participants only in transparent markets with relatively low risks of default, and their use by speculators can increase economic instability.

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213 Id.
215 Id.
216 Id.
1. Government Interventions

Instead of directly financing infrastructure through budget allocations, governments can raise capital for infrastructure through government bonds or can offer guarantees to bolster nascent corporate bond markets. Bond finance offers the long-term finance discussed in Section I, and, when a government has few risks or assumes risks from private investors, the government interventions potentially facilitate low-cost, low-risk finance.²¹⁹ The government interventions, however, depend on fundamentals of the government, which cannot quickly improve, just as developing a corporate bond market entails the gradual creation of a legal foundation for the market. Moreover, the government may become unable to carry out the obligations that it undertook or may decide to divert capital to other goals.²²⁰ Placing the faith and credit of a government at risk may sacrifice the future ability of the government to borrow.

a. Structure

Government bonds may offer long-term finance at a low cost because of the government backing of the bonds, and government guarantees can overcome limits to investment in corporate bonds by providing potential investors with assurances against risks. The development of a government bond market also may provide a foundation for expanding the corporate bond market into a source of long-term finance. The experience of East Asian countries in the wake of the Asian financial crisis has demonstrated that countries quickly can introduce government bond markets. Alternatively, government guarantees can target specific risks, time periods, or classes of investors, and guarantees have attracted additional investment into less-developed corporate bond markets in several instances.

i. government bonds

A government can issue long-term government bonds to supplement existing government revenues. Because the government claims to back the bonds, investors may perceive government bonds as low risk and offer capital at a low cost. If, however, a government faces a high likelihood of

sovereign default, investors may not invest in the bonds, or they may raise the interest rates that they charge.

The bonds suit infrastructure finance and provide additional benefits. Government bonds raise capital in local currency, and the government can issue bonds of the same duration as a typical infrastructure project. The development of the government bond market also may create a foundation for a corporate bond market by providing market infrastructure and contributing to the establishment of a yield curve.

In the wake of the Asian financial crisis in the late 1990s, for example, several East Asian countries sought to develop local bond markets to reduce the reliance of their economies on bank finance and international financial markets. The countries rapidly developed the bond markets. The size of local currency bond markets in East Asian economies excluding Japan, for example, rose to US $3.88 trillion by June 2008 from $491 billion in 1997, with growth in the government bond markets driving the increase (Figure 12).

Figure 12. Growth in East Asian Government Bond Markets

![Growth of Emerging East Asia’s Local Currency Bond Markets](image)

ii. government guarantees

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Government guarantees of corporate bonds can help to attract investors into the corporate bond market. In countries where creditors recover few assets in bankruptcy, including India, investors protect themselves against losses by charging interest rates too high for a viable corporate bond market to develop. If the government, however, guarantees that the bonds will not default, the government may bypass the impediment to investment.

Guarantees can eliminate a range of risks that discourage potential investors from participating in the bond market. Foreign investors in domestic infrastructure bonds, for example, must undertake currency risk because the projects earn revenues in domestic currency and pay bond coupons in domestic currency.\(^{222}\) The government, however, can offer guarantees against fluctuations in exchange rates. Guarantees also can protect investors against inflation and interest rate risks, liquidity risk caused by the absence of a secondary market for bonds, regulatory risks from potential changes to regulations that affect companies issuing bonds, and political risk.\(^{223}\)

Governments can tailor the guarantees to the needs of investors. They can, for example, calibrate guarantees to periods of high risk, such as the construction period of infrastructure projects. To attract investors willing to invest only in high-rated projects, governments can act to increase the ratings of bond offerings.\(^{224}\)

Many examples exist of the successful use of government guarantees. In the early 1990s, the government of New South Wales extended revenue guarantees to bonds that financed construction of the Sydney Harbor Tunnel Project, a tunnel spanning the Sydney Harbor. The cost of constructing the tunnel seemed likely to exceed the future toll revenues from the tunnel, and the government offered to supplement the toll revenues in order to ensure a minimum profit. The Chilean government also has extended revenue guarantees and exchange-rate guarantees to privately-financed toll roads. A typical revenue guarantee has ensured that the developers of a road would receive revenues equal to seventy percent of the estimated present value of the cost of the road. Some of the guarantees have lasted for as long as twenty years, and many have provided a higher percentage of revenues in


the early stages of a project and a lower percentage at later stages.

