Corporate Currency Risk and Hedging in Chile:

Real and Financial Effects

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Abstract[*]

This paper examines a panel (1994-2014) of Chilean non-financial firms, both publicly listed and private, which was built to analyze the determinants of the use of foreign currency debt and their potential consequences for firm investment and profitability. It is found that foreign assets and the use of FX derivatives are positively associated with firms' use of foreign currency debt. Also, depending on the estimation method, exports appear as an important determinant of the use of foreign currency debt. In terms of the potential effect of holding foreign currency debt on firms' performance after an exchange rate devaluation, no statistical differential effect is identified on either firm profitability or firm investment. This (lack of) result is interpreted as evidence that firms match liabilities and assets denominated in foreign currency and that firms actively involved in hedging aim to reduce their exposure to foreign exchange fluctuations.

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1. Introduction

Floating foreign exchange rates have gained increased support as a preferred regime to reduce emerging markets' vulnerability to external shocks. The volatility of the exchange rate associated with floating exchange rates, however, exposes economic agents to the risk of changes in the valuation of the financial assets and liabilities in their balance sheet, as well as in their stream of current and expected cash flows. In this context, to characterize the currency composition of firms' balance-sheet, its determinants and the effects of changes in exchange rate is relevant as it provides an assessment of the potential benefits and drawbacks of currency mismatches, and also a better understanding of the corporate risk associated with it.

This paper examines a panel of Chilean non-financial firms for the period 1994-2014, both publicly listed and private, which was built to analyze the determinants of the use of foreign currency debt (henceforth, FC debt) and the potential consequences of their use for the financial (profitability) and real (investment) performance of the firm. Our dataset contains detailed information not only on the foreign currency-denominated debt held by firms, but also their assets in foreign currency (henceforth, FC assets), their profits from sales abroad, and their use of foreign exchange derivatives (henceforth, FX derivatives). Thus, we are able to provide a complete characterization of the role played by the currency composition of the balance sheet on firm performance.

Previous literature has long debated about the potential negative consequences of holding large amounts of unhedged currency debt for firms. Bleakley and Cowan (2008), for example, using a sample of 450 firms in five Latin American economies, document that firms holding more FC debt do not invest less than firms holding local currency-denominated debt after an exchange rate devaluation. They also show that these firms match their foreign currency liabilities with their foreign profits. Others, however, argue that especially in the financial crises context in which large currency depreciations were observed, the use of foreign debt may hurt firms (Aguiar, 2005; and Carranza, Galdón-Sánchez and Gómez-Biscarri, 2011).

In order to manage foreign exchange risk, natural hedgers as foreign profits or exports act as a buffer mechanism for firms holding debt in foreign currency, however, the role played by financial FX derivatives has become increasingly important as well. For example, Gatopoulos and Loubergé (2013) state that the derivatives markets in emerging economies have been effective tools to reduce FX risk. Campello et al. (2013) provide robust empirical evidence

showing that corporate hedging positively affects the corporate financing and investment of firms. In particular, they show that hedgers pay lower loan spreads and are less likely to have capital expenditure restrictions in their loans agreements.

In addition to the insights provided by the prior literature regarding the determinants and the effects of currency mismatches, and on the use of FX derivatives as an efficient hedging tool, it is worth framing this paper and discussion below in the context of particularly favorable credit conditions for firms in emerging economies in the aftermath of the 2008 global financial crisis. Interest rates in the United States, for example, have been close to zero bound, making it more attractive for firms to issue bonds or take loans in U.S. dollars. In 2007, only two Chilean firms issued a bond in foreign currency abroad, whereas 13 firms issued one in 2014. Considering all these elements, it seems relevant to revisit the topics under study in this paper—in particular, whether increasing indebtedness in foreign currency has increased firms' vulnerability to exchange rate shocks.

For the specific case of Chile, Benavente, Johnson and Morandé (2003), Cowan, Hansen and Herrera (2005) and Fuentes (2010) study the balance sheet effects in non-financial firms. While Benavente et al. (2003) find a slightly positive effect of devaluations on investment, Cowan, Hansen and Herrera (2005) and Fuentes (2010) document negative balance sheet effects on investment. In this paper, we contribute to this debate by using a large set of firms and a longer time period in the analysis. Also, the emphasis is not only on the real effects (investment) of depreciations, but also on the financial effects (profitability) on the firms.

Consistent with previous literature, we find that exporting firms and firms having FC assets are more likely to hold FC debt. This evidence is consistent with firms matching their currency composition of liabilities and assets. The use of FX derivatives also appears strongly correlated with the use of FC debt, indicating that firms manage risk using financial hedging as well. Our findings indicate that larger and more leveraged firms are also more prone to holding FC debt. The effect of foreign ownership is mixed.

In terms of the effect of holding foreign currency debt on firm's performance after an exchange-rate devaluation, we do not identify any statistical differential effect on firm profitability, but we do find a strong balance sheet effect in which FX depreciations have a differential negative effect on firms' investment for those firms holding more foreign debt in the previous year. Our empirical evidence also shows that operational hedgers, the holding of assets

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in foreign currency and export sales, mitigate the negative effect on investment of depreciations, whereas financial hedgers, in particular the use of foreign exchange derivatives, do not.

The rest of the paper is structured as follows. In the next section we briefly review the relevant literature for this paper. In Section 3, we describe in detail our dataset. In Section 4, the determinants of holding FC debt are analyzed. In Sections 5 and 6, we study the effect of FC debt on firm profits and firm investment, respectively. We draw a conclusion in Section 7.

2. Literature Review

This paper is connected to several branches of the literature. First, it is related to the corporate finance literature aimed at identifying why firms hold debt in foreign currency. Second, it is related to the literature that analyzes balance sheet effects and currency risk exposure at the firm level. Finally, it is also related to the literature that analyzes the determinants of currency mismatches at the macro level, and their role during financial crises episodes.

The first literature aims to identify theories in finance able to explain why firms issue debt or take loans in foreign currency. Allayanis, Brown and Klapper (2003) provide a good overview of these theories and their predictions regarding the motives behind the use of FC debt by a firm. For example, the static trade-off theory predicts that leverage should increase with the benefits of debt and decrease with the costs of debt. In this regard, the spread between the domestic and the external interest rate could explain the use of FC debt. Differential tax treatment, if any, may also explain the use of FC debt.

The theory of agency costs of debt may also provide guidelines regarding the use of FC debt. Information asymmetries between managers and investors make firms incur in the high cost of monitoring. In this context, more tangible firms should use more FC debt because foreign investors' costs of monitoring are lower. Firms with low growth opportunities should hold more FC debt because their agency costs are lower. In the context of agency costs, Ross (1977) and Titman and Trueman (1986) use a signaling argument to rationalize the use of FC debt. Since accessing international capital markets is costly, some firms may strategically decide on signaling their creditworthiness by taking on FC debt. Therefore, being listed in a foreign exchange may predict the use of FC debt. Family or group affiliation could also be a predictor of higher leverage in general, and FC leverage specifically. Finally, the risk management theory states that firms that are better prepared to face exchange risk also take on more FC debt. This

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theory predicts that firms having foreign sales/profits take on more FC debt because they have a natural hedge.

These theories have been empirically tested by Keloharju and Niskanen (2001) for a sample of 44 firms in Finland; Allayanis, Brown and Klapper (2003) for a sample of around 70 East Asian firms during 1997 and 1999; Brown, Ongena and Yesin (2011) for a sample of around 3000 firms in 25 transition economies between 2001 and 2005; and Mora, Neaime and Aintablian (2013) for a sample of around 200 small firms in Lebanon, among others. The empirical results vary across studies; however, one empirical fact emerges among most of them: firms having more foreign revenues are more likely to hold FC debt. The role of interest rate differentials is less clear.

