Journal of Banking & Finance 37 (2013) 1093–1107

Contents lists available at SciVerse ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Foreign currency borrowing by small firms in emerging markets: When domestic banks intermediate dollars

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ARTICLE INFO

Article history:
Received 20 May 2011
Accepted 30 November 2012
Available online 10 December 2012

JEL classification:
F31
G21
G32

Keywords:
Dollarization
Foreign currency borrowing
Dollar debt
Currency mismatch

ABSTRACT

This paper investigates what induces small firms in an emerging market economy to borrow dollar credit from domestic banks. Our data are from a unique survey of firms in Lebanon. The findings complement studies of large firms with foreign currency loans from foreign lenders. Exporters, naturally hedged against currency risk, are more likely to incur dollar debt. Firms also partly hedge themselves by passing currency risk to customers and suppliers. Less opaque firms with easily verifiable collateral and higher net worth are more likely to access dollar credit. Firms reliant on formal financing (banks and supplier credit) are more likely to contract dollar debt than firms reliant on informal financing (family, friends and moneylenders). Bank relationships, however, do not increase the dollar debt likelihood. And finally, profitable firms are less likely to have dollar debt. Information frictions and limited collateral, therefore, constrain dollar credit even when it is intermediated domestically.

1. Introduction

The purpose of this paper is to understand what induces mostly small firms in an emerging market economy to contract dollar-denominated credit from domestic banks and creditors.[1] We investigate the determinants of dollar debt using data from a unique firm-level survey from Lebanon that we designed and administered. The extent of foreign currency borrowing by small firms in emerging markets is important for the financial stability and economic growth of these economies. One main reason is that extensive and possibly excessive use of dollar debt has been a common thread in emerging market crises over the past two decades. The resulting currency mismatch on the balance sheet has been singled out as an important factor causing dislocations and amplifying crises (see, for example, Aghion et al., 2000; Caballero and Krishnamurthy, 2003). A borrower's assets and revenue are mostly in domestic currency, but currency depreciation magnifies liabilities and debt repayment obligations that are mostly in dollars leading to a drop in net worth and investment. For example, Aguiar (2005) finds that firm-level investment was adversely affected by the 1994 peso devaluation in Mexico, especially among firms with high levels of foreign currency (even for exporters).[2] Bordo et al. (2010) show that historically a greater fraction of foreign currency debt in a country's debt is associated with a higher frequency of financial crises and permanent output losses. Therefore, systemic risk in emerging markets will be high when small firms, in addition to large internationally active firms, take on dollar debt resulting in correlated defaults in a downturn.

In addition to concerns about financial stability, there is a second reason why the extent of dollar debt and what drives its use are important to the welfare of emerging market economies. The productive sector in these developing economies needs external finance to fund investments that contribute to output growth.[3] The main suppliers of external finance in emerging markets are banks

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[1] We use the terms "dollar" and "foreign currency" interchangeably throughout this paper.

[2] Nonetheless, the effect of a depreciation is not unambiguous because firms that are seemingly most exposed to a depreciation also may be best placed to deal with the currency risk. For example, Bleakley and Cowan (2008) find that the positive competitiveness effect of a depreciation outweighs the negative balance sheet effect.

[3] Use of the term "external finance" follows the tradition in corporate finance literature, which distinguishes between retained earnings or "internal funds" and "external funds" sourced from outside suppliers such as banks, finance companies, trade credit suppliers, and equity and bond markets. To avoid this term being wrongly construed to mean foreign financing, we will often use the term "formal finance" instead. And we will be clear when external funds from foreign sources are the intended meaning.

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http://dx.doi.org/10.1016/j.jbankfin.2012.11.012

(Ayyagari et al., 2011). Bank loans can be extended by domestic banks or by foreign banks (including cross-border lending). But one stylized fact is that much of the lending by foreign banks is denominated in foreign currency. For example, Eichengreen and Hausmann (2005) describe the situation in which domestic currency simply cannot be used to borrow abroad or even for long-term domestic debt as "original sin". Hausmann and Panizza (2011) show that original sin has yet to be purged in that only nine developing countries are managing to issue at least 15% of their debt in domestic currency and less than 10% of developing countries' bonds held by US investors are denominated in the currency of the issuing country. In addition to foreign lenders, there also are domestic and foreign banks operating *within* the developing country that also widely extend dollar debt loans. Reasons for these stylized facts will be discussed at length in the next section, but one likely cause is the desire of risk-averse households to hold much of their savings in foreign currency deposits. These deposits then are intermediated domestically through the banking system. Deposit dollarization endures worldwide despite declining and stable inflation, with the share of deposits in foreign currency exceeding 10% in more than 70 countries (De Nicoló et al., 2005).

As a result, because a large part of loans to businesses in developing countries are contracted in foreign currency, the growth of the productive sector may be constrained if it has limited access to dollar debt. Small and new firms may be especially constrained if lenders – including domestic banks – channel funds (mostly dollar denominated) to firms based, not on the return of the investment project, but on the borrower's collateral and net worth. These decisions may be based on asymmetric information and limited commitment problems. In turn, aggregate economic growth and innovation may be stunted because small and new businesses are vital contributors to growth. For example, in the United States, small businesses employ roughly half of the labor force and account for 60% of gross job creation while newer small businesses account for 25% (Bernanke, 2010). Emerging economies feature large numbers of small businesses (more than 70% of a representative cross-country sample of firms in Ayyagari et al., 2011). Interestingly, Ayyagari et al. also show that access to external finance is associated with higher innovation within this sample of mostly small- and medium-sized enterprises. This is true especially for younger firms and for access to dollar credit (nonetheless, these are associations, not causations).

Therefore, for both financial stability and economic development objectives, it is important to study the determinants of dollar debt incurred by a wide range of firms in emerging economies. Significant progress has been made in recent years in developing different theories to rationalize the use of dollar debt. But empirical evidence derives almost entirely from Latin America and East Asia. A more important limitation is that studies focus on the largest and listed firms (a drawback Tornell and Westermann (2002) emphasize), and a large part of this dollar debt is owed to foreign banks and other foreign lenders. The case of Lebanon significantly contributes to this literature because the major part of credit is intermediated through domestic banks[4] (mostly in dollars), including to many small, non-exporting firms. For example, while only 27% of the companies in our survey export, 82% of the companies that borrow obtain dollar loans. Dollar debt as a share of total debt averages 73%. This compares to the World Bank's 2006 enterprise survey that found 87% of firms sampled have dollar debt with an average dollar share of 75%. In aggregate, central bank statistics show dollar loans comprise more than 80% of total commercial bank lending in recent years (Fig. 1). In addition, the choice of currency denomination in Lebanon long has been freely determined by the creditor and the debtor in an environment of free capital flows. Therefore, concerns about regulatory constraints and potential contemporaneous deregulation are mitigated in this study relative to studies of other emerging markets.

The main loanable funds of the banking system are in the form of claims by depositors. These claims, many of which are held by expatriate depositors and other regional investors, were more than $80 billion by the end of 2008. A large share of deposits – roughly 70% – is dollar deposits (Fig. 1). Depositors continue to deposit in dollars because of a perceived currency risk despite a de facto peg of the domestic currency (Lebanese lira or LBP) to the dollar since 1998. For example, the spread between the deposit rates of the lira and the dollar has been roughly 3.5% in recent years (Fig. 2).[5] There are no capital restrictions and depositors can invest in foreign assets overseas. Nonetheless, they hold a substantial amount of their savings domestically, what Schimmelpfennig and Gardner (2008) ascribe to a dedicated investor base. The deposit rate on domestic dollar deposits (about 5%) is also higher than the international dollar deposit rate (Fig. 2). This difference is not arbitraged away by foreign investors because they are unwilling to exchange internationally liquid assets for domestically liquid deposits with arguably greater counterparty risk.

As a result, private sector capital needs, in addition to Lebanese government debt, are financed by depositors intermediating desired dollar-denominated savings through domestic commercial banks. Even so, we find a number of common determinants with foreign currency borrowing by large companies in other emerging markets. Dollar debt is significantly more likely for exporters that are naturally insured against currency risk because foreign earnings help balance dollar liabilities. At the same time, importers are less likely to have dollar loans. Many companies also transfer currency risk to their customers and suppliers through short-term trade credit. Larger, older, audited borrowers with higher net worth are more likely to have dollar loans. Likewise, companies with more tangible assets or foreign earnings that can be used to secure loans are more likely to take out dollar loans. Among these are companies in the construction and wholesale and retail trade sectors. In contrast, companies in the manufacturing and services sectors are less likely to have dollar loans. And while there is a positive relation between dollar debt and formal finance (predominantly bank-sourced), seemingly stronger bank relationships do not materially influence a borrower's chances of accessing dollar loans. Finally, profitable companies are *less* likely to get dollar loans. Collectively, these findings indicate that information problems (proxied by opaqueness such as company size, age, audits, and difficulty in verifying and pledging profits), as well as limited collateral, constrain dollar credit even when it is intermediated domestically.

The rest of this paper is organized as follows. In Section 2, we review theories on foreign currency borrowing and relate the theories to empirical evidence from the literature. Section 3 describes our survey and Section 4 evaluates the determinants of dollar debt. We also compare the robustness of our results to using an alternative data set from a survey collected around the same time in Lebanon (the World Bank enterprise survey). Lastly, Section 5 concludes.

[4] For example, Lebanon has the highest share of banking assets to GDP (roughly 300%) and the lowest stock market capitalization (10%) in the Middle East and North Africa region (Grais and Kantur, 2003). Moreover, domestic banks dominate the banking system, accounting for 80% of system assets in recent years.

[5] While not the focus of this paper, the de facto adoption of the dollar alongside the domestic currency as a medium of exchange and a store of value was the outcome of the civil war and the accompanying depreciations from 1977 to 1992. The Lebanese lira depreciated from roughly 3 LBP/USD to more than 1700 LBP/USD over that period and dollar deposits became a pervasive feature of the banking system.

