
Table of content

1. Introduction	7
2. Currency mismatches in transactions and welfare	9
2.1. Theoretical model	9
2.2. Welfare effect	11
3. Survey framework	12
3.1. Survey purpose	12
3.2. Survey locations and sample size	12
3.2.1. Worker side	12
3.2.2. Factory side	13
4. Characteristics of survey workers and factories	15
4.1. Worker side	15
4.1.1. Basic characteristics of workers and their households	15
4.1.2. Workers' household income and expenditure	16
4.2. Factory side	20
4.2.1. Basic characteristics of factories and survey respondents	20
4.2.2. Factory sale and expenditure	21
5. Household expenditure by components and their determinants	23
5.1. Estimation framework	23
5.2. Estimation results	23
6. Overview of perceptions of wage payments in KHR	25
6.1. Worker side	25
6.2. Factory side	28
7. Perceptions of receiving and paying wages in KHR and their determinants	33
7.1. Estimation framework	33
7.2. Estimation results	33
8. Conclusion	37
9. Policy Recommendations	38
Appendix	39
Appendix A	39
Appendix B	42
Appendix C	43
Appendix D	44
Appendix E	45
Appendix F	46
References	47

Abstract

This study examines the dollarization issue in Cambodia, focusing on the garment, footwear, and travel goods and bag sector of the country. Particularly, we analyze the impact of currency mismatches on household welfare, examine the landscape of currency usage in the surveyed sector, and examine the perceptions of wage payments in Khmer Riel (KHR) of respondents from both worker and factory sides. The worker-side survey was conducted between March 15 and 31, 2023, with 1,068 total respondents. The factory-side survey took place from March 20 to May 27, 2023, and covered 114 factories across multiple locations, including Phnom Penh and four provinces in Cambodia.

Using theoretical and statistical analysis of surveyed data, our study demonstrates that currency mismatches can lead to welfare losses, especially for low-income households who earn in US dollars (USD) but spend most of their income on necessity goods in KHR. We also find that, in general, higher-income workers express a greater willingness to receive wages in KHR; however, this willingness decreases when reaching a certain level of high income, indicating a nonlinear relationship between income levels and the preference for receiving wages in KHR. Moreover, improved knowledge of the exchange rate can positively influence respondents' perceptions regarding receiving wages in KHR. The survey also reveals high awareness of the KHR as the national currency and a shared recognition among workers and factory management of the importance of supporting it.

The study recognizes that government measures and awareness campaigns are crucial to promote gradual de-dollarization. Findings from the study imply that enhancing wage payments in KHR would reduce the negative effects of currency mismatches in transactions. Furthermore, it underscores the necessity of stabilizing the exchange rate to foster trust, alongside the advancement of digital payment systems to ensure a fair exchange rate in transactions, towards enhancing KHR usage. Fear of exchange rate fluctuations emerges as the primary reason for opposition to wage payments in KHR, despite the relative stability of the KHR exchange rate over the last decade. Thus, increasing awareness of this stability could positively influence the willingness to accept wages in KHR.

To enhance the de-dollarization process, active involvement from the private sector is also vital. It can participate in policy dialogues, offer insights into the challenges and opportunities of transitioning to KHR, and voluntarily commit to paying wages in KHR, thereby setting an example for wider adoption. Collaborative efforts between the private and public sectors can establish more efficient KHR transaction mechanisms, such as digital payment platforms, fostering an environment conducive to the de-dollarization process.

The study also suggests the potential to provide a significant portion of workers' wages in KHR, particularly for those with lower household incomes, addressing currency mismatches in their daily transactions, especially for essential goods like food.

Key words: Dollarization, Welfare loss, Perceptions of wage payments

Acknowledgments

The United Nations Development Programme (UNDP) would like to thank the organizations and individuals who contributed directly or indirectly to this Policy Brief. We would also like to thank the National Bank of Cambodia (NBC), particularly Dr. Khou Vouthy, Assistant Governor and Director General of Policy and International Cooperation, Dr. Lay Sokheng, Assistant Governor and Director General of Regulation, Financial Inclusion, Financial Literacy, Consumer Protection, and Sustainable Finance, and Dr. Mon Sreyleak, Senior Economist, for their strategic guidance and inputs.

The Report is produced by Dr. Oum Sothea, UNDP Consultant. The text and analysis have benefited from the reviews and contributions by the UNDP team, namely, Mr. Enrico Gaveglia, Resident Representative, Ms. Alissar Chaker, former Resident Representative, Mr. Shakeel Ahmad, Deputy Resident Representative, Dr. Khoay Rada, Economist, and Dr. Iván Gonzalez de Alba, former Senior Economist.

Thanks to Ms. Iv Ek Nimnuon, Assistant Resident Representative, Ms. Nith Ponika, Project Coordination Officer, and Ms. Khiev Thida, Programme Associate, from UNDP for providing coordination and management support with the relevant stakeholders.

Copyright ©UNDP Cambodia 2026. All rights reserved.

#53, Pasteur Street, Boeung Keng Kong 1, Phnom Penh, Cambodia

The views expressed in this publication are those of the author(s) and do not necessarily represent those of UNDP Cambodia. UNDP Cambodia does not guarantee the accuracy, completeness, or currency of the data included in this policy brief and does not assume responsibility for any errors, omissions, or discrepancies in this work.

Introduction

Cambodia is a highly dollarized country, where the U.S. dollar (USD) is circulated in its economy despite not being officially recognized as legal tender. The USD is widely used for various purposes, serving as a medium of exchange (transaction dollarization), a unit of account for prices and wages (real dollarization), and a store of value (financial dollarization) (Nicoló et al., 2005). Numerous studies in the literature (e.g., Kem, 2001; Zamaróczy and Sa, 2002; Menon, 2008; Duma, 2011; Samreth, 2011) attribute this dollarization in Cambodia to several factors. These include the substantial influx of USD through foreign aid and external financing for peacekeeping operations by the United Nations Transitional Authority in Cambodia (UNTAC) during the early 1990s and the diminished public confidence in the Khmer Riel (KHR), stemming from socioeconomic and political instability of the transitional period. Appendix A provides an overview of the current status of dollarization in Cambodia.

Dollarization offers both advantages and disadvantages for the Cambodian economy (e.g., Kem, 2001; Zamaróczy and Sa, 2002; Samreth, 2010; Lay et al., 2012; Samreth et al., 2023). Dollarization promotes financial sector growth and maintain consumer purchasing power; however, it results in the loss of seigniorage and a reduction in the effectiveness of monetary policy. Partial dollarization, where both local currency and foreign currency are circulating, can also cause currency mismatches in transactions. This can increase the transaction costs for the economic agents and have a negative impact on their welfare, when they need to make currency exchange between local and foreign currencies with an exchange rate that does not reflect the official exchange rate.¹ Despite its associated benefits and drawbacks, a highly dollarized country like Cambodia often strives to de-dollarize its economy over the long term. This endeavor is justified by economic and non-economic rationales. The economic ones may include factors such as an attempt to restore the opportunity to collect seigniorage revenue and an attempt to enhance the effectiveness of the monetary policy. The non-economic ones may include factors such as the recognition of the importance of the national currency as the country's pride, sovereignty, and culture.

Cambodia has made various efforts to enhance the circulation and usage of the KHR in order to facilitate a gradual de-dollarization. The regulation requiring financial institutions to maintain 10% of their loan portfolio in KHR can be viewed as a strategy to enhance the KHR circulation (NBC, 2016a). The organization of “Riel Day” by the NBC is also indicative of its efforts to increase public awareness of KHR usage (NBC, 2017). In addition, the National Bank of Cambodia (NBC) has utilized the reserved requirement rate to incentivize the use of KHM.² Exchange rate stabilization has been employed as a key mechanism to bolster public confidence in the local currency. The NBC also provides KHR liquidity to financial institutions through a liquidity-providing collateralized operation (LPCO) since 2016 to provide KHR liquidity to financial institutions by pledging negotiable certificates of deposit (NCDs) as the collateral (NBC, 2016b). As a result, the KHR's circulation and usage have increased remarkably in recent years.

1 Using firm survey data from Cambodia, Kubo et al. (2023) demonstrate that in a transaction dollarization, firms may be required to endure the burden of currency exchange for domestic transactions, resulting in a loss of efficiency for the firms and the economy as a whole.

2 Prior to the Covid-19 pandemic, the reserve requirement rates for KHR and foreign currencies were 8% and 12.5%, respectively. During the pandemic, the reserve requirement rates were reduced to 7% for both KHR and foreign currencies. From January to 22 November 2023, the reserve requirement rate for foreign currencies was raised to 9%, while the rate for KHR was maintained at 7%. From 23 November 2023, the reserve requirement rate for foreign currencies was lowered to 7%.

Even though the KHR is widely used in public sector transactions and for paying wages, the private sector in Cambodia still largely uses USD. A significant share of their business dealings, including paying workers' wages, are conducted in USD. In this context, in order to provide inputs for policy measures addressing the dollarization issue, it is crucial to undertake a study to better capture the landscape and insights into dollarization in the private sector in Cambodia at the micro level.

Recent studies on dollarization in Cambodia were conducted by the NBC and the JICA Ogata Research Institute (JICA-RI), using data and information from a survey (e.g., Aiba and Tha, 2017; Odajima and Khou, 2017; Odajima and Aiba, 2019; Okuda and Chea, 2023). Although these studies have provided a comprehensive understanding of dollarization and the characteristics and usage of currencies in Cambodian households, businesses, and financial institutions, they do not provide detailed analyses of the country's garment, footwear, and travel goods and bag sector. It is essential to conduct a detailed examination of this sector, as it is the country's main private sector, employing a large share of its labor force and accounting for a significant portion of its exports. Moreover, this sector of the economy largely employs women, specifically low-income women, who are vulnerable to any shocks in employment that may occur from de-dollarization.

In light of this, the purpose of the study is to examine the dollarization issue in the Cambodian garment, footwear, travel goods, and bag sector and to assess the viability of enhancing de-dollarization in wage payments in the sector. Consequently, this will provide input for policy measures addressing the issue of "real dollarization" in the country.

The study reveals potential welfare losses for households that earn in USD but spend primarily in KHR, a situation that can be exacerbated for low-income households due to their substantial expenditures in KHR for necessity goods such as food and beverage consumption, based on the theoretical and statistical analyses of survey data from both the worker and factory sides. The study also identifies a nonlinear relationship between the propensity to receive wages in KHR and income levels. Furthermore, households with better knowledge of the exchange rate are more inclined to prefer KHR in wage payments. Our study also reveals a high preference for enhancing the role of KHR in the Cambodian economy. Many survey respondents advocate for government actions to foster wider KHR usage through policies and national awareness campaigns.

