

# **An analysis of covered bond market in Asia Pacific**

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Abstract:	
<p>After the worldwide mortgage-backed securities crisis (MBS) and European sovereign crisis, covered bonds with their high-quality credit have become more popular as a substitute for MBS and government bonds, especially ones issued in Asia Pacific. This research combines a market overview with an in-depth study of credit spreads to examine the performance as well as the risk-level in Asia Pacific covered bond market. Also, the research explores the dynamic relationships between Asia Pacific covered bonds with European sovereign crisis and German covered bond market, a representative for European covered bond market. The research employs asset swap spreads as the indicator for the risk-level in covered bonds. In the studied period, the asset swap spreads in Asia Pacific covered bonds have tendency to decrease and currently catching up with spreads in German covered bonds. The results indicate that the risk level of Asia Pacific covered bonds has been reduced; and not credit risk but contracted liquidity risk is the main factor currently driving down the risk level. On the other hand, the results reveal that the increasing dependence on European capital market makes Asia Pacific covered bonds largely influenced by European sovereign crisis thereby increasing the credit risk.</p>	
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# 1. INTRODUCTION

After the worldwide market meltdown in 2008, investors have been seeking for safer investing opportunities. The equity market has intimidated investors away when returns seem not appropriately compensate for increasing uncertainties. As a result, investors flock towards another playground, so-called fixed-income market. 2011 and 2012 have witnessed a record outstanding issuance in high-yield bonds of which the credit quality is ranked “junk” or “non-investment grade”. However, holding high level of risks with little prospects for value growth, junk bonds will merely serve investors short-term. In long-term, both investors and borrowers are in need for a more stable and secure financial instrument for capital circulation. Under the circumstances, covered bonds (CBs) are emerging as a superior tool which not only meet all strict requirements of complex financial market but also yield favourable returns. The first CBs were issued in (Germany) Prussia in 18th century and have been widely spread in Europe; Denmark (1797), Poland (1825) and France (1852) (Golin 2006). They have proved their efficiency in mortgage market as well as public sector. Up till the end of 20<sup>th</sup> century, the issuance volume of CBs declined considerably due to historical factors. After Germany issued its first “Jumbo Pfandbriefe” in 1995 with the minimum issuance volume per issue of EUR500 million, CBs regained their dominant standing in EU (Golin, 2006). According to European Covered Bond Council (ECBC) fact book, the outstanding volume of CBs was EUR 2.68 trillion worldwide in the end of 2011. Due to their superior structure and outstanding performance, CBs have been adopted in Asia Pacific recently. In 2009, Kookmin banks issued the first South Korean CBs dominated in U.S dollar (Tom Kohn and Katrina Nicholas 2009). In June 2011, bank of New Zealand issued their first covered bond. In 2011, Australia government announced their enable regulation for CBs; in November 2011, Australia and New Zealand banking group (ANZ) issued the first Australian CB program (ECBC fact book). Many other countries have put their eyes on these securities.

## ***Covered bond***

A covered bond is backed by a pool of loans including public sector loans or mortgage loans. Covered bonds can be mistaken with mortgage-backed securities (MBS) or asset-backed securities (i.e. CDO, CLO...) originated in United States as they share common features of a base pool. However, covered bonds outperform MBS, CDO or

CLO, etc, in the matter of credit quality. Since the base pool is retained in the loan-originating bank, if a single loan in the pool goes default the bank is obliged to cover the loss by its own account. Therefore, the risks of prepayment and default which pester holders of MBS or CDO are reduced under such dual-recourse mechanism. Besides, CB issuers are required to over-collateralize the base pool as well as provide many other investor safeguards. With those credit enhancements, CBs are literally considered as secure as government debt but still offer higher yield. CBs therefore are arranged in between of government debts and corporate debts concerning risks and returns. (Golin, 2006)

### *Aims of the research and research questions*

Covered bonds have existed in Europe for more than 200 years and virtually most European countries either issued or have been issuing CB programs for financing mortgage market and public sector (ECBC fact book, 2012). However, there are limited numbers of international researches deeply investigating CBs. Presently; major literatures available include mainly covered bond fact books or guidelines of individual programs. The main reason is that firstly CB's structures and mechanisms vary from country to country; hence it is difficult for universal generalization. Secondly, despite a long history in Europe, CBs have only become popular worldwide in recent decades as a substitute for MBS in mortgage funding. The concept of covered bond is relatively novel outside EU, particularly in Asia Pacific. Therefore, the research will concentrate in Asia Pacific area, a new participant in CB market, in order to capture a precise picture on how they are performing and integrating with each others. In short, the first purpose of this research is to review and summarize the CB market in Asia Pacific in order to fill the gap in existing literatures. Up till March 2013, there are 3 countries in Asia Pacific that have issued international CB programs namely Australia, New Zealand, and South Korea. Others such as Singapore, Japan, India or Thailand are redesigning regulations in order to adopt their own CB programs.

Despite special features such as over-collateral, dual-recourse or extra safeguards, CB holders are not entirely released from risks. The fact that CB's yields are higher than ones of government bonds which are used as benchmark for risk-free interest rate proves that CBs still hold certain level of risk. In second part, research will collect and observe credit spreads in Asia Pacific CB market. Through breaking down credit

spreads of Asia Pacific covered bonds, the research will figure out the main factors which are currently driving the credit spread or, in the other words, the price of CBs in the area of Asia Pacific. Furthermore, credit spreads in Australia, New Zealand and South Korea Covered bond market are likely to have a close linkage with each other's. Research will hence set up a line of credit spread movement in each country and compare them together to see if there are any similarities exist between them. Also since Germany currently plays the biggest role in the worldwide CB market, it would be useful to compare the Asia Pacific market with German market. The result can be utilized in predicting future market trend; particularly, if there is fluctuation in one market the other counterpart is likely to follow. Identifying the correlation in risk level between those countries could benefit asset managers in developing an optimal diversification strategy. Last but not least, as a large proportion of the covered bonds issued in Asia Pacific are dominated in euro and purchased by European investors, Asia Pacific covered bond market is likely to be influenced by European sovereign crisis. Thus, the last purpose is to examine the link between Asia Pacific covered bond and European debt crisis.

In summary, objective of this research is to answer four important questions:

- (1) Who are the main covered bond issuers in Asia Pacific and what are their market positions in current market?***
- (2) How is the credit spread line in covered bond in Asia Pacific market compared to one of German covered bond market which is currently the largest market worldwide?***
- (3) How is the credit spread in covered bonds in Asia Pacific market influenced by European capital market?***
- (4) What are the key factors driving the risk level in Asia Pacific CB market?***

***Materials and method description:***

Both primary and secondary data are used in the research. The research integrates quantitative and qualitative methods simultaneously exploiting the collected data in order to answer the research questions. More details will be explained in methodology section.

### ***Limitation***

Since the data for covered bonds in secondary market is not available, research will focus on analyzing covered bond price in primary market. Since price movements in secondary market are taken into account when pricing a new issue in primary market, observing primary market also reflects market perception of the issues. Therefore, it will not exclude any important factors affecting covered bond price. However, deeply identifying the relationship between covered bond price and risk factors in econometrical methods is beyond the scope of this research. The research will combine the theories and analysis of retrieved data to bring out the most accurate and useful results. It can be used as a base to further investigation into the market.

## **2. LITERATURE REVIEW**

Although many theories have been proposed to improve understanding of fixed-income market, this literature review will focus mainly on following themes: covered bond, credit spread in covered bond and cross-countries differences in credit spread. It will be structured into two main parts: general definitions of covered bonds and credit spreads in covered bonds.

### **2.1. Covered bond definition**

Since CBs are largely defined by country regulations and contractual agreements, there is no universally precise definition of covered bonds. There are two most exclusive definitions of covered bonds available; first is provided by European covered bond council in European covered bond fact book (2012) and second is in *Covered bond beyond Pfandbriefe: Innovations, investment and structured alternatives (2006)*, a collection of various researches selected and edited by Golin J. Accordingly, although CB issuers in different countries acquire their own conceptions towards CB, still they share numbers of similarities. From financial perspectives, a CB possesses four essential features:

***(i) A covered bond is debt security issued by credit institutions which operate under public supervision and regulations.*** Generally speaking, covered bonds are, like any other bonds, issued by borrowers where the lenders receive fixed payments includ-



ing the interest and principle and have all the rights over assets backed the loan in the event of default. Commonly, CBs are directly issued by credit institutions but sometimes there is special purpose entity (SPE) involved. In latter case, the loans are transferred to SPE who are in charge of repacking those loans and issuing covered bonds. Still credit institutions as original issuers have all obligations over the bonds, albeit indirectly. Since credit institutions are entities licensed in specific banking activities, for examples, depository banks, investment banks, or asset management companies... they have to obey specific banking regulations. Sequentially, covered bonds as the property of credit institutions are subject to those regulations as well. In advance cases, a country can design a specific jurisdiction for CB treatments only. Up to 2008, there are 26 countries in Europe which have special rules for covered bonds meanwhile there are 5 countries worldwide having no specific treatments towards covered bonds.

***(ii) Covered bonds are secured by a ring-fenced unit which consists of similar assets.*** Unlike corporate bonds, CBs are secured by not only single asset but a pool of those similar assets. Simply speaking, borrowers take loans from a bank; the bank gathers those similar loans into a *ring-fence unit* and uses it as the collateral to issue CBs. This feature can be mistaken with mortgage-backed securities (MBS) where the securities are also secured by a pool of mortgage loans. However, in CBs, the underlying asset pool is remained in issuers' balance sheets meanwhile loan originators in MBS sell those loans off their balance sheets. In MBS, banks sell off the loans to companies specializing in issuing MBS (Freddie Mac or Fannie Mae) so the MBS issued latter are no longer banks' obligations. Moreover, in CBs, a ring-fenced unit consists of loans with similar characteristics and the same level of risk; for instance, a unit with only residential mortgage loans facing a similar risk level or a unit consisting of only government loans. Therefore, CBs secured by single-class assets target *single-class investors*. This is another character differing CBs from MBS where multiple-class investors are assigned into different tranches verified with different levels of risks. Another attribute of underlying pool of CB is that it is dynamic rather than static. The components of the pool are not fixed at the issuance but rather be changeable over time. As long as the issuers are able to guarantee the total value of the pool being equal to the value of the pool at the issuance, they can substitute the loans in the pool by others which share the same characteristics. This feature, in one hand, eases issuers in allocating loans into pool but, on

the other hand, requires them to provide austere asset management aftermath in order to maintain the value of the pool.