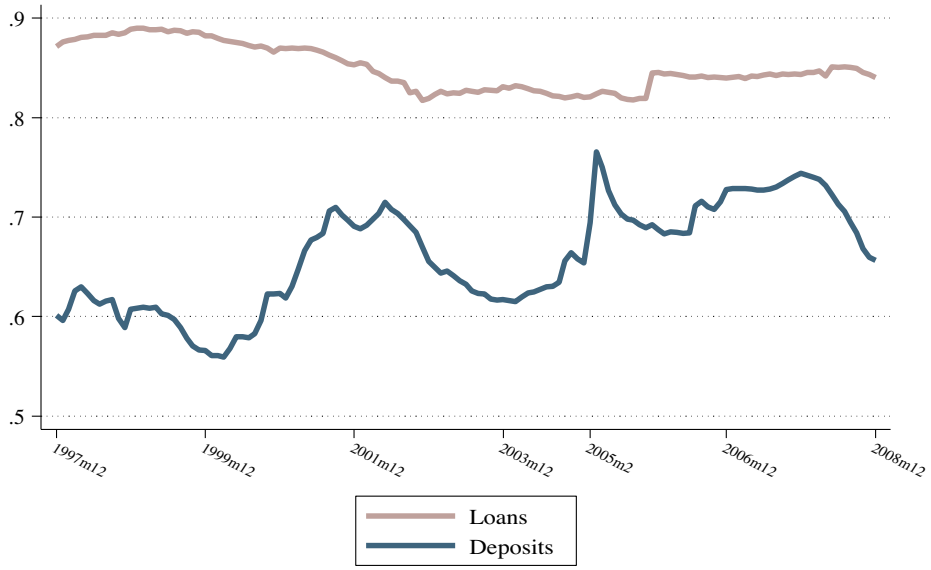

Fig. 1. The share of loans and deposits in foreign currency.

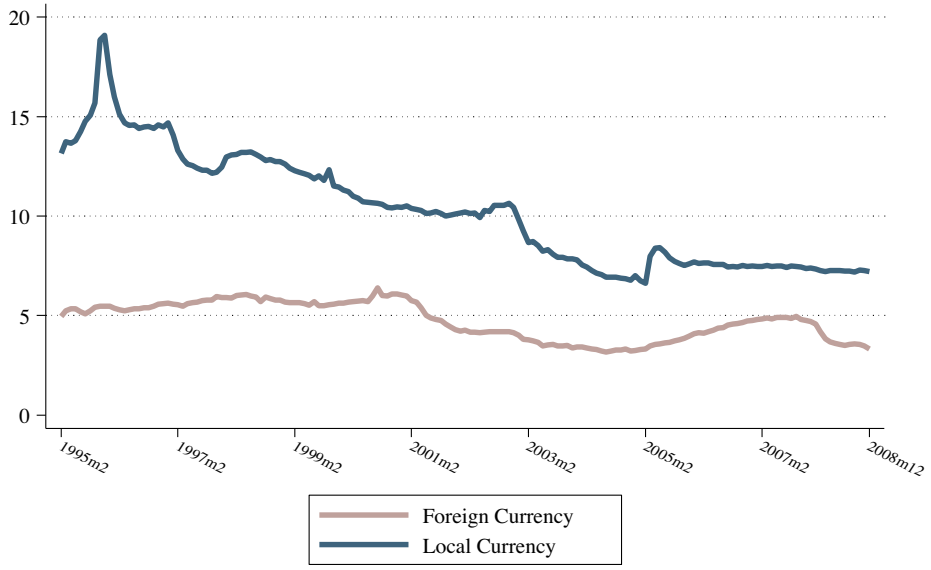

Fig. 2. The average interest rates on deposits. *Notes*: The underlying data are aggregate commercial bank data. The spike in foreign currency deposits and interest rates on local currency deposits in February 2005 reflected the political uncertainty following the assassination of former Prime Minister Rafik Hariri. *Source*: *Banque du Liban* (www.bdl.gov.lb).

2. Why do firms borrow in foreign currency?

2.1. Lender incentives

A large part of borrowing in emerging markets is intermediated in dollars (Eichengreen and Hausmann, 2005). Firms in emerging markets choose dollar debt for a number of reasons. First of all, much of this borrowing is from foreign lenders who lend in foreign currency and who would demand a premium if they were to lend in domestic currency. There are a range of explanations. First, as mentioned in the introduction, foreigners' preference for dollar lending may be due to "original sin", in that international lenders cannot forgive emerging market borrowers for past monetary sins, even after considerable time (Eichengreen and Hausmann, 2005; Hausmann and Panizza, 2011). As a result, foreign investors place a premium on domestic debt unrelated to current fundamentals and policy. Second, governments in emerging markets may be tempted to devalue and reduce real debt burdens once foreign lenders buy domestic currency denominated debt (Calvo and Guidotti, 1990). Anticipating this behavior, foreigners choose foreign currency denominated debt. Third, regulatory or institutional constraints on currency mismatch at foreign banks imply that foreigners lend in their own currency (Calvo, 2002). Fourth, more generally, transaction costs may discourage foreigners from lending in domestic currency.[6] Finally, reinforcing the foreign currency incentive, providers of foreign currency credit may be entitled to larger payments upon default than are providers of domestic currency credit. For example, in a model by Schneider and

[6] See Aghion et al. (2000) for a model with this assumption. In their model, firms resort to foreign lenders because domestic consumers are only willing to lend up to a maximum amount (in domestic currency) and the residual amount therefore comes from foreigners.

Tornell (2004), bailouts occur when a critical mass of borrowers defaults. As a result, borrowers in the non-tradable sector coordinate their exposure by denominating debt in tradable (foreign currency) goods.

Domestic agents often lend in dollars too. One view is that risk-averse consumers prefer to lend in foreign currency to risk-neutral domestic firms to insure against real shocks (Rappoport, 2009). The idea is that depreciations occur at the same time as recessions.[7] A second view is that the equal treatment of domestic and dollar deposit accounts in the event of a bank liquidation means that dollar claims experience a valuation gain when the exchange rate is devalued (Broda and Levy-Yeyati, 2006). Third, also rationalizing excessive dollarization is the dual liquidity view of Caballero and Krishnamurthy (2002, 2003); whereby international lenders lend dollars at the international dollar interest rate to domestic agents that, in turn, intermediate these dollars at home. Foreigners lend only against internationally tradable assets, but not against domestically tradable assets.[8] As this limited dollar liquidity is not necessarily in the hands of agents needing it for real investment, it is then intermediated between domestic agents at a domestic dollar interest rate that exceeds the international rate in times of scarce international liquidity. This rate difference is not arbitraged away by foreign lenders because they are unwilling to exchange international liquidity for domestic liquidity. We discuss some of the distortions that arise in more detail in Section 2.2.

In practice, domestic agents typically intermediate dollar debt through the domestic banking system. Banks with dollar deposits are induced to lend in dollars to match the currency composition of their assets to their liabilities because of regulatory constraints or internal limits on currency mismatch (Calvo, 2002; Luca and Petrova, 2008).[9] Nonetheless, these constraints do not necessarily imply that credit extended to domestic firms will be denominated in dollars because domestic banks can satisfy the dollar portfolio constraint by holding other assets such as foreign securities and government bonds. But, in practice, banks may do so only to a degree, especially when deposits are extensively dollarized. Moreover, in the presence of asymmetric information, banks have an incentive to lend dollars domestically because they have fewer information disadvantages at home than abroad. The empirical evidence supports currency matching by banks. Analyzing a panel of transition countries, Luca and Petrova (2008) find that high credit dollarization is associated with high deposit dollarization, but less so the larger the banks' net foreign asset holdings.

2.2. Borrower incentives

It is incomplete, however, only to focus on the supply decision of lenders. Firms jointly choose dollar debt. There are benefits and costs to borrowing in foreign currency. One main advantage is the lower interest rate on dollar loans. Following from "original sin" or more generally from the incompleteness of financial markets or from the imperfect substitutability between assets, uncovered interest parity can fail.[10] Therefore, lower interest rates on dollar loans give firms an incentive to borrow in dollars rather than domestic currency. Allayannis et al. (2003) provide empirical support showing that foreign currency borrowing is positively related to the difference between the domestic and foreign currency interest rates for a sample of East Asian companies in 1996 prior to the East Asian financial crisis (see also Brown et al., 2011, for supportive recent evidence from transition economies). However, this cheaper dollar debt comes at the cost of currency mismatch risk on the borrower's balance sheet. The possibility of exchange rate depreciation inflates the domestic currency value of debt and leads to an increase in the borrower's default likelihood if the borrower's assets and revenues are mostly denominated in domestic currency. Therefore, is the dollar debt demanded by a borrower facing such a tradeoff consistent with the optimal amount?

Theories in the literature that address different aspects of this tradeoff can be divided into four strands. First, one strand emphasizes various government policies that guarantee dollar debt (whether explicitly or implicitly). Governments may provide bailout guarantees in a systemic crisis to avoid defaults on dollar debt (see Schneider and Tornell, 2004, discussed earlier). Alternatively, insurance against exchange rate risk simply can be provided by a fixed exchange rate policy. This insurance encourages firms and banks to incur dollar debt, exacerbating asset-liability currency mismatches and reducing the incentive to hedge the associated exchange rate risk (see, for example, Burnside et al., 2001). Indeed, Martinez and Werner (2002) find that currency mismatch declined in Mexico after a floating exchange rate regime was adopted in 1994. Similarly, Brown et al. (2011) find that exchange rate pegs are associated with a higher incidence of dollar loans in transition countries.

A second strand instead highlights credit frictions in the private sector, not misguided government policy, as the reason for dollar debt borrowing (e.g. Caballero and Krishnamurthy, 2002, 2003). The combination of an international financial constraint and domestic credit market frictions leads firms to borrow too much in dollars because they undervalue insuring against possible exchange rate depreciation. As discussed in the previous section, entrepreneurs with real investment needs borrow against the value of their international liquidity from foreigners and against the value of their domestic liquidity from domestic agents such as banks. International liquidity can take the form of foreign currency revenues, while domestic liquidity can take the form of marketable domestic assets such as real estate and domestic financial assets. Importantly, limited collateral is a central constraint because borrowers cannot pledge all the future returns on their investment project as collateral.[11] More generally, the framework of credit constraints in Caballero and Krishnamurthy relates to a longstanding literature whereby a borrower's net worth determines its external finance premium or the extent to which it can borrow, and thus its real investment. In the absence of asymmetric information or limited commitment problems, investment would depend only on expected profitability and the user cost of capital, not on net worth. But in a constrained equilibrium with asymmetric information, such as a moral hazard problem, an increase in the borrower's net worth increases the project's chance of success because it induces the borrower to exert more effort (see Hubbard, 1998, for a review). Similarly, in a constrained equilibrium with a limited commitment problem, creditors protect themselves by

[7] While dollar-indebted borrowers have a higher default risk, credit market frictions lead to excessive dollarization because contracts are non-exclusive in Rappoport's model.

