Corporate Overseas Debt Issuance in the Context of Global Liquidity Transmission

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Abstract

Given the rising importance of non-financial corporate overseas debt issuance in the overall international capital flow activities, this paper tries to understand the determinants of corporate overseas bond issuance in 32 countries during the sample period 1993-2015. The results suggest that the compression in risk premium in advanced economies has encouraged the corporates in emerging markets to borrow more from international bond markets. This effect is more prevalent in countries where policy makers impose tighter international capital control, so that corporates outside financial regulation serve as surrogate financial intermediaries at the border. Besides, corporates hold short-term assets in domestic currency as collateral for outstanding overseas debt, in expecting domestic currency appreciation, a behavior often phased as price arbitrage or carry trade position. Our results suggest a potential systematic shift in international financial risk transmission through corporate fixed-income markets and a possible external shock transmission channeled through the monetary policy spillover effect.

JEL classification: E44, F31, F32, F34, F36, F65, G15

Keywords: Corporate Overseas Debt, Global Liquidity, Carry Trade Hypothesis, Monetary Policy Spillover

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1 Introduction

The recent surge in non-financial corporate[1] (hereafter "corporate") overseas debt issuance after 2007-2009 financial crisis has started drawing attention from macroeconomic researchers, as it plays a critical role in the conduct of international capital flow activities in the emerging markets. This surge in the overseas debt issuance is also referred to as the second phase of global liquidity (Shin, 2013).The first phase (2003-2007) of global liquidity is associated with a rapid increase in cross-border international bank loans. The international banks have recently lost the market share to international bond markets in the cross-border activities substantially after the global financial crisis, partly because of the strengthened financial system regulation. This fall in cross-border lending by international banks was followed by a rise in the overseas debt issuance of the non-financial corporate sector. The relative importance of corporate overseas debt issuance can be gauged from the fact that more than half of the net "external" financing of emerging economies in 2012 took place through the issuance of international debt securities (Turner, 2014).

Given its importance for the stability of the global financial system, it is important to understand the behavior and determinants of corporate overseas debt issuance. The purpose of this paper is to fill this gap in the literature. In particular, we want to examine three hypotheses related to the overseas debt issuance of these corporate firms. First, is there an evidence of price arbitrage on the part of these firms? Traditionally, a textbook-version corporate only issues bonds overseas because of foreign currency exposures. Think about the case when an exporting firm expects to receive a payment in foreign currency. This firm should issue foreign currency liability to match the foreign currency asset, in order to hedge foreign currency exposure. This behavior is considered as a typical corporate risk management practice to help this company focus on the main operating activities. In other words, they are not supposed to be interested in doing price arbitrage in foreign exchange markets. Nevertheless, in recent years, many studies suggest that corporate firms, especially large

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[1]In this paper, we are interested in non-financial corporate overseas debt issuance behavior. In finance literature, non-financial corporates normally are referred as corporates. Financial corporates are required to be specified explicitly to indicate the difference between these two types of subjects. We follow the norm to use corporates to refer non-financial corporates hereafter in this paper.

firms in emerging markets, may behave like financial intermediaries in overseas debt issuance activities. [Black and Munro (2010), Bruno and Shin (2015), Caballero et al (2015), Shin and Zhao (2013)]. Secondly, we also examine whether the firms get around capital control measures enacted by the countries and act more like a financial intermediary. This hypothesis is motivated by the recent behavior of the firms in the emerging markets where we observe a surge in debt issuance even in the presence of capital controls. Thirdly, we also examine the recent debate about the transmission of the U.S monetary policy to the global financial system by examining the link between overseas debt issuance and risk premium. To examine these hypotheses, we utilize a recently developed database on international debt securities by the Bank of International Settlement and perform a panel study of 32 countries for the 1993-2015 sample period.

Overall our results are consistent with the idea that non-financial firms in emerging economies have been acting like financial intermediaries. Firstly, we find evidence in support of price arbitrage hypothesis in case of emerging economies where we find significant negative impact of level and volatility of exchange rate on changes in overseas debt issuance. This implies that the corporate firms issue debt overseas in expecting that domestic currency will appreciate against the US dollar. We also find that capital control on bond market are positively correlated with corporate overseas debt issuance in emerging economies whereas this relationship has opposite pattern in the advanced economies. This difference in response to capital control across border reflects that corporate firms in emerging markets have strong incentive to walk around capital control to tap into international bond market, whereas corporate firms in advanced economies typically follow the regulation to reduce cross-border financial activities. We also find strong evidence between a measure of risk premium in the U.S. and overseas debt issuance in emerging economies implying that overall credit conditions in the U.S. do play a significant role. For advanced economies, however, we don't find a significant relationship between risk premium and debt issuance by its corporate firms implying that the non-financial firms in the advanced economies do behave very differently than the firms in the emerging market economies.

The remainder of this paper is structured as follows. Section 2 reviews the literature on international debt securities. Section 3 presents our conceptual framework and econometric methodology followed by a discussion. In section 4 and 5 we interpret and check the robustness of the results. Section 5 concludes the paper.

2   Literature Review

The surge in corporate overseas debt issuance plays an important role in the second phase of global liquidity. Turner (2014) suggests that declining in term premium in 10-year US treasuries may have implication on greater sensitivity to global long-term interest rates in emerging economy bond markets. McCauley et al (2014) also suggests that term premium compression in US treasuries has significantly stimulate offshore dollar-denominated bond issuance. Shin (2013) points out, furthermore, the transmission of financial condition across borders has taken the form of reaching for yield. The compositional shift in asset managers portfolios increases the demand for emerging market corporate bonds, which leads to the decline of risk premium for these debt securities. Meanwhile, the issuances of international debt securities explode in response to the compression in risk premium and the declining capital cost in overseas bond market. Chung et al (2014) identify a positive relationship between domestic money growth and capital flow to the non-bank sector in emerging markets. Large corporates borrow money overseas and hold short-term instruments in home country, such as deposits and other liquid assets. This behavior essentially enables small corporates to borrow money overseas and weakens the independence of monetary policy aiming at domestic liquidity control.