Related with the previous works, some branch of the corporate finance literature studies why firms use FX derivatives as a hedging tool for risk management purposes. Smith and Stulz (1985), Froot, Scharfstein and Stein (1993) and Geczy, Minton and Schrand (1997) propose theoretical frameworks and empirical evidence on this issue. A more recent and relevant reference is Campello et al. (2011), which studies the real and financial implications of corporate hedging. Using a tax-based instrumental variable approach, these authors provide empirical evidence that hedgers pay lower interest spreads and are less likely to have capital expenditure restrictions in their loan agreements. The cost of borrowing and investment channels connect hedging with firm outcomes.

The second strand of the literature in this paper is related to the balance sheet and currency mismatch literature using firm-level data. A currency mismatch occurs when there is a net debt denominated in foreign currency and an exchange-rate depreciation increases the value of this debt in local currency, which creates a negative balance sheet effect (Aghion, Bacchetta and Banerjee, 2001). While depreciation affects indebted firms adversely, export revenues can mitigate the negative effect by increasing their earnings in local currency. It is not completely clear which one of these two opposite effects dominates. Thus, the final impact on firm investment is ambiguous. On the one side, Martínez and Werner (2002) and Aguiar (2005) document a drop in the investment of Mexican firms with debt denominated in the foreign currency after the devaluation of the Mexican peso during the tequila crisis. On the other side, Bleakley and Cowan (2008) study the same phenomenon in a broader sample of Latin American

countries. Their findings do not reveal a significant negative effect of exchange rate depreciation on investment for firms with higher foreign currency debt.

In the specific case of Chile, few papers have addressed this issue. Benavente, Johnson and Morandé (2003), using a sample of around 200 publicly traded firms for the period 1994 to 2001, find that exchange rate depreciations had a slightly positive effect on firm investment for those firms having more FC debt. The authors conclude that the net-worth effect of depreciation dominates a potential balance sheet effect. In a follow up paper, Cowan, Hansen and Herrera (2005) find that, after controlling for the currency composition of assets and the net use of derivatives, there is a balance sheet effect on their sample of Chilean firms. They also document that the use of derivatives is important in isolating firms' investment from currency shocks. Finally, they also find that more credit-constrained firms are most affected by a negative balance sheet effect on investment. Fuentes (2009) also studies the balance sheet effect in a sample of Chilean firms in the period 1991-2001. This study also provides evidence supporting a negative balance sheet effect on firm investment. Finally, Hansen and Hyde (2013) study the determinants of exchange rate exposure measured as the sensitivity of firm stock returns to changes in the exchange rates. The authors find that Chilean firms tend to be hedged, and that foreign debt, foreign assets, and exports are the main drivers of FX exposure. Neither imports nor the use of FX derivatives are statistically associated to this measure of FX exposure.[1]

The third related branch of literature studies the determinants and the effects of currency mismatches at the macroeconomic level. A recent example of this literature is the paper by Baek (2013) who studies the aggregate determinants of aggregate currency mismatches using a panel dataset of 97 countries over the 1990-2004 period. The author concludes that both domestic and international factors are important determinants of currency mismatches. In particular, in order to reduce mismatches a country should be financially open and liberalized, develop domestic security markets, supervise financial intermediaries, upgrade institutional quality and adopt

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[1] A small amount of literature about FX derivatives has been developed in Chile as well. For example, Jadresic and Selaive (2005) document that the derivative market activity in Chile reduced aggregate currency risk, motivated by the adoption of a floating exchange rate regime in Chile in 1999. Fernández (2006) characterizes the main trends in the derivative market during the 1990s and early 2000s. She also proves that the use of FX derivatives reduces currency risk. Finally, Acharán, Espinoza and Villena (2010) study the use of derivatives by Chilean exporting firms in the context of the recent financial crisis. Using detailed data of derivative positions of exporting firms during 2008 and 2009, the authors find that small exporters were not particularly affected during the financial crises in their access to the derivative markets. They also find no evidence that the maturity of the derivative contracts was shortened.

credible monetary policies. The choice of FX regime does not play a significant role according to this author. Martínez and Werner (2002) and Michaux (2012), on the other hand, have opposite findings, that FX regimes is a relevant determinant of dollarization. Luca and Petrova (2008), Kesriyeli, Özmen and Yigit (2011) and Brown, Ongena and Yesin (2011) also identify institutional factors as important determinants of the level of dollarization at the aggregate level.

Finally, high indebtedness in foreign denominated debt has been associated with the occurrence of financial crisis in domestic economies. Hausmann and Panizza (2003) and Eichengreen, Hausmann and Panizza (2005) argue that emerging market economies are more vulnerable to financial crisis because of "original sin," namely the inability of these economies to borrow in domestic currency and at longer maturities. Calvo, Izquierdo and Mejía (2004) find that highly-dollarized economies are more likely to suffer a sudden stop of capital inflows.

3. Dataset and Main Facts

3.1 Dataset

A panel dataset of Chilean non-financial companies was built for the period 1994-2014. The dataset contains balance-sheet information, export sales, and foreign ownership information. For the purpose of this study, the balance sheet information includes the currency composition of debt and assets. From 1994 to 2008, the total amount of foreign debt and foreign assets held by firms are available, and from 2009 onwards more detailed information for a subsample of firms has been obtained. For the case of FC debt, information about bank debt, bond debt, accounts payables and other debts is available. We also are able to differentiate between short-term and long-term for bank and bond debt. Because this information is not straightforwardly available within the standard balance sheet, it has been hand-collected from the notes accompanying the balance sheet. In addition, with information from these notes, we compute an FX derivative dummy whether firms use currency forwards and cross-currency swaps.

The dataset is built from several sources. The balance sheet information mainly comes from the *Superintendencia de Valores y Seguros* (SVS), the government agency to which firms labeled, as "*Sociedades Anonimas*" must report by law periodically. This information is available online at the SVS webpage.[2] For some firms, the information is available in a standard spreadsheet, while for others an unformatted PDF file is available. In some cases, the SVS

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[2] www.svs.cl

information is complemented using Thompson-Reuters' Eikon platform in order to facilitate the data collection process. We obtain data of the FOB value of export sales at the firm level from PROCHILE, a government agency in charge of fostering and promoting international trade of Chilean companies.[3] Foreign ownership information is collected from the Eikon platform. Eikon provides detailed ownership information for publicly listed firms. Among the available information it is possible to find, at least for the first 20 main shareholders of each company, their names and nationality, the percentage of shares owned over the total shares, and the type of investor (pension fund, corporation, investment advisor, etc.). Using this information, three dummy variables were built accounting for foreign ownership. The first one takes the value of 1 if the firm has some foreign property without a minimum percentage; the second takes the value of 1 if at least 10 percent of the property is foreign, and the third one takes the value of 1 if at least 50 percent of the property is foreign.

All accounting variables are deflated using CPI information to local currency of 2010. The upper and lower 1 percent of the variables are dropped to eliminate outliers. Furthermore, observations outside the range (-0.1, 1.1) are dropped for the variables dollar debt to lagged total debt and dollar assets to lagged total assets.

Some macroeconomic variables are also added into the database. The nominal exchange rate,[4] the CPI and the average 30-day interbank interest rate that is used as the domestic interest rate in the analysis below, come from the Central Bank of Chile. The forward exchange-rate used to build the forward premium is provided by Bloomberg. The 30-day LIBOR rate used as the foreign interest rate is provided by the Federal Reserve Bank of Saint Louis database (FRED). Finally, domestic credit to the private sector as percentage of GDP is provided by the World Bank dataset.