[8] In their model, all loans are collateralized and foreigners only lend dollars against international collateral because they cannot seize domestic collateral.

[9] Luca and Petrova (2008) argue that banks substitute currency-induced default risk for currency risk because of a risk-aversion to assuming currency risk directly and because of imperfect regulation.

[10] For example, imperfect substitution between domestic and foreign assets leads to a failure of uncovered interest parity (UIP) in portfolio balance models and, therefore, to exchange rate changes from shifts in relative asset demand. Failure of UIP in the Lebanese context in recent years (Fig. 2) also may be a manifestation of the "peso problem". The peso problem arises when market participants anticipate a future shift in the exchange rate level that is not realized within the sample if devaluations are infrequent events (as was the case with the Mexican peso from the mid-1950s to the early 1970s before the peso was devalued in 1976).

[11] As a result, agents borrow too much in dollars because in those states of nature when more financing is needed to maintain investment, constrained firms will have a depressed demand for credit due to the limited collateral they can post. Therefore, the limited dollars available in these states will be undervalued relative to the social optimum.

collateralizing the loan up to its liquidation value (e.g. Kiyotaki and Moore, 1997).[12]

Mapping theories of net worth and (the type of) collateral to the empirical dollar debt literature is imperfect but there is much suggestive evidence. For example, to the extent that larger firms and firms with foreign currency revenue or foreign relationships are better able to post collateral, they are expected to be more likely to access foreign currency loans. Gelos (2003) and Aguiar (2005) draw on a sample of several hundred of the largest or listed companies in Mexico prior to the 1994 peso devaluation and find that size and foreign currency earnings are positively related to dollar debt. Similar evidence is in Allayannis et al. (2003) for large East Asian firms and in Brown et al. (2011) for a wider range of firms in transition countries. Also, foreign ownership (in Brown et al.) and issuance of shares in foreign equity markets (Aguiar) are positively related to dollar debt. Moreover, Allayannis et al. find that firms with more tangible assets have easier access to foreign currency debt.

A third strand argues that firms might incur dollar debt to signal to creditors that they are high-quality types in an adverse selection problem (Jeanne, 2000). Similarly, firms may choose to borrow in dollars because the incentives to exert high effort are stronger when debt is in dollars (in a moral hazard problem). In either case, Jeanne shows that dollar debt can be obtained at a lower interest rate *ex ante* because international lenders can expect higher returns. The reason is that policymakers no longer can respond to bad shocks by devaluing the exchange rate to allow the continuation of firms' projects. As a result, foreign currency debt serves as a commitment device: The entrepreneur has a strong incentive to produce effort to achieve high returns so that lenders do not terminate funding early and liquidate the project. Unlike the other theories, however, there is little existing empirical support. For example, Gelos (2003) finds that firms with higher dollar debt earn lower, not higher, *ex post* profits. Allayannis et al. (2003) find no significant relation between profitability (measured by operating margin) and foreign currency debt.

The fourth strand shows that firms have hedging motives for incurring dollar debt. This risk management view is that foreign earnings, such as revenue from exports or FDI operations, offer a natural hedge to risk-averse firms with dollar liabilities. Risk-averse managers aim to keep profits (after debt payments) stable. Thus, exporting firms are more likely to incur foreign currency debt. There is much support for this view. For example, Bleakley and Cowan (2008) find that firms match the currency denomination of liabilities to the exchange rate sensitivity of revenues. Similarly, Gelos (2003), Allayannis et al. (2003), Aguiar (2005), and Brown et al. (2011) provide evidence that exporters are more likely to have dollar debt. Interestingly, Gelos also finds that dollar debt is positively associated with the import share of sales – a result attributed to a need to finance the purchase of inputs on international markets.

Leveraged firms also have an incentive to curb dollar debt in order to reduce the likelihood of falling into bankruptcy because of a greater susceptibility to financial distress. There is mixed support for this view. For example, Aguiar (2005) documents that leverage as well as higher sales volatility (proxying for distress costs) reduce a firm's foreign currency debt. But Gelos (2003) and Brown et al. (2011) find, if anything, a positive effect from leverage.

[12] In models like Kiyotaki and Moore, positive shocks to collateral values (such as productivity shocks to the value of real estate) cause an increase in the borrower's net worth, allowing the constrained borrower to incur a larger loan and increase its investment. In the absence of an enforcement problem (i.e., if the borrower can credibly commit its human capital and does not repudiate the debt contract), positive productivity shocks would have no effect on the borrower's investment, only leading to an increase in consumption.

3. Survey method and data description

We conducted an original survey on a wide sample of representative firms during 2005–2006. Of 588 companies visited, 201 returned surveys. Companies were sampled randomly from the 2005 edition of the Kompass Lebanon business directory of more than 8000 companies. Specifically, non-financial companies were randomly sampled from urban regions because of project constraints – both time and funding – that limited the extent of research assistance. Therefore, the results can be interpreted as a lower bound of the financing difficulties faced by firms in rural areas. Both qualitative and quantitative questions drew out firms' views of the financial system, their financing conditions, and their key accounting characteristics (current and expected). We also asked firms about their foreign currency debt, their currency preferences, and their perceptions of the ease of borrowing in foreign currency.[13] Research assistants administered and collected the survey in person from a senior manager at each company.

The regional distribution of cooperative and non-cooperative firms is very similar, which suggests that there is no particular selection bias. The distribution of surveys is from the four provinces (governorates): Beirut (30%), Mount Lebanon (61%), North Lebanon (3.5%) and South Lebanon (5.5%).[14] Moreover, firms with dollar debt are not isolated to any one province such as to the capital, Beirut.

The other characteristics of the cooperative firms closely match those of the Kompass firms from which they were sampled: 23.5% are in manufacturing, 30% in services, 42% in wholesale and retail trade, and 4.5% in construction (Table 1, Panel A). The age distribution is also similar and the median year of establishment was 1993 after the end of the civil war (implying a median age of 13 years in 2006). The majority of firms identifies its legal status as limited partnerships and a substantial share are sole proprietorships (more than 20%). Most firms are controlled by either individual owners or a family (more than 75% of the sample), where control means responsibility for making major company decisions.

Most companies in Lebanon are relatively small by international standards with a quarter of the Kompass sample consisting of firms of fewer than five employees. The median size of our sample of firms is also nine employees as in the general Kompass sample (the distribution is as follows: 21% of the firms have fewer than five employees, denoting "small firms"; 27% have between five and nine employees; 30% have 10–19 employees; 11% have 20–49 employees; and the final 11% employs more than 50). Reflecting the small size of companies, median total sales are $325,000 and median fixed assets are $50,000. The median profit margin (profit to sales ratio) is 26%, fixed assets to sales ratio is 15%, net worth scaled by fixed assets is 1.6, and the median firm is not indebted.

Nonetheless, these small privately held Lebanese companies that do little or no exporting appear overall to be more likely to borrow in foreign currency than in domestic currency (based on descriptive evidence so far; the next section provides a statistical evaluation). Most firms import (59% of the sample) but only 27% of firms export. While the average export share of sales is 9% and

[13] A copy of the 15-page survey is available upon request. We devised and distributed the survey in English and Arabic and 32% of companies chose to complete the survey in Arabic. The results discussed in the next section are not sensitive to the choice of language. The questions were motivated by the Asian Corporate Crisis and Recovery Firm-Level 1999 Survey (The World Bank Group) and the 2000 World Bank Enterprise Survey.

[14] While cooperative and non-cooperative firms are similarly distributed, there are some differences between their distribution and the Kompass business directory from which they were sampled due to our urban area and other research assistance constraints. Nonetheless, our sample agrees with the highly concentrated regional distribution of companies in Beirut and Mount Lebanon in the Kompass business directory.

Table 1
Sample statistics.

