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Payment Dollarization and Foreign Exchange Market Development in Cambodia: The Role of Money Changers

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Abstract

Cambodia's foreign exchange market is cash-based, overshadowed by the retail transactions of money changers. Based on the original dataset of the enterprise survey on uses of currency exchange services, we elucidate the structure of the foreign exchange market and investigate how payment dollarization is related to the prosperity of money changers. The empirical evidence indicates that firms in the domestic business sector confront currency mismatch situations that mean they have to undertake currency exchange. Besides, cash transactions are the most common means of payment in the country. The combination of prevalent currency mismatch and cash-based transactions is considered to give rise to retail currency exchange transactions with which money changers are more compatible than banks are. The empirical results also suggest that the recent regulation to promote bank lending in Khmer Riels will boost banks' currency exchange services, a situation conducive to foreign exchange market development.

JEL Classification Codes: E42, G237

Keywords: Cash-based transaction, Money changer, Currency mismatch, Payment dollarization, Cambodia

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1. Introduction

Cambodia's foreign exchange market is cash-based, overshadowed by the retail transactions of money changers (IMF 2012, 2017). To nurture a non-cash-based wholesale foreign exchange market, the National Bank of Cambodia (NBC)—the country's central bank—aims to foster the separation of retail and wholesale markets. However, restrictions on money changers may not ensure the development of a non-cash-based wholesale market. To assess this, we investigate the root causes of the fragmented foreign exchange market.

We examine how payment dollarization relates to the structure of Cambodia's foreign exchange market as mentioned above. Payment dollarization refers to the condition where foreign currencies are used as a means of payment in the domestic business market. To elucidate the structure of Cambodia's foreign exchange market from the viewpoint of non-financial enterprises, we employ original data from an enterprise survey conducted by NBC and the Japan International Cooperation Agency (JICA) in 2017. The analysis of the survey data allows us to examine how payment dollarization affects enterprises and how such enterprises shape the foreign exchange market. In addition to payment dollarization, we focus on firms' cash payments, in either foreign or home currencies, in the domestic business market.

We organize this paper as follows. In Section 2, we present a brief review of two branches of literature pertinent to foreign exchange market organization in developing countries and dollarization in Cambodia. In Section 3, we offer an overview of Cambodia's foreign exchange market paying particular attention to money changers. In Section 4, we describe the data from the enterprise survey relating to the uses of currency exchange services. In Section 5, we present the results of empirical analyses relating to (i) firms' uses of currency exchange services, and (ii) their choice between banks and money changers. In Section 6, drawing on the results of the empirical analyses, we discuss policies for foreign exchange market development. In Section 7, we offer some concluding remarks.

2. Literature Review

When we consider the pathway of Cambodia's foreign exchange market development, a basis of comparison can be sought in the work by Canales-Kriljenko (2004) which summarizes the 2001 IMF Survey of Foreign Exchange Market Organizations in 91 developing and transition economies. Based on the survey results, five characteristics of the foreign exchange market in developing countries are presented as follows. First, the market is mainly for spot trade, thus forward and swap transactions are underdeveloped, which restricts the hedging of exchange rate risk. Second, the market is typically on-shore, the local currency is not traded in offshore markets. Third, the market is predominantly for the U.S. dollar trade. Fourth, trading is concentrated in a small number of banks; despite numerous exchange bureaus (i.e. money changers) in the foreign exchange market, banks have a high share of market turnover. One reason for this is that non-bank financial institutions are not permitted to undertake international transfers. On the contrary, with their customer dealing, banks can combine international transfers and currency exchange. Fifth, interbank dealing—foreign currency deals among banks—is underdeveloped. The turnover of bank customers dealing with such activities as purchases and sales of foreign exchange with exporters and importers is larger than the deals between banks.

Foreign exchange market development is postulated as: (1) an increase in forward and swap deals, and (2) growth in interbank dealing. Both are interlinked as swap deals typically take place between dealer banks in the interbank market. The concentration of currency deals among a small number of dealer banks is conducive to the liquidity of the interbank market; concentration of order flows in some dealer banks allows them to form predictions on exchange rates and act as market makers (Lyon 2001).

According to Canales-Kriljenko (2004), management of settlement risk is a challenge in foreign exchange market development.¹ A foreign exchange transaction consists of two way transactions; the buyer's bank account—usually a nostro account in a foreign bank—is credited and that of the seller is debited in a foreign currency, and the buyer's local currency account—usually at the central bank—is debited, and that of the seller is credited. There is a risk that the buyer or seller defaults on his obligation, which can compound into systemic illiquidity of the entire foreign exchange market, and this is called the Herstatt risk (BIS 2012). Compared with exchange bureaus (money changers), banks whose solvency is scrutinized by financial regulations looking at such benchmarks as net open position are well suited for interbank foreign exchange transactions. Rather, dealers engaging in foreign exchange deals must have credit lines with counterparties in the first place, otherwise foreign exchange deals do not occur. While the interbank market is underdeveloped in many developing countries, banks with their financial positions disclosed by financial regulations are better equipped to engage in interbank deals.

A prominent characteristic of Cambodia's foreign exchange market is the dominance of retail currency exchange transactions by money changers (IMF 2012, 2017). Separation of retail and wholesale foreign exchange transactions and the promotion of a wholesale foreign exchange market (interbank market) have been the NBC's long-term agenda.

In spite of the paucity of literature that directly relates dollarization with foreign exchange market development, we note two crucial implications of dollarization in the context of Cambodia. First, due to a high degree of payment dollarization as documented in Odajima (2017), firms and households confront currency mismatch, and settlements of domestic business often necessitate currency exchange. Prevalent currency exchange for domestic business

¹ Apart from mitigation of settlement risk, one indispensable component for foreign exchange market development is complementary development in the money market (Canales-Kriljenko 2004; Kubo 2018). Pricing of forward and swap transactions requires a benchmark yield curve with market-determined interest rates. In developing countries, the absence of a deep and liquid money market constrains the development of forward and swap transactions.

throughout the country results in a fragmented, retail-based foreign exchange market in Cambodia.

Second, Cambodia has a large circulation of U.S. dollar (USD) banknotes which dominates cash-based transactions in the economy. De Zamaroczy and Sa (2002) estimate that USD banknotes in circulation amounted to \$2.9 billion in 2001, which was equivalent to approximately 20 times that of the Khmer Riel (KHR) currency circulating outside banks and seven times that of the M2 measure of the money supply at that time. Combined with currency mismatch, cash-based transactions thus raise the demand for frequent currency exchange between USD and KHR.