These papers describe the paths in monetary policy spillover and the role of corporates in global liquidity transmission in the context of strict regulation imposed on international banking system. We borrow Figure 1 from Shin and Zhao (2013) to visualize the role of corporate debt issuance in global liquidity transmission. In the first phase of global liquidity, domestic household depositors and international investors (mostly international banks) supply liquidity to domestic financial

system to finance the final corporate borrower production projects. However, in the second phase of global liquidity, domestic large corporates, rise to serve as surrogate intermediaries to facilitate liquidity transmission into domestic financial system, presumably due to the restriction on direct lending from international banks. The large corporates headquartered in emerging markets may use their overseas subsidiaries to issue bonds in international financial markets and receive the proceeds through intra-company transactions (The subsidiaries can pay for operation costs for the headquarters, for instance). In this way, the proceeds flowing into emerging markets are treated as a form of foreign direct investment and do not appear in the residency-based external debt positions. This conjecture worries policy makers about the effectiveness of capital control policies at the border and the creation of systematic risks outside traditional international financial regulation framework.

Figure 1: Transmission of Global Liquidity across Borders
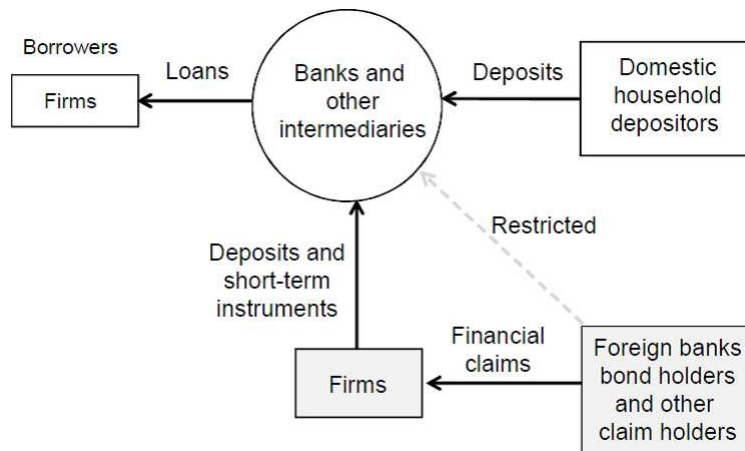
Shin and Zhao (2013)

Under this backdrop, researchers investigate the determinants of corporate debt issuance behavior by exploiting micro evidence from firm-level overseas debt issuance and financial accounting information. Black and Munro (2010) examines the onshore/offshore bond issuance decision by

non-government residents of five Asia-Pacific countries. Price arbitrage is identified as the most important motivator to issue offshore, for both financial and non-financial corporates. Market completeness and liquidity are also estimated to drive issuance decisions, i.e. firms seeks for more complete financial markets to issue larger-size, longer-maturity bond at a lower capital cost. Nevertheless, this study uses residency-based international bond issuance data, which may not be able to capture the real volume of cross-border issuance, especially given the fact that non-financial firms use intra-company transactions to avoid capital regulation across border. As depicted by Bruno and Shin (2015), the difference widen significantly between nationality-based and residency-based amount of external debt outstanding: the nationality-based external debt position reaches roughly twice as much as the residency-based measures in 2014. (Figure 2) Shin and Zhao (2013) use firm-level financial accounting information based on consolidated balance sheet and debt issuance data to further investigate the role of corporates as surrogate financial intermediaries. Their results also suggest that corporates in emerging markets behave like financial intermediaries in the sense that the correlation between financial assets and financial liabilities has a positive sign, which is supposed to be an accounting feature for financial corporates instead of non-financial corporates. [2]

Figure 2: Corporate Overseas Debt Issuance by Nationality/ Residency in Emerging Markets
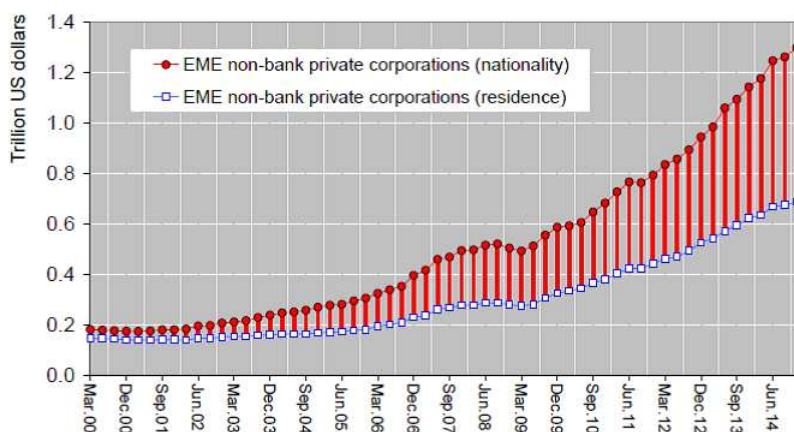
Bruno and Shin (2015)

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[2]This argument is based on Pecking Order Theory (Myers, 1984) in corporate finance literature. See Shin and Zhao (2013) for details.

Two recent micro studies, instead, focus on testing carry trade hypothesis. Both papers support the positive correlation between corporate overseas debt issuance and firm cash holding, which essentially indicates a carry trade position. Bruno and Shin (2015), furthermore, point out this phenomenon is more prevalent for emerging market firms during favorable carry trade periods. Caballero et al (2015) suggests that there is evidence for carry trade activities in countries with higher levels of capital controls. In our paper, we also find that corporate overseas debt issuance behaviors are positively correlated with capital controls at the border, especially in emerging markets where overall capital control levels are much higher than in advanced economies.

To summarize, the literature provides some evidence to support the idea that corporates dramatically increase overseas debt issuance to conduct price arbitrage and serve as surrogate financial intermediaries to facilitate capital flow across borders in emerging markets or countries with strict capital controls. Put it differently, corporates may step into the vacuum whereas financial sectors are blocked by international capital control regulation. This paper, from our knowledge, is the first paper using macro nationality-based corporate overseas debt issuance data, to tackle several hypotheses in the literature and to explain the determinants of corporate overseas debt issuance behavior.