	Mean	Median	Std. dev.	Obs.
Panel A. Business characteristics				
General characteristics				
Manufacturing industry	0.24	0.00	0.43	200
Services industry	0.30	0.00	0.46	200
Commerce and trade industry	0.42	0.00	0.49	200
Construction industry	0.05	0.00	0.21	200
Age	18.22	13.00	14.85	195
Size	37.44	9.00	160.36	168
Small firm	0.21	0.00	0.41	199
Sole proprietorship	0.21	0.00	0.41	198
Control by owner or family	0.76	1.00	0.43	201
Domestic shareholders' share of capital	99.31	100.00	7.67	178
Trade characteristics				
Export indicator	0.27	0.00	0.44	194
Import indicator	0.59	1.00	0.49	190
Export share (in percent)	9.23	0.00	20.35	193
Import share (in percent)	43.31	30.00	43.95	187
FDI indicator	0.05	0.00	0.22	184
Accounting information				
Sales (in USD thousand)	1798.87	325.00	6975.91	122
Fixed assets (in USD thousand)	1287.19	50.00	6276.57	119
After-tax profit to total sales	0.27	0.26	0.18	112
Net worth to fixed assets	2.55	1.55	6.25	106
Fixed assets to total sales	0.30	0.15	0.53	116
Debt to fixed assets	1.27	0.00	3.76	107
Expect sales to increase	0.56	1.00	0.50	193
Forecast sales growth	13.67	10.00	25.30	151
Panel B. Financing characteristics				
Dollar debt and borrowing				
Dollar debt indicator	0.82	1.00	0.39	77
Dollar debt share (in percent)	73.43	100.00	39.74	77
Bank borrowing indicator	0.36	0.00	0.48	192
Sources of finance (reported as share of firm's financing in previous year, in percent)				
Internal funds and retained earnings	76.94	100.00	35.65	174
Affiliates (parent and affiliated companies)	2.43	0.00	12.06	175
Family and friends	4.61	0.00	14.84	174
Informal (money lenders, traditional and other informal)	3.68	0.00	13.23	174
Formal credit	12.33	0.00	28.03	174
of which: supplier credit	2.21	0.00	8.42	174
of which: local commercial banks	9.18	0.00	23.38	174
Creditor relationships and hard information proxies				
Number of banks the firm does business with	1.93	2.00	1.51	184
Years of relationship with primary bank	11.73	10.00	8.60	179
Foreign bank ease of access indicator	0.09	0.00	0.29	187
Audit indicator	0.31	0.00	0.46	177
Audit needed for bank loan indicator	0.79	1.00	0.41	189
Credit chains				
Lend to customers indicator	0.44	0.00	0.50	196
Average share of credit to customers in LBP	32.50	35.00	31.90	60
Lend to suppliers indicator	0.22	0.00	0.41	189
Average share of credit to suppliers in LBP	21.15	0.00	33.98	26
Collateral characteristics				
Collateral indicator (loans <6 months)	0.63	1.00	0.48	163
Collateral indicator (loans more than 1 year)	0.89	1.00	0.31	167
Whether collateral differs by currency denomination	0.23	0.00	0.42	171
Share of collateral from cash and financial values	38.86	30.00	35.36	149
Share of collateral from real estate	34.90	30.00	33.53	149
Share of collateral from other real guarantees	13.66	0.00	20.66	149
Share of collateral from personal guarantees	12.01	0.00	28.35	149
Preferences about dollar debt and exchange rate risk perception				
Firm prefers to borrow in LBP	0.24	0.00	0.43	195
Firm prefers to borrow in USD	0.44	0.00	0.50	195
Because involved in foreign trade	0.41	0.00	0.49	86
Because of exchange rate risk perception	0.27	0.00	0.45	86
Because of interest rate differential	0.20	0.00	0.40	86
Banks prefer to lend in LBP	0.13	0.00	0.33	191
Banks prefer to lend in USD	0.33	0.00	0.47	191
Because of exchange rate risk perceptions	0.60	1.00	0.49	63
Because of interest rate differential	0.24	0.00	0.43	63
Because of collateral considerations	0.11	0.00	0.32	63
Exchange rate is stable	1.58	1.00	1.20	175
Hedging indicator	0.04	0.00	0.20	170

Panel A Notes: *Age* is years since establishment. *Size* is number of employees including owners and family members working for free. *Small Firm Indicator* = 1 if number of employees less than 5 and 0 otherwise. *Sole Proprietorship Indicator* = 1 based on legal status while *Control by Owner or Family Indicator* = 1 based on effective control of firm. *Export* = 1 if the firm exports or produces intermediate inputs sold to firms that export (and the *Export Share* is the share of sales that are sold outside Lebanon including intermediate inputs sold to export firms). *Import* = 1 if firm imports inputs (and the *Import Share* is the share of inputs that are imported). *FDI* = 1 if firm has holdings or operations in other countries. *Accounting Information* is based on year prior to survey and are self-explanatory. Net worth is total assets minus total liabilities. *Expect Sales to Increase* = 1 if firm projects an increase in the subsequent year. *Forecast Sales Growth* is the firm's forecast of the growth in total sales over the subsequent two years.
Panel B Notes: *Dollar Debt Indicator* = 1 if firm has dollar debt conditional on it borrowing (including from sources other than banks).*Dollar Debt Share* is fraction of debt in dollars. *Bank Borrowing Indicator* = 1 if firm borrowed from banks in previous two years. *Formal Credit* is the sum of supplier credit, local commercial banks, foreign banks operating outside Lebanon, investment funds and special development finance, equity or sale of stock, and leasing arrangements. *Foreign Bank Ease of Access* = 1 if firm perceives a greater ease of obtaining finance from majority-owned foreign banks than from majority-owned Lebanese banks. *Audit* = 1 if firm provides its shareholders with annual financial statements reviewed by an external auditor. *Audit for Bank Loan* = 1 if firm needs audited statements to receive bank loan. *Share of Collateral* are the respective shares of collateral for dollar loans. The distribution is similar for LBP-denominated loans. *Firm (Banks) Prefers to Borrow (Lend) in LBP (USD)* are indicators for which currency-denomination the firm prefers or which denomination it perceives that financial institutions prefer to lend in, respectively. The remaining fraction of firms were indifferent between USD and LBP. *Exchange Rate Stable* is the firm's opinion about the stability of the exchange rate peg ranging from stable (=1) to volatile (=6). *Hedging* = 1 if firm typically buys hedging/insurance contracts on its foreign currency exposure.

the average import share of inputs is 43%, 82% of the minority of firms that borrow do so in a foreign currency, predominantly dollars (Table 1, Panel B). And the average share of debt in dollars is 73.4%. It is also worth noting that almost no companies explicitly hedge their foreign exchange exposure. There are no forward exchange markets in domestic currency (about 5% of the firms claim to hedge financially, but are effectively hedging euro and non-dollar currency exposures only).[15]

To briefly highlight a number of credit characteristics and constraints presented in the remainder of Tables 1 and 2, most companies do not access bank credit. Only 36% of the companies surveyed took out a bank loan in the previous 2 years, of which, less than 20% was for investment purposes while most was for short-term financing such as working capital (Table 2, Panel C). As a result, an average of 75% of financing comes from internal funds including retained earnings. Formal funds, especially commercial bank and supplier trade credit, are a distant second, providing only 12% of funding (Table 1, Panel B). The rest of funding is sourced informally (from family, affiliates, and other sources).

Overall, financing difficulties are placed in the top three obstacles for business operations and growth – preceded only by taxes and regulations and policy instability. Fifty-two percent of the companies surveyed rank financing as a major obstacle (Table 2, Panel A); especially high interest rates are followed by collateral requirements (Table 2, Panel B). These obstacles are perceived as equally problematic regardless of the loan's currency denomination. As shown in Table 1, most loans are collateralized and sources of collateral are cash and financial values (about 40%), property and other real guarantees (48%), and personal guarantees (about 12% – mostly guaranteed by family and friends). These match aggregate figures in the Banque du Liban's (central bank) Quarterly Bulletin, 2008:Q4.[16]

4. Results

4.1. Relating the hypotheses to the available data

The primary interest of this study is to understand what factors explain the use of dollar debt by relatively small firms. To this end, we briefly revisit the theories in Section 2 that can be tested on a cross-section of firms. Some of the theories, including the static tradeoff theory (that firms prefer to borrow dollars because of lower rates on dollar debt), the government guarantee theory (e.g. by ensuring a fixed exchange rate), and the hypothesis that credit dollarization closely follows deposit dollarization are more difficult to test on a cross-sectional sample from one country and would require time-series or panel data (albeit qualitative responses provide some insight as discussed in the next section).

We narrow the remaining theories to three main testable hypotheses. First, the risk management hypothesis is that firms with foreign earnings, including exporters and those with operations abroad, are more likely to incur dollar debt because foreign earnings provide a natural hedge against exchange rate risk.[17]

Second, the signaling hypothesis is that more profitable firms take on dollar debt to signal to creditors that they are "good" types. The dollar debt should also discipline borrowers so that they exert a high effort level ensuring higher *ex post* profits.

The third hypothesis – which we broadly label the collateral hypothesis – groups a number of factors that are expected to facilitate access to finance when information is asymmetric or commitment is limited. A premium is therefore attached to formal finance, which mostly takes the form of domestic bank lending, to the extent that there are no developed domestic bond markets, a very limited equity market, and retained earnings are the primary source of funds. Therefore, larger, less opaque firms with more collateral to pledge are expected to benefit from greater access to and lower costs of bank funding because information is imperfect and monitoring (to learn about the quality and the riskiness of a borrower) is costly. We also hypothesize that such transparent firms with ample collateral will be more likely to access dollar credit as the domestic banking system intermediates the limited international liquidity (in the form of resident and expatriate dollar deposits) (as in the dual liquidity model).

Before turning to the results, it is worth noting that the existing literature's selection of large firms can distort inference in two possible ways: First, large publicly traded firms are more transparent and informational determinants of dollar debt may, as a result, be underemphasized in the existing literature; Second, however, information problems may be overemphasized if foreign lenders are at an informational disadvantage about borrowers relative to domestic lenders.[18] By examining small firms that borrow from mostly domestic lenders, we can offer insight into an underexplored dimension, which is theoretically ambiguous.[19]

4.2. Dollar debt: the baseline results

In this section, we analyze what particular borrower characteristics are associated with a greater likelihood of dollar debt, and whether there are common determinants with other emerging market economies. First, we describe what a firm states about its preferences with respect to a loan's currency denomination. Second, we relate borrower characteristics (including size, age, industry, and accounting measures) to dollar borrowing.

[15] An additional indirect hedge is provided when domestic prices are dollar-linked and we thank the referee for this point. In practice, however, there is evidence of differential pass-through of exchange rate changes to prices in the tradable and non-tradable sectors (see Bleakley and Cowan (2008) for evidence from Latin America; even under large nominal depreciations in 1977–1992 Lebanon, pass-through was incomplete and the real exchange rate therefore depreciated significantly). While the survey did not elicit the extent of indexed domestic pricing, we asked about wage indexation. Only 15% of firms said that their labor contracts oblige them to pay dollar-indexed wages.

[16] Comments made by company managers provide further anecdotal insight into their constraints: "The big problem in our banks is that they don't make a financial study on the company, they only need collateral requirements, they disregard the feasibility of your project and they act in a very passive way towards your project, they only need a collateral that covers at least 10 times their risk, because their provisions are not at all accurate"; "In the retail business, banks restrict their lending to short term financing. They expect and allow their customers to use the funds for working capital only"; "The rate against bank guarantee is very high"; "The major borrower is the gov [government]"; "[Arabic trans.] There is no trust in Lebanon and trade by companies because of the corrupt judicial system that does not guarantee the right of the companies and wholesalers/retailers until several years [later] when the debtor would have run away or passed away."