Existing studies on dollarization using large scale surveys in Cambodia suggest that the country's banking operations are skewed towards USD-denominated loans and deposits (Siregar and Chan 2014; Aiba et al. 2018; Okuda and Aiba 2018). For some banks, their balance sheet is fully dollarized, which allows them to mitigate currency mismatch (Okuda 2017). Dollarized balance sheets are pronounced particularly for foreign banks, while local banks with extensive branch networks—for example, ACLEDA Bank— have both KHR and USD assets and liabilities. We examine the implications of banks' dollarized balance sheets on the foreign exchange market in Cambodia.

3. Overview of Cambodia's foreign exchange market

3.1 Money changers

Major players in Cambodia's foreign exchange market include banks and money changers. The Law of Foreign Exchange (August 1997) stipulates that banks as authorized intermediaries are permitted to undertake any foreign exchange operations with residents and non-residents, including purchases and sales of foreign exchange, and international settlements. Thirty-nine banks were in operation as of December 2017.

Compared with banks, the moneychangers' scope of business is restricted in two ways. First, money changers are not permitted to make international remittances, so that their role in international trade is limited. Nonetheless, for cross-border trade with neighboring countries where trade settlements are often in cash, money changers offer currency exchange services for traders. Second, money changers are not authorized for lending. Obtaining the license of a microfinance institution, however, allows some money changers to operate in the lending market as a side business.

Money changers are classified into three types: licensed money changers, authorized money changers, and unofficial money changers. The Prakas (Directive) on Money Changer Licenses or Authorization (October 2009) stipulates that licensed and authorized money changers are permitted to sell and buy foreign currency banknotes and buy traveler checks. In Phnom Penh, there were 74 licensed money changers and 51 authorized money changers as of June 2018. In the provinces, there are no licensed money changers, but there are 2,580 authorized money changers. Apart from licensed and authorized money changers, there are numerous unofficial money changers all over the country.

A unique feature of the Cambodian foreign exchange market is that the central bank deals directly with money changers. Licensed money changers are entitled to participate in the KHR auctions of the NBC.² They buy KHR liquidity in these auctions and sell it to their customers. They are required to deposit at the NBC a minimum paid-up capital of KHR 80 million (approximately USD20,000) and pay an annual license fee of KHR 1.2 million (USD300). Authorized money changers are waived from having compulsory deposits, and they do not have access to the NBC auctions.

All types of money changers are often located near wholesale markets such as the Olympic, Orussey, and Central markets in Phnom Penh. This implies that wholesalers and retailers often confront currency mismatch and need to exchange one currency for another. Thus,

² The detail of the KHR auction is provided in Section 3.2.

as their side business jewelry and gold shops often engage in buying and selling USD banknotes in exchange for KHR banknotes. Some of them have turned into licensed or authorized money changers. Soklong and Aiba (2016) show that they often undertake money transfer services, which is also the case for money changers in other developing countries.³ Private money changers have a longer track record of currency exchange business than do banks.

The general perception among the public is that money changers offer more competitive exchange rates than do banks. However, the difference in exchange rates between money changers and banks has diminished. According to our observations of exchange rates at 20 money changers and banks in the central district of Phnom Penh,⁴ the narrowest spread that a money changer offered was KHR 6, with the US dollar buying rate at KHR 4098 and the US dollar selling rate at KHR 4114. Money changers' spreads varied from KHR 6 to KHR 15. On the other hand, banks' spreads varied from KHR 12 to KHR 35. While some banks do not offer competitive money change services and instead focus on USD-denominated financial intermediation,⁵ other banks such as the ACLEDA Bank that stretch their scope of business into KHR deposits and loans post competitive exchange rates at branches and on the website to attract customers. The difference between the best exchange rates of money changers and those of the bank is no more than 0.2 percent.

3.2 Khmer Riel auctions and the exchange rate

The NBC has been holding one-way auctions to buy USD liquidity and sell KHR with licensed money changers and banks based on their demand. The auction facilitates the NBCs need to absorb USD liquidity and inject KHR to the economy. The auction also equips the central bank

³ For a description of the money changer business in developing countries see El Oorchi et al. (2003).

⁴ Observations were made on September 12, 2018. Twenty observations include nine banks and 11 money changers.

⁵ In fact, some foreign-owned banks did not offer currency exchange services at all.

to alleviate the appreciation of KHR vis-à-vis the USD. The auction thus constitutes the NBC's primary instrument for monetary and foreign exchange policies.

Figure 1 illustrates the annual auction turnover by type of participant (money changers and banks) as well as the proportion of auction turnover to the stock of currency outside banks. In 2014, the auction turnover was comparable to half of the stock of KHR cash in circulation. However, the annual growth rate of the KHR currency outside banks was 26%, much lower than the auction turnover. This implies that the KHR liquidity released in the auctions has been partially refluxed to NBC and the banks. Other data (not shown here) on the transactions between the Government and the NBC indicates that the Government, whose revenues include the taxes and duties paid in KHR, sells more KHR than USD to the NBC.

Figure 1

Figure 1 also shows that money changers led the auctions until 2015 and that their sales of USD to the NBC still exceeded those of the banks in subsequent years except for 2016. Selling USD to the NBC, they withdraw KHR cash from the NBC to deliver to their customers. A considerable amount of KHR liquidity moves from the NBC via money changers to non-financial enterprises and households, bypassing the banks.

Several seasonal events are associated with temporary rises in demand for KHR cash. Before the Khmer New Year in mid-April, the demand for KHR cash is high as people going back to their hometowns in rural areas carry cash. Similarly, there is another hike in the demand for KHR cash for the *Pchum Ben* festival in late September to early October. The demand for KHR cash is also high during the harvest time of agricultural produce including rice, since marketing agents often pay farmers in cash using KHR. Finally, government taxes are payable in KHR and are often due in March, which causes a surge in demand for KHR.

Figure 2 illustrates the exchange rates of KHR vis-à-vis the USD. In this figure, a rise signifies the depreciation of the KHR against the USD. The exchange rates have been stable over the past four years, with fluctuations remaining at less than 3 percent. Nonetheless, they exhibit a

distinct cyclical pattern. The KHR depreciates most in August and starts to appreciate in September. It appreciates most in April. Therefore, we consider that seasonal variations in demand for KHR cash influences the KHR/USD exchange rate. Such a pattern of exchange rate movement implies a high weight of cash-based retail transactions in the foreign exchange market.

