# China's Offshore Dollar Debt and Corporate Investment

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## Abstract

Offshore bond issuances and redemptions by Chinese nonfinancial corporations have been a major driver of China's capital flows since 2013. In this paper, we show that the surge of China's offshore dollar debt resembles the characteristics of carry trade, similar to those in other major emerging market economies. By interacting the sectoral dummies and offshore issuances of dollar bonds, we also find that offshore bond financing has different impacts on corporate investment across sectors, corresponding to the sectors' reliance on external financing.

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# I. Introduction

In recent years there has been a rapid increase in the overseas bond issuances by emerging market (EM) firms. According to the BIS data, total EM overseas nongovernment securities outstanding (on a nationality-of-issuer basis) grew from less than $1 trillion in 2010 to close to $2.5 trillion by the end of 2016. McCauley, McGuire, & Sushko (2015) pointed out that the majority of the offshore corporate bond issuance has been in the U.S. dollar regardless of where the borrowers (and lenders) are located, and nonbank corporate dollar bonds accounted for the bulk of total dollar bonds for most emerging market economies. The primary driver of the surge in EM's offshore corporate dollar debt, as noted in Bruno & Shin (2017) and Panizza et al. (2017), is related to corporate financial decisions that resemble carry trades. Namely, by issuing dollar debt and using the proceeds to acquire domestic financial assets, firms stand to benefit from an appreciation of the domestic currency against the dollar.

China has been a major part of the EM dollar debt surge. As the Chinese government gradually liberalized the country's capital account, overseas bond issuances by Chinese nonfinancial firms registered a sharp increase from nearly nonexistence in the mid-2000s to about half trillion dollars by 2016. Although the government still imposes tight restrictions on offshore financing by the financial institutions, they have become more supportive for the non-financial corporates to tap into the offshore financial markets (Tang & Zhu (2016)). As the capital account liberalization represents a structural policy change, a natural question is whether the increase in Chinese corporate dollar debt is associated with carry trades, as in other EMs, or it is driven by the more traditional functions of overseas corporate debt, namely, trade financing and precautionary borrowing for future financing needs, see Bohn (1990);Brown, Ongena, & Yeşin (2011);Cohen (2005);Gelos (2003).

Corporate dollar debt moved in line with China's rising corporate leverage, especially in financially constrained sectors such as real estate sectors and utility sectors. China's offshore bond has grown rapidly since 2008 and has jumped to a historically high level at 2014. This moved in line with the rising corporate leverage since the "four-trillion" stimulus package in 2008. Specifically, large amounts of offshore money flew into real estate sector and utility sector which faced severe financial constraints in the domestic credit markets. The real estate sector and the utility sector seemed to raise leverage after issuing offshore bonds, indicating the offshore borrowings served as an alternative access to finance the highly constrained domestic sectors, see Figure 1.

Understanding the drivers of corporate dollar debt is also key to unravelling the significant reversals of China's capital account balances in the last few years. Between 2013 and 2015, there was a roughly $900 billion decline in China's rolling annual capital account flows. Over a half of the swing, about $500 billion, was due to a reversal of residents' net acquisition of external liabilities, usually thought of as debt repayment. Specifically, the fall in Chinese external liabilities primarily reflected the unwinding of loans from non-residents and the repatriation of deposits of non-residents, two key channels for the carry trade. On an annual basis, the increased pace of foreign asset acquisition could explain about 70 percent of the deterioration in the capital account in 2014 but only roughly 15 percent in 2015, see Figure 2. That is, a more rapid reduction of nonresident claims on China has been the dominant driver of capital outflows in 2015 (IMF 2016).

In response to this large capital outflows, the Chinese government applied a wide range of measures, including FX intervention and capital flow management measures, to stem outflow and depreciation pressures. After surging to record levels in 2015-16 (about $640 billion a year), capital outflows came down substantially in 2017 to below $100 billion. Meanwhile, Figure 3 shows total overseas borrowing by Chinese firms continued to rise, but the bulk of the borrowing is now by financial institutions especially banks, rather than by nonfinancial corporations as in the period before 2015.

In this paper, we construct a firm level dataset of offshore bond issuances and redemptions by the publicly listed nonfinancial corporations headquartered in China. We demonstrate that the dollar bond issuances (redemptions) by Chinese nonfinancial corporates are highly correlated with the global financial cycle, thus resembling the characteristics of carry trades, and China's economic policy uncertainty. The major issuers of dollar bonds in the offshore market are large firms and SOEs, with oil & gas, real estate, and the utility sector accounting for the bulk of the offshore dollar bonds. The impact of offshore bond financing on corporate investment differs across sectors. For SOEs with easy access to domestic bank financing, funding raised through offshore bond market seems to link to the SOEs' role in domestic financial intermediation (entrusted loans), rather than for investment purposes.

## II.    Data and Sample

**Data Source**

Our dataset combines the corporate bond data from Dealogic and the firm-level data from DataStream (Thomson Reuters) for the period of 2005-16 for all listed firms headquartered in China. As many Chinese corporates chose to issue foreign currency bonds through their HK subsidiaries, sometimes to circumvent the regulations in the onshore bond markets, we chose to use the firms with headquarters located in mainland China instead of Chinese firms by nationality. The Dealogic dataset contains 25,123 observations of domestic and international bond issuances by 6,027 issuers with headquarters in China. There are 2,254 U.S. dollar bonds issued by 476 corporates between 2005 and 2016, out of which 557 bonds were issued by 150 publicly listed nonfinancial corporates.[1]

The DataStream dataset contains data of 2,827 listed firms headquartered in mainland China. Out of these firms, there are 2,365 firms listed in Shanghai and Shenzhen stock exchanges and 462 firms listed in Hong Kong. We manually combined the two datasets by matching the bond issuers in Dealogic and the publicly listed firms in DataStream. About one-third of the firms in the combined sample issued at least one bond in 2005-16, and 6 percent of the firms in the sample issued dollar bonds. One thing to note here, Figure 4 shows most offshore bonds by Chinese non-financial corporates are denominated in US dollar and only less than 10% of total outstanding is denominated in other currencies, such as Euro and Yen.

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[1] More specifically, we first dropped from the Dealogic sample the 7,760 bonds issued by Chinese financial institutions and 634 bonds issued by the central government. We then dropped the 12,508 bonds issued by non-listed firms. The remaining 4,671 bonds were issued by 1,370 issuers controlled by 871 listed firms, of which 557 bonds were issued by 238 firms (controlled by 150 parent firms) in the U.S. dollar. This is our final sample of the dollar bond issuers. We manually matched the dollar bond sample with the listed firms for the period of 2005 to 2016.

**Bond Issuances**

Our sample indicates that offshore bond issuances by Chinese non-financial corporates have been closely linked to the global financial cycle. Figure 6 illustrates total issuances started to grow rapidly after 2013 and reached the peak of $157 billion in 2015Q2, before dropping to $48 billion in 2016Q4. The average maturity of the dollar denominated bonds has remained stable at around 6 years. Most of the nonfinancial corporate dollar bonds issued during the boom period between 2013 and 2015 need to be repaid in 2018-19. In fact, there was a first wave of redemption in 2015 that was accompanied by RMB depreciation and massive capital outflow.