[17] As discussed previously, the real hedge from directly exporting goods (or from selling intermediate goods to exporters) is expected to be stronger than other possible hedging mechanisms. Financial hedging (for example, through currency derivatives) is not available. And dollar-indexed domestic pricing is imperfect (especially when depreciations are concurrent with recessions).

[18] For example, one motivating hypothesis in Allayannis et al. (2003) is that foreign lenders have higher monitoring costs than local lenders. As a result, firms with tangible assets are assumed to borrow from foreigners while firms with soft or intangible assets borrow locally. Moreover, Allayannis et al. implicitly assume that foreign currency debt originates from foreign lenders (including local subsidiaries of global banks). Aguiar (2005) also suggests that firms access foreign currency loans from foreigners, as he finds a significant association between foreign equity issuance (ADRs) and foreign currency debt.

[19] We are aware of only the recent paper by Brown et al. (2011) that looks at a wide sample of firms from transition economies (about 60% of which are small firms). Nonetheless, there remains scope for more analysis because of some limitations to this study including that a large share of banking system assets in transition countries is held by foreign banks (both the mean and median is more than 50% in the 25 countries examined). In addition, the data set only indicates the currency denomination of the firm's last loan, omitting information about overall debt and other accounting characteristics such as profits and net worth.

Table 2
Descriptive statistics of general obstacles, financing obstacles, and the use of bank credit.

	Mean	Median	Std. dev.	Obs.	Major obstacle (percent)	Top obstacle (percent)[a]
Panel A. General obstacles for the operation and growth of firm's business[b]						
(Ordered response: 1 = No obstacle to 4 = Major obstacle)						
Policy instability and uncertainty	3.4	4.0	0.7	189	56.1	10.1
Taxes and regulations	3.4	4.0	0.7	190	55.3	17.3
Financing (access and cost)	3.3	4.0	0.9	190	52.1	15.1
Inflation	3.2	3.0	0.9	180	43.3	10.6
Operating expenses	3.1	3.0	0.8	188	38.3	20.7
Exchange rate	2.6	3.0	1.0	183	20.8	2.8
Corruption	2.5	2.0	1.1	187	22.5	5.6
Infrastructure	2.4	2.5	1.0	184	17.4	1.1
Foreign competition	2.4	2.0	1.1	185	17.8	6.7
Enforceability of contracts	2.1	2.0	1.1	185	14.1	3.4
Demand weakness	2.1	2.0	1.0	184	10.3	3.4
Panel B. Financing obstacles by category[c]						
(Ordered response: 1 = No obstacle to 4 = Major obstacle)						
High interest rates	3.4	4.0	0.7	187	56.7	53.9
Collateral requirements	3.0	3.0	0.9	188	38.3	23.4
Bank paperwork and bureaucracy	2.6	3.0	1.1	179	26.3	3.0
Special connections needed	2.4	2.0	1.1	173	20.2	7.8
Lack of access to foreign banks	2.2	2.0	1.1	161	16.8	2.4
Lack of access to non-banks (equity/investors)	2.2	2.0	1.2	144	18.8	2.4
Lack of access to export finance	2.0	2.0	1.1	142	12.7	
Lack of access to equipment lease finance	2.0	2.0	1.1	143	11.9	1.2
Banks' unwillingness to lend	1.9	2.0	0.9	173	6.9	5.4
Banks' lack money to lend	1.6	1.0	0.7	174	2.3	0.6
Insufficient credit history and bank relationship	1.6	1.0	0.9	156	5.8	
Panel C. Use of bank credit						
If used bank credit in the prior 2 years, the primary purpose was for (% responding, of 70 responses)						
Working capital (short-term financing)	52.9					
Investment purposes	18.6					
Foreign trade transactions	17.1					
Liability restructuring	4.3					
Other	7.1					
If did not use bank credit in the prior 2 years, the primary reason was (% responding, of 144 responses)						
High interest rates	29.2					
Economic uncertainty	11.1					
Banks' unwillingness to lend	6.3					
Application rejected	3.5					
Past-due loan portfolio	1.4					
Demand problems for your products	0.7					
Financial restructuring difficulties	0.0					
Market competition difficulties	0.0					
Other[d]	47.9					

[a] The top obstacle was based on 179 responses for general obstacles and 167 responses for financing obstacles, respectively.
[b] Three other obstacles were included in the survey (crime, inadequate workforce, and geographic location). These are omitted in Panel A and were ranked as no or minor obstacles (average less than 2).
[c] Additional disaggregated responses were collected on currency denomination. Results were similar. For example, interest rate costs (and collateral requirements) were a similar obstacle regardless whether the loan was USD or LBP denomination. In addition, banks were not seen to differ on their unwillingness or inability to lend USD or LBP. But 11% of firms perceived that banks' unwillingness to lend long-term loans (>1 year) was a major obstacle compared to only 5% for short-term loans.
[d] Many of the firms providing "other" as their response cited that they have no need for bank loans.

A large share of companies (44%) reports preferring dollar debt over Lebanese lira debt, while 24% prefers to borrow in Lebanese liras, and the remainder is indifferent (Table 1, Panel B). The extent of foreign trade transactions is the primary reason given for the dollar borrowing preference. A second stated reason is the lower interest rate on dollar loans compared with Lebanese lira loans. Third, most companies expect the exchange rate to remain stable, as revealed by their exchange rate risk perceptions. The government policy that guarantees a fixed exchange rate appears to encourage companies to take on dollar debt, tilting the tradeoff between foreign and domestic currency debt in favor of foreign currency (also supporting empirical evidence from other economies discussed in Section 2.2).

Turning to company characteristics, Table 3 presents the correlations between the main variables while regression results follow in Tables 4–7. The dependent variable in columns (1)–(4) of Table 4 is whether a firm takes on dollar debt conditional on reporting that it borrows, and the coefficients reported are the estimated marginal effects from probit regressions evaluated at the sample means of the regressors for continuous variables (and evaluated for a change from 0 to 1 for dummy variables). One caveat in these regressions is the small sample size because only 38% of firms indicate that they borrow (including the possibility of borrowing from non-bank sources). This limited borrowing is also found in other surveys on Lebanon (e.g. Hamdan, 2004) as well as in other developing countries (e.g. Bank of Mexico's quarterly Credit Market Survey). Despite this caveat, we believe that considerable insight on small firms can be gained from the results, complementing existing studies. As a robustness check, in Section 4.4 we also estimate similar regressions using an alternative data set from the World Bank's 2006 enterprise survey (with a sample size comparable to Allayannis et al., 2003, and Gelos, 2003).

First, the results support the risk management view, confirming the hypothesis that exporters are significantly more likely to borrow in dollars. We denote the specification shown in column (2) of Table 4 as the baseline model (unless otherwise noted) because

Table 3
Correlations between main variables.

		1	2	3	4	5	6	7	8	9	10	11
1	Dollar debt indicator	1										
2	Dollar debt share	0.88*	1									
3	Bank borrowing indicator	0.23*	0.24*	1								
4	Age	0.21*	0.32*	0.10	1							
5	Size	0.15	0.19	0.25*	0.13	1						
6	Small firm	−0.19*	−0.32*	−0.15*	−0.16*	−0.11	1					
7	Export indicator	0.23*	0.21*	0.14*	0.20*	0.17*	−0.02	1				
8	Import indicator	0.02	0.06	0.04	0.15*	−0.03	−0.11	0.27*	1			
9	After-tax profit to total sales	−0.26	−0.29*	−0.52*	0.06	−0.23*	−0.05	−0.05	−0.09	1		
10	Net worth to fixed assets	0.12	0.15	0.04	0.20*	−0.07	−0.04	−0.05	−0.01	−0.02	1	
11	Fixed assets to total sales	0.07	0.03	0.32*	0.07	0.02	−0.04	−0.03	0.01	−0.17*	−0.13	1
12	Debt to fixed assets	0.12	0.14	0.47*	0.05	0.10	−0.13	−0.05	0.14	−0.43*	0.50*	−0.10
13	Expect sales to increase	0.08	0.08	0.15*	−0.09	0.13	−0.06	0.12*	−0.08	−0.06	0.09	0.01
14	Financing share (internal funds)	−0.14	−0.12	−0.58*	0.01	−0.03	0.05	0.00	−0.03	0.51*	−0.10	−0.36*
15	Financing share (family and friends)	−0.20	−0.22*	−0.02	−0.15*	−0.06	0.19*	−0.11	−0.04	−0.04	0.10	0.00
16	Financing share (informal)	−0.31*	−0.36*	0.13*	−0.14*	−0.05	0.05	−0.14*	0.02	−0.18*	−0.19*	0.46*
17	Financing share (formal)	0.36*	0.37*	0.64*	0.13*	0.09	−0.15*	0.14*	0.06	−0.45*	0.20*	0.24*
18	Number of banks	0.20*	0.25*	0.30*	0.16*	0.24*	−0.19*	0.26*	0.05	−0.22*	−0.08	−0.03
19	Years of relationship	0.21*	0.32*	0.08	0.71*	0.26*	−0.13*	0.24*	0.22*	−0.03	−0.09	−0.06
20	Foreign bank ease of access	0.13	0.05	0.19*	0.02	0.07	−0.07	−0.02	−0.07	−0.17*	−0.04	0.08
21	Audit for bank loan indicator	0.42*	0.35*	0.15*	−0.14*	0.08	−0.17*	−0.04	0.05	−0.10	−0.22*	0.06
22	Lend to customers indicator	0.37*	0.44*	0.28*	0.03	0.17*	−0.14*	0.31*	0.12	−0.25*	0.11	0.03
		12	13	14	15	16	17	18	19	20	21	22
12	Debt to fixed assets	1										
13	Expect sales to increase	0.14	1									
14	Financing share (internal funds)	−0.49*	−0.08	1								
15	Financing share (family and friends)	0.10	−0.02	−0.39*	1							
16	Financing share (informal)	0.20*	0.03	−0.36*	0.07	1						
17	Financing share (formal)	0.50*	0.12	−0.76*	−0.05	−0.04	1					
18	Number of banks	0.11	0.17*	−0.10	−0.12	−0.04	0.17*	1				
19	Years of relationship	−0.06	−0.12	0.01	−0.07	−0.21*	0.08	0.24*	1			
20	Foreign bank ease of access	−0.01	0.04	−0.11	0.05	−0.08	0.11	0.12	−0.04	1		
21	Audit for bank loan indicator	0.02	0.19*	−0.01	−0.14*	−0.04	0.13*	0.14*	0.01	−0.03	1	
22	Lend to customers indicator	0.24*	0.08	−0.14*	−0.08	−0.09	0.24*	0.12	0.19*	0.03	0.18*	1

* Indicates significance at the 10% level.

it also includes key accounting measures.[20] The coefficient estimate on exporters in column (2) means that being an exporter is associated with an 8.1 percentage point higher likelihood of dollar debt, statistically significant at the 5% level and economically significant too (mean dollar debt rate 82%; standard deviation 39%). At the same time, importers are less likely to borrow in foreign currency (by 10.1 percentage points), a result that also is in line with the risk management hypothesis because cash flows of importers are more vulnerable to currency risk, all else fixed.

