On Remittances, Foreign Currency Exposure and Credit Constraints: Evidence from Nepal

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ON REMITTANCES, FOREIGN CURRENCY EXPOSURE AND CREDIT CONSTRAINTS: EVIDENCE FROM NEPAL

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Abstract: *Credit constraints are a major obstacle for firms in developing countries, in particular for small firms in the non-traded goods sector. In this paper, we investigate whether foreign currency accounts help overcome this problem, by contributing to financial development. We analyze a novel bank-level data set from Nepal, where a steady inflow of remittances has contributed to foreign currency deposits on bank balance sheets. In this data set we find that: (i) Banks hedge their FX exposure by investing in FX and non-resident assets. (ii) Banks also hedge indirectly via their sectoral lending composition: Banks with a large share of FX deposits primarily lend to firms in traded-goods sectors. They lend only little to firms in the non-traded sectors, as well as deprived sectors of the economy that have been targeted by various support programs. While the direct impact of FX accounts on relaxing credit constraints thus appears small, there is also a substantial indirect effect via the additional creation of domestic deposits – that helps all sectors of the economy.*

Keywords: *Foreign Currency Deposits, Sectoral Lending, Financial Development*
JEL Codes: *F31, F24, E58*

1. Introduction

Remittances from the working population abroad are often seen as a stable and sustainable way to overcome credit constraints in developing countries. Aggarwal et al. (2011) show for instance, in a large cross section of countries that remittances help to promote financial sector development by creating additional deposits in the banking system. Also, foreign currency accounts have been shown to have a positive impact on financial sector development (see De Nicoló et al. (2005)). Recently, policy makers have therefore suggested promoting foreign currency accounts as a means to channel more remittances into the domestic banking system (see for instance SAARC (2014)).

However, does this policy really help to intermediate financial resources to sectors of the economy which suffer most strongly from credit constraints? Could it lead to a back-door introduction of systemic risk in countries with only partially liberalized capital accounts? In this paper, we address these questions, focusing on different *sectors* of the economy. We use survey data as well as bank balance sheet data – each including a sectoral breakdown – from Nepal, a country which has very large remittances inflows of more than 28% of GDP.

In the first part of the paper, we use data from the World Bank Enterprise Surveys (WBES) to illustrate that constraints in Nepal are asymmetric across sectors: Small firms in non-traded sectors face severe credit constraints, while large traded-sector firms have relatively easy access to credit. This result confirms previous findings in the literature for the case of Nepal.[3] It is consistent with the view that traded sector-firms – which have part of their revenue in foreign currency – have easier access to bank credit, as well as alternative external financing opportunities.

In the second part of the paper, we analyze a panel data set (2009-2013) of commercial banks´ balance sheets in Nepal. In this unique dataset it is possible to identify the foreign currency share of various asset and liability positions of the banks including the foreign currency (FX) deposits, which will be our key variable of interest. It also contains a detailed breakdown of lending by sector.

We show that banks with large positions in FX deposits are hedged against foreign currency risk in two ways: A) They hedge their risks directly by investing in non-resident and foreign exchange assets. B) They are also hedged via their sectoral composition of lending: They lend more to firms in traded goods

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[3] See for instance Tornell and Westermann (2005), Schneider and Tornell (2004), Beck et al. (2006) and Brown et al. (2011).

sectors, such as manufacturing. They also lend relatively less to non-traded sectors including the deprived sectors which are recorded separately and have been targeted by various support programs.[4]

While this evidence suggests that banks aim to limit systemic risk, these indirect hedging activities also reduce the potentially positive impact of remittances on relaxing credit constraints. We find that the direct effect of FX deposits on total lending is positive but small. We use the balance sheet data to estimate a semi-accounting-identity that helps us identify the marginal sources of financing of various positions on the assets side of the banks' balance sheets. We document that lending to the non-traded good sector and to the deprived sectors of the economy has largely been financed from domestic, rather than foreign currency deposits.

There is, however, also a substantial indirect effect of FX accounts via the creation of additional domestic deposits. This strong complementarity has its roots in the institutional design of FX deposits in Nepal: As the remittance-transfer companies are allowed to hold FX deposits only for a limited time, a substantial share of the incoming remittances, are converted to domestic sector deposits. This indirect effect – consistent with the Aggarwal et al. (2011) hypothesis – helps financial development and a relaxation of credit constraints in a much wider set of sectors in the economy. According to our estimates, this indirect effect dominates the adverse effects from hedging even in the non-traded and deprived sectors.

We conclude the paper by discussing our results in the policy context of the debate on further capital account liberalization in Nepal. While the initial liberalization of FX accounts took place in the late 1980ies, the topic has come to the frontier of the policy debate again when a substantial part of the population started to migrate and earn income abroad in the early 2000s. The NRB has been aiming to channel the remittances back to Nepal via official channels by taking several steps to further liberalize the FX accounts. Some important restrictions, however, still remain. Our empirical analysis highlights that these institutional aspects greatly matter for reaping the benefits of remittances incomes and for the future development of the financial sector.

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[4] For instance the deprived sector lending initiative of the Nepal Rastra Bank, the central bank of Nepal, discussed in Appendix 3 of the paper.

2.   The diagnosis: asymmetric credit constraints across sectors

Like in many other developing countries, access to finance is a major obstacle for many firms in Nepal. To illustrate this point we analyze the Enterprise Survey of the World Bank (WBES) which covers a sample of 482 Nepalese firms.[5] Among these firms, 35% of the respondents report that access to finance is a *major* or even a *very severe obstacle*. More than half of the firms see at least a *moderate obstacle*. Only 41% of the respondents see only a *minor* or *no obstacle*.

The absolute values of these numbers should certainly be treated with caution. It is only a relatively small sample which may be biased to include a relatively privileged set of firms, which entered the World Bank Economic Survey.[6] Nevertheless, the data can be used to illustrate that credit constraints are asymmetric in Nepal.

Table 1 gives a first impression of this point. The matrix separates the total sample along two dimensions: Exporters vs. non-exporters and small vs. large firms. The table shows quite clearly where the credit constraints matter the most: Among large exporting firms only 16% of the respondents see a major obstacle in access to finance. Among the small non-exporting firms, the percentage share is the largest, with 39.2%. Nepal – like many other developing countries – thus appears not to be overall credit constraint, but rather to have credit constraints in specific sectors and for specific types of firms.

Table 1: Access to finance is (at least) a major problem (1 yes, 0 no)

		Large Firm (>50 Employees)	
		no	yes
Exporter	no	39.19%	23.94%
	yes	25.64%	16.00%

Notes: Table shows the percentage of respondents who perceive access to finance to be at least a major problem. Source: World Bank Enterprise Surveys (for details see data appendix).

In order to see whether the differences reported in Table 1 are statistically significant, we make use of the full survey data set which offers several important control variables to estimate a multivariate probit regression. In Table 2 we simplify the estimation and interpretation of the statistics by only considering a 0-1 dummy variable that captures whether the firms see a major obstacle in the access to finance or not.

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[5] In this section we follow the approach of Beck et al. (2006) who analyzed the entire WBES and derived several empirical regularities. The patterns in the Nepalese subset of firms are quite similar to their findings.

[6] As pointed out by Tornell, Westermann and Martinez (2003), using data from the Economic Census in Mexico, the smallest firms – making up the majority of firms in many countries – are much more severely credit constrained than the average firms usually entering a World Bank survey dataset.

The results from this regression show that the effect of being an exporter vs. non-exporter, as well as large vs. small firm is indeed statistically significant. The first row shows that exporters are significantly less credit constrained than non-exporters and the second row shows that large firms are significantly less credit constrained than small firms. Our control variables include standard variables such as the age of the firm, the share of foreign ownership as well as government participation. We also control for whether or not the firm is listed on the stock market, their business prospects (proxied by sales growth) and their productivity.