3   Empirical Models

3.1   Price Arbitrage Hypothesis and Risk Management Hypothesis

To test the hypotheses mentioned above, we build three empirical models to study the determinants of corporate overseas debt issuance behavior. In first model, we try to test price arbitrage hypothesis against risk management hypothesis based on the contradictive implication in response to exchange rate variables from these two hypotheses. If corporates behave more like price arbitragers, they will issue less debt when domestic currency depreciates/ when the exchange rate is volatile. Whereas, if corporates behave like what textbook suggests, they will issue more debt when domestic currency depreciates because when domestic currency depreciates, export increases so as

the foreign currency exposure. In order to hedge the foreign currency exposure, they should issue more debt securities. In addition, when exchange rate is more volatile, corporates are expected to have stronger incentive to hedge larger portion of foreign currency asset exposure. In our model, the exchange rate is computed based on direct quote against US dollar, which means the exchange rate number is interpreted as the amount of domestic currency one US dollar can purchase. Therefore, an increase in the exchange rate number implies depreciation of domestic currency.

To be explicit, if price arbitrage hypothesis dominates risk management hypothesis, then we would expect that $\beta_1 > 0$ and $\beta_2 > 0$; if the other way around, then $\beta_1 < 0$ and $\beta_2 < 0$. Besides exchange rate and exchange rate volatility, we also control for relevant economic fundamentals. In this case, we control for both domestic real GDP growth rate and current account balance. In the most complete specification, we also control for government foreign exchange market intervention, by adding the growth rate of official reserve. This specification allows us to see the impact of exchange rate and exchange rate volatility on corporate overseas net debt issuance while government intervention is in place.

$$Net\_Debt\_Issuance_{it} = \beta_0 + \beta_1 Exchange\_Volatility_{it-1} + \beta_2 Exchange\_Rate_{it-1} + \beta_3 Real\_GDP\_Growth_{it-1}$$

$$+\beta_4 Current\_Account\_Balance_{it-1} + \beta_5 Foreign\_Reserve\_Growth_{it-1} + \gamma_t + \delta_i + \varepsilon_{it}$$

$$(1)$$

3.2 The Effectiveness of Capital Control Policies

In the second model, we are interested to study the effect of capital control on corporate overseas debt issuance. The capital control policies imposed by governments are designed to control for the amount of international capital flow across borders. Therefore, if the capital control policies were effective and well-designed, we would expect the reduction of all types of international capital flow, implying the reduction of corporate debt issuance. If, instead, we found the effect of capital control was the rise in corporate debt issuance, then the effectiveness of capital control policies could be in doubt. Explicitly speaking, the capital control policies may impose a binding constraint on finan-

cial sectors, whereas the corporates may gain comparative advantage to take the role as financial intermediaries. As explained previously, corporates are able to use intra-company transactions to avoid the international capital control regulation.

Thereupon, the positive sign of capital control coefficient suggests the lack of effectiveness of capital control on corporates, whereas the negative sign indicates the effectiveness of capital control on both financial and non-financial sectors. As you may have noticed, we do not control both exchange rate variables and capital control variables simultaneously in one specification. This is due to the fact that capital control policies and exchange rate stability are strongly dependent on each other. According to international monetary policy trilemma, if the government imposes capital control at the border, then the country will gain the ability to stabilize the exchange rate and the independence of domestic monetary policy. If, instead, the government is willing to let exchange rate float according to market forces, then the capital are free to flow across borders and monetary authorities still maintain the independence of domestic monetary policies. Hence, the bottom line is, we are not able to identify the clean effect of capital control and exchange rate variables separately, by putting both of them into one specification.

$$Net\_Debt\_Issuance_{it} = \beta_0 + \beta_1 Capital\_Control_{it-1} + \beta_2 Real\_GDP\_Growth_{it-1}$$
$$+\beta_3 Current\_Account\_Balance_{it-1} + \gamma_t + \delta_i + \varepsilon_{it}$$

(2)

3.3 Advanced Economy Monetary Policy Spillovers: An Indirect Test based on Corporate Risk Premium

As explained in the introduction, there may exist advanced economy monetary policy transmission effect. In this study, we perform an indirect test based on the effect of corporate risk premium. If β_1 is negative, which suggests a decrease in risk premium will increase corporate debt issuance,

provides a piece of supportive evidence in the process of monetary policy spillovers. We test this

hypothesis by adding back all the variables in the previous regressions and are able to show that

risk premium indeed causes the rise in corporate overseas debt issuance.

$$Net\_Debt\_Issuance_{it} = \beta_0 + \beta_1 Risk\_Premium_{it-1} + \beta_2 Real\_GDP\_Growth_{it-1} + \beta_3 Current\_Account\_Balance_{it-1}$$

$$+\beta_4 Exchange\_Volatility_{it-1} + \beta_5 Exchange\_Rate_{it-1} + \beta_6 Capital\_Control_{it-1} + \gamma_t + \delta_i + \varepsilon_{it}$$

$$(3)$$

We control for both country fixed effect and year fixed effect in panel regressions in all the model

estimations. The standard errors we report in our paper are Driscoll and Kraay (1998) robust

standard errors. Driscoll and Kraay (1998) propose a nonparametric covariance matrix estimator

that produces heteroscedasticity- and autocorrelation- consistent standard errors that are robust

to general forms of spatial and temporal dependence. Because the nonparametric technique of

estimating standard errors place no restrictions on the limiting behavior of the number of panels,

the size of cross-sectional dimension in finite sample does not constitute a constraint on feasibil-

ity. These features make Driscoll and Kraay (1998) standard error the most suitable candidate in

our models. Our sample includes 32 countries and quarterly data observations spanning across

1993-2015. Clearly, we have limited cross-sectional dimensions but relatively large time series di-

mensions. Since our conjectures are mostly based on the stylized fact in emerging markets, we

split the sample countries into emerging market subsample (20 countries) and advanced economy

subsample (12 countries).

