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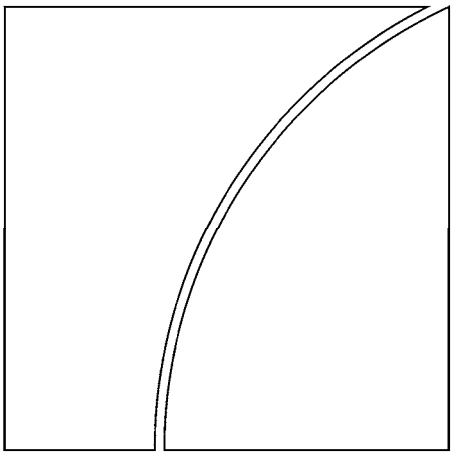

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by Susan Black and Anella Munro

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Why issue bonds offshore?[1]

Susan Black[2] and Anella Munro[3]

Abstract

This paper asks why Asia-Pacific residents issue debt in offshore markets and considers the implications for domestic debt markets. We use unit record data for bond issuance by non-government residents of Australia, Hong Kong, Korea, Japan and Singapore to link the decision to issue offshore to potential benefits. The results suggest that residents of smaller markets issue bonds offshore to arbitrage price differentials; to access foreign investors; and to issue larger, lower-rated or longer-maturity bonds. These bond characteristics tend to be correlated with offshore bond market size. The results support the notions that (i) deviations from covered interest parity are actively arbitraged by residents of minor currency areas, as well as by internationally active borrowers, as established in the literature; and (ii) issuers benefit from the liquidity and diversification of larger "complete" offshore markets. Against the potential benefits to borrowers, we consider the risks for both borrowers and the domestic market, and lessons from the ongoing financial crisis such as the benefits of funding diversification.

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1. Introduction

Bond markets in almost all currencies are becoming more internationalised (Table 1).[4] Internationalisation of bond markets should increase the financing options available to borrowers and widen the range of assets available to investors. Competition from offshore markets may motivate or help to focus improvements in domestic markets such as strengthening of domestic market infrastructure, improving investor protection and removing tax distortions that hinder domestic market development. Swap-covered foreign currency borrowing can be a powerful means of raising domestic currency funding, overcoming for many emerging market economies[5] the currency and maturity mismatches that were widely agreed to have exacerbated the Asian crisis.

Against these benefits come the risks associated with financial openness and sudden shifts in capital flows, and the risk that offshore markets may draw liquidity away from the domestic market. The former are well covered in the literature, and increasingly the risks associated with currency and maturity mismatch are well hedged in the region. However, risks to the domestic bond market are perhaps particularly relevant for Asian countries in the light of the many initiatives to develop domestic debt markets since the Asian crisis. If liquidity tends to concentrate in bond markets, development of a large offshore market in the local currency may be a concern. From the borrower's point of view local currency debt raised offshore may be as good as domestic debt. From a market point of view, there are likely to be important network externalities associated with reduced liquidity onshore, less scope for development of a lower-grade market in domestic currency, more limited availability of collateral for domestic markets and restricted access for domestic investors.

The literature on international bond markets focuses on three main aspects of the debt issuance decision: hedging/risk management, cost incentives to issue in foreign currency, and bond market characteristics that motivate offshore issuance such as size, payment structure and tenor.

The risk management literature[6] focuses on issuance by non-financial firms and mainly applies to foreign currency borrowing which is naturally hedged against foreign currency income. The predominance of financial issuers in international bond markets, however, means that this strand of the literature, while dealing with an important motivation for some firms, covers a relatively small part of the market. A large literature on covered interest parity (CIP) suggests that deviations in cost incentives for bond issuance are actively arbitraged.[7] McBrady and Schill (2007) link deviations from CIP and proxies for uncovered interest parity to the bond issuance decision, looking at "opportunistic" issuance by internationally active borrowers with no foreign currency funding requirements. They conclude that internationally active borrowers issue (swap-covered) foreign currency bonds to lower their funding costs and conclude that such borrowers actively arbitrage deviations from CIP and proxies for uncovered interest parity among major currencies.

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[4] We use "internationalised" to mean issuance of local currency bonds in offshore markets, issuance in the local currency by non-residents (on or offshore) and non-resident investment in domestic bond markets. In this paper we focus more on the issuer (as opposed to investor) side of bond markets.

[5] Often referred to as "original sin" (Eichengreen and Hausmann (1999)).

[6] For example see Allayannis and Ofek (2001), Kedia and Mozumdar (2003), Geczy, Minton and Strand (1997), Graham and Harvey (2001) and Siegfried et al (2007).

[7] See Taylor (1987) and Peel and Taylor (2002) for studies of short-term covered interest parity. Deviations from CIP in longer-term markets tend to be small on average (Popper (1983)), suggesting either that bond issuers are arbitraging cost differentials or that swap spreads are adjusting. In longer-term markets, deviations can be significant and persistent relative to short-term markets, even after taking into account transactions costs (Fletcher and Taylor (1996)).

Focusing on issuance costs rather than deviations from interest parity, Peristiani and Santos (2008) look at the costs of issuing bonds in the US domestic bond market and Eurobond market. They find that costs in the US market have declined, but costs in the Euro market have declined by more and are now lower. They relate the lower Eurobond market costs to the growing share of offshore issues by US firms.

Other studies focus on or include bond market characteristics. This literature overlaps substantially with cost incentives: the benefits of bond issuance in overcoming differences in markets or market access, or in aligning desired funding with investors' preferences, tend to be reflected in lower funding costs. Baker et al (2002) look at the decision to issue short- or long-term debt, finding that firms tend to issue long-term debt when the relative costs are expected to be less. Faulkender (2005) analyses the decision to issue fixed or floating rate debt, and whether firms are hedging or timing the market. He finds that firms respond to market conditions in an effort to lower funding costs; firms are more likely to lock in a lower fixed rate as the yield curve flattens and vice versa. Siegfried et al (2007) study the choice of currency by non-financial companies, finding that it is motivated by cost mitigation, hedging, the desire to establish a broader investor base and regulatory barriers. Munro and Wooldridge (2009) consider motivations for obtaining domestic currency funding through swap-covered foreign currency borrowing as opposed to borrowing in domestic currency directly. They find that foreign currency issuance by Asia-Pacific residents tends to be lower-rated, longer-term and larger in size than non-resident issuance in Asia-Pacific currencies, consistent with the notion that swap-covered foreign currency borrowing provides Asia-Pacific issuers with access to larger, more liquid, lower-grade and longer-term markets. Issuance by non-residents in the domestic currency meets investor demand for high-grade local currency assets.

This paper examines the onshore/offshore bond issuance decision by non-government residents of five Asia-Pacific countries. We consider a variety of potential motivations for offshore bond issuance, including: risk management; price arbitrage; benefits of tapping offshore markets with different characteristics (liquidity, diversity, risk); accessing non-resident investors, regulatory and no regulatory barriers to foreign investment in the domestic market; and funding diversification. We consider some of these motivations empirically using a large sample of unit record data for bonds issued by residents of Australia, Hong Kong, Korea, Japan and Singapore that covers issuance in both the domestic and offshore markets irrespective of issuance currency. A probit model links the decision to issue offshore to proxies for the benefits from doing so. The study supports the notions that (i) deviations from covered interest parity are actively arbitraged by residents of minor currency areas as well as by internationally active borrowers, as established in the literature; and (ii) issuers appear to benefit from access to larger, more diverse offshore markets. While price incentives are likely common to issuers from major and minor currency areas, residents from smaller markets may tap larger offshore markets for other more structural incentives such as overcoming market incompleteness. Indeed those structural benefits likely drive cost incentives and draw issuers from major markets into the domestic market. Against the potential benefits of using offshore markets, we consider the risks associated with offshore issuance including concentration of liquidity outside the domestic market and exposures highlighted by the recent financial crisis. Consideration of the wider international bond market provides context for discussion of domestic debt market development in the Asia-Pacific region.

Offshore markets may complement domestic market development, helping to focus improvements in domestic infrastructure, diversifying the overall local currency market, establishing a minor currency asset class, and providing an alternative means of resolving currency and maturity mismatch. Offshore markets may, however, provide a substitute for and draw liquidity away from the domestic market. In Hong Kong and New Zealand, the offshore market in local currency bonds rivals or exceeds the domestic market. Anecdotal evidence, however, suggests that policy can have a significant effect on the onshore/offshore choice in local currency. Weak infrastructure, a poor legal or information environment, weak

domestic savings or taxes may drive issuance offshore. A lack of stable savings supply or borrowing demand may lead to illiquidity in the domestic market. Looking forward, we consider the potential for concentration of liquidity in the domestic currency market on- or offshore against segmentation of the two markets serving different needs, and the scope for integrated global markets.

The remainder of the paper is organised as follows. Section 2 provides an overview of bond issuance by Asia-Pacific residents and in Asia-Pacific currencies. Section 3 considers potential motivations for issuing bonds offshore. Section 4 assesses these propositions using unit record bond issuance data for Australia, Hong Kong, Japan, Singapore and Korea. Section 5 discusses the risks of offshore bond issuance and lessons from the recent crisis. Section 6 concludes.

2. Asia-Pacific bond issuance

Outstanding bonds issued by Asia-Pacific residents are shown in Figure 1. The tendency for non-government borrowers[8] to issue bonds offshore varies markedly across countries in Asia-Pacific (Table 1).[9] Countries can be broadly grouped into those where a significant proportion of bonds is issued offshore (Australia, Hong Kong, New Zealand, Philippines and Singapore) and those where offshore bond issuance is a small share of overall issuance (China, Indonesia, India, Japan, Korea, Malaysia and Thailand).[10]

It is useful to think of offshore issuance by residents in the following segments: (i) local currency issuance offshore, (ii) foreign currency issued offshore which is (a) swapped into domestic currency, (b) naturally hedged against export income and (c) uncovered (Figure 2 depicts the bond market from an issuer's perspective). There is a distinct segregation between currency and market for Asian bond issuance: onshore issuance is almost entirely in local currency, while offshore issuance in is mostly in foreign currency. Foreign currency issuance is concentrated in US dollars, although euro-denominated issuance has been gaining share since 1999. The share of local currency bonds issued offshore is low across Asia-Pacific countries, with the exception of Japan.[11]

For some countries, such as Australia and New Zealand, it is common to raise foreign currency funding offshore and swap the proceeds into local currency as a substitute for issuing domestic currency bonds directly. Over 80% of foreign currency liabilities in those countries are hedged with financial derivatives (Becker et al (2005) and Statistics New Zealand (2008)).

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[8] Although government bonds account for a large share of domestic issuance in many Asian countries, our focus is on non-government entities that make a commercial decision whether to issue a bond onshore or offshore. Government issuance is likely to take into account other factors such as its role in the development of the domestic market and providing a liquid domestic benchmark.

[9] We consider "onshore" to represent bonds issued in the local or domestic market of the country in which the issuer resides, and issued in accordance with the regulatory jurisdiction and market conventions of that country (for example, prospectus or product disclosure requirements) regardless of the currency of the bond or the residency of the investor. "Offshore" covers all bonds that were not issued onshore.

[10] Focusing on the share of issuance can mask the size of offshore borrowings; for example, the size of the offshore Japanese and Korean bond markets are large (over US$100 billion) though the domestic markets are much larger.

[11] Our focus here is the issuer side of bond markets. It is worth noting that there are substantial non-resident holdings of local currency bonds in some domestic debt markets in the region, which is an alternative means of borrowing directly from non-residents in local currency.

The ability to swap foreign currency funding into domestic currency depends on the availability of a swap counterparty. The swap counterparty is typically a non-resident issuing domestic currency debt such as the World Bank (but generally with no use for domestic currency funding). In contrast to residents, whose issuance of local currency bonds is highly concentrated onshore, non-residents tend to issue local currency offshore (for example, a non-resident issuing NZD in the Eurobond market) as shown in Table 2 and Figure 3. This is particularly the case in more open financial systems (such as Hong Kong, Japan, Singapore and New Zealand); non-resident issuance in these currencies is substantial and mostly takes place offshore. Australia is an exception among the more open economies, with larger non-resident issuance onshore (Kangaroo bonds) than offshore. At the other extreme, for some countries, such as China and Malaysia, the local currency is not traded offshore.

Foreign currency debt that is not hedged with financial instruments is often naturally hedged against foreign currency income, for example by exporters. Where foreign currency debt is not hedged with foreign currency income or financial derivatives, but used to fund domestic currency assets implies currency mismatch. Uncovered foreign currency borrowing is a financing structure that has declined significantly after the Asian crisis and is not discussed in detail here.

3. Motivations for offshore issuance

In this section potential motivations for issuing bonds offshore are considered under the general headings of hedging/risk management, price arbitrage, market completeness; barriers to non-resident investment in the domestic market and funding diversification.[12] There can be a large degree of overlap among these groups. For example, benefits stemming from access to more liquid or diverse markets likely drive cost incentives to fill gaps in markets. In a liquid and complete market with intermarket capital mobility, there should be no scope for price arbitrage as prices can adjust to new information without trading. In the bond markets closest to this ideal, such as the US market, price differences are estimated to be arbitraged away relatively quickly.[13] Where arbitrage involves a less liquid market, arbitrage opportunities may be relatively persistent. Moreover, motivations that stem from persistent differences in market characteristics, for example absence of a low-grade debt market in one currency, may lead to persistent patterns of cross-border issuance, to maintain equal funding costs across markets.

Risk management

It is well known that firms with foreign exchange income may issue bonds denominated in a matching currency to provide a natural hedge. While this is a motivation to issue foreign currency bonds[14] rather than to issue offshore per se, foreign currency bonds are typically issued either as foreign bonds in the market of the currency of denomination (eg Singapore dollar bonds in Singapore) or in the Eurobond market (centred in London and other

[12] This section draws on Munro and Wooldridge (2009), which discusses motivations for swap-covered borrowing. Since most offshore funding is in foreign currency, there is typically a large overlap between offshore borrowing and swap-covered borrowing.

[13] Popper (1983), Fletcher and Taylor (1996).

[14] We use the term “foreign currency bonds” to describe bonds denominated in a currency different from that of the issuer’s residence and “local currency bonds” to describe bonds denominated in the same currency as that of the issuer’s residence.

European financial centres). Hedging is likely to be an important motivation for non-financial corporate issuers, especially exporters. Issuance by corporate borrowers, however typically accounts for a small share (on the order of 10%) of total foreign currency issuance, with the bulk done by financial firms. Moreover, many residents borrowing offshore raise foreign currency funding that is swapped into local currency.

Price arbitrage

Banks often explain that they undertake opportunistic swap-covered foreign currency borrowing to lower their funding costs without taking on exchange rate risk. This type of borrowing itself should lead to a convergence of funding costs across markets consistent with CIP (local and foreign funding costs are equal once the cost of hedging exchange rate exposure is taken into account). Foreign currency issuance can affect both bond spreads and the cross-currency basis swap spread (quoted as the cost of swapping US dollars into another currency), and, in turn the decision by both residents and non-residents on where to issue is dependent on the cross-currency basis swap. Moreover, cost incentives for offshore issuance are not limited to (swap-covered) foreign currency borrowing: issuance offshore in local currency may also respond to cost differences between onshore and offshore markets.

A large empirical literature on CIP finds that deviations are small on average but can be large and persistent, particularly for longer-term markets. McBrady and Schill (2007) take the CIP literature a step further, linking choice of issuance currency for a sample of internationally active borrowers with no operational reason to borrow in foreign currency to covered interest "bargains". They find that covered "bargains" of between 4 and 18 basis points can be gained through opportunistic foreign currency bond issuance among major currencies. Here we explore that link in more detail including bond characteristics and macroeconomic factors as well as price incentives to issue in the chosen currency. These internationally active non-resident borrowers are an important part of the picture, being the natural swap counterparties to resident issuance offshore in foreign currencies to obtain domestic currency funding.

Market completeness

Issuers may borrow offshore to access more or less "complete" bond markets, where differences in liquidity, diversity or risk characteristics lead to relative cost differentials. In general, borrowers from less complete markets are likely to be able to lower funding costs by using more developed markets. Similarly, issuers from more complete markets may be able to fill gaps in less complete markets, for example by creating a low default risk asset where sovereign credit quality is relatively low.

Underlying potential benefits from differences in market characteristics is a need to match investors' preferences (liabilities) with borrowers funding needs (assets). The literature on preferred habitat[15] considers the potential mismatch between investors' liabilities and borrowers' assets. For example, investors may prefer high-grade liquid assets while borrowers of varied credit quality may require funding for long-term projects. Premia offered to investors to buy bonds outside their desired risk classes may be ineffective in creating demand if supply and demand do not overlap at any price. Investors may ensure this by voluntarily creating barriers to investment in some asset classes, such as through mandates that restrict investments to high-grade bonds (for example, many managed funds in Australia tend to benchmark to a common, liquid, high-grade bond index). Swap-covered offshore

[15] See for example, Culbertson (1957), Modigliani and Sutch (1966), and Vayanos and Vila (2007).

borrowing provides a potential means of expanding the pool of savers and borrowers, increasing the scope for matching of assets and liabilities.

Some of the differences between markets that may give rise to benefits from issuance in offshore markets include:

- *Sub-investment grade bonds*: Low-grade markets are rare outside the US and Euromarkets. Lower-grade borrowers may be able to access offshore markets while being limited to bank finance at home.[16] Conversely, a high-grade non-resident counterpart may issue bonds in the domestic market to achieve lower costs for both parties.
- *Longer tenors*: Longer-term markets tend to develop after shorter term markets. The development of longer-term markets may be particularly slow in countries where investors avoid such investments due to a history of economic uncertainty or the sovereign benchmark yield curve is relatively short (Siegfried et al (2007)). Investors (borrowers) may also have a preference for a particular tenor so as to match their liabilities (assets).
- *Fixed rate bonds*: The fixed-floating composition in a particular dimension of the domestic market may vary according to idiosyncrasies of market development. Differences in liquidity in the fixed and floating segments of two markets, or differences in the credit quality gap for fixed term funding may lead to price differentials and opportunities for arbitrage.
- *Larger deal size and total volume*: Issuers may also tap offshore markets with a larger investor base so as to issue larger bonds (eg jumbo bonds greater than US$1 billion), thereby raising more funds for a given fixed cost of arranging a bond issue, or to cumulatively raise more funds than they would be able to onshore. If the domestic market is relatively small or illiquid, large volumes of issuance may lead to adverse price movements.
- *Exotic bond structures*: More complicated bond structures, such as structured bonds with step-up coupons, tend to develop in deep liquid markets before they are available in smaller markets. While more complex bonds are likely to be structured to meet investor preferences, their development may be limited by investors' financial sophistication (particularly where the bond market is predominantly retail), by regulations constraining their use, or by a lack of a legal framework.
- *Risk unbundling:* From a non-resident investor's perspective, buying bonds in another currency typically means taking on currency risk; local currency bonds have exchange rate risk, interest rate risk and credit risk. Market participants argue that investors generally prefer to take on credit risk separately from exchange rate risk,[17] and that the markets for credit and currency risk are segmented. Risk unbundling may be particularly compelling if these risks are correlated (for example, during a crisis, domestic credit risk tends to rise while the currency depreciates). If two borrowers from different currency areas with much the same credit rating and characteristics each issue in the other's currency and swap the proceeds, they provide local investors in both countries with new assets in terms of the combination

[16] See Hale and Santos (2008) on the progression from no access to funding to the sub-investment grade market to bank funding when the benefits of bank credit assessment overcome the intermediation cost, and ultimately to the investment grade bond market supported by a track record from bank borrowing.