In Table 1, the number of firms in the sample per year is reported. We start reporting the numbers of what we propose the "population" of firms. This universe includes the firms that must report (by law) their financial and relevant corporate events to the Superintendencia de Valores y Seguros (SVS) because they either issued a corporate bond or are listed in the Santiago Stock Exchange. Out of this universe, the number of non-financial firms is identified, and subsequently, the subset of those publicly listed. In the last two columns, the number of firms in

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[3] We are indebted to Ignacio Rodríguez and Marcela González of PROCHILE, who kindly provided access to the export data.
[4] Figure 1 shows the evolution through time of the real exchange rate in the analyzed period.

our sample is reported. A firm is included in the sample only if it has non-missing information about FC debt, FC assets, exports and FX derivatives in a particular year. This condition implies that a firm does not necessarily have information for the complete sample span; instead, it only appears in those years in which the required information is available. This condition reduces the sample but it assures that our empirical analysis below is consistent across specifications. The number of firms in the sample varies from around 60 in 1994 to around 140 firms in 2014.

3.2 Main Facts

3.2.1 Descriptive Statistics

In Table 2, descriptive statistics for the sample of firms used in our empirical exercises below[5] are reported. The average holding of debt in foreign currency in the sample is 8.1 percent of (lagged) total assets and 20.1 percent of total liabilities. On the other hand, the average holding of assets in foreign currency is 6.2 percent of (lagged) total assets. In the sample, 42 percent of firms report the use of some type of FX derivative. Exports as a percentage of total assets are on average 6.7 percent. The average investment rate is 2.4 percent, with a standard deviation of 11.9 percent. As a percentage of (lagged total assets), the profit measures have average values of 15.3 percent, 6 percent, 4 percent and 8.7 percent, respectively. The average leverage in the sample is 40.9 percent. Finally, 47.9 percent of the firms have some participation by foreign owners, 12.4 percent have at least 10 percent foreign property, and 4.5 percent have at least 50 percent foreign property.

3.2.2 Time Pattern of FX Exposure and Use of FX Derivatives

In this subsection, the time pattern of the main variables in the analysis is reported, namely, the FC debt, FC assets, FX derivatives, and two exposures measures: FC debt net of FC assets (exposure 1) and FC debt net of FC assets and exports (exposure 2). In Table 3, the mean and the median for the variables[6] is shown. In Figure 2, the distribution of these two exposures measures

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[5] A brief description of the variables is available in Appendix 1. In Appendix 2, we report descriptive statistics for the full sample of firms available, i.e., the set in which we do not impose the data requirement described above.
[6] This time period covers two foreign exchange regimes: a crawling peg within a band regime, between 1994 and 1999, and a free-floating regime from September, 1999 onwards. During the last regime the Central Bank of Chile intervened the foreign exchange market on four occasions (due to specific circumstances), but broadly speaking, we have had a free-floating exchange rate regime.

can be seen, and in Figure 3, the average evolution of these two exposures measures through time is depicted.

The average holding of FC debt increased from 7 percent of total assets in 1994 to 9 percent in 1999. Then, a drop to 3.8 percent in 2006 is detected, likely explained by the change in FX regime in 1999. Interestingly, a reversal in the time pattern of the aggregate holdings FC debt by Chilean firms is observed from 2007 onwards. In this period, the level of FC debt over total assets reaches levels of approximately 7 percent. This post-financial crisis period coincides with favorable credit conditions in developed markets that allow some firms access to a lower cost of debt.[7]

In Figure 2, it is noted that the change in the FX regime is an important determinant of the level of exposure by firms: with a crawling peg regime, the average exposure was approximately 4 percent of total assets, whereas with a free-floating regime the average exposure was reduced considerably. In fact, when exports are included in the exposure measure, this indicator becomes negative.

3.2.3 A Closer Look at the Types of Foreign Currency Debt between 2009 and 2014

For the period 2009-2014, we have detailed information about the types and the maturity of FC debt. In Table 5, for a subsample of firms, the types of FC debt[8] are reported. In particular, banking debt, bond debt, account payables and others types of debt are identified. For the case of bank and bond debt, short-term (less than a year) and long-term (more than a year) debts are also differentiated. The table shows that, out of total FC debt held by this subsample of firms, 55 percent was taken with banks, 8 percent corresponds to bonds, 32 percent is accounts payable and 4 percent comes from other sources.

3.2.4 Bond Issuance in Chilean Firms

In order to have a more detailed picture of the holdings of foreign debt by firms, the pattern of bond issuance in foreign currency by Chilean firms from 1996 to 2015 is presented in Table 6. This information was collected from the Thompson-Reuters (Eikon) platform. The table provides information about the number of non-financial firms that have issued a bond denominated in

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[7] For example, Hansen and Jara (2015) study the effect of the QE program implemented by the FED on the financial constraints of firms in emerging markets, including Chilean firms.
[8] This subsample of firms is selected based on data availability.

foreign currency either in local or international markets, the number of bonds issued (some firms have issued more than one bond), the average amount of debt issued in millions of U.S. dollars, the average yield to maturity at the emission time and the average maturity.[9]

First, the number of firms issuing bonds in foreign currency is quite small. More issuance activity was observed from 2010 up to the present day. As we mentioned above, this period coincides with the low interest rates observed in developed markets such as the United States. The peak of activity was observed in 2014, when 13 firms issued 24 bonds. Second, the average amount of debt issued varied between 200 and almost 800 U.S. millions. Third, the average yield to maturity at the emission time decreases trough time. In 1996, the average yield was 10.5 percent, while it was 3.3 percent in 2014. Finally, the average maturity has also declined in time. In 1997, for example, firms were able to issue bonds with an average maturity of 32 years, while the average maturity in 2014 was only 12 years.

The evidence indicates that despite the fact that the average amount involved in each of the issued bonds is relatively high for the size of an average Chilean company, it is clear that bond issuance activity is concentrated in a small number of firms. In general, these firms are big, more sophisticated and less subject to financial constraints; their main reason for issuing abroad is matching liabilities with income from operations that are denominated, in a significant percentage, in foreign currency due to the features of their market of operation.[10]

4. Determinants of Debt Composition

4.1 Drivers of FC Debt

In this section the drivers of FC debt used by non-financial firms in the sample are studied. Several financial theories provide predictions regarding why firms use foreign currency debt. As mentioned above, Allayannis, Brown and Klapper (2003) discuss the implications of the static trade-off theory, the theory of agency cost of debt, the pecking order hypothesis, and the risk management theory with respect to the use of FC debt. We investigate whether these theories find support in our sample. In particular, we estimate the following model:

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[9] Averages are weighted by market value of issued bonds.