The remaining part of this paper is structured as follows. Section 2 provides a theoretical and numerical analysis of the impact of currency mismatches in transactions on household welfare. Section 3 provides an explanation of our survey framework, including a description of the survey purpose, survey location, and sample size. Section 4 illustrates the characteristics of worker-side respondents, their households, factory-side respondents, and their factories. Section 5 presents an analysis of household expenditure by components and their determinants, including an estimation framework and results. Section 6 illustrates an overview of the perceptions of wage payments in KHR from both the worker and factory sides. Section 7 provides an examination of the perceptions of wage payments in KHR and their determinants from both the worker and factory sides. Section 8 contains the conclusion and policy implications.

Currency mismatches in transactions and welfare

As previously stated, in transaction dollarization, when an economic agent needs to exchange local and foreign currencies for the transaction at an exchange rate that does not reflect the official rate, the agent may be required to bear the transaction costs. This can be detrimental to their welfare. A utility maximization model is introduced here to illustrate this effect.

2.1. Theoretical model

Our model follows Arkolakis et al. (2012). The utility function of a representative household is defined as the following constant elasticity of substitution (CES).

$$(1) \quad U(c_D, c_R) = [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}},$$

where c_D and c_R are expenditures paid in USD and KHR, respectively; α is the share of c_D in yielding the utility; the elasticity of substitution between c_D and c_R is $\varepsilon = \frac{1}{1-\rho}$ (see Appendix B). The elasticity of substitution measures the percentage change in the ratio of c_D to c_R , resulting from a one percent change in their relative prices, while keeping the utility of the representative household constant.

The income of the representative household is in USD. This assumption is to reflect the fact that workers in Cambodia's garment, footwear, and travel goods and bag sector are paid in USD.³ For simplicity, we assume that the representative household does not save or borrow. The household's budget constraint can be written as follows.

$$(2) \quad c_D + \frac{p_R}{E_S} c_R = w_D,$$

where p_R is the price of c_R in KHR; E_S is the exchange rate set by the vendor in KHR per USD; and w_D is the household's income in USD. The prices of goods are normalized so that the price of c_D is unity. Assuming E_O to be the official exchange rate of KHR per USD and δ to be the difference between E_O and E_S , Eq. (2) can be rewritten as follows.

$$(3) \quad c_D + \frac{p_R}{(E_O - \delta)} c_R = w_D$$

Notably, if a vendor sets the exchange rate, expressed in KHR per USD, at a level lower (higher) than the official exchange rate, the price of c_R is overpriced (underpriced).

In Cambodia, it is widely observed that the unofficial exchange rate for a transaction favors the vendor. As a result, E_S is typically lower than E_O , in the case where goods are priced in KHR, but payment is made in USD. Therefore, in Eq. (3), δ is positive and its higher value leads to a greater overvaluation of c_R 's price. By assuming that $p_{RD} = \frac{p_R}{(E_O - \delta)}$, Eq. (3) can be rewritten as follows.

³ Adjusting the model to account for specific proportions of various currencies in the income of the representative household will not alter the model's main implications on the welfare effect of currency mismatches in transactions.

$$(4) \quad C_D + p_{RD}C_R = W_D$$

The representative household maximizes the utility, Eq. (1), subject to the budget constraint, Eq. (4). Letting λ be the Lagrange multiplier, The Lagrangian function is defined as follows.

$$(5) \quad L = [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}} + \lambda(w_D - C_D - p_{RD}C_R)$$

The first-order conditions with respect to C_R and C_D are as follows, based on Eq. (5).

$$(6) \quad \frac{\partial L}{\partial C_D} = \alpha c_D^{\rho-1} [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}-1} - \lambda = 0$$

$$(7) \quad \frac{\partial L}{\partial C_R} = (1 - \alpha)c_R^{\rho-1} [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}-1} - \lambda p_{RD} = 0$$

From Eq. (6) and Eq. (7), we obtain the following equations.

$$(8) \quad \alpha c_D^{\rho-1} [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}-1} = \lambda$$

$$(9) \quad (1 - \alpha)c_R^{\rho-1} [\alpha c_D^\rho + (1 - \alpha)c_R^\rho]^{\frac{1}{\rho}-1} = \lambda p_{RD}$$

From Eq. (8), Eq. (9), and given that $\varepsilon = \frac{1}{1-\rho}$, we obtain the following equation.

$$(10) \quad \frac{C_D}{C_R} = \left[\frac{(1-\alpha)}{\alpha p_{RD}} \right]^{-\varepsilon}$$

From Eq. (4) and Eq. (10), we obtain the following equation.

$$(11) \quad C_R = \frac{w_D}{\left[\frac{(1-\alpha)}{\alpha p_{RD}} \right]^{-\varepsilon} + p_{RD}} = \frac{(1-\alpha)^\varepsilon p_{RD}^{-\varepsilon} w_D}{\alpha^\varepsilon + (1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}}$$

$$(12) \quad C_D = C_R \left[\frac{(1-\alpha)}{\alpha p_{RD}} \right]^{-\varepsilon} = \frac{\alpha^\varepsilon w_D}{\alpha^\varepsilon + (1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}}$$

Substituting Eq. (11) and Eq. (12) into Eq. (1), we obtain the indirect utility (i.e., welfare) function of the household as follows.

$$(13) \quad V(p_{RD}, w_D) = \frac{w_D}{[\alpha^\varepsilon + (1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}]^{\frac{1}{1-\varepsilon}}},$$

where $\frac{\partial V}{\partial p_{RD}} < 0$. The higher the difference between E_O and E_S (i.e., higher δ), the higher the p_{RD} (i.e., greater overvaluation of the price of the expenditure in KHR, C_R 's price). This negatively affects the household's utility (welfare). Letting β be the share of the expenditure paid in KHR, β can be expressed as follows.

$$(14) \quad \beta = \frac{p_{RD}C_R}{w_D}$$

From Eq. (11) and Eq. (14), the share of C_D in yielding the utility, α , can be expressed as follows (see Appendix C).

$$(15) \quad \alpha = \frac{(1-\beta)^{\frac{1}{\varepsilon}}}{(1-\beta)^{\frac{1}{\varepsilon}} + \beta^{\frac{1}{\varepsilon}} p_{RD}^{\frac{1-\varepsilon}{\varepsilon}}}$$

2.2. Welfare effect

Eq. (10) and Eq. (12) can be used for a numerical analysis to assess the welfare effect of currency mismatches in transactions. Specifically, we intend to examine how the cost of currency mismatches in transactions, θ , the share of the expenditure in KHR, β , and the elasticity of substitution between goods paid in USD and in KHR, ε , affect the welfare of the economic agent. θ can be considered the magnitude of the overvaluation of P_{RD} , when using USD for the payment of C_R . Higher δ reflects higher θ . As discussed above, this cost occurs because the transaction exchange rate is generally set in favor of the vendor in a transaction.

Without affecting the implications, for simplicity, in the benchmark case we assume that $P_{RD} = 1$. The elasticity of substitution between C_D and C_R , which is ε , reflects the relative preference of the representative household on C_D and C_R in yielding utility. In our study, it is not possible for us to directly estimate ε . We consider the case of $\varepsilon=0.5$ and $\varepsilon=2$. By considering that $\theta=1.4\%$, the welfare effects of currency mismatches in transactions are shown in Table 1.⁴

Given the cost of currency mismatches in transactions, the results indicate that, for a household whose income is in USD, the greater the proportion of that household's expenditures in KHR, the greater the utility loss. The results also indicate that the impact is larger when the elasticity of substitution between C_D and C_R is higher.

Table 1: Welfare loss of currency mismatch in transaction, $\theta = 1.4\%$

β	$\varepsilon=0.5$	$\varepsilon=2$
0.10	-0.138%	-0.140%
0.20	-0.277%	-0.279%
0.30	-0.415%	-0.418%
0.40	-0.553%	-0.557%
0.50	-0.692%	-0.695%
0.60	-0.830%	-0.833%
0.70	-0.967%	-0.970%
0.80	-1.105%	-1.108%
0.90	-1.243%	-1.244%

Source: Authors' calculation

⁴ We also conducted a market survey in some shops regarding how a shopkeeper sets the exchange rate when a goods is sold in KHR, but a customer uses USD to purchase it, in Phnom Penh and Svay Rieng between March 16 and 23, 2023. The survey shows that, in most cases, the vendor set the exchange rate at KHR 4,000 per USD, while the monthly average official exchange rate in March 2023 was KHR 4,056 per USD, according to the data from the NBC. This result indicates an approximately 1.4% transaction cost for the customer due to a currency mismatch in the transaction. Thus, our setting of " $\theta=1.4\%$ " is reflecting reality. The data of market survey are available upon request.

Survey framework

3.1. Survey purpose

As analyzed in the previous section, currency mismatches in transactions can result in a welfare loss for a household. Given the cost of this currency mismatches and the elasticity of substitution between goods paid in USD and KHR, a higher proportion of household expenditure paid in KHR could potentially lead to a larger welfare loss for households, while their salaries and wages are paid in USD. When many goods and products are sold in KHR, promoting KHR in wage payments can help reduce welfare losses for households. Therefore, understanding the landscape of currency usage in transactions among economic agents and the impact is crucial for policymakers to address the dollarization issue and enhance people's welfare.

The data and information employed in this study were collected from a survey of worker side conducted between March 15 and 31, 2023.

Additionally, to gain additional insight into the landscape of currency usage for transactions and to examine employers' perceptions regarding the enhancement of KHR usage, particularly for wage payments, a factory-side survey was carried out separately. This survey targeted the administration and management staff members of factories in the garment, footwear, and travel goods and bag sector, and it was conducted from March 20 to May 27, 2023.