[17] See also, Herrerra-Pol (2004) who argues that strong demand for the World Bank's (highly rated) issues of international bonds in minor currencies is explained in part by investors' preference for taking on minor currency risk separately from credit risk.

of currency, market and credit risk. By unbundling risks for investors, issuers may be able to lower their funding costs.

As the local bond market develops over time, the motivations for Asia-Pacific residents to issue offshore may ease. Some motivations for issuing in offshore markets, however, such as risk unbundling may persist even among developed markets. The volume of cross-border issuance between the US and euro area markets suggests that some motivations are highly persistent. Volumes have certainly not diminished.

Capital and exchange controls can have a major effect on offshore borrowing. Many of the potential benefits to offshore issuance discussed above depend on the ability to swap foreign currency funding into domestic currency. For that to occur, residents must be allowed to issue foreign currency debt, non-residents must be allowed to issue domestic currency debt, and both must have access to foreign exchange derivatives markets. Even if these are allowed, but other restrictions limit liquidity in FX derivative markets, price incentives may quickly disappear as swap costs move against issuers in the absence of prearranged counterparties. For countries that do not have liquid FX derivatives markets, issuers may be unwilling to raise foreign currency offshore because of currency mismatch. Foreign investors are also likely to be deterred from participating in the domestic market if they are unable to hedge their risks (Takeuchi (2006)).

In principle, investors could hedge the risks in issuers' desired funding, rather than issuers transforming the risk characteristics of their funding. However, for several reasons, it is probably more cost-efficient for the issuer to swap its foreign currency borrowings back to its local currency than for a number of individual investors to hedge. Most issuers are banks and are regular participants in wholesale derivatives markets. Typically, issuers are dealing in larger amounts than investors, who have a small investment in each bond issue. Mandates – imposed by investors or regulations – may also restrict the use of derivatives.

Domestic savings also appear to play an important role in the development and liquidity of the onshore market. Tyler (2005) and Cameron et al (2007) argue that, weak domestic savings and the related slow growth in the funds management industry have contributed to slow growth in the New Zealand domestic corporate bond market, with most residents issuing offshore instead. In contrast, Battellino and Chambers (2005) argue that the introduction of a compulsory retirement savings system in Australia in the early 1990s significantly boosted the domestic pool of investment funds, contributing to the development of the onshore bond market.

Barriers to non-resident investment onshore

Offshore issuance appears to be an important means of tapping foreign savings.[18] Much of the previous discussion focused on benefits to issuers from issuing in a foreign market, which in turn may reflect access to a broader investor pool.[19] This section focuses on barriers to non-resident investment in the domestic market. Such impediments may include

[18] The potential benefits of offshore issuance are also not restricted to countries with current account deficits. A country with no debt may have large gross assets and liabilities, whereby investors diversify by holding foreign assets and residents borrow from non-residents.

[19] Data from the Australian Bureau of Statistics indicate that foreign investors own around 20% of bonds issued by Australian non-government residents in the domestic market, and own almost all of bonds issued offshore by Australian residents.

regulatory barriers; information asymmetries; weak domestic infrastructure, information environment or legal environment.[20]

Regulatory barriers can affect foreign investors' ability to transact in the domestic (and offshore) market through capital and exchange controls. Non-residents have increasingly been allowed to participate as investors in regional markets as Asian countries have encouraged the development of domestic debt markets as a means of addressing the currency and maturity mismatches implicated in the 1997–98 Asian crisis.

Where non-resident investors are allowed to invest in the domestic market, in practice non-resident withholding tax has been a common disincentive to doing so. For example, Cameron et al (2007) argue that New Zealand banks and other issuers use offshore branches to issue bonds to avoid the "approved issuer levy".[21] Similarly, in Korea, non-residents are exempt from withholding tax for Korean bonds denominated in foreign currency but not domestic currency.[22]

Many aspects of domestic market infrastructure are important for attracting non-resident investment into the domestic market, including documentation requirements, the legal environment (bankruptcy proceedings), the information environment (opaque corporate governance or weak disclosure requirements), accounting standards, settlement systems and distribution and marketing channels. Non-resident investors are also likely to be deterred if clearing and settlement systems are not internationally compatible (Park and Rhee (2006)).[23] Poor infrastructure, in turn, is likely to lead to illiquidity, particularly in lower-grade debt for which agency problems are more severe and the probability of default is higher. In response, investors may choose to buy bonds in more liquid offshore markets. Borrowers from a poor information environment may be able to signal that they are committing to higher standards by issuing offshore which may lower their cost of funding and improve their access to foreign investors.[24] Following the Asian crisis, there has been a focus in many Asian countries on strengthening market infrastructure including streamlining documentation requirements, improving the legal and information environment, reducing settlement risk and integrating domestic and international settlement systems. Many of these initiatives are discussed in detail in BIS (2006).

Agency and information problems are likely to lead to home bias in portfolio holdings, particularly for lower-grade debt. Some countries have weak disclosure requirements, poor accounting practices, opaque corporate governance rules, and concentrated ownership structures. Low-grade issuers may be able to lower their cost of funding by issuing in markets with greater creditor protection due to lower bankruptcy enforcement costs, especially for more complicated credit structures. Even if reporting standards are high in the domestic market, investors are more familiar with their home country issue requirements,

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[20] Ideally, foreign investors would participate directly in the domestic market as well as buying bonds offshore; they can help to broaden the investor base, which in turn may broaden the diversity of bonds issued onshore, and improve liquidity (Takeuchi (2006)).

[21] A 2% charge on the value of the security levied on debt that is exempt from the non-resident withholding tax.

[22] Asian Bonds Online: http://asianbondsonline.adb.org/korea.php.

[23] Battellino and Chambers (2005) detail the investment of market participants in improved market infrastructure, such as clearing and settlement systems, and in-house trading systems in the 1990s as an important factor in the development of the domestic bond market in Australia.

[24] Banks also play an important role in overcoming agency and information problems. For example, Hale and Santos (2008) find that firms with a record of high creditworthiness and low creditworthiness enter the public bond market (investment grade market and high-yield market respectively) before firms with an intermediate reputation. Moreover a firm's relationship with investment banks in connection with private bond issues and syndicated loans may speed entry into the public bond market by allowing the firm to signal higher credit quality.

such as the prospectus and settlement arrangements, and may have a preference for bonds issued in accordance with these. As a result, investors may hold a larger share of local assets in their portfolios than would be optimal in a well diversified portfolio. Stulz (1981) constructs a simple model of international asset pricing in which holding risky foreign assets is costly, and shows that investors will not hold some foreign assets, even if the return is increased slightly.[25] Moreover, local investors tend to be better informed than foreign (distant) investors. For example, for a sample of 32 countries, Bae, Stulz and Tan (2008) find that local analysts' earnings forecasts are more precise than those of analysts based in countries far from the company being analysed.

Government regulations can also create incentives to issue onshore or offshore by altering the costs of funding in different markets. For example, during the global financial crisis, many governments introduced guarantees of bonds issued by banks, though the currencies covered differed across guarantee schemes. The currency coverage of the guarantee is likely to affect the onshore/offshore decision and, in turn, the choice of which offshore markets banks issue into.[26] Central banks may also affect financing incentives through the collateral they accept in their lending operations, which is often restricted to high-grade bonds in domestic currency (which tend to be issued onshore). Bonds that are repo eligible often trade at a premium, particularly during credit crises when liquidity is scarce, which could draw issuance onshore (though other factors would also be at play during a crisis). The actions of other central banks can also affect onshore/offshore decisions if bonds issued by non-residents are repo-eligible in some countries and not in other countries.

Funding diversification

Issuers may also issue offshore for funding diversification. Financial institutions in particular, may value a diversified funding base and use a variety of funding sources and instruments (for example, bank bills, bonds, deposits and securitisation) as well as diversifying across markets. The desirability of maintaining a presence in a market may be part of an issuer's risk management strategy. If one market was closed, the issuer could still access the other markets.

If entities issue bonds in offshore markets to diversify their funding sources, then one would expect diversification among currencies raised, but there is a bias toward more liquid markets with issuance concentrated in US dollar and Euromarkets. In practice, issuers may not have allowed for a scenario like the recent global financial crisis where the most liquid bond market – the US market – was at the centre of the disruption. Pre-crisis, few could imagine illiquidity in the US market. In future, funding diversification may be a particularly compelling motivation.

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[25] See also Stulz (2005) which discusses agency problems in the context of foreign investment and Alfaro et al (2005) which examines explanations for the Lucas paradox (the lack of capital flows from rich to poor countries) and finds institutional quality to be the most important.

[26] While for some countries (such as Germany, the US, Sweden and Australia), the guarantee applied to all currencies, for others the range of currencies was wide though restricted to the major currencies (for example, the New Zealand guarantee covered NZD, AUD, USD, EUR, GBP, CHF, JPY, HKD, and SGD, the UK covered EUR, USD, JPY, AUD, CAD, CHF) and for others it is limited to a few currencies or just the local currency (for example, Portugal was restricted to EUR, and the Netherlands covered EUR, USD, GBP). While most schemes covered the local currency, there are some exceptions, such as Korea which covered foreign currency bonds only.

4. Data and methodology

Our empirical analysis links the choice to issue bonds offshore to potential benefits from doing so. By means of a discrete choice (probit) model and unit record data for all bonds issued by non-government residents (including public banks and public non-financial corporations) of Australia, Hong Kong, Korea, Japan and Singapore, the propensity to issue a bond offshore is related to price incentives, bond characteristics, bond market characteristics and macroeconomic variables.

The data for Australia are sourced from the Reserve Bank of Australia, which draws on several commercial data providers, namely Bloomberg, Insto and Thomson Reuters as well as market liaison. The data for Hong Kong, Korea and Singapore are sourced from Thomson Reuters. For Japan, the onshore bond data are sourced from Thomson Reuters, and the offshore data are obtained from the international securities database compiled by the BIS (which combines information from a number of commercial data providers, including Dealogic, Euroclear and Thomson Reuters).[27]

Characteristics recorded for each bond include: market of issue (onshore or offshore), date of issue, original term to maturity, deal size, currency, residency/nationality of issuer, industry sector, interest rate structure (fixed or floating), credit rating at issuance (not available for all bonds), sub-investment grade/investment grade. In addition, the data set for Australia also covers whether the bond is: credit-wrapped, structured, government-guaranteed, repo eligible, whether non-resident withholding tax was applicable and the bond spread at issuance.

Data are from 1992 to early 2009 for all countries. The sample sizes are large, though the number of observations varies substantially across countries from about 20,000 bonds issued by residents of Japan and Korea to about 7,000 for Australian residents, about 4,000 for Singapore and about 1,200 for Hong Kong. Not all bond characteristics and other variables are available for all bonds.

The empirical model is a probit model given by equations (1) and (2) which we apply to the unit record bond data:

$$y_{j,t} = \begin{cases} 1, & if \quad y^*_{j,t} > 0 \\ 0, & otherwise \end{cases} \tag{1}$$

$$y^*_{j,t} = \alpha\omega_{j,t} + \varepsilon_{j,t} \tag{2}$$

The variable $y_{j,t}$ is a dummy variable that takes the value of one if the bond was issued offshore, and zero if the bond was issued onshore. According to equation (1), whether the bond is issued offshore is assumed to be the result of an unobserved latent variable $y^*_{j,t}$, which depends linearly on a vector $\omega_{j,t}$. that includes bond or market characteristics, pricing information, the current account and a time trend.

The specification for the probit model includes the following variables:

- Size (log dollar value of the bond). We expect that larger bonds will be issued in larger/more liquid offshore markets.
- Tenor (log value). A potential motivation for issuing bonds offshore is to access longer-term markets which tend to develop after short-term markets. We expect the propensity to issue in more developed international markets to be larger for longer-

[27] The offshore data for Hong Kong, Korea and Singapore are similar in aggregate to BIS data. The offshore data for Japan are BIS data which appear to be more complete than Thomson Reuters data in recent years.

term bonds (a positive coefficient). We expect this to be particularly true for lower-grade borrowers.

- Bond rating at issuance. Liquid low-grade markets are rare, so lower-rated borrowers may issue offshore to tap such markets. We use two measures for credit quality: (i) granular credit ratings (AAA=1, AA+=2, AA=3 etc) though availability of these data is patchy at best except for Australia where it is relatively complete (ii) sub-investment grade dummy, for which the coverage is good for all countries.

- Fixed interest rate structure. We do not have strong priors on the sign of this variable. The fixed/floating preferences of domestic investors and borrowers may vary across countries depending on the respective liability/asset structure. Higher-grade issuers are expected to have a comparative advantage in issuing fixed rate bonds, and the issuance structure may not reflect the bond issuers' ultimate interest rate structure, as the issuers may swap the proceeds from floating to fixed or vice versa.

- Market size. The various aspects of market incompleteness discussed above are likely summarised by this variable. The variable is used in place of the above variables in some regressions. We expect the coefficient to be positive for the countries examined: a variety of characteristics of the US dollar and euro markets provide incentives for offshore issuance. An important factor may be the networking externalities of larger markets. Market size is constructed as a log of the size of the market in the currency of issuance normalised on the size of the USD market. So a US dollar bond has a value of log(100), a euro bond would have a value of about log(60), a yen bond about log(30), Australian dollar and Korean won bonds about log(2.5), Hong Kong and Singapore dollar bonds less than log(1). The values vary with relative market size over time. Source: BIS domestic debt data

- Covered "bargain".[28] Conceptually, the offshore bargain is the difference between what it would have cost to raise local currency funds onshore and the estimated cost of raising local currency funding synthetically or directly offshore.[29] We expect offshore issuance to be positively related to the covered bargain. We calculate the price incentive in two ways. First, we use secondary market five-year bond yield indices for AA-rated borrowers, interest rate swap data and basis swap data (all from Bloomberg). For example, the covered bargain on a US dollar bond issued by a Korean bank would be the spread of the five-year KRW yield over the domestic interest rate swap minus the spread of the five-year AA USD index over the USD interest rate swap adjusted for the won cross-currency basis swap. By construction, the incentive is zero for local currency issuance regardless of whether it is onshore or offshore (so we are not able to test the price incentive for local currency funding onshore versus offshore).

- Second, we use a more accurate transaction-based measure for a subsample of all senior one- to five-year bonds issued by the major Australian banks since 2000. This measure is constructed from primary market spreads onshore and offshore (adjusted by the relevant swaps) for the bonds at issuance and secondary market onshore spreads for the same sample of banks (historically, the secondary market has provided a very good indication of the banks' issuance spread in the primary market in Australia). This methodology is not only more accurate, but allows us to

[28] We borrow this terminology from McBrady and Schill (2007).

[29] What it would have cost to issue onshore instead of offshore is not directly observable unless a borrower issued bonds with equivalent characteristics in both markets at the same time. Nonetheless, if the domestic secondary market is sufficiently liquid it should provide a good proxy for the opportunity cost.

compare the cost of raising (i) AUD directly onshore (ii) AUD synthetically offshore and (iii) AUD directly offshore. Restricting the sample to the Australian banks also has the benefit of removing bond issues that may not be hedged through derivatives; the Australian banks swap back their foreign currency raisings to AUD at the time of issuance. This measure of the price incentive lines up relatively well with our alternative proxy discussed above.

- One-year interest rate differential (issuing currency minus home currency) at the time of bond issuance. We include this as a proxy for uncovered interest parity (with a random walk exchange rate expectation, the expected uncovered interest return is the interest differential). While the covered bargain may be more relevant for borrowers, the expected uncovered return may be relatively more important for investors, consistent with discussions of the carry trade in recent years.
- The interest differential also has a wider economic interpretation as the return to capital. We expect residents of borrowing countries issuing foreign currency bonds (almost always offshore) to issue bonds in lower-yielding currencies of net savings countries as a means of accessing investors in countries where the return to capital is relatively low. Source: Bloomberg.
- Current account balance as a percentage of GDP at the time of bond issuance. This variable serves as a proxy for the degree of engagement with non-residents in borrowing and lending at the margin. Such engagement may affect the issuance decision. For a current account deficit country (Australia, and for part of the period, Korea), borrowers need to raise funding from non-residents. In principle, this could be done by issuing a local currency bond onshore. In practice, issuers may issue in foreign currency markets to overcome barriers to foreign investment in the domestic market (eg information asymmetries, market risk, withholding tax), to unbundle credit risk from currency risk, or to access distribution networks of non-resident issuers through swap-covered borrowing. The greater the current account deficit, the greater these pressures may be.
- Conversely, for surplus countries (Hong Kong, Japan, Singapore), borrowers' funding requirements are more than covered by domestic savings, so the country as a whole is investing in foreign assets, which likely means taking on currency mismatch. There may be a case for surplus country issuers to issue foreign currency bonds as a means of unbundling foreign currency risk from credit risk, particularly as the degree of currency mismatch on the asset side grows – as the surplus gets larger. For example, a surplus country bank may issue foreign currency bonds in a name known to surplus country savers, and swap the proceeds with a deficit country bank.
- We expect offshore issuance to increase with the magnitude of the current account imbalance, with a positive coefficient for surplus countries (more offshore issuance as the surplus gets larger) and a negative coefficient for deficit countries (more offshore issuance as the deficit gets larger). Source: Australian Bureau of Statistics and BIS data.
- Time trend. We include a time trend to account for the internationalisation of bond markets generally. This is perhaps particularly relevant for Singapore, where exchange controls were eliminated in 1999 and all onshore and offshore segments of the Singapore dollar bond market have grown rapidly since. In general, we expect offshore issuance to increase over time.
- Global financial crisis dummy. This is set equal to one from July 2007. It is intended to capture any effect the crisis may have had on the propensity to issue bonds offshore.