b. Implementation

Because economic stability and a sophisticated legal infrastructure underpin government bond markets and guarantees, a country cannot easily implement a government bond market or guarantee system before the conditions for them have developed. Government bond markets depend on the trust of investors in government policies and the transparency and predictability of the bond market. Government guarantees depend on government credibility and also necessitate complicated legal drafting.

i. government bonds

Before it can develop a government bond market, a government must have achieved macroeconomic stability, including a sustainable fiscal policy, stable monetary conditions, and a credible and transparent exchange rate regime. If investors perceive the government as unable to manage its debts and expenditures or unable to collect taxes, the investors will anticipate high risks of default on the bonds and raise the interest rates on the bonds or decide not to participate in the government bond market.

Singapore, for example, has built a government bond market to finance infrastructure, but many other countries have not attained the market fundamentals that have made government finance successful in Singapore. The government in Singapore, for example, has maintained a balanced budget, with no external debt.

The legal infrastructure to support a government bond market also takes time to develop. Bond markets rely on accurate financial reporting, a reliable long-term yield curve, and liquidity. The law must protect the rights of investors and provide for the fair resolution of disputes. Investors in many countries, however, may lack confidence in disclosure standards, and, without greater liquidity, yields may be difficult to predict. In India, for example, bond trades often are not reported. Trading of government bonds also has concentrated in bonds with ten-year maturities, which has prevented the development of benchmarks for pricing government bonds at a full range of maturities.

ii. government guarantees

Although the implementation of a government guarantee program does
not seem to depend on significant legal supports, the law that the implementation does require also seems difficult quickly to establish. To issue guarantees, governments must achieve high sovereign ratings and must have access to agents with the skills to draft suitable contracts.

For investors to trust in government guarantees, governments must maintain a high national credit standing. Governments that appear to have low credit quality cannot share credibly in the credit risk of private projects. Many emerging economies, however, have sovereign ratings below BBB, and India currently has a rating of BBB-. 225

The language of the guarantees also must be tailored to specific risks, and the guarantees must not introduce improper incentives. When Turkey, for example, offered revenue guarantees on some railroad lines but not others, railroad operators diverted traffic from guaranteed to unguaranteed lines. 226 South Africa, by contrast, has constrained such actions by offering revenue guarantees that compensate only 50% of revenue shortfalls.

c. Risks

Both forms of government intervention threaten to place national budgets in jeopardy and may depend on governments following through on what they merely promised to do, or what they lack the ability to do. 227 Government intervention ultimately may sacrifice the ability of governments to borrow.

i. government bonds

The involvement of the government in government bond markets carries potential risks both for the government and for investors. If participants in a government bond market perceive rising risks, the participants will increase interest rates. Eventually, it may become difficult for the government to borrow to service its debts. In addition, though government bonds may purport to raise money to fund investment in infrastructure, the government may spend bond revenues on other objectives. 228 The assets underlying government bonds do not generate income streams, and the government

225 Moody’s, however, has raised the rating.
pays investors in government bonds from its tax revenues.\textsuperscript{229} As a result, the government can channel the capital that it raises through the bonds to any activity that it chooses.\textsuperscript{230}

ii. government guarantees

Government guarantees may increase the availability of long-term capital at the expense of the stability and reputation of the government. Opening the government budget to payments on guarantees may lead to costly financial obligations, causing hardships for taxpayers and negatively affecting the national budget. Governments in developing countries may not have the financial capacity to meet their commitments. Argentina, for example, attracted investment to its railway system by guaranteeing returns of 6-7%. The government, however, did not budget accurately for claims on the guarantee. Because the government could not meet the claims, eventually the guarantee contributed to the sovereign default of Argentina.

Often guarantees become due when a government has less ability to pay for them. If a government, for example, guarantees bonds to support the construction of a toll road, traffic on the road may decrease during an economic recession, triggering the guarantee at a time when tax revenues have fallen.