3.2. Survey locations and sample size

3.2.1. Worker side

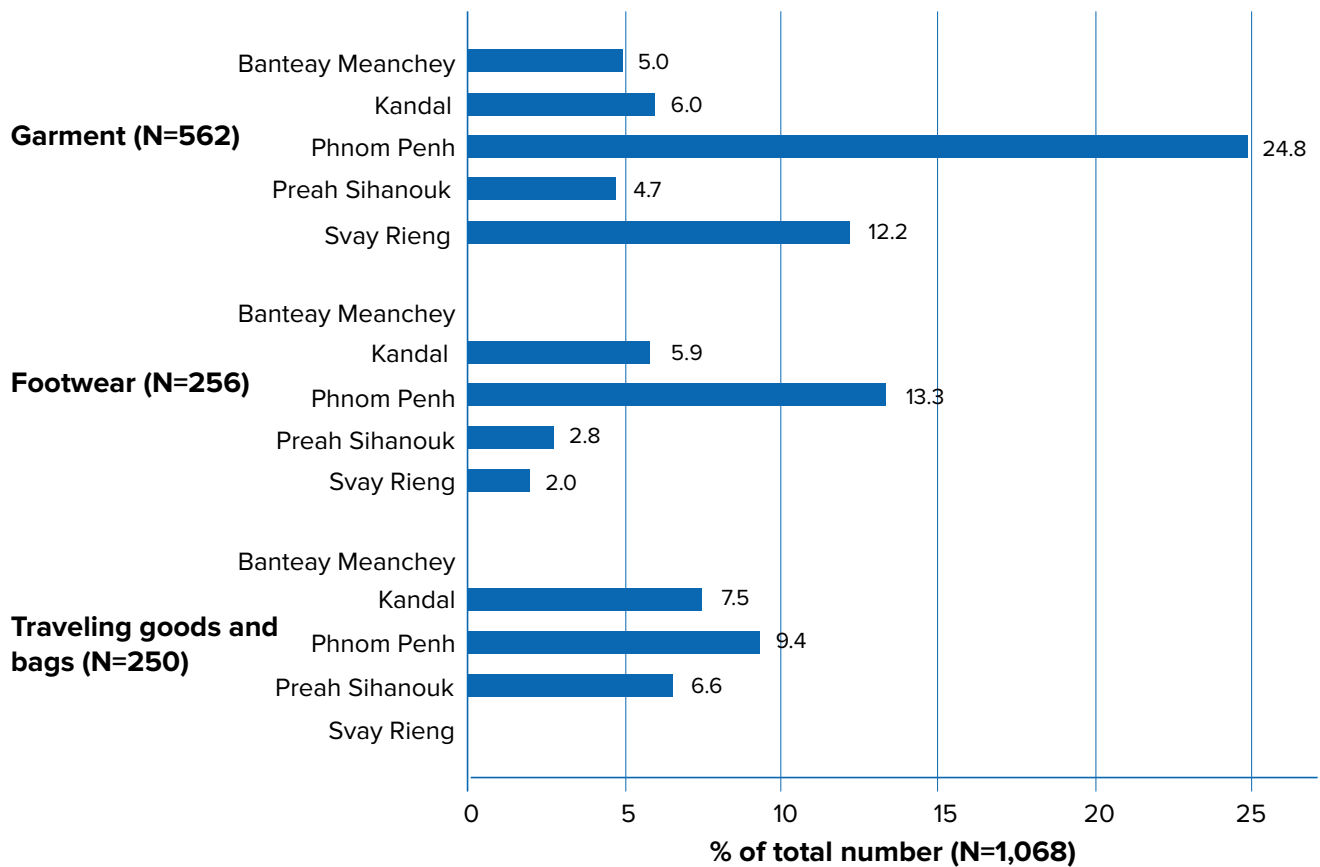
Factory workers and their households from the capital city, Phnom Penh, and four other provinces were selected for inclusion in the survey. The provinces included Banteay Meanchey, Svay Rieng, Preah Sihanouk, and Kandal. These provinces were chosen based on their relatively high economic activity and potential for foreign currency circulation.

The data collection process was carried out in person using a random sampling method, with 10 to 20 workers selected from each factory.⁵ The survey yielded responses from a total of 1,068 workers, of whom 888 are women. Figure 1 illustrates the distribution of workers according to their residential locations and the types of factories they are employed in.

From the figure, garment factory workers represent the largest share of the whole survey sample. In terms of residential location, the workers residing in Phnom Penh account for the largest proportion of the overall survey sample across all types of factories.

⁵ We interviewed workers from each factory in various settings: during their lunch breaks, at their departure from the factory, and at their accommodations. During lunch breaks, we approached their tables and randomly selected individuals for interviews. Upon their departure from the factory, we waited at the gate and once again randomly selected participants. Lastly, we conducted interviews at their accommodations, where we randomly visited and selected workers.

Figure 1: Percentages of survey workers by residential locations and factory types



Source: Produced by authors based on survey data

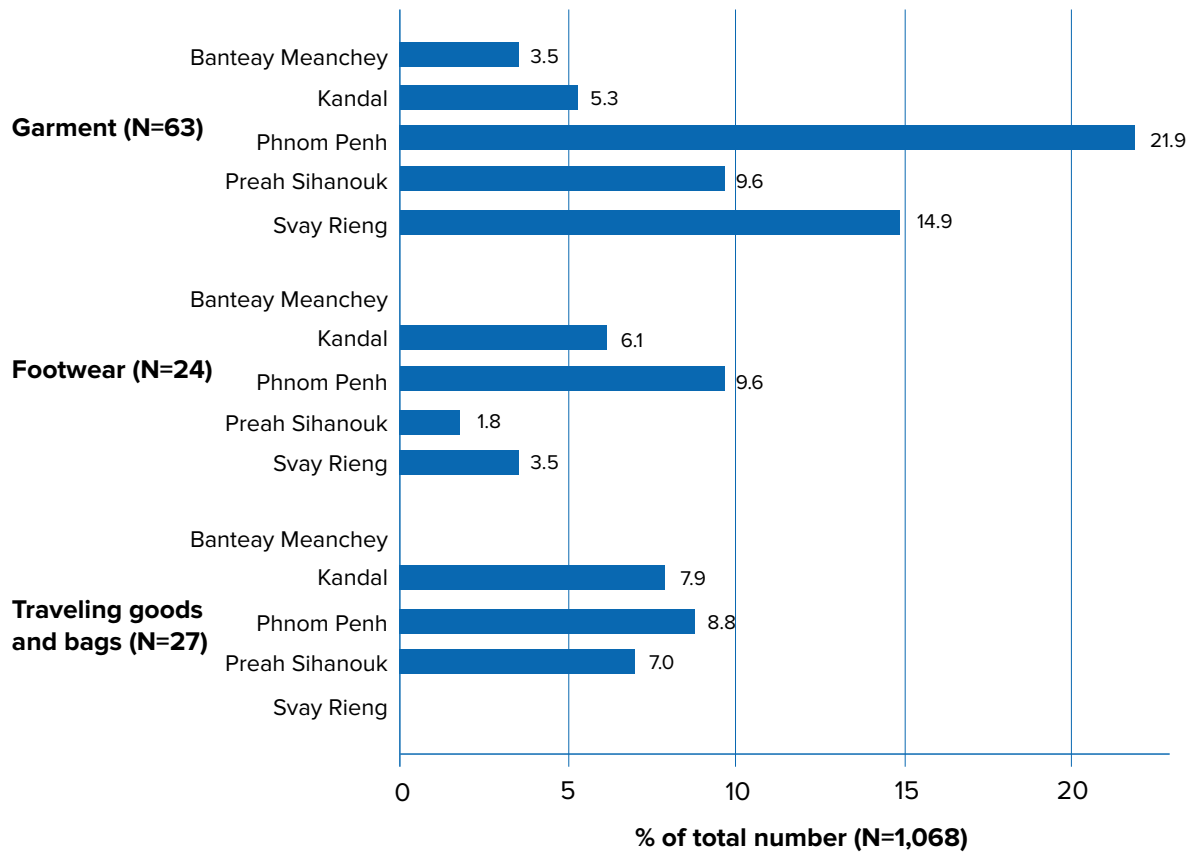
3.2.2. Factory side

For the factory-side survey, it was conducted in 114 factories in the garment, footwear, and travel goods and bag sector in various locations, including the capital city of Phnom Penh and four other provinces, like the worker-side survey. Figure 2 shows the distribution of factories according to their operational locations and types.

Similar to the worker-side survey, garment factories represent the largest proportion of the survey factory sample. By operational location, factories operating in Phnom Penh represent the greatest proportion of the total survey sample across all factory categories.

Furthermore, out of the 114 factories in our survey, 42 were situated within the special economic zones (SEZs) and the remaining 72 were located outside the SEZs. The SEZ-based factories were distributed among three provinces: Preah Sihanouk (Preah Sihanouk SEZ 2), Svay Rieng (Manhattan SEZ, Tai Seng 1 and 2, and Shandong Sunshell Svay Rieng SEZ), and Banteay Meanchey (Poi Pet O’Neang SEZ).

Figure 2: Percentages of survey factories by locations and factory types



Source: Produced by authors based on survey data

4

Characteristics of survey workers and factories

4.1. Worker side

4.1.1. Basic characteristics of workers and their households

The demographic and occupational characteristics of survey respondents and household heads are illustrated in Table 2. The table reveals that about 83.1% of respondents are women and that about 22.4% of household heads are women. This suggests that, despite the fact that a substantial majority of survey respondents are women, men predominately serve as household heads.

The average age of survey respondents is 30.5 years, with the youngest participant being 17 and the oldest participant being 60. For household heads, their average age is about 35.8 years, with a range between 18 and 79.

Regarding educational levels, about 47% of the 1,064 survey respondents hold degrees beyond the elementary level. This is slightly higher than the percentage of household heads with the same level of education.

Furthermore, about 22.6% of survey respondents are household heads, and about 52.6% of them work in garment factories. Footwear factory workers account for about 24.0%, while the other 23.4% work in travel goods and bag factories.

The table also reveals that the average household comprises 2.3 members, with the smallest household consisting of just one member and the largest having eight members.

Table 2: Basic characteristics of survey workers and their households

Characteristics	Respondents	Household head
Women (% of total)	83.1	22.4
Age (years)		
-Average	30.5	35.8
-Minimum	17.0	18.0
-Maximum	60.0	79.0
Education		
-Higher than elementary level (% of total)	47.0 ^a	44.3
Household head respondents (% of total)	22.6	-
Garment factory's workers (% of total)	52.6	-
Footwear factory's workers (% of total)	24.0	-
Travel goods and bag factory's workers (% of total)	23.4	-
Total number	1,068	775
Household size		
-Average	2.3	
-Minimum	1.0	
-Maximum	8.0	

^a **Total number=1,064**

Source: Authors' calculation based on survey data

4.1.2. Workers' household income and expenditure

Table 3 depicts the monthly income and expenditure in Phnom Penh and selected provinces. From the table, the average monthly income of households in the selected provinces is about KHR 1.95 million. It is higher than the average income of households in Phnom Penh, which is about KHR 1.70 million. This higher household income in provinces may reflect the fact that households in provinces generally have more members and more income sources than households in Phnom Penh do. The median income of households in the selected provinces is also higher than that of households in Phnom Penh.

