

## Cross-border Bank Lending in the APEC Region: the Role of Country Risks

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### Abstract

This paper aims to understand the structure and determinants of international bank lending among APEC economies. Specifically, this paper first aims to analyze whether Australia; Canada; Japan; Chinese Taipei; and the United States, which are the only APEC members for which international borrowing data are available, tend to lend more intensively to other APEC members than to non-APEC countries. This paper finds that the estimate for the APEC membership dummy in the equation for outward bank lending is positive and statistically significant, but the estimate for the APEC membership dummy becomes insignificant when a bilateral trade intensity variable is added, suggesting that closer ties in bank lending (outward) among APEC member economies are mostly due to closer ties in trade in goods. On the other hand, the estimates for the APEC membership dummy in the inward equation are negative and significant. This suggests that the 21 APEC member economies borrow more from non-APEC member economies than from the five APEC members. Finally, the five APEC member economies make fewer loans to the economies with a greater country risk. When the three disaggregated risk measures are added in the regression alternatively and concurrently, it is found that bank lending is positively associated with political and economic risks, but is negatively associated with financial risk. Thus, bank lenders from the five APEC member economies appear to make a proper assessment of the political and economic risks when making international loans.

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## 1. Introduction

Conventional theoretical models have predicted that foreign borrowing contribute to the economic growth of the borrowing countries.<sup>1</sup> It seems obvious that international capital movement helps the economic growth of the destination economies, as it finances domestic investment in the destination economies.<sup>2</sup>

This paper aims to assess whether Asia-Pacific Economic Cooperation (APEC) has helped expansion of bank lending among the member economies. Specifically, this paper aims to analyze the factors that have an impact on international bank lending so as to assess whether APEC members enjoy greater degree of cross-border bank lending between themselves than with non-members.<sup>3</sup>

We are also interested in assessing the importance of institutional variables in determining flows of financial asset. The link between institutional quality and cross-border capital movement deserves special attention, as such a link may be seen as one particular channel through which institutions are able to promote productivity growth (Acemoglu et al., 2005; Bénassy-Quéré et al., 2007). Indeed, good governance infrastructure exerts a positive influence on economic growth through the promotion of investment (domestic and foreign alike), while institutional underdevelopment is a key explanatory factor for the lack of foreign financing in the developing economies.

Many scholars have attempted to assess whether a sound institutional environment, i.e. efficient bureaucracy, low corruption, and secure property rights attract more FDI and high country risks such as political risks discourage

FDI inflows (See Blonigen (2005) for a survey of the literature). More recently, Ali et al. (2010) find that institutions are a robust predictor of FDI in manufacturing and in services. Lee and Rajan (2009) also find that APEC economies with lower political risk attract more FDI inflows.

On the other hand, Papaioannou (2009) shows that institutional underdevelopment (high political risk) is a key factor of the lack of international bank lending to the developing and underdeveloped world. Therefore, we aim to assess the impact on international bank lending in the APEC region of three different types of country risks - political, economic and financial risks - for the destination economy, using indices sourced from the International Country Risk Group (ICRG) database constructed by Political Risk Services (PRS).<sup>4</sup>

The remainder of the paper is organized as follows. Section 2 will first give a description of the extent and trends of global and intra-regional bank lending for the period 2001 – 2007. Section 3 will then introduces a financial gravity equation to analyze the factors that have impact on bank lending between APEC member economies and other economies (including both APEC member and non-member economies). In doing so, we augment the gravity equation with an APEC membership dummy variable and test whether APEC member economies conduct financial transactions more with other APEC member economies than with non-member economies. Regression results are reported in Section 4. Finally, Section 5 will draw policy implications and issues for further analysis.

## 2. Size of Bilateral Bank Lending

Data on foreign claims drawn from the Bank for International Settlements (BIS) are utilized.<sup>5</sup> The BIS publishes the consolidated foreign claims of BIS reporting banks by nationality of lenders and borrowers. The data are gathered for 30 reporting countries, but due to confidentiality concerns of some reporting economies, publicly available data are for 26 economies, which include seven APEC member economies (Australia; Canada; Chile; Japan; Mexico; Chinese Taipei; and the United States).

The bank lending data mainly include standard inter-bank lending activities such as loans, bank-to-bank credit lines, and trade-related credit. Thus, the data reflect the investment decisions of international banks to lend to other financial institutions or other foreign entities.

<sup>1</sup> See Huh *et al* (2009), and references therein, for theoretical models explaining how foreign capital inflow helps the economic growth of the borrowing economy. See also Chapter III in UNCTAD (2009), for a summary discussion on theoretical models and empirical studies on the link between international capital flow and economic growth.

<sup>2</sup> Of course, as can be seen in the recent global financial crisis of 2007-2009 and East Asian financial crisis of 1997-1998, a reckless management of finance can fuel over-investment and consumption boom and a sudden loss of confidence by investors can result in a financial crisis and hence an economic downturn.

<sup>3</sup> APEC is a group twenty one economies located in the Asia-Pacific region. With 2.7 billion people, the twenty-one APEC member economies as a whole accounted for 40 percent of the world population in 2007 and the combined GDP of the APEC member economies was US\$ 29.0 trillion in 2007, which accounted for over 53 percent of world GDP of US\$ 54.6 trillion.

<sup>4</sup> <http://www.prsgroup.com/>

<sup>5</sup> <http://www.bis.org/statistics/bankstats.htm>

It should be noted, however, that the BIS measure of international bank claims is classified by the country of origin of the claims (especially, the country in which the head office of the reporting bank is located), summing contractual lending by the head office as well as its branches and subsidiaries on a worldwide consolidated basis. For example, claims of Japanese bank branches operating in other countries (for example, Korea) and raising funds and extending loans to Korean borrowers are counted as Japanese claims on Korea. Therefore, this is not an exact measure of cross-border capital flows, but it can measure the degree of financial integration between Japan and Korea more accurately (see Eichengreen

and Park, 2005).