Figure 2

4. Enterprise survey on uses of currency exchange services

With the data of the enterprise survey regarding their uses of currency exchange, we shed light on: (i) the prevalence of currency exchange originating in domestic transactions; and (ii) firms' choice between money changers and banks for currency exchange. We employ the data from the NBC-JICA survey of enterprises—the Empirical Study on the Promotion of Home Currency in Cambodia—for which data collection was conducted between July and December 2017. The survey examined enterprise use of foreign currencies for settlements and financing, the extent of currency mismatch between their revenues and expenditures, and their perception of exchange rate risk. The survey also collected data on enterprise use of currency exchange services, which we employ to analyze the foreign exchange market structure from the viewpoint of those enterprises. Drawing on the Economic Census, the survey employed stratified sampling by firm size and by province. Firms were classified into four categories by asset size; micro firms (with assets below USD50,000), small (between USD50,000 and USD250,000), medium (between USD250,000 and USD500,000), and large (above USD500,000).

Table 1 summarizes the descriptive statistics of the enterprise survey. The number of observations used totaled 568.⁶ This sample of firms was classified into 163 micro enterprises,

⁶ The total sample size was 856. Dropping the observations with missing values related to expenditures

198 small ones, 102 medium ones, and 105 large ones. Varieties of industries are somewhat limited in Cambodia, and the majority of sample firms fall in the tertiary industry including trade and wholesale, retail, and hotels and restaurants. The composition of firm size differs considerably from one industry to another; for example, the proportion of large firms is high in the food processing and hotel industries. By contrast, the retail category is more represented by micro and small firms. Regarding the locations of firms, those in Phnom Penh (the capital) made up 19.1% of the sample.

Table 1

The table includes the survey results relating to: (1) the prevalence of cash payments; (2) the currency mismatch between revenues and expenditures; and (3) the uses of currency exchange, either banks or money changers, or neither. First, the average proportion of cash payments to total expenditures among the sample firms is as high as 72.0%, but there are some notable differences between micro and large enterprises. Micro enterprises have on average a much higher proportion of cash payments than that of large enterprises. Figure 3 summarizes the distribution of the percentage of cash payments in firms' total expenditures, classifying firms by size. The figure shows that cash is the most common means of payment among micro, small, and medium enterprises. However, it might not be appropriate to ascribe these differences solely to firm size since the composition of industry differs considerably among the four firm size categories.

Figure 3

Second, following Aiba and Tha (2017), we construct the indices of currency mismatch for individual enterprises as below; the currency mismatch indicator of Firm i in currency j is described as:

$$Mismatch_{ji} = \frac{Revenue_{ji} - Expenditure_{ji}}{Total\ Revenue_i} \quad j = USD, KHR \quad (1)$$

and revenues, we obtained 568 observations for subsequent analysis.

where $Total\ Revenue_i$ is denominated in USD. $Revenue_{ji}$ and $Expenditure_{ji}$ are revenues and expenditures by currency (USD or KHR) of which the amount is converted into USD. $Mismatch_{ji}$ takes the value between -1 and 1.⁷ For example, if a firm has all its revenues in USD and all its expenditures in KHR, $Mismatch_{USD,i} = 1$ and $Mismatch_{KHR,i} < 0$. The enterprises which have either $Mismatch_{USD,i} < 0$ or $Mismatch_{KHR,i} < 0$ are expected to use currency exchange services for settlements.

We summarize the currency mismatch indices by sector to illustrate that enterprises in some sectors are in severe currency mismatch. Figure 4 below depicts the histogram of currency mismatch indices by industry. For retailers, the histogram shows they are in KHR surplus and in USD deficit, implying that they procured goods in USD and sold to their customers in KHR.

Figure 4

Based on the currency mismatch indices, we created the currency mismatch dummy variables—USD short and KHR short—which indicate that an enterprise is short of respective currencies. As shown in Table 1, an average of the USD short dummy for the whole sample is 0.491, meaning that 49.1% of the sample firms were short of USD. Similarly, 19.9% of the sample firms were short of KHR.

The proportion of the firms running short of USD was lower among larger firms than it was among smaller ones. By contrast, the proportion short of KHR was higher among the larger firms. However, such patterns might be associated with the different composition of industrial sectors between large and small enterprise groups.

Third, despite the prevalent currency mismatch, only 37.9% of the sample enterprises reported that they used currency exchange services.⁸ Some enterprises however might have used currency exchange services without recognizing them as exchanges. For example, some money changers provide the agent service of tax payments and while the taxes and duties are

⁷ We assume that all enterprises have profits such that their total revenues exceed their expenditures.

⁸ Exchange at money changers, exchange at banks, and no exchange do not sum up to one as some firms used both money changers and banks for currency exchange.

denominated in KHR, service providers accept payments in USD from their customers. Although the service thus comprises currency exchange, the customers might not recognize it as such. In general, larger enterprises tend to use currency exchange services more than smaller ones; only 27.0% of micro enterprises used currency exchange, whereas 49.5% of large enterprises did so.

Regarding the choice between money changers and banks as a currency exchange service provider, there is a notable difference between large firms and the rest. Overall, the proportion of firms using banks (16.5%) is lower than that using money changers (24.5%). The gap between these two proportions is narrower for large firms than for the rest. Among large firms, 26.7% used banks while 28.6% used money changers. By contrast, among medium firms, 13.7% used banks whereas 31.4% used money changers. Currency exchange at banks appears to be a more popular choice among large firms.

The survey also contains information relating to the reasons for firms' choice between money changers and banks. These are summarized in Table 2. There were 139 firms that used money changers, and of these 18 also used banks. There were another 76 firms that used only banks. Among 139 enterprises that used money changers for currency exchange services, 13.6% (19 enterprises) chose a money changer as they did not have alternative service providers.

Table 2

There are some differences in reasons for firms' choice of currency exchange service providers between money changers and banks. Money changers are preferred for favorable exchange rates even though, as we have confirmed, the difference in exchange rates between money changers and banks has diminished. Apart from that, banks are favored by their customers for their secure transactions.

5. Empirical analysis

5.1 Currency exchange for domestic transactions

Before proceeding to examine the relationship between the international/domestic trade by enterprises and their uses of currency exchange, we check the status of currency mismatch by firms. In the dollarized economy, enterprises engaging in international trade do not necessarily face currency mismatch as both their revenues and expenditures can be in foreign currencies. In such a case, they do not need currency exchange. Moreover, even in non-dollarized economies, enterprises engaging in international trade may combine exports and imports so that international trade does not always necessitate currency exchange.