On the expenditure side, the average and median expenditures of worker households residing in Phnom Penh (about KHR 1.23 million for the average and about KHR 1.15 million for the median) are slightly higher than those of households in the selected provinces (about KHR 1.17 million for the average and about KHR 1.08 million for the median). This may reflect the higher living costs in Phnom Penh.

The table also indicates the proportion of expenditures made in KHR, USD, THB, and other currencies. Notably, Phnom Penh and the selected provinces have a very high percentage of their average income in USD: Phnom Penh has about 87.3% and the selected provinces have about 88.5%. However, the majority of expenditures are made in KHR, with Phnom Penh households spending about 82.4% and the selected provinces spending even more at about 92.2% in KHR. These results indicate the possibility of currency mismatches when households make expenditures.

Table 3: Household income and expenditure (month, thousand KHR)

Description	Household income		Household expenditure	
	Phnom Penh	Other provinces	Phnom Penh	Other provinces
Average	1,698	1,952	1,231	1,169
Median	1,760	2,000	1,153	1,080
Minimum	792	800	463	425
Maximum	5,020	10,000	3,633	4,166
Average share in KHR (%)	12.7	11.4	82.4	92.3
Average share in USD (%)	87.3	88.5	17.6	7.5
Average share in THB (%)	0.0	0.1	0.0	0.2

The average by currency type is calculated as a weighted average across either all expenditure components or all income sources by currency type. The weight represents the share of each household's expenditure component or income source in the total household expenditure or total income.

Source: Authors' calculation based on survey data

Table 4 shows the shares of household income by various sources and currency types. From the table, the primary source of income for households is from salaries and wages, accounting for about 98.6% of the total income. This dominant income source is primarily received in USD. On average, one household in our survey has 1.7 members receiving income from salaries and wages, while the average household size is 2.3 members, as indicated in Table 2. Agriculture, despite being a traditional occupation, contributes only about 0.1% to the total household income, and a significant portion of this income, about 91.7%, is in KHR. The very low share of income from agriculture should not be surprising, as our survey is of households with members working in factories, and their wages seem to be the main source of their household income. Business activities like wholesale and retail sales make up about 0.7% of total household income. Although the vast majority (about 93.5%) of this income is in KHR, but there is a noticeable 6.3% in USD.

Income from other casual jobs relating to agricultural tasks and retail businesses, represents about 0.5% of the total income. It is primarily received in KHR (about 77.3%), but USD also has a substantial share at 18.2%. THB comes into play with an approximately 4.5% contribution.

Remittances contribute about 0.2% to the household income, with the majority (about 76.3%) being in KHR and about 20% in USD. THB has a smaller, yet notable, representation at about 3.7%.

Overall income by currency type shows that worker households largely depend on the USD, with 88% of total income received in this currency.

Table 4: Shares of household income (month) by source and currency type

Income sources	Average share in total income (%)	Average share in KHR (%)	Average share in USD (%)	Average share in THB (%)
Agriculture	0.1	91.7	0.0	8.3
Business activities (wholesale, retail sale, etc.)	0.7	93.5	6.3	0.1
Salaries/wages	98.6	10.9	89.1	0.0
Other casual works (agriculture, retail business, etc.)	0.5	77.3	18.2	4.5
Remittances	0.2	76.3	20.0	3.7
Total (N=1,068)^a	100.0	12.0^b	88.0^b	0.0^b

^a Sample sizes in the calculations vary from case to case.

^b It is the average across all households. Income by currency type is calculated as a weighted average across all income sources by currency type. The weight is the share of each household's income source in the household's total income.

Source: Authors' calculation based on survey data

Table 5 depicts the monthly household expenditure by component and currency type. From the table, food and beverages account for the largest portions, about 30.2% of the total income and about 44.1% of the total expenditure. Remittances to family come next, accounting for about 12.2% of total income and about 14.9% of total expenditure, and then other expenses like wedding party and ceremony participation, accounting for about 9.4% of total income and 12% of total expenditure. Housing (rent) accounts for about 7.4% of total income and 10.2% of total expenditure, while transportation, water, electricity, and personal care account for less than 4% of total income and less than 6% of total expenditure.

The results also indicate a high usage of KHR in most expenditure categories, with transportation and personal care almost exclusively transacted in KHR. When it comes to housing (rent), however, USD is utilized at a rate of 67.0%, which is more than double the usage of KHR at 33.0%. Other components also exhibit a preference for KHR, with utilization exceeding 80%, with the exception of communication, which has a notable 15.5% expenditure in USD. For the average share of total household expenditure by currency type, KHR dominates with 87.6%, followed by USD with 12.3%, and THB with a negligible 0.1%.

Table 5: Shares of household expenditure (month) by components and currency types

Expenditure components	Average share in total income (%)	Average share in total expenditure (%)	Average share in KHR (%)	Average share in USD (%)	Average share in THB (%)
Food and beverages	30.2	44.1	99.9	0.1	0.0
Housing (rent)	7.4	10.2	33.0	67.0	0.0
Water and electricity	2.0	3.0	98.6	0.4	1.0
Communication (phone card, internet, etc.)	1.9	2.8	84.5	15.5	0.0
Transportation	3.7	5.2	100.0	0.0	0.0
Personal care (soap, toothpaste, razor, sanity, etc.)	1.9	2.8	99.4	0.6	0.0
Remittance to family members	12.2	14.9	81.6	18.4	0.0
Clothing and footwear (clothes, shoes, etc.)	2.0	2.7	95.2	4.7	0.1
Medical care (medical services, drugs, etc.)	1.6	2.3	98.7	1.3	0.0
Other expenses (wedding parties, ceremonies, etc.)	9.4	12.0	93.6	6.2	0.3
Total (N=1,068)^a	72.3^b	100^b	87.6^b	12.3^b	0.1^b

a Sample sizes in the calculations vary from case to case.

b It is the average across all households. Expenditure by currency type is calculated as a weighted average across all expenditure components by currency type. The weight represents the share of each household's expenditure component in the total household expenditure.

Source: Authors' calculation based on survey data

From Tables 4 and 5, a possible currency mismatch can be observed between household income and expenditure in different currencies (KHR, USD, and THB). The majority of income, especially salaries and wages, is predominantly in USD (about 88%), whereas the majority of expenditures, such as food and beverages (about 99.9%) and transportation (100%), are predominantly in KHR. This disparity can expose households to currency mismatch and exchange rate risks and may have an effect on their welfare as indicated in our theoretical discussion.

4.2. Factory side

4.2.1. Basic characteristics of factories and survey respondents

Table 6 outlines the basic characteristics of the factories and respondents involved in the survey. The table shows that many factories (47.4%) operate with 500 or fewer workers. There are many factories employing between 501 and 1,000 people, accounting for 28.9% of the total. Only 8.8% of factories have between 1,001 and 1,500 employees, and 4.4% have between 1,501 and 2,000 employees. Furthermore, 10.5% of the factories have a workforce of more than 2,000 employees. Regarding gender demographics, a substantial share of the employees is women, accounting for 70.3% of the total across 110 factories.

Table 6: Basic characteristics of survey factories and respondents

Characteristics	All factories
Number of employees (% of total)	
- 500 and less	47.4
- 501 to <1,000	28.9
- 1,001 to <1,500	8.8
- 1,501 to <2,000	4.4
- Over 2,000	10.5
Percentage of women employees	70.3a
Years in operation (number of years)	
-Average	7.3
-Minimum	1.0
-Maximum	26.0
Starting capital	
- USD 5,000,000 and less	71.9
- Over USD 5,000,000	28.1
Foreign ownership (% of total)	99.1
Total number	114
Respondents	
-Women (% of total)	50.9
-Manager and higher position	73.7
Total number	114
^a Total number of factories, N=110	

Source: Authors' calculation based on survey data

For the number of years in business operation, Table 6 indicates that the factories in the survey have been in operation for an average of 7.4 years. The newest factory in the survey has been in operation

for only one year, while the oldest one has been in operation for 26 years. A large number of factories, about 71.9%, began with a capital of USD 5 million or less. The results in the table show that foreign entities own about 99.1% of the survey factories, indicating a dominant role of foreign investment in the garment, footwear, and travel goods and bag sector in Cambodia.

For respondents, 50.9% of them are women, and about 73.7% of them hold managerial or higher positions within the factories, indicating that the survey largely includes the perspectives and insights of those in decision-making positions within the factories.

4.2.2. Factory sale and expenditure

Table 7 presents survey results on factory sales and expenditures. Among the 114 factories, 46 are located in Phnom Penh, while 68 are located in the selected provinces. For sales, factories in Phnom Penh have an average of approximately USD 5.1 million, whereas factories in the selected provinces have an average of approximately USD 7.4 million. Regarding expenditures, excluding tax payments, the factories in Phnom Penh, on average, spend around USD 2.8 million, slightly lower than the factories in the selected provinces, which average about USD 3.1 million.⁶

Table 7: Factory sale and expenditure

Description	Sale (USD)		Expenditure (USD, excl. tax) ^a	
	Phnom Penh	Other provinces	Phnom Penh	Other provinces
Average	5,091,667	7,446,047	2,805,419	3,138,071
Median	4,250,000	4,000,000	2,395,000	2,418,000
Minimum	500,000	1,000,000	285,000	258,600
Maximum	20,000,000	120,000,000	7,188,000	13,400,000
Average share in KHR (%)	0.0	0.0	14.1	15.1
Average share in USD (%)	100	100	85.9	84.9
Number of factories (Total=114)^b	46	68	46	68

^a Tax payment is excluded due to the lack of data. Many respondents refuse to answer the question on tax payment. ^b Sample sizes in the calculations vary from case to case.

Source: Authors' calculation based on survey data

By currency type, Table 7 shows that factory sales revenues for both Phnom Penh and the selected provinces are denominated entirely in USD. A portion of expenditures are denominated in KHR, with Phnom Penh having an average of about 14.1% and the selected provinces having a slightly higher average of about 15.1%. This indicates that a greater proportion of expenditures are made in USD, specifically about 85.9% in Phnom Penh and about 84.4% in the selected provinces.

In Table 8, a breakdown of the proportions of annual factory expenditures, excluding tax payments, is provided. The calculations take into account various expenditure components, such as salaries and wages, utilities, building rent, contributions to the National Social Security Fund (NSSF), and pensions,

⁶ Tax payment is excluded due to the lack of data. Many respondents refuse to answer the question on tax payment.

among others. It is important to observe that tax payment data is lacking because many respondents failed to provide the required information.