The marginal effects reported in Table 2 indicate that exporters have a 14.93% lower probability of reporting access to finance as a major obstacle for running their business. Furthermore, being a large firm also decreases the probability of experiencing credit constraints relative to small firms by roughly the same amount (14.1%).

Table 2: Probit Regression

Dependent Variable: Access to finance is (at least) a major problem (1 yes, 0 no)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Exporter	-0.121*	-0.131**	-0.149**	-0.142**	-0.158**	-0.166**
	(1.85)	(1.97)	(2.14)	(2.19)	(2.40)	(2.41)
Large	-0.144***	-0.174***	-0.149**			
	(2.61)	(2.89)	(2.22)			
Log Age		-0.040	-0.059		-0.036	-0.037
		(1.17)	(1.59)		(1.01)	(0.98)
Foreign Ownership		0.026	0.090		0.084	0.124
		(0.14)	(0.43)		(0.41)	(0.57)
Gov. Participation		0.393	0.423		0.415	0.506
		(1.07)	(1.16)		(1.14)	(1.48)
Firm Listed		0.0290	0.021		0.033	-0.024
		(0.08)	(0.06)		(0.09)	(0.07)
Sales Growth			0.055			0.060
			(1.09)			(1.18)
Productivity			-0.000			0.000
			(0.81)			(1.21)
Log Sales				-0.037***	-0.044***	-0.059***
				(3.42)	(3.69)	(3.45)
R^2 (pseudo)	0.02	0.04	0.04	0.03	0.05	0.05
Observations	482	481	456	471	470	456

Notes: The table shows the marginal effects of changes in the continuous independent variables at their means. In the case of binary explanatory variables it is the expected probability change if the variable changes from zero to one. *, **, *** indicate variables significant at a 10%, 5%, and 1% level respectively. z-values in parentheses. Additionally to the reported control variables, we also include industry dummy variables. Source: World Bank Enterprise Surveys (for details see data appendix).

Although the control variables mostly have expected signs, they are statistically insignificant. Our dummy variable on size and export-status of the firms (in Regression 1-3) remain, however, unaffected. Also, when replacing the dummy variables on the size of the firms measured by the number of employees by another size indicator – the log sales of each firm – the basic finding of significant differences among these groups remains unchanged.

The asymmetries illustrated in this section suggest that it is important to distinguish in the subsequent analysis between two types of firms: On the one hand those firms who are large and export part of their output. While the former allows them to issue stocks and commercial paper on the domestic market, the latter allows them to access international capital markets and attract foreign direct investment. The smaller firms which do not participate in international trade, on the other hand, draw their external financing from the domestic banking system. In the following we will refer to these firms as "T-Sector" and "N-Sector" firms, belonging to the traded goods and non-traded goods sector.

3.   Institutional background and the policy debate

Nepal's foreign exchange system has strictly been controlled until the late 1980s when the country issued the first amendment to the Foreign Exchange Regulation Act of 1962 (FERA), on October 18th, 1987. In this amendment foreign exchange earners were permitted for the first time to open foreign exchange accounts in a bank in Nepal. Initially, the FX accounts could only be opened up in US Dollar and Pound Sterling with 30 percent of the foreign exchange earnings. After further steps were taken,[7] foreign exchange earners could open up accounts in all currencies, except for the Indian currency, which are traded by NRB. Moreover, whereas only the foreign nationals and institutions were eligible to open such account initially, now the eligible Nepalese nationals and institutions.[8]

The policy debate on a further liberalization of FX accounts has gained momentum when in the early 2000s, a large share of the population started to migrate to other countries to earn income abroad and remit the earnings back to Nepal. As the earnings come initially in foreign currency, the NRB initiated efforts to channel such inflows through official channels and started issuing licenses to the private sector. Currently, private sector firms (i.e. money transfer units) are becoming more and more active in encouraging Nepalese workers to remit money using their services.

However, there are still some limits for the usage of these FX accounts, in particular for individuals remitting income from abroad through money transfer companies. Deposits from these remittances in convertible currency can only be retained for maximum 15 days before compulsory converting to

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[7] For example when the country liberalized the current account by accepting Article VIII of the International Monetary Fund's Articles of Association, on May 30th, 1994. Also, the restrictive provisions of the foreign exchange policy have been gradually relaxed with the promulgation of NRB Act, 2002 where there has been a second amendment in the FERA effective from August 7th, 2002.

[8] The procedure was made more systematic most recently with the issuance NRB circular 562 (dated 2068/5/01 Bikram Sambat in the Nepali calendar equivalent to 2011/8/18 AD). Under the current arrangement, foreign currency accounts are allowed to be opened in any of the commercial banks in Nepal upon presentation of relevant and required documents specifying the sources of foreign exchange earnings. Eligible individuals, firms, entities or commercial banks need no permission from the NRB to open such accounts.

Nepalese currency. For Indian currency, the maximum holding is seven working days. Furthermore, withdrawals from these accounts are only in Nepalese Rupees (converted at market rates). This implies that the money in FX accounts from remittances is highly transitory.[9]

A further liberalization of the use of FX accounts to channel remittances from abroad to the domestic banking system has been discussed not only in Nepal, but also the larger SAARC region. For instance Pant (2011) – in a comparison of institutional rules in SAARC countries – has argued that FX accounts are a way to help channeling the resources of remittances to productive use. In the context of these policy proposals our results highlight the trade-offs banks are facing when dealing with the resulting currency risks.

4.   The hypothesis: do FX accounts help to overcome credit constraints?

In order to evaluate the main hypothesis, we again start by looking at some descriptive statistics. Figure 1 shows that remittance flows are very large in Nepal. As a share of GDP, they have increased from 11% in 2004 to more than 28% in 2013, according to estimates provided by the Nepal Rastra Bank. The inflow of remittances has particularly increased during the period of domestic insurgency, were many workers looked for employment opportunities abroad.

**Figure 1: Remittances Inflows [% GDP]**
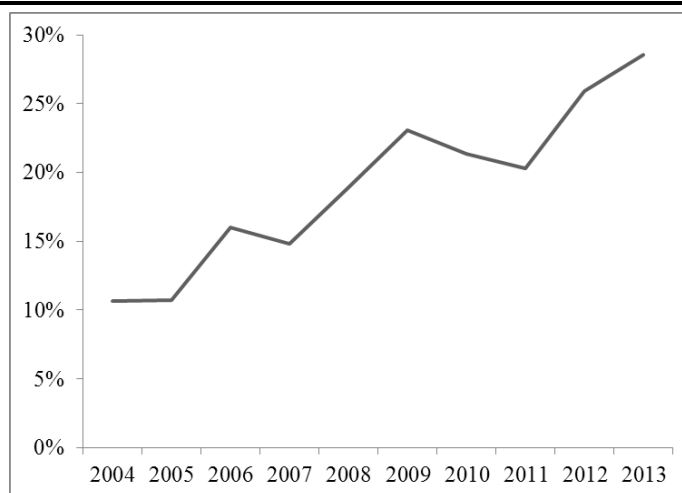
Notes: Figure shows Nepal's received remittances as percentage of GDP. Sources: Nepal Rastra Bank, Government of Nepal (Central Bureau of Statistics). For details see data appendix.

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[9] Currently there are 47 remittance companies in Nepal. The use of remittance companies has become more systemic with the issuance of remittance by-laws in 2010.