This cyclical behavior of offshore bond issuances resembles the characteristics of carry trades. Figure 7 shows before the global financial crisis, the 5y U.S. Treasury bill yield was almost twice as the 5y Chinese government bond yield. The interest rates converged after the global financial crisis, and by 2008, China's 5y government bond yield surpassed that of the U.S. 5y Treasury. The spread escalated after 2013 to around 2 percent in 2015 until the episode of "taper tantrum". Similarly, before 2008, the average yield of the dollar bonds issued by Chinese corporations, at around 10 percent, was twice as much as that of yuan denominated bonds. By 2013Q1, the average yields of Chinese onshore corporate bonds surpassed the offshore bond yields, with a spread of more than 100 basis points..

**Dollar Bond Issuers**

China's offshore dollar bond issuances are dominated by large firms and SOEs. As shown in Figure 8, firms with access to the offshore bond markets are on average twice as large as their onshore counterparts. In 2016, the average assets of the offshore bond issuers reached $2.2 billion compare to $1.2 billion of the corporates that only issued bonds in the onshore market. SOEs account for an increasing share of the bond issuers in the offshore market than in the onshore market (Figure 8).

At the sectoral level, our sample indicates that oil & gas, real estate, and the utility sector have the highest exposures to the offshore bond market. For the oil & gas sector, their total outstanding of dollar bonds grew from $1.7 billion in 2006 to $166 billion in 2016, accounting for 35 percent of the total dollar bonds outstanding. This is perhaps due to the fact that most global commodity transactions are denominated in the dollar, and the offshore bond market serves as an important source of foreign currency funding. The real estate sector accounts for 20 percent of the total and the utility sector 10 percent. Altogether, these three sectors account for two thirds of the total dollar bonds issued by Chinese non-financial corporates. The real estate sector used to dominate offshore bond issuances before 2011, accounting for more than 60 percent of the total (Figure 9). Its share, however, has declined to less than 20 percent by 2016.

There has been a rapid increase in the dollar bond issuances by the utility sector in the last two years. Figure 9 shows that the absolute value of the dollar bond issuances continued to grow since 2011, and its share of total issuance has surged from 5 percent in 2011 to 14 percent in 2016, only second to the oil & gas sector and the real estate sector. One noticeable feature of the utility sector is that most of the firms are local government financial vehicles (LGFV or city construction companies), which has been under increasingly scrutiny domestically with the government's effort to tighten local government financing frameworks.

# III.    Empirical Analysis

## The Determinants of Offshore Dollar Bond Issuances

In this sector we employ a linear regression model to detect the determinants of the dollar bond issuances by Chinese non-financial corporations. Specifically, we regress the dummy variable of dollar bond issuance on a set of firm characteristics and the policy uncertainty index.

$$USD\ ISSUER_{i,t} = X_{i,t}\beta + EPU_t\delta + \alpha_i + \varepsilon_{i,t} \qquad (1)$$

The issuer dummy $USD\ ISSUER_{i,t}$ takes the value 1 if firm $i$ issues dollar bonds in year $t$. The firm characteristics $X_{i,t}$ includes external financial dependence (defined as investment minus net income scaled by investment), profit growth (revenue growth), Tobin's Q (market value divided by book value), leverage (total debt over equity), and profitability (proxied by return on assets, ROA). We also replace the time fixed effect by economic policy uncertainty $EPU_t$. Baker, Bloom, & Davis (2016) developed the EPU index to proxy for movements in policy-related economic uncertainty for the world major economies. They showed this indicator is associated with many macro variables such as output, investment, unemployment, and stock price.

We start by regressing the issuer dummy over firm characteristics and a set of year fixed effects (Table 1). Column 1-7 show that external financial dependence is negatively correlated with the likelihood of issuing dollar bonds. As Shin & Zhao (2013) suggested, firms normally use internal sources to finance projects or operations and only seek outside funds after internal funds are exhausted. This "pecking order" implies that the foreign bond market should be the last resort for finance (Myers (1984)). Profitability, size, and leverage are not correlated with the likelihood of issuing dollar bonds. Bruno & Shin (2017) found similar results for their sample of emerging market countries. USD bond issuance is positively correlated with higher leverage and higher ROA. This is not surprising when we take into account of the reverse effect that to certain extent, the USD bond issuance raise the profitability and the leverage of a firm. Panizza et al. (2017) also found Chinese USD borrowers tend to boost profits through carry trade activities.

One interesting result is the correlation between dollar bond issuance and China's economic policy uncertainty. In column 7 we add China's economic policy uncertainty index in the regression and find a significant negative correlation with offshore bond issuance. Baker, Bloom, & Davis (2016) found that economic policy uncertainty delays the financing decisions and hence retards investment, employment, and output in US. Our result implies that in emerging markets like China, policy uncertainty is also one of the major factors that deters offshore bond issuances. The depressive effect of uncertainty is related to upward pressure on cost of finance (Gilchrist, Sim, & Zakrajšek (2014)), managerial risk-aversion (Panousi & Papanikolaou (2012)), and interactions between nominal rigidities and search frictions (Bundick & Basu (2015)). As robustness check, we estimate the logit model and obtain the same results as the linear regression model.

The above results suggest that firms may not utilize foreign bond market to finance real investment demands. Instead, our evidence supports Bruno and Shin (2016) that firms with limited investment opportunities may borrow abroad to generate financial profits through carry trade activities.

**Dollar Bond Issuance and Corporate Investment**

The above section has suggested that issuances of dollar bonds by Chinese non-financial corporations have little to do with financial dependence. In this section, we show more evidence that firms are not proceeding the dollar liabilities into real investment, neither fixed asset investment nor inventory investment.

If firms proceed the dollar debt into real investment, we should find a positive correlation between the dollar bond issuance and capital expenditure (or inventory investment). Therefore, we run the following regression to test the hypothesis.

$$Invesmtent_{i,t} = USD\ ISSUER_i * \beta + X_i\Gamma + \alpha_i + \tau_t + \varepsilon_{i,t} \qquad (2)$$

Investment is comprised by two components—fixed asset investment and inventory investment. We employ two proxies for the two types of investment on the left hand side. Capital expenditure $CapExp_{i,t}$ is a proxy for fixed asset investment which is defined as net increase of PPE of firm $i$ in year $t$ over PPE in year $t-1$. Inventory investment $Inventory\ Investment_{i,t}$ is defined as net increase of inventory of firm $i$ in year $t$ divided by inventory in year $t-1$. On the right hand side, the key explanatory variable is the dummy variable which takes the value 1 if firm $i$ issues dollar bonds in year $t$, and 0 if otherwise. We also add the same vector of firm characteristics of external financial dependence, profit growth, Tobin's Q, leverage, and profitability.

Table 2A and 2B show the regression results on capital expenditure and on inventory investment. Table 2A shows a significantly negative correlation between dollar bond issuances and capital expenditure. Dollar bond issuers have on average less than 10 percentage point less capital expenditure. At the same time, firms with higher revenue growth, higher Tobin's Q, higher leverage, and higher ROA tend to invest more on fixed assets. We also find that if a firm is more dependent on external funding, it is more cautious to invest due to higher exposure to refinancing risks. The result is robust if we augment the lagged capital investment in year $t-1$ on the right hand side and use system GMM to estimate the dynamic model. System GMM result confirms a negative correlation between dollar bond issuances and capital expenditure, though in a smaller magnitude of 6.3 percentage points.

Table 2B shows that dollar bond issuers also invest less in inventories by 8 percentage compared to non-dollar bond issuers. Again, firms with higher revenue growth, higher Tobin's Q, higher leverage, and higher ROA tend to investment more on inventories. The system GMM yields a smaller but significant coefficient of negative 5.7 for dollar bond issuers. These results confirm the pecking order hypothesis that firms would only resort to offshore bond markets to finance investment projects when they have exhausted other sources of financing. Panizza et al. (2017) also found similar results.