From the table, the largest share of factory expenditures is allocated to wage payments, comprising an average of about 55% of total sales and an even higher proportion of about 82.2% of total expenditures. Examining the currency use for this component reveals that the large majority (about 89.8%) of these payments are made in USD, while a lesser proportion (about 10.2%) are made in KHR. As discussed later in Table 13, regarding the reasons why factory-side respondents “disagree” or “strongly disagree” with the proposal requiring wages to be paid in KHR, there are several possible explanations for why the majority of factories prefer paying wages in USD. These reasons may include aligning their expenditures with their sales revenues received in USD and reducing the systemic burdens of currency conversions.

Utilities, which include electricity and water expenses, represent a small but notable portion of expenditures, accounting for about 3.3% of total sales and about 5.5% of total expenditures. About 76.4% of utility payments are made in USD. In the case of building rent, all transactions are conducted solely in USD, comprising about 4.2% of total sales and about 7.7% of total expenditures. Contributions to the NSSF and pensions account for about 2.6% of sales and about 4.2% of expenditures and are made entirely in KHR.

A small portion of the expenditure is allocated to other aspects such as maintenance and raw material procurement, accounting for an average of about 0.3% of total sales and about 0.4% of total expenditure. About 84.7% of these expenses are made in USD.

Examining the entire expenditure indicates that the expenditures account for 64.8% of total sales and, by currency type, about 85.4% of the total expenditures are made in USD.

Table 8: Shares of factory expenditure (year, excl. tax payment)^a by component and currency type

Expenditure components	Average share in total sale (%)	Average share in total expenditure (%)	Average share in KHR (%)	Average share in USD (%)
Salaries/wages payments	55.0	82.2	10.2	89.8
Utilities (electricity, water)	3.3	5.5	23.6	76.4
Building rent	4.2	7.7	0.0	100.0
National Social Security Fund (NSSF) and pensions	2.6	4.2	100	0.0
Other (maintenance, raw materials, etc.)	0.3	0.4	15.3	84.7
Total (N=114)^b	64.8	100	14.6^b	85.4^c

a Tax payment is excluded due to the lack of data. Many respondents refuse to answer the question on tax payment.

b Sample sizes in the calculations vary from case to case.

c It is the average across all factories. Expenditure by currency type is calculated as a weighted average across all expenditure components by currency type. The weight is the share of each factory’s expenditure component in the factory’s total expenditure.

Source: Authors’ calculation based on survey data

Household expenditure by components and their determinants

As shown in Table 5, a large share of worker households' total income is spent on food and beverages, and this expenditure is almost exclusively made in KHR, whereas a significant share of worker households' income is in USD. As indicated in Section 2, this may result in currency mismatches for this consumption, which may have a negative impact on household welfare. Understanding the influence of household characteristics on key expenditure components is important and can have policy implications.

5.1. Estimation framework

In examining how household characteristics affect household's main expenditure components, the following regression equation is considered.

$$(16) \quad y_i = x_i' \gamma + u_i,$$

where the dependent variable, y , encompasses the share in total income of the expenditures on food and beverages, housing (rent), remittances to family members, and other expenses such as attending wedding parties and participating in ceremonies. These expenditure components constitute a relatively significant portion of the total income, as depicted in Table 5. " $\gamma = (\gamma_1, \dots, \gamma_l)'$ " is an $(l + 1) \times 1$ vector of regression coefficients; " $x = (x_1, \dots, x_l)'$ " is an $(l + 1) \times 1$ vector of explanatory variables; " u " is the error term; and " i " represents an observation. As explanatory variables, numerous characteristics of worker households are considered.

Households usually face budget constraints; if they spend more on one item, they may have to reduce spending on others. In order to address this, we carry out the estimation using the seemingly unrelated regression method suggested by Zellner (1962). This approach simultaneously estimates four equations in which the dependent variables are the selected four components of household expenditure.

5.2. Estimation results

The estimation results, with the share of the expenditure on food and beverages being the dependent variable, are presented in Table 9.⁷ Table D1 in Appendix D presents the estimation results, in which dependent variables are the expenditures on housing (rent), remittances to family members, and other expenses such as attending wedding parties and participating in ceremonies.

The results in Table 9 indicate that households with a greater number of and older members tend to allocate a larger share of their income to food and beverages. Overall, household heads with higher education levels also tend to spend more on food and beverages, possibly reflecting a greater consideration for household welfare. While having a loan is not significantly associated with the proportion of income spent on food and beverage expenses, borrowing from informal money lenders is statistically significantly correlated with a lower share of expenditure on food and beverages.

⁷ To examine the multicollinearity issue, the variance inflation factors (VIFs) of explanatory variables in our estimation equations are also computed. The results, which are available upon request, revealed that, with the exception of household income, the average age of household members, and their squared terms, the VIFs of explanatory variables are less than 10, indicating that multicollinearity is not a significant issue. When an explanatory variable and its squared term are included in the estimation equation, their VIFs are typically quite large. However, this should not be a concern because the two variables are not linearly transformable into one another.

Furthermore, the results reveal that households with relatively lower income levels tend to spend a larger portion of their income on food and beverages.⁸ As shown in Tables 4 and 5, a significant share of household income is in USD, and food and beverages are spent mostly in KHR. This suggests that lower-income households may be more exposed to currency mismatches in transactions, potentially negatively affecting their welfare, as indicated in Section 2.⁹

Table 9: Estimation results of food and beverage expense (share of total income) and household characteristics

Variables	Share of food and beverage expense	Share of food and beverage expense
	(1)	(2)
Woman household head	-0.008 (0.009)	-0.009 (0.008)
Education of household head (1=higher than elementary level, 0=other)	0.011 (0.007)	0.012* (0.007)
ln(household income)	-1.497*** (0.546)	-1.418*** (0.510)
Squared ln(household income)	0.043** (0.019)	0.040** (0.018)
Household size	0.054*** (0.004)	0.062*** (0.003)
Average age of household members	0.011*** (0.003)	0.007*** (0.003)
Squared average age of household members	-0.000*** (0.000)	-0.000** (0.000)
Loan (1=Yes, 0=No)	-0.004 (0.007)	0.005 (0.007)
Loan*informal (moneylender)	-0.031 (0.028)	-0.045* (0.027)
Constant	12.700*** (3.932)	12.248*** (3.678)
Factory type dummies	No	Yes
Phnom Penh/Province dummies	No	Yes
Observations	767	767
R ²	0.498	0.565

Standard errors are in parentheses.

***, ** and * indicate the statistical significance at 1%, 5% and 10%, respectively.

Source: Authors' estimation based on survey data

8 The negative correlation between income and the share of expenditure on food and beverages in total income reflects Engel's law. We also confirm the positive relationship between income level and the amount of expenditure on food and beverages using a regression analysis by controlling various household characteristics. The results are available upon request.

9 Our survey reveals that a sizeable portion of respondents (approximately 12%) follow the exchange rate set by the vendors when purchasing products in KHR with USD currency. As discussed previously, the transaction exchange rate is normally set in favor of the vendors. The remaining 88% of respondents indicate that they exchange USD to KHR (likely at a currency exchanger) before purchasing products in KHR. Although they may not suffer from the unfair exchange rates set by the vendors, they still face a transaction cost due to the time spent at currency exchangers.

Overview of perceptions of wage payments in KHR

6.1. Worker side

Figures 3 and 4 depict the answers of worker-side respondents, in the total sample and by gender respectively, regarding their perceptions of receiving wages in KHR. These results are based on the answers to the question, “Do you think your wage should be paid in KHR?” From the figures, it is evident that their perceptions are mixed.

Figure 3 shows that approximately 57% of total respondents express opposition to the proposal, stating that they “disagree” or “strongly disagree” with receiving wages in KHR.¹⁰ On the other hand, approximately 41.5% of respondents indicated that they “agree” or “strongly agree” with receiving wages in KHR, and a small percentage of respondents have a neutral stance on the proposal to receive wages in KHR.

Figure 3: Perceptions of worker-side respondents on receiving wage in KHR

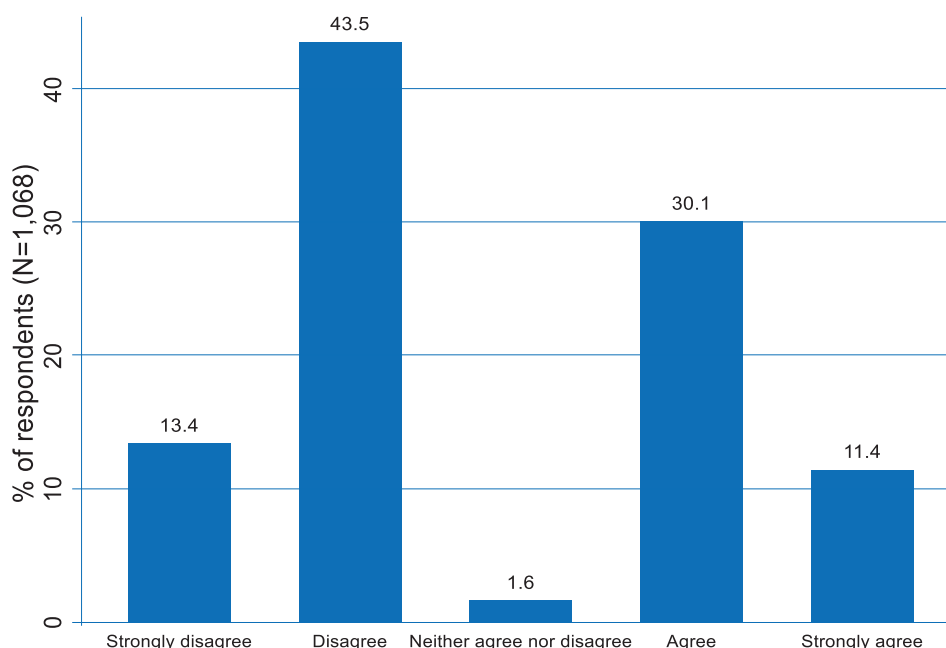
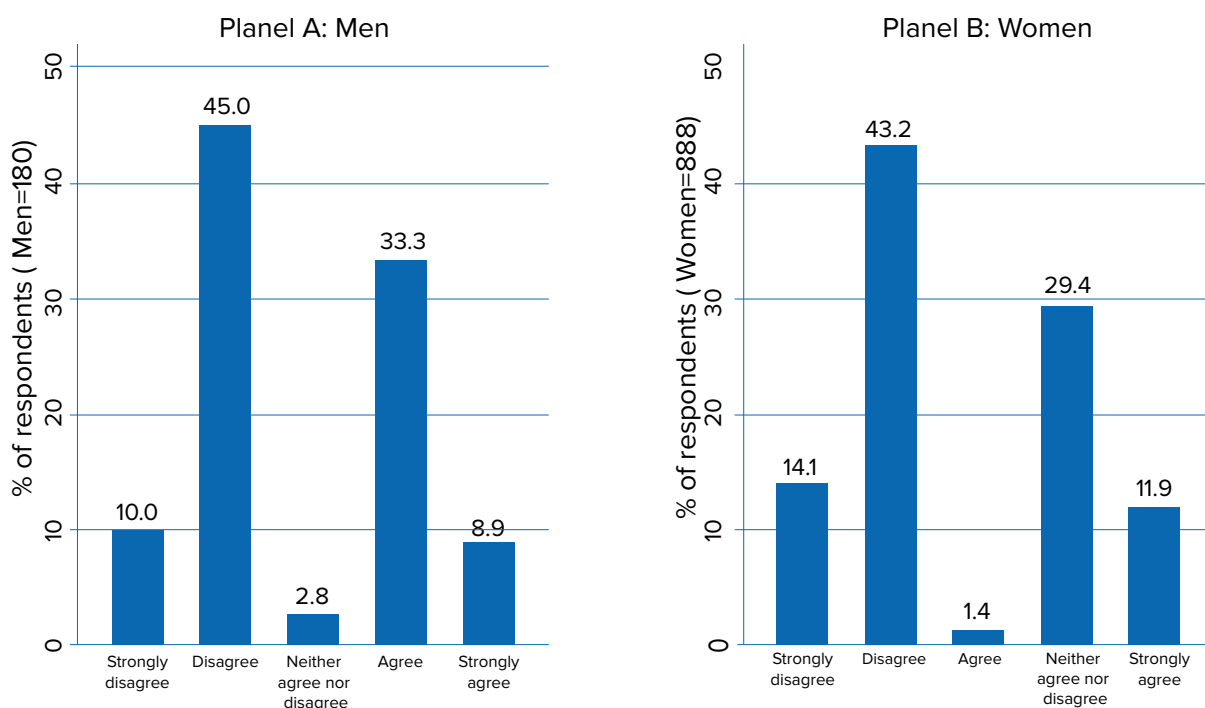