The largest part of remittances has been used to finance consumption and net imports. Figure A3 in the Appendix shows data on the balance of payments. Remittances are clearly the largest net credit item – larger than the financial account or other transfers (including development aid) - and correspond roughly in size the net imports in goods and services. Also from the Nepal Living Standard Survey (NLSS; displayed in Figure A3 of the Appendix), it is clear that most of the remittances are used for daily consumption (above 78%), while less than one percent (0.6%) of the respondents see domestic savings as the most important use of remittances.

While remittances are closely correlated with net imports, the part of the remittances that is used for domestic savings indeed creates additional deposits in the banking system. Figure 2 shows that a fraction of the foreign currency income is deposited in the domestic banking system as savings (dark bars). The grey bars in the same graph show the net FX exposure. As they are quite similar for most of the banks, this figure indicates that banks appear to have a relatively large "unhedged position", at least in the sense that foreign currency liabilities are not directly offset by a similar amount of FX assets. This paper will show, however, that banks engage in other indirect types of hedging activities such as lending to specific sectors and investing in non-resident assets.

Figure 2: Foreign Currency Deposits & Net FX Exposure
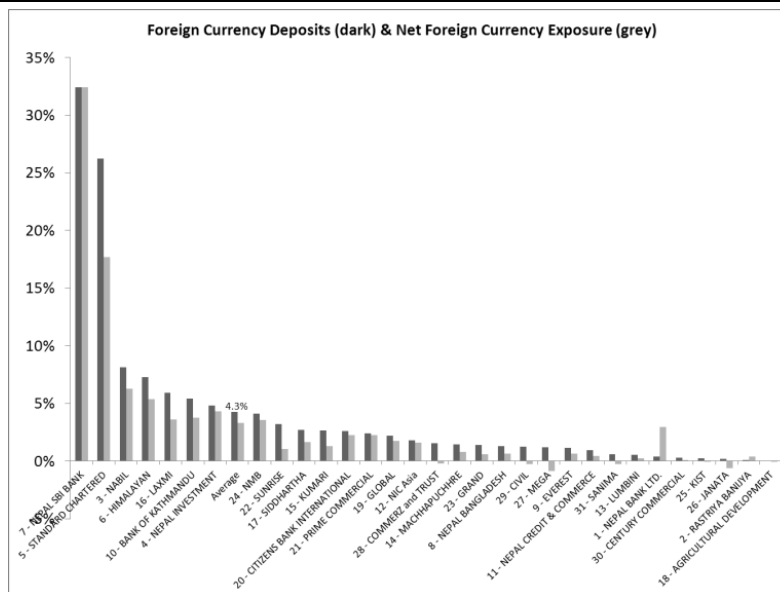
Notes: Dark grey bars show foreign currency denominated deposits for individual commercial banks. Light grey bars, on the other hand, represent their net foreign liabilities. Both variables as percentage of total liabilities. Sources: Nepal Rastra Bank, and own calculations. For details see data appendix.

Note that foreign currency deposits may also stem from exports or from NGOs who channel foreign aid to Nepal via the banking system. Exporters who hold foreign exchange in banks are not restricted in the time duration they keep foreign currency in their accounts. The data provided by the financial institutions are not detailed enough to differentiate this. However, as both in gross and net terms the income from remittances is much larger than from exports (as has been illustrated in Figure A3) this is likely to be a smaller component.

In principle, FX deposits could also reflect FX savings by domestic customers. In other countries, this would not be an uncommon phenomenon as a way to protect savings against domestic inflation. Note however, that domestic savers are not allowed to convert their domestic currency income into convertible currency such as Dollars – Nepal's Foreign Exchange (Regulation) Act, 1962 and NRB regulations/circulars, restricts on converting domestic currency income into convertible currency simply for saving purposes (or without a specific purpose which can be interpreted as for currency related speculative purposes).

Large inflows of remittances can lead to additional deposits and trigger a process of financial development and growth, as envisioned by Aggarwal et al. (2011) and others. However, there are also some countervailing effects. As remittances enter the domestic banking system in the form of foreign currency deposits, banks are increasingly exposed to foreign exchange risk. As a response, these banks may adjust to a more conservative risk portfolio of assets and reduced lending to those sectors that do not have foreign currency as major source of income, in particular the non-traded and deprived sectors – those who suffer most strongly from credit constraints. Furthermore, there may be substitution effects. An additional unit of savings in the form of FX deposits may lead to a reduction of domestic currency deposits by the same amount, if the total amount of savings is determined by exogenous preferences.

The central questions of the subsequent empirical analysis are therefore: A) Do banks hedge their risk from FX deposits by lending to the tradable sectors or investing in FX assets? B) Do crowding-out effects dominate the total impact of FX accounts on financial development?

5. The data set: Bank balance sheets from 2009-2013

In order to address both of the questions above, we analyze bank-level balance sheet data consisting of 31 commercial banks from Nepal in the period from 2009 to 2013. This panel data set has been assembled by the Nepal Rastra Bank, the central bank of Nepal.[10] The data set also contains 176 smaller banks, including development banks, finance companies and micro-finance banks. It furthermore includes 46 Savings and Credit Cooperatives and NGO's. In the present paper, we limit our main analysis to the commercial banks as (i) only commercial banks are allowed to hold FX deposits[11] and (ii) only for commercial banks, we have a sectoral breakdown of lending to individual sectors.

In order to get a first impression of the dataset, we start by investigating the aggregate bank balance sheet in Table 3, which was created by adding up the individual banks positions for each item. Starting with the liability side, we see that FX deposits, our main variable of interest, make up about 5% of the aggregate bank balance sheet. In our sample from 2009 to 2013 this value has fallen from nearly 6% in 2009 to about 4.8% in 2013. While this value is relatively stable over time, there is quite a bit of variance across banks. The bank with the largest share of FX deposits (Nepal SBI Bank) holds 32.4%, while the Agricultural Development Bank has the smallest percentage with only 0.1%.

Table 3: Aggregate Balance Sheet of Commercial Banks in 2013 (A class)

Assets		Liabilities	
Cash Balance	2.36%	Capital Fund	7.47%
Bank Balance	11.09%	Borrowings	1.80%
at NRB	9.52%	from NRB	0.18%
Investments	11.56%	Deposits	80.55%
Loans & Advances	59.08%	in Domestic Currency	59.36%
Shares & Other Inv. (incl. non-residents)	5.01%	in Foreign Currency	4.77%
Other Assets	10.90%	Other Liabilities	10.18%

Note: Table shows the aggregate balance sheet positions of Nepalese commercial banks as percentage of total assets. Source: Nepal Rastra Bank, own calculations. For details see data appendix.

Domestic currency deposits are the largest item on the liability side, making up about 60% of the balance sheet. The capital fund – also due to regulatory requirement – is close to 8%.[12]

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[10] The data are provided at a yearly frequency. Also – in line with the Nepalese fiscal year – the reporting date is mid-July.

[11] It is also allowed for national-level Development Banks. However, in our sample, they have not done so except for rare bank/year instances.

[12] Note that there is one component of deposits that cannot be decomposed into domestic and foreign currency: the call deposits. Our values for domestic and foreign deposits in Table 4 do therefore not add up to total deposits. For the rest of the analysis this implies that the total share of FX deposits is somewhat underestimated.

On the asset side, the loans and advances are the largest item with 59% followed by domestic investment (such as government bonds) with 11.6%. Furthermore, the bank balance at the NRB has a share of 9.5%. This number is relatively large as foreign currency deposits, which are converted at the central bank to be used for other purposes, initially create a claim of the private bank on the central bank (while the central bank stores the FX inflows in their foreign reserve account). An important element on the asset side of the banks is also the position "Share and other investment", which includes the investment in non-resident assets (such as call deposits, certificate of deposits and other low risk instruments). It is an important tool to hedge the exchange rate risk resulting from the inflow of FX deposits – as we will see in the subsequent analysis, this item co-moves closely with the FX deposits on the liability side.