**Extensive and Intensive Margins**

Following Panizza et al. (2017), we explore the extensive margin and the intensive margin of the dollar bond issuance on investment. We augment both the dollar bond issuer dummy and the outstanding amount of dollar bonds over total debt into the model. We want to explore whether it is the offshore bond issuance itself or the amount of issuance that hinders investment. By mixing the dummy variable and the dollar bond outstanding, we are able to separate the extensive and the intensive margin of the issuances.

Contrary to the results by Panizza et al. (2017), we find that it is the extensive margin rather than the intensive margin that matters for investment on fixed assets and inventories for the Chinese nonfinancial corporations. For both the capital expenditure and the inventory investment, we find the coefficient of the dollar bond issuer dummy is significantly negative (except in the dynamic model) while the coefficient of the dollar bond outstanding is negative (or positive) and insignificant.

The result further confirms that it is the dollar bond issuance per se, rather than the amount issued, that is correlated with decreasing investment. This implies that once firms have access to offshore bond market, they tend to conduct carry trades regardless of the amounts of bond issuances. It is also in line with the pecking order that offshore bonds are the last resort of financing. When a firm with less investment demand resorts to the offshore markets, it is unlikely to use the funding for the real investment.

**External Financial Dependency**

In the previous sections, we have documented that the external financial dependence is negatively correlated with the dollar bond issuance and is negatively correlated with the real investment. In this section we focus on the sectoral impact on the behavior of dollar bond issuers and their investment sensitivity towards external financial dependence.

To specify the sensitivity of investment of a dollar bond issuer towards external financial dependence, we add the interaction term of the dollar bond issuer and the external financial dependence on the right hand side of the regression. Furthermore, we take into account the difference of sensitivity across sectors by adding the third interaction term of sector dummy, which equals 1 if the firms belong to SOE/the real estate sector/the oil & gas sector, and equals 0 if otherwise. If firms in certain sector resort to the offshore bond market because they have strong external financing demand, we would expect the coefficient of the triple interaction term to be positive. Otherwise we would expect a negative or insignificant coefficient on the triple interaction term.

Table 4 shows the sensitivity of investment to external financial dependence for dollar bond issuers in each sector. For SOEs, the triple interaction term is significantly negative, implying that SOEs who issue dollar bonds as an additional source of finance are even more cautious to invest when they face higher external financial demand. In other words, SOEs are more likely engaged in the carry trade activities. This is perhaps related to SOEs' easier access to domestic bank financing and their engagement in financial intermediation through entrusted loans (Panizza et al., (2017)).

For the real estate sector, the triple interaction term is significantly positive for both the fixed assets and the inventories. According to the accounting principle, the newly-build houses are recorded in the inventory item for the real estate developers, whereas the equipment for construction is recorded as PPE. The two significantly positive signs imply that the real estate sector resorts to the offshore market to finance their investment demand. Since the real estate sector is capital intensive, most of the funding comes from the external sources in the form of debt. The tightening domestic credit condition has made the offshore bond market the "last resort" of funding for many of the real estate developers. Therefore, there is little evidence that the real estate developers are engaged in carry trades.

**Redemptions**

We have carefully analyzed the correlation between dollar bond issuances and investment in fixed assets and inventories. Our results are largely in line with the literature of carry trade in EMs. What is largely missing in the existing literature is the effect of bond redemptions on investment. According to our dataset, the redemption pressure will intensify in the near future, reaching about $50 billion by 2018Q2.

We replace the dollar issuance dummy (dollar debt outstanding) with the redemption dummy (or redemption amount over total debt) to test the effect of redemption on investment. We also mix the redemption dummy and the redemption amount together so that we can separate the extensive margin and the intensive margin. The results are presented in Table 5.

Column 1 and column 4 present the impact of dollar bond redemption on capital expenditure and inventory investment. We find a significantly negative correlation whose magnitude is even larger than dollar bond issuances. This implies that when firms repay their dollar debt, they are more cautious on making investment decisions which is in accordance to the binding hypothesis. In fact, column 2 and 5 show that the larger the amount of redemption, the more cautious firms invest in fixed assets. However, we did not find significant results on inventory investment whose sign is also negative but statistically insignificant.

Column 3 and 6 illustrate the result on extensive margin and intensive margin. Interestingly, the intensive margin dominates the redemption story while the extensive margin is statistically insignificant. In other words, the effect of redemption on investment mainly depends on the amount of dollar bonds to be paid back. If a firm has a little amount of dollar debt to pay, its binding power on firm's investment decision is neglectable.

However, as presented in table 3A and 3B, it is the dollar bond issuance per se that hinders corporate investment in fixed assets and inventories. We conclude that it is mainly due to carry trade activities. The extensive margin on investment mainly reflects the difference between firms engaging in carry trades and those who don't. However, when firms repay the dollar debt, what matters is the intensive margin, i.e., the amount of redemption regardless of the type of the issuer.

## IV.    Conclusion

Offshore bond issuance by NFCs surged in EMEs after the 2008 GFC, and China is one of the primary player in the offshore bond market. However, as the global financial cycle turns to the upside, there are looming pressures on dollar bond redemption for Chinese NFCs, accompanied by strong dollar and rising US interest rate.

This paper provides a thorough investigation on dollar bond issuance and redemption by Chinese NFCs from the macro, sectoral, and micro level.

On the macro level, we find a strong cyclical behavior of dollar bond issuance and redemption as the main driver of the reversals of China's capital account balances in the last few years. The dollar bond issuances surge when economic policy uncertainty is relaxed, US interest rate is low, and RMB FX rate is strong. However, the dollar bonds redemptions are accompanied by a massive capital outflow, a weak RMB, and a rising US interest rate. Bond redemptions will reach a staggering 50 billion dollar in 2018Q2 and will remain at the high level until

2020Q2 with more than 50 billion dollar to be repaid. This will inflate firms' debt and add to the refinancing risk for firms with foreign debt outstanding.

On the sectoral level, the offshore bond issuance is mainly dominated by large firms, SOEs and HK subsidiaries who can overcome the fixed cost of offshore bond issuance and circumvent the domestic regulations. While two thirds of which are concentrated in the oil & gas sector, the real estate sector, and the utility sector, there has been a redistribution of exposure between the three sectors as the issuances of offshore bonds shifted from real estate developers to the utility companies (former LGFV).

On the micro level, first, we find that dollar bond issuances are negatively correlated with external financial dependence and domestic economic policy uncertainty. This is consistent with the "pecking order" that offshore bond market is the last resort for corporate finance. At the same time, economic policy uncertainty negatively affects the offshore bond issuances for Chinese non-financial corporates. These results suggest that firms may not utilize foreign bond market to finance real investment demands. Instead, firms with limited investment opportunities may borrow abroad in an attempt to generate financial profits through carry trade activities.

Second, dollar bond issuers invest less in fixed assets and inventories. Firms with higher revenue growth, higher Tobin's Q, higher leverage, higher ROA, and less external financial dependence tend to investment more. Moreover, it is the extensive margin rather than the intensive margin that matters for investment on fixed assets and inventories, which implies that once firms have access to offshore bond market, they tend to conduct carry trade regardless of the amounts of bond issuances.

Third, by adding the triple interaction term of dollar issuer, external financial dependence, and sector dummy, we find the coefficient is negative for SOE, positive for real estate, and insignificant for oil &gas sector. This implies that SOEs are not utilizing the offshore bond market to finance their investment projects, the real estate developers are borrowing to circumvent domestic credit constraints. The former might be related to carry trade while the latter might have triggered the housing price bubble. Oil & gas sector, on the other hand, mainly borrows to finance their transaction in overseas business.

