Dollarization and Enterprise's Behaviors: The Case of Cambodia*

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1. Introduction

Although Cambodia has been heavily dollarized for decades, the debate on dollarization has long relied on the measure of FX deposits over M2 or total deposits. There is a paucity of empirical studies on Cambodian dollarization at micro level, and it has been unclear to what extent enterprises are dependent on FX currency, or how much FX currency has prevailed in industries. Since businesses often operate across provinces, enterprises are possibly significant drivers to spread FX currency widely throughout a country. The role of enterprises may be significant for the transmission of dollarization in Cambodia.

The primary objective of this paper is to present the real picture of the dollarization of enterprises, using data from a survey carried out on 856 enterprises from 25 provinces from October 2014 to January 2015. We investigate different aspects of enterprises' operations, such as revenues, expenditures, price quotations, exchange rates, borrowing behaviors, and potential risks of currency mismatches in the firm's operations. Our analysis aims at facilitating discussion and providing policy implications for de-dollarization.

We focus on how firms manage to deal with the currency mismatch risks in their operation. Compared to households, the operations of enterprises are more

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* The author acknowledges financial supports from JICA Research Institute under the project, "Empirical Study on the Promotion of Home Currency in Cambodia," and from Japan Society of Promotion for Science. This article is a revised version of Aiba (2016).

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diversified even in developing economies, and their behaviors are complicated to explain. Meanwhile, in the previous literature of dollarization, several factors are found to have a significant effect on firms' behaviors in dollarized economies. In particular, hedging the risk of currency mismatch is one of the significant factors to drive enterprises to have foreign currency assets or borrowings, apart from interest rate differentials (Brown et al., 2011; Mora et al., 2013). [1] Currency mismatch risks can cause the decrease in the asset values of firms, and firms are supposed to minimize such risks in their operation (Jeanne, 2003, 2005). In addition, dollarization in revenues and expenditures of domestic firms (even non-exporting or importing firms) are also prevailed to a great extent even in provincial areas of Cambodia, apart from debt and assets. Therefore, we further focus on currency mismatches between the inflow and outflow in enterprises' operations. In this paper, we also assess how Cambodian enterprises manage to operate under the multiple-currency circulating environments.

We found that, in the case of Cambodia, that (1) not only loans, but revenues, expenditures and price quotations are also highly dollarized. (2) The extents of dollarization vary across regions, firm size and industries. (3) Most of borrowings are denominated in USD. Even firms which use local currency in their operations borrow in USD. (4) Furthermore, there was a relatively wide gap in the currency composition of revenues and expenditures for enterprises operating in the central area, those of small sizes, or those classified as the wholesale and retail trade sector. (5) Even though a lot of enterprises deal with multiple currencies in their operations, most of them do not recognize the risk of exchange rate changes and do not have hedging strategies.

The rest of this paper is organized as follows: Section 2 describe the date obtained from the survey on enterprises. Section 3 presents a set of results of our analyses. Section 4 draws several policy implications and gives a conclusion.

1） Or currency mismatch is sometimes referred to as a balance sheet effect.

2. Data Description

We carried out the survey on dollarization of enterprises from October 2014 to January 2015. In the survey, we collected data from a total of 856 enterprises from 25 provinces by interviewing managers of enterprises. We selected the sample at random from each stratum classified according to sizes and geographical distribution of enterprises, and in order to make strata, we followed actual enterprise distribution from the Economic Census 2011.[2] We defined the size classification based on the asset sizes of enterprises.[3] (1) Firms of which asset size are below 50,000USD are classified as micro enterpraises; (2) firms of which asset sizes are ranged fron 50,000USD are classified as small enterprises; (3) firms of which asset sizes are ranged from 250,000USD to 500,000USD are classified as madium-sized enterprises; (4) firms of which asset sizes are more than 500,000USD are classified as large enterprises. There are 204 large, 183 medium-sized, 251 small, and 218 micro enterprises, out of the total sample of 856 firms.[4]

In the interview, managers were asked questions relating to (1) the financial condition, currency-wise, of enterprises at the end of 2013, (2) the currency choice in price quotations, (3) their own expectations of exchange rate changes, and (4) perceptions of behaviors of their competitors or government policy regarding currency usage.

Approximately 95 percent of the entire sample of enterprises were owned

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2) Data is available at the website of National Institute of Statistics. http://www.nis.gov.kh/index.php/en/

3) As an available source, the Small and Medium Enterprise Development Framework 2005 proposed a workable SME definition in terms of employment and assets excluding land. However, in our survey, the definition of firm sizes is only based on asset size, for the sake of simplicity.

4) Compared with the size distribution from the Economic Census 2011, our survey is slightly biased to the side of large enterprises, and to the side of enterprises in rural area. Therefore, when we interpret the results of analyses, it is worth noting that the whole sample is subject to the biases of such sample selection.

fully or mainly by Cambodian people. This result is in line with the Economic Census 2011 conducted by National Institute of Statistics. There were three industries that dominated more than 80 percent of the entire sample. The top industry in the sample was the wholesale and retail trade sector, with a 42 percent share of the entire sample. The second largest industry was the manufacturing sector, and the third largest was the accommodation and food service sector. The shares of the second and third largest industry in the sample were 21 percent and 20 percent, respectively. Table 2 highlights the sample sizes by areas. Because of the difference in the size of economic activities, the sample sizes varied across regions.

To make a comparison with other data source, we present the sample distributions in industrial categories of the Economic Census 2011. This data was

Table 1: Numbers of Sample by Industries

Enterprise classification	Freq.	Percent
1 Agriculture, forestry and fishing	7	1%
2 Mining and quarrying	0	0%
3 Manufacturing	178	21%
4 Electricity, gas, steam and air conditioning supply	1	0%
5 Water supply; sewerage, waste management and remediation activities	4	0%
6 Construction	5	1%
7 Wholesale and retail trade; repair of motor vehicles and motorcycles	359	42%
8 Transportation and storage	10	1%
9 Accommodation and food service activities	170	20%
10 Information and communication	13	2%
11 Financial and insurance activities	1	0%
12 Real estate activities	5	1%
13 Professional, scientific and technical activities	9	1%
14 Administrative and support service activities	14	2%
15 Public administration and defence; compulsory social security	0	0%
16 Education	42	5%
17 Human health and social work activities	7	1%
18 Arts, entertainment and recreation	15	2%
33 Other service activities	16	2%
Total	856	100%

collected in 2010, and all of business entities operating in Cambodia were captured. Compared to this data source, the sample distribution of our dataset in industries is similar, although there are slight differences in percentages of each industry. The most frequent industry is wholesale and retail trade, and the second and the third largest ones are manufacturing and accommodations, respec-

Table 2: Numbers of Sample by Areas

Area	Freq.	Percent
Phnom Penh	182	21%
Siem Reap	61	7%
North-West Area	64	7%
North-East Area	49	6%
Central Area	189	22%
South-West Area	136	16%
South-East Area	175	20%
Total	856	100%