Finally, we also have separate breakdown of the so called deprived sector lending – the lending to the poorest part of the population, which is recorded in a separate set of statistics. As a share of total assets, banks lend about 2.2% to the deprived sectors. This is close to the regulatory minimum in most cases.[13]

6.   Descriptive statistics

In order to get a first – non-econometric – impression of the impact of foreign currency deposits on lending by sector, we split the total sample of banks into three groups: the upper quartile of banks with regard to FX deposits, the mid-50% and the lower quartile. Table 4 shows that the upper quartile of banks do not differ significantly from other banks with regard to total lending, relative to total asset (although there are some differences in the subgroups, these are not statistically significant).

The difference with regard to the deprived sectors on the other hand is statistically significant. The banks in the upper quartile lend 1.88% of total assets to the deprived sector. Banks in the lower quartile lend 3.07% to the deprived sectors.

There are significant differences, however, when considering the sectoral lending structure: Banks in the upper quartile lend significantly more to the traded goods sector and significantly less to non-traded goods sectors and deprived sectors. The opposite relation is the case in the lower quartile of banks.

Also, the upper quartile invests a substantial share of its assets in FX assets, as well as other assets (including investments with non-residents). The lower quartile has hardly any investment in these positions (less than 1%), but displays a slightly higher share of investments in other domestic assets.

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[13] A short discussion of the Nepalese deprived sector lending program and the regulatory requirements can be found in the Appendix 3 and in the corresponding Table A12.

Table 4: Average lending, investment and deposits relative to total assets (2009-2013)

		Foreign Currency Deposits / Total Assets				
	Full Sample	Lower 25%	mid- 50%	Upper 25%	Diff. upper and lower	t-Test: equality of mean
Asset side						
Total Loans	61.19%	56.20%	64.67%	59.14%	2.94	1.14
Deprived Sector Loans	2.19%	3.14%	1.90%	1.89%	-1.25	2.43**
N-Sector Loans	27.29%	30.39%	26.25%	26.47%	-3.92	2.12**
T-Sector Loans	15.73%	10.75%	16.87%	18.04%	7.29	4.81***
FX Assets	2.72%	0.68%	1.33%	7.13%	6.45	3.79***
Other Assets (incl. non-residents)	1.51%	0.26%	0.40%	4.69%	4.43	3.32**
Other Domestic Assets	25.57%	27.75%	25.18%	24.37%	-3.38	2.10**
Liability side						
Domestic Deposits	56.38%	61.64%	55.22%	53.85%	-7.80	3.03***
FX Deposits	4.00%	0.25%	1.89%	11.27%	11.02	6.28***
Capital Fund	10.23%	14.36%	9.69%	7.56%	-6.79	3.85***

Notes: Table shows the average balance sheet positions of commercial banks as percentage of total assets for the full sample and various subsamples. The last column tests whether the difference between the upper and the lower quartile is indeed statistically significant. Source: Nepal Rastra Bank, own calculations. For details see data appendix.

When breaking down further the lending by sectors, as a share of total loans, we get a more detailed overview of the lending patterns of banks with high foreign currency exposure. Table 5 firstly breaks down the total deprived sector lending into its components, the direct lending to the deprived sectors and the indirect investment, which is typically implemented by buying shares from smaller microfinance institutions. We see that the difference in the aggregate value of deprived sector lending is driven by the differences in directly lending. While the lower 25% banks with regard to foreign currency exposure lend 1.72% of their total loans to the deprived sectors, the upper 25% practically do not lend directly to the deprived sectors at all: Their share is merely 0.11% of total lending. On the other hand, there is no statistically significant difference between indirect investment, although even in this category, the lower quartile of banks lend about 2% more than the upper quartile.

The breakdown of major sectors in the economy, furthermore, sheds light on the differences between traded and non-traded sectors reported above. When looking at the major sectors of the economy, we see that banks with high foreign currency deposits lend significantly more to the manufacturing sector and the construction sector and lend significantly less to the agricultural sector, the retail sector and consumption loans. The construction sector is difficult to classify – it is typically considered non-traded in the literature. However, as many construction projects are financed and supported by international aid organizations, their currency risk from a bank's perspective is unclear. The other sectors fall in the ordinary traded/non-

traded classification that is used in the literature. The agricultural sector is tradable in principle. However, due to (i) tariff barriers and (ii) the small size of the average agricultural firm in Nepal, it is highly non-tradeable in practice.

Table 5: Average sectoral loans as share in total loans (2009-2013)

| | Full Sample | Foreign Currency Deposits / Total Assets | | | Diff. upper and lower | t-test: equality of mean |
		Lower 25%	mid-50%	Upper 25%		
Deprived Sector Loans						
A. Direct Lending	0.56%	1.72%	0.25%	0.11%	-1.61	3.29***
B. Indirect Investment	2.89%	4.57%	2.27%	2.53%	-2.04	1.35
Total (A+B+Other)	3.92%	6.77%	2.93%	3.19%	-3.58	2.14**
Sector Loans						
Agricultural and Forest	2.66%	5.40%	1.81%	1.82%	-3.58	2.99***
Manufacturing	22.05%	16.49%	21.80%	27.20%	10.72	5.90***
Construction	10.38%	8.73%	10.03%	12.40%	3.66	2.61**
Wholesaler & Retailer	17.16%	20.77%	15.82%	16.41%	-4.36	2.31**
Other Services	21.02%	18.11%	23.07%	19.96%	1.85	0.84
Consumption Loans	5.39%	9.79%	3.87%	4.24%	-5.55	3.39**
Others	21.34%	20.70%	23.60%	17.97%	-2.73	1.32

Notes: Table shows the average sectoral loans of commercial banks as percentage of total loans for the full sample and various subsamples. The last column tests whether the difference between the upper and the lower quartile is indeed statistically significant. Loans to the sector 'other services' also includes: i) Finance, Insurance and Real Estate and ii) Hotel or Restaurants. Source: Nepal Rastra Bank, own calculations. For details see data appendix.

7.   A panel data analysis

Methodological note

Before starting the empirical analysis, it is important to point out the special nature of our data set: In the empirical analysis we will take items from the liability side of the bank balance sheets (for instance foreign currency deposits) and regress them on items on the asset side (for instance loans to specific sectors). We are thus estimating an accounting (semi) identity, which has important implication for the interpretations of our findings.

This setting, for instance, makes more likely clear to find some form of correlation between the exogenous and endogenous variables – as the sum of the assets and the sum of liabilities are equal to each other. This explains the remarkable high R-squares in the subsequent regressions: We regress one particular item on the asset side on *all items* of the liability side. As the financing of each item must come from somewhere, we have a near perfect fit in all of your regressions.

It is also more difficult to interpret the direction of causality. Even if a positive correlation exists, it is not only one item on the liability side that matters for another item on the asset side. It is rather the sum of all sources of financing that was needed to allocate the resources for an entire portfolio of different of different assets. The financing decisions of banks are likely to be taken jointly, not independently.

It is nevertheless interesting to analyze the partial correlations between *sources* of financing and *lending structures* in a bank-level data set: If a coefficient is statistically significant, it signals for instance that a particular item on the liability side has been "the marginal source of financing" for a given item on the asset side. It is clear that each item should be significant somewhere, but it does not need to be significant everywhere. Our objective in the subsequent analysis is to highlight the differences between domestic and foreign currency deposits as a marginal source of financing for lending to the non-traded and deprived sectors.

Lending in traded and non-traded goods sectors

We start by regressing items on the assets side on various liability side items in *levels*. We are thus looking for a positive net effect of FX deposits on lending to specific sectors. As a next step we will look at the share thus the crowding-out effects that might exist, despite a positive total net effect.