Fourth, the larger the amount of redemption, the more cautious firms invest in fixed assets, but not necessarily on inventory. Interestingly, it is the intensive margin dominates the redemption story while the extensive margin is statistically insignificant. That is to say, the effect of redemption on investment mainly depends on the amount of dollar bond to be paid back. Therefore, when firms repay the debt, the risk concentrates on the amount of dollar debt redemption.

# a. Figures

Figure 1: Offshore bond issuance/outstanding and domestic leverage
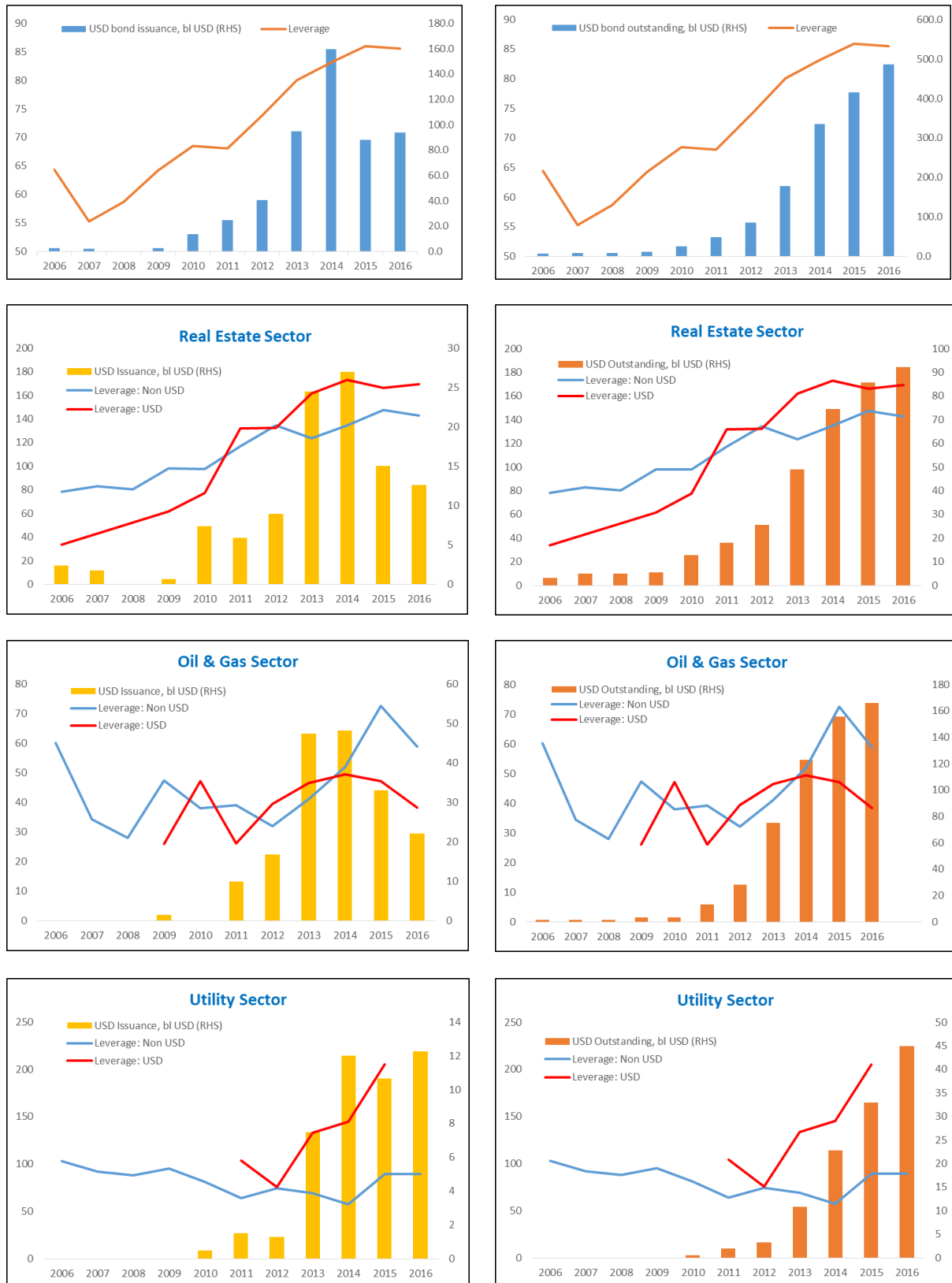
Figure 2: China capital account balance and its composition
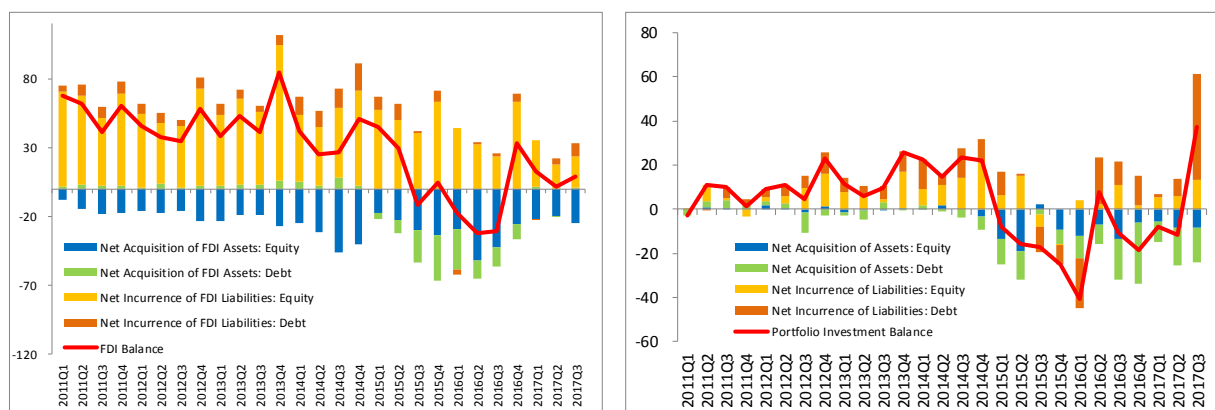
Figure 3: Offshore debt by Chinese financial institutions and non-financial corporations
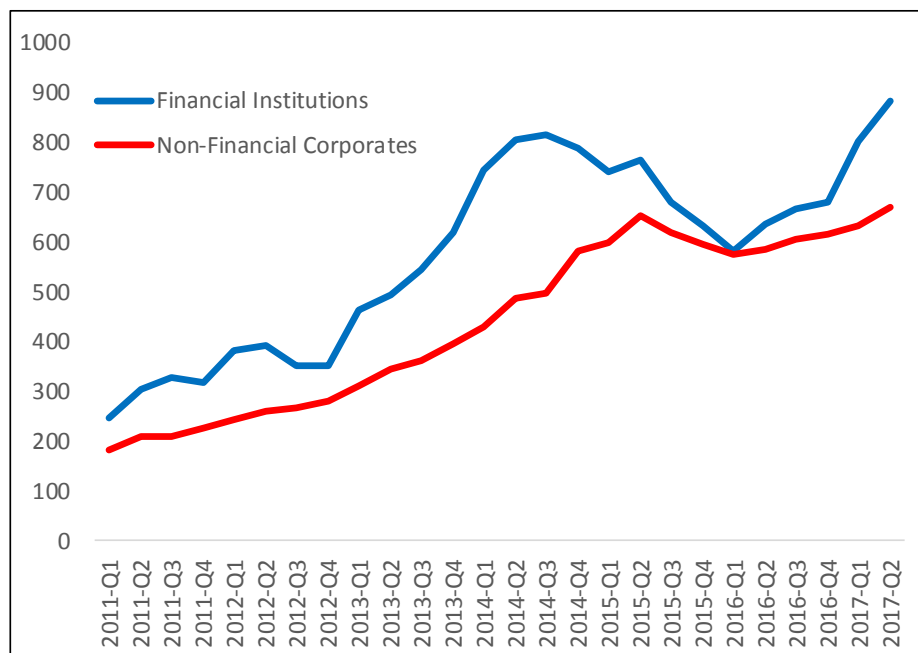
Figure 4: Currency composition by Chinese residence