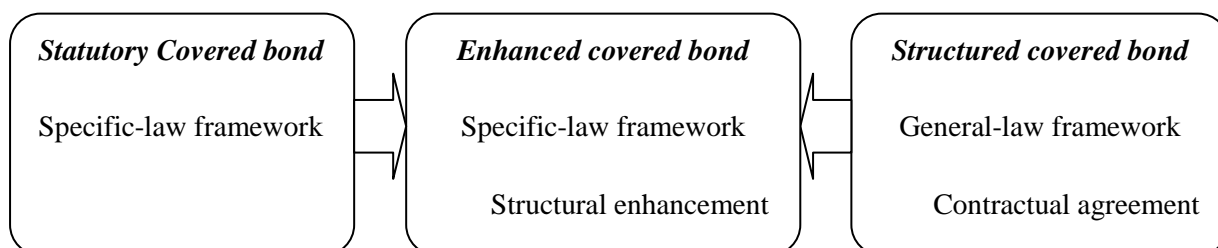
*(iii) Covered bonds have a dual-recourse feature over bond issuers.* Holding CBs, investors have claim not only over the *collateral* but also on the *issuers' assets*. In the event of bankruptcy, normal loan lenders have single-recourse in collateral and no further claims over borrowers' other assets. If the value of the collateral is not sufficient to cover up all the payments, normal lenders will end up losing their capital. In CB's mechanism, things go more complicated due the nature of covered pool. There are two scenarios possibly happen that are either default of underlying loans or default of the CB issuers. If the CB issuers are no longer able to meet the debt obligations, bondholders can have claims on the collateral and in this case, the covered pool. Another scenario is that underlying loans go default. CB investors can have further claims on issuers' other assets which are not included in that unitary pool. In the other words, CB issuers have to compensate their own capital to fill in the gap in the covered pool in the default of underlying loans. This dual-recourse feature upholds the level of safety in CBs and drives down the risk level literally equal with sovereign debt.

*(iv) Covered bonds require strict management and offer many others safeguards towards bondholders.* Cash-flow mismatch problem can occur in CB mechanism when a cover pool is constructed by short-term small amortizing loans but the CB holders can require bullet repayment. Also floating interest term of small loans in a cover pool in oppose to a fixed interest rate in CB itself and vice versa can cause mismatch troubles. Therefore, in purpose of maintaining high credit quality, over-collateral is implemented in CB structures where the value of the underlying asset must be kept greater than market value of the covered bond (the percentage is decided by regulation framework). Sequentially, banks are required to provide strict asset-liability mismatch management up till the maturity or a call/put event. Moreover, many buffers are provided by issuers to reinforce the credit quality of CBs.

### ***Types***

In lack of general definitions, covered bonds are commonly defined according to legal-based frameworks that consist of statutory CBs and structured CBs. A statutory CB is one operating under a special-law based framework. Meanwhile, a structured one requires only a general-law based framework allowing countries easily adopt CBs.

Structured CBs which possess similar features with the securitization process is mostly defined by contractual agreements among involved parties. There is also one type in-between called enhanced covered bond. Enhanced covered bonds are issued in countries which have specific regulations for CBs but structural enhancements are executed in order to mitigate weaknesses in legal frameworks.



*Figure 1: Types of covered bond (Golin 2006)*

On the other hand, CBs can sometimes be defined according to the size of the issues. German CBs gained their reputation for the concept of Jumbo CBs which were originally defined as issue larger than €500 million.

## **2.2. Credit spread in covered bond**

Despite of superior safeguards and strict rules over a cover pool, a CB is still an unsecured debt instrument so the credit spread structure in CBs is basically similar to one in corporate bond. Hence, the review will start with relevant literatures concerning credit spreads in corporate bonds then move more specifically to covered bonds. In addition, since the research comprehends data analysis of various countries, some literatures in regard of cross-countries differences will be discussed.

Generally, the research is related to literatures about the credit spread in unsecured corporate debts of Elton (1999), Collin-Dufresne (2003) and Longstaff (2004), etc. Elton, Gruber, Agrawal and Mann (1999) attempted to explain factors underlying the risk premium of corporate bonds relative to government bonds. They found that default risks, tax statuses and systemic risks are main reasons for the spread. Also, they pointed out that the default risk and tax status contribute to minority portion in the risk premium meanwhile remainder takes the largest responsibility for driving up the risk compensation. In 2003, in a research paper for *Journal of Finance Vol. 56*, Collin-Dufresne,

Goldstein and Helwege suggested that monthly credit spread changes in corporate bonds are largely caused by demand-supply shocks and the credit risk factor explains for only one-quarter of monthly spread variations. Plus, they claimed that the firm-individual factors are not as important as aggregated market factors in affect to credit spread. The results from Elton and Collin go opposite to structural models where credit risks account for large proportion in corporate bond spreads. Later, the so-called structural model was re-tested by Longstaff in 2004 where again default components are claimed to represent a large portion in credit spreads. It accounts for approximately 50% of the credit spread even highest-rated firms.

In the context of covered bond, in 1998, Buhler and Hies published a research on credit spreads of German covered bond market. They proved that there is a dynamic movement in German Pfandbriefe's credit spreads but did not reveal the main components driving the credit spread movement. In contrast, Schäfer and Hochstein (1999) claimed that Jumbo Pfandbriefe is rather homogenous thus should yield equally. Later, Birkmeyer and Herbert (2002), Koziol and Sauerbier (2007), Kempf (2012) showed that the covered bond market is not uniform and there are considerable differences in credit spreads between countries, segments and individual CBs. However, they concluded with different explanations for underlying components of the credit spread. Birkmeyer and Herbert (2002) showed the yield differences are due to the outstanding volume and the rating meanwhile Koziol and Sauerbier (2007) and Kempf (2012) believe that the liquidity is main driver of CB credit spreads. Prokopczuk and Vonhoff (2012) pointed out countries' legislations as well as the developing level of real estate markets have a specific impact in the yield spread of mortgage covered bonds, particularly in period of financial distresses. Later in 2012, Prokopczuk, Siewert and Vonhoff published another paper on the credit risk of covered bonds. They argued that not only liquidity but credit risk are highly relevant in pricing covered bond, especially during financial distress. Among the existing literatures, Prokopczuk, Siewert and Vonhoff's theory is the most exclusive and critical providing the base theory for this research.

However, most of the existing literatures focused on European Covered Bond market, particularly German Pfandbriefe. For cross-countries researching, an exclusive study which is highly relevant to this research is the work of Raquel Bujalance and Ferreira (2004). They examined the co-integration relationship of yield spreads between German, France and Spain. A common trend in credit spread curves is discovered between Germany, France and Spanish Covered bond market. Despite having different

lags but they all move in the same pattern. Moreover, German average spread moves before the others and its lag has influence on moving directions of other countries' spreads.

In short, it can be said that the covered bond market has not been investigated exclusively, especially in Asia Pacific where covered bonds are emerging more and more critical with an impressive issuing volume after 2008. There have been a few published market overview reports from European Covered bond Council and rating agencies Moody's but not yet an insight research. Therefore, as an in-depth research in Asia Pacific market, this research contributes significantly to the literature base of covered bonds.

### **3. METHODOLOGY**

#### **3.1. Research approach**

In order to understand the market comprehensively, the research employs the triangulation method. This method was first time broadly defined by Denzin (1978) that was developed from the concept of navigation and military missions where an object's position is identified by using multiple reference points. The same in the research field, triangulation is a combination of multiple research methodologies applied to study an event or a phenomenon. Denzin encourages the combinations in 4 main ways: data, investigators, theories and methodologies. Triangulation's outcomes tend to be more accurate and exclusive than outcomes from a single method since the weaknesses of one method can be compensated by the others' strengths. Therefore, this research will use the methodological triangulation aggregating quantitative and qualitative method together so that they can implement each other in answering research questions thoroughly.

In that context, the rest of the research will be conducted in two parts. Part one (Section IV) is a qualitative study of the market in Asia Pacific where each individual country will be study deeply from general country situations to covered bond specifications. Part 1 will firstly familiarize readers with the covered bond mechanism, structure and Asia Pacific market and secondly answer the first research question. Next, part 2 (Section V) is a quantitative study of credit spreads in order to fully explain the risk lev-

el in Asia Pacific covered bond market. The asset swap spread as the main variable of this research will be collected and analyzed using MS Excel. Finally, the findings from part 1, 2 will be aggregated with relevant theories to produce answers for last 3 research questions.

## **3.2. Data collection**

### **3.2.1. Material sources**

In this research, both secondary and primary data will be utilized. Secondary data are collected from fact books, guide books as well as articles concerning covered bonds and also from issuers' periodical reports. Primary data are gathered from covered bond communities (covered bond report community and European covered bond council (ECBC)), covered bond programs' prospectuses and monthly investor reports published on issuers' official websites.

### **3.2.2. Sample design**

Since Asia Pacific is a new member in the international covered bond market, there is possibility to obtain all listed covered bond which have been issued up till now. The first covered bond in the area was issued in 2009 by Kookmin bank in Korea; however the information for this very first issue can be achieved. The second one was issued in June 2011 in by Bank of New Zealand so all the CBs have been issued from June 2011 up to April 2013 will be observed. Issuers in Asia Pacific have been issued 42 series of CB in total where 34 series from Australia banks (8 series in Australia dollar and 26 in foreign currencies), 6 from New Zealand and 2 from South Korea. However, 3 of the series issued by Australia are missing data thus there are 39 observations in total (Australia 31, NZ 6 and South Korea 2). In order to conduct a relative comparison between Asia Pacific market and German market, the research also collects 43 series of German covered bond issued in period from June 2011 to April (excluding 5 series missing data). Detail of the series including issuer, pricing date, coupon and maturity date can be seen in appendix A.

### 3.2.3. Variable explanation

- *Variable for credit spread*

#### Asset swap spread

Since the credit risk is one of the biggest concerns pestering bondholders, many researchers have put efforts in exploring the risk. Up till now, there are various types of credit risk measurement available such as yield spread, I-spread, Z-spread, option-adjusted spread, asset swap spread, credit default swap spread, etc. Each of them has its own advantages and disadvantages and brings out the best outcomes in different market situations. For instance, in a volatile market, where prices of bonds are sensitive to market situations, the credit default swap spreads reflect relatively accurate the credit risk embedded under the bonds. Or often the yield spread is considered the most reliable measurement since it's argued that a country cannot default on its debt. However, it is no longer the case when many countries in Europe have failed to meet their debt obligations namely Greece, Spain and Cyprus. Therefore, the research decided to utilize another measure, so-called asset swap spread which can recount correctly the risk level underlying covered bonds. In short, asset swap spread data of individual CB series will be collected and analyzed to answer the research questions.

**FIGURE 4** Mechanics of a par asset swap.

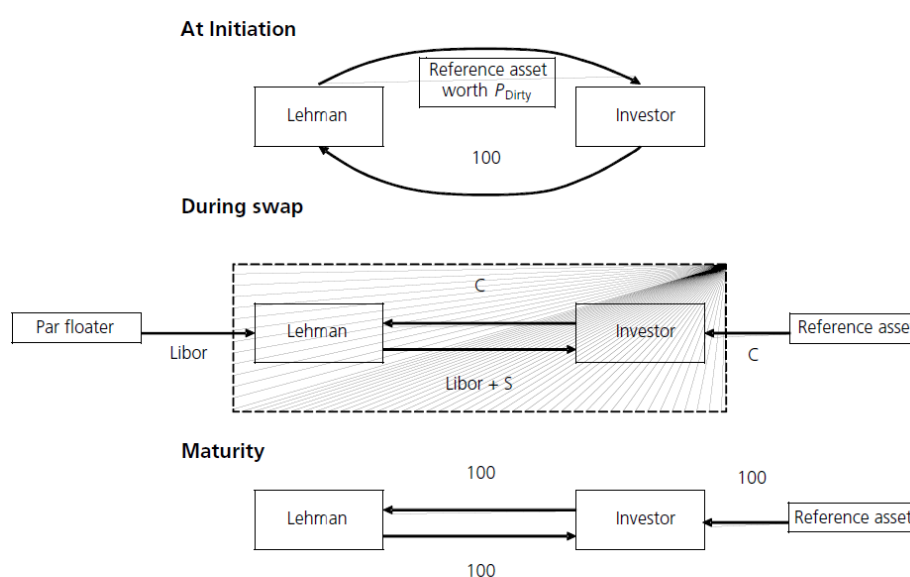


Figure 2: Asset swap mechanism (Pereira 2003)

An asset swap in cash bond is somewhat similar to a plain vanilla interest rate swap where a fixed-interest rate is swapped for a floating-interest rate (most often Libor). The main purpose is hedging the interest rate risk. In a par asset swap package, an investor buys a fixed-coupon bond and combines it with an interest swap where the fixed-coupon rate is exchanged with a floating rate. More specifically, when an investor buys a bond, he/she simultaneously participates in an asset swap deal with the bank who sells the bond. Periodically, investor pays the bank the fixed-coupon rate and in return, the bank pays investors a floating-rate (Figure 2) In fact, there is only the different amount between floating and fixed-rate being exchanged. An asset swap is considered as insurance over the interest rate risk and default risk hence the price of swap or swap spread narrates the risk level of investments perceived by investors. If the bondholders start being aware of uncertainties they will buy asset swap thence driving up swap price and vice versa. At the same time, prices of the bond move conversely with asset swap spread. An increasing risk level will drag down the bond price but simultaneously drive up the swap spread (Pereira 2003) (Figure 3).