Column (1) of Table 6 shows a benchmark regression where total loans in logs are regressed on the logged FX deposits, domestic deposits, the capital fund, other items on the liability side as well as time fixed effects. The results from this regression thus are mainly driven by the between-dimension of the panel as the variance across banks is considerably larger than the variance over time. In this regression we see that both, FX deposits and domestic deposits have a statistically significant impact on total loans to the private sector (see column 1). The magnitude of this impact will be assessed in the following section.

In regressions 3 and 4 we partition the total lending into two sub-categories: The lending to traded and non-traded sectors. Interestingly the impact of FX deposits on lending to the traded-goods sector is statistically significant, while the lending to the non-traded sector is not. Vice versa there is a significant impact of domestic currency deposits on lending on both sectors, but the impact on the non-traded sector is considerably larger. As in the descriptive statistics reported above, these results suggest that – while positive – the direct impact of remittances entering the banking system as FX deposits is mainly targeted towards a set of firms that do not suffer from credit constraints most strongly. This also holds for the set of deprived sector firms, which is reported in regression 2.

In regression 5 and 6, we furthermore see that there is a significant relationship between FX deposits and the foreign exchange assets of the banks. In column (5) we take all items that are explicitly labelled as

foreign currency items on the balance sheet. In column (6) we also include the investment in other assets (including non-residents) which is also plausibly an item that can be considered a foreign currency asset. In both regressions the coefficients for foreign currency deposits are statistically significant, whereas for domestic currency deposits they are not. It thus appears that the FX deposits are indeed the marginal source of financing for FX assets. Vice versa as shown in column (7), there is a significant impact of domestic currency deposits on domestic asset holdings of the banks.

Table 6: Lending to traded and non-traded goods sectors

Variables	(1) Total Loans	(2) Deprived sector loans	(3) N-sector loans	(4) T-sector loans	(5) FX assets	(6) Other Assets (incl. non-residents)	(7) Other domestic assets
FX Deposits	0.041**	0.018	0.005	0.185***	0.491***	0.430***	0.005
	(2.51)	(0.39)	(0.21)	(3.58)	(7.71)	(3.67)	(0.23)
Dom. Deposits	0.797***	0.478**	0.644***	0.438***	0.190	0.265	0.520***
	(11.75)	(2.00)	(7.46)	(3.80)	(0.64)	(0.73)	(3.67)
Capital Fund	0.346***	-0.041	0.248***	0.309***	-0.003	-0.326	0.351**
	(5.53)	(0.13)	(2.98)	(3.26)	(0.01)	(1.09)	(2.45)
Other Liab.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	No	No	No	No	No	No
R-Squared	1.00	0.99	1.00	1.00	0.96	0.73	1.00
Observations	138	132	138	138	135	138	138

*Notes: Robust t-statistics in parentheses; *, **, *** indicate variables significant at 10%, 5%, and 1% level respectively. Regression is estimated using OLS and including time fixed effects. All variables enter the regression in logged levels. Sources: See data appendix.*

Hedging strategies

As shown above, the overall impact of FX deposits on total lending, as well as traded-sector lending and foreign exchange assets is positive. In Table 7 we further investigate the impact of FX deposits on the *shares* in total assets. Even though total assets may go up, the share of a particular item on the asset side may decline. This representation helps to illustrate some of the crowding-out effects that occur when FX deposits enter the banking system.

In the second column of Table 7, we see that such crowding-out effects indeed exist: An increase in FX deposits increases the share of FX assets in total assets. A similar crowding-out effect is not visible for an increase in domestic deposits. Also, as shown in column (1), there is no significant reaction of domestic assets to either FX deposits or domestic currency deposits. Column (3) shows that the ratio of domestic to foreign assets significantly reacts to an increase in FX deposits, but does not react to an increase in domestic sector deposits.

When considering columns 4-6, we see that a similar effect exists on the composition of the lending portfolio of banks. An increase in FX deposits significantly decreases the share of loans to non-traded sector firms (column (4)) and significantly increases the share of loans to firms in the traded sector (column 5). Also, the ratio of the two is significantly affected (column 6). Domestic deposits on the other hand only have a significant (and positive) impact on the share of loans given to the non-traded sector (column 4).

Table 7: Hedging strategies

	(1)	(2)	(3)	(4)	(5)	(6)
	Asset composition			Loan composition		
Variables	Dom. Assets / TA	FX Assets / TA	FX Assets / Domestic Assets	N-sector loans / TA	T-sector loans / TA	T / N-sector loans
FX Deposits	-0.008	0.013***	0.057***	-0.012***	0.010**	0.058**
	(1.43)	(3.73)	(3.86)	(3.51)	(2.55)	(2.49)
Dom. Deposits	-0.023	-0.011	-0.040	0.039***	0.003	0.022
	(0.61)	(1.35)	(1.20)	(2.91)	(0.24)	(0.33)
Capital Fund	0.057	0.006	0.021	0.005	0.030**	0.124*
	(1.48)	(0.90)	(0.73)	(0.36)	(2.38)	(1.92)
Other Liab.	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	No	No	No	No	No
R-Squared	0.94	0.46	0.47	0.96	0.90	0.84
Observations	138	135	135	138	138	138

Notes: Robust t-statistics in parentheses; *, **, *** indicate variables significant at 10%, 5%, and 1% level respectively. Regression is estimated using OLS and including time fixed effects. Independent variables enter the regression in logged levels. Dependent variables are relative to total assets. Sources: See data appendix.

A further disaggregation of sectors

In the analysis above we have aggregated different sectors of the economy into either a traded- or a non-traded goods sector (T- and N-sector). These results are robust to plausible alternative specifications of N and T. For instance the services sector – mostly classified as non-traded in the literature – maybe a tradable sector due to the large tourism industry in Nepal, which enters the aggregate accounts as exports of services. In the present section we further disaggregate total lending into its individual components.

In each regression of Table 8 the dependent variable is lending to a specific sector in the economy, in logged levels. In the first two columns we break down the deprived sector lending into its components, direct lending and indirect lending. Indirect lending is an opportunity for large banks to fulfill their regulatory requirements to lend to deprived sectors – by investing in shares of micro-finance institutions. The idea is that this improves the capital base of small banks and takes advantage of their customer network. The regressions show that banks with large shares of FX deposits make use of this opportunity.

While they lend significantly less *directly* to the deprived sectors (Column 1), their indirect lending to deprived sectors is not statistically different from other banks.

In columns (3-9) we display the lending to individual sectors of the economy. With respect to banks with high FX deposits, we find that they lend significantly more to the manufacturing sector, which is typically considered the most tradable sector. All other sectors are insignificant. It is also remarkable that they also lend less (although not statistically significant) to the agricultural sector and to consumers.

Table 8: A further disaggregation of sectors

	Deprived Sector Loans		Other Total Loans						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	Direct depr.	Indirect depr.	Agr.	Manu.	Const.	W&R	Other serv.	Cons. loans	Other
FX Dep.	-0.418***	0.031	-0.052	0.223***	0.070	-0.019	0.023	-0.029	-0.013
	(3.02)	(1.20)	(0.84)	(3.46)	(1.56)	(0.52)	(0.75)	(0.42)	(0.53)
Dom. Dep.	0.388	0.437**	0.166	0.406***	0.853***	0.651***	0.038	0.117	-0.056
	(0.94)	(2.49)	(0.80)	(2.66)	(4.91)	(5.98)	(0.44)	(0.43)	(0.65)
Capital Fund	0.230	0.261	0.192	0.254*	-0.137	-0.072	-0.168*	0.112	-0.153*
	(0.62)	(1.34)	(1.04)	(1.91)	(0.81)	(0.71)	(1.95)	(0.41)	(1.81)
Other Liab.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	No	No	No	No	No	No	No	No	No
R-Squared	0.77	0.99	0.97	0.99	0.99	1.00	0.94	0.97	0.93
Observations	76	125	137	138	138	138	138	137	138

*Notes: Robust t-statistics in parentheses; *, **, *** indicate variables significant at 10%, 5%, and 1% level respectively. Regression is estimated using OLS and including time fixed effects. Independent variables enter the regression in logged levels. Dependent variables are relative to total loans. Sources: See data appendix.*

8.   Evaluating the direct and indirect effects of foreign currency deposits

In the previous section we have documented that banks hedge their risk of FX exposure by adjusting their lending portfolio and by investing in FX assets. In the present section we will quantify whether there remains a positive net effect on lending to credit constrained sectors, when also taking into account possible indirect effects.