[10] For example, CODELCO, the largest copper producer of the world, belongs to this group of firms. According to information collected in a personal interview with the CFO of the company, almost 100 percent of its income is denominated in foreign currency; therefore, issuing in foreign currency in international markets is a natural business practice for them. Besides, the CFO commented that bond domestic markets are too small and illiquid to absorb the demand of financing of these big companies.

$$FC_{ikt} = \alpha_i + \beta X_{ikt-1} + \delta_t + \gamma_k + e_{ikt} \qquad (1)$$

where the dependent variable is either a dummy variable taking the value of 1 for firms reporting the use of any type of foreign currency debt or the amount of FC debt as a share of total assets. The subscript i accounts for firm, k for economic sector and t for time. The specification includes economic sectors dummies to account for sector-specific shocks and year dummies to account for changes in macroeconomic conditions over time. X is a set of firm-specific control variables. In particular, we include as possible determinants exports sales, the holding of FC assets, the use of FX derivatives, foreign ownership, size, measured as the natural logarithm of total assets, and leverage, measured as total debt over total assets.[11]

In Table 7, the estimated models are reported. In columns (1) to (5) we report Probit estimates of the probability of holding foreign debt and in columns (6) to (10) we report OLS-FE estimates for models in which the dependent variable is the amount of debt. Note that our identification derives from variation across firms.[12] Across specifications, we use robust clustered-by-firms standard errors. In column (1) we only include exports as an explanatory variable and we find a strong positive correlation with FC debt. When we add FC assets and the FX derivatives dummy as control variables, in columns (2) and (3), we find that the estimated coefficients are also positive and statistically significant. These results are consistent with the idea of firms matching the currency composition of liabilities and assets, and with firms actively managing their FX exposure with FX derivatives. In column 4 we add size, measured as the log of total assets, and leverage. Only the estimated coefficient for size is positive and statistically significant. Finally, in column (5), foreign ownership as additional control is included. Note that due to data limitations, for this specification, the number of observations drops by approximately a third; therefore it is not fully comparable to the previous estimated models. We expected that foreign ownership would positively impact the likelihood of holding FX debt because of the potential connection that foreign owners may have with international creditors. Nevertheless, the variable is not statistically significant.

Similar results are found with the OLS-FE estimates. The estimates coefficients of FC Assets, FX Derivatives and size are still positive and statistically significant. However, while

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[11] In a previous version of the paper, we also include cash flow, fixed assets and the fraction of short-term debt over total debt as additional control variables, and the results are qualitatively the same.
[12] An ANOVA analysis shows that in the sample most of the variation is across firms instead of between firms.

leverage and foreign ownership become significant, the exports sales estimated coefficient loses significance across models. These results are consistent with firms matching asset and liabilities in foreign currency and with firms hedging foreign currency risk. A potential explanation of the estimated negative coefficient of foreign ownership is the substitution between external and internal capital markets by multinationals. These firms may issue less debt in foreign currency because they have access to alternative internal financing sources.

4.2 Macroeconomic Conditions

In this section, we study whether aggregate macroeconomic variables affecting credit conditions influence the use of FC debt by firms. For example, the relative cost of domestic credit versus foreign credit, proxied by an interest rate spread, should affect the relative attractiveness of taking debt in domestic versus foreign currency. A similar effect should be observed if the available credit to the domestic sector increases in a particular period.

We estimate an extended version of (1) to account for this potential effect:

$$FC_{ikt} = \alpha_i + \beta_1 X_{ikt-1} Z_t + \beta_2 X_{ikt-1} + \beta_3 Z_t + \delta_t + \gamma_k + e_{ikt}. \qquad (1')$$

In this model, the variable Z_t is a macroeconomic variable accounting for changes in aggregate credit conditions. In particular, the domestic interest rate, the spread between the domestic and the U.S. lending interest rate, the forward premium, and finally, the domestic credit to private sector as a percentage of GDP are considered macroeconomic indicators. We would expect that firms involved in foreign operations (exporters and holders of FC assets) and larger firms would be more able to take advantage of favorable external conditions and increase their FC debt positions when interest rates were lower abroad.

In Table 8, the estimated models are reported. The interest is focused on the interaction term β_1 that measures the differential effect of the control variable X on the holding of FC debt, for a given level of Z_t. In column (1), we report a model without macroeconomic variables as a benchmark model. In columns (2) to (5), we report the extended model for each of the 4 macroeconomic aforementioned variables. At the top of each column we report the macro variable used in the respective regression. As compared with the previous models, we do not include foreign ownership as a control variable to avoid reducing the sample size.

First, we observe that results reported in columns (1) remain when the macroeconomic variables are incorporated in models in columns (2) to (5): the estimated coefficients for FC

assets, FX derivatives, size and leverage remain positive and statistically significant. Looking at the interaction variables, we observe that larger firms take more debt in foreign currency when the domestic interest rate is higher and when the forward premium is lower. This evidence indicates that larger firms have better access to debt in foreign currency when the cost of this debt is relatively cheaper compared to debt in domestic currency, and when the expectations of exchange rate devaluations are reduced. We also find that firms hedging with FX derivatives take on relatively more FC debt than firms without FX derivatives when the domestic credit to private sector increases.

5. The Impact of Holding Foreign Currency on Firm Profit

In this section, we study whether the currency composition of debt affects firm profitability. The argument behind this hypothesis is similar to the one supporting the standard Balance Sheet effect of foreign exchange depreciations on investment: firms may encounter an automatic increase in their financial burden if unexpected foreign exchange devaluations inflate the value of foreign currency debt in domestic currency, therefore affecting the profitability of the firm. To test this hypothesis, we estimate the following specification:

$$Y_{it} = \alpha_i + FC_{it-1}(\alpha + \beta \, \Delta e_t) + \delta \, X_{it-1} + \theta_t \eta_k + \gamma_i + u_{it}, \tag{2}$$

where Y_{it} represents the measure of profitability, FC is the lagged amount of FC debt, Δe_t is the change in the real exchange rate between the Chilean peso and the US dollar and X_{it-1} is a set of firm-specific control variables. Industry sectors-years fixed effects are included. 4 alternative measures of profitability are considered: the profit margin on sales defined as net income available to common stockholders over total sales (profit 1); basic earning power defined as the ratio between earnings before interest and taxes (EBIT) and total assets (profit 2); return on assets (ROA); and return on equity (ROE).[13]

The variable of interest is β that will show the differential effect of depreciation on firm profits for firms holding FC debt. If the estimated coefficient is negative, we can conclude that an exchange-rate depreciation reduces relatively more the profits of firms with FC debt compared to firms with less FC debt.

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[13] See Brigham and Ehrhardt (2005) for details on these profitability measures.

In Table 9, OLS-FE estimates of alternative models are reported. In columns (1) to (3) the dependent variable is profit 1, in columns (4) to (6) it is profit 2, in columns (7) to (9) it is ROA, and finally, in columns (10) to (12) it is ROE. As expected, the estimated coefficient for the interaction term between exchange rate and FC debt is negative across models but not statistically significant. This evidence indicates that there is no differential effect of exchange rate depreciations on the profitability of firms holding more FC debt. Similar results, in terms of the lack of significance, are found for the interactions of exchange rate depreciation with FC assets, exports and FX derivatives. To some extent, firm profit seems to be immune to exchange rate risk. This is consistent with firms matching the currency composition of debt, and with the use of FX risk mitigation problems. A less plausible explanation is that firm profitability is affected by FX depreciations but in a dimension which is not covered by the four profitability measures used in the analysis.

Despite the absence of a differential effect of holding FC debt, we find that in most of the specifications the estimated coefficient for the variable in levels appears negative and statistically significant. In other words, firms that are more profitable seem to hold lower levels of debt in foreign currency. For export sales, we also find a positive and significant effect. Both foreign assets and the FX derivative dummy are not statistically significant. Finally, size and leverage are negatively related to firm profitability.

Overall, the findings in this section show that there is no differential effect of exchange rate depreciations on profitability for firms having FC debt, FC assets and FX derivatives. A similar result is found for exports. We find, however, a first order effect between these variables and profitability.