Table 3: Distribution of industries in Economic Census 2011

Enterprise classification in Economic Census	Freq.	Percent
Mining and quarrying	179	0%
Manufacturing	71,416	14%
Electricity, gas, steam and air conditioning supply	4,607	1%
Water supply; sewerage, waste management and remediation activities	461	0%
Construction	188	0%
Wholesale and retail trade; repair of motor vehicles and motorcycles	292,350	58%
Transportation and storage	1,557	0%
Accommodation and food service activities	69,662	14%
Information and communication	4,711	1%
Financial and insurance activities	3,584	1%
Real estate activities	120	0%
Professional, scientific and technical activities	957	0%
Administrative and support service activities	6,023	1%
Education	9,874	2%
Human health and social work activities	4,885	1%
Arts, entertainment and recreation	1,780	0%
Other service activities	32,780	6%
Total	505,134	100

tively, both in our sample and Economic Census 2011. We can confirm that our dataset is not severely biased in terms of the industrial distribution, compared to the Economic Census 2011.

Due to space constraints, we have not provided here all the responses to our entire questionnaire and questions in detail. We highlight some of results to draw meaningful policy implications for strategies of de-dollarization in the next section.

3. Results of Survey

3.1 Currency usage in Operation

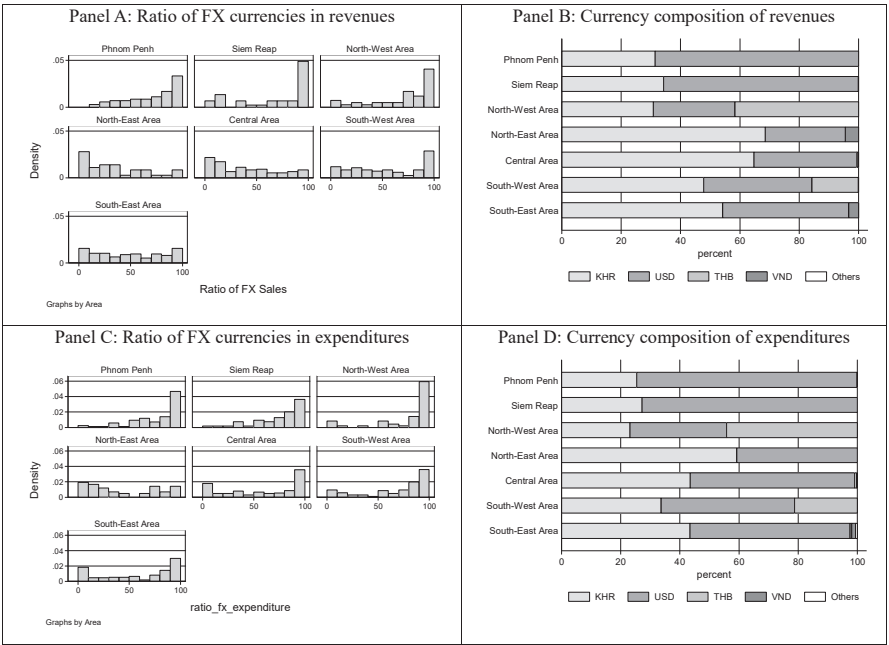
First, we investigated geographical differences in the dollarization of revenues and expenditures. We divided our sample into seven regions: (1) Phnom Penh; (2) Siem Reap; (3) the Northeast Area; (4) the Northwest Area; (5) the Central Area; (6) the Southeast Area; and (7) the Southwest Area.[5] We summarized the results in Figure 1. In Panel A and Panel C of Figure 1, we estimated the distribution of the usage of FX currency in revenues and expenditures by regions. We found that there were differences in the distribution of the ratio of FX currencies among regions. In Phnom Penh, Siem Reap, and the North-West Area, the distributions were biased to right-hand side, and most of samples were concentrated at the 90-100 percent interval. Those results mean that most firms in these areas made their revenues mainly in USD. On the other hand, the distributions in other regions were thicker and flat, and the samples were clustered both near 0 percent and near 100 percent. This might suggest that samples in those regions were generated from the combination of two different

5) The Northeast Area includes Kratie, Modul Kiri, Ratanak Kiri, and Stung Treng. The Northwest Area includes Banteay Meanchey, Otdar Meanchey, and Preah Vihear. Central Area includes Kampong Cham, Kampong Chhnang, Kampong Speu, Kampong Thom, and Kandal. The Southeast Area includes Kampot, Kep, Prey Veng, Svay Rieng, Takeo, and Tboung Khmum. The Southwest Area includes Koh Kong, Preah Sihanouk, Pursat, Battambang and Pailin.

distributions. In other words, there might be two types of enterprises: those mainly using KHR in their operation, and those mainly using FX currencies.

We also found that the distributions of the ratio of FX currencies in revenues and expenditures were similar to each other, except for in the Central Area, where the distribution was inclined to the right-hand side in revenues (which means that more firms are dollarized in revenues), while the distribution in

Figure 1: Usage of FX currencies by areas



Panel E: Average of Shares of FX Currencies in Revenues and Expenditures

Area	Revenues	Expenditures
Phnom Penh	69%	75%
Siem Reap	66%	73%
North-West Area	69%	77%
North-East Area	31%	41%
Central Area	35%	56%
South-West Area	52%	66%
South-East Area	46%	57%

expenditures is inclined to the left-hand side (indicating that firms are less dollarized in expenditures). Interestingly, there were huge variations in the usage of FX currencies even within regions, suggesting that there are possibly other factors driving firms to use FX currencies, apart from geographical factors.

Next, we estimated the average currency compositions of revenues and expenditures by regions. To do so, we calculated shares of each currency in revenues and expenditures within enterprises, and then calculated the average of shares of each currency in each region.[6] Panel B and Panel D in Figure 1 show the results. Overall, we found that enterprises on average had more FX currencies in their expenditures than revenues, and we observed the same result in every region. Next, there were differences in the extent of dollarization among regions: while we found that Phnom Penh, Siem Reap, and the North-West Area were dollarized more than 65 percent in both revenues and expenditures, in the Central Area, there was a gap between the currency composition of revenues and expenditures. Specifically, the expenditure sides of those regions were highly dollarized (56 percent), while the dollarization of the revenue sides was weak (35 percent). The North-East Area showed the relatively low extent of dollarization in both revenues and expenditures (31 and 41 percent, respectively).

Furthermore, we found that there were varieties of currencies used in operations aside from KHR and USD, particularly in the areas close to borders. In the North-East, North-West, and South-East Area, THB and VND were used in the operations as commonly as KHR and USD, though VND was less likely to be used in the expenditure side than in the revenue side.