For Australia we also considered:

- Australia managed funds/GDP as a measure of domestic savings, which we expect would draw issuance onshore. The time series variable is matched to the issuance date of the bond. Source: Australia Bureau of Statistics.

A potential issue with our simplification arises from our treatment of offshore local currency issuance. [30] In particular, the right-hand side "bargain" variable and the interest differential are set to zero for local currency offshore bonds in our setup. For Hong Kong and Korea, there is no local currency offshore issuance in our dataset, so a two-way decision is appropriate. For Singapore and Australia, the share is about 5% and for Japan the share is about 50%. One reason that this may be important is that issuers tend to have higher ratings for local currency issuance than for foreign currency issuance. Another is that offshore local currency markets may differ in size from the domestic local currency market. To assess the three-way decision, however, would require a more detailed dataset than we have available. For Australian major banks, however, such data is available, and we consider the role of local currency offshore issuance for that subsample in the analysis.

An important characteristic of probit models is that they are highly non-linear; the estimated probabilities and marginal effects of any independent variable are conditional on the values of all covariates. This means that if the value of one of the independent variables changes, the marginal effect of all of them will also change. Accordingly, our discussion focuses on the sign of the coefficient; a positive (negative) sign indicates that as the variable increases (decreases) so does the probability of offshore issuance.

5. Empirical results: factors motivating offshore issuance

In this section we begin by examining the role of individual factors on the onshore/offshore issuance decision, and then estimate multivariate probit models to allow for interaction among these factors. Finally, we examine subsamples of the bond data to illuminate different motivations among sectors. Where relevant we comment on the impact of the global financial crisis.

The distributions of the bond characteristics listed in the previous section for onshore and offshore bonds are shown graphically in Figure 4.[31] Univariate probit estimates are presented in Table 3 to illustrate the potential explanatory power of each of these factors on its own on the onshore/offshore decision. Overall, these bond characteristics have modest explanatory power. Characteristics with relatively stronger explanatory power are issuance of larger bonds offshore by Australia, Hong Kong, Korean and Singapore residents, issuance of smaller bonds offshore by residents of Japan, issuance of fixed rate bonds offshore by Korean residents, issuance of lower-rated bonds offshore by residents of Singapore and issuance of sub-investment grade bonds offshore generally. Notably, residents of Australia, Korea and Singapore have only issued sub-investment grade bonds offshore.

Multivariate estimates presented in Tables 4 and 5 give an idea of the relevance of bonds characteristics conditioned on other **bond characteristics**. The coefficients on bond size are positive where significant, indicating that offshore bonds tend to be larger in size. This is consistent with the notion that Asia-Pacific residents borrow offshore to access more

[30] Thanks to Phil Wooldridge and Bob McCauley for highlighting this point.

[31] The graphs show the distribution of bonds by value rather than by number, which, arguably, investors care more about. The probit model tests the distributions by number. However, the distributions by value and number are very similar for all characteristics with the exception of the tenor of bonds issued by Japanese residents; by number, issuers go offshore for longer tenors, but by value the result is the opposite (consistent with Japan being a relatively large market).

complete, liquid markets. As shown in Figure 4, the issuance of jumbo bonds (greater than US$1 billion) is relatively common, except by Japanese residents, and these tend to be issued offshore.

The coefficients on bond tenor are positive, indicating that offshore bonds tend to be longer in maturity. The exceptions are Japanese non-financial corporate issuers and Australian and Singaporean financial institutions which tend to issue longer-term bonds onshore. Well established pension funds in Australia and Singapore may provide long-term savings to support longer tenors onshore.

Similarly, the estimated coefficients for credit ratings are positive, indicating that lower-rated bonds are issued offshore. As seen in Figure 4, sub-investment grade bonds are, indeed, almost exclusively issued offshore. These results support the idea that residents issue offshore to tap more liquid low-grade markets and more liquid or diverse high-grade markets. They may also reflect the potential benefits from unbundling of risk implicit in swap-covered borrowing. Lower-rated bonds issued offshore (in a foreign, probably major, currency) and swapped for higher-rated bonds issued in local currency by non-residents (see Munro and Wooldridge (2009)) provide potential investors with bonds with different risk characteristics compared to each party borrowing in the desired currency. In particular, foreign investors are able to purchase minor currency risk separated to a large degree from credit risk.

The effect of coupon structure on the propensity to issue offshore is mixed. Residents of Japan, Korea and Singapore are more likely to issue floating rate bonds offshore while Australian and Hong Kong residents are more likely to issue fixed interest rate bonds offshore. The coupon structure may not reflect the ultimate interest rate exposure of resident borrowers for two reasons. First, borrowers may subsequently swap the funds for their desired coupon structure but borrow fixed or floating rate debt in response to cost structures determined by their own characteristics (eg credit quality) and investors' preferences. For example, higher-rated institutions (such as the Australian banks, who are the main offshore borrowers from Australia) may have a comparative advantage in issuing fixed rate bonds. Australian banks have floating rate mortgage assets, so tend to swap their fixed rate borrowing to floating. Second, the coupon structure may reflect the desired interest rate exposure of swap counterparties rather than the bond issuer if the (foreign currency) proceeds are swapped for local currency funding. Of note, Figure 4 shows that while Australian residents are more likely to issue fixed rate bonds offshore than onshore, overall they have a greater tendency to issue floating rate bonds (63% of offshore bonds and 75% of onshore bonds are floating). Bonds issued by residents of Korea and Japan show the opposite tendency, with around 65% of offshore bonds and over 90% of onshore bonds being fixed (where data are available). Borrowers may also issue fixed or floating rate debt in an attempt to lower their funding costs, depending on their expectations of future economic conditions, rather than hedging their asset exposure (Faulkender (2005)).

The **marginal effects** of different bond characteristics on the propensity to issue offshore are shown in Figure 4a. An increase in bond size from US$50 million to $100 million increases the likelihood that the bond is issued offshore by 8% for Hong Kong and Singapore financial institutions, 5% for Japanese non-financial corporate issuers and 4% for Australian financial and non-financial corporate issuers.

An increase in tenor from three to five years increases the propensity to issue offshore by 10% for Hong Kong corporate issuers, 8% for Australian corporate issuers and Japanese financial institutions, and reduces the propensity to issue offshore by 9–11% for Japanese non-financial corporate issuers and Singaporean financial institutions.

Sub-investment grade issuance is almost exclusively offshore. For those countries where there is some onshore issuance, not surprisingly, the marginal effects of a sub-investment grade rating on the propensity to issue offshore are estimated to be large.

The marginal effect of a bond having a fixed interest rate increases the propensity of Australian financial institutions to issue offshore by 31%, and reduces the propensity for Japanese financial institutions to issue offshore by 24%.

Tables 5 and 6 include **price incentives and macroeconomic conditions** as well as individual bond characteristics. The results for size, tenor, the sub-investment grade dummy and payment structure are similar, but the results for the more granular credit ratings are more nuanced. The only countries for which we have a substantial sample of bonds with granular ratings are Australia, Hong Kong and Japan. For Hong Kong and Japan, credit quality, as measured by the credit rating suggests that higher-rated residents are more likely to issue bonds offshore. The same is true for Australian financial institutions (Table 6).

These seemingly conflicting results (higher-grade and sub-investment grade issuers go offshore) are consistent with the story Hale and Santos (2007) tell about the relationship between bond markets and bank borrowing, which would imply a nonlinear pattern. The lowest-rated entities don't borrow at all. As potential borrowers progress to a somewhat higher credit quality, they issue bonds in the sub-investment grade market. As credit quality rises further, the intermediation cost of bank borrowing becomes worthwhile due the lower borrowing cost from a higher revealed credit quality. Finally, as a potential borrower can signal high credit quality without bank intermediation, but helped by its track record with the bank, the intermediation cost of a bank is no longer offset by a lower borrowing cost. If the Hale and Santos model is set in an international context, it would be expected that lower-grade borrowers would borrow offshore in the absence of a domestic low-grade market and that higher-grade borrowers might take advantage of relatively liquid and diverse offshore markets.

The pricing incentive to issue offshore is measured as the covered interest "bargain" (the incentive to issue offshore calculated as the deviation from covered interest parity) and the interest rate differential which we use as a proxy for the expected uncovered interest return. While we assume that borrowers hedge their foreign currency borrowing, investors may be more likely to take uncovered positions (eg the carry trade).

The literature on ***covered interest parity*** shows that for shorter maturities deviations from parity tend to be small and short-lived (the 2008–09 experience notwithstanding). In longer-term markets, deviations tend to be larger and more persistent, and so may provide an important incentive in terms of currency of issuance. A bargain in a particular currency may lead residents to issue in that currency and swap the proceeds back into the desired currency. As shown in the univariate results in Table 3, the coefficient on the covered interest bargain (denoted CIP) has a positive sign except in the case of Japan. In the multivariate probit estimates (Table 5), the coefficient on the covered bargain is positive, as expected, where significant.

The equations are re-estimated for non-financial corporate issuers (Table 6), financial institutions (Table 7) and a more detailed sectoral breakdown for Australia (Table 8). While the coefficient on the covered interest rate spread is insignificant for non-financial corporate issuers, it is larger and more significant for Australian, Hong Kong and Korean financial institutions. The detailed results for Australia suggest that banks (but not other financial institutions) issue offshore in search of price arbitrage, which is consistent with their sophisticated financial skills. Non-financial issuers are estimated to be less motivated by price, perhaps consistent with a risk management motivation where the currency rather than the domestic currency equivalent cost is what matters. Non-financial corporate offshore borrowing is almost exclusively in foreign currency. Non-bank financial institutions appear to be more motivated by size and fixed coupon structures.

Measurement error is a concern with the CIP variable for a number of reasons. First, we are using yield indices rather than transaction costs and those indices may be subject to interpolation where there a relatively few securities for pricing.[32] Second, we assume our representative borrower to be a AA-rated bank. While this is a reasonable proxy for the major banks in the countries examined, the measure is likely to be least accurate for Japan in view of the changes in ratings of Japanese borrowers over the period, which we do not account for, and for Hong Kong, where the only index available is a sovereign index which is based on a thin market and likely subject to a substantial "specialness" discount. Nevertheless, we think that a deviation from covered interest parity at one horizon and credit quality is likely to be correlated with other deviations and credit ratings relative to the same currencies. Third, not all foreign currency borrowings are swapped back to local currency; some of it is naturally hedged or it may be not hedged at all. However, these should bias our sample against finding issuance behaviour consistent with swap-covered arbitrage.

As a cross-check on our pricing results we use ***more accurate issuance spreads*** available for a subsample of Australian major banks. Here the pricing data is based on actual issuance costs relative to the domestic secondary market. These results, shown in Table 9, are consistent with the broader Australian results, indicating that the banks borrow offshore when it is cheaper to do so. The more accurate pricing measure tends to give large and more significant coefficients. Using actual issuance costs, we are also able to test whether the banks issue Australian dollar offshore versus onshore for cost reasons. While the estimated coefficient is the expected positive sign, it is less significant than the larger sample that included foreign currency bonds. Studies by the Reserve Bank of Australia (2006) have found that, on average, costs (after hedging) have been equivalent onshore and offshore over time for the major Australian banks (Figure 5). Short-term cost differentials arise at times, which leads to issuance in a particular market, though the banks' issuance itself then contributes to driving costs back towards parity (Figure 6).

The significance of the covered bargain is important relative to the outstanding literature that examines bond issuance in response to deviations from parity. The only paper we know of that does this is McBrady and Schill (2007), which looks at internationally active opportunistic borrowers' currency choice among major currencies using sovereign yields which may include a substantial measurement error. Based on that evidence, they conclude that those international borrowers are active arbitrageurs among major currencies. Here, with the exception of Japan, we examine borrowers from smaller currency areas, and the results suggest that financial institutions from smaller countries are also active arbitrageurs in the market. In fact, the benefits for issuers from minor currency areas of accessing larger markets may be an important driving force in price incentives for non-resident investors to issue in the minor currency, potentially more so if local bond markets are relatively small or less diverse than those in major currency areas.

The ***interest differential*** serves as both a proxy for expected uncovered interest returns and the return on capital in different countries. In practice, the higher returns on capital in one currency provide a rationale for the carry trade whereby capital flows from low return on capital areas to higher return on capital areas (higher-yield currencies), consistent with a basic growth model.

The estimated coefficients for the interest differential tend to be positive for countries running external surpluses (consistent with a low return on capital) and negative for countries running external deficits (consistent with a high return on capital). In Table 3 the interest differentials

[32] Moreover, although we have matched the rating of our onshore and offshore indices, there are different banks in the various countries' indices so the margin could reflect factors other than price arbitrage such as credit risk or liquidity premia. We also are not able to distinguish between costs of local currency borrowing onshore and offshore.

are positive and significant for Japan and Singapore, negative and significant for Australia and Korea and insignificant for Hong Kong. These results hold for the multivariate estimates, but with the coefficient for Hong Kong being positive and significant.

By issuing in lower-yield currencies, borrowing countries may gain better access to savers in high-saving countries. Conversely, banks in high-saving countries may issue bonds in high-yield currencies as a means of providing a more diversified class of assets for domestic savers (such as high-yield foreign currency bonds issued by a known name) while lending the proceeds to borrowers in a high-yield country. While the returns to capital should, in theory, be arbitraged away as capital flows to areas with a higher return on capital, in practice the process may take decades. For example, a low-capital economy that wishes to double its capital stock could, in theory, borrow 100% of GDP in year one (run a current account deficit of 100% of GDP) to converge with the rest of the world, and repay the funds over time. In practice, current account deficits of more than 10% of GDP are rare and tend to be associated with subsequent reversals. Instead, a low-capital economy may run a smaller but persistent current account deficit over decades to achieve the same outcome and convergence on capital returns. In that context, the result that net borrowing countries issue bonds in currencies with a low return on capital and vice versa appears to make sense.

The estimated effect of the ***current account balance*** tells a similar story, but is mostly not significant, perhaps dominated by the interest differential here. The coefficient is only significant for Hong Kong issuers in Table 5 and has a positive sign, as expected. In some subsequent tables, it is sometimes significant for Japanese issuers (with a positive sign, as expected) and for some subsamples of Australian issuers (with a negative sign as expected). Offshore issuance tends to be larger for larger current account surpluses and larger deficits.

As discussed above, increased offshore issuance in response to large current account imbalances is consistent with several motivations. One is diversification of assets. For Hong Kong and Japan, which are current account surplus countries, at the margin residents are investing in foreign assets, which means taking on currency risk. For example, Hong Kong banks may issue foreign currency debt offshore to diversify the savings products offered to their clients. As well as local currency assets in the local bank name, and foreign currency assets in a foreign name, offshore issuance may provide investors of surplus countries with both foreign currency assets in a known (local bank) name and local currency assets in a less known name, issued by a swap counterparty, such as an Australian bank issuing Hong Kong dollars, as well as providing diversification of market risk. The larger the current account surplus, the more pressing those diversification motives may be because of the implied need to unbundle currency risk from other potentially correlated risks.

For a current account deficit country, the same diversification motives are relevant for investors, but these may be dominated by borrowers' motives to issue offshore to attract foreign savings since local savings fall short of investment needs. Providing such diversification is one such means of facilitating the flow of foreign savings. Another is the presence of market frictions that affect non-resident investment in the domestic market. These include regulatory barriers, non-resident withholding tax, and information asymmetries (for example, non-resident investors may lack information about the quality of enforcement in the domestic market, or may face language barriers) that lead to home bias in investment. Offshore issuance may help to link into foreign distribution channels for financial assets or, through swap-covered foreign currency borrowing, tap the comparative advantage of foreign financial institutions in distributing foreign currency products to investors. If the motivations of borrowers dominate those of investors in a current account deficit country, then we would expect the coefficient on the current account to be negative: a larger current account deficit increases the probability that issuers use offshore bond markets. For a surplus country, the same motivations hold in helping investors overcome aspects of market incompleteness.

We could have used the absolute value of the current account balance as a measure of borrowing and lending with non-residents, but as the countries in our sample have tended to

run persistent deficits (Australia and Korea) or surpluses (Japan, Singapore and Hong Kong), the results would be qualitatively the same.

The ***time trend*** serves as a proxy for factors not captured in our analysis that trend over time, particularly those that contribute to the increasing internationalisation of debt markets. The estimated univariate coefficients are positive for all countries except Singapore where the trend is not significant. The removal of capital controls and other barriers to internationalisation of debt markets and the development of derivatives markets that enable residents to take advantage of larger markets may be captured here. Accounting for the characteristics of the bonds and price incentives, however, the estimated coefficients are generally negative, where significant, suggesting that issuance for a given type of bond is increasingly offshore. While offshore (and non-resident) issuance in Asia-Pacific currencies grew rapidly in the years leading up to the international financial crisis, domestic debt markets are also growing rapidly (Figures 2 and 3). We discuss the potential shift offshore in more detail in the policy section discussion later in the paper.

The more detailed sectoral breakdown for Australia (Table 8) reveals both similarities and differences among sectors. Corporate issuers and ABS issuers are estimated to go offshore for larger size and longer tenor. In contrast, smaller issuance size and shorter tenor are features of issuance by banks, particularly by minor banks. The smaller banks' offshore issuance is skewed toward shorter maturities than their onshore issuance. Another factor that might explain this is particular bond structures whereby many small tranches are issued under one set of documentation such as medium-term note programmes. In the unit record data these show up as several smaller bonds. Also, in recent years, some of the major Australian banks have also been issuing more exotic bonds offshore (such as step-up coupon bonds). These types of bond tend to be relatively small and have only been issued offshore. Lower-rated corporates and higher-rated banks are more likely to issue offshore. Non-bank financial institutions are estimated to go offshore for fixed rate structures. A large current account deficit drives non-bank financials and ABS issuers offshore. Price incentives are only significant for banks. Across all sectors, a relatively high domestic interest rate is associated with offshore issuance (demand spills into the current account), and over time issuance appears to be moving onshore.