**Foreign Bond Composition (All Sector)**

USD  EUR  HKD  JPY

**Foreign Bond Composition (NFC)**

USD  EUR  HKD  JPY

Figure 5: Foreign debt redemptions by Chinese non-financial corporations

Figure 6: Foreign bond issuance and FX rate

Figure 7: Interest rate movement in China and US

Figure 8: Firm characteristics between USD issuers and non-USD issuers

Figure 9: Sectoral exposure to USD bond
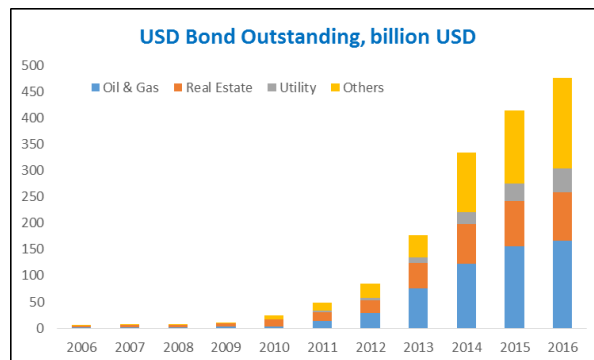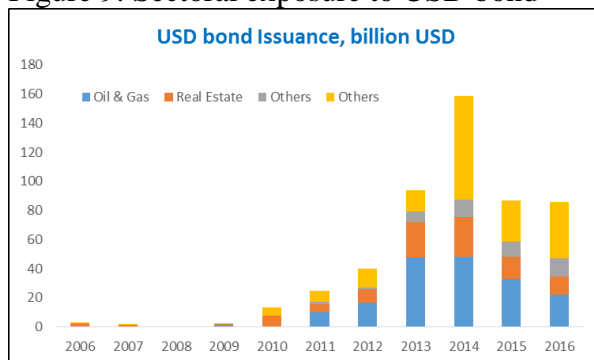
## b. Tables