Governments may have difficulty forecasting and planning for their liabilities under guarantees. In the 1990s, for example, the government of the Republic of Korea guaranteed up to 90% of the revenues of a privately-financed road linking Seoul to a new airport at Incheon for a period of twenty years. The government retained the right to keep any revenues that exceeded the volume of revenues forecast. In fact, however, the revenues amounted to less than half of the volume of revenues forecast, and the government has had to pay a substantial amount of money every year since the road opened. The government remains uncertain of the total amount of money it will become responsible for paying over the duration of the guarantee.

Finally, guarantees may encourage investment in high-risk projects and also incentivize insufficient monitoring.\textsuperscript{231} When the burden of failed projects falls on the government, investors may support projects with

\textsuperscript{229} Id.
\textsuperscript{230} Id.
\textsuperscript{231} B. Eichengreen, Financing Infrastructure in Developing Countries, 10 World Bank Research Observer 75, 78 (1995).
possibilities for earning high profits but high probabilities of failure. The companies responsible for the projects also may undertake excessive debt, since the government will become responsible if the companies default. In addition, the guarantees shift responsibility for monitoring projects from investors to the government. The investors have certain returns, while government bureaucrats may have no personal stake in project outcomes, and therefore the bureaucrats may fail to influence, anticipate, or respond to risks.

2. Credit Default Swap Market

Credit default swaps transfer the default risks of bonds to third parties, but the CDS rely on efficient pricing in an active bond market, and do not eliminate risks from the financial system. While relatively easy to implement, CDS may threaten the stability of the financial system in ways that appear difficult to contain.

a. Structure

Credit default swaps enable hedging of the default risks of bonds. The hedging facilitates increased liquidity and lower interest rates on bonds. CDS therefore may increase participation in corporate bond markets.

CDS insure investors in bonds against the risk of the bonds defaulting. In return for fees to protection sellers, investors in the underlying bonds receive payouts if the bonds default. (See Figure 13).

Figure 13. Credit Default Swaps.

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232 B. Eichengreen, Financing Infrastructure in Developing Countries, 10 World Bank Research Observer 75, 78 (1995).
236 IOSCO, Credit Default Swap Market, FR05/12, June 2012 at 31.
CDS therefore redistribute the risk that bonds will default to third parties, which facilitates finance of infrastructure projects in two ways. First, transferring the risk of default allows investors in the bonds of infrastructure companies to hedge their exposure to the bonds.\footnote{IOSCO, Credit Default Swap Market, FR05/12, June 2012 at 31.} Because hedging reduces the risk of the bonds for investors in the bonds, hedging enables the investors to charge lower interest rates. Second, the ability to transfer the risk of default attracts investors and increases the liquidity of the bonds.\footnote{IOSCO, Credit Default Swap Market, FR05/12, June 2012 at 31.} More frequent trading of the bonds reduces information asymmetries and improves the price discovery process.\footnote{“Ashcraft and Santos (2009) empirically evaluate the impact of the inception of CDS trading on bond issuance and loan origination for a sample of US firms and find that in the period following the inception of CDS trading, more transparent and highly rated companies experience a slight reduction in the cost of debt, whilst for the other companies the costs of debt actually increase. Shim and Zhu (2010), however, find different results for the Asian markets and show how CDS lowered the cost of issuing bonds, particularly for smaller non-financial firms. For example, Blanco et al find short-term deviations between CDS and bond spreads, which tend to be corrected in the long-term through a price adjustment mechanism in which CDS play a leading role. The authors justify the evidence whereby CDS are more sensitive to changes in credit risk with the greater liquidity and the different type of players that operate on the CDS market.} The increased liquidity of the bonds also enables investors to charge lower interest rates, because the investors have more ability to sell the bonds if the risk of the bonds fluctuates.

The benefits of using CDS have particular significance in emerging economies such as India, where corporate bond markets have not attracted many investors and investors recover few assets when bonds default. As discussed above in section II, the secondary market for corporate bonds in India has a small investor base, due to restrictions on institutional investors and high taxes and stamp duties that hamper secondary trading. Section IV.A.2 set out the reasons that investor recoveries in bankruptcy in India remain low.

b. Implementation
The implementation of credit default swaps markets can occur quickly, though some economies may have difficulty attaining the transparency necessary in underlying bond markets to attract participants. If the risks to potential protection sellers appear too high, CDS markets may not develop.