The relationship between offshore issuance and credit quality may involve other factors and vary by sector. For Australia, financial institutions are more likely to issue higher-rated bonds offshore while non-financial corporates, which issue most of the lower-rated Australian bonds, are more likely to borrow offshore. Moreover, Australian corporates rated about BBB have tended to issue credit-wrapped bonds onshore – bonds that are guaranteed by monoline insurers to achieve a AAA rating (though many of these have been downgraded during the global financial crisis). This reflects strong demand by domestic investors for highly rated bonds due to investment mandates of managed funds. Lower-rated Australian corporates have not used credit enhancement when issuing offshore (so we are not able to control for credit-wrapping in the probit regression). At the other end of the credit quality scale, the larger and higher-rated (typically AA) Australian banks, who are better known overseas, have tended to be more prolific users of offshore funding than the smaller lower-rated Australian banks which rely more on domestic funding (where they are better known).

Table 10 includes ***market size*** in place of bond characteristics as a proxy for characteristics of the issuing market and other factors not captured such as liquidity and infrastructure. The notion that issuers tap offshore markets to take advantage of larger, more liquid and more diverse markets, is reinforced by the positive coefficient on market size. Offshore bonds tend to be in currencies of a larger market. Market size serves as a proxy for a range of bond market characteristics including liquidity, diversification of products and investors and is typically correlated with the bond characteristics listed above. As can be seen in Table 3, market size has a larger explanatory power than the individual bond characteristics in the univariate probits with the exception of Japan (a relatively large market). This result holds up in the multivariate estimates for all countries.

The global ***financial crisis*** dummy was included to pick up factors that may have affected the onshore/offshore motivations and the fact that markets were not functioning normally during this time. As shown in Table 11, it is significant and negative only for Hong Kong. For Australia and Singapore, it is negative and significant for the financial subsample (not shown) suggesting some tendency to issue onshore during the crisis, possibly reflecting stress in offshore USD markets in particular and home bias among investors amid uncertainty. In contrast, Japanese residents' issuance shifted offshore during the crisis. This result could be a response to greater issuance in yen by minor currency areas as USD markets closed (to provide the other side of a swap). Overall, the crisis period is marked more by a general fall in issuance rather than a major shift in its location. For example, during the credit crisis Australian securitised bonds were only issued onshore. While this partly reflects government purchases of residential mortgage-backed securities (RMBS) onshore from late 2008, it was mostly due to the disruptions in the US securitisation market, which was at the centre of the crisis; structured investment vehicles (SIVs) were used to purchase around a third of Australian RMBS before the crisis. Nonetheless, offshore issuance by the major Australian banks was stronger during the crisis than beforehand, supported by government guarantees that apply for offshore as well as onshore bonds.

For Australia, we also included variables for *repo eligibility*, availability of a *government guarantee*, presence of non-resident *withholding tax* and the size of managed funds/GDP as a proxy for *domestic savings*. **Repo eligibility** was expected to draw banks' bond issuance onshore, whereas the government guarantee could work either way as it was available for both onshore and offshore issuance. On it's own, the dummy variable for repo eligibility was estimated to have had a significant effect in drawing bank issuance onshore (Table 12). However the collateral accepted in central bank repo operations was widened during the global financial crisis so the repo dummy variable could be picking up the difficulty that firms had raising funds offshore during the crisis. When we include both repo eligibility and the crisis dummies, only the crisis dummy was significant, and on its own, the crisis dummy was not significant (Table 11). Although suggestive of expected effects, effectively disentangling these effects was not possible in the available data.

The availability of a **government guarantee** also coincided with a shift toward onshore issuance. Unlike repo eligibility, the estimated onshore shift is robust to the presence of a crisis dummy (which also suggests a shift onshore). Anecdotally, these factors can have a strong influence on the offshore/onshore issuance decision. For example, Australian banks were the first to issue government-guaranteed bonds in Japan during the global financial crisis, as they were one of the few countries whose guarantee extended to JPY bonds. Overall, the onshore shift during the crisis was modest, with banks expanding issuance both on- and offshore.

Non-resident withholding tax, which was applicable for onshore bonds sold to non-residents for part of the sample, is expected to drive bond issuance offshore, while a larger pool of domestic savings (measured as managed funds/GDP) was expected to draw bond issuance onshore. The effect of the non-resident withholding tax and supply of domestic savings should apply more broadly than banks. The removal of non-resident withholding tax is estimated to have shifted issuance offshore, the opposite of what we expect. The removal on non-resident withholding tax may have coincided with an offshore shift associated with internationalisation of the Australian dollar market more generally. Anecdotally, its removal had a significant effect on non-resident issuance (growth of the Kangaroo bond market – onshore issuance by non-residents), which is outside our sample of issuance by residents.

The ratio of **managed funds/GDP** as a proxy for domestic savings is estimated to be positive and significant, suggesting that, as the supply of domestic savings increases, bond issuance shifts offshore.

In summary, our results suggest that differential returns on capital are probably the most important factors motivating offshore issuance. The repackaging and unbundling of risk

appears to be an important part of the flow of capital from low-return to high-return jurisdictions. Covered price incentives are estimated to be important motivators for banks whose issuance, in turn, contributes towards funding costs being equalised onshore and offshore. Our results also suggest that market size and the ability to issue larger, longer-term bonds offshore motivate issuers, particularly corporate issuers, to issue bonds offshore. This effect may be underestimated here to the degree that benefits from completing markets are reflected in price incentives. The results are also consistent with the notion that borrowers from net deficit currencies issue offshore to access foreign investors in net surplus currency areas, possibly by unbundling credit and currency risk and seeking to overcome barriers such as withholding taxes. It is difficult to test how important funding diversification is. Liaison with the Australian and New Zealand banks indicates that it is a factor they take into account in their funding decisions. Consistent with this, they issue in a relatively wide range of currencies (Figure 2). It appears to be less of a consideration for offshore issuers from some other countries who predominantly tap the US market when they issue offshore, though this may reflect the expectation prior to the global financial crisis that the US dollar markets were unlikely to suffer a significant disruption.

6. Policy lessons and risks

The preceding discussion focuses on the potential benefits for domestic issuers from tapping offshore markets. At the same time, the use of offshore bond markets can pose risks to the borrower, the liquidity of the domestic bond market, and the financial stability of the borrowing economy.

The risks of unhedged foreign currency borrowing are well known. While currency mismatches may be a problem for some issuers, the experience of 2007–08 suggests that uncovered foreign currency borrowing is no longer a major issue in the Asia-Pacific region. Hedging surveys for Australia and New Zealand show that the vast bulk of offshore foreign currency borrowing is swapped into local currency financing. Of the remainder, most is naturally hedged against foreign currency income. As experienced during the Asian crisis and in 2007–09, availability of short-term foreign currency funding (eg for trade credit) and rollover of longer-term funding can be subject to foreign liquidity pressures and disruptions in external markets. It can be equally disruptive to local currency markets when borrowers who are unable to roll over funding in international markets turn to local markets with the intention of borrowing in local currency and converting the loan proceeds into foreign currency. As recent events have illustrated, mechanisms for using reserves to provide foreign currency liquidity can be an important part of risk mitigation.

Swap-covered foreign currency borrowing carries little currency risk, but is a more complex form of borrowing which involves other risks.[33] The greater complexity of swap-covered borrowing requires more sophisticated risk management capabilities on the part of both borrowers and supervisors. Moreover, refinancing risk involves not one bond market but liquidity in both the foreign exchange swap market and the underlying funding markets on both sides of the swap. Disruptions in either of the funding or hedging markets can lead to problems in refinancing.[34] Rollover concerns are greater still if non-residents, who tend to make up the bulk of investors in offshore markets, are a less stable funding source during a crisis than domestic investors.

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[33] A well functioning domestic bond market with an established yield curve from which derivatives can be priced, helps to develop a derivatives market (Burger and Warnock (2003)).

[34] Refer to Munro and Wooldridge (2009) for further discussion of the risks of swap-covered borrowing.

The experience of countries in the Asia-Pacific region that rely heavily on offshore funding, such as Australia and New Zealand, during the global financial crisis suggests that the risks can be managed effectively, especially for highly rated borrowers. Their resilience highlights the importance of a variety of factors, including well capitalised banks with good risk management, widespread hedging of foreign currency borrowing, scalable domestic currency liquidity provision, strong fiscal positions and high sovereign ratings, and flexible exchange rates (see Munro and Wooldridge (2009) for a more detailed discussion of risks). Where foreign currency borrowing was hedged (effectively domestic currency denominated borrowing), local currency liquidity provided a substitute for external funding and rollover requirements declined in foreign currency terms as local currencies depreciated. For Australian banks, as with other banks internationally, AAA government guarantees helped to maintain offshore market access.

Diversification of funding sources across markets may mitigate refinancing risk, though less so if liquidity pressures are correlated across markets. During the 2007–08 financial crisis, although funding pressures in the US market spread to other integrated markets, diversification appears to have provided some benefits, with borrowers continuing to tap less disrupted markets and entering new ones such as the Japanese Samurai market (JPY bonds issued in Japan by non-residents).

Turning to macro financial stability, some countries may be concerned that offshore issuance may result in an increase in foreign indebtedness. Those borrowers previously restricted to borrowing onshore or not at all might be able to access cheaper funding or a wider pool of funding. Greater access to external funding might in turn lead borrowers to increase financial leverage, financial risk (particularly if the debt is denominated in foreign currency or short-term) and external indebtedness. These risks of offshore borrowing will, of course, depend on the risk management capacity of both borrowers and regulator and need to be weighed against the costs of financial autarky and the potential benefits of financial integration such as scope for consumption-smoothing in response to shocks and more efficient allocation of capital (see Henry (2006) for a review), and other more nuanced and catalytic institutional benefits (Kose et al (2006)).

A common concern is that offshore borrowing, which is mostly swap-covered foreign currency debt, may draw away liquidity from the domestic market. Swap-covered borrowing itself does not necessarily reduce the size of the local currency market. Rather, it changes the composition of issuers in the local currency market from domestic borrowers to non-resident borrowers (who issue local currency debt and swap it to their preferred currency).[35] However, non-resident issuance is highly skewed toward offshore markets, consistent with a loss of liquidity in the domestic market.

Because of network externalities and economies of scale in financial markets, liquidity tends to concentrate (CGFS (1999)), and there is a risk that it may tend to concentrate offshore. Indeed, the value of outstanding bonds issued offshore in Hong Kong dollars and New Zealand dollars is greater than that of onshore issuance (Table 2). Factors that would favour concentration of liquidity in the domestic market are a steady volume of government issuance, stable demand from domestic investors who want domestic currency assets (foreign investors' demand for local currency assets is likely to vary in response to exchange rate expectations), better assessment of domestic credit risk, especially in the case of lower-grade borrowers. The offshore market, however, offers lower costs, including the absence of withholding taxes and lower issuance costs. Peristiani and Santos (2003) report that

[35] The experience for Australia and New Zealand is that non-resident issuance in the domestic market does not crowd out local issuers (Battellino and Chambers (2005) and Tyler (2005)). Non-resident issuance pushes down the cross-currency basis swap, making it cheaper to issue offshore and swap back the proceeds into local currency.

underwriting costs in the Eurobond market are now lower than in the US market, suggesting an absolute advantage, even in US dollar debt. Consistent with this, US dollar international debt markets (issuance by non-residents and by residents offshore) increased from about one tenth the size of the domestic debt market in the mid-1990s to about a third in 2007. There are advantages to a deep onshore market, including availability of collateral for other domestic financial markets; the provision of access to a liquid market for domestic borrowers; better access for resident investors; the tendency for transparency to be greater onshore; and the contribution of a more developed bond market to greater efficiency in the banking system.[36]

Rather than a concentration of liquidity in the domestic or offshore market, the two may provide potentially complementary segments. For example, onshore markets tend to serve domestic borrowers and investors, while offshore markets tend to serve non-resident borrower and investors. While competition from an offshore market is likely to expose weaknesses in the onshore market, a dose of competition may provide the incentive to improve domestic infrastructure and the regulatory, legal or information environment, leading to a more efficient onshore market. In that case, offshore issuance may accelerate the development of the overall local currency bond market to the benefit of all borrowers. Battellino and Chambers (2005) argue that domestic financial institutions' first-hand experience in the offshore bond market helped to develop a financially sophisticated workforce which contributed to the development of a deep domestic bond market in Australia. If the onshore market infrastructure is weak, offshore issuance may usefully help to establish a minor currency as an asset class. Offshore markets, however, may concentrate a large segment of higher credit quality liquidity (Eurobonds are usually rated A or above) away from the domestic market and high-grade liquidity can be important for the development of lower-grade segments.

The balance between on- and offshore issuance is subject to policy influence, including simplicity of registration requirements, market infrastructure, transactions costs, withholding taxes, greater legal certainty and more efficient payment and settlement systems. Some onshore markets have competed more successfully than others. Issuance in the Kangaroo bond market (Australian dollar bonds issued onshore by non-residents) soared over the 2002–06 period due to a combination of factors. While a minimum volume of government issuance may be important to establish benchmarks, a fall in the supply of government debt securities left unfilled demand for high-grade local currency assets, a gap that was filled by high-grade non-residents. Second, growth in domestic demand for high-grade domestic currency securities was provided by pension funds and broadening of assets accepted by the central bank as collateral. Removal of non-resident interest withholding tax lowered costs.[37] It is worth noting that these policy changes were not intended to promote the domestic market, but reflected fiscal prudence, growing domestic pension savings, removal of preferential restrictions on collateral, and the principle of taxation in the place of residence. The policy shift was more a case of removing barriers to onshore market development than promoting it.

Rather than domination or segmentation, the advent of global bonds (issued in more than one market), suggests development toward an integrated global bond market (Miller and Puthenpurackal (2005)). Such a path may require a degree of convergence in both issuance requirements among markets and settlement platforms. To date, global bonds account for a

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[36] Borensztein and Panizza (2006) find that banks and bond markets are complements, with bond market development contributing to the development of an efficient banking system. Banks provide bond underwriting services, bridging finance prior to issuance, bond distribution channels and are major issuers of bonds.

[37] In 2007–08, non-resident issues of New Zealand dollar bonds shifted toward onshore issuance after they became repo eligible.

very small share of overall issuance. Another path to a global market might be integration of market access standards. Mutual recognition of investment funds via two-way acceptance of registrations between Hong Kong and Australia provides a recent example of such integration (ASIC (2008)). If liquidity concentrates in bond markets because of network externalities, then integration of networks may make location of issuance less important for local currency bond market liquidity.

While the offshore market may offer a substitute for a weak domestic market, development of the domestic debt and streamlining of domestic market infrastructure are likely to complement overall market development. Much has been done in recent years, particularly in Asia, to develop domestic local currency bond markets infrastructure and environment including developing local rating agencies, streamlining documentation requirements, developing settlement systems, and improving the legal and information environment (many of which measures are documented in BIS (2006)). Domestic market quality has moved toward best practice, markets have become more liquid, sovereign umbrella ratings have been raised and an increasing number of regional currencies have become more established asset classes. Complementary to the development of domestic markets, foreign exchange controls on non-resident buying of assets in domestic debt markets have increasingly been eased.

7. Summary

Asian bond markets, like bond markets globally, are becoming increasingly international in terms of offshore and non-resident issuance in the local currency. This paper explored empirically a variety of motivations for offshore bond issuance by residents, using a discrete choice (probit) model and unit record bond data for five Asia-Pacific countries (Australia, Hong Kong, Japan, Korea and Singapore) to link the issuance decision to potential benefits. Our results support the idea that (i) deviations from covered interest parity are actively arbitraged by banks resident in minor currency areas as well as by internationally active borrowers among major currencies, as established in the literature; and (ii) issuers benefit from the liquidity and diversification of larger “complete” offshore markets. The latter appears to be particularly so for lower-rated borrowers. Sub-investment grade bonds are almost exclusively issued offshore, reflecting the rarity of sub-investment grade markets outside the United States. Against the potential benefits to borrowers, we considered the risks for both borrowers and the domestic market, and lessons from the financial crisis such as funding diversification. The many initiatives undertaken in Asia-Pacific countries in the past decade and those underway such as the ASEAN+3 Credit Guarantee and Investment Mechanism, remain highly relevant for both domestic markets development and for taking advantage of the potential benefits offered by international bond markets.