In doing so, we allow for possible complementarities between FX and domestic deposits. Such a complementarity can be motivated by the institutional structure in Nepal. Remittance companies are allowed to hold FX deposits for 14 days before converting them into domestic currency deposits. If the deposits are not withdrawn after 14 days, domestic currency deposits will also go up.

Table 9 shows that such a complementarity exists as the partial correlation between them is positive and statistically significant, i.e. additional FX deposits lead to further domestic deposits in the domestic

banking system. This partial correlation can plausibly be interpreted as a causal impact of FX deposits on domestic currency deposits as the bank customers are not allowed to convert domestic currency into foreign currency accounts. Such a reverse transaction is only allowed under special circumstances and with proper documentation of the usage of the money.[14]

Table 9: (Partial-)Correlation between Domestic and Foreign Currency Deposits

(A) Without controls	0.436***	(C) Time Fixed Effects	0.416***
(B) Liability balance sheet items	0.307***	(D) Liability balance sheet items + Time Fixed Effects	0.307***

*Notes: The table shows partial correlations between domestic currency deposits and foreign currency deposits with the effect of different controls partialled out from both variables. Stated differently, displayed coefficients are identical to the simple bivariate correlation between the residuals regressing the two deposit items on the different sets of control variables specified within the table. *, **, *** indicate variables significant at a 10%, 5%, and 1% level respectively. Data source: See data appendix.*

In Table 10 we use the estimated elasticities from Table 6 to compute the effect of one additional Rupee entering the banking system in the form of FX deposits or domestic deposits on various items on the asset side. Firstly, we only consider the direct effects, abstracting from the correlation reported in Table 9. While an additional Rupee worth of FX deposits directly increases loans by 0.46 Rupees, domestic deposits increases them by 0.77 Rupees. The direct impact of domestic currency deposits is, therefore, considerably stronger.

Aside from total loans, a one Rupee increase in domestic currency deposits also leads to an increase of other domestic assets by 0.22 Rupees. Foreign exchange assets, or deprived sector lending, on the other hand, hardly increase. They only display a reaction of 0.01 and 0.02 Rupees respectively. Among the N- and T-sectors, the N-sector displays a substantially stronger impact.

An additional Rupee entering the banking system in foreign currency, on the other hand, it neither has a sizable impact on the deprived sector loans (0.01) nor on the N-sector loans (0.03). The impact on total loans appears to be entirely focused on the T-sectors loans that go up by 0.53 (note that the number of N and T-sector loans to not add up perfectly to total loans as some sectors remained unclassified). Unlike domestic currency deposits, FX deposits also lead to a sizable increase in FX assets, which increase by 0.28 Rupees. Also, other Assets (including the investment with non-residents) rise by 0.19 Rupees.

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[14] Note that this indirect effect may not be limited to the same bank. If for instance a remittances recipient – instead of depositing it directly at his bank – spends the money, which indirectly gets deposited in another bank, this would not be picked up by our correlation. The estimates reported below, can this be thought of as a lower bound, or conservative estimate, of the indirect effects triggered by FX accounts.

Table 10: Marginal funding source of bank assets in absolute terms

Variables		Total Loans	Deprived sector loans	N-sector loans	T-sector loans	FX assets	Other Assets	Other domestic assets
Dom. Deposits		0.77	0.02	0.29	0.11	0.01	0.01	0.22
FX Deposits	direct	0.46	0.01	0.03	0.53	0.28	0.19	0.02
	indirect	2.11	0.05	0.79	0.30	0.03	0.03	0.59
	total	2.56	0.06	0.82	0.83	0.31	0.22	0.62

Notes: This table evaluates the size of the regression coefficients from Table 6 in terms of Rupees. It shows the marginal effect of one additional Nepalese Rupee in deposits entering the banking system on different asset positions. The indirect is calculated taking the partial correlation of Table 8, Panel (D) as a basis for computation.

Thus the direct impact of domestic currency deposits on lending, both in total as well as deprived and N-sector lending, is substantially larger than FX deposits. In rows (3) and (4) of Table 10 we also compute the indirect as well as total effect of FX deposits on lending and asset holdings. We see that these indirect effects are very substantial and dominate the direct effects discussed above. While banks hedge their risks from FX holdings, the FX accounts appear to be an instrument to channel financial resources into the domestic banking system.

Taking these indirect effects into account, the total impact of FX deposits on total lending is more than five times as large. One extra Rupee FX deposits on the bank balance sheets has a direct impact of 0.46 Rupees on lending and an indirect effect of 2.11 by also creating further domestic deposits. Taking these indirect effects into account, the effect of FX deposits is also stronger than domestic deposits when considering the deprived sector loans (0.06 Rupees) or the N-Sector loans (0.82 Rupees). On the other hand, there is hardly any indirect impact on FX assets or other Assets, as the direct impact of domestic currency deposits on these balance sheet positions is so small.

9.   Related literature

Our paper relates to several different lines of research in the literature. A positive impact of FX accounts on financial development has first been documented in De Nicoló et al. (2005). This finding is consistent with the indirect effect of remittances on poverty alleviation that has been suggested by Aggarwal et al. (2006, 2011).[15] In a broad cross section of countries, they show that remittances have a strong impact on deposit formation in the banking system. The authors argue that financial development helps relax credit

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[15] Gupta et al. (2009) confirm the results of Aggarwal et al. (2006) for Sub-Saharan Africa. Also, Giuliano and Ruiz-Arranz (2009) analyze the relationship between remittances and growth and its interaction with financial development. They find a stronger impact of remittances in less financially developed countries. Using municipality-level data of Mexico in 2000, Demirguc-Kunt et al. (2011) furthermore show that remittances have a positive impact on banking sector breadth and depth, e.g. the value of deposits to GDP.

constraints in developing countries leading to growth and prosperity beyond the direct impact of remittances. They argue that further poverty reduction can be achieved via this channel.

Another line of literature distinguishes between credit constraints in large and small firms, as well as traded and non-traded goods sector firms. Bernanke, Gertler and Gilchrist (2000) for instance show that the credit channel of monetary policy is stronger for small than for large firms, and varies across sectors. Also, Beck et al. (2006) documents that small firm industries benefit more from financial development than large firms industries. Tornell and Westermann (2003, 2005), in a set of middle income countries, have reported differences in credit constraints between firms in the traded goods sectors and the non-traded sector. The former group has easier access to credit because it can borrow on international capital markets and typically also being large firms, they can issue their own equity and commercial paper. The latter group on the other mainly borrows from the domestic banking system as an external source of finance. With a focus on Eastern Europe, Brown et al. (2011), have documented the differences between large and small firms as well as the exporter-status of firms in large survey data set comparable to the one used to motivate the analysis in the introductory part of this paper.

In the context of these two lines of literature, our paper investigates whether the positive impact of FX accounts and remittances on deposits really translates into a relaxation of credit constraints in those segments of the economy that suffer most severely from credit constraints.