6. The Impact of Holding Foreign Currency Debt on Investment

In this section, the effects of holding FC debt on investment are studied. The balance-sheet literature stresses that the value of the foreign currency debt, denominated in domestic currency, increases automatically after an unexpected depreciation of the exchange rate. Thus, firms facing a large financial burden may postpone positive-NPV projects. Following Bleakley and Cowan (2008), this hypothesis is tested using the following investment equation:

$$\frac{I_{it}}{A_{it-1}} = \alpha_i + \beta_1 \left(\frac{FC_{it-1}}{A_{it-1}} \Delta e_t \right) + \beta_2 \left(\frac{FC_{it-1}}{A_{it-1}} \right) + \beta_3 \left(\frac{I_{it-1}}{A_{it-2}} \right) + \delta X_{it-1} + \theta_t \eta_k + \gamma_i$$

$$+ u_{it} \quad (3),$$

where I_{it} is the change in the capital stock of the firm. As before, FC_{it-1} is lagged holding of foreign debt and Δe_t is the change in the real exchange rate. Again the focus is on the parameter of the interaction variable, β_1. The estimated coefficient will capture the differential impact of a shock in the real exchange rate on investment for those firms holding FC debt. The balance-sheet hypothesis suggests that this coefficient should be negative. Note that in this specification, we include sector-year fixed effect ($\theta_t \eta_k$) to control for any heterogeneity across industrial sectors by year.

Our estimation results are reported in table 10. In columns (1) to (3), we report alternative versions of equation (3), whereas in columns (4) to (6) the lagged dependent variable is included as an additional control variable. We find that across models, our main variable of interest, the interaction of the changes in the exchange rate and the holdings of FC debt, is negative, as expected, and statistically significant. Only in column (6) did the interaction variable lose significance. These estimates corroborates that the balance sheet effect is present in our sample of Chilean firms in line with previous results in Cowan, Hansen and Herrera (2005). Thus, foreign exchange depreciation hurts firms with debt in foreign currency.

Interestingly, we also find that foreign assets and exports help to hedge foreign exchange exposure caused by the use of foreign debt by firms. Their significance is weaker than those for the foreign debt, though. For example, in columns (1) and (2), the interaction between foreign assets and changes in the exchange rate is positive and significant. In these specifications the estimated coefficient is smaller than the one for foreign debt indicating that, if any, the exposure to foreign debt is not completely compensated by changes in the other side of the balance sheet in the opposite direction. The interaction of firm exports and changes in the exchange rate is positive, as expected, and significant as well. Finally, the use of foreign exchange derivatives seems do not affect firm´s investment after a foreign exchange depreciation as the interaction variable with the foreign exchange rate is not significant across models.

7. Conclusion

In this paper, we study the currency composition of the balance sheet of a sample of Chilean non-financial firms for the period 1994 to 2014 using a panel dataset containing detailed information about the currency composition of firm debt and assets, export sales, FX derivatives use and foreign ownership. In particular, we investigate the determinants of the use of FC debt, its interaction with macroeconomic variables, and finally, its potential effects on firm profitability and investment.

In terms of the determinants, we find that the use of FC debt is strongly linked to the use of both FC assets and FX derivatives. We also find that export sales, size, leverage and foreign ownership appear as relevant determinants depending on the considered specification. Regarding the potential effect of holding foreign currency debt on firm performance, we do not identify any statistical differential effect on the financial profitability of the firm but we do find a statistical robust balance sheet effect in our sample, as depreciations seems to reduce firms' investment, especially for firms holding more foreign debt in the previous year. The holding of foreign assets and export activities by the firm operate as operational hedgers to foreign exchange risk by producing a compensatory, positive, effect on investment after a devaluation. Finally, we do not find evidence that financial hedgers, the use of foreign exchange derivatives, help to mitigate the negative balance sheet effect associated with foreign currency debt.

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Table 1. Number of Firms

	Population			Sample	
	All Firms	Non-Financial Firms	Listed Non-Financial Firms	Non-Financial Firms	Listed Non-Financial Firms
1994	NA	NA	NA	61	38
1995	NA	NA	NA	66	41
1996	NA	NA	NA	67	41
1997	NA	NA	NA	69	41
1998	NA	NA	NA	74	43
1999	NA	NA	NA	69	38
2000	NA	NA	NA	71	39
2001	358	315	111	94	46
2002	375	327	113	88	45
2003	366	318	116	91	45
2004	370	320	119	74	54
2005	372	320	126	74	55
2006	369	313	128	70	53
2007	356	302	134	100	69
2008	340	288	132	125	82
2009	249	205	135	140	89
2010	453	345	136	143	97
2011	591	467	143	141	97
2012	576	455	141	144	102
2013	593	473	143	149	104
2014	588	465	142	140	101

Note: This table presents the (relevant) universe of firms in Chile and the number of firms in the sample. The population corresponds to the firms that must report to Superintendecia de Valores y Seguros (SVS). The sample only contains non-financial firms with available information of FC debt, FC assets, exports and FX derivatives in the respective year.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	p25	p50	p75	Max
FC Debt (dummy)	2,050	0.735	0.442	0.000	0.000	1.000	1.000	1.000
FC Debt (% assets)	2,050	0.081	0.113	0.000	0.000	0.026	0.122	0.541
FC Debt (% liabilities)	2,023	0.201	0.250	0.000	0.000	0.071	0.342	0.938
FC Assets (% assets)	2,050	0.062	0.125	0.000	0.000	0.005	0.066	0.920
FX derivative dummy	2,050	0.429	0.495	0.000	0.000	0.000	1.000	1.000
Exports (% assets)	2,050	0.067	0.149	0.000	0.000	0.000	0.026	0.787
Profit 1 (Net income / Sales)	2,050	0.153	0.487	-4.281	0.026	0.090	0.214	4.887
Profit 2 (EBIT / assets)	2,050	0.060	0.062	-0.308	0.020	0.055	0.094	0.263
ROA	2,050	0.040	0.052	-0.275	0.014	0.039	0.067	0.217
ROE	2,050	0.087	0.129	-0.701	0.031	0.089	0.141	0.857
Investment (% assets)	2,050	0.024	0.119	-0.482	-0.009	0.014	0.061	0.518
Size	1,970	18.703	1.537	12.716	17.691	18.706	19.909	21.818
Total debt (% assets)	2,011	0.409	0.194	0.007	0.263	0.408	0.538	0.931
Foreign ownership dummy (any)	1,320	0.479	0.500	0.000	0.000	0.000	1.000	1.000
Foreign ownership dummy (at least 10 %)	1,320	0.124	0.330	0.000	0.000	0.000	0.000	1.000
Foreign ownership dummy (at least 50 %)	1,320	0.045	0.208	0.000	0.000	0.000	0.000	1.000

Table 2., continued

Variable	Obs	Mean	Std. Dev.	Min	p25	p50	p75	Max
FC Debt (dummy)	4,867	0.549	0.497	0	0	1	1	1
FC Debt (% assets)	4,771	0.062	0.110	0.000	0.000	0.001	0.076	0.543
FC Debt (% liabilities)	4,721	0.160	0.250	0.000	0.000	0.003	0.254	0.939
FC Assets (% assets)	4,787	0.046	0.117	0.000	0.000	0.000	0.032	0.920
FX derivative dummy	2,968	0.408	0.491	0.000	0.000	0.000	1.000	1.000
Exports (% assets)	7,079	0.035	0.113	0.000	0.000	0.000	0.000	0.798
Profit 1 (Profit margin on sales)	5,759	0.091	0.665	-4.996	0.008	0.084	0.229	4.941
Profit 2 (Basic Earning Power)	6,904	0.037	0.076	-0.319	-0.003	0.029	0.077	0.263
ROA	6,903	0.027	0.067	-0.352	0.000	0.027	0.062	0.219
ROE	6,897	0.076	0.163	-0.710	0.000	0.067	0.141	0.857
Investment (% assets)	6,123	0.022	0.102	-0.485	-0.003	0.004	0.044	0.522
Size	6,939	17.226	2.441	10.328	15.821	17.633	18.979	21.818
Total debt (% assets)	6,855	0.352	0.240	0.000	0.145	0.344	0.529	0.933
Foreign ownership dummy (any)	2,626	0.421	0.494	0.000	0.000	0.000	1.000	1.000
Foreign ownership dummy (at least 10 %)	2,626	0.121	0.327	0.000	0.000	0.000	0.000	1.000
Foreign ownership dummy (at least 50 %)	2,626	0.045	0.206	0.000	0.000	0.000	0.000	1.000