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6) In other words, we calculated the weighted average of shares of currency in total revenue and expenditures with total revenue and expenditures. Since the difference in asset size between large and small enterprises are large in our sample, simple aggregation represents merely behaviors of large enterprises. Therefore, we adapted weighted averages in this section. Apart from this method, we also calculated the aggregated amounts of revenue. This method rather focuses on large enterprises than small enterprises. The results are available on request.

In Figure 2, we depicted the geographical distribution of dollarization in revenues and expenditures. We categorized the extent of dollarization into three levels, and used different colors for each level: (1) 0-33 percent, (2) 34-66 percent, and (3) 67-100 percent. We confirmed the same trend as is shown in Figure 1. In addition, we found that economically active areas such Phnom Penh, Banteay Meanchey, Sihanoukville, and Kep are heavily dollarized both in revenues and expenditures.

Next, to investigate the difference among enterprises of different sizes, we divided the sample into four categories by size: (1) large, (2) medium-sized, (3) small, and (4) micro enterprises. The results of the distribution of the ratio of FX currencies in revenues and expenditures, and average currency compositions of revenues and expenditures are shown in Figure 3. First, we found that, on the revenue side, a lot of enterprises were concentrated in the interval of 90-100 percent, while the distributions of other classes were thicker and flatter (Panel A). The currency composition of revenues of large enterprises was mostly dominated by FX currencies, particularly by USD. In addition, there was a clear trend showing the shares of FX currencies decreasing as the firm size becomes smaller (Panel B).

We found that there were differences in the usage of FX currencies between the revenue and expenditure sides. Compared to the revenue sides, the distributions in expenditures tended to be polarized to both the left- and right-hand sides in every size category (Panel A and Panel C of Figure 3). This might mean that enterprises tend to use one currency on the expenditure sides, while they receive multiple currencies on the revenue sides. In addition, in the case of small and micro enterprises, there were wide gaps between the currency compositions of revenues and expenditures. These firms had larger shares of FX currencies in the expenditure sides than revenue sides. (Panel B and Panel D). Those results might suggest that micro and small enterprises are likely to be more burdened with the risk of exchange rate changes than large- and

Figure 2: Geographical distribution of dollarization

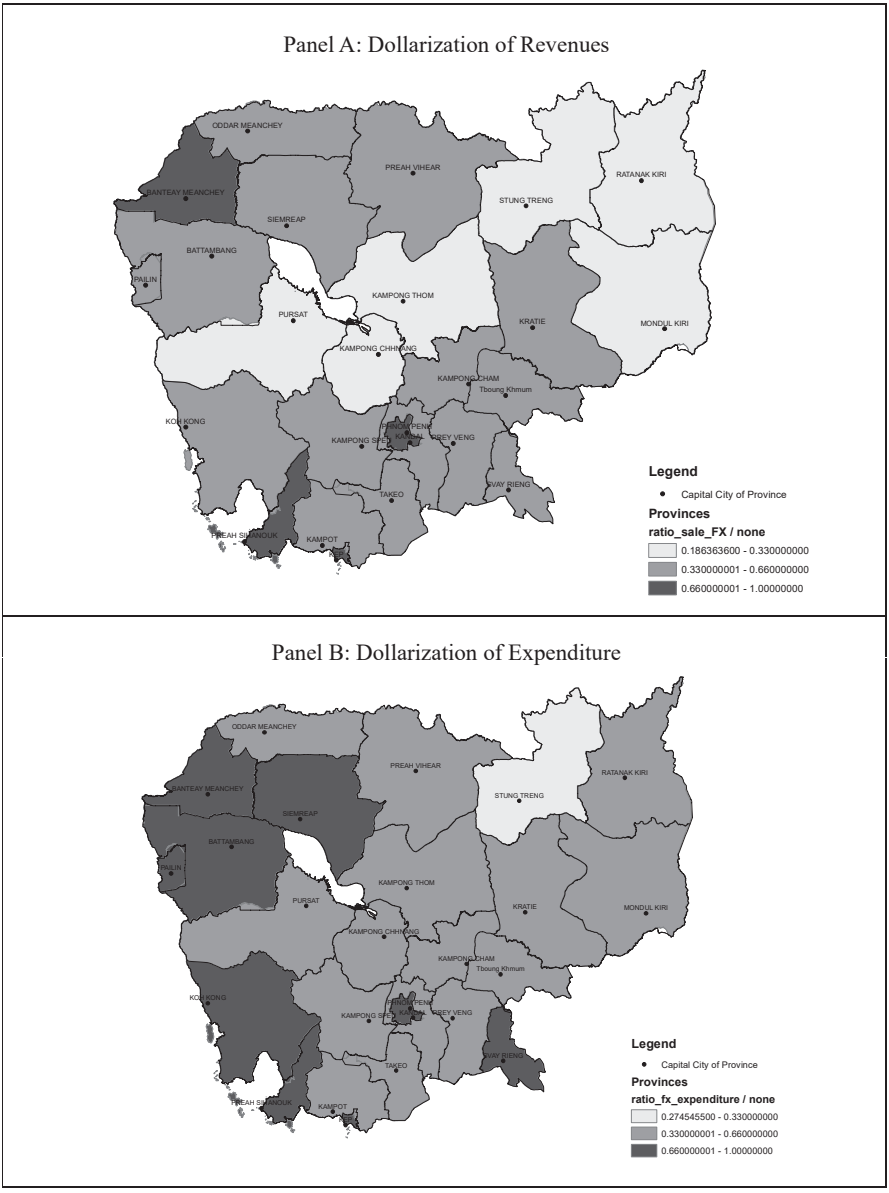
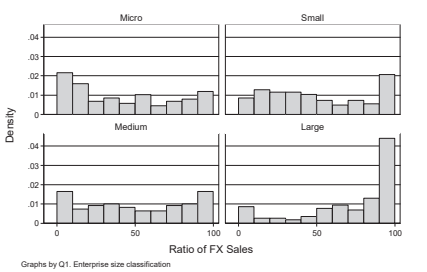
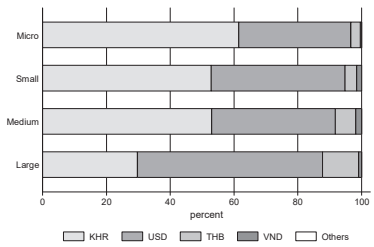
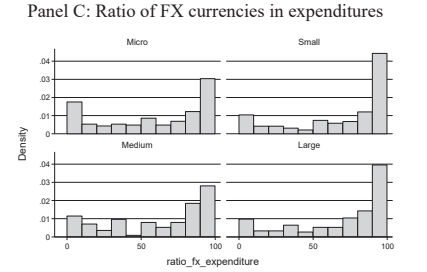
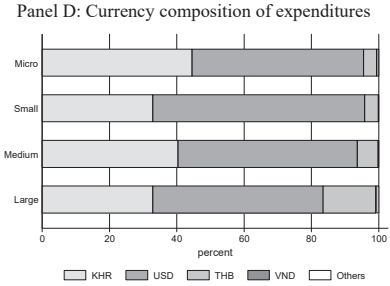


Figure 3: Usage of FX currencies by size









Panel E: Average of Shares of FX Currencies by Firm Sizes

	Revenues	Expenditures
Micro	39%	55%
Small	47%	67%
Medium	47%	60%
Large	70%	67%

medium-sized enterprises. As well as regional differences, there were huge variations even within groups (Panel A and Panel C), suggesting that there were possibly other important factors which drive enterprises to use FX currencies apart from firm sizes.