The article by Aggarwal et al. (2011) has already been challenged in several respects by other authors. For instance Bettin, Lucchetti, and Zazzaro (2012) highlight the endogeneity between the decision to send remittances and the stage of financial development and the investment opportunities in the recipient country (see also Broda and Yeyati (2006) on endogenous deposit dollarization). Furthermore, Brown et al. (2013) have shown that remittances appear to deter – rather than enhance – the use of formal banking services at the household level. Our paper relates to these papers, by raising the question whether there may be other endogenous responses, such as a lending response of the banks to the share of foreign currency deposits received. While we do find evidence of such an endogenous response, it does not appear to dominate the total positive impact in our dataset.

A third line of research relevant for our analysis, regards the measurement of currency mismatch. Tornell and Westermann (2005) and Ranciere, Tornell and Vamvakidis (2010a) have for instance suggested that the foreign currency liabilities are an insufficient measure of foreign currency exposure. They suggest that lending by sector should be taken into consideration when assessing the overall currency exposure of banks. Ranciere, Tornell and Vamvakidis (2010b) have analyzed Eastern European banks using a new definition of currency mismatch. Our paper contributes to this literature, by illustrating that the lending

structure of banks may react endogenously to changes in their currency composition of deposits. Banks with large inflows of deposits appear to react to these inflows by adjusting their lending portfolio.

Finally, our analysis also connects to the debate on the benefits of remittances for Nepal. A common agreement in this literature is that remittances indeed help to alleviate poverty. However, there is also the general perception that remittances are greatly underutilized as most of it is spend on daily consumption. Maskay and Adhikari (2013)– analyzing the Nepal Standards of Living Survey – argue that labeling remittances as contributing only to transitory poverty reduction (since they have mainly helped finance consumption, rather than savings, education or capital formation) is misleading; they argue that remittances have contributed to long-term societal changes as well as enhancing access to services. Our paper reinforces their argument by documenting an indirect effect: While remitters do not directly save their foreign income, there appears to be a "rebound effect"[16]. Foreign earnings – initially spend on daily consumption –are at least partly deposited in the banking system by those who sell goods and services to them.

10. Conclusions

In the literature there is a widespread agreement that both, remittances and foreign currency accounts, help promote financial development, as measured by total deposits in the banking system. It is further argued that this financial development relaxes credit constraints and reduces poverty in developing countries. There is little evidence, however, whether the currency composition of these deposits matters for lending to specific sectors and on how exactly these funds are intermediated to different branches of the economy.

In this paper, we use a novel dataset on FX deposits and sectoral lending to shed light on this intermediation process. We find that the direct impact of FX deposits on domestic lending is much smaller than often believed. This is because risks at the bank level – resulting from FX deposits – are hedged by (a) lending to traded goods sectors and (b) investing in foreign assets. In particular, the deprived sectors do not experience a clear and sizable direct benefit via the relaxation of credit constraints.

There is, however, a sizable indirect effect: Banks with larger FX deposits also tend to have more domestic currency deposits. While initially remittances are mainly spend on daily consumption, part of this money gets deposited back into the banking system, in domestic currency by other customers. This complementarity indeed leads to a substantial positive impact of FX accounts on financial development

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[16] This rebound effect is also consistent with the greater use of financial accounts in municipalities with higher remittances documented by Demirgüç-Kunt et al. (2011).

and more lending in all sectors of the economy. Our results indicate that the net impact is positive also for non-traded and deprived sectors.

Our analysis is also intended to contribute to the policy debate on further capital account liberalization in Nepal. For a country experiencing severe problems of absolute poverty, the question of how a central bank can help to alleviate this burden is a high priority for policy design. Implementing the deprived sector lending program, for instance, the Nepal Rastra Bank has focused on this issue for several years. However, this program only covers 2,2% of total bank lending, and it has been criticized as a direct intervention in the market economy.

For Nepal and other developing countries, breakdown by sectors greatly matters. While the traded-goods sector, for instance manufacturing, makes up for only 14% of employment even in urban areas, the labor-intensive industries are in the non-traded goods sector. In particular, agriculture – a sector that is tradeable in principle, but due to tariff barriers experiences little trade – suffers from credit constraints and makes up for 74% of total employment. The sectoral composition of lending is, therefore, very important for employment, poverty alleviation and welfare. The introduction of FX accounts – if effective in deprived and non-traded sectors – may thus be a market-based alternative to more direct forms of intervention.

While the documented hedging activities reduce the systemic risk exposure at the bank level, we would like to point out that a large inflow of remittances is still not without risk: Over the past years, the steady inflow of remittances not only led to an increase of FX exposure of the private banks, but also of the central bank. When the incoming foreign currency is exchanged for domestic currency, it contributes to a net foreign asset position at the central bank.

While banks hedge their risks by adjusting their lending and investment portfolio, the central bank does not have this option available. Its liabilities are the currency in circulation and deposits of private banks at the central bank – both denominated in domestic currency.[17] Swings in the exchange rate – that is pegged to the Indian Rupee – vis-à-vis other currencies will therefore affect the value of the reserves. The management of these reserves and the ability to sterilize the impact of FX inflows on the monetary base will be an important factor for an overall assessment of the benefits of remittances.

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[17] Although banks are allowed to have FX accounts with their central bank, in practice, this number is small: In our dataset, the banks hold 59.4% of the aggregate balance sheet as domestic deposits at the NRB while they only hold 4.8% in foreign currency.

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Appendix 1: Data Sources

Table A11: Variable definitions and data sources

Variable	Description	Source
Enterprise survey data		
Exporter	Dummy = 1, if firm exports, 0 otherwise.	World Bank - Enterprise Surveys: indicators "d3b" and "d3c"
Large Firm	Dummy = 1, if firm has more than 100 employees, 0 otherwise.	World Bank - Enterprise Surveys: indicator "a6a".
Small Firm	Dummy = 1, if firm has less than 20 employees, 0 otherwise.	World Bank - Enterprise Surveys: indicator "a6a".
	Note: Number of employees includes permanent and temporary employees. Number of temporary workers is adjusted by the average number of months worked in a year.	
Log Age	Natural logarithm of years since firm's establishment	World Bank - Enterprise Surveys: indicator "b5".
Foreign Ownership	Dummy = 1, if firm (at least) partly owned by foreign private individuals, companies or organizations, 0 otherwise.	World Bank - Enterprise Surveys: indicator "b2b".
Government Participation	Dummy = 1, if firm (at least) partly owned by Government/state, 0 otherwise.	World Bank - Enterprise Surveys: indicator "b3c".
Firm Listed	Dummy = 1, if firm is a shareholding company with shares trade.	World Bank - Enterprise Surveys: indicator "b1".
Sales Growth	Real annual sales growth (%)	World Bank - Enterprise Surveys: indicator "d2" and "n3".
Productivity	Sales per Worker	World Bank - Enterprise Surveys: indicator "d2" and "l1".
Log Sales	Natural logarithm of last complete fiscal year's total sales.	World Bank - Enterprise Surveys: indicator "d2".
Obstacle *Access to Finance*	Dummy variable = 1, if access to finance is at least a major obstacle, 0 otherwise. Alternatively, as categorical variable scaled [0,…,4] from *no problem* to *severe problem*.	World Bank - Enterprise Surveys: indicator "k30".
Banking data		
FX Deposits	Bank deposits held in foreign currency (remittances)	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, lines L.3a.f, L.3b.f, L.3c.f.
Domestic Deposits	Bank deposits held in domestic currency	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, lines L.3a.d, L.3b.d, L.3c.d.
Loans	Bank loans - sectoral or in total	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, Sectorwise Loans and Advances of Commercial Banks
N-Sector Loans	Loans to sectors producing non-tradeable goods	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, Sectorwise Loans and Advances of Commercial Banks
	Note: In the benchmark case N-sectors include: Agriculture and Forest Related; Fishery; Construction; Transport; Transport, Communication & Public Utilities, Wholesale & Retail, Other Services, Consumption	