FIGURE 5 Dependence of asset-swap spread on bond coupon.

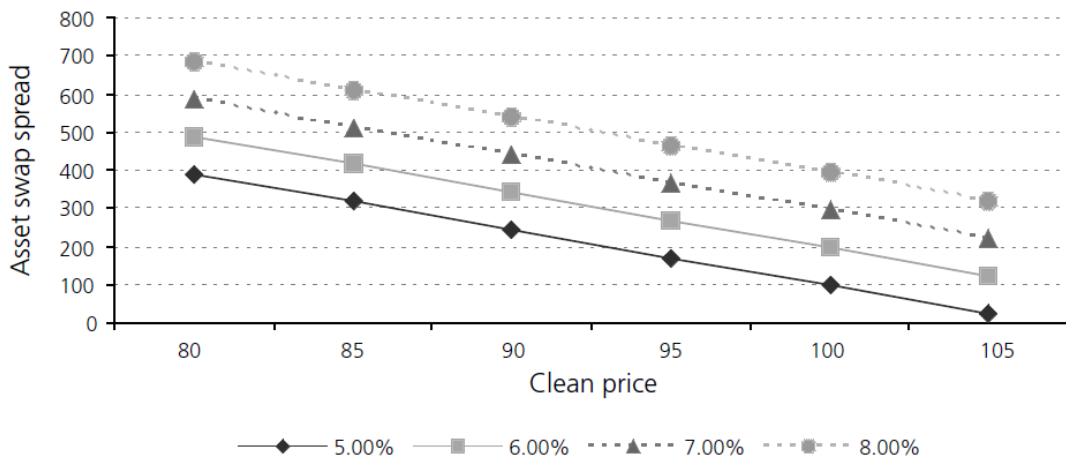


Figure 3: Dependence of asset-swap spread and bond price (Pereira 2003)



The idea of asset swap spread as a risk measure has been supported by Tuchman et al. (2003) and O’Kane et al. (2001). Following is Tuchman’s formula of asset swap spread.

$$Spread = \frac{PV(\text{libor}) - P_{\text{market}}}{PV1}$$

Where:

PV (libor) is present value of a bond discounted by libor rate

P<sub>market</sub> is market price of the bond

PV1 is the present value of a 1bp coupon stream

The formula shows that a converse relationship exists between bond price and swap spread. Again, it suggests that the risk level of an asset can be obtained from analyzing asset spreads. In addition, Fabozzi F. J (2006) analyzed that the swap spread reflects both credit risk and liquidity risk in bond. Plus, he claimed that a swap rate, in many cases, is a better estimate of the risk level than a yield spread (certain bond yield over yield of government T-bill). Since credit risks of government bonds vary in different countries therefore, cross-countries comparisons by yield spread can be limited. Meanwhile, asset swap uses inter-bank swap curve as the international benchmark thereby making cross-countries comparisons easier. Plus, unlike other spreads, a swap spread is a traded spread making it more available from internet sources. Due to those advantages of swap spread, research will employ it in measuring the risk level in Asia Pacific area.

#### Swap spread and currency difference

While in New Zealand and South Korea, CBs are uniformly dominated in Euro or U.S dollar, the Aussie CB market is a mixture of Euro, U.S dollar, British pound and Australia dollar. In *Statement of monetary policy* by Reserve Bank of Australia published in February 2012, it’s stated that currency difference can affect the swap spread. Thus, the research breaks down the currency components in Australia covered bond market to see if there are any differences in risk levels between CBs issued in different currencies.

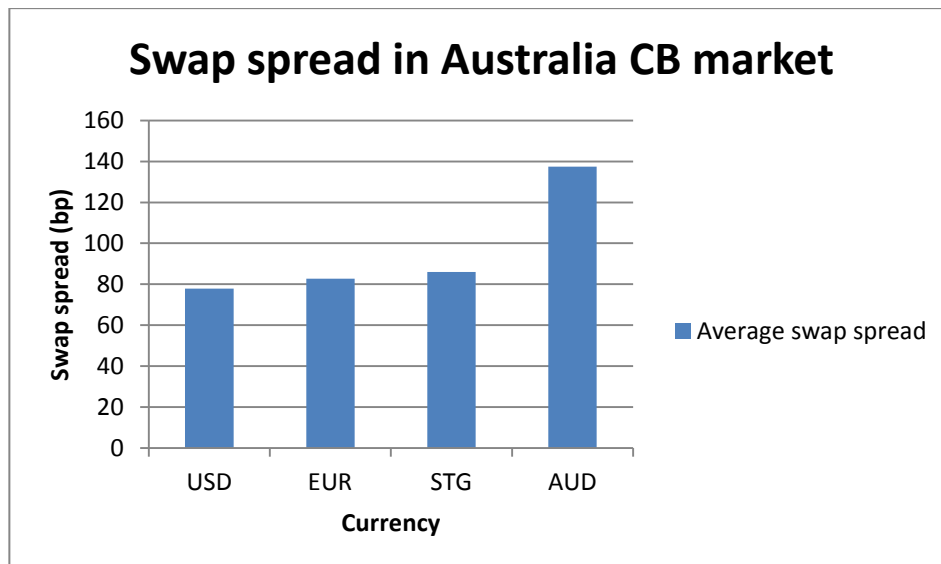


Figure 4: Average swap spread in Australia CB in different currencies  
(Data from Appendix C)

In the figure 4, the swap spread in Aussie CB is higher than others where it almost reaches 140 basis points meanwhile the rest stays at similar level around 80 basis points. However, because of the high cost in hedging those issues back to Australia dollar, the overall cost for issuing CB dominated in foreign currency is in fact higher than Australia dollar CB (Statement of monetary policy, Reserve banks of Australia, box D). Therefore, the research will exclude CBs which is issued in Australia dollar and focus only on international issuances dominated in USD, EUR and STG. Following is the summary of observations in the research:

Asia Pacific			Germany
Australia: 23	New Zealand: 6	South Korea: 2	
<b>31</b>			<b>43</b>

Figure 5: Sample design

- **Variables for credit quality**

The risks level in CBs is closely linked with the credit quality of cover pools. The higher the credit quality is, the lower the default probability is; thereby lower level of risk. In purpose of identifying if the credit quality is currently the main factor driving the risk level in CBs, research uses two variables over-collateral ratio and Loan-to-value ratio for examining the cover pool quality. Research will observe if the rates are stable

during the period from June 2011 to April 2013. The data is collected from monthly investor CB reports available in issuers' websites.

### Over-collateral ratio

In order to maintain the reputation for the high credit quality in CB, issuers are required to pool assets into the ring-fence units of which the value must be larger than the market value of the CB at issuance. The excess amount is decided by contractual agreements for structural CBs and by legislations for statutory CBs and often it rotates around 130%. This feature helps remove the concern of fluctuation in market value of the bond and the higher the over-collateral rate, the better.

### Loan-to-value ratio (LTV)

A LTV ratio is an important risk assessment for mortgage lending which is one of the rates the banks use to qualify borrowers for a mortgage loan.

$$LTV \text{ Ratio} = \frac{\text{Mortgage amount}}{\text{Appraised value of property}}$$

The higher the LTV ratio is, the riskier the mortgage is. Often, loans with LTV above 80% are considered risky loans.

## **3.3. Reliability and validity**

According to Jary & Jary (1995), a social science research's accurate outcomes are originated from the logical combinations of indicators, measures and the underlying concepts being utilized in the research. Hence, when testing the validity and reliability of a research, often creditability of data, information sources and measurements are taken into account (Golafshani 2003).

### **3.3.1. Reliability:**

- Data and information:

Golafshani claimed that "Reliable data is dependable, trustworthy, unflinching, sure, authentic, genuine, reputable. Consistency is the main measure of reliability". Also he suggested data sources' reputation and data from different sources comparable are criti-

cal for the research's reliability. On the other hand, the reliability of data depends on the proximity to the events (John Cole). In this research, data are collected from two main sources: covered bond report website and covered bond issuers' monthly investor reports. Firstly, covered bond report which is dedicated to accurately summarize and analyze all published information of covered bond worldwide lead by Neil Day, an acknowledged and awarded professor in covered bond market. Secondly, all reports of monthly performance of CBs are available on issuers' website which the issuers have to guarantee the truthfulness and accuracy. Also, some of data collected from covered bond report are compared directly with data provided with issuers' reports and CB programs' prospectuses. Accordingly, data sources and data itself are considered trustworthy to be used in this research.

- **Measurement:**

The reliability of research's measurement comes from repetitions, accurate representative for population and consistence over time (Golafshani 2003, Kirk and Miller 1986). The collected data has been analyzed repeatedly in order to ascertain the accuracy of the outcomes. Plus, as mentioned in sample design, since the CBs are a new concept in Asia Pacific and they started issue CBs just since 2011 (except for Kookmin's issue in 2009), it is possible to obtain all the issues. However, in order to achieve accurate results, the research excludes all series which have special characteristics and extraordinary features. Since those outsiders are a few (discussed in sample design) so the sample is able to represent the population accurately. Furthermore, along with reliable data, well-designed sample, the measurement are consistent and stable over time so the same approach can be employed in other populations or in different time periods.

### **3.3.2. Validity:**

For both data and measurement, their validity refers to their relevance and appropriateness to research questions. In other words, testing the validity of a research is to answer the question if the data and measurement used truly measure what it intent to be measured (Joppe 2000). As shown in the section of variable explanation, the research uses the asset swap spread, LTV ratio, over-collateral percentage which are believed to be the most appropriate indicators for the risk level as well as the credit quality of covered pools in this case.