It is expected that dollarization levels differ from one industry to another due to the differences in business connections and dependence on external funds. To investigate the differences across types of businesses, we divided the sam-

ple into 5 categories: (1) agriculture, (2) manufacturing, (3) wholesale and retail trade, (4) tourism, and (5) others.[7] In our sample, there were only seven enterprises categorized in the Agriculture sector. Thus, it is difficult to draw a statistically accurate inference about this sector. Therefore, we focus on the other four sectors.

In the manufacturing sector, if we take a look at the average currency compositions, there is no wide gap between revenues and expenditures, though in the revenue and expenditure sides, there were possibly two clusters in the distribution of the sector (Panel A and Panel C of Figure 4). This suggests that there are two different groups of manufacturing using FX currencies, with one group mainly using KHR currency, while another mostly uses USD currency.

In the wholesale and retail trade sector, the use of FX currencies differs between the revenue and expenditure sides. In the revenue side of the wholesale and retail trade sector, the distributions of the ratio of FX currencies was flat, while those on the expenditure side are concentrated on a right-hand side, especially in the interval of 90-100 percent (Panel A and Panel C of Figure 4). Furthermore, in this sector, the currency composition of revenues and expenditures are different from each other (Panel B and Panel D of Figure 4). In particular, although the dollarization of revenues is low (46 percent are in FX currencies), the expenditure sides are highly dollarized (71 percent are in FX currencies). The results indicate that the wholesale and retail trade sector needs to manage to convert KHR to USD in their operation. Presumably, the wholesale and retail trade sector in general purchases large amounts of goods at once, and sells them to many consumers. Therefore, they likely have a currency mismatch between revenues and expenditures.

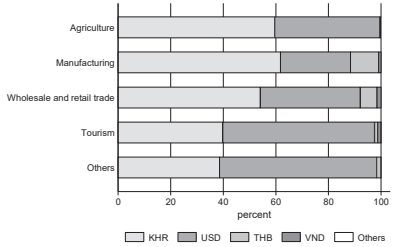
7） The agricultural sector includes (1) agriculture, forestry, and fishing sectors and (2) mining. The Manufacturing sector includes (3) manufacturing. The wholesale and retail sector includes (4) wholesale and retail trades. The tourism sector includes (5) transportation and storage and (6) accommodation and food service activities. Others includes all the other categories.

The tourism sector was highly dollarized both in revenues and expenditures, with the FX currency ratios were more than 50 percent on both sides. This might be because their main targets are foreigners, and they pay wages in the currency they receive.

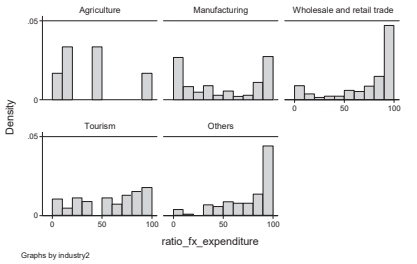
Figure 4: Usage of FX currencies by business types

Panel A: Ratio of FX currencies in revenues

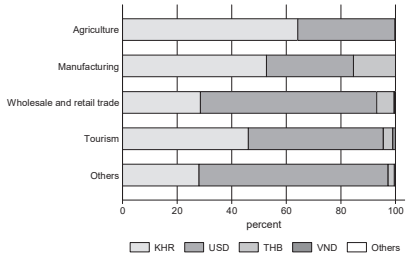
Panel B: Currency composition of revenues



Panel C: Ratio of FX currencies in expenditures



Panel D: Currency composition of expenditures



Panel E: Average of Shares of FX Currencies by Industries

	Revenues	Expenditures
Agriculture	40%	36%
Manufacturing	38%	47%
Wholesale and retail	46%	71%
Tourism	60%	54%
Others	61%	72%

Note: The sample size of each category is as follow: 7 for the agricultural sector, 178 for the manufacturing sector, 359 for wholesale and retail sector, 180 for tourism, 132 for others.

3.2 Price Quotation

Focusing on price setting, each currency has its own role based on geographical differentiation (Table 4) . Most entrepreneurs tend to set prices of their goods and services either only in USD, only in KHR, or in a mix of the two. Among the seven regions, we found that more enterprises located in Phnom Penh and Siem Reap set prices to sell their goods and services in one currency (USD), followed by those that used a combination of KHR and USD, while the remaining small proportion used only KHR. The combination of KHR and THB was used by entrepreneurs in North-West and South-West Areas where cross-border trading with Thailand exists. It is noted that VND is rarely set for pricing, by only a very small portion of enterprises in the South-East Area. Additionally, KHR plays a very important role in terms of price setting in the Central, North-East, South-East and South-West Areas.

To promote price setting in KHR, it is helpful to make clear what factors are behind the price setting in FX and KHR. To do so, we identified the main

Table 4: Price Quotations in Each Currency Combiation

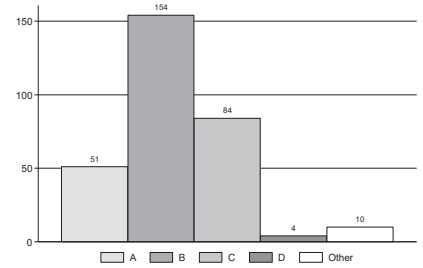
	Phnom Penh	Siem reap	North-west area	North-east area	Central area	South-west area	South-east area
Only KHR	6	4	5	16	66	22	77
Only USD	121	38	9	9	46	35	48
Only THB	-	-	9	-	-	12	-
Only VND	-	-	-	1	-	-	2
KHR & USD	55	18	14	22	77	43	61
USD & THB	-	-	14	-	-	15	-
KHR & THB	-	-	13	-	-	7	4
USD & VND	-	-	-	-	-	-	1
KHR & VND	-	-	-	-	-	-	1
THB & VND	-	-	-	-	-	-	-
Total number of firms	182	61	64	49	189	136	175
Number of firms using KHR	61	22	32	38	143	72	143
Number of firms using USD	176	56	37	31	123	93	110
Number of firms using THB	-	-	36	-	-	34	4
Number of firms using VND	-	-	-	1	-	-	4

reasons entrepreneurs set certain currencies for pricing, which are depicted in Figure 5. The main reasons enterprises price their products and services in a certain currency are their customers' compliance and convenience. Those enterprises that set prices only in KHR do so because most of their clients use KHR for payments, and it also seems easier for entrepreneurs to measure prices in KHR (Panel A). The main reason to set prices in a foreign currency is that it is easier for enterprises to measure prices, and also because they follow the currency used in the payment of input materials and workers' wages (Panel B). In addition, most enterprises that set prices both in FX and KHR currencies base their pricing decisions on what their customers want to use to pay (Panel C). From those findings above, we can conclude that pricing decisions are determined by both demand-side (customers) and supply-side (enterprises) factors. This means that a larger share of FX (KHR) currency in the currency composition of their expenditures makes them set prices in FX (KHR), while they are also following their clients' or customers' needs to pay in a certain currency. The mechanism behind price quotations seems complex, and accounting standards, modern side of products, and price comparisons are not really determinants of price quotations. Need to describe what questions were asked.