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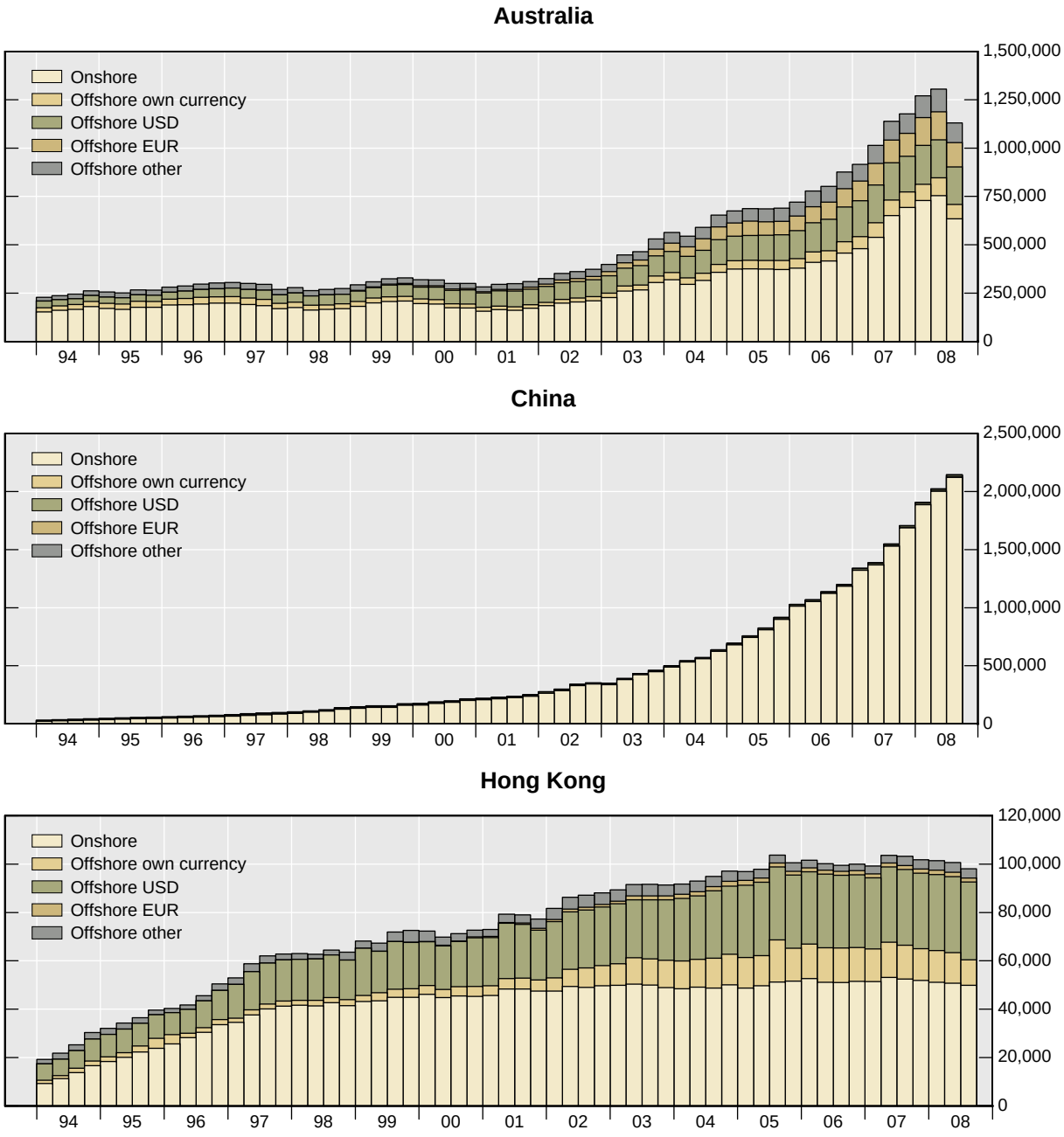
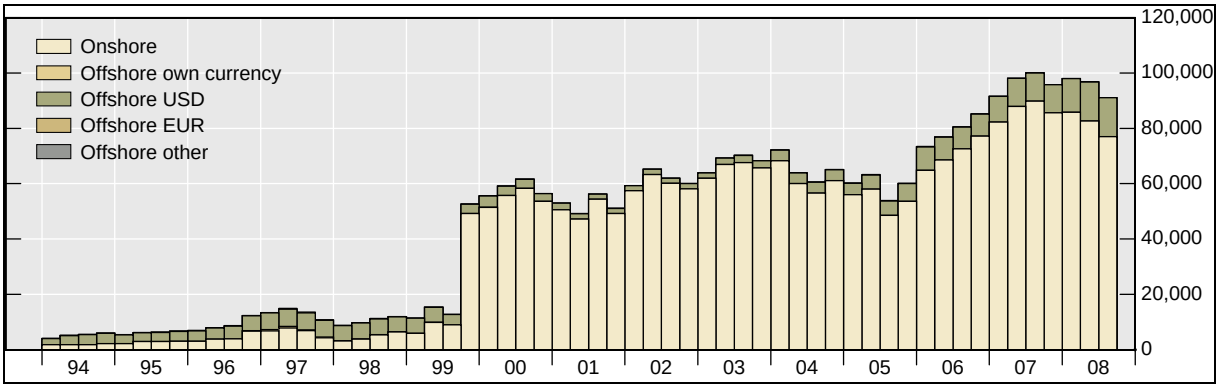
Figure 1: Bonds issued by Asia-Pacific residents

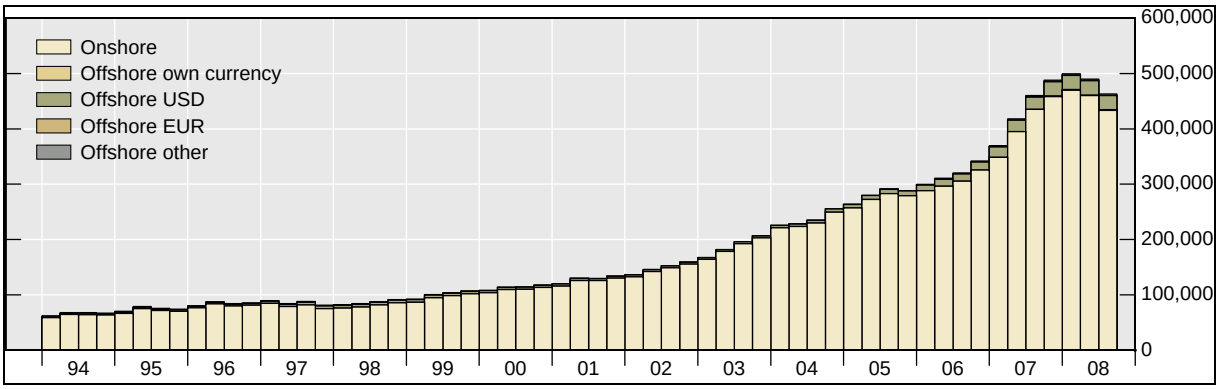
(US$ million outstanding)



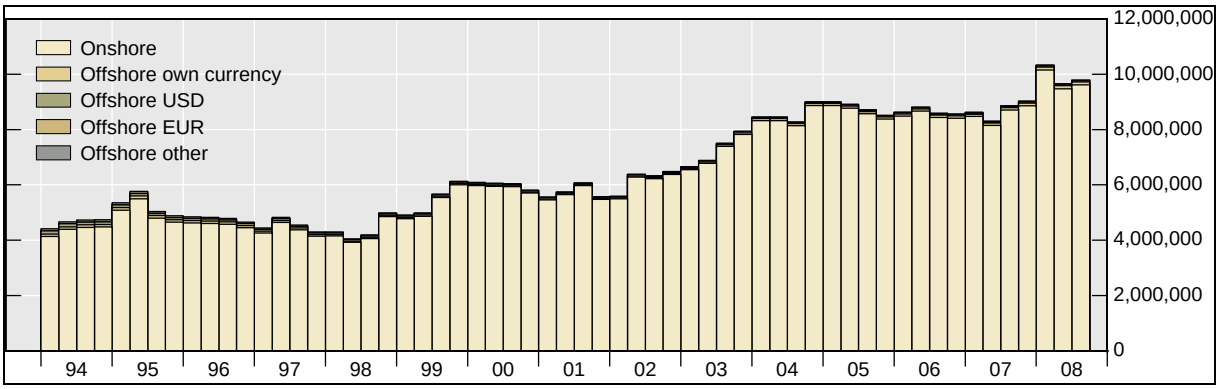
Indonesia



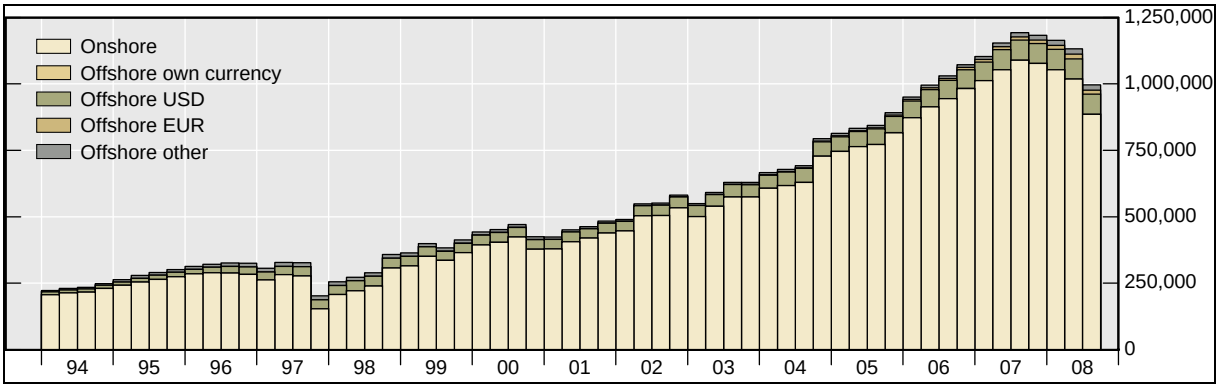
India



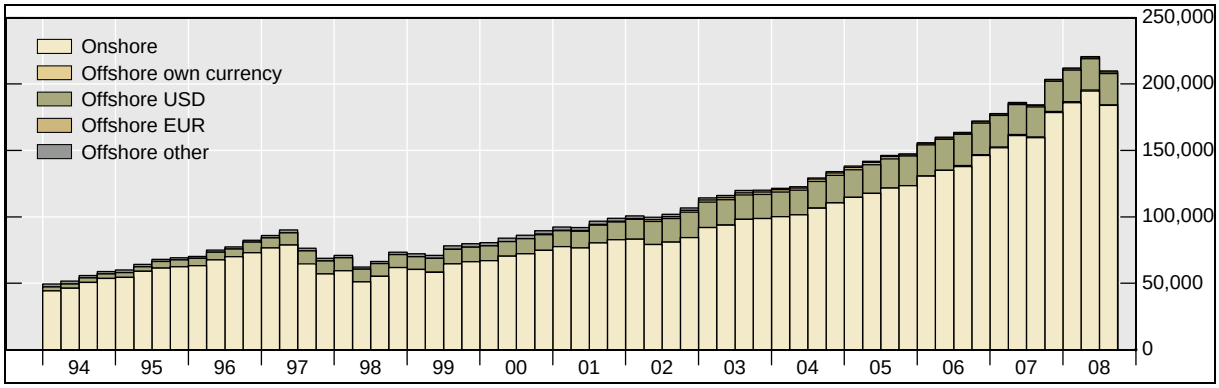
Japan



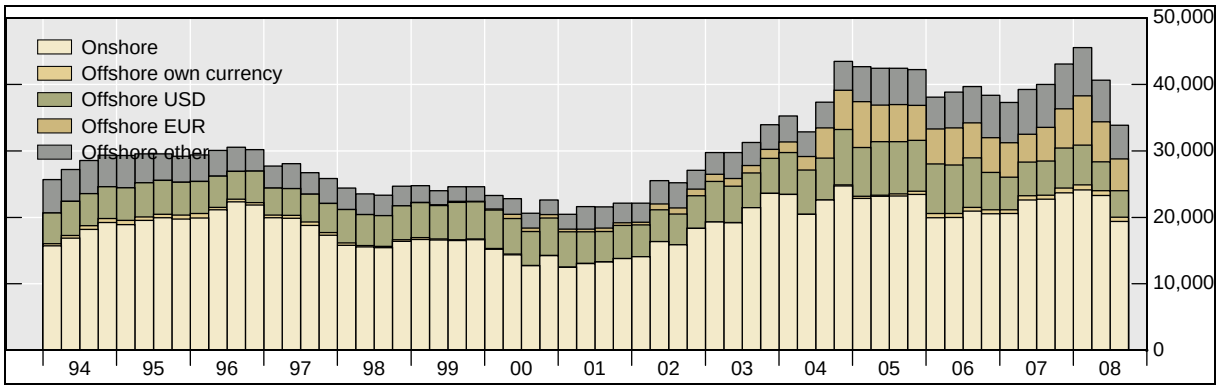
Korea



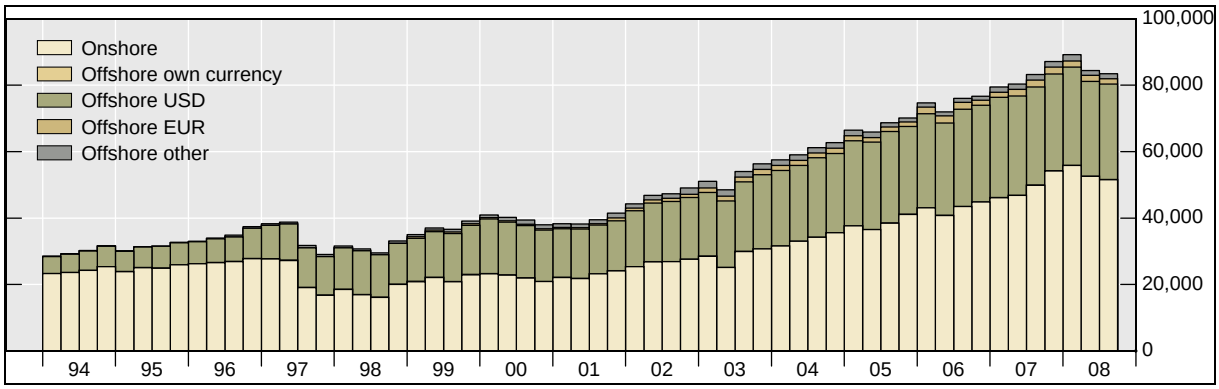
Malaysia



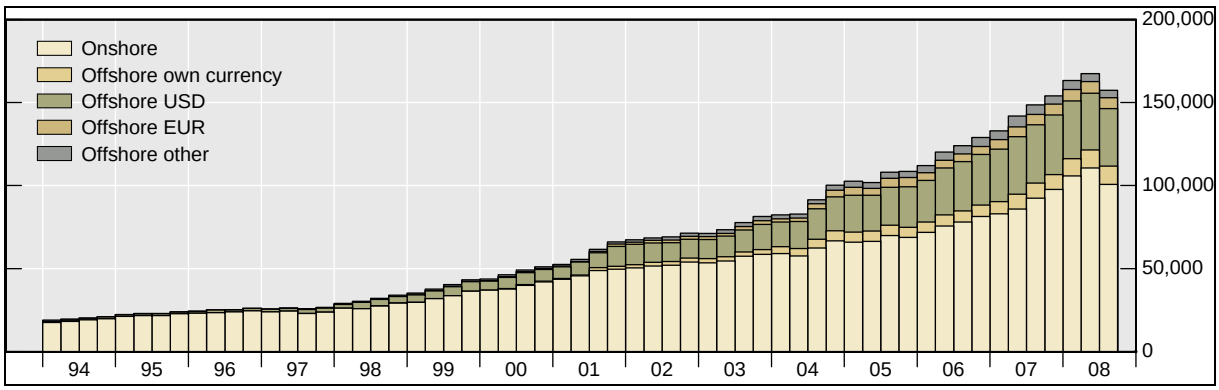
New Zealand



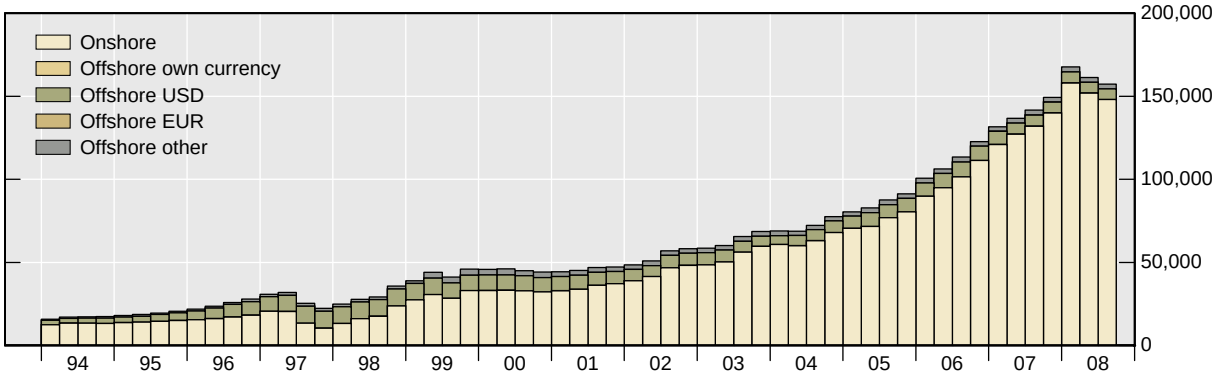
Philippines



Singapore

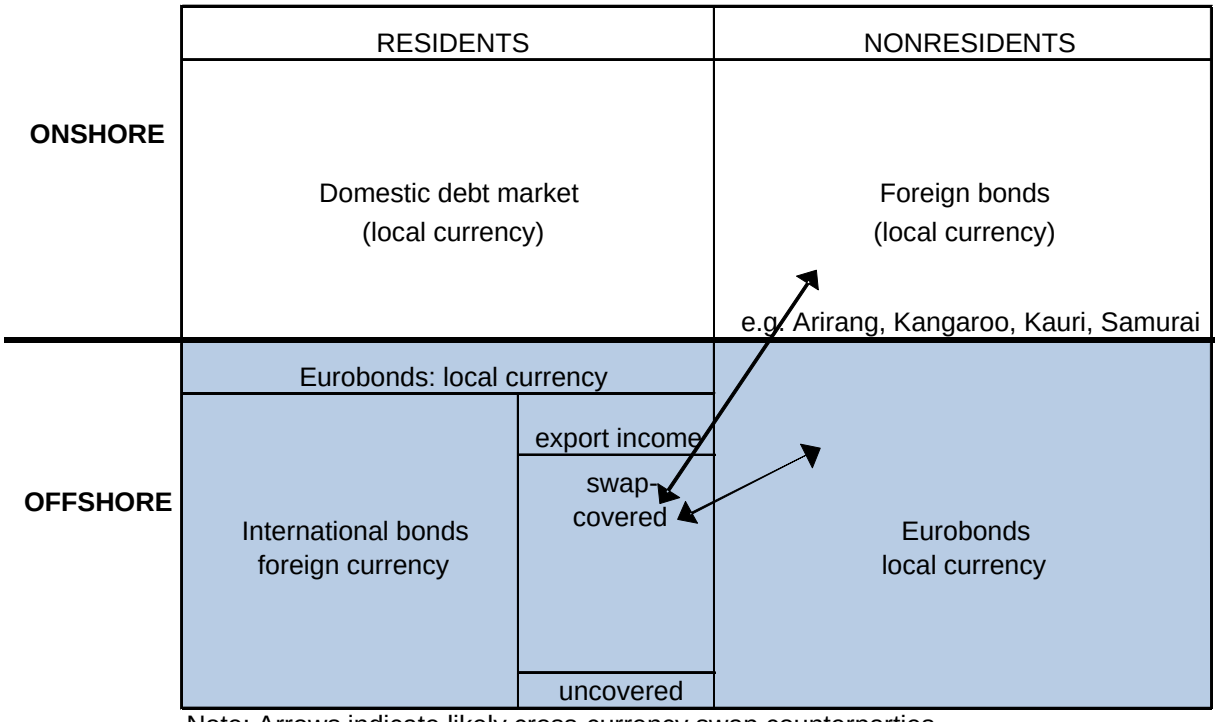


Thailand



Source: BIS

Figure 2: Stylised view of bond market: domestic issuer's perspective



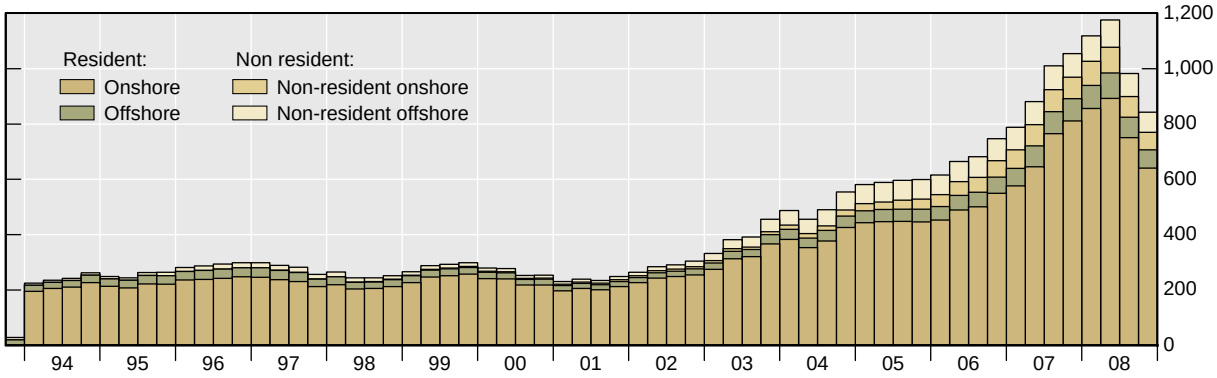
Note: Arrows indicate likely cross-currency swap counterparties