CDS amount to contracts that establish the obligations of protection sellers and protection buyers. The contractual arrangements increasingly have become standardized. The International Swaps and Derivatives Association, for example, publishes master agreements that set out prevailing terms.242

CDS typically do not receive credit ratings, and consequently the assessment of default risks in CDS markets depends on disclosure and auditing practices that some emerging economies, including India, have not yet perfected. When public companies file complete financial reports that are well audited, CDS on corporate bonds reference a transparent underlying market.243 In India, however, the quality of the financial reports, as well as access to the reports, remains problematic. Indian companies have faced few sanctions for noncompliance with reporting requirements. A recent investigation, for example, revealed that hundreds of companies in India had made inaccurate disclosures, and the investigation led to calls for a new agency to improve oversight of the dissemination of information by companies. A study by the World Bank also has exposed accounting problems that survived auditing undetected, and some have advocated for an independent entity to supervise the auditing industry, in order to improve standards and enhance the credibility of financial reports. Although the Indian Department of Company Affairs and the Registrar of Companies collect company information, these agencies actively maintain the confidentiality of the information. The law in India also has prevented independent third parties from publishing company data in an organized way.

Moreover, potential protection sellers likely participate in CDS markets only if they perceive accurate bond pricing and some participate only if they perceive low risks of bond defaults. Less developed bond markets may lack sufficient liquidity to allow for dynamic pricing of default risk into bonds. In India, for example, as discussed in Section II, the bonds of only a handful of companies dominate secondary trading. The Indian bond market also has not offered reliable benchmarks from which investors can estimate the

value of the bonds. Generally, a yield curve based on the government bond market provides a credible reference for the price of corporate bonds of different maturities, but the yield curve in India remains incomplete. As discussed earlier in this section, most investment in Indian government bonds has concentrated in bonds of ten-year maturities. The clustering around a single maturity has constrained the development of benchmarks for pricing corporate bonds at a full range of maturities.

Even when protection remains available at high levels of default risk, the protection may become very expensive. In many countries including India, infrastructure projects frequently have failed. Some potential protection sellers therefore may have insufficient assurances of the stability of the bonds of the project development companies. In countries similar to India a viable CDS market may not develop.

3. Risks

Although credit default swaps allow investors to unbundle and redistribute default risks, encouraging investment in corporate bonds, CDS also allow market participants to speculate, push companies into bankruptcy, and propagate economic vulnerabilities.

Rather than using CDS to hedge default risks, investors can use CDS to speculate. While those that use CDS to hedge seek to limit the risk of the underlying bonds, those that use CDS to speculate seek to profit from fluctuations in the risk of the underlying bonds. Speculators bet against the credit quality of the bonds for which they buy protection and receive payments if the bonds default.

Such investors may profit from forcing distressed firms into bankruptcy even when debt restructuring would lead to better outcomes or cost less. The gains to investors that have bought CDS protection may outweigh the losses on the bonds for the investors.

In addition to destroying value in companies, speculation using CDS

245 Id.
246 IOSCO, Credit Default Swap Market, FR05/12, June 2012 at 31.
247 IOSCO, Credit Default Swap Market, FR05/12, June 2012 at 31.
248 Forcing a company into bankruptcy rather than restructuring the company potentially destroys value in the company. It also may, however, produce some benefits: by raising the bargaining power of the investors in the bonds, CDS may prevent the companies that issued the bonds from renegotiating their payments to the investors, which
can introduce vulnerabilities into the financial system.\textsuperscript{249} When banks invest in bonds and then buy CDS protection, the CDS can magnify maturity risk in ways that regulators may have difficulty detecting.\textsuperscript{250} Moreover, although the CDS protect investors in bonds against losses if the bonds default, CDS do not remove the underlying risk of default from the financial system. Because buyers of CDS protection do not have to pay for the protection until a default occurs, investors in bonds have the ability to establish leveraged positions that amplify volatility. If, for example, a bank invests in a bond and hedges its exposure to the bond by buying CDS protection from another bank, in cases where the seller of the CDS protection defaults and the bond also defaults, the bank that invested in the bond no longer has protection against the losses.\textsuperscript{251} When banks enter into chains of interlinked CDS transactions, the inability of the protection seller to pay the protection buyer upon the default of the underlying bond threatens to spread losses through the market.\textsuperscript{252}