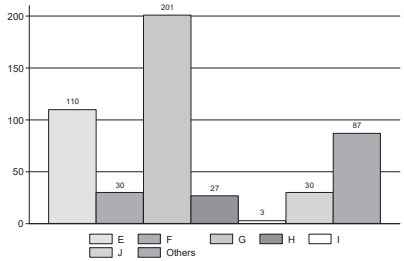
Although there are several currencies used in price quotations, the majority of enterprises responded positively to a hypothetical question "if the pricing of goods and services had to be conducted in KHR, what would be your reaction from a business perspective?". Only 16 firms answered "Not at all acceptable". This positive reaction to the question might be a good sign for the promotion of the use of local currency. Next, we asked the firm about the questions of what is a factor to make them use more KHR. We find there are three possible factors that enterprises would voluntarily change fees for goods and services to KHR: Firms would use more KHR if (1) the majority of competitors change their pricing to KHR (70% of firms answered Yes), (2) more customers request KHR billing (80%), and (3) exchange rate is more stable (70%).

Figure 5: Reasons for Pricing the currency.

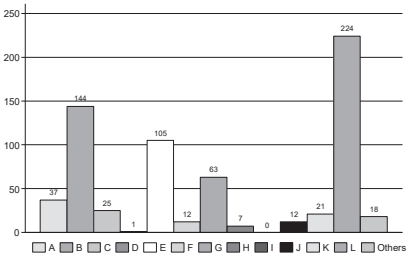
Panel A: Reasons for pricing only in KHR



Panel B: Reasons for pricing only in USD



Panel C: Reason for pricing both in KHR & USD



Note:

Reasons for pricing only in KHR

A: Most of my purchasing of raw materials is in local currency therefore I price in a local currency

B: Most of my customers use the KHR

C: Easier to measure price in KHR

D: My accounting is in local currency

Reasons for pricing only in USD

E: All my purchasing of raw materials is in a foreign currency therefore I price in a foreign currency

F: All products are exported and pricing in foreign currency is essential

G: Easier to measure prices in foreign currency

H: My accounting is in foreign currency

I: Price in foreign currency reflects modern side of the product

J: It protects clients/ buyers from foreign exchange loss

Reasons for pricing both in KHR and USD

K: I use any currency (combination) based on what currency my customer want to pay in

L: It makes easy for clients to compare prices and help them to make decision faster

Others

For those who set their prices in FX currencies, 75 percent of them answered that they would also accept payment in KHR; out of these, 26 percent answered that they would receive the payment in KHR if they imposed their own exchange rate, while 49 percent of them would accept if the market exchange rate was used.

3.3 Exchange rate

According to previous studies on enterprises' dollarization in other countries, risk-averse enterprises tend to hedge the risks of exchange rate changes in their operation (Brown et al., 2011; Kamil, 2012; Mora et al., 2014). In our survey, we asked enterprises about their predictions of future exchange rate values in six months, in one year, and in five years. The results are presented in Table 5 and Table 6. The majority of respondents (635 respondents, and 74% of total samples) answered "Don't know" even to the question of prediction of the future exchange rate in six months, which possibly means that only a small number of respondents understand exchange rate movement, and gave their predictions of future exchange rates.

The results suggest that the managers of enterprises might lack the knowl-

Table 5: The Prediction of the Future Exchange Rates (KHR/USD)

		In Six Months		In One Year		In Five Years	
		Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Don't Know		635	(74.2%)	776	(90.7%)	820	(95.8%)
$x \leq 4000$	(Appreciate)	60	(7.0%)	26	(3.0%)	18	(2.1%)
$4000 < x < 4100$	(Stable)	87	(10.2%)	21	(2.5%)	3	(0.4%)
$4100 \leq x$	(Depreciate)	74	(8.6%)	33	(3.9%)	15	(1.8%)

Note: The exchange rate of KHR to USD was 4076 KHR/USD at the end of October, 2014, and it was 4060 KHR/USD at the end of January, 2015.

Table 6: The Prediction of the Future Exchange Rates (THB/USD)

		In Six Months		In One Year		In Five Years	
		Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Don't Know		818	(95.6%)	843	(98.5%)	852	(99.5%)
$x \leq 32$	(Appreciate)	24	(2.8%)	9	(1.1%)	3	(0.1%)
$32 < x < 34$	(Stable)	12	(1.4%)	3	(0.4%)	1	(0.4%)
$34 \leq x$	(Depreciate)	2	(0.2%)	1	(0.1%)	0	(0.0%)

Note: The exchange rate of THB to USD was 32.73 THB/USD at the end of October, 2014, and it was 32.61 THB/USD at the end of January, 2015.

edge of the exchange rate movement, or the exchange rate movement might be highly uncertain. Either way, those problems pose the risks on the management of enterprises in a highly dollarized economy. To address this, NBC as a policy maker should strengthen its communications to the public regarding its exchange rate policy in addition to publicizing the daily official exchange rate.

When we look at the predicted values, out of 221 who answered the predicted values, 87 respondents (10.2%) expected that the exchange rate would vary between 4000-4100 KHR/USD, and 60 respondents (7%) answered no more than 4000 KHR/USD, and 74 respondents (8.6%) answered no less than 4100 KHR/USD. The exchange rate of KHR to USD was 4076 KHR/USD at the end of October, 2014, and it was 4060 KHR/USD at the end of January, 2015. Given the actual exchange rate values in the observed period, we do not find clear tendency for enterprise managers to predict the future exchange rate values.

Furthermore, respondents were more likely to answer "Don't know" to a question regarding the exchange rate of THB to USD (Table 6). This might reflect that usage of THB is not common and that enterprises do not care about the future exchange rate of THB/USD.