4 Data Description

Our sample includes 32 countries[3] during the period 1993Q3: 2015Q1. The key variable we are interested in, net debt issuance based on nationality of corporate issuers, is from Bank of International Settlement (BIS) website. Luckily, we are also able to find a dataset, just available recently, about capital control measures in various financial markets, constructed based on IMF annual reports. This dataset allows us to disentangle the effect of the capital control policies in each financial sector on corporate overseas debt issuance separately. Table 1 lists all the data sources we use in this study.

Table 1: Data Sources

Variable	Data Source
Net Debt Issuance (Millions of USD)	Bank for International Settlements (BIS): http://www.bis.org
Exchange Rate (Quarterly Average)	OANDA: http://www.oanda.com
Exchange Rate Volatility	OANDA: http://www.oanda.com
GDP Growth Rate (%)	FRED: https://fredqa.stlouisfed.org; IFS: http://www.imf.org
Current Account Balance (Millions of USD)	IFS: http://www.imf.org
Foreign Reserve Growth Rate (%)	IFS: http://www.imf.org
Risk Premium (Junk Spread) (%)	FRED: https://fredqa.stlouisfed.org
Capital Control Measures (range: [0,100])	NBER: http://www.nber.org/data/international-finance/

The variables used in this paper are constructed as described below.

Net Debt Issuance: We remove the seasonality in the international debt security amount outstanding, which are issued by non-financial corporates and categorized based on nationality of issuers. Then first difference these series to get net debt issuance in millions of US dollars for each country.

Exchange Rate:measured in direct quote, i.e. in domestic currency per unit of US dollar. We take the average of the daily closing rate in the quarter to serve as quarterly average exchange rate.

Exchange Rate Standard Deviation: The standard deviation of exchange rate within the quarter based on the daily closing rate.

Exchange Rate Volatility: $= (ExchangeRateStandardDeviation/ExchangeRate) * 100$. It can be interpreted as percentage deviation from the quarterly average. This measure of exchange rate volatility

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[3]The 32 countries we use in this study are based on data availability. These countries are Argentina, Australia, Brazil, Canada, Chile, China, Czech Republic, Denmark, Hong Kong, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Japan,Korea, Malaysia, Mexico, New Zealand, Norway, Peru, Philippines, Poland, Russia, Singapore, South Africa, Sweden, Switzerland, Thailand, Turkey, UK.

gets rid of unit of measures, therefore is comparable across currencies.

Real GDP Growth Rate: We take log difference of seasonality-adjusted real GDP to get the quarterly GDP growth rate.

Current Account Balance: We remove seasonality in current account balance data and convert series to be measured in millions of US dollars.

Foreign Reserve Growth Rate: We take log difference of official reserve assets which are measured in US dollars.

Risk Premium: We use BAA corporate bond rate minus 10-year Treasury bond rate to measure risk premium in corporate bonds.

Capital Control Measures: We use international capital control indexes on the money market/ bond market/ equity market/ real estate market/ foreign direct investment separately. These measures are continuous variables ranging from 0 to 100. This variable is only available between 1995 and 2013.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Net Debt Issuance (Millions of USD)	358.199	2077.493	-22934.971	23020.229	2720
Exchange Rate	356.624	1599.789	0.014	10000	2738
Exchange Rate Standard Deviation	2.82	35.909	0	1151.724	2738
Exchange Rate Volatility	1.7	1.956	0	48.979	2738
Real GDP Growth	0.88	1.816	-12.074	42.294	2637
Current Account Balance (Millions of USD)	2127.202	11555.506	-39157.066	108339.003	2603
Foreign Reserve Growth	2.743	10.293	-95.652	85.048	2815
BAA minus 10 Treasury Bond Yield	2.406	0.794	1.37	5.58	2855
Capital Control: Money Market	38.035	38.612	0	100	2432
Capital Control: Bond Market	36.397	39.083	0	100	2176
Capital Control: Real Estate Market	47.862	36.247	0	100	2432
Capital Control: Direct Investment	41.612	40.304	0	100	2432
Capital Control: Equity Market	37.87	39.116	0	100	2432

5 Results and Interpretation

5.1 Price Arbitrage Hypothesis VS. Risk Management Hypothesis

Price arbitrage hypothesis implies that domestic currency depreciation and volatile exchange rate against US dollar has a negative impact on corporate overseas net debt issuance. Whereas, risk management hypothesis suggests that domestic currency depreciation will stimulate export and create larger currency exposure position needed to be hedged by issuing overseas liabilities, and the more volatile the exchange rate against US dollar, the stronger the incentive for corporates to hedge the exposures. These ideas implies a positive impact on overseas debt issuance from domestic currency depreciation and exchange rate fluctuation, from the risk management perspective.

Table 3 reports the results from the first model that tests price arbitrage against risk management hypothesis. In all specifications, as the exchange rate increases, i.e. domestic currency depreciates, corporate overseas debt issuance will decrease; as exchange rate becomes more volatile, the less the corporate will issue debt securities overseas. This result is in line with price arbitrage hypothesis. The corporates issue debt overseas in expecting that domestic currency will appreciate against US dollar. From model specifications (1) to (4), we add real GDP growth and current account balance to control for the economic fundamentals. Interestingly, current account balance is insignificant in explaining corporate overseas debt issuance, which confirms the result that corporate overseas debt issuance does not strongly associate with hedging foreign currency receivable exposure. In the last column, by adding the growth rate of official reserve, a proxy for government foreign exchange market intervention, we find that government intervention stabilizes corporate debt issuance by mitigating the effect of exchange rate volatility, while the exchange rate variables still play a significant role in explaining the corporate overseas debt issuance behavior.