Table 3 summarizes the relationship between firms' international trade operations and currency mismatch. Among the 568 sample firms, there are 45 importers and 26 exporters. As for the exporters, only 11 firms export themselves while the other 15 use intermediaries for exports.

Table 3

Regarding imports, the proportion of firms running short of USD was lower among importers than among non-importers. Only 44.4% of importers run short of USD. This implies that more than half of all importers have sufficient foreign currency revenues for imports. Surprisingly, nearly half of the non-importers fell short of USD, implying that a large proportion of non-importers procure goods in USD and sell them in KHR.

Regarding exports, the data show that exporters are more often short of KHR than non-exporters. More than 70% of the exporters run short of KHR, implying that their revenues are in foreign currencies while some of their expenditures are in the local currency. Still, 23.1% of the exporters do not have currency mismatch problems because their expenditures are also in foreign currencies. Finally, 17.1% of non-exporters fell short of KHR.

These figures demonstrate two points. First, enterprises engaging in international trade do not always face currency mismatch; more than half of the importers appear to have revenues in foreign currencies. Second, currency mismatch is prevalent among enterprises not engaging in international trade. Combined with the fact that the majority of Cambodian firms do not undertake international trade, these imply that currency mismatch is prevalent among enterprises in the domestic business market.

Taking into account the sample firms' status of currency mismatch, we investigate what firm characteristics are related to their use of currency exchange services. We examine the relationship between a firm's international trade and its use of currency exchange services using logit regression. We consider two binary variables y_{ij} , $j \in (\text{KHR to USD}, \text{USD to KHR})$. One is a dummy variable which takes the value of one if Firm i engaged in currency exchange from KHR to USD and zero if otherwise. Likewise, the other is a dummy variable which takes the value of one if Firm i engaged in currency exchange from USD to KHR and zero if otherwise. We then introduce the latent variables y_{ij}^* :

$$y_{ij} = \begin{cases} 1 & \text{if } y_{ij}^* > 0 \\ 0 & \text{if } y_{ij}^* \leq 0 \end{cases}$$

We assume the latent variables as the function of independent variables as below:

$$y_{ij}^* = \mathbf{x}_i' \boldsymbol{\beta} + u_{ij}$$

where \mathbf{x}_i is a vector of independent variables, $\boldsymbol{\beta}$ is a vector of coefficient to be estimated, and u_{ij} is a random error term. For the independent variables, we include the currency mismatch indices, log of sales revenue which is used as a proxy variable for the firm size, ownership of firms (dummy for foreign-owned firms), international trade operation (dummies for exporters and importers), and a dummy variable for firms which use services for tax payment spending USD. We also include enterprise size dummies, location dummies, and industry sector dummies as control variables. The probability that $y_{ij} = 1$ can be restated as $Pr[y_{ij} = 1] =$

$Pr[y_{ij}^* > 0] = Pr[u_{ij} > -x_i'\beta]$. Assuming that u_{ij} follows the logistic distribution, we estimate the coefficient β by the Maximum Likelihood method that yields the largest value for the function $L = \prod Pr[y_{ij}]$ with the set of observations of y_{ij} , where:

$$Pr[y_{ij}] = \begin{cases} Pr[y_{ij} = 1] & \text{if } y_{ij} = 1 \\ Pr[y_{ij} = 0] & \text{if } y_{ij} = 0 \end{cases}$$

Table 4 summarizes the results of the regression analysis. First, firms short of a currency tend to carry out currency exchange to make up for that shortage. Second, larger firms are more likely to use currency exchange services compared with smaller ones. Third, foreign-owned companies do not change KHR to USD, perhaps because their business is denominated in USD, and they have sufficient USD liquidity. Fourth, exporters are more likely to exchange their USD revenues to KHR for payments. Fifth, importers are less likely to exchange USD revenues to KHR perhaps because their revenue is in KHR while their expenditure is in USD. These results are consistent with the view that the market is catering for enterprises facing a currency mismatch situation.

Table 4

Patterns of currency exchange differ substantially by region and by industry. Firms in Phnom Penh are more likely to undertake currency exchange from USD to KHR compared with those in other regions. Similarly, firms in the wholesale and retail industries are less likely to sell USD to buy KHR, whereas those in the hotel industry are less likely to buy USD. These appear to reflect diverse patterns of currency mismatch among firms.

Overall, the empirical results suggest that the foreign exchange market caters for the currency exchange demand of the firms in the domestic business sector. Due to the possible endogeneity problem, the regression results should be accepted with some reservations. There can be unobservable variables that affect both a firm's degree of currency mismatch and its use of currency exchange. Replacing the explanatory variable with its value in a previous period would solve the issue. However, such data is not available.

5.2 Banks and money changers

Between banks and money changers, how do enterprises choose currency exchange service providers? We tested hypotheses pertinent to firms' choice of currency exchange service providers. One is that money changers are more compatible with cash-based transactions so that firms with a higher percentage of cash payment in their total expenditures are more likely to use money changers than banks. The other is that firms in a good relationship with a bank would prefer currency exchange with it. As proxy variables for firms' relationship with a bank, we employ dummy variables for firms having bank accounts and loans and those using a bank for payment.

For this analysis, dropping the observations which did not use currency exchange services, we ran logit regressions to see what firm characteristics are associated with their choice of banks as currency exchange service providers. The dependent variable is a dummy variable which takes the value of one if an enterprise uses banks for currency exchange and zero otherwise. The explanatory variables include the percentage of cash payment in total expenditures, log of sales revenue, dummy variables for foreign-owned firms, exporters and importers, as well as dummy variables that capture firms' relationship with a bank. We expected that firms with a higher proportion of cash payments in their total expenditures would deal more with money changers. We also expected that firms with a close relationship with a bank would not use money changers.

Table 5 summarizes the results of the logit regressions. For the baseline specification of Model 1, firms with a higher proportion of cash payment in their total expenditure are more likely to use money changers for currency exchange. For firms at the average proportion of cash payments, 63.1%, a 1 percent rise in the proportion of cash payments raises the probability of

choosing banks for currency exchange by 0.4 percent. On the other hand, the dummy variables representing firms' relationship with banks are all insignificant.

Table 5

We now take into account the heterogeneity of banks. Banks in urban areas are often more focused on USD-denominated business, while those in rural areas, especially ACLEDA Bank which has an extensive branch network into rural areas, handle both KHR and USD. Accordingly, we add into the regression model an interaction term of the dummy variable of firms having bank loans and the dummy variable of firms located in rural areas (Model 2). For this specification (Model 2), the coefficient on the interaction term is positive and significant, whereas the coefficient on the dummy variable for firms having loan is negative and significant. This can be interpreted as those firms in rural areas having loans are likely to choose a bank for currency exchange, while those firms in urban areas having loans are likely to choose money changers. On the other hand, a firms' rural area location per se appears to be neutral on their choice of currency exchange provider between banks and money changers.