## 4. COVERED BOND MARKET IN ASIA PACIFIC

### 4.1. Australia

- Background

Back to 2008, Australian mortgage market was suffering under the worldwide bubble and the housing price first surged dramatically. When the subprime mortgage-backed securities market collapsed in United States, real estate markets all over the world experienced a sharp fall and Australia was no exception. After the shortfall, Australia housing price skyrocketed and crashed one more time in 2010. A Double-hit dragged down investors' confidence making price drop 0.4% in 2012, followed by 3.6% decline in 2011 (Saminather 2013). In 2012, Australian housing demand remained idle meanwhile the supply side is constraint in funding sources. Besides, the wholesale bank funding for mortgage market largely depends on mortgage backed securities. According to Australian Bureau of Statistics (ABS), securitization contributes 8.4% of A\$1.2 trillion worth of home loans outstanding in 2012 (Standard & Poor's rating services 2012). This significant dependence on a single funding source is likely to cause insolvency for whole banking system in case of securitization market's pitch. Considering the situation, Australian government and financial governors recognized the need of another financial tool to attract more capital and allow more diversification in mortgage funding. In September 2010, Australian government announced a reform package which was in purpose of implementing Australian banking sector's competitiveness and searching for funding sources for mortgage market. The package consists of two components: Issuance of covered bond and Mortgage-backed securities structure improvement. This research will focus merely on covered bond matters in this campaign. In March 2011, the first draft of Australian covered bond program was released suggesting a legal framework as well as CB structures. Next, in October 2011, the covered bond legislation officially came into effect. The main purposes of CB in Australia market are first to provide an economical and stable funding source and secondly to improve diversification environment, particularly in mortgage market. (ASJ/ Issue 1, 2012)

- Legal framework

Australian covered bonds are defined as enhanced covered bonds where exist combination of a special framework and a contractual agreement. Any authorized deposit-

taking institutions (ADI) can issue covered bond under Australian covered bond regulations. CB issuances are governed under “Banking Amendment Covered Bonds Act” (2011). Before this Act, Australian jurisdiction did not allow CB issuances. The act drew general structures and a legal framework for CBs and set up minimum requirements for issuers and CB issuances. Under this Australian CB program, the issuance cap is 8% of issuers’ total asset value meaning that maximum value of outstanding volume of CBs allowed to issue is approximately A\$152bn. Besides, Australia prudential regulation authority (APRA) with its Prudential Standards (PS) acts as the main governor in mortgage CB market. APRA’s three main responsibilities are examining issuances, monitoring cover pools and supervising the maintenance of the cover pools. In the event of issuance, APRA has obligations on registration procedure, testing compliance of the pools with minimum requirements and guaranteeing over-collateral rate of 103% of the face value. In monitoring and maintaining cover pools, APRA keeps track on value of underlie assets and have obligation to send alert to the banks about the violation of terms which aims to protect investors. However, like ADI’s managers, APRA has no rights towards covered pools.

Due to the issuance out of European Economic Area (EEA), Australian CBs are not compliant with Undertakings for Collective Investment in Transferable Securities (UCITS) requirements. However, Australian CB market is still subjected to Basel III regulations. Under Basel III, Australian CBs have to meet some requirements such as quality of pooled assets, risk-weighting percentages, stricter liquidity reform and higher capital reserve. More specifically, ADIs will be required to apply 1250% risk weighting and the reserved possibly ranges around 40-100%. ADIs are also required to remove non-investment grade assets out of cover pools. For liquidity enhancements, liquidity buffers and Liquidity Coverage Ratio (LCR) are pledged to be increased. However, Basel III regulations concerning LCR will not take effect upon Australian CB until 2015. In the other words, ADIs are not compelled to meet LCR test since Australian CB are currently in implementing proves and being purchased in low volume. Some short-falls in LCR test can be arranged through a committed secured faculty with Reserve Bank of Australia. (ASJ/ Issue 1, 2012, pp.20-24)

- Issuers and obligations

Under Australian CB jurisdiction, any authorized depository institutions (ADI) in Australia can issue covered bonds. Up till beginning of 2013, there are only 5 banks which have issued CB namely: Australia and new Zealand Banking Group (ANZ), Commonwealth bank (CBA), National Australia Bank (NAB), Westpac banking Corporation (Westpac) and Suncorp bank. In total, the outstanding CB from those 5 banks reached almost A\$45,5 (Eu35bn) (Appendix B). There are other banks which are eligible for issuing CBs: Macquarie bank Ltd, Citigroup Ltd, ING bank Ltd and Bendigo and Adelaide bank. If those banks join the current CB market, with given issuance cap of 8%, the total value of outstanding CB allowed will be A\$168.2bn. The other small and medium banks in Australian banking sector are barely able to participate in securitization as well as CB market.

As a top-class investment, CBs offer many superior safeguard towards investors in order to remain their favourable positions: over-collateral requirement, asset quality, asset-liability mismatch management or liquidity buffers. In order to supervise those above criteria, issuers perform dynamic Asset Coverage Test (ACT) on monthly basis. (ECBC fact book 2012, pp. 223-233)

- Covered bond structure

Australian Covered Bond Program is structured similar as CB programs in United Kingdom, Canada and New Zealand. However, Australia CBs use a special purpose vehicle (SPV) called guarantor. A bank sends mortgage loans to a guarantor and the guarantor is in charge of repacking those loans into a base pool and uses it as collateral for issuing CBs. If the value of the base pool dwindles and misses minimum requirements, the guarantor informs the bank and it is obliged to transfer more loans to fill in the gap. Still, the assets stay in bank's balance sheet for accounting, tax or any regulatory or capital purposes and remain as direct and unconditional obligations of the bank. In the event of the bank's default, the guarantor is accounted for distributing the cover pool to meet debt obligations. This streamline allows transparently separate the banks' other assets with ones in the cover pool. Plus, by outsourcing the process of packing cover pool to third party, banks can concentrate more in principle banking activities such as deposit taking, underwriting, etc.

Australia CB program facilitates joint ventures including several ADIs under two models. The first model suggests establishment of a new ADI called Covered Bond

credit institution. After obtaining loans from participating ADIs, the institution as representative launches a joint CB. The second model forms a more complex construction involving two phases. First of all, each ADI issues its own CBs using its own loans. Secondly, ADIs syndicate to constitute a separate entity. This entity sums up all the CBs from individual ADIs and issues CBs backed by a collection of those subordinate CBs. In fact, there has been no issuance of CBs under these arrangements because of their complexity causing time-wasting and capital-costing. However, due to the superior performance from 2011, those models will be soon utilized to facilitate capital market in a larger scope, particularly aiming for small ADIs to promote their competitiveness in Australian CB market. (ECBC fact book, 2012, pp. 223-233)

## **4.2. New Zealand**

- Background

Possessing many similarities with Australian financial market, New Zealand has been experiencing two pressures in real estate and housing market in 2008 and 2010. According to statistics from real estate institute, since May 2011 NZ property sales have been recovering promising a bright outlook in 2013. As the results, NZ banks are seeking for various funding sources in order to meet mortgage lending demand. Meanwhile, after the MBS crash and the sovereign debt crisis in Europe zone, global investors call for CBs as a safer investment creating a favorable situation for NZ to gain off-shore capital. Bank of New Zealand (BNZ) was pioneer to issue CB in June 2010 with an issue of NZ\$425million. The bearing of New Zealand CBs solves two main problems for the banking sector. First of all, NZ banks at the moment were over-reliant in short-term deposits and securitization in which the whole sector easily shut down if capital crashes occur again. Issuing CBs therefore helps diversify banking sectors' funding sources and making capital market flow more effectively and efficiently. Secondly, Reserve Bank of New Zealand (RBNZ) set up new stricter liquidity requirements for mortgage funding where retail deposit was not be able to fulfill. In long-term, the capital from both retail funding as well as securitization will become insufficient in mortgage funding and CBs can help fill in the capital gap. After first issuance of BNZ, there have been many other banks participating in CB market in both domestic and offshore market. Up



till March 2013, NZ banks have issued EU3.5 billion in total. (ECBC fact book, 2012, 373-381)

- Legislation

However, NZ has not developed a specific legislation to treat CBs. All the CBs that have been issued are structural CBs where all terms and conditions are determined by contractual agreements. Unlike in Australian case where APRA's rules before 2011 prohibited CB issuances, there is no restriction in issuing CBs in regulations of neither Reserve Bank of New Zealand nor New Zealand government. Accordingly, NZ banks are liberal in issuing CBs by contractual agreements that explains why there is no rush in generating a special law treatment for CBs as in Australia's case. Nevertheless, lack of specific regulations can create confusion and risks cutting down investors' confidence in long-run. Reserve Bank of New Zealand therefore had suggested a legal framework for CBs in their *Consultation document: covered bond* released in October 2010. The paper has been under consideration and supported by most of stakeholders in NZ financial market. The first step of Reserve Bank in process of CB jurisdiction foundation is imposing issuance cap of 10% of registered bank's total asset. The main purpose of the constraint is to avoid risk-shifting from CB holders to retail depositors as well as other unsecured creditors. The risk-shifting trouble impedes investors when banks are obliged to pour high-quality assets to meet over-collateral requirements thus leave others creditors with inferior assets. Over-issuing CBs can lead to serious problem when the risk-shifting effect concerns others creditors making them reduce investments, therefore actually reduce banking funding. (Reserve bank of New Zealand, Consultation document: covered bonds, 2010)

- Issuers

There are now five banks who have issued New Zealand Covered Bond either domestically or internationally. Pioneer in New Zealand CB market was BNZ with NZ\$425million domestic Cover Bond. The second mover was Westpac Corp with a EU1bn CB program in June 2011. This program marks an official inauguration of NZ CBs in international market where it targets investors in Europe zone. In the same year, ANZ National Intl announced its Eu500m CB program with minimum 5 year maturity. Next in line was ASB finance limited. All of those above issuers have executed other series after their first issues. Recently Kiwibank, the fifth national largest bank in NZ,

has formed its trustee unit called Kiwi Covered Bond trustee Ltd. On March 2013, Kiwibank launched its debut CB a Sfr150m issued with 7 year maturity. (Covered bond report, New Zealand section)

### **4.3. South Korea**

- Background:

As its two counterparts in Asia Pacific, Korea is now considered a safe-haven for capital in-flows when United States and Europe-zone members are currently so indebted. However, even considered more secured than those markets, Korean housing market has been now encountering one of the most sluggish periods in history. Im Hyeong Lim, a property dealer in Mokdong, Seoul stated: “It was the worst winter ever since I started the real estate business in 1996”. The idle status in the market mainly originates from the demand side. Korean housing clients with their expanding sum of debt are more cautious in mortgage loans. In the fourth quarter of 2012, Korean household debt had reached record 959.4 trillion won of which mortgage lending contributes 42%. That makes up to the hesitant attitude toward mortgage lending. In addition, the mortgage market can blame mortgage lending restrictions for a dwindling mortgage lending volume by Korean banks. In the fear of a global recession, Korean government decided to tighten up the housing legislations as well as apply certain constraints in the mortgage market to avoid an overheated market. The limitation then adds up borrowers’ cautiousness. Meanwhile, in primary property market, companies are struggling with financial difficulties themselves. After the hit of mortgage crisis, many housing and construction firms had loaded their balance sheets with a large sum of debt that now makes it even more challenging to raise capital in building activities. In short, the domestic mortgage market has no bright outlook in next few years. However, international investors still keep piling up Korean covered bonds into their portfolios since Korean market is anyhow far secured than either U.S or EU. From Korean perspectives, a strong demand for CBs therefore is good news for Korean market where they can enhance housing market as well as boost mortgage lending demand. (Cynthia Kim & Eunkyung Seo, 2013)

- Legislations and issuers:

The first Korean Covered Bond was issued in 2009 by Kookmin bank, the biggest bank in both asset value and market capitalization. Kookmin collateralized its \$1bn CB

program with mortgage loan and credit card receivables and issued it under U.S dollar to lure U.S investors whose assets just got crashed by MBS crisis. As in New Zealand case, Korea has no special jurisdiction for CB but also no regulations prohibiting CB issuances. Although any banks that meet certain standards are eligible for issuing CB, they have to pay high commission fees for involving parties to form its stand-alone structure CB. Therefore, there is no individual bank issuing CB internationally regardless of Kookmin's program in 2009. In order to assist individual banks participate in CB market, Korean government are considering a specific legal framework for stand-alone CBs. Another CB issuer is Korean Housing Finance Corporation (KHFC) who has issued 3 CB programs in 2010, 2011 and 2013. The government-owned institution who is the principle housing finance provider for low and medium-income borrowers in South Korea is currently the main supplier of Korean covered bonds in an international market. KHFC is a special issuer when they have its own legislation concerning CB issuance and provides bondholders with statutory priorities over covered assets. Hence, KHFC's CBs can be considered statutory CBs. KHFC can also be considered a SPV where it buys mortgage loans from originating banks repackages and issues CBs under its own legislation. (Covered bond report, Korean section)

#### **4.4. Asia Pacific as an integrated area**

After the market overviews in individual country, the research now looks at Asia Pacific area as an integrated market and answer the first research question:

*(1) Who are the main covered bond issuers in Asia Pacific and what are their market positions in current market?*

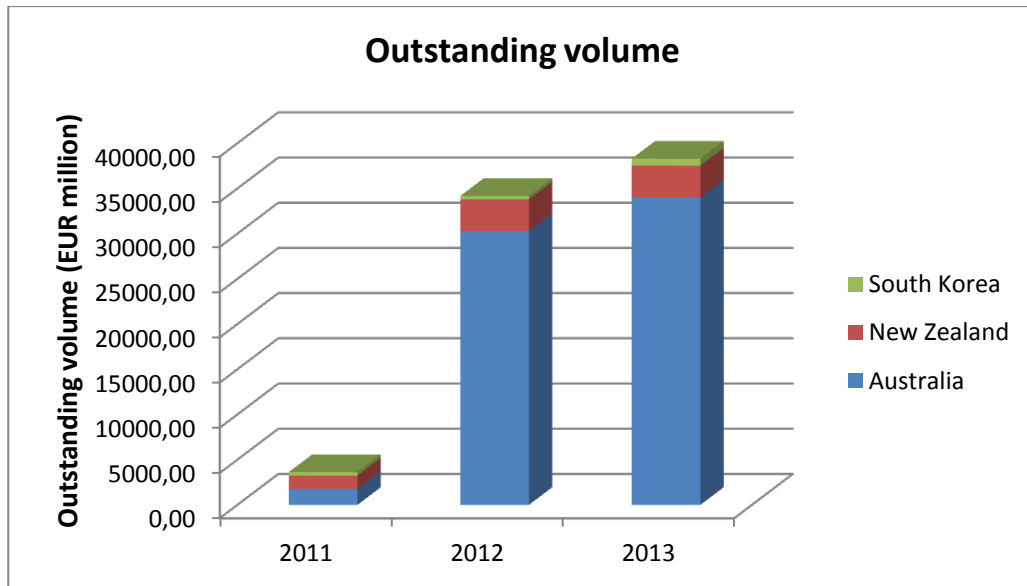


Figure 6: Outstanding volume in Asia Pacific covered bond market

(Data from Appendix B)

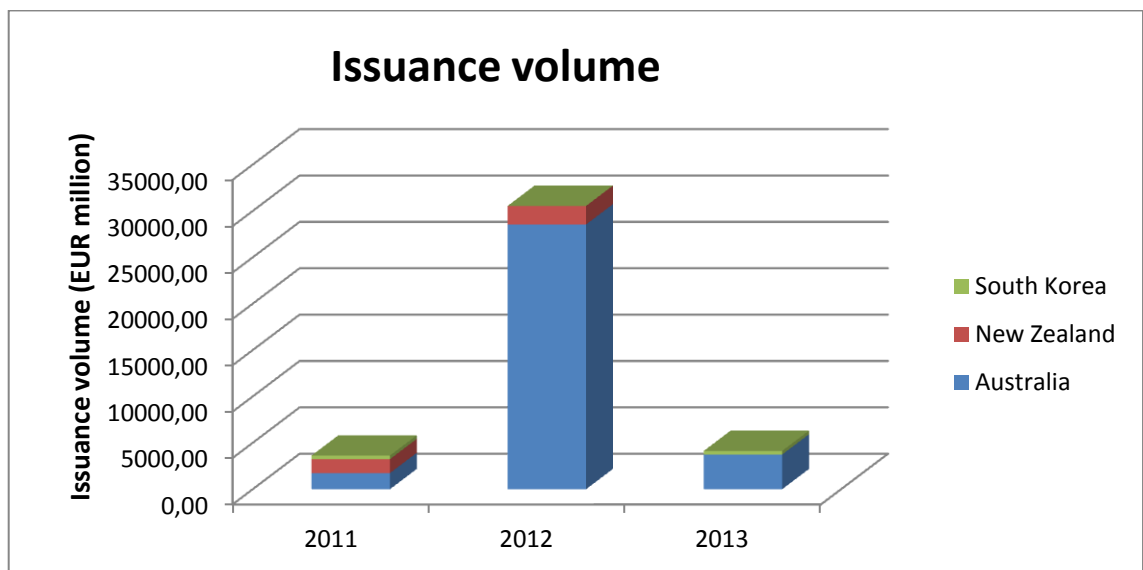


Figure 7: Issuance volume in Asia Pacific covered bond market

(Data from Appendix B)

Covered bond issuance volume in Asia Pacific has grown dramatically after 2011. Figure 11 shows that the issuance volume surged remarkably with the largest contribution of Australia. After a special legislation for CBs was enacted in 2011, the issuance volume in 2012 skyrocketed up to €28 billion, 15 times higher than the amount in 2011.

Meanwhile markets in South Korea and New Zealand maintained constant. Although the real estate and mortgage markets in those two countries have better signals for future growth as well as the refinancing demand runs strong, still South Korea and NZ CB market keep idle in reason of lacking special jurisdiction. That proves the positive effect of designing a CB regulation within a country. Presently, NZ and South Korea are in process of forming CB legislations in order to expand their CB market internationally. Also, Australia in its developing dynamic is currently preparing to bring smaller banks into the CB market to take advantage of available off-shore funding sources. That promises a large amount of covered bond will be issued in near future.

## 5. RESULTS AND DISCUSSION

### 5.1. Asset swap spread

#### 5.1.1. Asia Pacific

After collecting swap spreads for all observations in the study, the research first establishes a swap spread line for individual country namely Australia, New Zealand and South Korea (Figure 12)

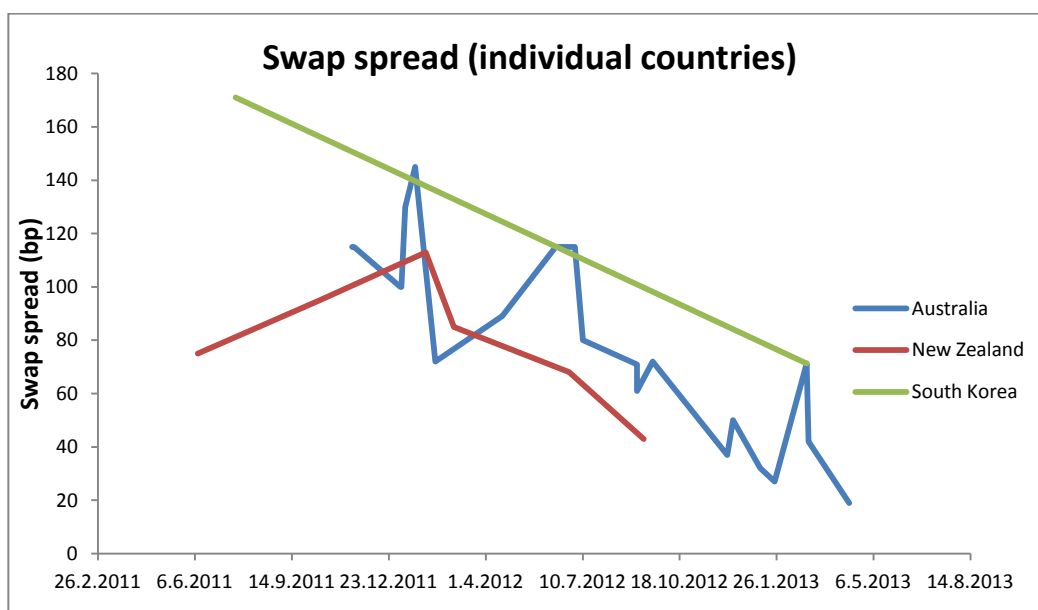


Figure 8: Swap spread by countries

(Data from Appendix C)

Since South Korea has issued only 2 international CBs since 2011, there is no fluctuation like in Australia and NZ lines. However, there is a considerable shrink in funding cost from 171 bp to 71 bp (basis points). More swings can be observed in 2 others lines, especially Australia but similar to South Korea, spreads in both countries are decreasing. In short, *the research finds down that regardless of inhomogeneous patterns, asset swap spreads in 3 countries all have tendency to decrease*. Next, in order to see Asia Pacific as an integrated market, research combined all the observations and obtained a single line of asset swap spread in Asia Pacific (Figure 9).

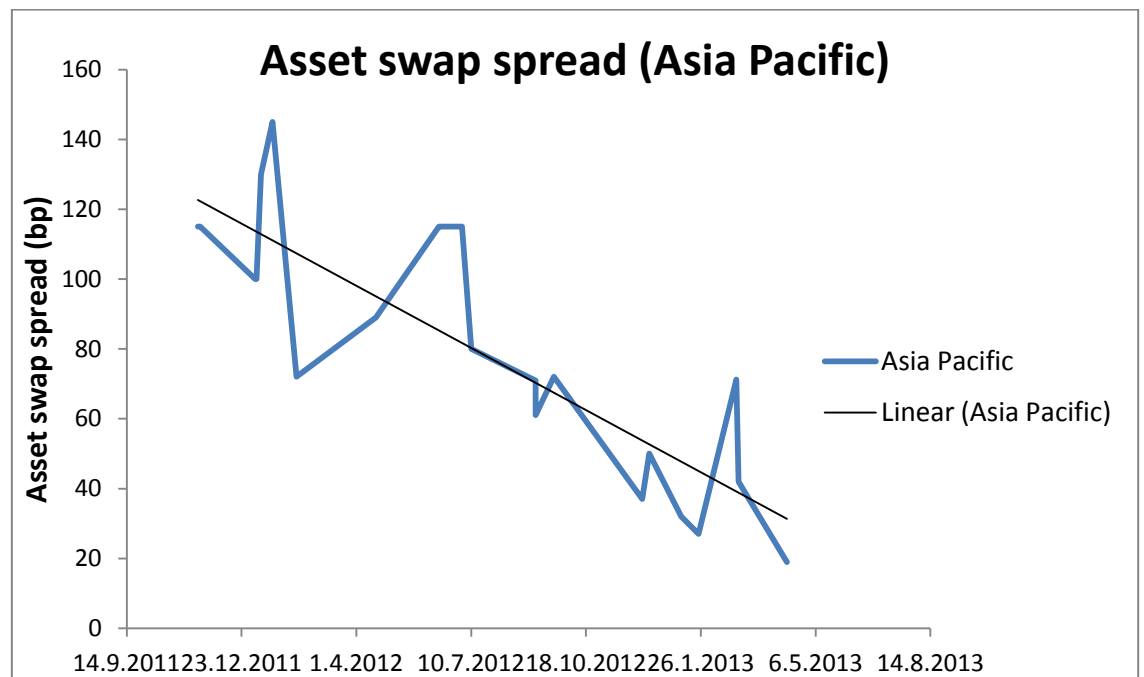


Figure 9: Swap spread in Asia Pacific market

(Data from Appendix C)

The result is a complicated line with seemingly no specific pattern. Research breaks down the line into two elements: trend and seasonability. Firstly, *spread obviously have tendency to go downward*. The spread at the beginning is approximately 115 bp moving down to 19 bp at latest. Secondly, *besides the downward trend, spread line in Asia Pacific also experienced fluctuation by seasons*.