Table 3. FC Debt, FC Assets, Exposure and FX Derivatives by Year

	Mean						Median				
year	Debt	Assets	Exposure 1	Exposure 2	FX derivat.		Debt	Assets	Exposure 1	Exposure 2	FX derivat.
1994	0.069	0.033	0.028	-0.034	0.105		0.010	0.000	0.000	0.000	0.000
1995	0.073	0.030	0.036	-0.018	0.178		0.004	0.000	0.000	0.000	0.000
1996	0.072	0.028	0.041	-0.018	0.167		0.007	0.000	0.000	0.000	0.000
1997	0.080	0.023	0.055	-0.006	0.185		0.010	0.000	0.001	0.000	0.000
1998	0.089	0.032	0.050	-0.008	0.194		0.016	0.000	0.000	0.000	0.000
1999	0.091	0.036	0.051	-0.001	0.278		0.012	0.000	0.000	0.000	0.000
2000	0.062	0.046	0.018	-0.033	0.287		0.000	0.000	0.000	0.000	0.000
2001	0.047	0.046	0.003	-0.036	0.411		0.000	0.000	0.000	0.000	0.000
2002	0.045	0.039	0.008	-0.027	0.349		0.000	0.000	0.000	0.000	0.000
2003	0.036	0.045	-0.008	-0.047	0.366		0.000	0.000	0.000	0.000	0.000
2004	0.041	0.046	-0.006	-0.050	0.311		0.000	0.000	0.000	0.000	0.000
2005	0.041	0.040	0.001	-0.042	0.346		0.000	0.000	0.000	0.000	0.000
2006	0.038	0.044	-0.005	-0.043	0.421		0.000	0.000	0.000	0.000	0.000
2007	0.062	0.076	-0.011	-0.069	0.469		0.005	0.010	0.000	-0.001	0.000
2008	0.076	0.084	-0.007	-0.062	0.478		0.005	0.010	0.000	0.000	0.000
2009	0.062	0.046	0.003	-0.036	0.520		0.014	0.002	0.000	0.000	1.000
2010	0.069	0.061	0.001	-0.039	0.520		0.020	0.005	0.000	0.000	1.000
2011	0.075	0.063	0.003	-0.024	0.549		0.021	0.004	0.000	0.000	1.000
2012	0.073	0.055	0.009	-0.010	0.556		0.014	0.002	0.000	0.000	1.000
2013	0.087	0.055	0.023	0.006	0.571		0.019	0.002	0.000	0.000	1.000
2014	0.080	0.051	0.016	-0.006	0.565		0.018	0.003	0.000	0.000	1.000

Note: This table presents the annual mean and median of FC Debt, FC Assets and FX derivatives from 1994 to 2014. It shows also the temporal evolution of two measures of FX exposure: FC debt net of FC assets, and FC debt net of both FC asset and export sales. All the variables are scaled by total assets.

Table 4. FC Debt by Economic Sector

Sector	Mean	Median	St. Dev.	Min	Max
Food, Beverages and Tobacco	0.081	0.044	0.098	0.000	0.456
Consumption	0.056	0.023	0.081	0.000	0.431
Construction	0.038	0.000	0.074	0.000	0.413
Forestry	0.056	0.004	0.103	0.000	0.446
Water Transportation	0.074	0.008	0.111	0.000	0.445
Railroad and Highway Transportation	0.094	0.029	0.126	0.000	0.456
Mining	0.098	0.036	0.118	0.000	0.447
Energy	0.000	0.000	0.000	0.000	0.000
Telecommunications	0.069	0.001	0.112	0.000	0.446
Sanitary Services and Gas	0.020	0.000	0.058	0.000	0.348
Electric	0.067	0.000	0.119	0.000	0.459
Health Services	0.007	0.000	0.023	0.000	0.129
Infrastructure Concessionaires	0.031	0.000	0.086	0.000	0.407
Leisure and Educational Services	0.008	0.000	0.039	0.000	0.329
Others	0.025	0.000	0.075	0.000	0.400
Conglomerates	0.038	0.002	0.071	0.000	0.285

Note: This table presents the mean, median, standard deviation, minimum and maximum FC debt, scaled by total assets, by economic sector.

Table 5. Types of Foreign Currency Debt for a Sub-Sample of Firms and Years

Year	# Firms	Bank		Bonds		Accounts Payable	Others
		ST	LT	ST	LT		
2009	67	0.26	0.27	0.00	0.07	0.37	0.03
2010	70	0.25	0.29	0.01	0.08	0.31	0.06
2011	74	0.23	0.35	0.01	0.06	0.31	0.04
2012	75	0.24	0.38	0.00	0.07	0.27	0.04
2013	73	0.20	0.34	0.02	0.07	0.32	0.06
2014	74	0.20	0.31	0.01	0.09	0.36	0.03

Note: This table decomposes firms' total FC debt into its components. Numbers are percentages over total FC debt. ST is short term and LT is long term.

Table 6. Bonds Issued in Foreign Currency

Year	Num. Firms	Num. Issues	Avg. Amount (millions US$)	Avg. Yield-to-Maturity	Avg. Maturity
1996	1	2	290.0	10.5	23
1997	2	3	203.3	6.9	32
2001	1	2	421.0	4.9	21
2003	2	3	235.1	6.6	20
2006	2	4	200.0	7.5	20
2007	1	1	250.0	7.2	15
2009	2	5	499.7	6.0	10
2010	5	10	390.5	5.1	10
2011	4	7	549.9	5.8	10
2012	4	9	783.5	4.9	10
2013	10	19	576.9	6.7	14
2014	13	24	635.6	3.3	12
2015	4	14	571.9	5.3	12

Note: This table shows aggregate bond issuance activity in foreign currency by Chilean non-financial firms. *Source:* Thomson-Reuters' Eikon platform. Averages are weighted averages by bond's market value. During the period 1998-2000, no bond was issued.

Table 7. Determinants of Foreign Currency Debt Use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	dep var: Dollar Debt (dummy)					dep var: Amount of Dollar Debt				
Exports	0.677***	0.418***	0.462***	0.564***	0.428***	-0.0112	-0.0238	-0.0212	0.000541	0.0195
	(0.196)	(0.157)	(0.157)	(0.154)	(0.151)	(0.0324)	(0.0340)	(0.0313)	(0.0296)	(0.0321)
FC Assets		1.385***	1.223***	1.072***	0.829***		0.191***	0.190***	0.182***	0.173***
		(0.329)	(0.285)	(0.250)	(0.307)		(0.0379)	(0.0386)	(0.0365)	(0.0453)
FX Derivatives (dummy)			0.184***	0.105***	0.0767**			0.0389***	0.0261***	0.0284***
			(0.0386)	(0.0341)	(0.0304)			(0.00712)	(0.00727)	(0.00851)
Size				0.0735***	0.0597***				0.0138***	0.0144***
				(0.0154)	(0.0174)				(0.00366)	(0.00506)
Leverage				0.0357	0.126				0.124***	0.124***
				(0.0796)	(0.0880)				(0.0253)	(0.0296)
Foreign Ownership					0.00283					-0.0202**
					(0.0283)					(0.00886)
Observations	1,867	1,767	1,767	1,661	1,072	1,868	1,768	1,768	1,662	1,077
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms						228	223	223	216	117
Estimation method	Probit	Probit	Probit	Probit	Probit	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE

Note: The table shows estimates of equation (1) in the text. Clustered standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8. Determinants of the Use of FC Debt and Macroeconomic Conditions