Figure 3

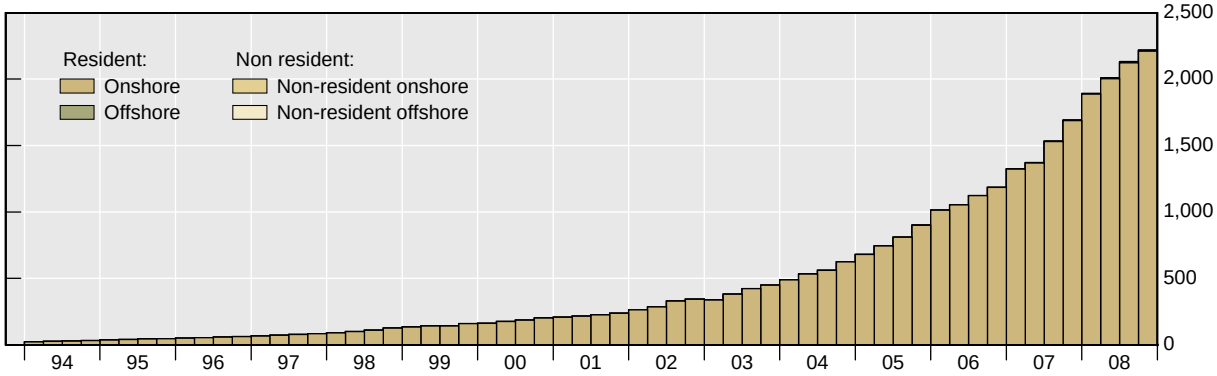
Onshore and offshore issuance in Asia-Pacific Currencies[1]

Amounts outstanding

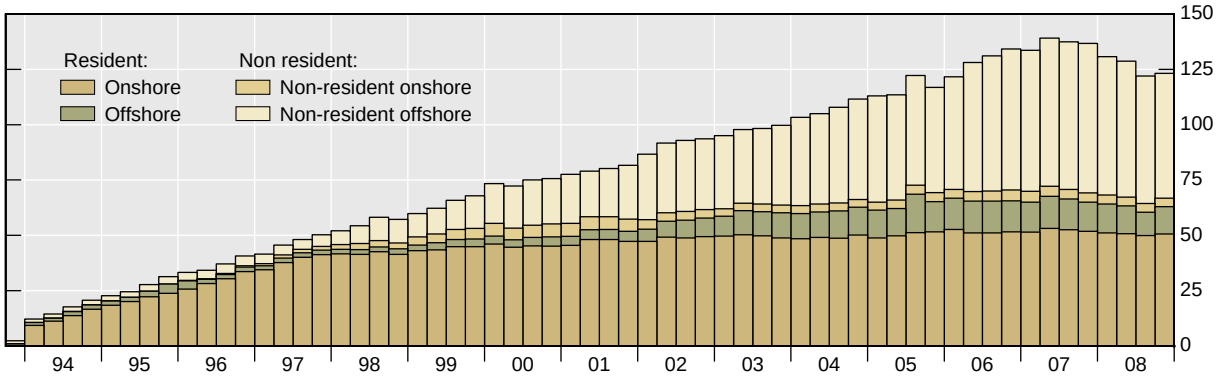
Australian dollar



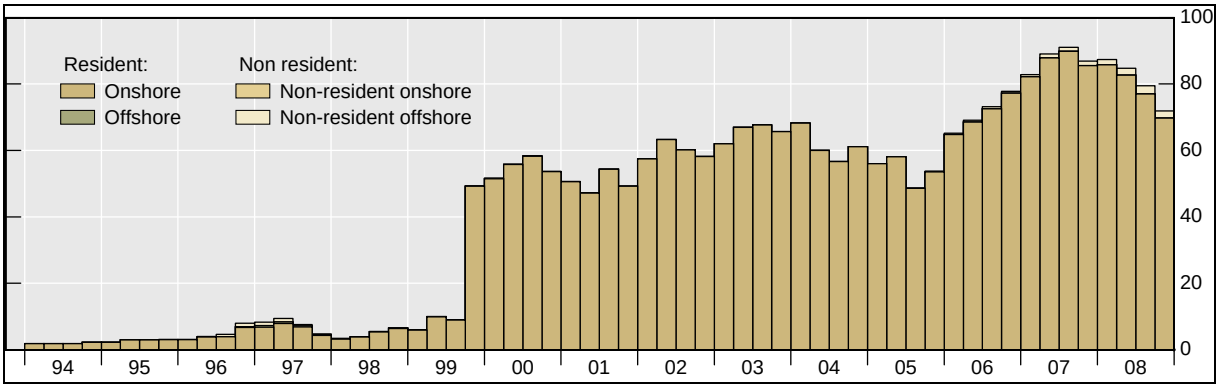
Renminbi



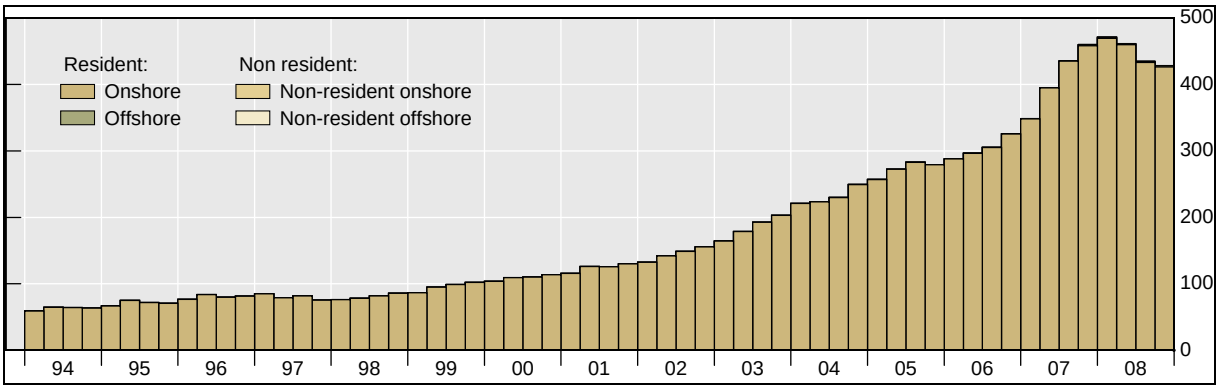
Hong Kong dollar



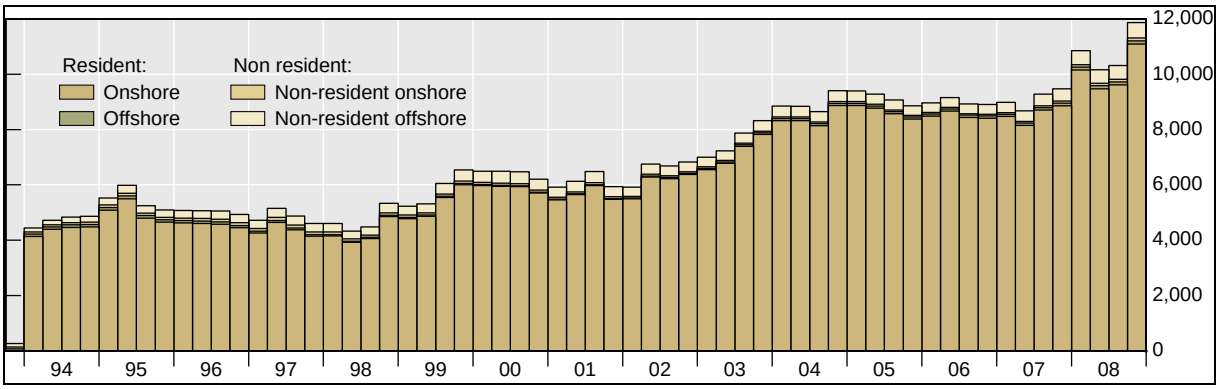
Rupiah



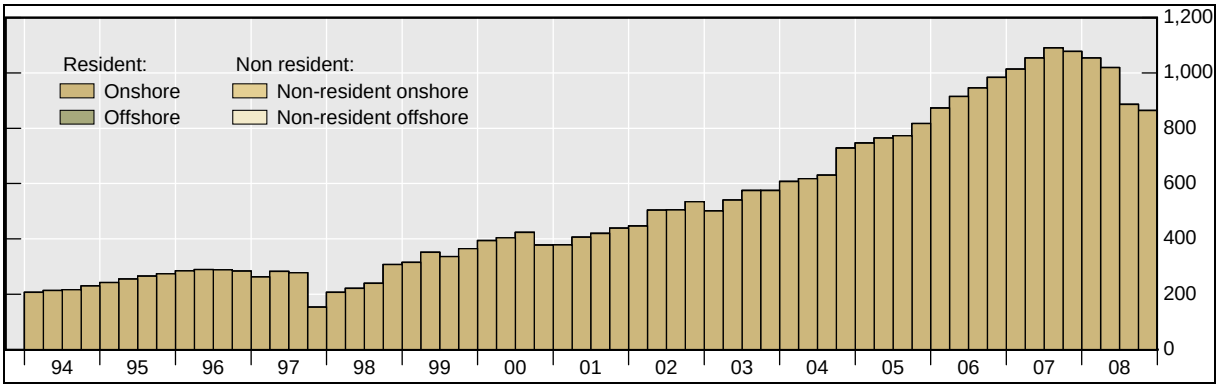
Indian rupee



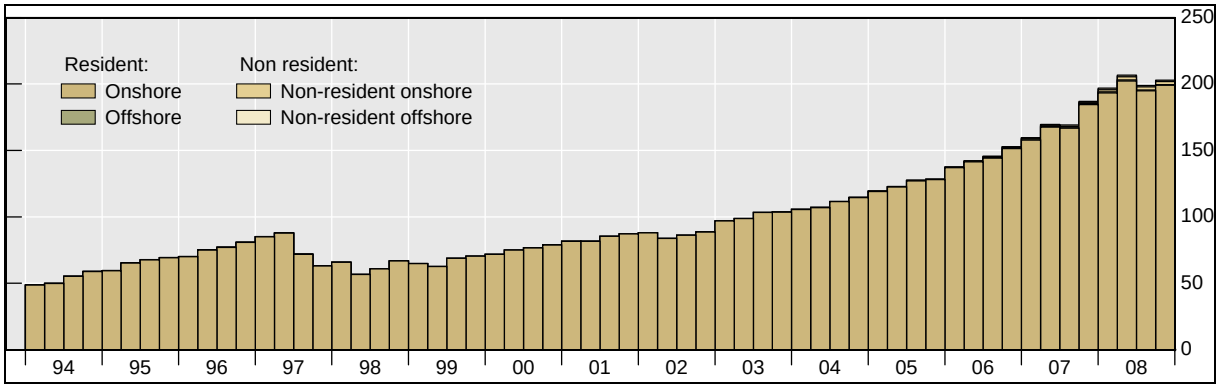
Yen



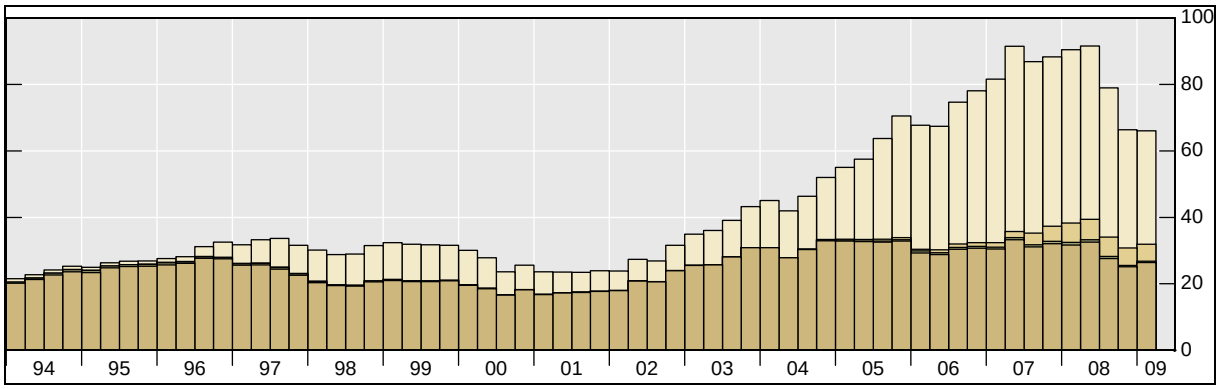
Won



Malaysian ringgit



New Zealand dollar



Singapore dollar

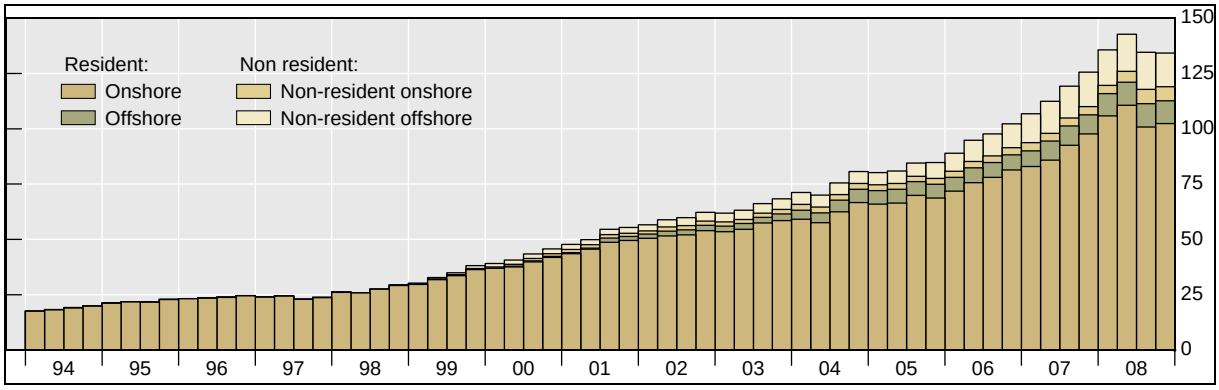
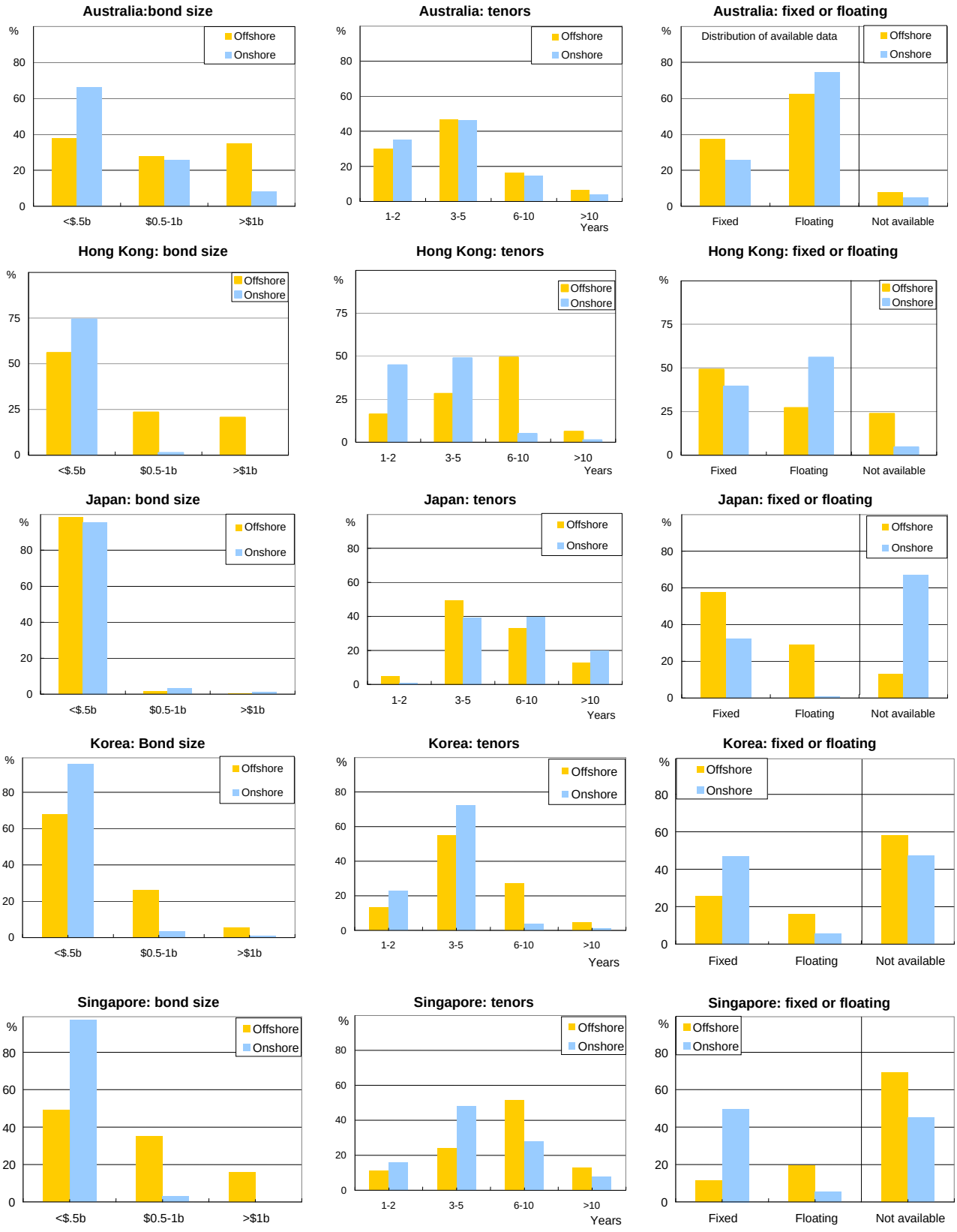
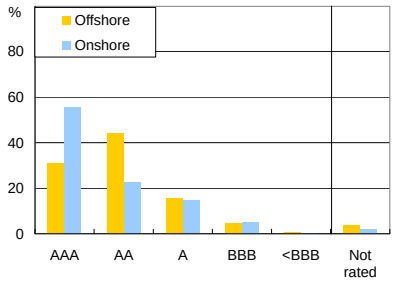