Table 1: determinant of USD bond issuance

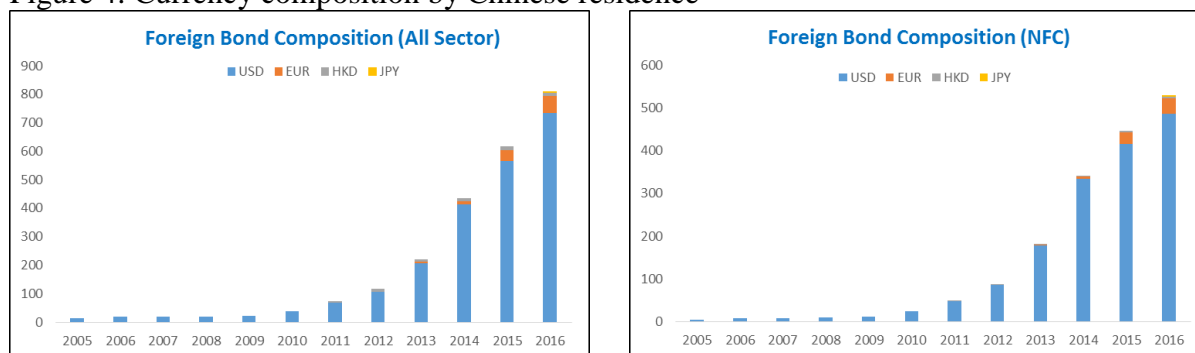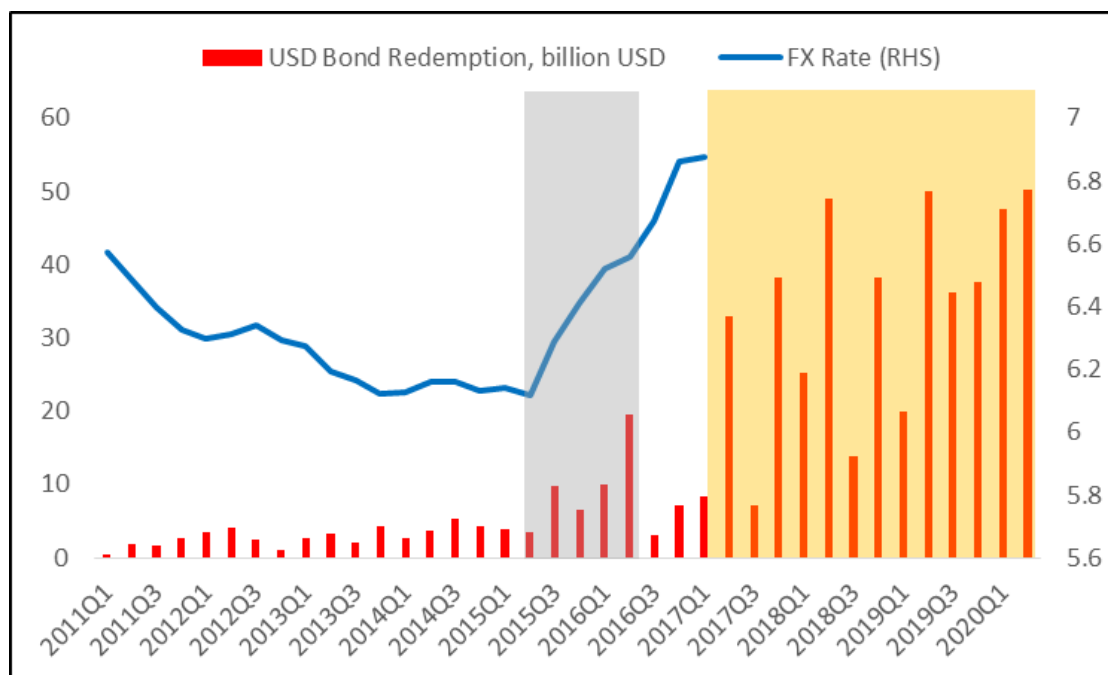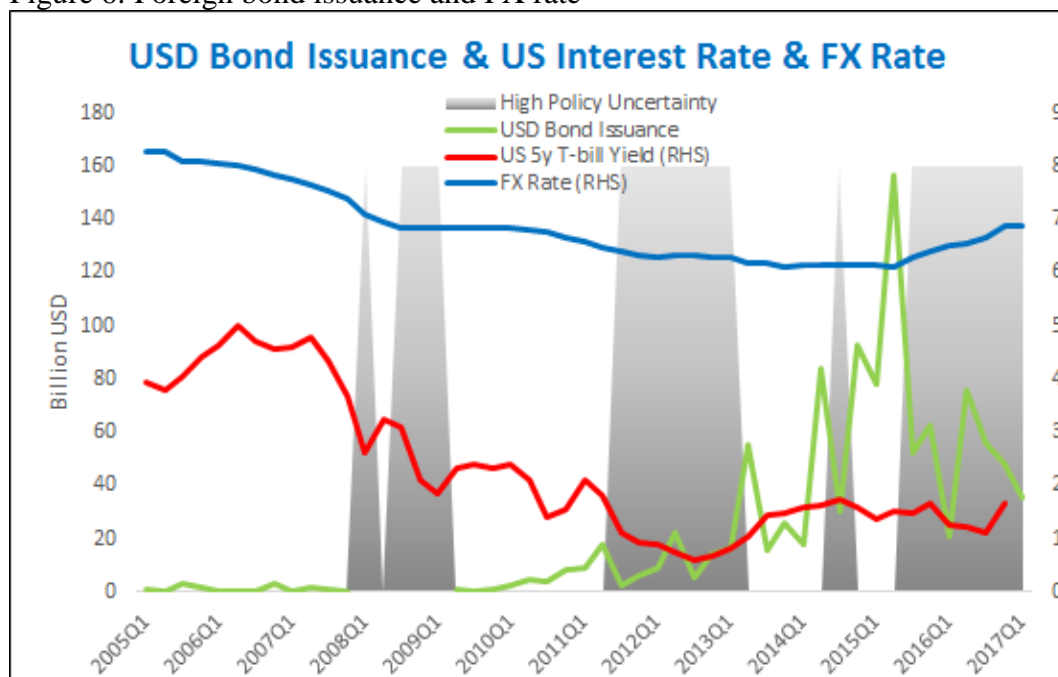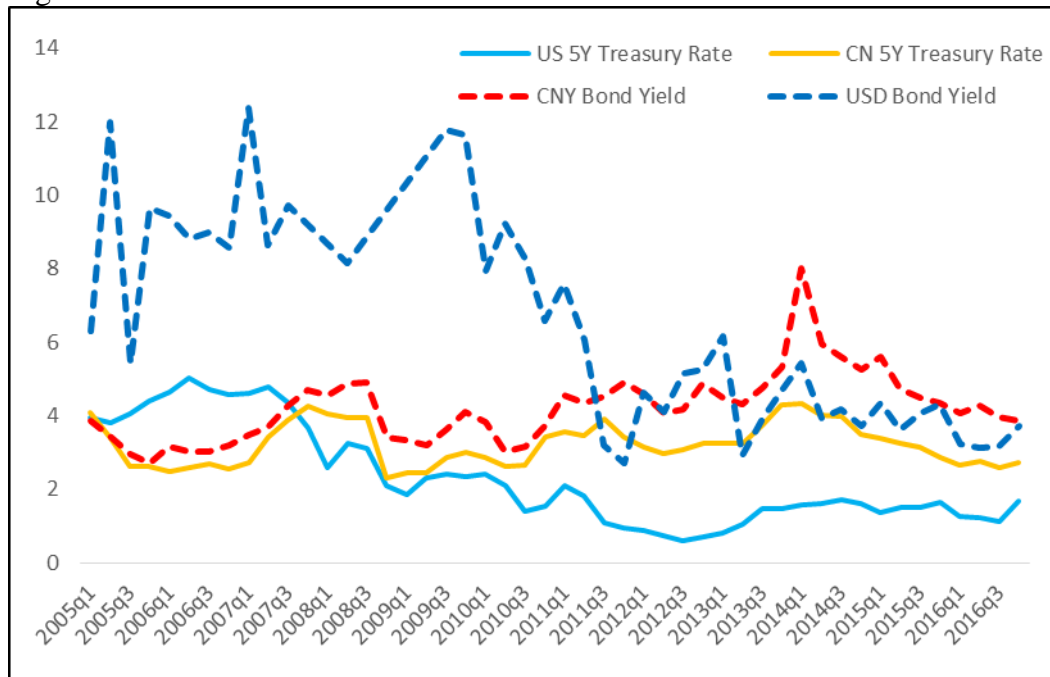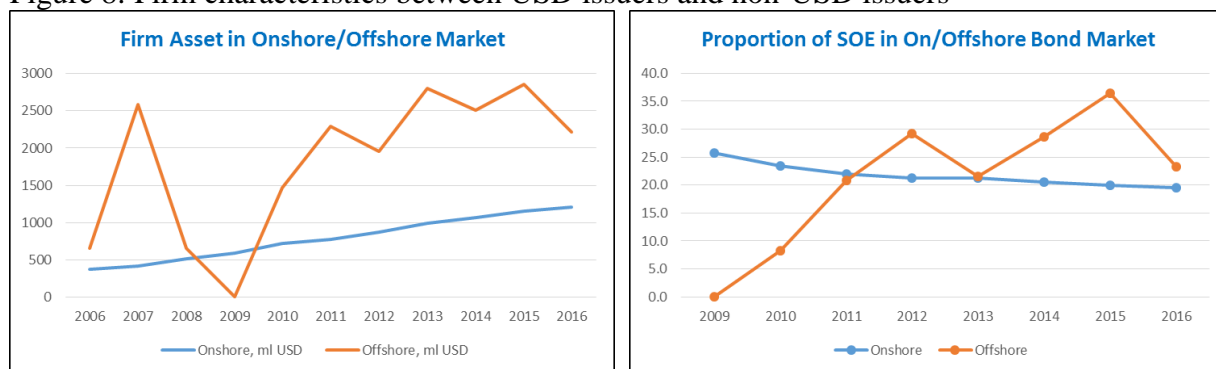| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | | | | USD Bond Issuer (Y=1, N=1) | | | | |
| External Financial Dependence | -0.030*** | -0.032*** | -0.032*** | -0.032*** | -0.032*** | -0.033*** | -0.039*** | -0.040*** |
| | (-2.900) | (-3.068) | (-3.068) | (-3.077) | (-3.116) | (-3.128) | (-6.042) | (-6.158) |
| Revenue Growth | | | 0.001 | 0.001 | 0.001 | -0.000 | -0.001 | 0.001 |
| | | | (0.323) | (0.431) | (0.243) | (-0.195) | (-0.326) | (0.280) |
| Tobin's Q | | | | -0.235 | -0.128 | -0.139 | 0.286 | 0.078 |
| | | | | (-1.455) | (-0.819) | (-0.887) | (1.424) | (0.342) |
| Leverage | | | | | 0.006*** | 0.007*** | 0.004* | 0.004* |
| | | | | | (2.735) | (2.913) | (1.851) | (1.775) |
| ROA | | | | | | 0.010*** | 0.016* | 0.018** |
| | | | | | | (2.903) | (1.886) | (2.107) |
| EPU | | | | | | | -0.002*** | |
| | | | | | | | (-2.663) | |
| CNY Bond Yield Dispersion | | | | | | | | -0.455 |
| | | | | | | | | (-1.114) |
| Firm FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | N | Y | Y | Y | Y | Y | N | N |
| Observations | 22,568 | 22,568 | 22,545 | 22,545 | 22,545 | 22,545 | 14,583 | 14,583 |
| R Square | 0.002 | 0.007 | 0.007 | 0.007 | 0.008 | 0.008 | 0.004 | 0.004 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table reports the determinants of dollar bond issuance. The dependent variable is a dummy that equals 1 if a firm issues a dollar bond in year t, and 0 otherwise. We Control firms' revenue growth, Tobin's Q, Leverage, return on assets (ROA), leverage. We add firm fixed effect and year fixed effect in the first 6 columns. In column 7, we replace the time fixed effect by economic policy uncertainty economic policy uncertainty index developed by Baker, Bloom, & Davis (2016) to proxy for movements in policy-related economic uncertainty in China.