	(1)	(2)	(3)	(4)	(5)
		dom. int. rate	spread	forward prem.	dom. credit
Exports	0.000541	0.0175	-0.0128	0.00516	0.0333
	(0.0296)	(0.0571)	(0.0466)	(0.0319)	(0.104)
FC Assets	0.182***	0.183*	0.188**	0.170***	-0.256
	(0.0365)	(0.0965)	(0.0740)	(0.0375)	(0.275)
FX Derivatives (dummy)	0.0261***	0.0225***	0.0253***	0.0244***	0.0201***
	(0.00727)	(0.00726)	(0.00750)	(0.00691)	(0.00753)
Size	0.0138***	6.59e-05	0.0128**	0.0160***	0.0299**
	(0.00366)	(0.00614)	(0.00522)	(0.00383)	(0.0133)
Leverage	0.124***	0.192***	0.0364	0.136***	0.309**
	(0.0253)	(0.0307)	(0.0341)	(0.0267)	(0.126)
Exports x Z		-0.000823	0.196	-0.00164	-0.000374
		(0.00422)	(0.504)	(0.00131)	(0.00128)
FC Assets x Z		-0.000875	-0.112	0.00329	0.00554
		(0.00826)	(0.972)	(0.00223)	(0.00354)
FX Derivatives (dummy) x Z		0.000304	0.0347	0.000748	0.000174*
		(0.000610)	(0.0973)	(0.000455)	(9.50e-05)
Size x Z		0.00105**	0.0230	-0.000425**	-0.000192
		(0.000536)	(0.0588)	(0.000185)	(0.000144)
Leverage x Z		0.00301	1.332***	-0.00127	-0.00228
		(0.00238)	(0.454)	(0.00121)	(0.00168)
Z		-0.0128	-0.391	0.00229	0.00280
		(0.0113)	(1.294)	(0.00663)	(0.00292)
Observations	1,662	1,580	1,583	1,583	1,583
Number of rut	216	212	212	212	212
Sector FE	Yes	Yes	Yes	Yes	Yes
Year Effect	Yes	Yes	Yes	Yes	Yes
Estimation Method	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE

Note: The table shows estimates of equation (1') in the text. The macroeconomic variables are: is the interbank domestic interest rate, the spread between this rate and the LIBOR rate, forward premium is the difference between forward and spot exchange rate between Chilean peso and US dollars, and finally, the domestic credit to private sector as percentage of GDP. Clustered (by firm) standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9. The Effect of FC Debt on Firms' Profits

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	LHS: net income / sales			LHS: EBIT / assets			LHS: ROA			LHS: ROE		
FC debt x rer	-2.292	-1.279	-2.277	0.136	0.123	0.0919	-0.158	-0.1000	-0.155	-0.482	-0.337	-0.396
	(1.909)	(2.248)	(2.154)	(0.144)	(0.150)	(0.164)	(0.125)	(0.123)	(0.135)	(0.329)	(0.338)	(0.350)
FC assets x rer	-0.416	-1.066	1.433	-0.132	-0.139	-0.139	-0.0214	-0.128	-0.112	-0.0968	-0.274	-0.243
	(3.150)	(3.434)	(1.882)	(0.161)	(0.142)	(0.142)	(0.189)	(0.143)	(0.146)	(0.512)	(0.470)	(0.479)
Exports x rer		1.299	1.295		0.156	0.143		0.00549	0.0180		0.0665	0.0858
		(1.157)	(1.061)		(0.114)	(0.115)		(0.107)	(0.104)		(0.266)	(0.262)
FX Derivative x rer		-0.156	0.157		0.0270	0.0279		0.0145	0.0276		-0.0283	0.0185
		(0.391)	(0.315)		(0.0353)	(0.0362)		(0.0322)	(0.0312)		(0.0745)	(0.0722)
rer	0.415*	0.481	0.465	0.121	0.0870	0.0821	0.189**	0.173*	0.181*	0.306*	0.309	0.278
	(0.220)	(0.393)	(0.377)	(0.0844)	(0.0880)	(0.0866)	(0.0943)	(0.0990)	(0.0977)	(0.175)	(0.190)	(0.186)
FC Debt	-0.545**	-0.533**	-0.272	-0.0307	-0.0271	-0.0249	-0.0631***	-0.0575***	-0.0459**	-0.0951**	-0.0870*	-0.0930**
	(0.218)	(0.212)	(0.204)	(0.0219)	(0.0203)	(0.0229)	(0.0178)	(0.0166)	(0.0194)	(0.0463)	(0.0446)	(0.0465)
FC Assets	0.195	0.193	-0.0263	-0.0198	-0.0273	-0.0250	-0.00639	-0.0182	-0.0228	-0.0758	-0.101*	-0.0986*
	(0.314)	(0.322)	(0.242)	(0.0282)	(0.0239)	(0.0230)	(0.0238)	(0.0200)	(0.0193)	(0.0568)	(0.0544)	(0.0529)
Exports		-0.293	-0.201		0.102***	0.0968***		0.0530**	0.0513**		0.121**	0.111**
		(0.179)	(0.137)		(0.0274)	(0.0259)		(0.0219)	(0.0210)		(0.0477)	(0.0463)
FX Derivatives (dummy		-0.0122	0.0139		0.000642	-0.000250		-0.00285	-0.00118		-0.0139	0.000129
		(0.0415)	(0.0359)		(0.00424)	(0.00452)		(0.00333)	(0.00345)		(0.0118)	(0.00822)
Size			0.0314			-0.0110*			-0.00920**			-0.0186*
			(0.0653)			(0.00644)			(0.00453)			(0.00994)
Leverage			-0.896***			0.0226			-0.0235			0.00122
			(0.312)			(0.0218)			(0.0152)			(0.0354)
Observations	2,155	2,108	1,994	2,155	2,108	1,994	2,155	2,108	1,994	2,155	2,108	1,994
R-squared	0.179	0.183	0.242	0.169	0.199	0.217	0.184	0.195	0.228	0.207	0.216	0.258
Number of rut	241	241	233	241	241	233	241	241	233	241	241	233
Sector x Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE

Note: The table shows estimates of equation (2) in the text. Rer is the change in the real exchange rate. Clustered (by firm) standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 10. The Effect of FC Debt on Firm investment.

	(1)	(2)	(3)	(4)	(5)	(6)
	LHS: Change in Fixed Capital					
FC debt x rer	-0.590**	-0.575**	-0.596**	-0.499*	-0.488*	-0.459
	(0.270)	(0.282)	(0.298)	(0.286)	(0.291)	(0.304)
FC assets x rer	0.522**	0.401*	0.395	0.348	0.242	0.221
	(0.251)	(0.242)	(0.256)	(0.277)	(0.266)	(0.278)
Exports x rer		0.351*	0.350		0.392*	0.389*
		(0.209)	(0.220)		(0.208)	(0.222)
FX Derivative x rer		-0.0586	-0.0126		-0.0688	-0.0241
		(0.0642)	(0.0589)		(0.0627)	(0.0610)
Real Exchange Rate	0.276*	0.299*	0.282*	0.261*	0.297*	0.268*
	(0.153)	(0.158)	(0.158)	(0.152)	(0.157)	(0.158)
FC Debt	-0.0607	-0.0681	-0.0912*	-0.0545	-0.0634	-0.0915*
				(0.0432)		
	(0.0419)	(0.0440)	(0.0522)	)	(0.0444)	(0.0544)
FC Assets	0.00894	-0.00655	0.0107	0.0211	0.00539	0.0224
				(0.0467		
	(0.0469)	(0.0440)	(0.0482)	)	(0.0445)	(0.0487)
Exports		0.0121	0.0199		0.0155	0.0263
		(0.0304)	(0.0326)		(0.0343)	(0.0360)
FX Derivatives (dummy)		0.0104	0.00953		0.0124	0.0117
		(0.00778	(0.00784		(0.00795	(0.00818
		)	)		)	)
Size			0.00518			0.00720
			(0.00949			
			)			(0.0104)
Leverage			0.0170			0.0208
			(0.0398)			(0.0415)
Lagged Dep. Variable				-0.0356	-0.0246	-0.0274
				(0.0362		
				)	(0.0361)	(0.0327)
Observations	2,155	2,108	1,994	2,053	2,007	1,905
R-squared	0.461	0.469	0.491	0.461	0.470	0.489
Number of firms	241	241	233	238	237	231
Sector x Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE	OLS-FE