Readers should also note that bank lending data are not flows but outstanding stocks. Simply taking differences from holdings to estimate net flows could be misleading because the reporting population changes between surveys and exchange rate movements may alter asset values. One advantage of working with holdings is that they are less volatile than flows and can be used to investigate the long-term determinants of international capital movement. Table 1 provides, for 2001 and 2007, outward cross-border bank claims by 7 APEC member economies in the left panel and inward bank claims (i.e. loans) against 21 APEC member economies in the right panel

**Table 1: APEC's Outward and Inward Bank Claims in the World**

	World (all) as Destination			World (30) as Source		
	2001 (million USD)	2007 (million USD)	2001-2007 (annualised growth, %)	2001 (million USD)	2007 (million USD)	2001-2007 (annualised growth, %)
Australia	....	416,896	....	162,612	646,815	25.9
Brunei Darussalam	....	....	....	1,433	1,919	5.0
Canada	343,091	724,199	13.3	217,236	513,084	15.4
Chile	....	3,668	....	43,910	81,682	10.9
China	....	....	....	57,510	276,039	29.9
Hong Kong, China	....	....	....	267,937	375,865	5.8
Indonesia	....	....	....	37,328	67,177	10.3
Japan	1,175,208	2,294,213	11.8	553,338	937,161	9.2
Korea	....	....	....	73,098	374,836	31.3
Malaysia	....	....	....	51,417	110,298	13.6
Mexico	....	5,856	....	215,075	338,709	7.9
New Zealand	....	....	....	30,571	236,593	40.6
Papua New Guinea	....	....	....	98	1,643	60.0
Peru	....	....	....	14,689	25,329	9.5
Philippines	....	....	....	22,448	31,027	5.5
Russia	....	....	....	41,446	233,728	33.4
Singapore	....	....	....	133,838	260,952	11.8
Chinese Taipei	67,531	187,858	18.6	32,107	109,244	22.6
Thailand	....	....	....	42,360	54,967	4.4
United States	799,238	1,711,582	13.5	2,704,258	6,483,742	15.7
Viet Nam	....	....	....	2,438	15,293	35.8
<b>APEC</b>	<b>2,385,068</b>	<b>5,344,272</b>	<b>14.4</b>	<b>4,705,147</b>	<b>11,176,103</b>	<b>15.5</b>
(simple average)			14.3			19.3
France	818,772	3,693,831	28.5	538,901	1,975,880	24.2
Germany	2,200,325	4,427,835	12.4	791,329	2,287,993	19.4
United Kingdom	1,153,280	3,840,261	22.2	1,451,063	4,546,374	21.0
<b>World</b>	<b>11,499,530</b>	<b>34,216,668</b>	<b>19.9</b>	<b>11,499,530</b>	<b>34,216,668</b>	<b>19.9</b>

Notes: ....denotes data not available; World investors are available for the 30 BIS reporting economies, including 7 APEC members; Regional growth rates are weighted average, unless stated as "simple average".

Source: Bank for International Settlements (BIS) Database

In 2007, the total value of bank claims in the world was US\$ 34.2 trillion, which is larger than the total value of equity holdings of US\$ 17.8 trillion or that of long-term bond holdings of US\$ 19.2 trillion. The largest provider of bank loans was Japan, with US\$ 2.3 trillion in

bank claims in 2007, followed by the United States, holding US\$ 1.7 trillion in bank claims. On looking at the right panel of the table, the largest bank loan borrower in the APEC region is the United States, with US\$ 6.5 trillion, which amounts to 58.0 percent of total cross-border

bank claims against the 21 APEC members and 18.9 percent of total international bank claims in the world.

Between 2001 and 2007, bank claims against most APEC member economies also grew at double-digit annualized growth rates. In particular, Papua New Guinea; New Zealand; Viet Nam; Russia; and Korea increased foreign borrowing at annualized rates of over 30 percent during the period, these being larger than the world average of 19.9 percent.

Table 2 shows intra-regional cross-border bank claims in the APEC region. Cross-border bank lending in the APEC region also increased at a double-digit growth rate of 12.1 percent per annum during the 2001-2007 period, but this is again smaller than the corresponding rates for APEC-to-world bank claims (15.5%) or world-to-APEC bank claims (14.4%), implying that financial market integration in terms of bank lending in the APEC region has also been slower than worldwide integration.

**Table 2: APEC's Outward and Inward Bank Claims in the APEC Region**

	APEC (21) as Destination			APEC (7) as Source		
	2001 (million USD)	2007 (million USD)	2001-2007 (annualised growth, %)	2001 (million USD)	2007 (million USD)	2001-2007 (annualised growth, %)
Australia	....	250,366	....	35,576	130,643	24.2
Brunei Darussalam	....	....	....	126	178	5.9
Canada	226,010	453,698	12.3	63,185	118,049	11.0
Chile	....	2,270	....	11,482	10,604	-1.3
China	....	....	....	15,617	64,770	26.8
Hong Kong, China	....	....	....	67,177	86,725	4.3
Indonesia	....	....	....	14,077	20,058	6.1
Japan	666,272	1,075,428	8.3	68,568	133,526	11.7
Korea	....	....	....	30,290	113,717	24.7
Malaysia	....	....	....	14,812	22,705	7.4
Mexico	....	3,186	....	98,007	89,899	-1.4
New Zealand	....	....	....	3,108	207,893	101.5
Papua New Guinea	....	....	....	26	66	16.8
Peru	....	....	....	2,742	4,123	7.0
Philippines	....	....	....	9,197	10,037	1.5
Russia	....	....	....	2,974	29,272	46.4
Singapore	....	....	....	47,349	84,086	10.0
Chinese Taipei	46,869	101,018	13.7	15,393	35,556	15.0
Thailand	....	....	....	16,119	24,162	7.0
United States	303,624	578,456	11.3	726,010	1,273,512	9.8
Viet Nam	....	....	....	940	4,841	31.4
<b>APEC</b>	<b>1,242,775</b>	<b>2,464,422</b>	<b>12.1</b>	<b>1,242,775</b>	<b>2,464,422</b>	<b>12.1</b>
(simple average)			11.4			17.4
France	304,703	1,109,646	24.0	78,332	200,703	17.0
Germany	687,102	1,222,459	10.1	178,323	254,649	6.1
United Kingdom	681,922	1,942,643	19.1	259,610	766,981	19.8
<b>World</b>	<b>4,705,147</b>	<b>11,176,103</b>	<b>15.5</b>	<b>2,385,068</b>	<b>5,344,272</b>	<b>14.4</b>

Notes: .... denotes data not available; World investors are available for the 30 BIS reporting economies, including 7 APEC members; Regional growth rates are weighted average, unless stated as "simple average".