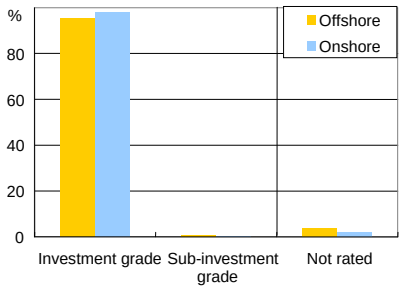
Figure 4: Bond Characteristics



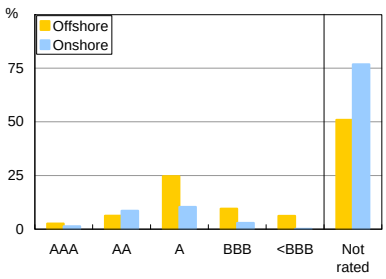
Australia: credit rating



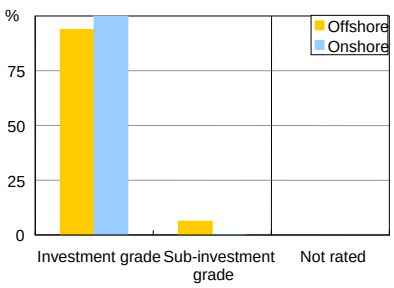
Australia: credit rating



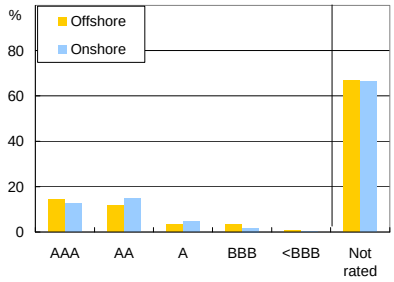
Hong Kong: credit rating



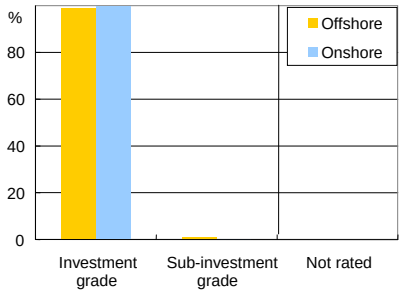
Hong Kong: credit rating



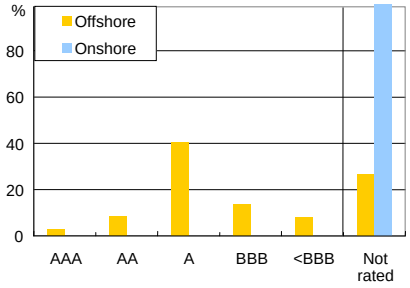
Japan: credit rating



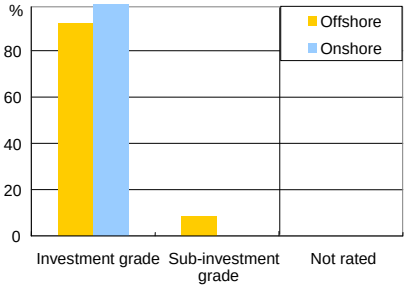
Japan: credit rating



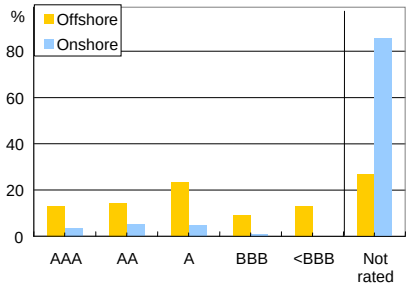
Korea: credit rating



Korea: credit rating



Singapore: credit rating



Singapore: credit rating

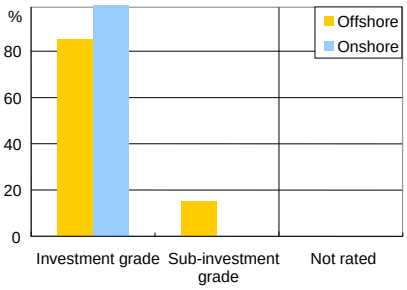


Figure 5

Australia major banks: covered bargain

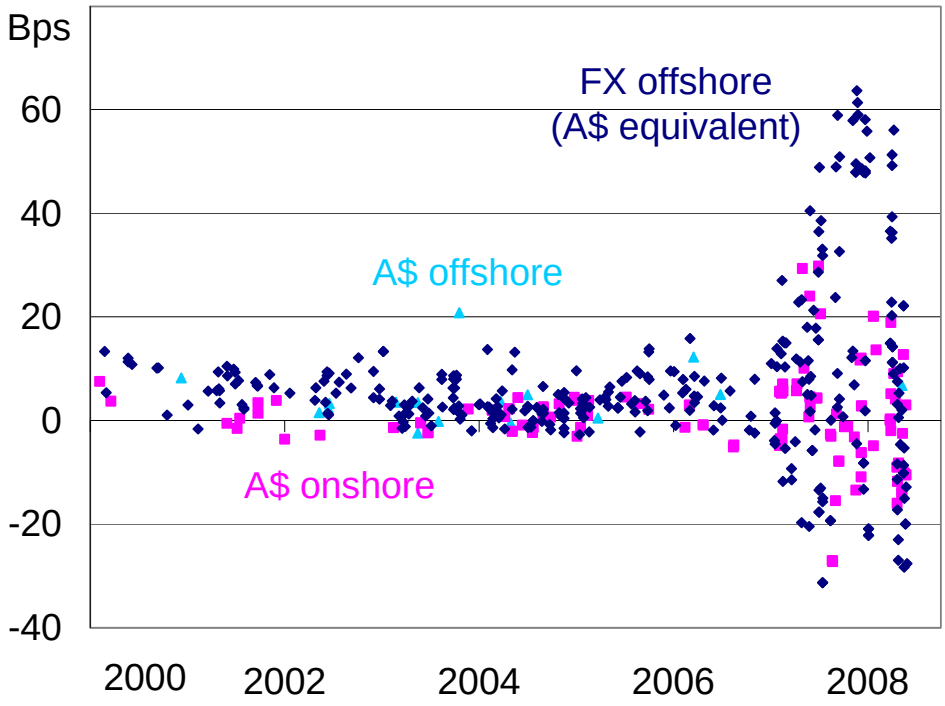
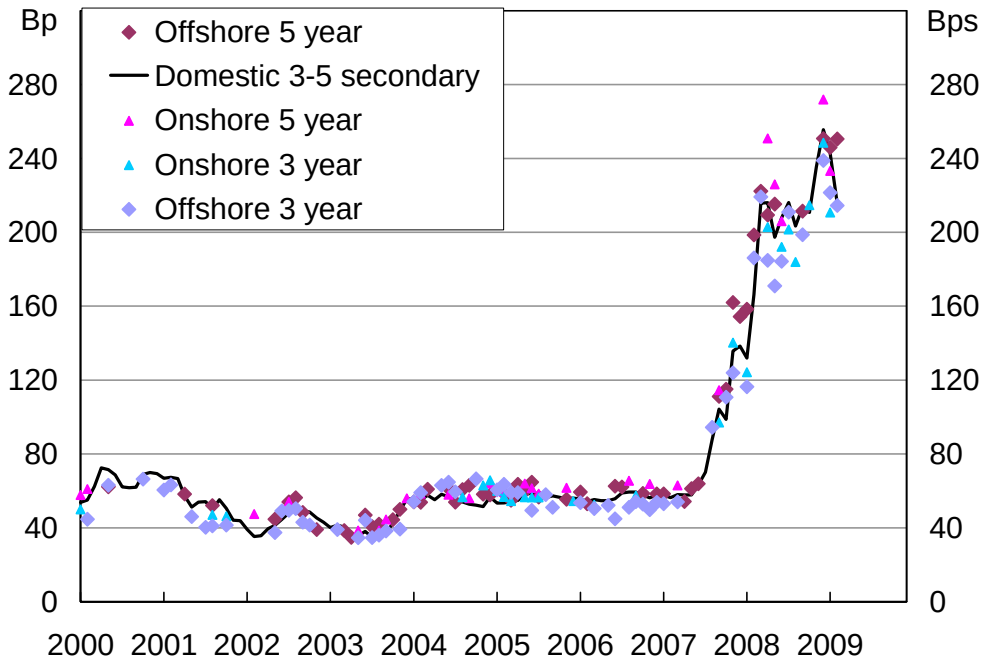


Figure 6

Major banks' bond pricing at issuance

$A equivalent spread to CGS*



* Includes fee for guaranteed bonds.
Includes AUD, USD, Euro, GBP, CHF and JPY
Source: RBA

Table 1. Outstanding bonds issued by Asia-Pacific Residents

End-2007, per cent of GDP

	Onshore		Offshore		Offshore share
	Government (a)	Corporate (b)	Local currency (c)	Foreign currency (d)	(Per cent) =(c+d)/(a+b)
Australia	13	63	9	44	41
China	35	17	0	1	1
Hong Kong	9	16	6	18	49
Indonesia	18	2	0	2	11
India	38	4	0	3	6
Japan	163	39	2	1	2
Korea	49	64	0	11	9
Malaysia	38	58	0	13	12
New Zealand	18	N/A	1	14	45
Philippines	35	2	0	23	38
Singapore	42	18	6	29	36
Thailand	39	18	0	3	5

Source: BIS.

Table 2. Global market for bonds denominated in Asia-Pacific Currencies

Outstanding, end-2007, per cent of GDP

	Onshore		Offshore		Non-resident offshore share
	Resident	Non-resident (a)	Resident	Non-resident (b)	(b)/(a)
Australian dollar	76	8.5	9	9.4	53
Chinese renminbi	52	0.0	0	0.1	100
Hong Kong dollar	25	2.1	6	32.6	94
Indonesian rupiah	20	0.0	0	0.3	100
Indian rupee	42	0.0	0	0.0	n/a
Japanese yen	202	1.6	2	10.1	86
Korean won	113	0.0	0	0.1	100
Malaysian ringgit	96	0.3	0	0.5	63
New Zealand dollar	18	3.5	1	39.8	92
Philippine peso	38	0.1	0	0.1	50
Singapore dollar	61	2.3	6	9.5	81
Thai baht	57	0.3	0	0.1	25

Source: BIS.

Table 3: Univariate probit estimates

		Australia	Hong Kong	Japan	Korea	Singapore
log(Size)	Coefficient	0.07	0.34	-0.48	0.61	0.33
	z	7.45 **	17.77 **	-74.82 **	40.64 **	10.42 **
	Pseudo Rsq	0.01	0.07	0.10	0.28	0.08
	No obs	6,795	3,757	17,706	19,946	1,191
log(Tenor)	Coefficient	0.069	0.362	0.416	0.195	0.235
	z	8.11 **	12.33 **	35.03 **	6.94 **	4.68 **
	Pseudo Rsq	0.01	0.03	0.05	0.01	0.02
	No obs	6,786	3,572	17,702	20,114	1,192
Rating Index	Coefficient	0.063	0.053	0.017	3/	0.133
	z	9.07 **	3.59 **	1.61		3.75 **
	Pseudo Rsq	0.01	0.01	0.00		0.07
	No obs	5,939	1,160	2,142		187
Sub Inv Grade	Coefficient	1/	1.82	0.63	1/	1/
	z		7.87 **	3.46 **		
	Pseudo Rsq		0.02	0.00		
	No obs		3,846	9,983		
Fixed	Coefficient	0.76	0.03	-1.04	-1.43	-0.62
	z	20.37 **	0.67	-20.85 **	-25.45 **	-5.04 **
	Pseudo Rsq	0.06	0.00	0.05	0.17	0.04
	No obs	5,286	3,452	11,519	5,935	583
CA/GDP	Coefficient	-0.110	0.044	0.223	0.007	0.028
	z	-9.8 **	8.7 **	23.43 **	1.65	4.21 **
	Pseudo Rsq	0.01	0.02	0.02	0.00	0.01
	No obs	6,799	2,768	17,706	20,114	1,192
CIP	Coefficient	6.060	0.0496 2/	-1.700	1.371	1.100
	z	6.03 **	0.8	-6.23 **	14.78 **	4.11 **
	Pseudo Rsq	0.00	0.00	0.00	0.20	0.02
	No obs	6,563	2,607	14,581	1,220	937
$i - i^H$	Coefficient	-2.005	-0.0482	0.2903	-0.9977	0.2373
	z	-30.34	-1.81	16.4 **	-35.9 **	6.94 **
	Pseudo Rsq	0.50	0.00	0.02	0.51	0.04
	No obs	6,799	3,746	17,349	19,998	1,168
year	Coefficient	0.039	0.014	0.020	0.084	-0.006
	z	11.22 **	3.04 **	9.93 **	26.08 **	-0.58
	Pseudo Rsq	0.01	0.00	0.00	0.08	0.00
	No obs	6,799	3,846	17,706	20,114	1,192
Market Size	Coefficient	0.436	,703	0.010	0.055	0.053
	z	16.91 **	17.11 **	14.44	30.79 **	9.05 **
	Pseudo Rsq	0.66	0.40	0.01	0.63	0.45
	No obs	6,798	3,801	17,396	20,040	1,185

Note: ** indicates significance to the 1% level; * indicates significance to the 5% level
Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.
The pseudo R^2 measures the improvement of the regression fit against a regression on a constant only.
1/ Subinvestment grade bonds only issued offshore
2/ HK pricing constructed from sovereign index (no corporate index), so potentially large measurement error.
3/ Ratings only available for offshore bonds.

Table 4a: Multivariate probit estimates: bond characteristics

Non-financial corporate issuers

	Australia		Hong Kong	Japan	Korea	Singapore
log(size)	0.31	0.25	0.13	0.26	0.57	0.23
	5.34 **	4.62 **	1.36	4.87 **	9.74 **	2.56 *
log(tenor)	0.54	0.42	0.70	-0.59	0.52	-0.04
	6.61 **	5.65 **	3.82 **	-4.15 **	4.55 **	-0.2
Rating Index 1/	0.22	2/	2/	2/	2/	2/
	10.47 **					
Fixed	0.02	0.06	-0.37	-2.40	-0.92	-0.65
	0.21	0.61	-1.40	-9.90 **	-8.46 **	-2.74 **
Year	-0.04	-0.05	-0.14	-0.47	-0.14	0.00
	-2.73 **	-3.59 **	-5.82 **	-22.86 **	-10.82 **	-0.10
No obs.	709	695	252	2,881	2,132	337
onshore	418	418	66	1,867	1,963	312
offshore	291	277	186	1,014	169	25
Pseudo Rsq	0.24	0.09	0.23	0.88	0.32	0.08
Sensitivity	66.3	46.9	92.5	96.8	24.3	-
Specificity	86.6	86.8	40.9	98.7	99.4	100.0
Correctly classified (%)	78.3	70.9	79.0	98.0	93.4	92.6

Financial institutions

	Australia		Hong Kong	Japan	Korea	Singapore
Size	0.18	0.16	0.33	-0.01	0.54	0.31
	12.2 **	11.12 **	13.63 **	-0.36	13.42 **	4.26 **
Tenor	-0.09	-0.09	0.27	0.48	0.023	- 0.53
	-2.78 **	-2.90 **	7.64 **	5.01 **	0.36	- 4.08 **
Rating Index 1/	0.06	2/	0.13	0.94	2/	2/
	5.76 **		2.95 **	2.05 *		
Fixed	0.81	0.81	0.08	-0.66	-2.09	-0.35
	17.42 **	17.43 **	1.38	-5.08 **	-19.33 **	-1.89
Year	0.052	0.051	0.026	-0.253	-0.162	0.018
	8.29 **	8.28 **	4.11 **	-14.04 **	-12.36 **	0.69
No obs.	3,904	3,903	2,979	909	3,595	242
onshore	2,284	2,284	2,145	629	3,258	133
offshore	1,620	1,619	834	280	337	109
Pseudo R2	0.11	0.10	0.08	0.42	0.53	0.12
Sensitivity	47.5	47.8	16.7	69.3	57.9	57.8
Specificity	81.3	80.4	96.1	95.9	98.7	76.7
Correctly classified (%)	67.3	66.9	73.9	87.7	94.8	68.2

Notes: Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore. ** indicates significance to the 1% level; * indicates significance to the 5% level. Pseudo ^{2}R measures the improvement of fit against a regression on a constant only. Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error). Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error). '1/ For Australia, Rating index (AAA=1, AA+=2, etc) in the first column, otherwise subinvestment grade dummy. 2/ Sub-investment grade bonds only issued offshore.

Table 4b: Multivariate probit: marginal effects of bond characteristics

(change in propensity to issue offshore)

Non-financial corporate issuers

	Australia		Hong Kong	Japan		Korea		Singapore	
US $50m --> $100m	4%	**	2%	5%	**	2%	**	2%	*
3 --> 5 years	8%	**	10%	-9%	**	2%	**	0%	
Sub-investment grade	1/		1/	1/		1/		1/	
floating --> fixed	2%		0%	-77%	**	-10%	**	0%	**
+ one year	0%	**	0%	-14%	**	0%	**	0%	

Financial Issuers

	Australia		Hong Kong	Japan		Korea		Singapore	
US $50m --> $100m	4%	**	8%	0%		2%	**	8%	**
3 --> 5 years	-2%	**	4%	8%	**	0%		-11%	**
Sub-investment grade	1/		41%	36%	*	1/		1/	
floating --> fixed	31%	**	2%	-24%	**	0%	**	0%	
+ one year	2%	**	1%	-8%	**	0%	**	0%	

1/ Subinvestment grade bonds issued only offshore.