Note: The table shows estimates of equation (2) in the text. Rer is the change in the real exchange rate. Clustered (by firms) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Figure 1. Change in the Real Exchange Rate between the Chilean Peso and the US Dollar

Figure 2. FX Exposure Distribution
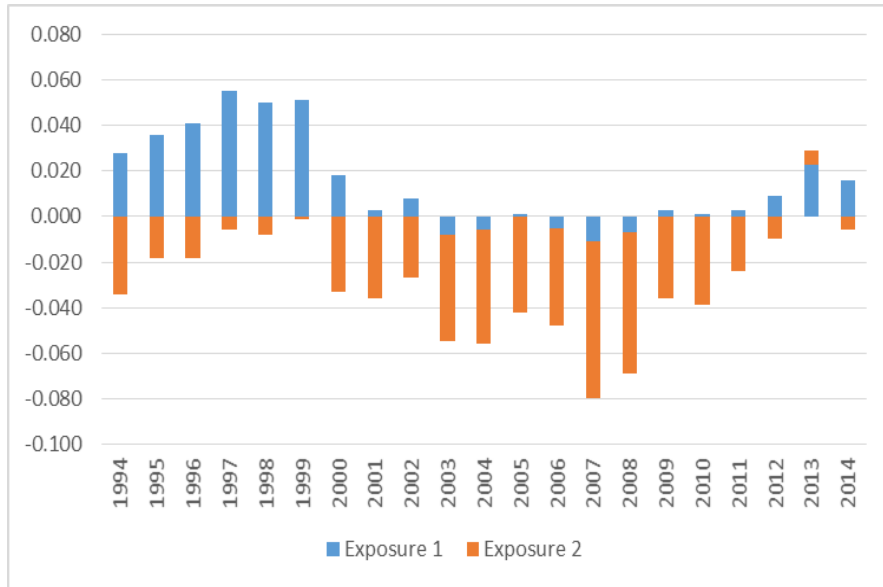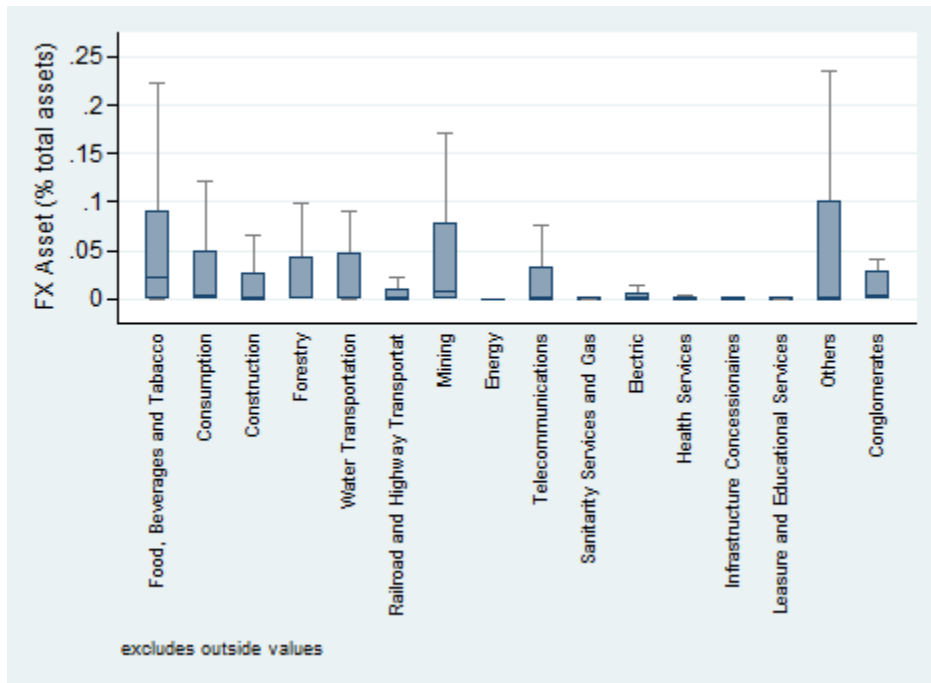
Figure 3. Average FX Exposure

Figure 4. FC Debt by Economic Sector

Appendix 1. Variable Description

Variable Name in database	Description	Source
act_us	Total Foreign Currency Assets ($)	SVS
debt_us	Total Foreign Currency Debt ($)	SVS
deriv	FX Derivatives Dummy	SVS
export	Sales from Exports ($)	Aduanas / Prochile
d_forown	Foreign Property Dummy	Thomson Reuters
dd2a	FC debt / Total Assets	SVS
da2a	FC assets / Total Assets	SVS
exp2a	Exports / Total Assets	Aduanas / Prochile
l2a	Leverage (Total Debt / Total Assets)	SVS
size	Natural logarithm of Total Assets.	SVS
i2a	Change in Fixed Assets / Total Assets	SVS
Profits 1	Net Income / Sales	SVS
Profits 2	EBIT/Total Assests	SVS
ROA	Return on Assets	SVS
ROE	Returns on Equity	SVS

Appendix 2. Descriptive Statistics (Full-Sample)

Variable	Obs	Mean	Std. Dev.	Min	p25	p50	p75	Max
FC Debt (dummy)	4,867	0.549	0.497	0	0	1	1	1
FC Debt (% assets)	4,771	0.062	0.110	0.000	0.000	0.001	0.076	0.543
FC Debt (% liabilities)	4,721	0.160	0.250	0.000	0.000	0.003	0.254	0.939
FC Assets (% assets)	4,787	0.046	0.117	0.000	0.000	0.000	0.032	0.920
FX derivative dummy	2,968	0.408	0.491	0.000	0.000	0.000	1.000	1.000
Exports (% assets)	7,079	0.035	0.113	0.000	0.000	0.000	0.000	0.798
Profit 1 (Profit margin on sales)	5,759	0.091	0.665	-4.996	0.008	0.084	0.229	4.941
Profit 2 (Basic Earning Power)	6,904	0.037	0.076	-0.319	-0.003	0.029	0.077	0.263
ROA	6,903	0.027	0.067	-0.352	0.000	0.027	0.062	0.219
ROE	6,897	0.076	0.163	-0.710	0.000	0.067	0.141	0.857
Investment (% assets)	6,123	0.022	0.102	-0.485	-0.003	0.004	0.044	0.522
Size	6,939	17.226	2.441	10.328	15.821	17.633	18.979	21.818
Total debt (% assets)	6,855	0.352	0.240	0.000	0.145	0.344	0.529	0.933
Foreign ownership dummy (any)	2,626	0.421	0.494	0.000	0.000	0.000	1.000	1.000
Foreign ownership dummy (at least 10 %)	2,626	0.121	0.327	0.000	0.000	0.000	0.000	1.000
Foreign ownership dummy (at least 50 %)	2,626	0.045	0.206	0.000	0.000	0.000	0.000	1.000