Source: Bank for International Settlements (BIS) Database.

### 3. Theoretical Framework and Empirical Models

Since Tinbergen (1962) and Pöyhönen (1963), it has been well known that the simple gravity equation, in which the volume of trade between two countries is proportional to the product of their masses (GDPs) and inversely related to the distance between them, is empirically highly successful. Recently, with renewed interest among economists in geography, it has again become widely used in the literature. Indeed,

many researchers have shown that the gravity equation can be derived from many different models of international trade (Helpman and Krugman, 1985; Bergstrand, 1989; Deardorff, 1998; Eaton and Kortum, 2002; and Evenett and Keller, 2002).<sup>1</sup> Thus, it possesses "more

<sup>1</sup> Harrigan (2001) and Anderson and van Wincoop (2003) provide a comprehensive review of the literature on the theoretical foundations for the gravity model. Greenaway and Milner (2002) provide a review of research utilizing the gravity model to investigate the trade effects of regional trading blocs.

theoretical foundation than any other trade model” (Baldwin, 2006b).

Portes and Rey (2005) is one of the first papers using gravity models to analyze the determinants of cross-border portfolio investment. Using a sample of 14 developed economies over the 1989-1996 period, they find that market sizes and distance are key determinants of cross-border portfolio investment. Dahlquist *et al.* (2003) use U.S. data and confirm the importance of distance in cross-border portfolio investment. Using the gravity model, Lee (2008) focuses on East Asia and finds that financial integration in equities and debt securities among East Asian economies is relatively lower than in Europe. Lane and Milesi-Ferretti (2008) also provide a systematic analysis of the bilateral factors driving portfolio equity holdings across countries and find that bilateral equity holdings are strongly correlated with bilateral trade in goods and services.

Utilizing a more theoretically motivated financial gravity model, Lee and Huh (2008) also find that the level of bilateral holdings of financial assets between Japan and other East Asian countries is smaller than what is expected by the gravity model. Garcia-Herrero *et al.* (2009) also use the gravity model and confirm that East Asian economies are less integrated in financial assets trade than European economies and find that the lack of liquidity in Asian financial markets helps to explain why Asian investors prefer to access the extra-Asian markets.

To a lesser degree, the geography of cross-border bank lending has also been analyzed using gravity models (Rose and Spigel, 2004; Lee, 2008; Papaioannou, 2009) and geographical proximity has been found to exert a significant determinant. Papaioannou (2009), in particular, finds that institutional quality and its improvements in the recipient economies have significant positive impact on international bank inflows.

This section builds on recent papers that have analyzed the financial gravity equation, such as Martin and Rey (2004), Portes and Rey (2005), Aviat and Courdacier (2005), and Courdacier and Martin (2006). Specifically, we draw a testable financial gravity equation from the model of Martin and Rey (2004) and Courdacier and Martin (2006). We then use the model to derive a testable equation for bilateral holdings of financial assets across borders.

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Baier *et al.* (2007) address the potential problems in estimating the gravity model to isolate the effects of an FTA on bilateral trade.

### 3.1. Theoretical Framework

Based on the model of Martin and Rey (2004 and 2006), Courdacier and Martin (2006) derive a gravity equation for international trade in assets with financial transaction costs. In a two-period model with two countries, the value of the aggregate demand by country *i* agents for assets issued in country *j* is:

$$Asset_{ijt} = \frac{\beta L_{it} y_{it} n_{jt}}{(1 + \beta)} \left( \frac{r_{jt} Q_{it}}{\tau_{ijt}} \right)^{\epsilon - 1} \quad (1)$$

where  $Asset_{ijt}$  = Bank claims for country *j* by country *i* agents at time *t*,

$L_{it}$  = population of country *i* at time *t*,

$y_{it}$  = per capita income of country *i* at time *t*,

$L_{it} y_{it}$  = size factor (GDP) of country *i* at time *t*,

$n_{jt}$  = number of assets in country *j* at time *t*,

$\tau_{ijt}$  = transaction costs between the two countries at time *t*,

$r_{jt}$  = expected return in country *j* at time *t*,

$Q_{it}$  = financial price index specific to country *i* at time *t*.<sup>1</sup>

$\beta/(1 + \beta)$  is the elasticity of the size factor and the number of assets, while  $\epsilon$  can be interpreted as the elasticity of substitution between assets.

Thus, the value of the aggregate demand by country *i* agents for assets issued in country *j* will increase as the economic size (population and per capita GDP) of the source country *i* increases, the number of financial assets in partner country *j* increases, the expected return in the partner country increases, and transaction costs between the two countries decrease. It is noted here that the number of financial assets can be considered as the degree of financial sophistication of the country, which is shown to increase with the financial openness of the country (Martin and Rey; 2006).