Figure 4, which is broken down by gender, shows that men (Panel A) and women (Panel B) have similar perceptions (in terms of percentages) about receiving wages in KHR, which are similar to the overall sample’s perception shown in Figure 3.

¹⁰ It is important to note that the sector’s production inputs account for a significant proportion of Cambodia’s total imports. Due to the sector’s dependence on foreign trade for both purchases and sales, most of their transactions may be mainly conducted in USD or other foreign currencies. If wages must be paid in KHR, factories in the sector would need to engage in currency exchange, which could increase their transaction costs. This can reduce their willingness to pay wages in KHR.

Figure 4: Perceptions of worker-side respondents on receiving wage in KHR by gender



Source: Produced by authors based on survey data

In our survey, we also asked the respondents to provide up to two reasons for their answers. Tables 10 and 11 illustrate the reasons provided by the respondents.

From Table 10, which outlines the reasons respondents disagree or strongly disagree with receiving wages in KHR, “fear of exchange rate risk” is the primary reason for about 79.1% of respondents and the second reason for about 15.8% of respondents.¹¹ This underscores a pronounced concern about the impact of fluctuations in the exchange rate on their wages.¹² Following this, “the need to use USD for expenditures” is also a major factor that 16.6% of respondents cited as their primary reason and 28.5% as their secondary reason. A small percentage of respondents cited “the inconvenience of KHR for saving and usage,” with about 3.9% citing this as their primary reason and about 11.7% citing it as their secondary reason. Meanwhile, a notable number of respondents (about 40.8%) did not provide a second reason.

Table 10: Reasons of “disagree” or “strongly disagree” on receiving wages in KHR

Description	First reason		Second reason	
	Number of answers	Percentage (%)	Number of answers	Percentage (%)
Fear of exchange rate risk	481	79.1	96	15.8
Need of using USD for expenditure	101	16.6	173	28.5
Inconvenience of KHR for saving and usage	24	3.9	71	11.7
Convenience of USD for saving and usage	1	0.2	11	1.8
Other	1	0.2	9	1.5
No answer	0	0.0	248	40.8
Total	608	100	608	100

Source: Authors’ calculation based on survey data

11 Although a large number of worker-side respondents mention “fear of exchange rate risk” as the main reason for them to disagree or strongly disagree with receiving wages in KHR, our survey also reveals that about 97% of them express “somewhat trust” or “completely trust” in KHR.
 12 When comparing the reasons by gender for why men and women either “disagree” or “strongly disagree” with receiving wages in KHR, approximately 76.8% of men (out of a total of 99 respondents) and 79.6% of women (from a total of 509 respondents) cited the fear of losing on exchange rate risk as their primary reason. These results highlight a high concern regarding exchange rate risks among both genders, with a marginally higher proportion of women expressing this concern.

Table 11 shows the reasons why respondents agree or strongly agree with receiving wages in KHR. The majority (about 55.3%) answered that “the convenience of KHR for saving and usage” is their primary cause, while approximately 16.9% cited it as their secondary reason. This indicates a preference for using KHR for daily transactions and deposits, indicating a level of familiarity with the national currency. Moreover, a substantial portion of respondents (about 33.6%) cited “the need to support the national currency” as their primary reason, and approximately 10.8% cited it as their secondary reason, highlighting a desire to supporting the national currency. Other justifications, such as “ease of identification,” comprise a lesser proportion of answers. A high percentage of respondents did not provide a second rationale.

Table 11: Reasons of “agree” or “strongly agree” on receiving wages in KHR

Description	First reason		Second reason	
	Number of answers	Percentage (%)	Number of answers	Percentage (%)
Convenience of KHR for saving and usage	245	55.3	75	16.9
Need to support the national currency	149	33.6	48	10.8
Easiness of identifying	17	3.8	29	6.5
Other	31	7.0	10	2.3
No answer	1	0.2	281	63.4
Total	443	100	443	100

Source: Authors’ calculation based on survey data

Focusing on respondents who “agree” or “strongly disagree” to receive wages in KHR, Table 12 displays their answers on their willingness to receive a percentage of their wages in KHR. From the table, it appears that the majority of respondents agree to receiving at least a portion of their salary in KHR. About 53.6% of them agree to receive 100% of their wages in KHR.

Moreover, among respondents who “agree” or “strongly disagree” to receive wages in KHR, the 50% option is the second most popular one, with approximately 22.2% of respondents consenting to it. This indicates that a sizeable proportion of respondents are content with receiving half of their wages in KHR. From the table, we also observe that about 10.5% and about 5.9% of respondents are amenable to receiving 80% and 90% of their wages in KHR, respectively.

Our survey reveals an intriguing dichotomy in which the majority of respondents prefer either a large percentage (80-100%) or precisely 50% of their wages in KHR. This may indicate a polarization in the preferences among the respondents who “agree” or “strongly agree” to receive wages in KHR, with one substantial group fully embracing the KHR and another substantial group favoring a balanced approach.¹³

¹³ It would provide more implications if we could match respondents who chose “strongly disagree” or “disagree” with their responses for “percentage of wage in KHR.” However, unfortunately, due to our data limitations, we could not do so. Our question regarding the agreed percentage of wage in KHR is, “If you want your wage to be paid in KHR, what is the share of the total wage?”, which is applicable only to those who have no objections to receiving their wage in KHR.

Table 12: Agreed percentage of wage in KHR and respondents who expressed no objection on receiving wage in KHR

Agreed percentage of wage in KHR	Neither agree nor disagree	Agree	Strongly agree	Total respondents	% of respondents
10	1	0	0	1	0.2
20	1	0	0	1	0.2
30	0	1	0	1	0.2
40	0	2	0	2	0.4
50	14	80	7	101	22.2
60	0	6	1	7	1.5
70	0	18	5	23	5.1
80	0	38	10	48	10.5
90	0	25	2	27	5.9
100	0	148	96	244	53.6
Total	16	318	121	455	100

Source: Authors' calculation based on survey data

In our survey, we also inquired about the general opinions of worker-side respondents regarding receiving wages in KHR.¹⁴ About 44.5% of respondents have no specific requests and follow the factories' decision. However, among those who provided comments and requests, the majority of them consider factories should use the market exchange rate and fair exchange rate when deciding to use KHR for wage payments.

We also find varying levels of support for expanding KHR usage in various sectors and aspects of daily life. Some respondents have expressed a desire for the KHR to play a larger role in domestic transactions by suggesting that all salaries and wages should be paid in KHR, a fair exchange rate should be established, and the KHR should be used in all sectors of the economy. Despite constituting a small portion of the responses as a whole, these sentiments may represent a collective expression of support for enhancing the usage of the national currency.

The survey also shows that a notable portion of the respondents insist that proprietors set rent payments in KHR, indicating a preference for standardizing rent prices in the local currency. Moreover, some respondents emphasized the need for broader adoption of KHR by businesses and institutions.

The survey also indicates that only a minority of respondents argue for maintaining the use of USD in wage payments or even increasing the dollar proportion of wage payments.

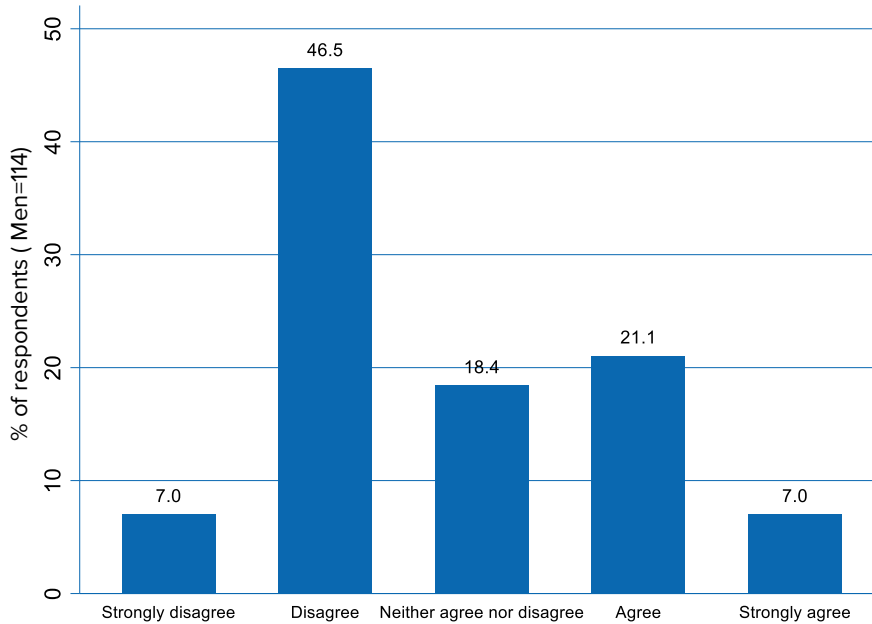
6.2. Factory side

Figures 5 and 6 depict the answers of factory-side respondents, in the total sample and by gender respectively, regarding their perceptions of the requirement to pay wages in KHR to their employees. The results are based on the question, "Do you agree that factories should be required to pay wages in KHR?" It is evident from the figure that their perspectives differ.