Table 5a: Multivariate probit estimates with bond, macroeconomic and price variables

	Australia		Hong Kong		Japan		Korea	Singapore
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(Size)	0.172	0.162	0.261	0.299	-0.293	-0.095	0.467	0.342
	8.35 **	8.02 **	5.91 **	9.88 **	-5.14 **	-2.21 *	3.77 **	3.89 **
log(Tenor)	0.00	-0.09	0.36	0.32	0.487	0.71	0.50	-0.02
	-0.89	-0.24	6.05 **	8.08 **	3.73 **	7.32 **	1.87	-0.1
Rating Index	0.023	--	-0.022	–	-0.148	--	3/	2/
	2.11 *		-1.13		-5.65 **			
Subinvestment grade	--	1/	--	1.32	--	1.54	3/	1/
				3.50 **		3.44 **		
Fixed	0.64	0.65	0.28	0.29	-1.029	-1.38	-0.11	-1.15
	11.66 **	11.71 **	2.61 **	4.56 **	-5.52 **	-10.27 **	-0.50	-4.93 **
CA/GDP	0.006	0.004	0.023	0.032	0.148	-0.039	-0.060	-0.017
	0.28	0.18	2.13 *	4.11 **	1.49	-0.57	-1.19	-0.62
CIP	1.0	1.0	0.49	0.13	4/	4/	0.501	-0.70
	1.93	2.04 *	2.52 **	1.37			1.87	-0.92
$i^I - i^H$	-1.65	-1.66	0.57	0.64	5/	5/	-0.56	1.14
	-20.84 **	-20.91 **	4.9 **	8.68 **			-5.22 **	3.78 **
year	-0.021	-0.022	-0.029	-0.012	-0.186	-0.062	-0.272	0.140
	-2.57 **	-2.64 **	-1.28	-0.87	-4.15 **	-2.18 **	-1.33	1.69
No obs.	4,498	4,487	953	2,317	646	2,594	807	446
onshore	2,702	2,702	534	1,601	547	2,495	740	398
offshore	1,796	1,785	419	716	99	99	67	48
Pseudo R^2	0.53	0.53	0.11	0.27	0.33	0.28	0.55	0.43
Sensitivity	75.7	75.4	46.3	29.6	47.5	12.1	58.2	58.3
Specificity	100.0	100.0	81.8	95.4	97.4	99.8	99.1	100.0
Correctly classified (%)	90.2	90.2	66.2	75.1	89.8	96.4	95.7	95.5

Notes: Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

** indicates significance to the 1% level; * indicates significance to the 5% level

Pseudo R^2 measures the improvement of fit against a regression on a constant only.

Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).

Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)

1/ Subinvestment grade bonds only issued offshore.

2/ Small sample.

3/ Detailed ratings only for offshore bonds.

4/ Dropped because of collinearity

5/ i_diff>0 predicts offshore perfectly for the available sample

Table 5b: Multivariate probit estimates with bond, macroeconomic and price variables: marginal effects

(change in propensity to issue offshore)

	Australia		Hong Kong		Japan		Korea	Singapore
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
US $50m --> $100m	4% **	4% **	7% **	7% **	-3% **	0% *	1% **	2% **
3 --> 5 years	0%	0%	7% **	6% **	4% **	2% **	1%	0%
Rating Index	1% *		-1%		-2% **		3/	2/
subinvestment grade		1/		49% **		26% **	3/	1/
floating --> fixed	21% **	21% **	11% *	10% **	-26% **	-20% **	-1%	-18% **
CA/GDP (+1%)	0%	0%	1% *	1% **	2% *	0%	0%	0%
CIP (+100bp)	33%	35% *	19% **	4%	4/	4/	2%	-7%
i_diff (+100bp)	-58% **	-58% **	23% **	22% **	5/	5/	-2% **	11% **
+ one year	-1% **	-1% **	-1%	0%	-3% **	0% **	-1%	1%

1/ Subinvestment grade bonds only issued offshore.
2/ Small sample.
3/ Detailed ratings only for offshore bonds.
4/ Dropped because of collinearity
5/ i_diff>0 predicts offshore perfectly for the available sample

Table 6: Sectoral estimates: non-financial corporates

	Australia		Hong Kong	Japan	Korea	Singapore
log(Size)	0.48	0.40	0.09	-0.50	0.30	0.55
	4.46 **	3.95 **	0.66	-18.45 **	1.98 *	1.89
log(Tenor)	0.54	0.36	0.55	-0.118	0.719	-0.339
	3.48 **	2.53 *	2.23 *	-1.81	2.12 *	-0.72
Rating Index	0.160	--	--	--	--	--
	5.06 **					
Subinvestment grade	--	1/	1/	1/	1/	1/
Fixed	0.17	0.19	0.04	-3.5	0.05	-1.438
	0.98	1.13	0.10	-25.65 **	0.18	-2.54 *
CA/GDP	0.084	0.044	0.047	-0.0048	-0.113	0.0157
	1.20	0.65	1.24	-0.08	-1.90	0.21
CIP	-0.4	0.7	0.047	2/	0.257	6.64
	-0.26	0.45	1.24		0.75	0.99
$i^I - i^H$	-1.74	-1.73	0.39	3/	-0.58	3.159
	-8.69 **	-9.26 **	1.54		-3.70 **	1.28
year	-0.10	-0.10	-0.14	-0.23	-0.13	0.12
	-3.01 **	-3.31 **	-2.32	-11.47 **	-0.51	0.56
No obs.	646	635	123	2,801	495	291
onshore	418	418	44	1,866	460	279
offshore	228	217	79	935	35	12
Pseudo R^2	0.68	0.65	0.14	0.68	0.45	0.67
Sensitivity	84.7	83.4	83.5	85.0	40.0	66.7
Specificity	99.3	100.0	40.9	94.2	98.7	100.0
Correctly classified (%)	94.1	94.33	68.29	91.15	94.55	98.63

Notes: Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

** indicates significance to the 1% level; * indicates significance to the 5% level

The pseudo R^2 measures the improvement of the regression fit against a regression on a constant only.

Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).

Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)

/1 Subinvestment grade bonds only issued offshore; in the case of Japan almost only offshore.

2/ Dropped because of collinearity

3/ Dropped: i_diff > 0 predicts offshore perfectly for the available sample

Table 7: Sectoral estimates: financial institutions

	Australia	Hong Kong	Japan	Korea	Singapore
log(Size)	-0.18	0.28	-0.15	0.92	0.38
	-5.27 **	8.65 **	-2.88 **	3.02 **	3.28 **
log(Tenor)	-0.226	0.277	0.9278	0.408	0.0145
	-3.49 **	6.64 **	7.79 **	0.71	0.06
Rating Index	-0.174	--	--	--	--
	-7.94 **				
Sub-investment grade	--	1.13	1.016	2/	1/
		2.59 *	2.16 **		
Fixed	0.11	0.28	-0.66	-0.87	-0.764
	1.36 **	4.25 **	-4.18 **	-1.55	-2.12 *
CA/GDP	-0.0437	0.03	-0.0049	-0.015	-0.03
	-1.54	3.93 **	-0.05	-0.13	-0.87
CIP	1.99	0.1	3/	2.03	-3.07
	2.84 **	1.27		2.80 **	-2.12 *
$i^I - i^H$	-1.621	0.664	4/	-0.436	1.999
	-14.48 **	8.43 **		-2.26 *	2.40 *
year	-0.087	0.002	-0.081	-0.32	0.176
	-7.01 **	0.11	-2.16 *	-0.75	1.47
No obs.	2,059	2,167	725	313	156
onshore	715	1,557	629	280	119
offshore	1,344	610	96	33	37
Pseudo R^2	0.48	0.11	0.26	0.76	0.46
Sensitivity	83.6	21.6	36.5	78.8	64.9
Specificity	88.3	97.4	98.4	99.6	98.3
Correctly classified (%)	85.2	76.1	90.2	97.4	90.4

Notes: Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

** indicates significance to the 1% level; * indicates significance to the 5% level

Pseudo R^2 measures the improvement of fit against a regression on a constant only.

Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).

Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)

1/ Sub-investment grade bonds only issued offshore.

2/ Small sample.

3/ Dropped because of collinearity

4/ i_diff >0 predicts offshore perfectly in the sample

5/ Australia includes banks and non-banks, but excludes ABS.

Table 8: Detailed sectoral estimates: Australian data

	All	Corporate	Non-bank financials	Bank	Major Banks	ABS 3/
log(Size)	0.172	0.48	0.302	-0.250	-0.310	0.550
	8.35 **	4.46 **	2.41 **	-6.70 **	-6.17 **	8.75 **
log(Tenor)	0.00	0.54	-0.31	-0.27	-0.32	0.65
	-0.89	3.48 **	-1.78	-3.66 **	-3.08 **	6.6 **
Rating Index	0.023	0.160	-0.08	-0.21	0.15	0.07
	2.11 *	5.06 **	-1.86	-7.62 **	2.08 *	1.72
Fixed	0.64	0.17	0.76	-0.02	-0.04	all fixed
	11.66 **	0.98	3.45 **	-0.18	-0.32	
CA/GDP	0.006	0.084	-0.200	-0.030	0.059	-0.128
	0.28	1.20	-2.41 *	-1.01	1.29	-2.26 *
CIP	1.0	-0.4	1.9	1.9	3.0	-1.1
	1.93	-0.26	0.87	2.56 **	3.16 **	-1.45
$i^I - i^H$	-1.65	-1.74	-0.94	-1.76	-1.87	-1.51
	-20.84 **	-8.69 **	-4.50 **	-14.00 **	-11.26 **	-10.13 **
year	-0.021	-0.10	-0.06	-0.11	-0.08	-0.01
	-2.57 **	-3.01 **	-2.07 *	-7.74 **	-3.31 **	-0.39 *
No obs.	4,498	646	242	1,214	1,214	1,682
onshore	2,702	418	137	272	272	1,458
offshore	1,796	228	105	942	942	224
Pseudo R^2	0.53	0.68	0.31	0.52	0.56	0.64
Sensitivity	75.7	84.7	68.6	87.3	90.8	73.2
Specificity	100.0	99.3	82.5	86.2	80.2	99.7
Correctly classified (%)	90.2	94.1	76.5	87.0	88.4	96.2

Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.
Note: ** indicates significance to the 1% level; * indicates significance to the 5% level
Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).
Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)
1/ CIP not equal to zero predicts offshore issuance perfectly.

2/ Dropped because of collinearity

3/ Excludes subinvestment grade ABS issuance which is not issued publicly, but retained on bank balance sheets ("skin in the game").

Table 9: More accurate pricing data (Australian major banks)

	Index Pricing	Actual pricing		Index Pricing	Actual pricing	
		all issues	AUD		all issues	AUD issues
Market size				0.86	0.42	-7.44
				4.67 **	2.37 *	-2.85 **
log(Size)	-0.415	-0.44	-1.55			
	-6.59 **	-3.11 **	-3.83 **			
log(Tenor)	-0.42	-0.67	0.87			
	-3.34 **	-1.64	1.08			
Rating Index	0.02	-0.19	-0.90			
	0.25	-0.85	-2.1 *			
Fixed	0.26	-1.46	2/			
	1.73	-2.45 *				
CA/GDP	0.013	-0.19	-0.57	0.01	-0.18	-0.44
	0.26	-2.12 *	-2.69 **	0.24	-2.52 *	-2.77 **
CIP 1/	**2.13**	**4.44**	**5.90**	**6.01**	**6.13**	**6.52**
	1.68	**2.33 ***	**1.24**	**2.14 ***	**4.40 ****	**2.42 ***
$i^I - i^H$	-2.75	-3.50	--	-2.04	-2.41	-2.08
	-10.01 **	-5.88 **		-2.88 **	-3.4 **	-2.32 *
year	-0.25	-0.33	-0.59	-0.18	-0.27	0.53
	-6.49 **	-4.7 **	-3.6 **	-5.39 **	-5.12 **	1.78
No obs.	1,157	481	108	2074	481	151
onshore	234	132	89	239	132	132
offshore	923	349	19	1835	349	19
Pseudo R^2	0.65	0.72	0.39	0.70	0.69	0.30
Sensitivity	93.0	93.12	57.89	94.01	89.11	21.05
Specificity	81.6	84.85	95.51	97.49	95.45	98.48
Correctly classified (%)	90.7	90.85	88.89	94.41	90.85	88.74

Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

Note: ** indicates significance to the 1% level; * indicates significance to the 5% level

Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).

Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)

1/ Index pricing based on AA indices. Actual pricing based on issuance pricing relative to AUD secondary market price. Measured in percent.

2/ AUD floating rate bonds issued only onshore

Note: 2000-2009 period

Table 10: Multivariate probit estimates with market size

	Australia	Hong Kong	Japan	Korea	Singapore
Market size	1.105	0.627	2.47	0.82	1.02
1/	16.05 **	12.82 **	19.54 **	13.5 **	2.09 *
CA/GDP	0.02	0.03	0.16	-0.08	0.03
	1.02	4.30 **	11.4 **	-1.81	1.53
CIP	5.10	-0.01	2/	-2.16	0.14
	6.05 **	-0.05		-7.38 **	0.03
$i^I - i^H$	-1.27	0.16	3/	-1.46	-0.02
	-6.54 **	1.70		-12.53 **	-0.01
year	-0.053	0.057	0.13	-0.82	-0.06
	-9.38 **	3.97 **	26.64 **	-5.55 **	-1.05
No obs.	6,563	2,603	14,389	1,271	986
onshore	3,398	1,735	7,197	1,040	858
offshore	3,165	868	7,192	231	128
Pseudo R^2	0.65	0.29	0.09	0.65	0.74
Sensitivity	82.6	40.8	77.6	78.8	83.6
Specificity	100.0	99.8	55.4	98.6	100.0
Correctly classified (%)	91.6	80.1	66.5	95.0	97.9

Notes: Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

** indicates significance to the 1% level; * indicates significance to the 5% level

Pseudo R^2 measures the improvement of fit against a regression on a constant only.

Sensitivity is the share of offshore issues predicted to be offshore (= 1 - Type I error).

Specificity is the share of onshore issues predicted to be onshore (= 1 - Type II error)

1/ Log size of market of issuance relative to US market

2/ Dropped because of collinearity

3/ i_diff>0 predicts offshore perfectly for the available sample

Table 11: Effect of the international financial crisis

	Crisis dummy				
	Australia	Hong Kong	Japan	Singapore	Korea
log(Size)	0.17	0.30	-0.10	0.34	0.47
	8.41 **	9.97 **	-2.26 *	3.89 **	3.78 **
log(Tenor)	0.00	0.32	0.71	-0.02	0.50
	-0.11	8.04 **	7.28 **	-0.1	1.86
Rating Index 1/	0.02	1.26	1.48	2/	2/
	2.25 *	3.36 **	3.3 **		
Fixed	0.64	0.27	-1.41	-1.15	-0.12
	11.52 **	4.17 **	-10.37 **	-4.9 **	-0.55
CA/GDP	0.001	0.017	-0.023	-0.018	-0.062
	0.04	2.07 *	-0.34	-0.62	-1.21
CIP	0.9	0.0	3/	-0.7	0.5
	1.83	-0.25		-0.92	1.77
$i^I - i^H$	-1.67	0.67	4/	1.14	-0.56
	-20.64 **	9.07 **		3.78 **	-5.22 **
year	-0.03	0.07	-0.12	0.14	-0.34
	-2.73 **	3.51 **	-3.31 **	1.6	-1.21
crisis dummy	0.10	-0.80	0.46	-0.09	0.14
	1.04	-6.76 **	2.45 *	-0.1	0.38
No obs.	4,498	2,317	2,594	446	807
onshore	2,702	1,601	2,495	398	740
offshore	1,796	716	92	48	67
Pseudo R^2	0.53	0.16	0.29	0.46	0.56
Sensitivity	75.56	33.24	12.12	58.33	58.21
Specificity	100.00	95.00	99.60	100.00	99.05
Correctly classified (%)	90.24	75.92	96.26	95.52	95.66
Table 5 ref. eqn.	(1)	(4)	(6)	(7)	(8)

Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

Note: ** indicates significance to the 1% level; * indicates significance to the 5% level

1/ Rating index for Australia, subinvestment grade dummy for other countries.

2/ Subinvestment grade issuance only offshore.

3/ Dropped because of collinearity

4/ Foreign currency interest rates all higher than domestic interest rates.

Table 12: Australia: other factors

	Repo eligibility	Govt' guarantee available	Non-resident witholding tax	Managed funds
log(Size)	-0.250	-0.240	0.171	0.160
	-6.72 **	-6.48 **	8.25 **	7.68 **
log(Tenor)	-0.34	-0.26	0.00	-0.02
	-4.56 **	-3.50 **	0.06	-0.42
Rating Index 3/	-0.24	-0.23	0.022	0.020
	-8.46 **	-8.1 **	2.01 *	1.87
Fixed	-0.03	-0.04	0.65	0.66
	-0.28	-0.38	11.73 **	11.9 **
CA/GDP	0.033	0.021	-0.001	0.018
	0.98	0.62	-0.04	0.85
CIP 1/	2.3	2.1	1.0	1.1
	3.12 **	2.79 **	2.06 *	2.28 *
$i^I - i^H$	-1.61	-1.72	-1.66	-1.64
	-13.29 **	-13.80 **	-20.79 **	-20.74 **
year	-0.05	-0.09	-0.034	-0.102
	-2.69 **	-6.14 **	-2.88 **	-6.24 **
Repo eligibility	-0.87			
	-5.41 **			
Govt' guarantee available		-0.96		
		-3.38 **		
Non-resident witholding tax			-0.166	
			-1.53 **	
managed funds				0.021
				5.81 **
No obs.	1,817	1,817	4,498	4,498
onshore	272	578	2,702	2,702
offshore	942	1,239	1,796	1,796
Pseudo R^2	0.53	0.52	0.53	0.54
Sensitivity	87.3	92.0	75.7	75.5
Specificity	86.2	94.6	100.0	99.9
Correctly classified (%)	87.0	92.9	92.0	90.2
Ref. Eq. Table (Column)	8 (4)	8 (4)	5 (1)	5 (1)

Dependent variable is 1 if the bond is issued offshore and 0 is issued onshore.

Note: ** indicates significance to the 1% level; * indicates significance to the 5% level

1/ Index based cost.