Regulatory changes in the wake of the crisis reflect the recognition of this risk, and other countries easily could implement similar reforms. Many countries, including the U.S., Denmark, and South Korea, have undertaken efforts to establish multilateral settlement of CDS through central counterparties (“CCPs”). When a CDS is agreed between a protection buyer and protection seller, the CCP clears the trade, becoming the counterparty to each leg of the trade.\textsuperscript{253} If the protection seller defaults, the CCP absorbs the loss and honors the obligation to the protection buyer.\textsuperscript{254} The CCP thus cushions the risk of defaults.\textsuperscript{255} Currently, India limits CDS trades to: 1) transactions that reference Indian entities; 2) Indian protection buyers and sellers; and 3) rated reference entities, and the CDS market remains very small. If, however, Indian regulations and similar regulations in other countries liberalized and the markets grew, multilateral settlement immediately would become important.

\textsuperscript{254} \textit{Id.}
\textsuperscript{255} \textit{Id.}
Finally, current reforms are examining the contribution to the recent crisis of exemptions for derivatives including CDS from the bankruptcy code. If domestic banks in other countries like India began to tether themselves to each other through CDS trades, such evaluations also would become necessary, along with the establishment of adequate resolution authorities. Most bankruptcy codes exempt CDS from the bankruptcy process, which led to unpredictable and rapid unwinding of CDS positions during the recent crisis. Unwinding of the positions destroyed value at companies and banks and propagated vulnerabilities through economies. In the U.S., for example, a statutory exemption has extended special treatment to investors in CDS and permitted the investors to terminate their CDS agreements, liquidate their positions, net their contracts, and seize their collateral, without participating in the traditional bankruptcy process. During the crisis, the unrestricted right that investors in CDS have to close out their trading positions weakened entities already approaching bankruptcy. As the CDS investors seized assets that might otherwise have supported restructuring, coordinated resolution in bankruptcy became impossible. When the same assets backed the CDS trades of other entities, the selling of those assets by one entity reduced the liquidity of the others holding them, creating conditions for other protection sellers also to begin calling on their protection buyers to post additional collateral. As the protection sellers jettisoned their CDS, the protection buyers had to sell more collateral to meet their obligations. This, in turn, caused the protection sellers to rush to close out their trades, before the

261 See, e.g., Kenneth Ayotte, David A. Skeel, Jr., Bankruptcy or Bailouts?, 35 J. Corp. L. 469, 484, 495 (2010).
price of the collateral assets fell further.\textsuperscript{262} Lehman Brothers, for example, had to terminate nearly 800,000 of its 1.5 million derivatives trades within five weeks of filing for bankruptcy.\textsuperscript{263} Countries with nascent bond markets could legislate to force parties to CDS contracts to participate in bankruptcy. Otherwise, countries such as India might risk having to rely on crisis resolution authorities to maintain stability, which could threaten the problems discussed in section IV.A.2.

CONCLUSION

Transitioning to intermediate financing models can increase the availability of private finance for infrastructure projects in economies in which legal reforms remain ongoing. In light of the tradeoff between the provision of long-term capital and managing its risks, raising finance through covered bonds seems best suited to countries at the equivalent level of legal development as India. Covered bonds mitigate the maturity risk of plain bank finance, and legal systems have the capacity to introduce protections against many of the countervailing risks that covered bonds introduce.

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\textsuperscript{262} See, e.g., Testimony of Sheila Bair, \textit{Regulation and Resolving Institutions Considered “Too Big to Fail”} Before the S. Comm. on Banking, Hous. & Urban Affairs, 111th Cong. 51 (2009) at 53.