## Table 2A: USD bond issuance and capital expenditure

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | | | | Dep Var: Capital Expenditure | | | | |
| USD Issuer | -10.11*** | -8.41** | -8.79** | -8.72** | -8.96** | -9.52*** | -9.81*** | -6.33** |
| | (-2.84) | (-2.48) | (-2.51) | (-2.49) | (-2.57) | (-2.77) | (-2.85) | (-2.13) |
| Revenue Growth | | | 0.27*** | 0.27*** | 0.26*** | 0.24*** | 0.24*** | 0.23*** |
| | | | (21.10) | (20.85) | (20.83) | (18.63) | (18.58) | (23.99) |
| Tobin's Q | | | | 1.62* | 1.86** | 1.57* | 1.55* | -0.09 |
| | | | | (1.93) | (2.20) | (1.94) | (1.92) | (-0.18) |
| Leverage | | | | | 0.01* | 0.03*** | 0.03*** | 0.02*** |
| | | | | | (1.94) | (3.56) | (3.59) | (5.20) |
| ROA | | | | | | 0.28*** | 0.28*** | 0.18*** |
| | | | | | | (10.07) | (10.08) | (8.46) |
| External Financial Dependence | | | | | | | -0.04* | -0.06*** |
| | | | | | | | (-1.82) | (-2.59) |
| Lag Cap Exp | | | | | | | | 0.18*** |
| | | | | | | | | (20.28) |
| Firm FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | N | Y | Y | Y | Y | Y | Y | Y |
| Observations | 22,566 | 22,566 | 22,543 | 22,543 | 22,543 | 22,543 | 22,543 | 19,494 |
| R Square | 0.00 | 0.04 | 0.09 | 0.09 | 0.09 | 0.10 | 0.10 | System GMM |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table shows the impact of dollar bond issuance on fixed asset investment defined as net change in fixed assets standardized by lagged fixed assets. We find a significantly negative correlation between dollar bond issuances and capital expenditure. Dollar bond issuers have on average less than 10 percentage points less capital expenditure. At the same time, firms with higher revenue growth, higher Tobin's Q, higher leverage, and higher ROA tend to investment more on fixed assets. In column 7, we augment the lagged capital expenditure in year *t-1* on the right hand side and use system GMM to estimate the dynamic model. System GMM result confirms a negative correlation between dollar bond issuances and capital expenditure.

## Table 2B: USD bond issuance and inventory investment

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | | | | Dep Var: Inventory Investment | | | | |
| USD Issuer | -11.07*** | -6.74** | -7.32*** | -7.23*** | -7.65*** | -8.19*** | -8.33*** | -5.70* |
| | (-3.64) | (-2.53) | (-2.89) | (-2.87) | (-3.03) | (-3.27) | (-3.32) | (-1.68) |
| Revenue Growth | | | 0.37*** | 0.37*** | 0.37*** | 0.34*** | 0.34*** | 0.30*** |
| | | | (26.32) | (26.11) | (25.96) | (23.96) | (23.93) | (27.14) |
| Tobin's Q | | | | 1.86** | 2.28*** | 2.06** | 2.05** | -0.33 |
| | | | | (2.25) | (2.73) | (2.52) | (2.51) | (-0.55) |
| Leverage | | | | | 0.02*** | 0.04*** | 0.04*** | 0.04*** |
| | | | | | (3.24) | (4.75) | (4.76) | (7.53) |
| ROA | | | | | | 0.26*** | 0.26*** | 0.27*** |
| | | | | | | (8.28) | (8.29) | (10.61) |
| External Financial Dependence | | | | | | | -0.02 | -0.03 |
| | | | | | | | (-0.80) | (-1.17) |
| Lag Cap Exp | | | | | | | | -0.02** |
| | | | | | | | | (-2.02) |
| Firm FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 22,188 | 22,188 | 22,177 | 22,177 | 22,177 | 22,177 | 22,177 | 19,135 |
| R Square | 0.00 | 0.07 | 0.14 | 0.14 | 0.14 | 0.15 | 0.15 | System GMM |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table shows the impact of dollar bond issuance on inventory investment defined as net change in inventory standardized by lagged inventory. We find a significantly negative correlation between dollar bond issuances and inventory investment. Dollar bond issuers have on average less than 10 percentage points less inventory. In column 7, we augment the lagged inventory investment in year *t-1* on the right hand side and use system GMM to estimate the dynamic model. System GMM result confirms a negative correlation between dollar bond issuances and inventory investment.

## Table 3A: extensive and intensive margin of USD issuer and capital expenditure

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | | | | Dep Var: Capital Expenditure | | | | |
| USD Issuer | -9.76** | -7.62* | -7.40* | -7.25* | -7.60* | -8.13** | -8.46** | -4.46 |
| | (-2.31) | (-1.86) | (-1.76) | (-1.73) | (-1.82) | (-1.98) | (-2.05) | (-1.39) |
| USD Outstanding | -0.01 | -0.02 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.02 |
| | (-0.22) | (-0.53) | (-0.85) | (-0.90) | (-0.84) | (-0.89) | (-0.86) | (-0.46) |
| Revenue Growth | | | 0.27*** | 0.27*** | 0.26*** | 0.24*** | 0.24*** | 0.22*** |
| | | | (21.09) | (20.85) | (20.83) | (18.62) | (18.57) | (14.39) |
| Tobin's Q | | | | 1.63* | 1.87** | 1.58* | 1.56* | 0.59 |
| | | | | (1.94) | (2.21) | (1.95) | (1.93) | (0.85) |
| Leverage | | | | | 0.01* | 0.03*** | 0.03*** | 0.02*** |
| | | | | | (1.93) | (3.54) | (3.58) | (4.40) |
| ROA | | | | | | 0.28*** | 0.28*** | 0.19*** |
| | | | | | | (10.06) | (10.08) | (6.80) |
| External Financial Dependence | | | | | | | -0.04* | -0.06*** |
| | | | | | | | (-1.81) | (-2.58) |
| Lag Cap Exp | | | | | | | | 0.15*** |
| | | | | | | | | (11.01) |
| Firm FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Observations | 22,566 | 22,566 | 22,543 | 22,543 | 22,543 | 22,543 | 22,543 | 19,494 |
| R Square | 0.00 | 0.04 | 0.09 | 0.09 | 0.09 | 0.10 | 0.10 | |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table reports the extensive margin and intensive margin of USD bond issuance on capital expenditure. The dependent variable capital expenditure defined as net change of fixed asset standardized by lagged fixed assets. The two main explanatory variables are dollar bond issuer dummy that equals 1 if the firm has issued USD bond in a given year, and the USD bond outstanding divided by total debt. We find that it is the extensive margin rather than the intensive margin that matters for the decreasing capital expenditure.