By taking logs, we produce the financial version of the gravity equation for the total holdings of assets between countries *i* and *j*:

$$\begin{aligned} \log Asset_{ijt} &= \log(\beta/(1 + \beta)) + \log L_{it} + \\ \log y_{it} &+ \log n_{jt} + (\epsilon - 1) \log r_{jt} - (\epsilon - 1) \\ \log \tau_{ijt} &+ (\epsilon - 1) \log Q_{it} \end{aligned} \quad (2)$$

It is noted that, unlike the standard gravity equation, Equation (3.2) includes the market size (and financial openness and expected returns) of only one country. It seems, however, reasonable to assume that the aggregate demand by country *i* agents for assets issued in country *j*

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<sup>1</sup> As in Anderson and van Wincoop (2003), where the price index measures the country's remoteness in the gravity equation for goods trade,  $Q_i$  measures the country's remoteness.

also increases as the economic size of the partner country  $j$  increases. The aggregate demand by country  $i$  agents for assets issued in country  $j$  may also increase as country  $i$  agents have a greater degree of freedom in purchasing foreign financial assets. It also seems that low rates of return from domestic investment will cause domestic residents to invest more in foreign financial assets. Therefore, this study extends Equation (2) and utilizes the following gravity equation:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + \\ & \beta_6 \log Finlib_{jt} + \beta_7 \log \tau_{ijt} + \beta_8 \log \tau_{ijt} + \\ & \beta_9 \log \tau_{ijt} + \beta_{10} \log Q_{it} + \varepsilon_{ijt} \end{aligned} \quad (3)$$

where  $\log Asset_{ijt}$  is the natural logarithm of the value of the holdings of bank claims for country  $j$ , by residents of an APEC member economy,  $i$ .  $\log POP_i$  and  $\log POP_j$  are logs of populations of economies  $i$  and  $j$ , respectively, and  $\log PCGDP_i$  and  $\log PCGDP_j$  are logs of per capita GDP of economies  $i$  and  $j$ , respectively.<sup>1</sup>  $Finlib_i$  and  $Finlib_j$  are the degree of capital market liberalization in economy  $i$  and economy  $j$ , respectively, and  $\tau_{ij}$  signifies transaction costs between the two countries. Thus, we proxy the financial sophistication by  $Finlib$ , which is the capital control intensity index drawn from the *Economic Freedom of the World (EFW)* index published annually by the Fraser Institute.<sup>2</sup> The capital control intensity index measures the foreign ownership/investment restrictions and capital controls, taking a value between 0 and 1. The higher the value, the less stringent are the restrictions on foreign ownership/investment and capital controls, and hence the greater is the degree of liberalization of the financial markets.

### 3.2. Benchmark Model

#### *Empirical Specification 1 (Outward investment)*

We explore a panel data set on international bank claims by taking five APEC “source” economies: Australia; Canada; Japan; Chinese Taipei; and the United States, for the period 2001 - 2007.<sup>3</sup> Sixty six countries including all

APEC member economies are considered as partner economies.

To analyze whether the APEC “source” economies are major investors in assets issued by the residents of other APEC member economies, we add a dummy variable, *APEC*, which takes the value of one if the issuing economy is an APEC member. In order to compare the EURO market with the APEC region as a competing financial market, we also add another dummy variable, *EURO*, which takes the value of one if the issuing economy is an EU member state that uses the euro as its official currency.<sup>4</sup> Thus, we estimate the following equation:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + \\ & \beta_6 \log Finlib_{jt} + \beta_7 Return_{it} + \beta_8 Return_{jt} \\ & + \beta_9 \log \tau_{ijt} + \beta_{10} APEC_{jt} + \beta_{11} EURO_{jt} + \\ & u_i + u_j + \varepsilon_{ijt} \end{aligned} \quad (4)$$

where  $i$  and  $j$  indicate the “source” and “destination” economy, respectively,  $u_i$  is the dummy for the source economies, and  $u_j$  is the year dummy. Thus, we control for fixed effects in the source country dimension ( $i$ ). It is also noted that we do not explicitly include the financial price index,  $Q_{it}$ , which can be considered as the “multilateral resistance term” of Anderson and van Wincoop (2003), because the use of fixed effects in the source countries will allow us to control for this. We also include year dummies to take account of factors such as the world business cycle, global capital market shocks, and so forth.

Among the explanatory variables, *POP* and *PCGDP* are taken from the World Bank’s WDI Online data.<sup>5</sup> Note that *Asset* and *PCGDP* are expressed in 2000 US dollars, using the US GDP deflator. The expected return,  $Return_j$  is the annualized average monthly return adjusted for exchange rate movement to take into account the influence of exchange rate changes, i.e.,  $Return_j = [(1 + R_j)(1 + e_j)] - 1$ , where  $R_j$  is the one-year nominal rate of return of an asset in its own currency, and  $e_j$  is the rate of appreciation

<sup>1</sup> We also used GDP in place of population and per capita GDP, but this did not affect our estimates.

<sup>2</sup> <http://www.freetheworld.com>.

<sup>3</sup> Among the seven APEC member economies participating in the BIS data on the consolidated foreign bank claims, Chile and Mexico are excluded because their data are incomplete for too many partner economies in the sample. See Appendix Table

A3.3. It is also noted that Australian data are only available from 2005.

<sup>4</sup> The euro is the official currency of 16 of the 27 member states of the European Union (EU). The euro was introduced to world financial markets as an accounting currency on 1 January 1999.

<sup>5</sup> <http://publications.worldbank.org/WDI>



of the home currency relative to the U.S. dollar.<sup>1</sup>

Transaction costs between the two countries,  $\tau_{ij}$ , take the following specific functional form:

$$\tau_{ijt} = Dist_{ij}^{\delta_1} \times \exp(\delta_2 Tax_{ijt} + \delta_3 Comlang_{ij} + \delta_4 Contig_{ij} + \delta_5 Colony_{ij} + \delta_6 OFC_j)$$

where  $Tax_{ijt}$  is the tax rate on interest earned by resident  $i$  in country  $j$  at time  $t$ .  $Dist$  is the bilateral geographical distance, and  $Comlang$ ,  $Contig$ ,  $Colony$ , and  $OFC$  are dummies that indicate that partner countries share a common language, share a common border, are former colonies, and are offshore financial centers, respectively. We include  $OFC$  to control for partner countries that are offshore financial centers (OFC) with very favorable fiscal treatment.<sup>2</sup> It is noted here that  $Dist$ ,  $Comlang$ ,  $Contig$ , and  $Colony$  are proxy variables not just for transaction costs but to a greater extent for information frictions.