Second, factors that contribute to increased transparency, including size and age, are associated with a higher likelihood of dollar debt, which is statistically significant in the case of size. For example, small firms (fewer than five employees) are 14.5 percentage points less likely to incur dollar debt than are other firms. This result is in line with a recent comment made by the General Manager of BLOM Invest, a subsidiary of one of the top three banks, that "it's easier and safer to lend $10 million than $100,000" (*Financial Times*, November 22, 2010, "In need of new business model"). Additional support for the transparency and collateral hypothesis comes from industry patterns and the effect of a borrower's net worth. For example, firms in the manufacturing sector and the services sector are less likely to borrow in dollars compared with firms in the wholesale and retail trade and construction sectors (we combine the latter two sectors in an omitted category; they are roughly 28 percentage points more likely to borrow in dollars than firms in the manufacturing and services sectors). Companies in the trade and construction sectors typically have greater foreign earnings and marketable tangible assets that can be used to back loans and therefore secure dollar liquidity. In contrast, borrowers in the services or manufacturing sectors may find it harder to overcome a limited commitment problem if their capital is in the form of human or machinery-specific capital that cannot be pledged as easily (in results not shown, a borrower's fixed assets to sales ratio also enters positively but is not statistically significant at standard confidence levels; *p*-value 0.13). Lastly, firms with higher net worth are more likely to access dollar loans. For example, a one-standard deviation increase in the net worth ratio translates into an increase of 16 percentage points in the borrower's dollar debt likelihood.

Third, the signaling hypothesis does not receive support (in line with Gelos, 2003, and Allayannis et al., 2003). In fact, more profitable firms are *less* likely to have dollar debt and the effect is statistically significant at the 1% level (e.g. the baseline model implies that a one-standard deviation increase in the profit to sales ratio (0.18) is associated with a decrease of 7.7 percentage points in the dollar debt likelihood). Scarce dollar liquidity might therefore be misallocated to less-profitable firms if, for example, firms cannot promise high project returns to secure loans (say because returns are not verifiable in court). Other proxies for profitability, such as the growth of sales or of employment over the previous 2 years, yield similar results. The regressions in columns (3) and (4) also include expectations about future sales (to the extent that these expectations, proxying for *ex post* profits in Jeanne's (2000)

[20] We also include in these regressions variables indicating missing accounting information because fewer firms report accounting information. One option is to estimate the regressions on the sample of firms that report these figures. The results on this smaller sample are similar. The alternative option in column (2) is to include a variable indicating if the accounting measure is missing and to replace it with zero in these cases. This allows a test of whether missing profits, for example, are significantly associated with dollar debt – in which case there is falsification by firms. Alternatively and what we find is that missing profits (and other accounting variables) do not predict dollar debt, meaning that missing information is the result of random cases of data recording and reporting.

Table 4
The determinants of dollar debt and the share of dollar debt: Baseline results.

	(1)	(2)	(3)	(4)	(5)	(6)[a]	(7)
	Pr (dollar debt)				Share of dollar debt		
Risk management measures							
Exporter dummy	0.175	0.081	0.057	0.085	18.42	1.48	16.97
	(2.00)**	(2.10)**	(1.82)*	(1.27)	(1.40)	(0.14)	(1.17)
Export share					−0.13	−0.05	−0.08
					(0.63)	(0.27)	(0.39)
Importer dummy	−0.129	−0.101	−0.088	−0.114	−27.71	−8.34	−26.09
	(1.23)	(1.85)*	(1.73)*	(1.67)*	(1.40)	(0.75)	(1.25)
Import share					0.25	0.17	0.22
					(1.48)	(1.68)*	(1.15)
Information opacity and collateral measures							
Small firm	−0.215	−0.145	−0.115	−0.234	−36.82	−21.91	−40.10
	(1.78)*	(1.90)*	(1.77)*	(1.77)*	(2.56)**	(1.65)*	(2.46)**
Age	0.005	0.002	0.002	0.003	0.51	0.27	0.34
	(1.34)	(1.22)	(1.45)	(0.83)	(1.96)*	(1.83)*	(1.16)
Manufacturing industry	−0.204	−0.279	−0.224	−0.635	−5.49	6.97	−6.81
	(1.35)	(2.14)**	(1.91)*	(2.49)**	(0.36)	(0.76)	(0.41)
Services industry	−0.277	−0.281	−0.319	−0.408	−13.03	8.83	−19.10
	(1.89)*	(2.58)***	(2.56)***	(2.21)**	(0.86)	(0.95)	(1.24)
Net worth to fixed assets		0.026	0.024	0.028			0.82
		(2.83)***	(2.79)***	(1.81)*			(0.92)
Profitability and profit signaling measures							
After-tax profit to sales		−0.430	−0.421	−0.502			−80.12
		(3.14)***	(3.60)***	(2.85)***			(1.85)*
Dummy if expect sales to increase			0.049				
			(1.28)				
Forecast sales growth				−0.001			
				(0.72)			
Leverage control							
Debt to fixed assets		0.004	0.003	0.000			−1.42
		(0.75)	(0.55)	(0.02)			(0.75)
Observations	68	68	66	44	64	61	64
R^2	0.22	0.36	0.38	0.38	0.27	–	0.32

Notes: Standard errors are robust to heteroskedasticity; *t*-statistics are reported in parentheses. The dependent in columns (1)–(4) is whether the firm incurs dollar debt conditional on reporting that it borrows. Reported are the marginal effects from probit regressions evaluated at the sample means of the regressors for continuous variables (and evaluated for a change from 0 to 1 for discrete variables). The R^2 is the pseudo-R^2 for the probit regressions. The dependent variable in columns (5)–(7) is the share of the firm's debt that is in dollars, conditional on borrowing.

[a] Column (6) shows the second stage of a Heckman model correcting for sample selection. The first stage selection equation (not shown) predicts whether the firm incurs dollar debt. The additional instruments used in the first stage are an FDI dummy and a foreign bank ease of access dummy. The instruments are positive and jointly significant at the 1% level.

*** Indicate 1%, significance.
** Indicate 5%, significance.
* Indicate 10% significance.

signaling theory, may be positively related to dollar debt even if current profits are not). There is no significant association between dollar debt and expectations of future sales. Finally, firms with a greater risk of financial distress (higher debt ratio) do not limit dollar borrowing.

The dependent variable in the last three columns of Table 4 is the share of debt in dollars, conditional on borrowing. The results are qualitatively similar to the likelihood of dollar debt, although the coefficients are less precisely estimated. One interesting result is that the higher a firm's import share, the *more* dollar debt it incurs. The effect is statistically significant when applying a Heckman selection model in column (6), so that a one-standard deviation increase in the import share is associated with an increase of 7.5 percentage points in a borrower's dollar debt share. This result suggests that, offsetting the risk management incentive, is a need to borrow more dollars when purchasing inputs from abroad as these payments are typically settled in a foreign currency (see also Gelos, 2003).

4.3. Dollar debt: exploring the effect of creditor relationships, hard information measures and credit chains

As seen in the previous section, informational transparency and collateral facilitate access to dollar loans. This is an interesting result because it shows that other studies' findings cannot be fully attributed to the fact that firms are borrowing foreign currency loans from informationally disadvantaged foreign lenders as conjectured in Section 4.1 (in that monitoring to collect soft information is costly). In this sense, the insight in Caballero and Krishnamurthy (2002, 2003) is valuable because information and limited commitment problems mean that easy-to-market assets also collateralize domestically intermediated dollar loans (and constraints on pledging future profits are significant, even at home).

To explore these issues in greater depth, we include in Table 5 several additional measures to proxy for the type and strength of creditor relationships. Focusing on the first three columns, column (1) includes the extent of formal financing obtained by a borrower (mostly local commercial bank-sourced as discussed previously in Section 3) and columns (2) and (3) include different measures of the strength of a borrower's bank relationships. The correlations in Table 3 show that a greater dependence on formal finance goes together with dollar debt. In contrast, greater financing from family, friends, and other informal sources (e.g. moneylenders) is associated with lower dollar indebtedness. The regression analysis in column (1) of Table 5 shows that the share of formal financing is indeed significantly positively associated with dollar debt, controlling for other borrower characteristics discussed previously. For

Table 5
The determinants of dollar debt: the effects of creditor relationships, hard information proxies, and credit chains.