Table 4 reports the same regressions using advanced economy subsample. No significant impacts are found for exchange rate and exchange rate volatility, which suggests that corporates in ad-

Table 3: Price Arbitrage Hypothesis and Risk Management Hypothesis: Emerging Markets

This table is to test the two hypotheses based on the contradictive implication on exchange rate and exchange rate volatility. The dependent variable is corporate net overseas debt issuance within the quarter. Exchange rate is measured using direct quote, i.e. the amount of domestic currency per unit of US dollar can purchase. Therefore an increase in exchange rate is equivalent to domestic currency depreciation. Exchange rate volatility is measured as the percentage deviation from the quarterly average of exchange rate. Price arbitrage hypothesis predicts both coefficients of exchange rate and its volatility are negative, whereas the risk management hypothesis predict the opposite. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance
Exchange Rate Volatility (t-1)	-13.19**	-14.37**	-18.47**	-19.72**	-15.84**
	(-2.11)	(-2.20)	(-2.72)	(-2.64)	(-2.18)
Exchange Rate (t-1)		-0.0281**	-0.0651*	-0.0584*	-0.0558*
		(-2.38)	(-1.99)	(-1.95)	(-1.86)
Real GDP Growth (t-1)			-16.94	-18.34	-18.63
			(-0.95)	(-1.06)	(-1.08)
Current Account Balance (t-1)				0.00430	0.00409
				(1.60)	(1.52)
Official Reserve Growth (t-1)					3.331
					(1.32)
Constant	515.7***	530.6***	227.3***	1001.2***	1003.3***
	(18.19)	(18.31)	(2.91)	(12.04)	(12.09)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	1629	1629	1564	1469	1469

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

vanced economies are not sensitive to exchange rate variables in overseas bond issuance activities. Together with insignificant effect from current account balance, we could not support either of the hypothesis in advanced economies. Our conjecture is that corporates in advanced economies could issue bonds overseas in domestic currency so that these firms are less sensitive to exchange rate variables. Another interpretation could be, if countries fall into more flexible exchange rate regimes, there is less opportunity to conduct price arbitrage in the foreign exchange markets. Most emerging markets impose much stronger capital control at the border to stabilize the exchange rate and maintain monetary policy independence. Thereupon, the exchange rates in emerging markets may not reflect market expectation about the true exchange rate against US dollar. It will take much longer time to arbitrage away these zero-risk opportunities because capitals need to find a way to walk around the capital control regulation at the border. Whereas, in advanced economies, domestic financial markets are well integrated into international financial markets and the overall capital control levels are much lower at the border for these counties. Corporates headquartered in advanced economies presumably on average face a smaller interest rate gap at the border, due to financial market integration. Moreover, they do not have comparative advantage, compared to financial corporates, to rise as financial intermediaries because of less regulation at the border. Overall, there is no evidence to support the price arbitrage hypothesis for the corporates in advanced economies.

To summarize, the results from the first model support the conjecture that price arbitrage incentive dominates corporates overseas debt issuance behavior in emerging markets. This assessment is in line with the micro evidence from Black and Munro (2010), which concludes that price arbitrage is the most important incentive for corporates to issue bonds overseas, although the evidence for financial corporates is even more prevalent. On the other hand, there is no such evidence found among the counterparts in advanced economies. Shin and Zhao (2013) suggests that corporates in advanced economies behave more like textbook-version corporates.

Table 4: Price Arbitrage Hypothesis and Risk Management Hypothesis: Advanced Economies

This table is to test the two hypotheses based on the contradictive implication on exchange rate and exchange rate volatility. The dependent variable is corporate net overseas debt issuance within the quarter. Exchange rate is measured using direct quote, i.e. the amount of domestic currency per unit of US dollar can purchase. Therefore an increase in exchange rate is equivalent to domestic currency depreciation. Exchange rate volatility is measured as the percentage deviation from the quarterly average of exchange rate. Price arbitrage hypothesis predicts both coefficients of exchange rate and its volatility are negative, whereas the risk management hypothesis predict the opposite. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1)	(2)	(3)	(4)	(5)
	Net Debt Issuance	Net Debt Issuance	Net Debt Issuance	Net Debt Issuance	Net Debt Issuance
Exchange Rate Volatility (t-1)	-130.4	-129.6	-124.8	-154.2	-155.6
	(-1.32)	(-1.33)	(-1.26)	(-1.61)	(-1.61)
Exchange Rate (t-1)		-5.985	-3.817	-3.915	-4.399
		(-0.40)	(-0.25)	(-0.26)	(-0.29)
Real GDP Growth (t-1)			-8.865	2.147	4.960
			(-0.19)	(0.04)	(0.10)
Current Account Balance (t-1)				-0.0108	-0.0107
				(-0.47)	(-0.47)
Official Reserve Growth (t-1)					-6.018
					(-0.99)
Constant	-386.2**	-275.0	-317.5	53.21	74.85
	(-2.44)	(-0.87)	(-1.01)	(0.13)	(0.18)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	1011	1011	1003	949	949

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2 The Effectiveness of Capital Control in Emerging Markets

Typically we would expect a reduction in cross-border activities from all market participants when facing a strengthened international regulation. This intuition implies a negative impact of capital control on corporate debt issuance overseas. Table 5 reports the effect of capital control on corporate debt issuance in emerging markets. Surprisingly, we find that capital control on bond market are positively correlated with corporate overseas debt issuance. This result suggests that corporates may exercise their comparative advantage as surrogate financial intermediaries, while financial sectors face strict regulation at the border. This result, together with Caballero et al (2015), illustrates the importance of corporate overseas debt issuance as surrogate financial service in countries where strict international capital flow regulation is in place.