### 5.1.2. Asia Pacific vs. Germany

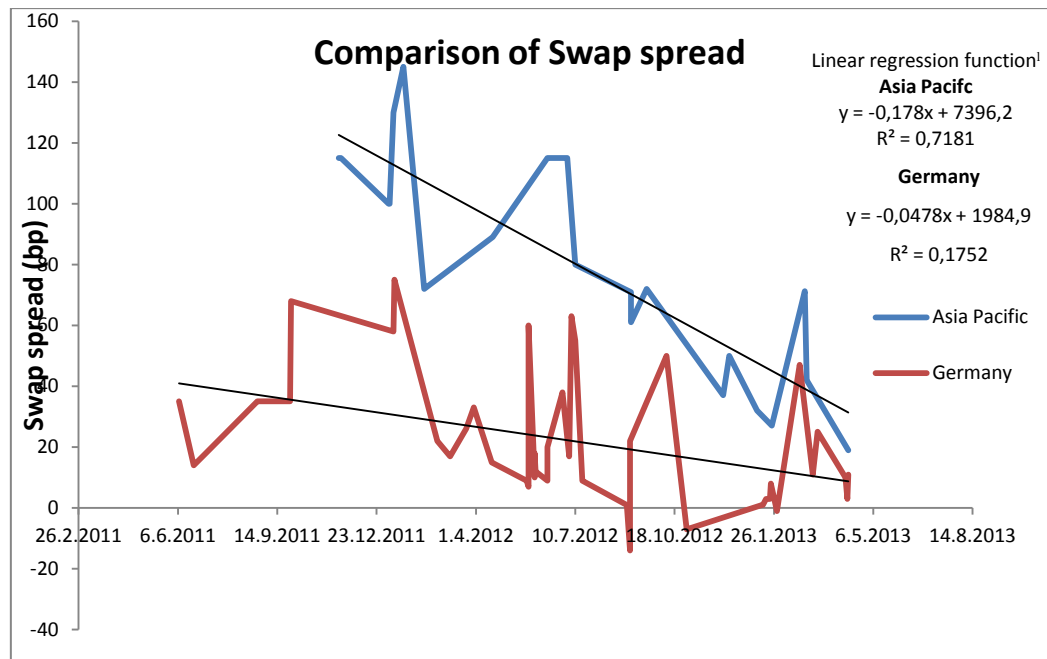


Figure 10: Swap spread in Asia Pacific and German covered bond market  
 (Data from Appendix C)

The last findings can be found when research compares swap lines between Asia Pacific and Germany. First of all, *German spread line is more fluctuated than Asia Pacific's*. The main reason is that German market is more exposed to European crisis. Secondly, more important finding is that *Asia Pacific CB are issued at higher risk premium than German ones however the differences are likely to be narrowed down*. At the beginning, the spread in Asia Pacific was 150 bp almost double the German spread. However, the gap has been narrowed down and two lines even intersected in March 2013 at 11 bp.

## 5.2. Covered pool credit quality

### 5.2.1. Australia

*Over-collateral ratio*

<sup>1</sup> Research uses automatic trend line adding function in Excel (the function is based on TREND () function with general equation  $y=ax + b$  (For more details: <http://office.microsoft.com/en-us/excel-help/perform-a-regression-analysis-HA001111963.aspx>

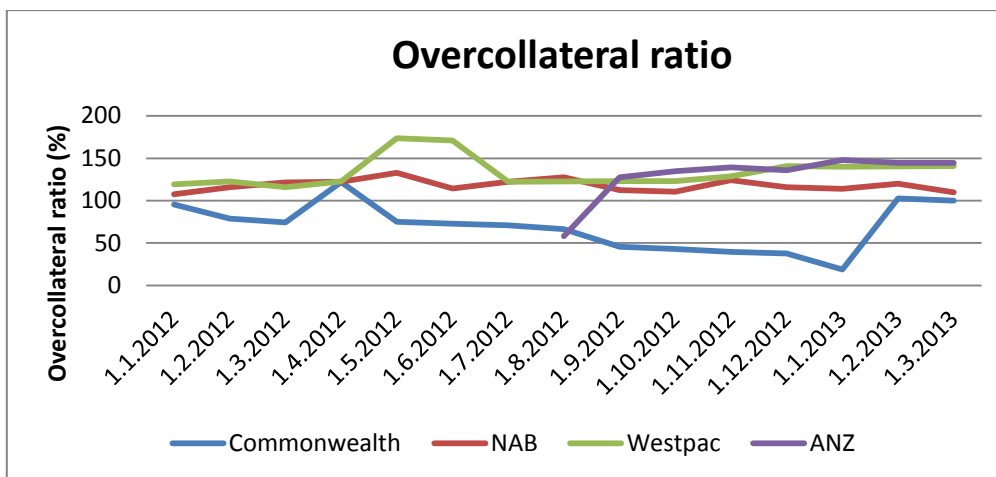


Figure 13: Over-collateral ratio by Australian covered bond issuer  
(Data from Appendix D, table D.1)

Except for Commonwealth case, generally, over-collateral rates of other issuers are sufficient and relatively invariable. The average has been around 120% which is considered safe. For commonwealth case, in the period before 2013, the rate was dragging down but it is recovering and catching up with others issuers. In short, averagely, the over-collateral rate of cover pool underlying Australia CB is at safe level and moving stable in observing period.

*Loan to value ratio*

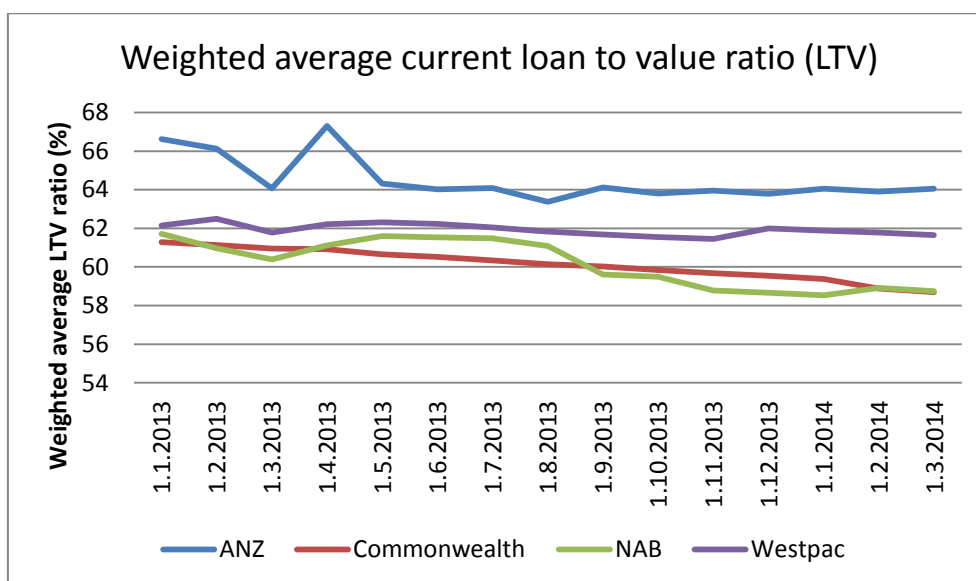


Figure 14: Weighted loan-to-value ratio by Australian covered bond issuers  
(Data from Appendix D, table D.2)



The same conclusion can be retrieved for LTV ratio. Broadly speaking, during studied period, the average ratio remained around 60%. Although the ANZ ratio is exceptionally high compared to the others', still the ratio has not gone above 70%, not even close to the risky level. It proves that issuers have attempted to put high quality loans into the pool. High and stable level of over-collateral and low LTV rate combined proves that issuers have been cautious in managing cover pool thereby enhance credit quality of cover bond. An impressively increasing issuance volume combined with a stable and high credit quality indicate that the risk level in Australia CB will reduce steadily.

### 5.2.2. New Zealand

#### *Over-collateral ratio*

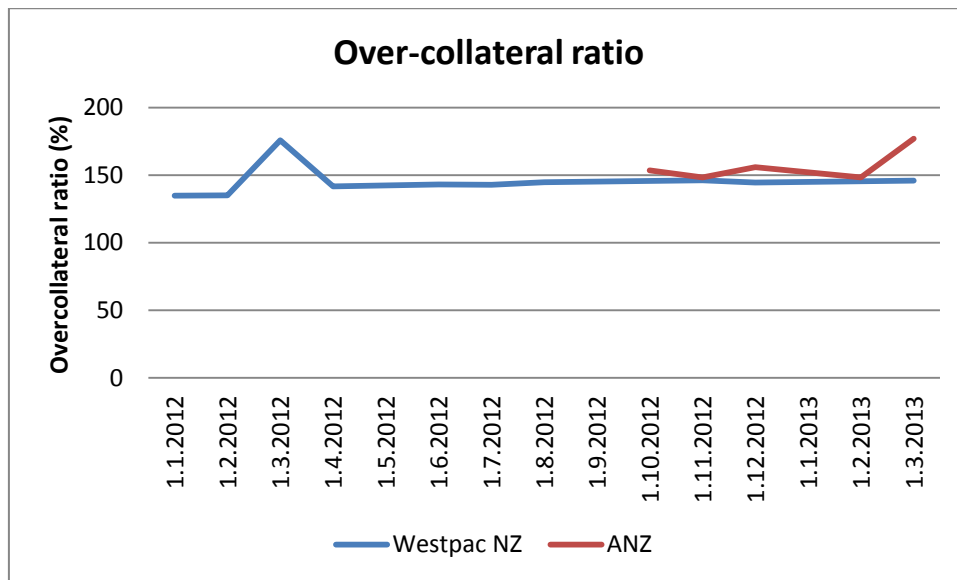


Figure 11: Over-collateral ratio by New Zealand issuers

(Data from Appendix D, Table D.1)