	(1)	(2)	(3)	(4)	(5)	(6)
Risk management measures						
Exporter dummy	0.072	0.049	0.071	0.020	0.051	0.042
	(1.89)*	(1.70)*	(2.23)**	(2.39)**	(2.15)**	(1.62)
Importer dummy	−0.071	−0.056	−0.082	−0.030	−0.071	−0.085
	(1.29)	(1.75)*	(1.73)*	(1.70)*	(1.87)*	(1.92)*
Information opacity and collateral measures						
Small firm	−0.151	−0.120	−0.093	−0.115	−0.124	−0.186
	(1.73)*	(2.12)**	(1.56)	(1.90)*	(2.02)**	(2.36)**
Age	0.004	0.001	0.002	0.001	0.001	0.000
	(1.87)*	(1.33)	(1.23)	(2.57)***	(0.71)	(0.21)
Manufacturing industry	−0.372	−0.217	−0.257	−0.065	−0.414	−0.166
	(1.86)*	(2.08)**	(1.98)**	(1.70)*	(2.85)***	(1.83)*
Services industry	−0.209	−0.213	−0.249	−0.085	−0.426	−0.256
	(1.96)*	(2.50)**	(2.52)**	(1.88)*	(3.24)***	(2.45)**
Net worth to fixed assets	0.020	0.019	0.021	0.005	0.013	0.020
	(2.11)**	(3.23)***	(2.72)***	(3.08)***	(2.42)**	(3.80)***
Profitability and profit signaling measures						
After-tax profit to sales	−0.322	−0.275	−0.323	−0.100	−0.296	−0.326
	(2.22)**	(3.07)***	(2.77)***	(3.29)***	(2.43)**	(2.81)***
Leverage control						
Debt to fixed assets	0.002	0.003	0.005	0.000	0.000	0.003
	(0.33)	(1.04)	(1.04)	(0.21)	(0.11)	(0.70)
Additional measures						
Financing from formal sources	0.0015					
	(1.69)*					
Number of banks		0.015				
		(1.38)				
Years of primary bank relationship		−0.001				
		(0.75)				
Foreign bank ease of access indicator			0.041			
			(1.82)*			
Audit for bank loan indicator				0.679		
				(3.45)***		
Lend to customers indicator					0.134	
					(2.96)***	
Lend to suppliers indicator						0.073
						(3.03)***
Observations	53	65	65	67	68	67
R^2	0.39	0.39	0.38	0.62	0.48	0.45

Notes: Standard errors are robust to heteroskedasticity; *t*-statistics are reported in parentheses.
The dependent is whether the firm incurs dollar debt conditional on reporting that it borrows. Reported are the marginal effects from probit regressions evaluated at the sample means of the regressors for continuous variables (and evaluated for a change from 0 to 1 for discrete variables). The R^2 is the pseudo-R^2.
*** Indicate 1% significance.
** Indicate 5% significance.
* Indicate 10% significance.

example, a one-standard deviation increase in a borrower's formal financing share is associated with a 4.2 percentage point higher dollar debt likelihood. That formal loans are more likely to be denominated in dollars than informal loans is supported by both dual liquidity in Caballero and Krishnamurthy (2002, 2003) and non-exclusivity of credit contracts in Rappoport (2009).[21]

But interestingly, stronger bank relationships are not found to significantly increase the dollar debt likelihood. For example, in column (2) we include two relationship proxies. These are, respectively, the number of financial institutions that a firm does business with and the number of years that it has been doing business with its primary bank. The median number of institutions is two and the median number of relationship years with the main bank is 10 (Table 1, Panel B). These characteristics are both highly correlated with dollar debt incidence and its share (Table 3). But care must be exercised in interpreting simple correlations because bank relationships are also correlated with size and age, among other characteristics. Controlling for the standard covariates, the relationship variables do not have a statistically significant effect in influencing a borrower's dollar debt, as shown in Table 5 (2). Therefore, soft information gathered by banks in the course of doing business with a borrower is not particularly effective at facilitating dollar credit (or that the soft information is noisy if bank relationships are at arm's length). However, one type of bank relationship is significantly associated with contracting dollar debt and that is a foreign bank relationship. The results in column (3) show that if a firm perceives a greater ease of obtaining finance from majority foreign-owned banks than from domestic-owned banks, it also has a 4.1 percentage point higher dollar debt likelihood.

While soft information acquired through bank relationships is not significant, measures of hard information are related to dollar debt. Specifically, these attributes gauge whether financial statements are reviewed by an external auditor and whether firms typically need audited statements to access bank lending. For example, if a firm provides its shareholders with regularly audited statements, it has a statistically significant 13.8 percentage point

[21] To the extent that informal credit contracts are exclusive because family lenders are able to monitor a borrower's agreements with other lenders. Empirically, this finding also is in Hamdan (2004): Of formal (bank) loans, roughly 70% are denominated in dollars compared to only 54% of informal loans.

Table 6
Robustness check (World Bank enterprise survey): the determinants of dollar debt and the share of dollar debt.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Pr (dollar debt)				Share of dollar debt		
Risk management measures							
Exporter dummy	−0.001	0.000	−0.002	0.003			
	(0.03)	(0.01)	(0.05)	(0.08)			
Export share					0.15	0.15	0.15
					(2.02)**	(1.97)**	(2.04)**
Importer dummy	0.069	0.075	0.071	0.074			
	(1.59)	(1.88)*	(1.75)*	(1.83)*			
Import share					0.08	0.09	0.09
					(1.44)	(1.74)*	(1.73)*
Information opacity and collateral measures							
Small firm (World Bank measure)	−0.083	−0.069	−0.066	−0.075	−8.66	−8.05	−8.32
	(2.02)**	(1.89)*	(1.79)*	(2.00)**	(2.20)**	(2.02)**	(2.09)**
Age	0.001	0.001	0.001	0.001	0.17	0.16	0.16
	(1.36)	(1.40)	(1.65)*	(1.29)	(2.40)**	(2.16)**	(2.10)**
Manufacturing industry	−0.017	−0.006	−0.010	0.000	−9.11	−7.60	−7.63
	(0.36)	(0.16)	(0.24)	(0.01)	(1.90)*	(1.57)	(1.59)
Services industry	−0.077	−0.057	−0.052	−0.049	−6.50	−5.11	−4.95
	(1.40)	(1.17)	(1.06)	(1.01)	(1.07)	(0.82)	(0.80)
Net worth to fixed assets		0.005	0.005	0.005		0.09	0.10
		(0.52)	(0.50)	(0.54)		(3.54)***	(3.63)***
Fixed assets to sales							0.10
							(1.96)*
Profitability and profit signaling measures							
After-tax profit to sales		−0.174	−0.177	−0.189		−48.28	−46.86
		(0.97)	(0.98)	(1.05)		(1.91)*	(1.83)*
Dummy if expect to hire			−0.084				
			(2.29)**				
Forecast employment growth				−0.001			
				(1.59)			
Leverage control							
Debt to assets		0.002	0.001	0.002		0.018	0.02
		(0.51)	(0.45)	(0.48)		(0.89)	(0.94)
Observations	327	327	327	324	327	327	327
R^2	0.06	0.09	0.11	0.10	0.06	0.08	0.09

Notes: Standard errors are robust to heteroskedasticity; *t*-statistics are reported in parentheses.
The dependent in columns (1)–(4) is whether the firm incurs dollar debt. Reported are the marginal effects from probit regressions evaluated at the sample means of the regressors for continuous variables (and evaluated for a change from 0 to 1 for discrete variables). The R^2 is the pseudo-R^2 for the probit regressions. Small firms indicator (World Bank measure) is less than 50 employees. The dependent variable in columns (5)–(7) is the share of the firm's debt that is in dollars.
*** Indicate 1%, significance.
** Indicate 5%, significance.
* Indicate 10% significance.

higher likelihood of dollar debt (results not shown in the interest of space). An even stronger association exists when audited statements are required to receive a bank loan as shown in column (4) (a 67.9 percentage point difference). Brown et al. (2011) document similar relations between dollar debt and audits and the application of international accounting standards.

On a final note, borrowers whose earnings might be insufficient for hedging the currency risk of foreign currency borrowing can, nonetheless, apply other risk management practices. One mitigating practice is offloading currency risk onto other firms. Just as banks intermediate dollar deposits to borrowers in the form of dollar loans, a similar process occurs in the non-financial sector. Specifically, these credit chains are formed when firms lend to their suppliers and customers via short-term trade credits: 44% of firms lend to their customers and 22% lend to their suppliers (Table 1, Panel B).[22] This lending also takes place mostly in dollars; the dollar share of customer lending is 68% and the dollar share of supplier lending is close to 80%. These two types of credit are positively correlated and both are correlated with dollar debt and bank borrowing. More formally, they are significantly positively associated with dollar debt, controlling for the other covariates (columns (5) and (6) of Table 5). For example, firms that lend to their customers are more likely to borrow in dollars by 13.4 percentage points.

4.4. Robustness check: the World Bank enterprise survey

This section checks the robustness of our findings on an alternative larger data set of 354 firms collected by the World Bank at roughly the same time (WBES, 2006).[23] This survey samples from an a priori less financially constrained population of firms operating in Lebanon. It can be seen as a lower bound of financial problems in the population. In contrast, a study by Hamdan (2004) uses a sample from a population of more financially constrained micro- and

[22] However, while banks and firms lending dollars to their customers and suppliers transfer the currency risk to (mostly) non-hedged borrowers, they retain the resulting credit risk, as emphasized by Luca and Petrova (2008).

[23] The World Bank provides its enterprise-level data for research purposes. The survey covers a range of topics including technology, workforce, and corruption in addition to finance (see WBES, Lebanon summary report 2006 and http://www.enterprisesurveys.org/portal).

Table 7
Robustness check (World Bank enterprise survey): the determinants of dollar debt: the effects of hard information proxies.