Table 5: The Effectiveness of Capital Control: Emerging Markets

The table is to study the effect of capital control on corporate overseas debt issuance behavior. The dependent variable is corporate net overseas debt issuance within the quarter. In all specifications, we control for economic fundamentals, i.e. current account balance and the real GDP growth rate. In each specification, we add one capital control index on a specific financial sector, in order to test which capital control policy plays a role in explaining corporate overseas debt issuance. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance
Real GDP Growth (t-1)	-12.22	-19.01	-12.44	-11.75	-13.32
	(-0.64)	(-0.93)	(-0.66)	(-0.61)	(-0.70)
Current Account Balance (t-1)	0.00584*	0.00671**	0.00599**	0.00582**	0.00525*
	(2.05)	(2.37)	(2.16)	(2.24)	(1.88)
Capital Control: Money Market (t-1)	0.672				
	(0.53)				
Capital Control: Bond Market (t-1)		2.797***			
		(3.15)			
Capital Control: Equity Market (t-1)			1.777		
			(1.60)		
Capital Control: Real Estate Market (t-1)				0.310	
				(0.22)	
Capital Control: Direct Investment (t-1)					2.679
					(1.53)
Constant	32.75	120.8	-50.10	57.22	-118.9
	(0.40)	(1.62)	(-0.61)	(0.65)	(-0.91)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	1392	1276	1392	1392	1392

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Using advanced economy data in the same specifications (Table 6), we see the opposite pattern: capital controls in financial markets are negatively correlated with corporate overseas debt issuance. This difference in response to capital control across border reflects that corporates in emerging markets have strong incentive to walk around capital control to tap into international bond market, whereas corporates in advanced economies typically follow the regulation to reduce cross-border financial activities. Especially among our sample countries, many advanced economies have international financial centers in their home countries or they are by themselves financial centers (e.g. Hong Kong and Singapore). Corporates in these countries do not have strong incentive to issue bonds overseas, when they face more strict capital control at the border.

Table 6: The Effectiveness of Capital Control: Advanced Economies

The table is to study the effect of capital control on corporate overseas debt issuance behavior. The dependent variable is corporate net overseas debt issuance within the quarter. In all specifications, we control for economic fundamentals, i.e. current account balance and the real GDP growth rate. In each specification, we add one capital control index on a specific financial sector each time, in order to test which capital control policy plays a role in explaining corporate overseas debt issuance. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance
Real GDP Growth (t-1)	12.18	30.35	13.52	20.41	16.76
	(0.22)	(0.53)	(0.25)	(0.38)	(0.31)
Current Account Balance (t-1)	0.00851	-0.00363	0.00764	0.00631	0.00567
	(0.34)	(-0.17)	(0.30)	(0.25)	(0.22)
Capital Control: Money Market (t-1)	-12.15***				
	(-3.19)				
Capital Control: Bond Market (t-1)		-5.617*			
		(-1.97)			
Capital Control: Equity Market (t-1)			-9.425**		
			(-3.02)		
Capital Control: Real Estate Market (t-1)				1.096	
				(0.37)	
Capital Control: Direct Investment (t-1)					-7.657
					(-1.14)
Constant	-1167.1***	-761.0***	-1188.4***	-1279.9***	-1106.9***
	(-4.75)	(-3.31)	(-4.84)	(-4.82)	(-4.08)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	871	799	871	871	871

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.3 Advanced Economy Monetary Policy Transmission and an Indirect Test Based on Risk Premium

There exists a common sense that compression in corporate risk premium originates from expansionary monetary policy in advanced economies, among researchers and market participants. To test monetary policy spillover effect, one of the key factors in the spillover chain is the response of corporate overseas debt issuance from compression in risk premium. In the third model, we test this broad hypothesis by providing some supportive evidence from the impact of risk premium on corporate overseas debt issuance behavior. Table 7 provides strong evidence to support that corporates issue more bonds overseas in response to compression in risk premium in emerging market economies.

Table 7: Advanced Economy Monetary Policy Transmission: An Indirect Test (Emerging Market Subsample)

This table performs an indirect test on advanced economy monetary policy spillover effect based upon corporate risk premium. The dependent variable is corporate overseas net debt issuance within the quarter. If a decrease in risk premium is followed by an increase in corporate overseas debt issuance, we conclude that there is some evidence to support the monetary policy spillover effect. Risk premium is measured by BAA bond yield minus 10 year Treasury bond yield, which captures corporate risk premium. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance	(6) Net Debt Issuance
Risk Premium (t-1)	-119.5**	-137.7**	-147.6**	-142.2**	-141.4**	-169.0***
	(-2.44)	(-2.66)	(-2.68)	(-2.56)	(-2.55)	(-3.11)
Real GDP Growth (t-1)		-15.52	-16.75	-20.86	-22.21	-26.33
		(-0.94)	(-1.06)	(-1.30)	(-1.42)	(-1.55)
Current Account Balance (t-1)			0.00474*	0.00471*	0.00437	0.00664**
			(1.82)	(1.80)	(1.66)	(2.40)
Exchange Rate Volatility (t-1)				-15.92**	-18.41**	-6.883
				(-2.30)	(-2.42)	(-1.13)
Exchange Rate (t-1)					-0.0576*	-0.0302
					(-1.91)	(-1.52)
Capital Control: Bond Market (t-1)						2.749***
						(3.01)
Constant	549.7***	995.0***	1043.7***	1264.6***	1297.5***	1019.1***
	(5.58)	(4.53)	(4.38)	(8.93)	(9.24)	(4.25)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1700	1597	1502	1469	1469	1276

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

No significant effect in advance economies (Table 8) suggests that corporates in these countries do have different incentive in conducting cross-border activities, compared to the emerging market counterparts. In advanced economies, domestic financial markets are well connected in the international financial market. Compression in risk premium in international bond market also imply compression in risk premium in domestic bond market. Therefore, these firms have no strong incentive to go abroad to issue bonds, whereas the corporates in emerging markets face a segregation between domestic bond market and international bond market.