6. Discussion

We have illustrated how payment dollarization and prevalent cash-based transactions in the economy characterize Cambodia's foreign exchange market. Due to payment dollarization, currency mismatch occurs even among firms in the domestic business sector. At the same time, settlements in cash, either in KHR or USD, are prevalent in domestic business. The combination of payment dollarization and prevalent cash payments gives rise to the cash-based, retail-transaction-oriented foreign exchange market. The cash-based nature of the foreign exchange market is reflected in the cyclical patterns of the exchange rate caused by seasonal variations in demand for KHR cash. Furthermore, since money changers are more compatible with cash transactions than banks are, money changers dominate the foreign exchange market.

Without payment dollarization, exporters and importers would face currency mismatch, and their non-cash-based international settlements would be conducive to wholesale transactions in the foreign exchange market. In Cambodia's partially dollarized environment, importers do not necessarily confront currency mismatch perhaps because they charge their buyers in foreign currencies. This keeps importers away from currency exchange, which deters non-cash-based currency deals at banks.

The empirical results also suggest that the commercial banks' management policy affects the availability of competitive currency exchange services for their customers. As presented by Okuda (2017), some banks—especially foreign-owned banks operating in urban areas—have a management policy to fully dollarize their balance sheets and keep away from taking a position in KHR. Such banks are reluctant to offer competitive rates for currency exchange, which means that their customers, including foreign-owned companies, need to search for other service providers including money changers. In this regard, the recent regulation that forces banks to have 10% of their loan portfolio in KHR will boost their KHR operations including currency exchange, a result conducive to the development of the foreign exchange market.

An alternative policy measure to foster the development of a non-cash-based wholesale foreign exchange market is to promote non-cash payments. Our empirical analysis indicates that enterprises with a higher proportion of cash payments in their total expenditures rely more on money changers. Promotion of non-cash payments through the banking system would be conducive to a concentration of currency deals at banks and raises their turnover of non-cash-based foreign exchange transactions. There is a growing body of literature on the promotion of non-cash payments (Harasim 2016).

7. Conclusion

Cambodia's foreign exchange market is cash-based and dominated by money changers (IMF 2012, 2017). Money changers have direct deals with the central bank, accounting for an overwhelming share in NBC auctions where they raise KHR liquidity to circulate KHR cash in the economy through currency change with customers. The cash-based market eclipsed by money changers makes a stark contrast to the structure of the foreign exchange market in other emerging economies where non-cash-based wholesale transactions between banks are the core. In this paper, we examined how payment dollarization is related to Cambodia's foreign exchange market.

The empirical evidence indicates that firms in the domestic business sector confront currency mismatch, meaning that they need to undertake currency exchange. Furthermore, the empirical evidence also suggests that money changers are more compatible with cash-based transactions than banks are; enterprises with a higher proportion of cash payments in the total expenditures tend to use money changers rather than banks. Thus, the combination of prevalent currency mismatch even among firms in the domestic business market and their dependence on cash-based settlements results in the prosperity of money changers in Cambodia's foreign exchange market.

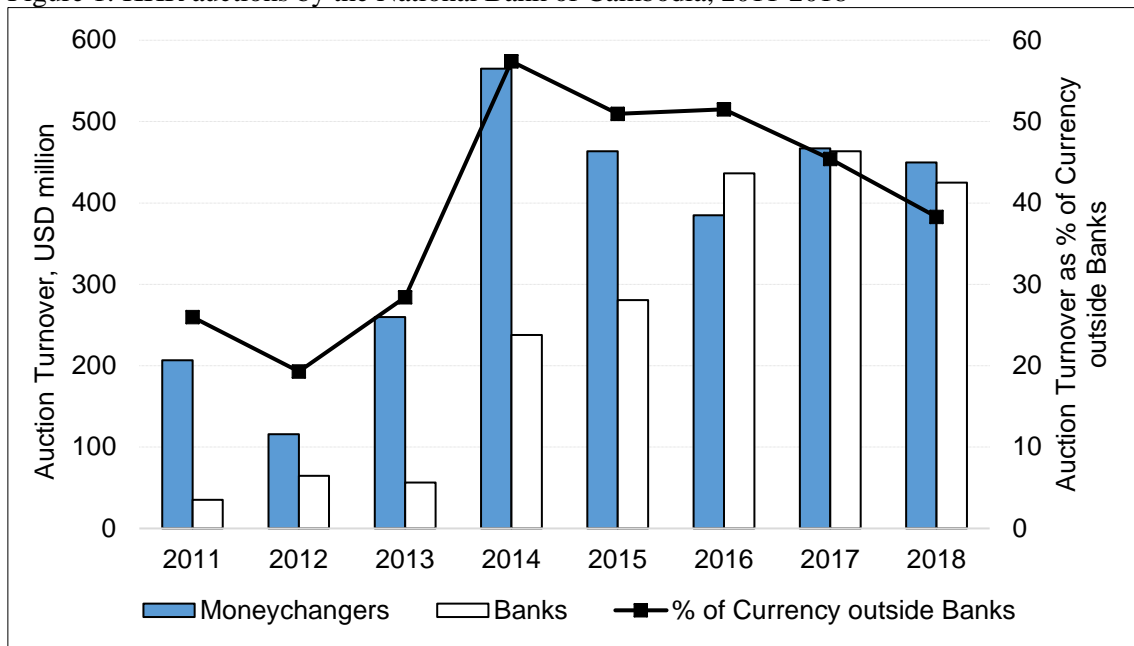
Finally, the recent regulation that forces commercial banks to have 10% of their loan portfolio in KHR could be a stimulus to promote their currency exchange services. The regression analysis of choice of currency exchange service providers suggests that firms in a good relationship with a bank tend to choose that bank as long as it offers competitive rates for currency exchange. However, those banks that dollarize their balance sheets to mitigate exchange rate risk do not offer competitive currency exchange services, which drives their customers to money changers. As the regulation will force banks to stretch their scope of

business to KHR operations, more banks are expected to offer competitive currency exchange services, which in turn will be conducive to the development of the foreign exchange market.