¹⁴ More detailed results can be provided upon request.

Figure 5 indicates that approximately 53.5% of respondents are opposed to the proposal, indicating that they “disagree” or “strongly disagree” with being required to pay wages in KHR. On the other hand, approximately 28.1% of respondents indicated that they “agree” or “strongly agree” with being required to pay wages to their employees in KHR, and a sizable percentage of respondents have a neutral posture on the proposal to be required to pay wages to their employees in KHR.

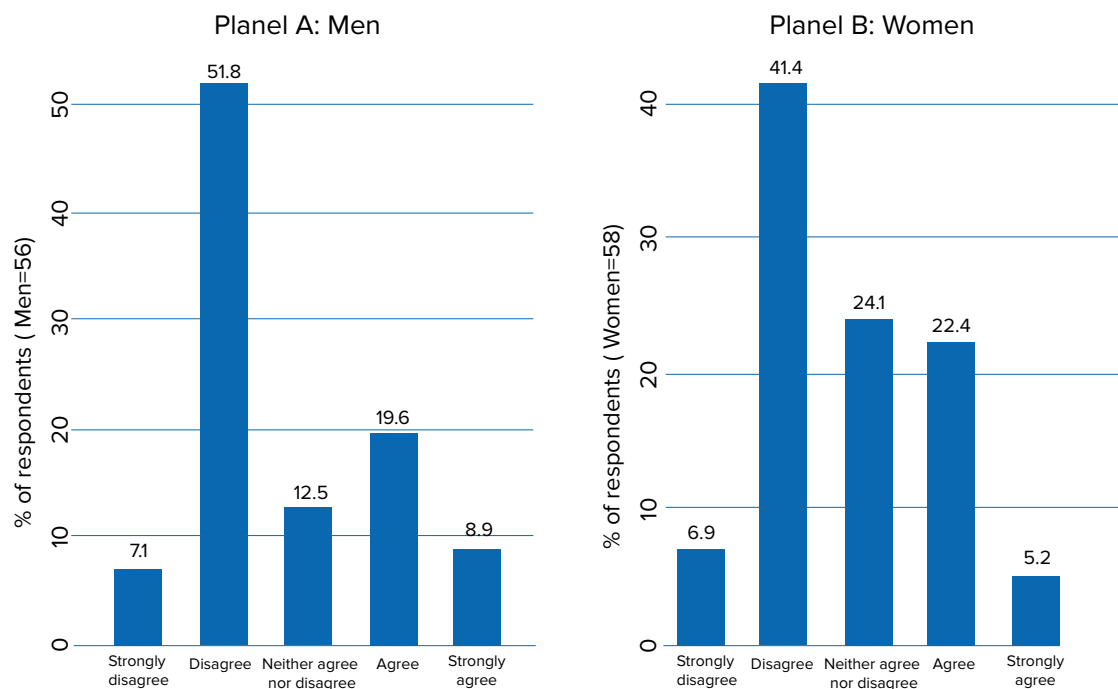
Figure 5: Perceptions of factory-side respondents on paying wage in KHR



Source: Produced by authors based on survey data

Figure 6, categorized by gender, illustrates that the perception among men (Panel A) is comparable to the overall sample’s perception depicted in Figure 5. But women (Panel B) demonstrate a higher percentage of no objection to receiving wages in KHR.

Figure 6: Perceptions of factory-side respondents on paying wage in KHR by gender



Source: Produced by authors based on survey data

Like the worker-side survey, for the factory-side survey, we also asked the respondents to provide up to two reasons for their perceptions. Tables 13 and 14 illustrate the reasons provided by the respondents.

Table 13 illustrates the reasons why the factory-side respondents “disagree” or “strongly disagree” with the proposal for the requirement of paying wages to employees in KHR. Approximately 32.8% of factory-side respondents mentioned “workers’ fear of exchange rate risk” as their main justification, and 6.6% cited it as their secondary justification for not wanting to pay wages in KHR. Then, about 16.4% of factory-side respondents said that “workers’ dissatisfaction to receive wages in KHR due to the need to use USD for expenditures” and the same number mentioned “the inconvenience for preparing and keeping KHR” were their main reasons, while about 4.9% and about 18% of respondents said that these were their secondary reasons, respectively.

Table 13 also shows that “the burden of system adjustment” was mentioned as a primary reason by approximately 9.8% of respondents and as a secondary reason by about 8.2%. A considerable proportion of respondents.

Table 13: Reasons of “disagree” or “strongly disagree” on paying wages in KHR

Description	First reason		Second reason	
	Number of answers	Percentage (%)	Number of answers	Percentage (%)
Workers’ fear of exchange rate risk	20	32.8	4	6.6
Workers’ dissatisfaction to receive wages in KHR due to the need to use USD for expenditures	10	16.4	3	4.9
Inconvenience for preparing and keeping KHR	10	16.4	11	18.0
Burden of system adjustment	6	9.8	5	8.2
Other	8	13.1	5	8.2
No answer	7	11.5	33	54.1
Total	61	100	61	100

Source: Authors’ calculation based on survey data

On the other hand, Table 14 emphasizes the reasons why the factory-side respondents “agree” or “strongly agree” to pay wages to their employees in KHR. Significant numbers of respondents mentioned “the need to support the national currency,” with about 43.8% citing this as their primary reason and 3.1% listing it as their secondary reason. “Regulation or policy intervention to require paying wages in KHR” was the second most frequently mentioned primary reason, cited by 37.5% of respondents; however, similar to the first reason, only 3.1% cited it as a secondary reason.

Table 14 also depicts a smaller percentage of factory-side respondents who mentioned the “convenience of KHR for workers and usage,” with about 6.3% and about 9.4%, respectively, selecting it as the first and second reasons. No respondents mentioned “avoidance of exchange rate risk” as a primary reason, but about 6.3% did so as a secondary reason.

Table 14: Reasons of “agree” or “strongly agree” on paying wages in KHR

Description	First reason		Second reason	
	Number of answers	Percentage (%)	Number of answers	Percentage (%)
Need to support the national currency	14	43.8	1	3.1
Regulation or policy intervention to require paying wages in KHR	12	37.5	1	3.1
Convenience of KHR for workers and usage	2	6.3	3	9.4
Avoidance of exchange rate risk	0	0.0	2	6.3
Other	4	12.5	3	9.4
No answer	0	0.0	22	68.8
Total	32	100	32	7

Source: Authors’ calculation based on survey data

Table 15 displays the agreed percentage of KHR for paying wages among factory-side respondents who express no objection to the requirement of paying wages to their employees in KHR.

The table shows that the large majority of respondents (27 of 31, or 87.1%) who express no objection to the requirement of paying wages in KHR agree that the entire wage should be paid in KHR. A minority of respondents chose alternative percentages for the wages that will be paid in KHR. Two respondents (representing 6.5% of the total) held the opinion that 20% of the wages should be paid in KHR. One respondent (3.2% of the total) chose that 30% of the wage should be paid in KHR. Similarly, a respondent (3.2%) opted for a 40% wage payment in KHR.

Table 15: Agreed percentage of paying wages in KHR among respondents who expressed no objection on the requirement to pay wages in KHR

Agreed percentage of wage in KHR	Neither agree nor disagree	Agree	Strongly agree	Total respondents	% of respondents
20	1	1	0	2	6.5
30	1	0	0	1	3.2
40	0	0	1	1	3.2
100	3	17	7	27	87.1
Total	5	18	8	31	100.0

Source: Authors’ calculation based on survey data.

In our survey, we also inquired about factory-side respondents' general perspectives on wage payments in KHR.¹⁵ The majority of factory-side respondents mention the necessity of a policy stipulating wage payments for factory workers in KHR, emphasizing this as an essential measure. This perspective of respondents reflects the prevailing sentiment among factory management regarding the government's role in promoting KHR usage in wage payments.

Many factory-side respondents also emphasize the need for a nationwide campaign to increase people's awareness of the advantages of receiving wages in KHR. It indicates a consensus of the need for a communicative strategy to promote the KHR's acceptability.

In addition, a notable number of factory-side respondents advocate setting prices for goods and services in KHR and promoting the use of KHR in the market, indicating a desire for broader measures to strengthen the use of the national currency.

There are numerous demands by respondents for a stable exchange rate for wage payments and for financial institutions to play a role in achieving this. This indicates concerns regarding the impact of the fluctuating exchange rate.

¹⁵ More detailed results can be provided upon request.

Perceptions of receiving and paying wages in KHR and their determinants

As indicated in Section 6, our survey reveals that worker-side and factory-side respondents have diverse perceptions on wage payments in KHR. To gain a deeper understanding of the factors influencing these perceptions, regression analyses are employed.

7.1. Estimation framework

In examining the factors influencing perceptions of worker-side and factory-side respondents, the following probit regression equation is considered.

$$(17) \quad \Pr(r_i = 1 | d_i) = F(d_i' \beta),$$

where r is a binary variable, whose value is 1 if a worker-side respondent or factory-side respondent “agrees” or “strongly agrees” to receiving or paying wages in KHR, and 0 if the respondent “disagrees” or “strongly disagrees” to receiving or paying wages in KHR. “ $\beta = (\beta_0, \beta_1, \dots, \beta_k)$ ” is a $(k + 1) \times 1$ vector of regression coefficients; “ $d = (1, d_1, \dots, d_k)$ ” is a $(k + 1) \times 1$ vector of the explanatory variables; i indicates the observation. F is the cumulative distribution function of the standard normal distribution. Given the binary nature of the dependent variable, this analysis employs probit regression.

For the worker-side analysis, we consider various respondent and household characteristics as explanatory variables. These variables include whether a respondent is the household head or a spouse, the respondent’s gender, age, level of education, household income, and the proportion of household expenditures in KHR.

In addition, we incorporate explanatory variables capturing respondents’ knowledge of inflation, knowledge of the exchange rate, the frequency of using digital payments, and the frequency of currency exchange from USD to KHR. Appendix E offers explanations and descriptive statistics concerning knowledge of inflation and knowledge of the exchange rate. Appendix F provides details and descriptive statistics on the frequency of using digital payments and the frequency of currency exchange from USD to KHR.