Tax rate is the current highest marginal rate applied (either on dividends or on interest), drawn from the International Bureau of Fiscal Documentation (IBFD) Tax Treaties Database.<sup>3</sup> Geographical distance is taken from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)'s website.<sup>4</sup> It is noted that the distances are weighted distances, which use city-level data to assess the geographic distribution of population inside each nation. The variables indicating whether the countries share a geographic border and a common language and are former colonies of another country are also taken from CEPII's website.

It is noted that the United States is the largest source and destination economy for bank lending in the region, and hence it would be useful to know whether any positive coefficient for APEC membership is due to the overshadowing role of the United States. Lee and Huh (2008) find that Japan, the second largest investor in East Asia, is more closely linked with the United States than with other East Asian economies. Garcia-Herrero *et al.*

(2009) also find that Asian capital is invested predominantly outside the Asian market, such as in the United States.

Therefore, we split the APEC membership dummy into  $APEC\_no\_us$  and  $USA$ , where  $APEC\_no\_us$  captures all 20 non-U.S. APEC member economies and  $USA$  gives the value of one only when the destination economy is the United States. It is also noted that in this specification we also exclude the United States from the source economy group:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + \\ & \beta_6 \log Finlib_{jt} + \beta_7 Return_{it} + \beta_8 Return_{jt} + \\ & \beta_9 \log \tau_{ijt} + \beta_{10} APEC\_no\_us_{jt} + \beta_{11} USA_{jt} \\ & + \beta_{12} EURO_{jt} + u_i + u_t + \varepsilon_{ijt} \end{aligned} \quad (5)$$

Lee (2008), Lane and Milesi-Ferretti (2008), and Garcia-Herrero *et al.* (2009) suggest that the volume of trade in goods between countries has a positive impact on cross-border financial asset trade and add the (one-year lagged) volume of trade in goods as an explanatory variable in their gravity equations, but this is subject to endogeneity bias because trade in goods itself is affected by other gravity variables such as market size and geographic distance. Therefore, we instead include the residuals of the dependent variable obtained from running the following equation:

$$\begin{aligned} \log Trade\_goods_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Tariff_{it} + \\ & \beta_6 \log Tariff_{jt} + \beta_7 \log Distance_{ij} + \\ & \beta_8 \log Contig_{ij} + \beta_9 \log Comlang_{ij} + \beta_{10} \\ & \log Colony_{ij} + u_i + u_t + \varepsilon_{ijt} \end{aligned} \quad (6)$$

The residual ( $r$ -Trade) from this regression measures bilateral trade intensity between economies. Specifically, positive values imply that the pair enjoys bilateral trade at a degree greater than what is expected by gravity, while negative values imply that the bilateral trade between the pair is smaller than what is expected by gravity. Therefore, we estimate the following equation:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + \\ & \beta_6 \log Finlib_{jt} + \beta_7 Return_{it} + \beta_8 Return_{jt} + \\ & \beta_9 \log \tau_{ijt} + \beta_{10} r\text{-Trade}_{ijt} + \beta_{11} APEC_{jt} \\ & + \beta_{12} EURO_{jt} + u_i + u_t + \varepsilon_{ijt} \end{aligned} \quad (7)$$

*Empirical Specification 2 (Inward investment):*

As noted above, even though only a few

<sup>1</sup> The average bank lending rate is used. Following (Faruqee *et al.*, 2004), we also adjusted the lending rate using the rate of inflation in the destination economy, and found similar results.

<sup>2</sup> OFCs are usually low-tax, lightly regulated jurisdictions. In our sample, they are Bahrain, Barbados, Bermuda, Costa Rica, Cyprus, Hong Kong, Ireland, Luxembourg, Malta, Panama, and Singapore.

<sup>3</sup> <http://www.ibfd.org/portal/app?bookmarkablePage=home>

<sup>4</sup> <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

APEC member economies are participating in the BIS report as reporting countries, all of them are included as partner economies. Therefore, in our second specification, we explore a panel data set for the period 2001 - 2007 on bank borrowing by 21 APEC “destination (borrowing)” economies from 26 “source (lending)” economies.

Thus, our second benchmark empirical specification takes the following form:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + (8) \\ & \beta_6 \log Finlib_{jt} + \beta_7 Return_{it} + \beta_8 Return_{jt} + \\ & \beta_9 \log \tau_{ijt} + \beta_{10} APEC_{jt} + \beta_{11} EURO_{jt} + u_i + u_j \\ & + \varepsilon_{ijt} \end{aligned}$$

where  $i$  and  $j$  indicate the “destination” and “source” economy, respectively. Equation (8) appears to be the same as Equation (4), but  $i$  here no longer stands for source economy but destination economy; therefore, we control for fixed effects in the destination economy dimension ( $j$ ). It is also noted that the number of observations for use in estimating Equation (8) is different from that in Equation (4).

As in Equation (5), in a separate equation we split the APEC membership dummy into  $APEC\_no\_us$  and  $USA$  so as to establish whether any positive coefficient for APEC membership is due to the overwhelming role of the United States. As in Equation (7), we also add in a separate equation  $r-Trade$ , the residuals taken from running a regression of Equation (6), showing how bilateral trade intensity is correlated with cross-border financial asset trade.