Table 8: Advanced Economy Monetary Policy Transmission: An Indirect Test (Advanced Economy Subsample)

This table performs an indirect test on advanced economy monetary policy spillover effect based upon corporate risk premium. The dependent variable is corporate overseas net debt issuance within the quarter. If a decrease in risk premium is followed by an increase in corporate overseas debt issuance, we conclude that there is some evidence to support the monetary policy spillover effect. Risk premium is measured by BAA bond yield minus 10 year Treasury bond yield, which captures corporate risk premium. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance	(6) Net Debt Issuance
Risk Premium (t-1)	-33.45	-38.14	-74.25	33.67	32.78	98.31
	(-0.10)	(-0.11)	(-0.21)	(0.09)	(0.09)	(0.25)
Real GDP Growth (t-1)		-5.659	3.825	5.418	3.562	22.93
		(-0.11)	(0.07)	(0.11)	(0.08)	(0.48)
Current Account Balance (t-1)			-0.00951	-0.0110	-0.0108	-0.00431
			(-0.41)	(-0.48)	(-0.47)	(-0.17)
Exchange Rate Volatility (t-1)				-156.6	-156.5	-156.8
				(-1.44)	(-1.46)	(-1.31)
Exchange Rate (t-1)					-3.905	-10.48
					(-0.26)	(-0.56)
Capital Control: Bond Market						-2.222
						(-0.24)
Constant	1606.3	1636.7	-1035.6	-1030.5	-953.3	0
	(1.03)	(1.05)	(-1.44)	(-1.43)	(-1.37)	(.)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1020	1003	949	949	949	796

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

These results offer some support to the idea of advance economy monetary policy spillover effect. Although the less integration of emerging markets in international financial system, monetary policy in advanced economies do push international investors to crack through border barriers to chase for yield; and meanwhile market participants in emerging markets also try to walk around

the regulation to arbitrage the return across the borders. This phenomenon raises the concern about the relevant liquidity measures for policy makers, even for those policy makers in countries where impose tight capital regulation at the borders. They may also need to put an eye on the global liquidity measure, as it helps explain anomalies in domestic liquidity supply. (Chung et al, 2014)

In the most complete regression estimation, we include all the three sets of variables together with real economic fundamentals. The effect of exchange rate variables disappears. This result may imply that the effect of capital control can dominate the effect of exchange rate variables because they are strongly interdependent and it is hard to tease apart the marginal effect if we try to regress them simultaneously in one estimation. Without controlling for capital control policies, we found the consistent results as in previous model specifications.

6 Robustness Check

So far, our main results show that the compression in risk premium increases corporate overseas debt issuance and the stronger regulation policy makers impose at the border, the more bonds corporates issue overseas. These features seem to suggest the role of corporates as surrogate financial intermediaries. If this interpretation is solid, by adding the interaction between risk premium and capital control measures, we should see the effect of this interaction term is negative in the second phase of global liquidity. The reason is as follows. If corporates are indeed surrogate financial intermediaries, they have stronger incentive to issue overseas when both risk premium is lower and financial corporates face more strict capital control at the borders. Given a constant level of capital control, the lower the corporate risk premium is, the more corporate bond issuance. Given a constant level of risk premium, the tighter the capital control is, the less corporate bond issuance. This is because, corporate capital cost from issuing bonds is the risk free interest rate plus corporate risk premium. A constant level of risk premium implies a constant level of capital cost in the bold part. Given a constant level of capital cost, the corporates should have less incentive to serve as surrogate

financial intermediaries when facing more strict capital regulation at the borders. Therefore, the effect of the interaction term in the second phase of global liquidity is expected to be negative if corporates indeed serve as surrogate financial intermediaries.

We provide the robustness test results in Table 9 below. To tease apart the effect of capital control and risk premium, we incorporate them separately in different regressions and also split the whole sample based on the timing of the second phase of global liquidity. The first two columns report the effect of capital control on corporate overseas debt issuance. The effect of capital control in the 2007-2013 subsample is positive and three times as much as the counterpart in the 1993-2006 subsample, suggesting that strengthened international capital control policies indeed stimulate corporates to act as financial intermediaries across borders. The middle two columns report the effect of risk premium on corporate overseas debt issuance. Corporates were not sensitive to corporate risk premium before 2007. However, since 2007, one percentage decrease in corporate risk premium lead to more than 100 million US dollar more corporate bond issuance within the following quarter. The last two columns provide further evidence to support the corporate role as surrogate financial intermediaries in the second phase of global liquidity. The effect of interaction term between capital control and risk premium is insignificant before 2007, while in the second phase of global liquidity, the coefficient of the interaction is negative and significant. Based on the intuition described in the last paragraph, the data favor the conjecture about corporates behaving like financial intermediaries. It is worth to point out, in the last two regressions, we control for linear time trend instead of time fixed effect because our capital control measures are in annual frequency. There will not exist meaningful variation in the interaction term if we control for annual time fixed effect. Therefore, we instead use annual time trend to control for the variation over time.

To sum up, we perform a robustness check to verify our interpretation about corporates serving as financial intermediaries, with further evidence by exploiting information in subsamples and allowing for the interaction between variables.

Table 9: The Corporate Role as Surrogate Financial Intermediary: A Robustness Check

The table provides the effect of capital control and risk premium on corporate overseas debt issuance before and after 2007, when was perceived as the start of the second phase of global liquidity. The negative sign of the coefficient of the interaction term of capital control and risk premium is line with the corporate role as surrogate financial intermediaries, because the corporate overseas issuance is expected to increase when both capital control is strengthened and risk premium is falling. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance	(6) Net Debt Issuance
Real GDP Growth (t-1)	7.180	-27.07	4.520	-39.94**	7.551	-32.50
	(0.67)	(-1.12)	(0.62)	(-2.41)	(0.65)	(-1.69)
Current Account Balance (t-1)	-0.00906**	0.00101	-0.00921**	0.000421	-0.00869*	0.0000590
	(-2.19)	(0.11)	(-2.31)	(0.05)	(-2.03)	(0.01)
Capital Control: Bond Market (t-1)	2.901***	9.528***			2.285	15.46***
	(4.44)	(3.22)			(1.42)	(5.18)
Risk Premium (t-1)			11.33	-220.0***	-116.6***	40.03
			(0.21)	(-3.99)	(-3.75)	(0.74)
Capital Control(Bond)*Risk Premium(t-1)					0.284	-2.119**
					(0.38)	(-2.56)
year					13.37*	126.1***
					(1.78)	(5.74)
Constant	78.85	-18.28	0	1388.2***	-26572.9*	-253503.1***
	(1.40)	(-0.09)	(.)	(6.50)	(-1.77)	(-5.76)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	No	No
Observations	719	557	898	604	719	557

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7 Conclusions and Policy Implication

This paper studies the determinants of corporate overseas debt issuance in 32 countries during the period 1993-2015. The results provide some macro evidence to support the conjecture that corporates in emerging markets serve as financial intermediaries at the border to facilitate global liquidity transmission. Corporates hold a carry trade position, in other words, borrowing liabilities in foreign currency and holding assets in domestic currency, during the periods when domestic currency is expected to appreciate against US dollar and the exchange rate is less volatile. The rise in corporate overseas debt issuance can be explained as the product of advanced economy monetary policy spillover and capital control policies at the border. As corporate risk premium compresses, corporates have incentive to serve as surrogate financial intermediaries across border, especially in countries where domestic financial sector faces strict international capital flow regulation.