#### *Loan-to-value ratio*

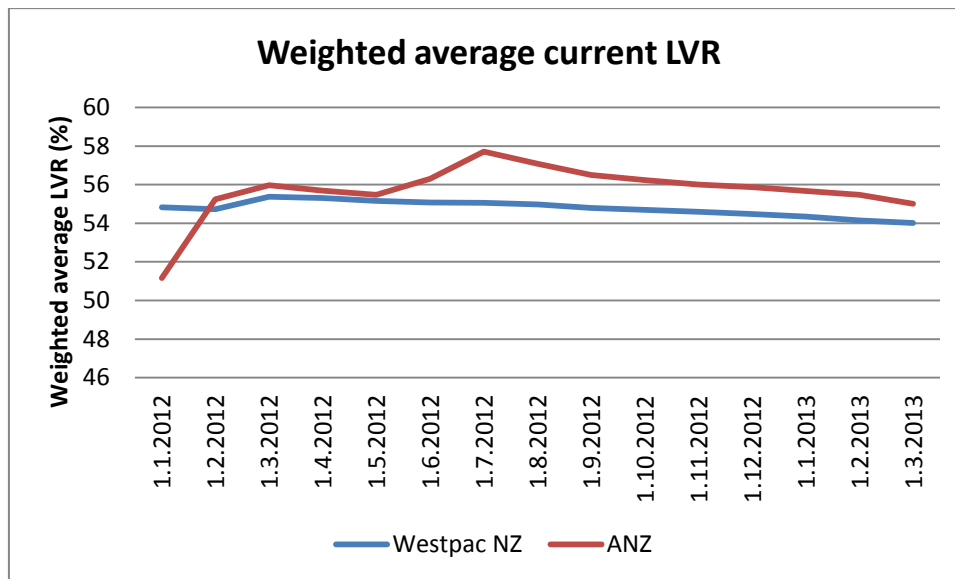


Figure 12: Weighted loan-to-value ratio by New Zealand issuers  
(Data from Appendix D, table D.2)

The ratio which is only published by two issuers in New Zealand is shown in figure 12. The average is approximately 140% which is slightly higher than Australian CB. Especially, in ANZ latest report, it announced that the over-collateral has climbed up over 170%. In figure., LTV ratio which is used to measure quality of underlying loans indicate that in average, the mortgage amount contributes to only 55% of property value. Both the level of over-collateral and LTV stay stable. The indicators show that the credit quality of underlying collateral in New Zealand CB is not only stable but also more secure than Australia. However, New Zealand has not established a special jurisdiction for CB. Despite of high credit quality and bright outlook for real estate market, NZ is still lagging behind Australian CB market in issuance volume.

When investors flock in Asia Pacific CB market pushing up the price, issuers certainly will take advantage of the situation by issuing as much as possible. That acceleration thus raises question of credit quality underlying; whether issuers are able to keep up with credit quality requirements in that huge amount issued. ***Through examining the over-collateral ratio and loan-to-value ratio, research suggests that despite of increasing amount; credit quality of underlying loans in cover pools remained sufficient and stable in observed period.***

### 5.3. Discussion for research questions

In combining the market overview, the covered pool quality and asset swap spreads, the research is able to answer the last 3 research questions as following:

***(2) How is the credit spread line in covered bond in Asia Pacific market compared to one of German covered bond market which is currently the largest market worldwide?***

The spread in Asia Pacific is 150 bp higher than German spread in the beginning. At initiation, banking sector, especially in Australia, has already over-dependend in EU capital market for bank funding. By the end of 2011, more than 40% of funding for domestic lending of Australian banks was from EU credit market. The overreliance to EU funding even forced Moody's downgrade the four banks in Australia to Aa2 (Luo Jun and Jason Scott). That affects covered bond spreads since under CB mechanisms; issuers' credit quality becomes more crucial to the bond's risk level. Thus, the first reason why Asia Pacific issuers had to pay a premium compared to German ones is due to over-reliance in European market. Second reason is that Asia Pacific CB issuers participated in the market in the middle of EU turmoil making it even riskier. By the end of 2011, when the first Asia Pacific CB were issued was exactly in the middle of sovereign crisis. The concerns of Greece leaving Euro zone had frozen the capital market and Asia Pacific was not outside influenced zone. In summary, the reliance on offshore funding and bad timing made CB issuers pay a high interest rate at the beginning.

However, the latest issues in April 2012, the different level were contracted to 8bp with German at 11 bp and Australia at 19bp (Figure 10). The remarkably reduced spread proves that despite of the early developing stage, Asia Pacific covered bond has caught up with German market, the largest CB market worldwide.

***(3) How is the credit spread in covered bonds in Asia Pacific market influenced by European capital market?***

In observing asset swap spreads, the research suggests that Asia covered bond market is closely linked to EU capital market and largely affected European sovereign crisis. Findings show that the spread in Asia Pacific spread has experienced seasonal fluctuation which is closely related to credit distresses in EU crisis during observed period. Figure 9 shows that spread has reached 3 peaks in January 2012, June 2012 and Febru-

ary 2013 along with two lower peaks in September and December 2012. Interestingly, all the peaks witnessed in the spread movement are coincident with tenses in the EU sovereign debt crisis. First, after the first bailout ratified for Greece, the government were obliged to privatize government assets to keep debt level stable, execute austerity methods and structural reform for growth and competitiveness improvement. The situation worsened when Greece failed to comply with the restructure and privatization plan. The concerns then laddered up the risk premium in all kind of assets and covered bonds were no exception. After many negotiations, the second package was finalized by authorized parties in February 2012 that is exactly when spread in Asia Pacific CB market was cooled down and redirected. Second peak in June-July 2012 was again coincided with other credit events in Greece and Spain crisis. Failure in forming a coalition government, Greek election was postponed to June 2012. Furthermore, the investigation from Troika group figured out that the second bailout program was widely off track and decided to withdraw the bailout scheduled in August 2012. Coincidentally, concerns of the Spain crisis was also stretching up EU credit market. Finally, the recent Cyprus banking crisis was again reflected in swap spread movement in Asia Pacific CB market where it surged to 71 bp from its preceding lowest point of 27 bp. Obviously, the Asia Pacific CB market has been sensitive to EU credit market and moving seasonally according to credit distresses in EU.

#### ***(4) What are the key factors driving the risk level in Asia Pacific CB market?***

Findings in the spread analysis show that the average swap spread in Asia Pacific has decreased considerably since 2011. It proves that the perceived risk level attached to covered bonds has been reduced. As analyzed in literature review, credit risk and liquidity risk are accounted for the changes in the credit spread of covered bonds. However, as analyzed in credit quality section, the credit quality remains unchanged meaning that the credit risk has small effect in spread differences in observed period. Therefore the possible explanation is the contracted liquidity risk. When investors show more confidence in covered bonds, it makes the bonds more attractive and increase liquidity. The reason why the demand for Asia Pacific covered bonds stays high is mainly due to European crisis affect. Since European turmoil has scared investors away, there is a large amount of capital flowing towards Asia Pacific, a so-called “safe-haven” market presently. The issuance amount in EU CB market has dropped dramatically. Total amount in EU market was €75bn in 2012 corresponding to about half of the amount €130bn issued

same period in 2011 (Financial times, global market). In the meantime, the domestic CB market in Asia Pacific is insufficient for funding and refinancing in banking sector, Asia Pacific banks have shown their desire to approach EU capital market with increasing CB outstanding volume dominated in foreign currencies. An inflated demand combined with a strong supply side therefore helps eliminate liquidity risk as well as reducing funding cost in general. In short, not credit risk but liquidity risk is the main factor driving price movement in covered bond in Asia Pacific.

## **6. SUMMARY AND CONCLUSION**

Asia Pacific covered bond market has expanded impressively since 2011 with the issuance volume at €30,5bn in 2012 almost half of total for European market with €75bn. The main participant in Asia Pacific market is Australia with 89% of the total outstanding volume since the country enacted the special legislation for covered bonds. An increasing outstanding volume has put Asia Pacific covered bond market in line with German market which is the largest and oldest covered bond market worldwide (established 200 years ago).

As the subprime-mortgage backed securities crisis as well as European sovereign crisis have forced investors to seek for other safer investment opportunities with reasonable returns, covered bond seems a good substitute in both cases. Backed by a growing and stable real estate market and mortgage market makes Asia Pacific covered bond become more favorable among investors thereby make them more liquid. The findings show that the credit spread of covered bonds has been reduced gradually meaning that the perceived risk level has dropped. Since the credit quality of covered pools has been remained stable, the spread changes are likely caused by liquidity risk.

However, before covered bonds were largely issued in Asia Pacific, large proportion of capital used in banking finance had come from European market. A significant amount of covered bonds issued by Asia Pacific has added up the dependence in funding from EU. The research has shown the fluctuations in Asia Pacific swap spreads are closely related to the financial distresses in European crisis. In the future, with the potentially increasing issuance volume, Asia Pacific covered bond market will become highly correlated to European one. A single credit event in EU capital market can have significant affect in covered bond market in Asia Pacific.

Altogether researchers have found that currently credit risk embedded in Asia Pacific covered bonds is insignificant in observed period. In fact, reduced liquidity risk is responsible for lower perceived risk level reflected in higher price. Despite going more liquid, Asia Pacific market has become more sensitive to European capital market. Regardless of the high-quality collateral, price of covered bond is likely to be influenced by situations in European capital market.

### ***Significance of the study***

This research explored the market situation and risk factors underlying Asia Pacific covered bonds. The results are useful for investors, bond issuers and regulators. Investors are interested in understanding the inherent risk factors of covered bonds to be able to make investment decisions. Bond issuers need to know accurately market situation as well as the risk level in covered bonds in order to price them properly. Regulators also need to discover the existing covered bond market to implement the regulation systems or fully-design a new efficient system.

### ***Suggestions for further study***

Since the research studied data in primary market, it would be useful to further exploration in secondary market pricing. Secondary market are largely influenced by investors' psychology and more difficult to predict. Understanding it can help value covered bonds more accurately. Or one can study a direct link between credit spreads in covered bonds with liquidity risk by examining bid-ask spreads in secondary market to see more clearly their relationship. In addition, other researchers could apply the same research approach to other emerging covered bond markets such as United States, Canada...where the markets have evolved lately.

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## **APPENDICE**

### **Appendix A. Details of Covered bond series in Asia Pacific**

*(Source: coveredbondreport.com)*

Table A.1. Australia

Issuer	Pricing date	Currency	Amount (m)	Coupon	Maturity date	Issuance amount (Eum)
<b>ANZ Banking Group Ltd</b>	15.11.2011	USD	1250	2,400	23.11.2016	967,74
<b>Westpac Banking Corporation</b>	17.11.2011	USD	1000	2,450	28.11.2016	774,19
<b>Commonwealth Bank of Australia</b>	4.1.2012	EUR	1500	2,625	12.1.2017	1500,00
<b>National Australia Bank</b>	5.1.2012	EUR	1000	2,625	13.1.2017	1000,00
<b>ANZ Banking Group Ltd</b>	9.1.2012	EUR	1000	3,625	18.7.2022	1000,00
<b>Commonwealth Bank of Australia</b>	17.1.2012	AUD	2000	5,750	25.1.2017	1612,90
<b>Commonwealth Bank of Australia</b>	17.1.2012	AUD	1500	90 day BBSW+175	25.1.2017	1209,68
<b>National Australia Bank</b>	19.1.2012	STG	500	3LO+145bp	27.1.2015	588,71
<b>Westpac Banking Corporation</b>	24.1.2012	AUD	1400	90 day BBSW+165	6.2.2017	1129,03
<b>Westpac Banking Corporation</b>	24.1.2012	AUD	1700	5,750	6.2.2017	1370,97
<b>Westpac Banking Corporation</b>	9.2.2012	EUR	1750	2.125	16.2.2016	1750,00
<b>Commonwealth Bank of Australia</b>	5.3.2012	USD	2000	2,250	16.3.2017	1548,39
<b>ANZ Banking Group Ltd</b>	16.3.2012	AUD	1000	5,250	23.3.2016	806,45
<b>ANZ Banking Group Ltd</b>	16.3.2012	AUD	2000	3BBSW+95	23.3.2016	1612,90
<b>Commonwealth Bank of Australia</b>	18.4.2012	EUR	1500	3,000	3.5.2022	1500,00
<b>Suncorp-Metway</b>	30.5.2012	AUD	500	90 day BBSW + 105	12.6.2014	403,23
<b>Suncorp-Metway</b>	30.5.2012	AUD	1100	4,750	12.6.2016	887,10
<b>National Australia Bank</b>	12.6.2012	USD	1250	2,000	20.6.2017	967,74
<b>Westpac Banking Corporation</b>	2.7.2012	EUR	1000	2.125	9.7.2019	1000,00
<b>Westpac Banking Corporation</b>	10.7.2012	USD	500	3LO+80	17.7.2015	387,10
<b>Westpac Banking Corporation</b>	10.7.2012	USD	1500	1.375	17.7.2015	1161,29
<b>Commonwealth Bank of Australia</b>	23.8.2012	STG	750	3,000	4.9.2026	883,06
<b>National Australia Bank</b>	30.8.2012	STG	250	3,000	4.9.2026	294,35