### 3.3. Extended Model – Effects of Country Risk

As noted above, Papaioannou (2009) finds that institutional quality/political risk is highly correlated with international bank lending. Therefore, we extend our benchmark model by adding a country risk variable in the outward investment equation, as follows:

$$\begin{aligned} \log Asset_{ijt} = & \alpha + \beta_1 \log POP_{it} + \\ & \beta_2 \log POP_{jt} + \beta_3 \log PCGDP_{it} + \\ & \beta_4 \log PCGDP_{jt} + \beta_5 \log Finlib_{it} + (9) \\ & \beta_6 \log Finlib_{jt} + \beta_7 Return_{it} + \beta_8 Return_{jt} + \\ & \beta_9 \log \tau_{ijt} + \beta_{10} APEC_{jt} + \beta_{11} EU_{jt} + \\ & \beta_{12} Country\_Risk_{jt} + u_i + u_j + \varepsilon_{ijt} \end{aligned}$$

where  $Country\_Risk_{jt}$  is the country risk factor for economy  $j$  in terms of political, economic, and financial risks.

The variable  $Country\_Risk$  will be proxied by the composite index constructed by Political Risk Services (PRS)<sup>1</sup> and published as the International Country Risk Guide (ICRG) rating, which comprises 22 variables in three subcategories of risk – political risk ( $Pol\_Risk$ ), economic risk ( $Econ\_Risk$ ), and financial risk ( $Fin\_Risk$ ). The political risk index is based on one hundred points, financial risk on fifty points, and economic risk on fifty points. The total points from the three indices are divided by two, so that the composite country risk variable,  $Country\_Risk$ , ranges from zero, indicating minimum institutional quality, to one hundred, indicating total absence of country risk.

In the regression analysis, the composite country risk variable,  $Country\_Risk$ , will be used in Equation (9) and then each of the three subcategories of risk will be used alternatively, noting that there is a significant correlation between political, economic, and financial risk, respectively. Finally, the three subcategories of risk will be included concurrently so as to assess what type of risk matters the most in cross-border investment. It should be noted that, for the sake of comparison, the original indices of economic risk and financial risk are multiplied by two, so that each of these three measures ranges from zero to one hundred. See Appendix A2. Data Sources for further details of these three subcategories of risk.

## 4. Empirical Results

### 4.1. Results from Benchmark Model

The estimated results are presented in Table 3. Columns (1), (2), and (3) present the estimates for outward cross-border bank claims by the five APEC member economies (Australia; Canada; Japan; Chinese Taipei; and the United States) against 66 economies, while Columns (4), (5), and (6) present the estimates for inward bank loans to the 21 APEC member economies.

On looking at the first three columns, we find a particular difference, among others, that the estimated coefficient for per capita GDP of source economy is negative, while that of destination economy is positive and significant. However, readers should not put much weight on this finding because this is in large part due to the fact that we have only five source economies whose income level is very similar.

<sup>1</sup> <http://www.prsgroup.com/>



**Table 3: Determinants of Cross-border Bank Claims (2001-2007)**

	(1)	(2)	(3)	(4)	(5)	(6)
	Outward	Outward	Outward	Inward	Inward	Inward
<i>logPOP_s</i>	-3.1 (-0.49)	-6.45 (-0.25)	-0.55 (-0.09)	0.84*** (22.18)	0.93*** (19.45)	0.98*** (26.59)
<i>logPOP_d</i>	0.92*** (26.65)	0.8*** (18.46)	0.97*** (29.92)	0.37 (0.17)	-5.76** (-2.07)	-3.72* (-1.93)
<i>logPCGDP_s</i>	-1.26 (-1.58)	-0.99 (-0.39)	-1.04 (-1.35)	2.44*** (23.76)	2.57*** (23.74)	2.51*** (26.84)
<i>logPCGDP_d</i>	1.28*** (26.56)	1.21*** (19.13)	1.33*** (31.06)	1.49*** (5.31)	0.93** (2.36)	1.5*** (6.06)
<i>Finlib_s</i>	0.1 (1.01)	0.09 (0.81)	0.09 (0.92)	0.59*** (13.32)	0.62*** (12.29)	0.47*** (11.38)
<i>Finlib_d</i>	0.05 (1.56)	0.05 (1.2)	0.03 (1.01)	-0.1 (-1.55)	0.06 (0.83)	-0.12* (-1.89)
<i>Return_s</i>	0.29 (0.42)	0.27 (0.29)	0.11 (0.16)	0 (0.56)	0 (0.18)	0 (-0.62)
<i>Return_d</i>	-0.21 (-0.88)	-0.07 (-0.23)	0.1 (0.43)	0.01 (0.72)	0.02 (1.24)	0.02 (1.13)
<i>Tax_d</i>	-0.01 (-1.45)	-0.02*** (-2.78)	-0.01 (-1.2)	0 (-0.16)	-0.02** (-2.22)	0 (0.07)
<i>logDist</i>	-0.9*** (-9.32)	-0.99*** (-8.32)	-1.12*** (-12.99)	-1.38*** (-18.1)	-1.28*** (-15.92)	-1.51*** (-22.89)
<i>OFC</i>	1.25*** (6.79)	1.2*** (5.4)	0.73*** (3.98)	0.82*** (3.04)	1.34*** (4.37)	1.11*** (3.52)
<i>Comlang</i>	0.79*** (5.88)	1.04*** (5.61)	1.16*** (9.28)	0.58*** (4.62)	0.67*** (5)	1.06*** (8.96)
<i>Contig</i>	-0.84*** (-2.82)	-1.71*** (-5.05)	-0.89*** (-3.34)	-1.3*** (-5.8)	-0.82*** (-2.68)	-1.51*** (-7.03)
<i>Colony</i>	-0.04 (-0.15)	-0.14 (-0.36)	-0.2 (-0.99)	0.4** (2.25)	0.36* (1.85)	0.39** (2.47)
<i>r-Trade</i>			0.75*** (13.2)			0.82*** (12.97)
<i>APEC</i>	0.8*** (9.04)		0.08 (0.85)	-0.39*** (-3.25)		-1.01*** (-8.63)
<i>APEC_no_us</i>		0.85*** (7.62)			-0.48*** (-3.7)	
<i>USA</i>		2.2*** (8.08)			-0.99*** (-5.42)	
<i>EURO</i>	0.4*** (3.66)	0.71*** (5.15)	0.31*** (3.08)	-0.26*** (-2.57)	-0.3*** (-3.07)	-0.39*** (-3.89)
Constant	48.85 (0.48)	106.56 (0.25)	4.81 (0.05)	-41.64 (-0.94)	85.26 (1.46)	17.75 (0.6)
# OBS	1332	986	1314	1708	1602	1695
R <sup>2</sup>	0.7381	0.7164	0.7825	0.7444	0.7195	0.7787