	(1)	(2)	(3)	(4)	(5)
Risk management measures					
Exporter dummy	−0.008	−0.009	−0.001	0.007	0.000
	(0.27)	(0.34)	(0.03)	(0.21)	(0.01)
Importer dummy	0.067	0.062	0.068	0.072	0.070
	(1.74)*	(1.77)*	(1.74)*	(1.83)*	(1.71)*
Information opacity and collateral measures					
Small Firm (World Bank measure)	−0.061	−0.042	−0.064	−0.063	−0.064
	(1.62)	(1.23)	(1.76)*	(1.72)*	(1.70)*
Age	0.001	0.001	0.001	0.001	0.001
	(1.50)	(1.29)	(1.42)	(1.10)	(1.36)
Manufacturing industry	0.003	0.004	−0.004	−0.015	−0.013
	(0.07)	(0.10)	(0.10)	(0.37)	(0.31)
Services industry	−0.035	−0.040	−0.055	−0.045	−0.049
	(0.74)	(0.96)	(1.14)	(0.96)	(0.98)
Net worth to fixed assets	0.006	0.007	0.007	0.005	0.005
	(0.62)	(0.69)	(0.62)	(0.51)	(0.52)
Profitability and profit signaling measures					
After-tax profit to sales	−0.251	−0.236	−0.177	−0.197	−0.177
	(1.44)	(1.56)	(1.00)	(1.11)	(0.98)
Leverage control					
Debt to assets	0.001	0.002	0.002	0.002	0.002
	(0.71)	(0.59)	(0.45)	(0.45)	(0.48)
Additional measures					
Financing from formal sources	0.0012				
	(2.31)**				
Credit line indicator		0.093			
		(2.69)***			
Share of inputs on credit		0.001			
		(2.51)**			
Audit indicator			0.099		
			(1.48)		
Own property indicator				0.060	
				(1.76)*	
R&D (scaled by size)					−0.018
					(2.27)**
Observations	322	325	327	325	327
R^2	0.12	0.16	0.10	0.11	0.11

Notes: Standard errors are robust to heteroskedasticity; *t*-statistics are reported in parentheses.
The dependent is whether the firm incurs dollar debt. Reported are the marginal effects from probit regressions evaluated at the sample means of the regressors for continuous variables (and evaluated for a change from 0 to 1 for discrete variables). The R^2 is the pseudo-R^2. Small firms indicator (World Bank measure) is less than 50 employees.
*** Indicate 1% significance.
** Indicate 5%, significance.
* Indicate 10% significance.

small-enterprises.[24] Our sample, taken from the Kompass business directory, lies between these two bounds. For example, the mean (median) WBES firm has more than 60 (25) full-time employees compared with 37 (9) in our sample. Similarly, the median WBES firm was established in 1985 compared with 1993 in our data. Second, the majority of WBES firms is urban and heavily engaged in foreign trade and operations: More than half of the firms export (55%), an even greater share import (75%), more than 22% have foreign holdings, and close to 7% are (partly) foreign owned.[25] Therefore, it is not surprising that the WBES enterprises rely more on formal finance than our firms do: Close to 42% of the sample borrow from banks, 69% have a credit line or overdraft protection, and more than 46% of their financing comes from formal sources (30% from local commercial banks). Lastly, 87% of enterprises have dollar debt, and the average dollar debt share is 75%, similar to the summary statistics of our sample.

Despite the fact that these enterprises appear to be less financially constrained, they, nonetheless, rate financing problems relatively highly. For example, the median firm views financing costs as a major obstacle (placing it in the top three obstacles). For comparability with our results, if access to finance is grouped with the cost of finance obstacle, 16.5% of firms cite one of these two as the biggest obstacle, implying that broad financing difficulties are the most common problem.[26]

We present the results of robustness checks on the drivers of dollar debt in Tables 6 and 7. These regressions are specified to

[24] Hamdan sampled from the census of business establishments collected by the Central Administration for Statistics (CAS) (a government agency). More than 97% of establishments employ fewer than 50 employees (based on the CAS' Lebanon Statistical Yearbook 2006). The establishments' sample is also younger (one-third were established after 2000 compared with 15% of our sample), less urban, and financially constrained (only 8% have a formal bank loan). Securing capital in the start-up phase was a major obstacle (and much of start-up capital therefore came from own savings and family and inheritance) (Hamdan, 2004).

[25] The WBES sample is also highly concentrated in the manufacturing sector (41%), more than the general population in which only between 16% and 24% of establishments belong to the industrial sector (CAS, Kompass).

[26] While a large share of firms that do not apply for bank credit state that they have no need for loans, caution should be exercised on this interpretation. The decision to apply is an endogenous one and a firm may not apply because it correctly anticipates being rationed. We show that, conditioning on firms that did not apply because of reported sufficient financing, financing obstacles are still the most important obstacle (for an even greater fraction of firms, 18%, than the unconditional response, 16.5%).

be as similar to the earlier models in Tables 4 and 5 to the extent possible given some data differences between our survey and the WBES survey. For example, because the WBES enterprises are larger, small firms follow the World Bank classification (fewer than 50 employees). There are many common drivers of foreign currency borrowing that the WBES sample shares with our earlier results. For example, small firms are about 7 percentage points less likely to incur dollar debt (Table 6 (2)). Other proxies for informational transparency and collateral such as age, net worth, and fixed assets have the hypothesized effects and are statistically significant in explaining the share of dollar debt. For example, a one-standard deviation increase in a borrower's age is associated with a 3.6 percentage point higher dollar debt share. One main difference from our findings is that importers are more likely to borrow in dollars (7.5 percentage points more likely) while exporters are not (although the export share is positively associated with the dollar debt share as shown in the last three columns of Table 6). Therefore, the WBES sample of less financially constrained firms does not adhere as closely to the risk management of currency risk.[27] But reinforcing our earlier findings, profitable firms are less likely to borrow dollars and are significantly associated with a lower dollar debt share. Likewise, proxies for future profits, such as expected hiring and employment growth, are associated with a lower dollar debt incidence (e.g. an 8.4 percentage point lower likelihood for a firm planning to hire).

Finally, Table 7 shows that various proxies for access to formal finance and hard information attributes are associated with higher dollar debt likelihood. For example, a one-standard deviation increase in a borrower's formal financing share implies a 4.2 percentage point higher dollar debt likelihood based on column (1) (practically identical to the effect in Table 5). Moreover, borrowers with credit lines have a 9.3 percentage point higher incidence of dollar debt as does increasing the share of inputs that a borrower is able to purchase on credit (column (2)). The last three columns of Table 7 confirm that borrowers with more hard information are also more likely to access dollar credit. These measures are if a borrower's financial statements are regularly audited (10 percentage points more, though p-value 0.14), if a borrower owns property (6 percentage points more likely), and if its business is less reliant on intangible human capital such as research and development. Interestingly, the WBES asks about R&D expenditures and we find that a one-standard deviation increase in a firm's R&D (about 2.25 when measured in thousand dollars scaled by number of employees) is associated with a 4 percentage point lower dollar debt likelihood.

5. Discussion and concluding thoughts

We set out in this research to understand what induces many firms (even many small non-exporters) in an economy dominated by domestic banks to appreciably engage in foreign currency borrowing. The findings can be understood within the dual liquidity framework developed by Caballero and Krishnamurthy (2002, 2003), in which dollar liquidity is intermediated domestically between agents with surplus dollar liquidity (domestic banks channeling regional and expatriate depositor funds) and entrepreneurs borrowing this limited liquidity against the value of their collateral. Underdeveloped domestic financial markets restrict the amount of future investment returns that an entrepreneur can use to secure a dollar loan (supporting the possibility that profitable firms are constrained in their ability to pledge profits). If we take the Caballero and Krishnamurthy claim one step further, borrowers are, most likely, excessively dollarized. In the event of a crisis – characterized by a shortage of international liquidity – domestic asset prices (and hence, collateral values) will be depressed, pushing down the demand for credit.

Crises are not impossible even for Lebanon, which has long puzzled observers by its economic stability despite a high debt-to-GDP ratio that reached 180% in 2006 (e.g. Schimmelpfennig and Gardner, 2008; *The Economist*, April 25, 2009 "Lebanon: Bucking the trend"). This enviable position is supported by self-sustaining lending by the banking system to the government, as articulated by Nassib Ghobril of Byblos Bank: "in this crisis, governments in the US, Europe and elsewhere have been stepping in to rescue their banking sectors, whereas in Lebanon the sector is so large it has been supporting the state for years." (*The New York Times*, October 28, 2008 "Armored against turmoil, Lebanon lures investors"). While domestic banks have no incentive to mount a speculative attack because they are fully exposed to the state (unlike, for example, the case of dispersed foreign lenders in Argentina in 2001), this stable funding position relies on the continued cooperation of depositors. Should a run occur, similar liquidity shortages will result.

What can policymakers do to mitigate the likelihood and effects of crises? First, central banks can accumulate foreign exchange reserves to increase international liquidity, which the Banque du Liban has done in recent years (e.g. Bordo et al., 2010, find that high international reserves help decrease the likelihood of currency crises for countries with high foreign currency debt shares). Second, policymakers and market participants can develop forward foreign exchange markets to allow domestic agents to financially hedge exchange rate risk (Luca and Petrova, 2008). Such a development also would facilitate a move to a more flexible exchange rate policy. Exchange rate flexibility would nudge agents to internalize the currency risk that they incur, lowering credit dollarization (Martinez and Werner, 2002). Third, other domestic financial markets can be deepened, including the equity market, which is associated with positive welfare gains. For example, when successful companies raise additional capital such as the Patchi family-owned global chocolate chain, they choose to list in London and Dubai rather than on the Beirut Stock Exchange (*Financial Times*, August 10, 2009, "Lebanese chocolate maker set for listing"). Deepening equity markets – in addition to other mechanisms such as better verification of profits through credible contracts and courts – would also serve to expand collateral and the extent to which future profits can be pledged to investors. This would help reduce misallocations of the limited dollar credit. Finally, if the government were to reduce its debt burden, economy-wide real interest rates would decrease, allowing more projects to pass the financing threshold.

Acknowledgements

The views expressed herein are those of the authors and do not necessarily reflect the positions of the Federal Reserve Bank of Kansas City or the Federal Reserve System. This research was conducted while Nada Mora was Assistant Professor at the American University of Beirut (AUB). We wish to thank a number of former students at AUB for their excellent research assistance, particularly Rana El Helou, and also Amin Kalawoun, Fares Nejm, Joyce Mounayar, Nora Baba, Moon Baz, Ramy Osseiran, Bahaa Nahas, Joumanna Nasr, and Amer Jeambey. This paper previously circulated under the title "Finance with a focus on dollar debt: Evidence from a survey of Lebanese firms" and we thank Samir Makdisi, Ike Mathur (the Editor), an anonymous referee, and seminar participants at the ASSA/MEEA annual meeting, the Federal Reserve Bank of Kansas City, and AUB for helpful comments. We also acknowledge

[27] Neither do measures of foreign ties such as foreign ownership, equity listing, FDI, and sales to multinationals, have a significantly positive relation with dollar debt.

AUB's University Research Board for a grant that funded this project. All errors are our own.

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