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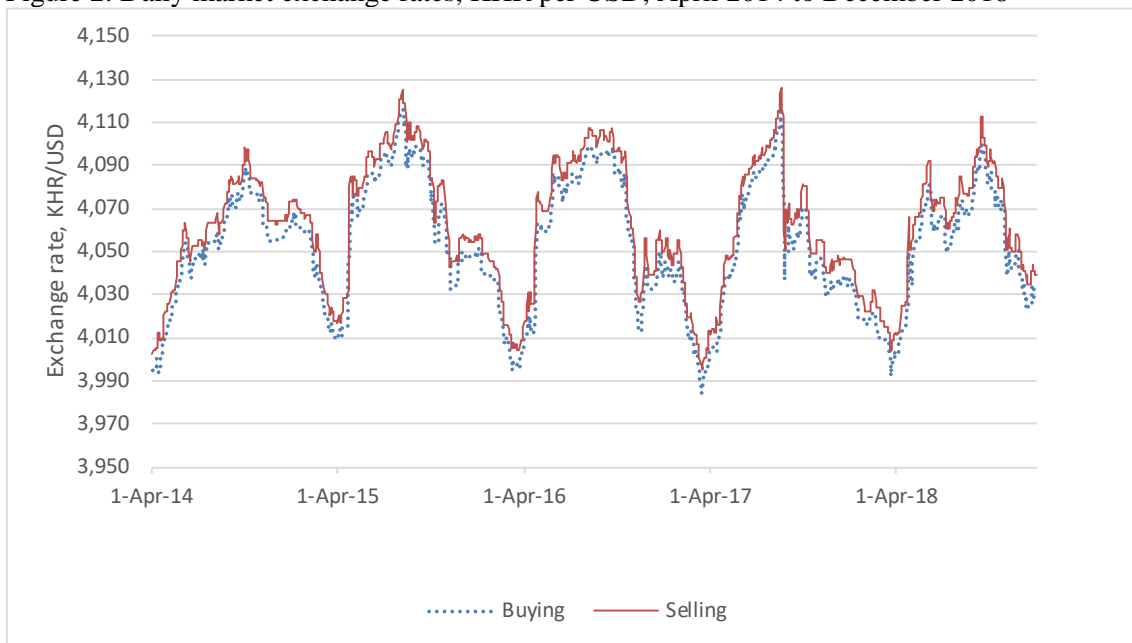
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Figure 1: KHR auctions by the National Bank of Cambodia, 2011-2018



Source: National Bank of Cambodia.

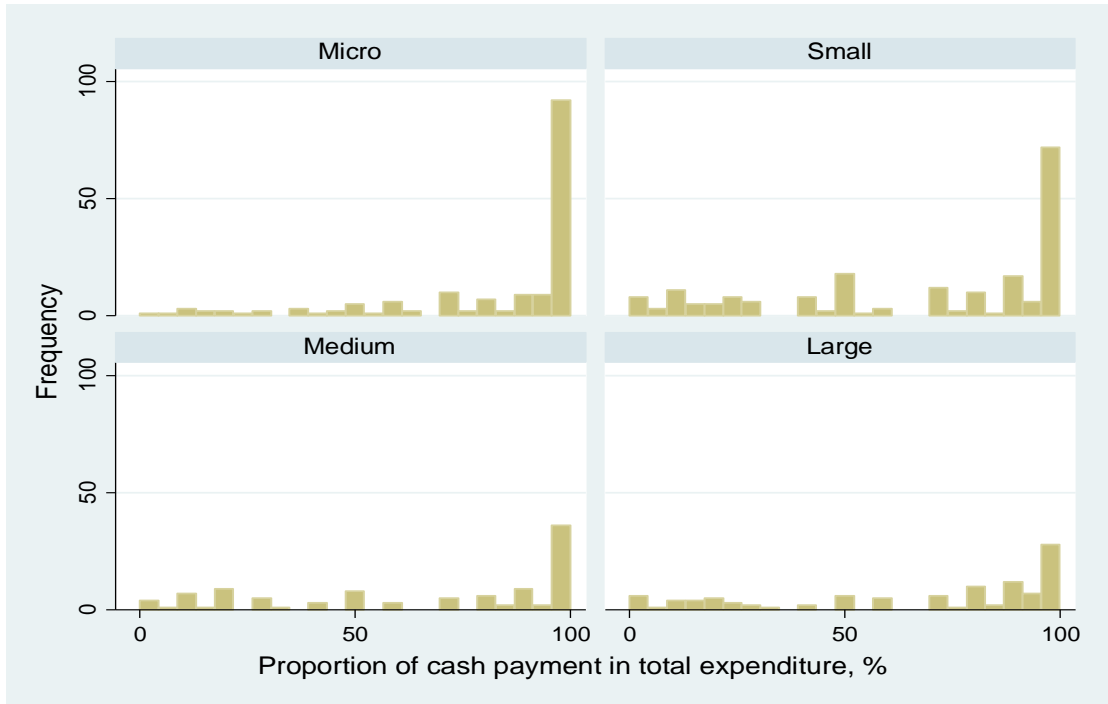
Figure 2: Daily market exchange rates, KHR per USD, April 2014 to December 2018



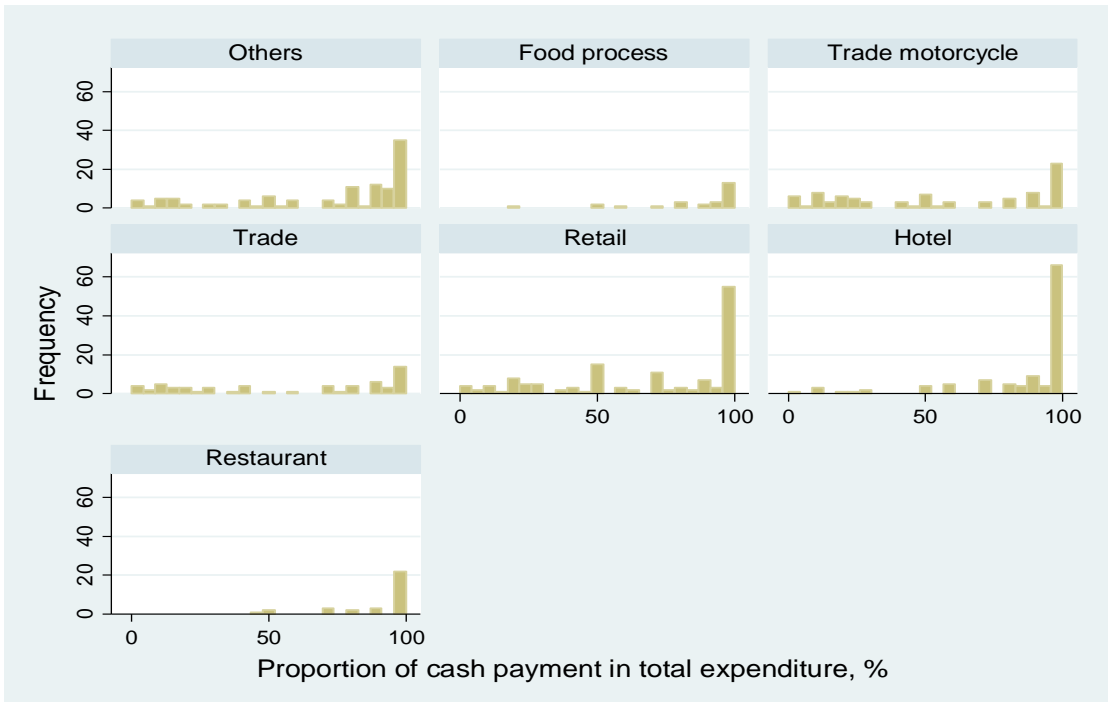
Source: National Bank of Cambodia.