We assessed how many enterprises recognize the exchange rate risks in their business. Table 7 shows the results of the question "if your business is exposed to a foreign exchange risk, how is a risk to your business?" As a result,

Table 7: How much is the exchange rate risk to your business

	Freq.	Percent.
Not at all a risk	434	51%
A slight risk	263	31%
A moderate risk	99	12%
A high risk	45	5%
A very high risk	4	0%

Note: This table shows the results of the question "if your business is exposed to a foreign exchange risk, how is a risk to your business?"

most respondents answered that they were not exposed to the exchange rate risks (51%). Even though the respondents answered that they were exposed to the risks, most of them recognized only a slight risk. Furthermore, in the survey, respondents were asked how they mitigated the exchange rate risks. We present the results of the question in Table 8. First, we find that the number of answers to each question is low, suggesting that most of respondents do not take any strategies to mitigate exchange rate risks. Out of the respondents who answered this question, common strategies are accepting only a single currency (33 answers) and adding mark-up (39 answers). In all, we find that the awareness and the engagement in risk-hedging are low for the Cambodian enterprises.

3.4 Borrowing Behaviors and Currency Mismatches

We investigated the role of foreign currencies and local currency in the financing behaviors of enterprises. In the survey, managers of enterprises were interviewed about their outstanding loans. Specifically, they were asked about the interest rates, maturity, and initial amounts of their loans, the currency in

Table 8: The strategies to mitigate the foreign exchange risks

	Freq.
I negotiate the exchange rate in advance with a bank, MFI, or money changer	7
I accept all payment in a single currency	33
I reserve sufficient amount of currencies	26
Other	111
Set own exchange rate	21
Use market exchange rate	20
Add mark-up	39

Note: This table shows the results of the question "What do you do to mitigate the impact of currency exchange risks? (Select only 2)." While there are many minor answers to details of "Others", we only present the main answers regarding the details of "Others".

which the loan was made, and who the lender is. The previous literature of dollarization has argued that firms with FX incomes, such as exporters, borrow FX loans in order to hedge the risk of exchange rate changes (Jeanne, 2000, 2005). Brown et al. (2011) and Mora et al. (2014) show empirical evidence that firms' FX currency borrowing can be explained by hedging purposes. In this section, we uncover how Cambodian enterprises manage to finance their operations and projects, and who borrows FX loans.

First, we look into incidence of borrowing by Cambodian enterprises. We found that out of 856 enterprises interviewed in the survey, 223 enterprises had a loan at the time the interviews were carried out. We found that some enterprises had more than one loan, and there was a total of 237 loans in our dataset. To assess what kinds of firms have access to loans, we focused on whether firms had loans or not. As we did in the previous section, we divided the sample into four sectors: (1) agriculture, (2) manufacturing, (3) wholesale and retail trade, (4) tourism, and (5) others. Table 9 shows the frequency of firms having a loan by sector. We found that the manufacturing sector was more likely to finance their assets through the external finance, while the agricultural sector and the wholesale and retail trade sector also tend to borrow money. Comparisons of the incidences of loans held by large and small enterprises reveal no difference between large and small enterprises. Table 9 also shows the regional differences in whether or not enterprises had loans. Surprisingly, we found that enterprises in Phnom Penh were less dependent on loans than those in other regions. A possible explanation of this may be that since Phnom Penh is the most prosperous area, firms benefit from higher economic growth and are therefore likely to finance their business through internal funds, such as profits.[8] There might be another possible explanation. Since the survey seems not to capture trade credit as external finance, it is possible that enterprises in Phnom Penh borrowed from

8） Not sure where this footnote is?

Table 9: Numbers/Percentages of Enterprises Having Access to Loans

	(1) Having loans	(2) All sample	(3) Percentages (=1/2)	(4) Debt/Assets	(5) Bank Loans/Debt	(6) Average Amounts of Debt
Industrial categories						
Agriculture	2	7	29%	40%	100%	40,000
Manufacturing	69	178	39%	24%	84%	331,201
Wholesale and retail trade	113	359	31%	41%	63%	34,499
Tourism	20	180	11%	29%	50%	26,763
Others	19	132	14%	21%	58%	76,167
Size crassifications						
Micro	48	218	22%	64%	46%	10,587
Small	75	251	30%	27%	63%	25,917
Medium	47	183	26%	19%	85%	59,597
Large	56	204	27%	22%	89%	486,906
Regions						
Phnom Penh	22	182	12%	55%	36%	81,927
Siem Reap	16	61	26%	37%	50%	36,738
North-West Area	20	64	31%	21%	71%	59,714
North-East Area	12	49	24%	39%	71%	29,571
Central Area	60	189	32%	19%	63%	35,427
South-West Area	41	136	30%	24%	80%	455,588
South-East Area	52	175	30%	52%	75%	90,167

other firms as trade credit, and our results underestimate the debt dependency of firms. Because the institutional environment is better than other areas in Phnom Penh, then such better social capital, such as wide network of firms, better law enforcement, and higher business literacy, enables firms to rely on trade credits, and thus appear to be low dependency in Table 9.

Table 9 also shows the debt-to-asset ratio, shares of bank loans in total loans, and the average amount of loans per firm. It is noteworthy that shares of bank loans out of total loans were high (more than 50 percent) on the whole, even though the incidences of borrowing and debt-to-asset ratios were low. Furthermore, the shares of bank loans out of total debt seem different among types of firms: The manufacturing sector had the highest share of bank loans and exhib-

ited the largest average amount of debts, while the wholesale and retail trade sector had the highest debt-to-assets ratio among industries. Firm sizes also might affect the dependence on external funds and access to bank loans. The results imply that smaller firms are likely to rely on other sources of funds than banks, and are less likely to access bank loans. Looking at regional differences, the debt-to-asset ratio of firms in Phnom Penh was high, while shares of bank loans were relatively low.

Table 10 shows the firm's currency choice in loans by lenders. Surprisingly, almost all loans were made in USD. In particular, loans from formal financial institutions, such as commercial banks and microfinance institutions were all in USD. Furthermore, we assessed which currency the Cambodian enterprises with foreign currency loans were using in their operations using the question, "Which is the main currency in your operation?" and we summarized the result in Table 11. We found that 60 enterprises (about 27 percent of enterprises having loans) operated in KHR. This revealed that the Cambodian enterprises tended to borrow in a foreign currency although some of them operated in the local currency. This result differed from those found by previous studies on firms' foreign currency borrowing. Largely, previous studies have found that firms tend to avoid currency mismatch by borrowing foreign currency loans only if a large part of their incomes or assets are also in the foreign currency (Gelo, 2003; Allayannis et al., 2003; Aguiar, 2005; Brown et al., 2011; Mora et al., 2011; Kamil

Table 10: Choice of currency by lenders

	KHR	USD	Total
Commercial banks	0	172	172
Microfinance	0	19	19
Kinship Network	4	38	42
Informal Lenders	2	1	3
Others	0	1	1
Total	6	231	237

Table 11: Which currency does your company mainly use in operation?