Notes: 1. Outward equations include source-economy dummies and inward equations include destination-economy dummies. All equations also include year dummies. 2. Subscript "s" stands for source economy and "d" stands for destination economy. 3. Shown in parentheses are the robust t-statistics. 4. \*\*\*, \*\*, and \* denote one, five, and ten percent level of significance, respectively, for a two-tailed test.

Financial liberalization and the rate of interest in both source and destination economies do not appear to have any discernible

effect on outward bank lending, but the proxies for transaction and information costs, such as distance and the use of a common language,

have statistically significant effects on the five APEC economies' outward bank lending.

Interestingly, the estimate for the APEC membership dummy in the equation for outward bank lending is positive and statistically significant, but the estimate for the APEC membership dummy becomes insignificant when a bilateral trade intensity variable is added, suggesting that closer ties in bank lending (outward) among APEC member economies are mostly due to closer ties in trade in goods.<sup>1</sup>

When the USA dummy is included separately from the non-U.S. APEC membership dummy, it is found that both the four non-U.S. APEC members and the United States are holding higher values of bank claims against other APEC members than non-members, yet the United States holds a greater value of claims than the other four APEC members.

On looking at the inward equations (Columns 4, 5, and 6), a noticeable difference from the outward equation is that per capita GDP of source economies reveals positive and significant estimates. The financial liberalization variable in the source economies also reveals statistically significant positive estimates.

More importantly, the estimates for the APEC membership dummy in the inward equation are negative and significant. This suggests that the 21 APEC member economies borrow more from non-APEC member economies. It is also interesting to note that when the non-U.S. APEC membership dummy is included separately from the USA dummy, Column (5) shows that APEC member economies borrow less from both the United States and other non-U.S. APEC members. Lastly, when a trade intensity variable is added, the estimate for the APEC membership dummy becomes smaller, while that for the trade intensity variable is positive and significant. This suggests again that closer ties in goods trade contribute to cross-border bank lending in the APEC region.

#### 4.2. Results from Extended Model

This section reports the results obtained from running Equation (9) to assess how country risk

is associated with capital movements across borders. Specifically, Table 4 reports the results assessing how country risk affects cross-border bank lending, respectively. Column (1) yields the estimates when the ICRG composite country risk measure (lagged) is included. Columns (2), (3), and (4) report the estimates when the political, economic, and financial risk measures are included, on an alternative basis. Finally, Column (5) reports the estimates when the three risk measures are included together.

On looking at Column (1), the five APEC member economies make fewer loans to the economies with a greater country risk. Specifically, the estimated coefficient of 0.02 implies that a 10-point reduction in country risk of a borrowing economy is associated with a two percent increase in bank loans from the five APEC member economies. When the three disaggregated risk measures are added in the regression alternatively (Columns 2-4) and concurrently (Column 5), it is found that bank lending is positively associated with political and economic risks, but is negatively associated with financial risk. Thus, bank lenders from the five APEC member economies appear to make a proper assessment of the political and economic risks when making international loans. However, bank lenders do not appear to put much weight on financial risk of the borrowing economies. Again, the United States, showing a very low financial risk rating during the period 2001-2007, is in fact the largest bank loan borrower in the world.

#### 5. Conclusion

This paper evaluates the magnitude and determinants of APEC member economies' cross-border bank lending. This report also assesses whether APEC members enjoy greater banking linkages between themselves than with non-members.

Our analysis using the gravity model has shown that Australia; Canada; Japan; Chinese Taipei; and the United States, which are the only APEC members for which international borrowing data are available, tend to lend more intensively to other APEC members than to non-APEC countries. But the estimate for the APEC membership dummy becomes insignificant when a bilateral trade intensity variable is added

<sup>1</sup> This is in part due to the fact that foreign trade-related credit is included in the BIS bank lending data, but its proportion is very small.