Policy makers should carefully evaluate the potential side effect from international capital control policies. Ill-designed these policies reduces the effectiveness of cross-border capital control.

Furthermore, these policies may create the systematic risk outside the traditional framework and makes it harder for policy makers to monitor and manage international capital flow activities. Additionally, policy makers should be aware the international financial risk transmission through either monetary policy shocks in advanced economies or financial risk materialization in emerging market corporates. The last but not the least, domestic currency depreciation and volatile exchange rate against US dollar may add uncertainty in the capacity for emerging markets corporates to borrow and rollover the existing debt.

8 Appendix

Table 10: Price Arbitrage Hypothesis and Risk Management Hypothesis: All Countries

This table is to test the two hypotheses based on the contradictive implication on exchange rate and exchange rate volatility. The dependent variable is corporate net overseas debt issuance within the quarter. Exchange rate is measured using direct quote, i.e. the amount of domestic currency per unit of US dollar can purchase. Therefore an increase in exchange rate is equivalent to domestic currency depreciation. Exchange rate volatility is measured as the percentage deviation from the quarterly average of exchange rate. Price arbitrage hypothesis predicts both coefficients of exchange rate and its volatility are negative, whereas the risk management hypothesis predict the opposite. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance
Exchange Rate Volatility (t-1)	-22.77*	-25.03**	-28.11**	-30.82**	-29.53**
	(-1.97)	(-2.08)	(-2.32)	(-2.33)	(-2.19)
Exchange Rate (t-1)		-0.0602***	-0.0501**	-0.0480*	-0.0471*
		(-4.71)	(-2.23)	(-1.82)	(-1.78)
Real GDP Growth (t-1)			-18.15	-17.92	-18.15
			(-0.98)	(-0.91)	(-0.93)
Current Account Balance (t-1)				-0.000893	-0.000946
				(-0.11)	(-0.11)
Official Reserve Growth (t-1)					1.241
					(0.46)
Constant	-259.4***	-236.4***	-252.7***	-28.48	-33.61
	(-5.11)	(-4.71)	(-4.02)	(-0.16)	(-0.19)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	2640	2640	2567	2418	2418

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: The Effectiveness of Capital Control: All Countries

The table is to learn the effect of capital control on corporate overseas debt issuance behavior. The dependent variable is corporate net overseas debt issuance within the quarter. In all specifications, we control for economic fundamentals, i.e. current account balance and the real GDP growth rate. In each specification, we add one capital control index on a specific financial sector each time, in order to test which capital control policy plays a role in explaining corporate overseas debt issuance. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance
Real GDP Growth (t-1)	-9.315	-9.294	-9.263	-9.190	-9.676
	(-0.45)	(-0.38)	(-0.45)	(-0.44)	(-0.47)
Current Account Balance (t-1)	0.00528	0.00281	0.00532	0.00550	0.00490
	(0.68)	(0.42)	(0.68)	(0.70)	(0.62)
Capital Control: Money Market (t-1)	0.852				
	(0.93)				
Capital Control: Bond Market (t-1)		1.852*			
		(1.79)			
Capital Control: Equity Market (t-1)			1.754		
			(1.37)		
Capital Control: Real Estate Market (t-1)				1.365	
				(1.06)	
Capital Control: Direct Investment (t-1)					3.373**
					(2.51)
Constant	169.3***	-176.2	125.6**	129.5*	35.88
	(4.28)	(-1.69)	(2.05)	(1.86)	(0.56)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes
Observations	2263	2075	2263	2263	2263

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: The Effectiveness of Capital Control: All Countries

This table performs an indirect test on advanced economy monetary policy spillover effect based upon corporate risk premium. The dependent variable is corporate overseas net debt issuance within the quarter. If a decrease in risk premium is followed by an increase in corporate overseas debt issuance, we conclude that there is some evidence to support the monetary policy spillover effect. Risk premium is measured by BAA bond yield minus 10 year Treasury bond yield, which captures corporate risk premium. Driscoll and Kraay (1998) robust standard errors are reported in all estimations.

	(1) Net Debt Issuance	(2) Net Debt Issuance	(3) Net Debt Issuance	(4) Net Debt Issuance	(5) Net Debt Issuance	(6) Net Debt Issuance
Risk Premium (t-1)	-87.24	-101.5	-119.1	-106.3	-105.6	-101.8
	(-0.69)	(-0.81)	(-0.90)	(-0.79)	(-0.79)	(-0.74)
Real GDP Growth (t-1)		-15.26	-15.12	-20.31	-21.11	-16.19
		(-0.89)	(-0.84)	(-1.10)	(-1.16)	(-0.75)
Current Account Balance (t-1)			-0.000666	-0.000697	-0.000885	0.00256
			(-0.08)	(-0.08)	(-0.11)	(0.38)
Exchange Rate Volatility (t-1)				-27.50**	-29.30**	-18.35
				(-2.18)	(-2.25)	(-1.41)
Exchange Rate (t-1)					-0.0471*	-0.0523**
					(-1.80)	(-2.57)
Capital Control: Bond Market (t-1)						1.712
						(1.68)
Constant	1174.8**	1243.6**	36.10	1382.5**	1402.8**	0
	(2.14)	(2.31)	(0.13)	(2.43)	(2.46)	(.)
Country Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2720	2600	2451	2418	2418	2075

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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