Table 3B: extensive and intensive margin of USD issuer and capital expenditure

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| VARIABLES | | | | Dep Var: Inventory Investment | | | | |
| | | | | | | | | |
| USD Issuer | -16.06*** | -10.53*** | -10.35*** | -10.16*** | -10.78*** | -11.29*** | -11.46*** | -5.12 |
| | (-4.69) | (-3.45) | (-3.26) | (-3.20) | (-3.43) | (-3.65) | (-3.70) | (-1.41) |
| USD Outstanding | 0.10** | 0.08** | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.02 |
| | (2.57) | (1.98) | (1.42) | (1.37) | (1.48) | (1.46) | (1.47) | (0.29) |
| Revenue Growth | | | 0.37*** | 0.37*** | 0.37*** | 0.34*** | 0.34*** | 0.28*** |
| | | | (26.32) | (26.11) | (25.96) | (23.96) | (23.93) | (16.61) |
| Tobin's Q | | | | 1.84** | 2.26*** | 2.04** | 2.03** | 1.75** |
| | | | | (2.22) | (2.71) | (2.50) | (2.49) | (2.20) |
| Leverage | | | | | 0.02*** | 0.04*** | 0.04*** | 0.04*** |
| | | | | | (3.27) | (4.79) | (4.80) | (6.77) |
| ROA | | | | | | 0.26*** | 0.26*** | 0.25*** |
| | | | | | | (8.27) | (8.29) | (7.45) |
| External Financial Dependence | | | | | | | -0.02 | -0.02 |
| | | | | | | | (-0.82) | (-0.93) |
| Lag Cap Exp | | | | | | | | 0.02 |
| | | | | | | | | (1.60) |
| Firm FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Year FE | N | Y | Y | Y | Y | Y | Y | Y |
| | | | | | | | | |
| Observations | 2,790 | 22,566 | 22,543 | 22,543 | 22,543 | 22,543 | 22,543 | 19,494 |
| R Square | 0.00 | 0.04 | 0.09 | 0.09 | 0.09 | 0.10 | 0.10 | |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table reports the extensive margin and intensive margin of USD bond issuance on inventory investment. The dependent variable capital expenditure defined as net change of fixed asset standardized by lagged fixed assets. The two main explanatory variables are dollar bond issuer dummy that equals 1 if the firm has issued USD bond in a given year, and the USD bond outstanding divided by total debt. We find that it is the extensive margin rather than the intensive margin that matters for the decreasing inventory investment.

## Table 4: sector difference of financial sensitivity

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Dep Var: Capital Expenditure | | | Dep Var: Inventory Investment | | |
| | SOE | Real | Oil | SOE | Real | Oil |
| USD | -9.196 | -7.355*** | -10.837*** | -5.735 | -9.607*** | -7.102*** |
| | (-1.434) | (-2.881) | (-2.971) | (-1.315) | (-3.435) | (-2.815) |
| USD*External Financial Dependence | 0.163 | 0.039 | 0.138 | -0.018 | -0.179 | -0.044 |
| | (1.558) | (0.635) | (1.564) | (-0.060) | (-1.225) | (-0.222) |
| USD*Sector | 9.293 | -4.243 | -3.792 | 0.394 | 3.218 | -13.104 |
| | (0.980) | (-0.498) | (-0.263) | (0.051) | (0.620) | (-1.421) |
| External Financial Dependence*Sector | -0.047 | -0.267*** | 0.240 | -0.148*** | 0.112 | -0.053 |
| | (-0.945) | (-5.546) | (1.183) | (-3.104) | (1.103) | (-0.917) |
| USD*External Financial Dependence*Sector | -0.481*** | 0.291** | 1.404 | -0.274 | 0.896** | -0.193 |
| | (-3.778) | (2.211) | (0.979) | (-0.753) | (2.059) | (-0.763) |
| Revenue Growth | 0.239*** | 0.239*** | 0.239*** | 0.320*** | 0.340*** | 0.340*** |
| | (14.512) | (18.574) | (18.575) | (16.392) | (23.774) | (23.773) |
| Tobin's Q | -0.203 | 1.504* | 1.575* | 0.857 | 1.743** | 1.695** |
| | (-0.190) | (1.857) | (1.947) | (0.835) | (2.144) | (2.082) |
| Leverage | 0.022** | 0.026*** | 0.026*** | 0.033*** | 0.035*** | 0.035*** |
| | (2.065) | (3.572) | (3.588) | (3.291) | (4.713) | (4.704) |
| ROA | 0.286*** | 0.280*** | 0.278*** | 0.261*** | 0.258*** | 0.258*** |
| | (7.916) | (10.133) | (10.083) | (6.261) | (8.021) | (8.026) |
| External Financial Dependence | 0.017 | 0.020 | -0.050** | -0.138*** | -0.222*** | -0.216*** |
| | (0.486) | (1.010) | (-2.560) | (-4.197) | (-12.656) | (-12.035) |
| Constant | 19.523*** | 15.188*** | 15.096*** | 14.353*** | 13.244*** | 13.311*** |
| | (10.660) | (11.665) | (11.596) | (7.107) | (9.249) | (9.296) |
| Observations | 12,987 | 22,543 | 22,543 | 12,698 | 22,177 | 22,177 |
| R-squared | 0.113 | 0.102 | 0.101 | 0.152 | 0.157 | 0.157 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table shows the sensitivity of investment to external financial dependence for dollar bond issuers in each sector. The dependent variables are capital expenditure and inventory investment. We augment the triple interaction term between USD issuer dummy, external financial dependence (defined as investment minus net revenue standardized by investment), and sector dummy that equals one if a firm belongs to a certain sector. For SOEs, the triple interaction term is significantly negative, implying that SOEs who issue dollar bonds reduce their investment even when they are facing higher external financial demand. For the real estate sector, the triple interaction term is significantly positive for both the fixed assets and the inventories, implying that the real estate sector resorts to the offshore market to finance their investment demand. For the oil & gas sector, the triple interaction term is insignificant, implying that they issue USD bonds mainly for transaction purpose.

## Table 5: redemption and investment

| VARIABLES | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Dep Var: Capital Expenditure | | | Dep Var: Inventory Investment | | |
| USD Redemption Dummy | -12.47*** | | -0.02 | -8.77 | | 9.29 |
| | (-3.21) | | (-0.00) | (-1.19) | | (0.92) |
| USD Redemption/Total Debt | | -2.36*** | -2.36* | | -1.84 | -3.42 |
| | | (-3.61) | (-1.83) | | (-1.38) | (-1.57) |
| Revenue Growth | 0.24*** | 0.24*** | 0.24*** | 0.35*** | 0.35*** | 0.35*** |
| | (17.99) | (17.99) | (17.99) | (23.89) | (23.89) | (23.89) |
| Tobin's Q | 1.46* | 1.46* | 1.46* | 2.09** | 2.09** | 2.09** |
| | (1.75) | (1.74) | (1.74) | (2.36) | (2.36) | (2.36) |
| Leverage | 0.02*** | 0.02*** | 0.02*** | 0.03*** | 0.03*** | 0.03*** |
| | (2.89) | (2.88) | (2.88) | (4.55) | (4.55) | (4.54) |
| ROA | 0.31*** | 0.31*** | 0.31*** | 0.28*** | 0.28*** | 0.28*** |
| | (10.60) | (10.61) | (10.60) | (8.23) | (8.23) | (8.23) |
| External Financial Dependence | -0.03 | -0.03 | -0.03 | -0.01 | -0.01 | -0.01 |
| | (-1.49) | (-1.49) | (-1.49) | (-0.62) | (-0.61) | (-0.62) |
| Firm FE | Y | Y | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y | Y | Y |
| | | | | | | |
| Observations | 20,896 | 20,896 | 20,896 | 20,688 | 20,688 | 20,688 |
| R Square | 0.11 | 0.11 | 0.11 | 0.16 | 0.16 | 0.16 |

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

This table reports the effect of USD bond redemption on capital expenditure and inventory investment. Column 1 and column 4 show a significantly negative correlation between USD bond issuance and capital expenditure but not inventory investment. Column 2 and 5 show a similar result if we replace the USD redemption dummy with USD bond redemption amount divided by total debt outstanding. Column 3 and 6 show the result on extensive margin and intensive margin. Interestingly, the intensive margin dominates the redemption story while the extensive margin is statistically insignificant, implying the effect of redemption on investment mainly depends on the amount of dollar bonds to be paid back.

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