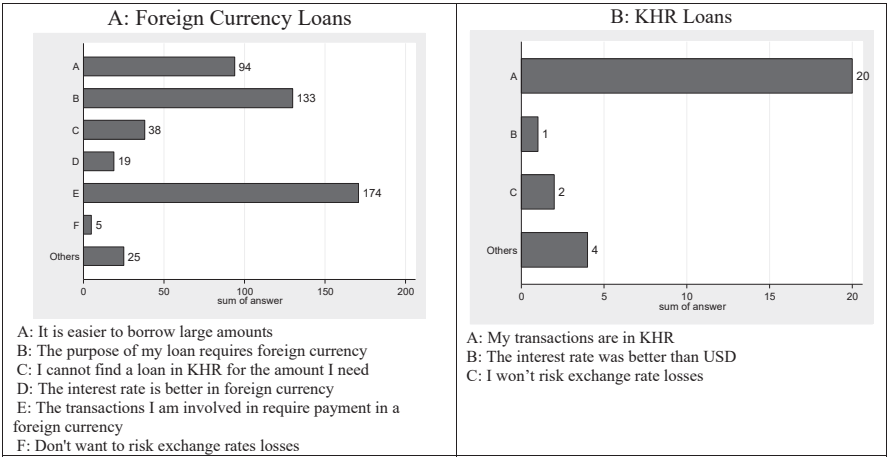
	Frequency
KHR	60
USD	126
Other currencies	15
N.A.	21
Don't Know	1
Total	223

et al., 2012). Our results may suggest the possibility that enterprises are obliged to borrow in a foreign currency due to the lack of a developed financial market in the local currency, which in turn means that some Cambodian enterprises, particularly enterprises which use the local currency as the main currency in their operations, could be exposed to the risk of currency mismatch between the currency in operation and their loans.[9] The results may seem to indicate that lenders, particularly commercial banks, pass these risks of currency mismatch onto Cambodian enterprises.

Figure 7 shows the frequencies of answers to the question "For those who borrowed a foreign currency loan, why did you borrow money in a foreign currency/KHR? (Select only two)." Only firms which have borrowed money in the past three years were asked this question. In our dataset, out of total of 856 firms, 353 firms have borrowed an FX loan in the past 3 years, and 24 firms have borrowed a KHR loan in the same period. For foreign currency borrowing, the most frequent answer was "transaction I was involved in requires payment in a foreign currency," and similarly the most frequent answer for KHR borrowing was, "My transactions are in KHR." The results might indicate that

9) This situation could be harmful for economic development. The literature of currency mismatch suggests that investment rates, as a measure of firm performance, could deteriorate when the exchange rate is volatile (Carraza et al., 2003; Cowan, 2006).

Figure 7: The reasons to choose the currency in borrowings.



Note: This figure shows the frequencies of answers to the question "For those who borrowed a foreign currency loan, why did you borrow money in a foreign currency/KHR? (Select only two)." Out of total of 856 firms, 353 firms have borrowed an FX loan in the past 3 years, and 24 firms have borrowed a KHR loan in the same period.

firms seem to choose a currency for loans that matches the currency composition of their payments. Incidents of the answer "I don't want to risk exchange rate losses" were low, with only 5 answers for foreign currency borrowing and 2 for KHR borrowing. Therefore, it is likely that the Cambodian firms do not care about their exchange rate risks relating to the currency mismatch in their liabilities and income stream or assets. These results might be an indication that Cambodian firms were vulnerable to sudden changes in the exchange rate.

3.5 Currency mismatch between revenues and expenditures

As seen earlier, Cambodian enterprises are likely to borrow in an FX currency even if their incomes are in KHR. This means that Cambodian enterprises with KHR income take risks relating to their balance sheets when borrowing.

In this section, we further assess the currency mismatch between inflows

and outflows in enterprises' operations. Not only did Cambodian enterprises have income in an FX currency, but they also used an FX currency in their expenditures even in provincial areas. We assessed how Cambodian enterprises manage flows of their FX and KHR currencies in their operation, using the following measure that we constructed.

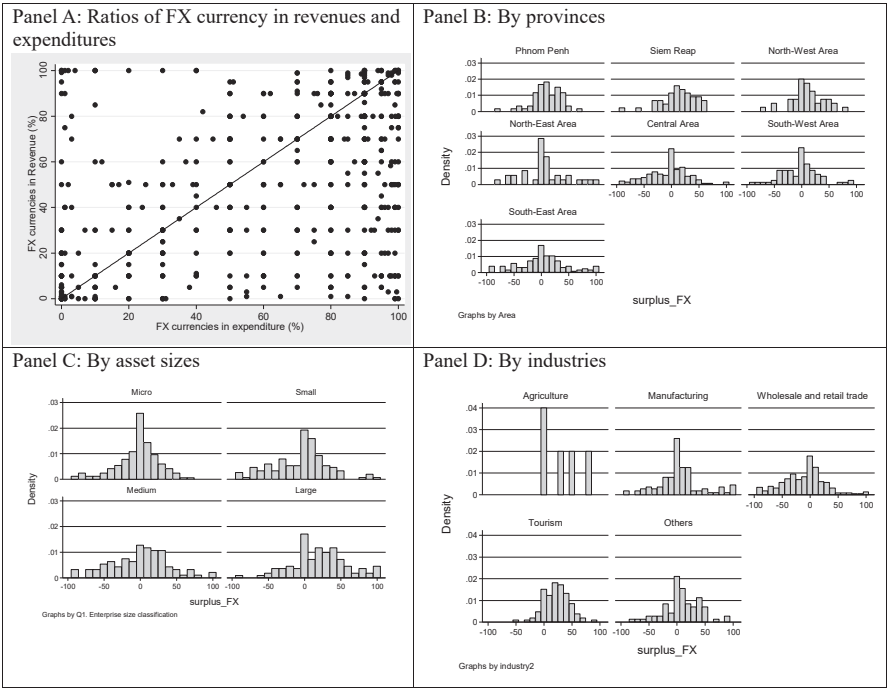
$$Surplus\ of\ FX\ currency_i\ (\%) = \frac{Sales\ in\ FX_i - Expenditure\ in\ FX_i}{Total\ Sales_i} * 100$$

where subscript i represents the individual enterprises. This measure shows the excess FX currency by subtracting the amount of expenditures in the FX currency from the amount of sales in the FX currency, and the measure is then normalized by total sales. This measure is supposed to capture the extent of the mismatch in currency composition between sales and expenditures. A result of zero indicates that the enterprise has no mismatch between their inflow and outflow of the FX currency, whereas a result greater than zero means that the enterprise has a surplus in the FX currency. Further, a result of less than zero means that the enterprise is short on the FX currency.

We summarized the results of currency mismatch in Figure 8. In Panel A, we plotted the ratio between revenues and expenditures of the FX currency, and the figure might suggest that many enterprises had mismatches in the currency composition of their revenues and expenditures. Furthermore, there were enterprises for which the currency compositions of revenues in operation were completely different from that of expenditures.