<b>ANZ Banking Group Ltd</b>	4.9.2012	USD	750	3LO+61	6.10.2015	580,65
<b>ANZ Banking Group Ltd</b>	4.9.2012	USD	1500	1,000	6.10.2015	1161,29
<b>National Australia Bank</b>	20.9.2012	USD	1250	2,000	20.6.2017	967,74
<b>National Australia Bank</b>	20.9.2012	USD	250	3LO+72	27.9.2017	193,55
<b>Suncorp-Metway</b>	1.11.2012	AUD	600	4,000	9.11.2017	483,87
<b>National Australia Bank</b>	6.12.2012	EUR	1000	1.875	13.1.2023	1000,00
<b>Westpac Banking Corporation</b>	12.12.2012	USD	2000	4,5	15.12.2017	1548,39
<b>Commonwealth Bank of Australia</b>	9.1.2013	USD	2000	0.75	15.1.2016	1548,39
<b>ANZ Banking Group Ltd</b>	24.1.2013	STG	500	3LO+27bp	4.2.2016	588,71
<b>National Australia Bank</b>	28.2.2013	USD	1750		28.2.2018	1354,84
<b>Westpac Banking Corporation</b>	11.4.2013	EUR	1000	1,375	17,4,2020	1000

Table A.2. New Zealand

Issuer	Pricing date	Currency	Amount (m)	Coupon	Maturity date
<b>Westpac Securities NZ Ltd</b>	9.6.2011	EUR	1000	3.500	16.6.2016
<b>ANZ National Intl</b>	13.10.2011	EUR	500	3.000	20.10.2016
<b>BNZ International Funding Ltd London Branch</b>	30.1.2012	EUR	500	2.375	7.5.2015
<b>ANZ National Intl</b>	28.2.2012	EUR	250	3	20.10.2016
<b>ASB Finance Limited</b>	26.6.2012	EUR	500	1.875	10.7.2017
<b>ANZ National Intl</b>	11.9.2012	EUR	750	1.375	5.10.2017

Table A.3. South Korea

Issuer	Pricing date	Currency	Amount (m)	Coupon	Maturity date	Issuance (EU m)
<b>Korea Housing Finance Corporation</b>	18.7.2011	USD	500	3.500	15.12.2016	385
<b>Korea Housing Finance Corporation</b>	26.2.2013	USD	500	1.625	15.9.2018	385

## Appedix B. Outstanding and issuance volume in Asia Pacific

(Data source: coveredbondreport.com)

The research calculated the outstanding and issuance volume)

	Australia	New Zealand	South Korea	TOTAL
<i>Outstanding volume</i>				
2011	1741,94	1500	385	3626,94
2012	30290,33	3500	385	34175,33
2013	34032,26	3500	770	38302,26
<i>Issuance volume</i>				
2011	1741,94	1500	385	3626,94
2012	28548,39	2000	0	30548,39
2013	3741,94	0	385	4126,94

## Appedix C. Asset swap rate

(Source: coveredbondreport.com)

and the research categorized issuers by countries and calculated the average)

Issuer	Pricing date	Swap rate (bp)
<b>Australia (USD+EUR)</b>		
ANZ Banking Group Ltd	15.11.2011	115
Westpac Banking Corporation	17.11.2011	115
Commonwealth Bank of Australia	4.1.2012	100
National Australia Bank	5.1.2012	100
ANZ Banking Group Ltd	9.1.2012	130
National Australia Bank	19.1.2012	145
Westpac Banking Corporation	9.2.2012	72
Commonwealth Bank of Australia	18.4.2012	89
National Australia Bank	12.6.2012	115
Westpac Banking Corporation	2.7.2012	115
Westpac Banking Corporation	10.7.2012	80
Westpac Banking Corporation	10.7.2012	80
ANZ Banking Group Ltd	4.9.2012	70,9
ANZ Banking Group Ltd	4.9.2012	61
National Australia Bank	20.9.2012	72
National Australia Bank	20.9.2012	72
National Australia Bank	6.12.2012	37
Westpac Banking Corporation	12.12.2012	50
Commonwealth Bank of Australia	9.1.2013	32
ANZ Banking Group Ltd	24.1.2013	27

Korea Housing Finance Corporation	26.2.2013	71,25
National Australia Bank	28.2.2013	42
Westpac Banking Corporation	11.4.2013	19
<b>Australia (AUD)</b>		
Commonwealth Bank of Australia	17.1.2012	175
Commonwealth Bank of Australia	17.1.2012	175
Westpac Banking Corporation	24.1.2012	165
Westpac Banking Corporation	24.1.2012	165
ANZ Banking Group Ltd	16.3.2012	95
ANZ Banking Group Ltd	16.3.2012	95
Suncorp-Metway	30.5.2012	140
Suncorp-Metway	1.11.2012	90
<b>New Zealand (EUR)</b>		
Westpac Securities NZ Ltd	9.6.2011	75,00
ANZ National Intl	13.10.2011	95,00
BNZ International Funding Ltd London Branch	30.1.2012	113,00
ANZ National Intl	28.2.2012	85,00
ASB Finance Limited	26.6.2012	68,00
ANZ National Intl	11.9.2012	43,00
<b>South Korea (USD)</b>		
Korea Housing Finance Corporation	18.7.2011	171
Korea Housing Finance Corporation	26.2.2013	71,25
<b>Germany (EUR+USD)</b>		
Aareal Bank AG	7.6.2011	35,00
ING-DiBa	22.6.2011	14,00
Landesbank Baden-Wuerttemberg	4.7.2011	18,00
Eurohypo AG	25.8.2011	35,00
UniCredit AG	27.9.2011	35,00
Deutsche Pfandbriefbank AG	28.9.2011	68,00
Aareal Bank AG	9.1.2012	58,00
Deutsche Pfandbriefbank AG	10.1.2012	75,00
Deutsche Bank AG	22.2.2012	22,00
ING-DiBa	6.3.2012	17,00
Westfaelische Landschaft Bodenkreditbank	22.3.2012	26,00
HSH Nordbank AG	30.3.2012	33,00
Landesbank Hessen-Thueringen	17.4.2012	15,00
Berlin-Hannoversche Hypothekenbank AG	22.5.2012	9,00
Landesbank Baden-Wuerttemberg	24.5.2012	7,00
Deutsche Pfandbriefbank AG	24.5.2012	60,00
Muenchener Hypothekenbank eG	30.5.2012	10,00
HSH Nordbank AG	30.5.2012	18,00
Deutsche Bank AG	31.5.2012	12,00
Deutsche Hypothekenbank AG	12.6.2012	9,00
Aareal Bank AG	12.6.2012	20,00

Deutsche Pfandbriefbank AG	27.6.2012	38,00
Bayerische Landesbank	4.7.2012	17,00
Muenchener Hypothekenbank eG	6.7.2012	63,00
NordLB	10.7.2012	55,00
NordLB	17.7.2012	9,00
Deutsche Bank AG	31.8.2012	1,00
Muenchener Hypothekenbank eG	3.9.2012	-14,00
UniCredit AG	3.9.2012	22,00
NordLB	10.10.2012	50,00
Landesbank Hessen-Thuringen	30.10.2012	-7,00
Aareal Bank AG	14.1.2013	1,00
Deutsche Hypothekenbank AG	15.1.2013	1,00
Deutsche Kreditbank AG	18.1.2013	3,00
DG Hypothekenbank	22.1.2013	3,00
Deutsche Pfandbriefbank AG	23.1.2013	8,00
Berlin-Hannoversche Hypothekenbank AG	29.1.2013	-1,00
Commerzbank	21.2.2013	47,00
HSH Nordbank AG	6.3.2013	11,00
Deutsche Pfandbriefbank AG	11.3.2013	25,00
HSH Nordbank AG	8.4.2013	10,00
Muenchener Hypothekenbank eG	10.4.2013	3,00
Bayerische Landesbank	11.4.2013	11,00

## Appendix D. Over-collateral percentage and LTV ratio

*(The research collected data from issuer's monthly report  
and categorized them by issuers)*

Table D.1. Over-collateral percentage

	Australia					New Zealand	
	ANZ	Commonwealth	NAB	Westpac		Westpac	ANZ
1.1.2012		95,49	107,67	119,47		134,74	
1.2.2012		78,83	115,8	122,55		135,06	
1.3.2012		74,36	121,72	115,9		175,84	
1.4.2012		121,79	122,3	122,55		141,68	
1.5.2012		75,07	132,7	173,6			
1.6.2012		72,95	114,36	171,14		143,08	
1.7.2012		70,89	122,4	122,13		142,81	
1.8.2012	58,26	66,53	127,46	122,55		144,86	
1.9.2012	127,51	45,8	112,45	122,91		145,35	
1.10.2012	134,85	43,05	110,7	123		145,77	153,5

1.11.2012	139,22	39,49	124,27	128,63		146,32	148,27
1.12.2012	135,77	37,57	115,78	140,86		144,65	155,91
1.1.2013	147,83	18,65	113,92	140		145,11	152,08
1.2.2013	144,55	102,68	120	140,35		145,55	148,29
1.3.2013	144,41	100,07	109,98	140,68		145,99	176,95

Table D.2. LTV ratio

	Australia				New Zealand	
	ANZ	Commonwealth	NAB	Westpac	Westpac	ANZ
1.1.2012	66,62	61,28	61,71	62,14	54,82	51,16
1.2.2012	66,13	61,14	60,97	62,49	54,72	55,24
1.3.2012	64,07	60,95	60,39	61,79	55,38	55,97
1.4.2012	67,31	60,92	61,12	62,21	55,3	55,69
1.5.2012	64,32	60,65	61,6	62,32	55,16	55,48
1.6.2012	64,02	60,52	61,54	62,23	55,07	56,31
1.7.2012	64,08	60,34	61,48	62,05	55,06	57,71
1.8.2012	63,37	60,14	61,09	61,84	54,97	57,08
1.9.2012	64,12	60,03	59,61	61,69	54,79	56,5
1.10.2012	63,8	59,85	59,5	61,55	54,69	56,24
1.11.2012	63,95	59,68	58,78	61,45	54,59	56,01
1.12.2012	63,79	59,54	58,67	62	54,48	55,87
1.1.2013	64,05	59,38	58,54	61,88	54,34	55,68
1.2.2013	63,9	58,88	58,91	61,79	54,14	55,47
1.3.2013	64,06	58,7	58,75	61,65	54,02	55,01