T-Sector Loans	Loans to sectors producing tradeable goods	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, Sectorwise Loans and Advances of Commercial Banks
	Note: In the benchmark case T-sectors include: Mining; Manufacturing; Metal Products, Machinery & Electronic Equipment.	
FX Assets	Bank sssets in foreign currency (denominated in Nepalese Rupees)	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, lines A.1a.f, A.1b1.f, A.1b2.f A.1c.f, A.3b, A.5b, A.6b.
FX Shares	Shares & other investment in non-residents.	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, line A.3b.
Other Domestic Assets	Bank assets in domestic currency (excl. loans)	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, lines A.2a, A.2b, A2c, A.2d, A.3a, A.5a, A.7, A.1a.d, A.1b1.d, A.1b2.d, A.1b3, A.1c.d
Capital Fund	Bank's capital fund	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, line L.1
Other Liabilities	Bank's liabilities (excl. Capital, FX Deposits & Domestic Deposits	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59, lines L.2, L.4, L5, L6, L7.
Total Assets	Bank's Total Assets / Liabilities	Nepal Rastra Bank, Banking and Financial Statistics, issues 37 to 59.
Net Foreign Currency Exposure	Net foreign currency exposure = FX Deposits – FX Assets	See above
Macro variables		
Remittances	Personal remittances received	Nepal Rastra Bank, Quarterly Bulletin April 2014 (Table 77) & July 2012 (Table 64)
GDP	Nominal GDP	Government of Nepal (Central Bureau of Statistics), Table 2 "Gross Domestic Product"
Net Imports	Net Imports = Imports of goods and services – Export of goods and services	World Bank, WDI, Series NE.EXP.GNFS.ZS, NE.IMP.GNFS.ZS
Official Reserve Assets	Official Reserve Assets of Nepal (incl. gold)	International Monetary Fund, International Financial Statistics, concept code: RAFA
Nepal Rastra Bank (NRB) Total Assets	Total gross assets of Nepal Rastra Bank	International Monetary Fund, Central Bank Survey, concept code: FAAG

Appendix 2: Use of remittances

Figure A3: Use of remittances

(A)

(B)
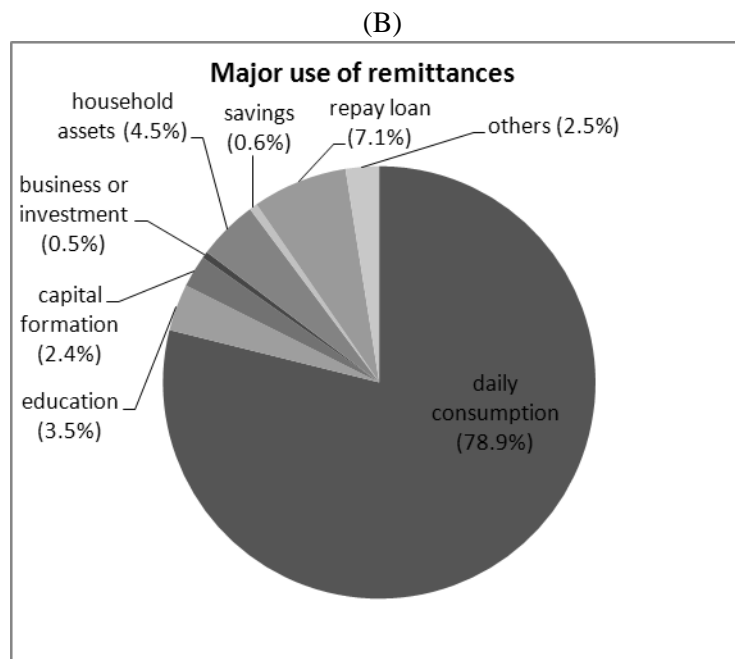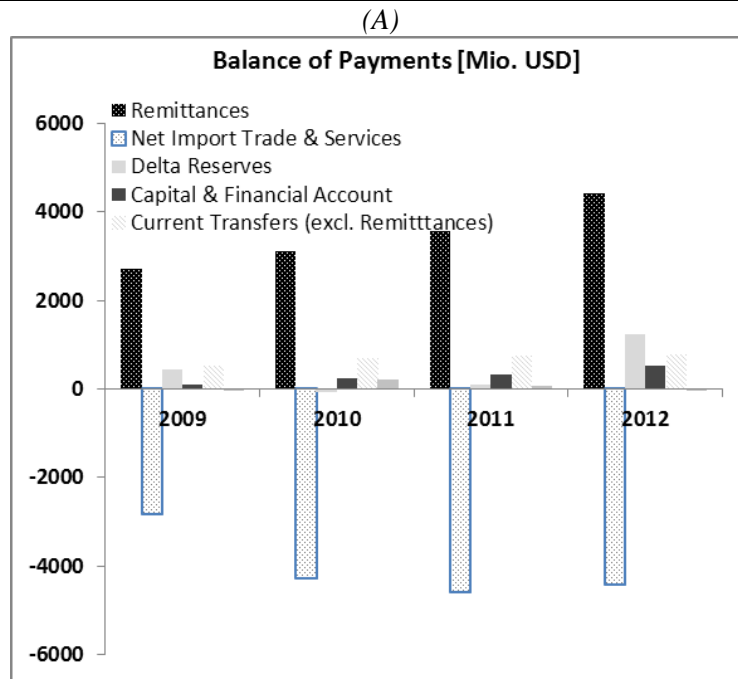
Sources: IMF country reports, Nepal Standards of Living Survey 2010/11 For details see data appendix.

Appendix 3: Deprived sector lending in Nepal

The Nepal Rastra Bank (NRB) has introduced the Directed Credit Policy in 1974 for the first time. The requirement of this policy is to invest a specified percentage of total deposits in the underprivileged sector with the objective of increasing the flow of credit to small farmers and businesses. The scheme was collectively renamed the "Priority Sector Credit" in 1976, when its mandate was extended to all banks and the amount was increased to 70 percent of total deposits. In 1984, the lending requirement under this program was tied up with total outstanding loans. This lending target was fixed at 12 percent of outstanding loans and advances since 1990. Moreover, since 1991/92, the NRB has directed that some percentage of priority sector loans including three percent of the total lending portfolio be given to the poorest part of the population under the "Deprived Sector Credit" program. While the priority sector lending program was phased out in mid-July 2006, deprived sector lending requirements are still in force as shown in the table below.[18]

Table A12: Trend of mandatory provision for deprived sector lending (as % of total loans)

	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13	2013-14
License A	3	3	3	3	3	3.5	4	4.5
License B	-	1	1.5	2	2.5	3	3.5	4
License C	-	-	1	1.5	2	2.5	3	3.5

Notes: Licenses refer to the Nepal Rastra Bank's classification of banks. Class A banks are commercial banks, Class B are Development Banks, and Class C are Finance Companies. Source: Various Issues of Monetary Policy, available at www.nrb.org.np.

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[18] An additional requirement is the following (see Monetary Policy 2011-12, Paragraph 111): *"To ensure sufficient investment in the productive sectors particularly in agriculture, power, tourism, and cottage and small industries, the banks and financial institutions providing credit equivalent to less or more than 10 percent of the industry average in specified sectors are required to increase it to 20 percent of the industry average within the next three years. The implementation of action plan submitted by the banks and financial institutions in this regard will be effectively monitored".*