Figure 3: Enterprise use of cash in expenditures, by enterprise size and by industry

(A) By enterprise size

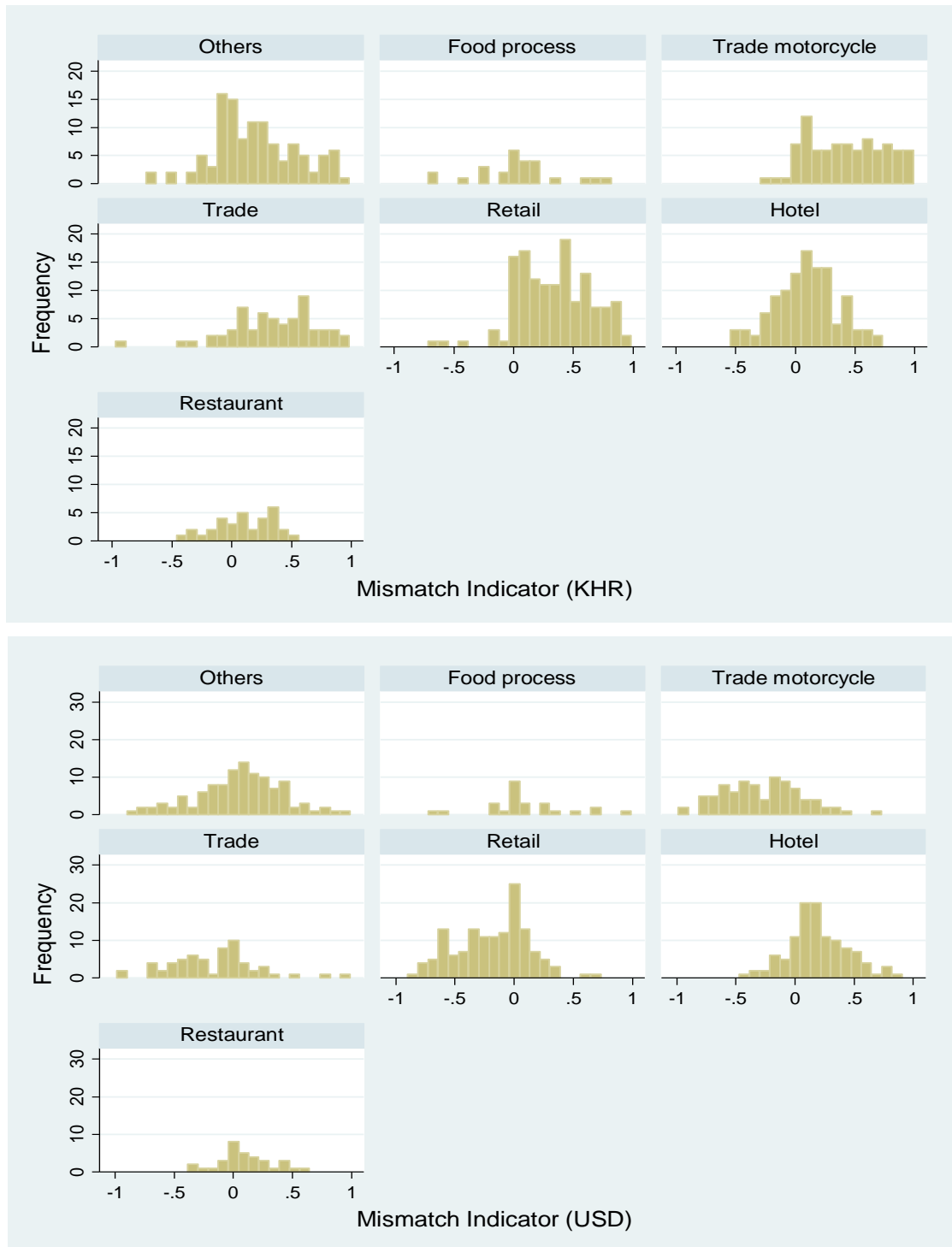


(B) By industry



Source: Authors.

Figure 4: Currency mismatch by industry



Source: Authors.

Table 1: Survey results

	Enterprize size category	Total	Micro	Small	Medium	Large
Frequency		568	163	198	102	105
By industry						
Food processing		26	3	5	3	15
Trade motor cycle		87	24	43	11	9
Trade		60	12	29	14	5
Retail		138	67	51	16	4
Hotel		112	9	30	32	41
Restaurant		33	12	12	6	3
Others		112	36	28	20	28
By location						
Phnom Penh		109	35	36	25	13
Siem Reap		53	10	9	13	21
North-East		38	15	9	6	8
North-West		23	5	13	2	3
Central		142	48	50	26	18
South-East		119	36	49	16	18
South-West		84	14	32	14	24
Average						
Log of sales revenue		9.18	8.08	9.13	9.42	10.77
Proportion of chash payment in total expenditure		72.0	83.8	67.8	66.3	67.1
Located in rural township		0.327	0.399	0.399	0.196	0.210
Foreign-owned company		0.033	0.025	0.015	0.039	0.076
USD short (Yes=1, No=0)		0.491	0.472	0.591	0.471	0.352
KHR short (Yes=1, No=0)		0.199	0.166	0.121	0.216	0.381
Exchange at money changers (Yes=1, No=0)		0.245	0.184	0.237	0.314	0.286
Exchange at banks (Yes=1, No=0)		0.165	0.110	0.172	0.137	0.267
No exchange (Yes=1, No=0)		0.621	0.730	0.616	0.578	0.505

Source: Authors.