We further investigated the mismatches in FX currency usage using the measure above. In Panel B, Panel C, and Panel D, we divided the sample by regions, asset sizes, and industries, as we have done in earlier sections, and made histograms by groups to capture the differences among enterprises. In the calculation, we removed samples that took less than negative 100 percent since those enterprises which experience deficit in their operation, and those might

Figure 8: Currency Mismatch in Operation



Note: In Panel B, Panel C, and Panel D, we divided sample by regions, asset sizes, and industries, as we did in earlier sections, and made histograms to capture the trend by each group. In histograms, we set the width of intervals at 10. In the calculation, we removed samples that took less than negative 100%.

be unlikely to operate rationally.[10)]

In Phnom Penh and Siem Reap, both areas where tourism thrives, the distributions of the surplus of FX currency were largely located on the right-hand side (Panel B). On the other hand, in other areas, the distributions were thicker and show larger variance than those from Phnom Penh and Siem Reap, suggesting that enterprises are more likely to face currency mismatches in rural

10） Six enterprises had less than -100 in our measure of surplus of FX currency.

areas. In other words, inflows and outflows of FX currency might be unstable in rural areas.

We also found that there were differences in the patterns of inflows and outflows of FX currency when enterprises were divided by asset sizes (Panel C). Compared to micro, small, and medium-sized enterprises, larger fragments of the distribution of large enterprises were located on right-hand side of graph, suggesting that large enterprises are likely to have a surplus of FX currency.

Finally, when dividing enterprises by industrial categories, we found clear differences in the distribution of surplus FX currency (Panel D). In particular, in the wholesale and retail trade sector, most enterprises showed negative values in the surplus of FX currency, meaning that the enterprises faced shortages of FX currency. This might be because the enterprises in the sector generally buy products in FX currency, sometimes from abroad and sell them at local markets in KHR.

4. Conclusion and Policy Implications

Although Cambodia has been heavily dollarized for decades, there has been no empirical analysis of Cambodian enterprises regarding dollarization. Our study first investigated the actual situation of enterprises in the multi-currency-circulating environments using survey-based data which was collected under the joint-project of JICA and NBC.

Although prior studies on dollarization mainly focused on FX currency in loans, we analyzed FX currency usage of enterprises from various aspects: revenues, expenditures, price quotations, and debts. We also investigated those enterprises' conditions by regions, industries, and firm sizes. In addition to financial conditions, we further examined the perceptions of managers of enterprises regarding expectations of exchange rate changes, competitors' behaviors, and government policy relating to currency.

As results of our analyses, we found that not only loans, but revenues, ex-

penditures and price quotations are also highly dollarized in Cambodian firms. In addition, the extents of dollarization vary across regions, firm size and industries. We also found that most of borrowings are denominated in USD. Even firms which use local currency in their operations borrow in USD. Furthermore, we found a wide gap in the currency composition of revenues and expenditures for enterprises operating in the central area, and also for firms of small sizes, or for those classified into the wholesale and retail trade sector. Finally, even though a lot of enterprises deal with multiple currencies in their operations, most of them do not recognize the risk of exchange rate changes and do not have hedging strategies.

Furthermore, we found that there are a lot of enterprises reporting more than 50 percent of their revenues and expenditures in FX currency, suggesting that enterprises used more FX in their operations than households. [11] Given that the financial system in Cambodia is still immature, the current financial dollarization has been possibly driven and widely spread by enterprises.

From the findings above, we can draw several important implications for policy making regarding de-dollarization in the enterprise sector. First, while most of transactions are in an FX currency in Phnom Penh, there are wide usages of KHR currency in firms' operations in rural areas, and some firms in some areas are exposed to potential risks of currency mismatch between revenues and borrowings, and between revenues and expenditures. We found that a lot of firms had either a surplus or shortage of FX currency, meaning that they are required to convert currency to meet different currency compositions between revenues and expenditures. Furthermore, even firms that mainly used local currency borrowed FX loans from financial institutions. Accordingly, most Cambodian enterprises are likely to be exposed to potential risks of currency mismatches. Especially in the Central Area, enterprises of small sizes, or those

11） See Odajima (2016).

classified as part of the wholesale and retail trade sector, potentially have a risk of exchange rate changes as part of their operations due to the mismatch in the currency composition between revenues and expenditures. This implies that they are likely to exchange money, especially KHR to USD in their operations. It could incur exchange rate risks on the operations of micro and small enterprises.

Second, there seem to be potential demands for local currency loans, especially bank loans. Even though most firms answered that they had only FX currency loans, some firms with FX loans were operating using the local currency as their main currency (as seen in 3.4). However, the local currency loans are currently not available in almost all commercial banks. Even though a few banks extend local currency loans for corporates, the loan provisions are inactive and rare. Thus, firms can't easily raise large funds in local currency. This result might indicate the market imperfection is the cause of loan dollarization. Specifically, the local currency loan market is shallow and firms cannot find out the external funding sources in local currency. Therefore, it might be effective to encourage banks to make local currency loans available and also to facilitate local currency loan provisions for those firms operating in local currency.

Third, governments should encourage firms to recognize the risks of exchange rates. We also assessed how firms manage the risk of currency mismatch in their operations. Most firms do not seem to care about the currency mismatch risk in their operation (as shown in 3.3 and 3.4), probably because of long-lasting stable exchange rates. Since de-dollarization can more or less have a negative impact on uncertainty, such as increase in exchange rate volatility, the firms lacking an awareness of exchange rate risk can be damaged during the process of de-dollarization. Thus, some policy measures, such as introducing hedging instruments, should be taken before implementing de-dollarization.

Our findings shed light on the strategies of de-dollarization in Cambodia. The de-dollarization process could possibly be accompanied by risks of exchange

rate changes, which in turn could damage enterprises that do not prepare for risks. As dollarization has pros and cons for the Cambodian economy, de-dollarization might also have disadvantages. Governments should take steps to reduce the damages during the process. Our findings may provide insights into those sector and enterprises that are dollarized and thus face potential risks in dollarization or during the de-dollarization process.

However, we are aware of several limitations on our study. Since our data does not capture a sufficient number of sample of enterprises with local currency loans, we could not analyze behaviors related to currency choices for loans, as the previous studies have done. Currency mismatches in assets and liabilities are one of the largest sources of risks, and the purposes of risk-hedging against them might be a significant factor behind the currency choice in loans for enterprises. In our study, it is still unclear why Cambodian enterprises take out FX currency loans even though their revenues are in the local currency. In this regard, a future study should explore the factors behind the currency choice of expenditures and loans, by using empirical models. In addition, the information of liabilities is not sufficient for the comprehensive analysis on firm's borrowing, since the dataset does not cover whether firms rely on the trade credits between firms. Thus, the design of the next survey on enterprises should aim at capturing more information of firm's liabilities. Furthermore, as we found in this study, firms with potential demand for local currency loans could be screened out by financial institutions, due to low capability of lending to low transparent firms. Therefore, the future study need to take into account those firms with potential demand for local currency loans, and estimate the demand function for local currency loans.

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