**Table 4: Effects of Country Risk on Cross-border Bank Claims (2001-2007)**

	(1)	(2)	(3)	(4)	(5)
	Outward	Outward	Outward	Outward	Outward
<i>logPOP_s</i>	-3.39 (-0.54)	-3.34 (-0.54)	-3.43 (-0.55)	-2.42 (-0.39)	-3.07 (-0.49)
<i>logPOP_d</i>	0.94*** (26.91)	0.96*** (27.87)	0.94*** (26.83)	0.97*** (29.41)	1.01*** (30.41)
<i>logPCGDP_s</i>	-1.17 (-1.48)	-1.26 (-1.62)	-1.13 (-1.42)	-1.28* (-1.66)	-1.24 (-1.62)
<i>logPCGDP_d</i>	1.16*** (18.37)	1.02*** (16.38)	1.17*** (21.09)	1.33*** (29.09)	0.98*** (15.66)
<i>Finlib_s</i>	0.1 (0.98)	0.1 (1.03)	0.1 (0.96)	0.09 (0.95)	0.1 (1)
<i>Finlib_d</i>	0.08*** (2.7)	0.06** (2.06)	0.09*** (3.02)	0.06** (2.21)	0.07** (2.29)
<i>Return_s</i>	0.27 (0.39)	0.29 (0.42)	0.27 (0.4)	0.21 (0.3)	0.31 (0.47)
<i>Return_d</i>	-0.15 (-0.61)	-0.22 (-0.95)	-0.17 (-0.69)	-0.58*** (-2.69)	-0.55*** (-2.69)
<i>Tax_d</i>	-0.01* (-1.86)	-0.01 (-1.4)	-0.01** (-2.04)	-0.01*** (-2.86)	-0.01** (-1.99)
<i>logDist</i>	-0.87*** (-8.81)	-0.88*** (-9.28)	-0.86*** (-8.74)	-0.95*** (-10.06)	-0.92*** (-10.02)
<i>OFC</i>	1.11*** (6.09)	1.22*** (6.54)	1.11*** (6.09)	1.22*** (6.72)	1.38*** (7.41)
<i>Comlang</i>	0.75*** (5.59)	0.76*** (5.88)	0.71*** (5.19)	0.74*** (5.54)	0.65*** (4.93)
<i>Contig</i>	-0.74** (-2.29)	-0.8** (-2.51)	-0.72** (-2.21)	-1.18*** (-3.99)	-0.95*** (-2.99)
<i>Colony</i>	-0.03 (-0.11)	-0.04 (-0.18)	0 (-0.01)	-0.08 (-0.35)	0.02 (0.08)
<i>APEC</i>	0.76*** (8.58)	0.69*** (7.96)	0.74*** (7.89)	0.87*** (9.99)	0.56*** (6.23)
<i>EURO</i>	0.37*** (3.47)	0.29*** (2.73)	0.35*** (3.22)	0.35*** (3.22)	0.11 (0.95)
<i>Country_Risk_d</i>	0.02** (2.32)				
<i>Political_Risk_d</i>		0.04*** (6.26)			0.03*** (4.8)
<i>Economic_Risk_d</i>			0.02** (2.41)		0.04*** (5.14)
<i>Financial_Risk_d</i>				-0.03*** (-6.13)	-0.04*** (-7.83)
Constant	51.69 (0.51)	51.47 (0.51)	51.87 (0.51)	38.74 (0.38)	46.75 (0.46)
# OBS	1321	1321	1321	1321	1321
R <sup>2</sup>	0.7428	0.7494	0.743	0.7488	0.7604

Notes: 1. All equations include source-economy dummies and year dummies. 2. Subscript "s" stands for source economy and "d" stands for destination economy. 3. Shown in parentheses are the robust t-statistics. 4. \*\*\*, \*\*, and \* denote one, five, and ten percent level of significance, respectively, for a two-tailed test.

suggesting that closer ties in bank lending (outward) among APEC member economies are mostly due to closer ties in trade in goods. On the other hand, the estimates for the APEC membership dummy in the inward equation are negative and significant. This suggests that the 21 APEC member economies borrow more from non-APEC member economies than from the five APEC members. This implies that the financial market in the APEC region as a whole is not as fully integrated as the goods market, even though the continuing expansion of intra-regional trade in goods in the region is expected to contribute to the intra-regional financial transactions in the region.

It has also been found that, the five APEC member economies make fewer loans to the economies with a greater country risk. When the three disaggregated risk measures are added in the regression alternatively and concurrently, it is found that bank lending is positively associated with political and economic risks, but is negatively associated with financial risk. Thus, bank lenders from the five APEC member economies appear to make a proper assessment of the political and economic risks when making international loans.

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## Appendices

### A.1. Data Sources

- Bilateral bank claims: in millions of US dollars, Bank for International Settlements, *Consolidated Banking Statistics* (<http://www.bis.org/>)

- Bilateral exports and imports: in millions of US dollars, from International Monetary Fund, *Direction of Trade* (<http://www.imfstatistics.org/DOT/>); Chinese Taipei Bureau of Foreign Trade (<http://cus93.trade.gov.tw/ENGLISH/FSCE/>)

- Population, GDP, per capita GDP: in millions of US dollars, from World Bank, *World Development Indicators* (<http://publications.worldbank.org/WDI>); Chinese Taipei Statistical Data Book (2008)

- Bilateral distance: weighted distances in km, which use city-level data to assess the geographic distribution of population inside each nation, from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)'s website (<http://www.cepii.fr/anglaisgraph/bdd/distances.htm>)

- Geography variables (Comlang, Contig, Colony): from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII)'s website, (<http://www.cepii.fr/anglaisgraph/bdd/distances.htm>)

- Bank loan interest rate: authors' calculation on primary lending rate adjusted to exchange rate fluctuation; Source of lending rate is World Bank, *World Development Indicators* (WDI) and Chinese Taipei Central Bank

(<http://www.cbc.gov.tw>)

- Tax rate on dividend income and interest income: International Bureau of Fiscal Documentation (IBFD) Tax Treaties Database ([http://www.ibfd.org/portal/Product\\_treaties.html](http://www.ibfd.org/portal/Product_treaties.html))

- Country risk: the variable *Country\_Risk* is the composite index constructed by Political Risk Services (PRS), and published as the International Country Risk Guide (ICRG) rating which comprises 22 variables in three subcategories of risk – political risk (*Pol\_Risk*), economic risk (*Econ\_Risk*), and financial risk (*Fin\_Risk*) (<http://www.prsgroup.com/>).

- The political risk (*Pol\_Risk*) rating aims to assess the political stability of the countries. It is comprised of the following 12 components: government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic tensions, democratic accountability and bureaucracy quality.

- The economic risk (*Econ\_Risk*) rating is to assess a country's current economic strengths and weakness. It is comprised of the following five components: per capita GDP, real GDP growth, annual inflation rate, budget balance as a percentage of GDP, and current account as a percentage of GDP.

- The financial risk (*Fin\_Risk*) rating aims to provide a means of assessing a country's ability to pay its way. It is comprised of the following five components: foreign debt as a percentage of GDP, foreign debt services as a percentage of exports and goods and services, current account as a percentage of exports of goods and services, net international liquidity as months of import cover, exchange rate stability.