Table 2: Reasons for choice of currency exchange service providers

	Enterprises which use money changers	Enterprises which use banks only
Number of observations	139	76
Reasons for choice (% of relevant observations)		
1. Don't know alternative service providers.	13.7	2.6
2. Location is near.	46.0	56.6
3. Price is favorable.	73.4	47.4
4. Service is convenient.	78.4	72.4
5. Transaction is safe.	21.6	47.4

Source: Authors.

Table 3: Relationship between enterprises' international trade and currency mismatch

		(A) Imports		
		USD short		
		Yes	No	Total
	Import	20 (44.4%)	25 (55.6%)	45 (100%)
Import	No import	259 (49.5%)	264 (55.5%)	523 (100%)
	Total	279 (49.1%)	289 (50.9%)	568 (100%)

		(B) Exports		
		KHR short		
		Yes	No	Total
	Direct export	9 (81.8%)	2 (18.2%)	11 (100%)
Export	Export with middlemen	11 (73.3%)	4 (26.7%)	15 (100%)
	No export	93 (17.2%)	449 (82.8%)	542 (100%)
	Total	113 (19.9%)	455 (80.1%)	568 (100%)

Source: Authors.

Table 4: Results of the regression analysis: use of currency exchange services by firms

Dependent variable	Model 1		Model 2	
	Exchange from		Exchange from	
	KHR to USD (Yes=1, No=0)		USD to KHR (Yes=1, No=0)	
	Marginal effect	p-value	Marginal effect	p-value
Explanatory variable				
Currency mismatch, USD (-1 to 1)	-0.731 ***	0.000		
Currency mismatch, KHR (-1 to 1)			-0.620 ***	0.000
Log of sales revenue	0.051 ***	0.003	0.029 *	0.071
Dummy: (Yes=1, No=0)				
Have exports	-0.128	0.354	0.326 **	0.032
Have imports	0.140	0.114	-0.131 *	0.086
Foreign owned company	-0.580 ***	0.000	0.323	0.113
Pay tax using USD			0.001	0.991
Region dummy (Phnom Penh=0)				
Siem Reap	0.108	0.258	-0.029	0.751
North-East Area	0.037	0.741	-0.200 **	0.025
North-West Area	0.111	0.475	-0.147	0.245
Central Area	0.224 ***	0.002	-0.095	0.178
South-East Area	0.282 ***	0.000	-0.140 *	0.052
South-West Area	0.165 **	0.045	-0.133 *	0.075
Industry dummy (Other industries=0)				
Foodprocess	-0.1211	0.340	-0.108	0.294
Trade & wholesale (motorcycle & vehicle)	0.0181	0.841	-0.064 *	0.387
Trade & wholesale (others)	0.0232	0.807	-0.273 ***	0.002
Retail	-0.0582	0.435	-0.203 ***	0.003
Hotel	-0.1819 **	0.021	-0.019	0.763
Restaurant	-0.2525 **	0.014	0.056	0.567
<hr/>				
Number of observations	568		568	
Log pseudolikelihood	-277.97		-268.81	
Prob > chi2	0.000		0.000	
Pseudo R2	0.275		0.259	

Source: Authors.

Notes: ***, **, and * stand for the significance level of 1%, 5%, and 10%, respectively. p-values are calculated with robust standard errors. Marginal effects of continuous variables are evaluated at their mean.

Table 5: Results of the regression analysis: choice of currency exchange service providers

Dependent variable	Model 1		Model 2	
	Use banks for exchange (Yes=1, No=0)		Use banks for exchange (Yes=1, No=0)	
	Marginal effect	p-value	Marginal effect	p-value
Explanatory variable				
Proportion of cash payment in total expenditure	-0.004 **	0.023	-0.004 **	0.022
Log of sales revenue	0.032	0.282	0.032	0.282
Dummy variable: (Yes=1, No=0)				
Foreign owned company	-0.021	0.895	-0.052	0.741
Have export	0.085	0.558	0.064	0.661
Have import	-0.020	0.868	-0.024	0.844
Have bank account	0.035	0.720	0.036	0.709
Have bank loan	-0.047	0.584	-0.192 *	0.081
Use banks for payment	0.128	0.256	0.123	0.271
Administrative location is rural area (Rural area) x (Have bank loan)	0.252 ***	0.005	0.142	0.209
			0.407 **	0.031
Region dummy (Phnom Penh=0)				
Siem Reap	-0.096	0.489	-0.077	0.582
North-East Area	0.256	0.149	0.272	0.136
North-West Area	-0.239 *	0.087	-0.231 *	0.085
Central Area	0.201	0.140	0.225 *	0.099
South-East Area	0.172	0.231	0.217	0.152
South-West Area	-0.136	0.292	-0.128	0.330
Industry dummy (Other industries=0)				
Foodprocess	0.042	0.817	0.015	0.931
Trade & wholesale (motorcycle & vehicle)	-0.146	0.281	-0.149	0.277
Trade & wholesale (others)	-0.115	0.401	-0.123	0.372
Retail	-0.307 ***	0.023	-0.310 **	0.022
Hotel	0.003	0.981	-0.007	0.963
Restaurant	0.399 *	0.063	0.423 **	0.050
Number of observations				
	215		215	
Log pseudolikelihood				
	-119.80		-117.65	
Prob > chi2				
	0.001		0.000	
Pseudo R2				
	0.187		0.201	

Source: Authors.

Notes: ***, **, and * stand for the significance level of 1%, 5%, and 10%, respectively. p-values are calculated with robust standard errors. Marginal effects of continuous variables are evaluated at their mean.

Abstract (in Japanese)

要約

カンボジアの外国為替市場は現金取引が主で、両替商の小売取引が中心である。本稿では、通貨交換サービスの利用に関する企業調査個票データを用いて、決済ドル化が両替商の興隆といかに結びついているかに着目して外国為替市場の構造を解明する。データからは、地場のビジネスであっても多くの企業が通貨ミスマッチに直面し、両替を必要としていることが示された。さらに、企業の決済手段が現金決済に留まっていることともあいまって、現金の外貨両替が広がり、銀行に比べて現金両替の利便性の高い両替商が重用されている。他方、実証分析の結果は、リエル建ての貸し出しを促す銀行規制が、銀行の両替業務を後押しして、外国為替市場の発展につながることも示唆している。

キーワード: 現金取引、両替商、通貨ミスマッチ、決済ドル化、カンボジア



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Ken Odajima, Daiju Aiba, and Vouthy Khou