As explanation variables for the factory-side estimation, various respondent and factory characteristics are considered. Depending on the availability of data, these variables include whether a respondent is a manager or holding higher position in the factory, the respondent’s gender, the number of years the factory has been in business, its total sale revenue, and the number of employees.

7.2. Estimation results

The estimation results for the worker side and the factory side are presented in Tables 16 and 17, respectively.¹⁶

¹⁶ To investigate multicollinearity, we also compute the variance inflation factors (VIFs) of explanatory variables in our estimation equations. With the exception of household income, the factory’s sales revenue, the respondent’s age, the factory’s age, and their squared terms, the VIFs of explanatory variables are less than 10, indicating that multicollinearity is not a major issue. Typically, when an explanatory variable and its squared term are included in the estimation equation, their VIFs are quite large. This should not be a concern, however, because the two variables cannot be linearly transformed into one another.

Table 16 shows the worker-side results on the factors affecting respondents' perceptions of receiving wages in KHR. From the table, respondents with greater knowledge of exchange rates are more inclined to consent to receiving wages in KHR. Furthermore, as the proportion of their household expenditures in KHR rises, survey respondents are more likely to accept wage payments in KHR.

The results also show that the relationship between income and the perception of receiving wages in KHR is nonlinear. At a relatively lower level of income, for households with a higher household income, the likelihood of agreeing to be paid in KHR increases, but it decreases for households with a monthly income of more than KHR 1.9 million.¹⁷

The estimation also reveals that respondents who are household heads or their spouses are less likely to accept wages in KHR suggesting a limited knowledge of currency mismatches in transactions and exchange rate among household heads and their spouses. Respondents who use digital payments more frequently are less likely to consent to receiving wages in KHR. A possible reason for this result is that respondents who frequently use digital payments do not suffer from unfair exchange rates set by the vendors, even if they purchase goods in KHR by using USD, because through digital payments, the exchange rate will be the rate set by the financial institutions, which is normally fairer than the rate set by the vendors.¹⁸ Therefore, they may not find the benefit of reducing the cost of currency mismatches by receiving wages in KHR.

For respondents' gender, age and its squared term, education level, knowledge of inflation, and frequency of exchanging USD to KHR, they are not statistically significant, suggesting that these factors do not have a substantial influence on the perception of receiving wages in KHR.¹⁹

17 Let $\ln x$ represent the natural logarithm of monthly household income. From Equation (14) and the results presented in Column (2) of Table 16, we can calculate its marginal effect on the perception of receiving wages in KHR as $\frac{\partial \Pr(r_i=1|d_i)}{\partial \ln x} = \frac{\partial F(d_i'\beta)}{\partial \ln x} = f(d_i'\beta)$ ($12.198-2 \times 0.422 \ln x$), where F is the cumulative distribution function of the standard normal distribution and f is its probability density function. Since $f(d_i'\beta)$ is non-negative, the sign of $\frac{\partial \Pr(r_i=1|d_i)}{\partial \ln x}$ is dependent on the sign of $12.198-2 \times 0.422 \ln x$, which is negative when $\ln x$ is larger than 14.453 or when the household income (x) is greater than KHR 1.9 million.

18 It is worth noting that there can be many reasons, including the convenience of transactions, for respondents to use digital payment methods, apart from the fairer exchange rate they provide.

19 The estimation results also reveal that, after accounting for other variables, respondents from footwear factories are less likely to agree to receive their wages in KHR, compared to the baseline group, which consists of respondents from garment factories. But the inclination to accept wages in KHR among respondents from travel goods and bag factories does not show a statistically significant difference from the baseline group. Additionally, controlling for other factors, it appears that respondents from Preah Sihanouk province are less likely to consent to receiving wages in KHR compared to the baseline group of respondents from Phnom Penh. However, for respondents from other provinces, the difference in their likelihood to accept wages in KHR is not statistically significant. The underlying reasons for these variations remain a topic for future investigation.

Table 16: Probit regression results (dep. var.: perception on receiving wages in KHR, agree:1, disagree:0)

Variables	perception on receiving wages in KHR (1)	perception on receiving wages in KHR (2)
Household head or spouse	-0.219** (0.106)	-0.225** (0.108)
Woman	-0.083 (0.109)	-0.110 (0.112)
Age	-0.005 (0.109)	-0.012 (0.112)
Squared age	0.000 (0.001)	0.000 (0.001)
Education of respondent (1: higher than elementary level, 0: other)	0.051 (0.084)	0.022 (0.086)
Knowledge of inflation (1: correct answer, 0: wrong answer)	-0.018 (0.089)	0.023 (0.092)
Knowledge of exchange rate (1: correct answer, 0: wrong answer)	0.430*** (0.082)	0.409*** (0.084)
ln (household income)	11.719* (7.067)	12.198* (7.283)
Squared ln(household income)	-0.406* (0.246)	-0.422* (0.254)
Share of household expenditure in KHR	0.721*** (0.277)	0.843*** (0.301)
Frequency of using digital payments (0: never to 3: very often)	-0.065* (0.039)	-0.072* (0.039)
Frequency of making currency exchange from USD to KHR (1: sometimes to 3: very often)	0.029 (0.117)	0.092 (0.120)
Constant	-85.400* (50.628)	-88.956* (52.167)
Factory type dummies	No	Yes
Phnom Penh/Province dummies	No	Yes
Log pseudolikelihood	-667.220	-656.214
Pseudo-R2	0.04	0.05
Observations	1,014	1,014

Standard errors are in parentheses.

***, ** and * indicate the statistical significance at 1%, 5% and 10%, respectively.

Source: Authors' estimation based on survey data

The results of a probit regression examining the factory-side respondents' perception of wage payments in KHR are presented in Table 17. The table shows that survey respondents who are in managerial or higher positions are more likely to agree with paying wages to their employees in KHR. It also indicates that factory-side woman respondents are more likely to agree to pay wages in KHR. A possible explanation for this result is that woman respondents, who are more engaged in household management, particularly in the Cambodian context, may find that paying wages in KHR is more convenient for workers. This

perception could be especially prevalent if they believe that a significant share of workers' expenditures is on necessity goods like food, which are typically transacted in KHR.²⁰

Furthermore, the estimation results suggest a nonlinear correlation between the factories' sales revenue and the likelihood of consenting to paying wages to their employees in KHR. At the relatively lower levels of annual sales revenues, for factories with a higher annual sales revenue, the likelihood of agreeing to be paid in KHR increases, but it decreases for factories with annual sales revenues of more than about USD 2.7 million.²¹

Other variables, such as the number of years of operation and the number of employees, are not statistically significant.

Table 17: Probit regression results (dep. Var.: perception on paying wages in KHR, agree:1, disagree:0)

Variables	perception on paying wages in KHR (1)	perception on paying wages in KHR (2)
Manager and higher position	0.936* (0.526)	1.783** (0.779)
Woman	0.579 (0.387)	1.095* (0.565)
Years in operation	-0.039 (0.096)	0.087 (0.137)
Squared years in operation	-0.000 (0.005)	-0.008 (0.008)
ln(sale)	7.486 (6.698)	13.531* (7.775)
Squared ln(sale)	-0.242 (0.220)	-0.457* (0.259)
ln(number of employees)	0.123 (0.427)	0.836 (0.549)
Constant	-59.818 (51.149)	-107.744* (59.343)
Factory type dummies	No	Yes
Region dummies	No	Yes
Log pseudolikelihood	-34.602	-27.277
Pseudo-R2	0.10	0.27
Observations	63	60

Standard errors are in parentheses.

***, ** and * indicate the statistical significance at 1%, 5% and 10%, respectively.

20 The estimation also indicates that, controlling for other factors, factory-side respondents from travel goods and bag factories are less likely to agree to pay wages in KHR, compared to the baseline group from garment factories. However, this tendency is not statistically significantly different for individuals from footwear factories. Moreover, after controlling for other factors in the estimation, it is noted that factory-side respondents from Kandal province show a lesser propensity to agree to wage payments in KHR compared to those from Phnom Penh, the reference group. For respondents from other provinces, the estimation results are not statistically significant. The reasons behind this remain the subject of future research.

21 Let $\ln y$ denote the natural logarithm of the factory's annual sales revenues. Utilizing Equation (14) and the results in Column (2) of Table 17, its marginal effect on the perception of receiving wages in KHR can be computed as $\frac{\partial \Pr(r_i=1|d_i)}{\partial \ln y} = \frac{\partial F(d_i\beta)}{\partial \ln y} = f(d_i\beta) (13.531-2 \times 0.457 \ln y)$, where F is the cumulative distribution function of the standard normal distribution and f is its probability density function. Since $f(d_i\beta)$ is non-negative, the sign of $\frac{\partial \Pr(r_i=1|d_i)}{\partial \ln y}$ is dependent on the sign of $13.531-2 \times 0.457 \ln y$, becoming negative when $\ln y$ is greater than 14.804 or, equivalently, when the factory's sales revenues (y) is larger than USD 2.7 million.

Conclusion

The current study on the dollarization issue in Cambodia, focusing on the garment, footwear, and travel goods and bag sector, presents a multifaceted examination of the currency usage in the sector. The theoretical and statistical analyses have yielded insightful findings regarding the potential issues of currency mismatches and perceptions wage payments for both household and factory sides.

Our analyses indicate that there can be a welfare loss for households earning in USD and spending a large share in KHR. Worker-side households with lower income levels are more susceptible to the adverse impact of currency mismatches given their higher expenditure in KHR for necessity goods such as food and beverages.

For worker-side respondents' perceptions of receiving wages in KHR, our study reveals that higher-income workers generally demonstrate a stronger inclination to accept wage payments in KHR; however, this inclination diminishes beyond a certain income threshold, indicating a non-linear relationship between income levels and the preference for receiving wages in KHR. Furthermore, respondents with better knowledge of the exchange are more likely to consent to receiving wages in KHR.

For the factory side, our results reveal that respondents in managerial or higher positions in the factories and factories with higher sales revenues generally express a higher willingness to pay wages to their employees in KHR, though again with a nonlinear relationship regarding sales revenue. For factories whose annual sales revenues exceed USD 2.7 million, higher sales revenues tend to be associated with lower willingness to pay wages in KHR. This tendency may be attributed to the greater exposure of larger factories to international markets and transactions. As a result, they are more likely to prefer to use USD for wage payments in order to align with their revenue streams and mitigate currency exchange risks.

Survey framework

Our study examines the perspectives regarding the expansion of KHR usage in wage payments, from both the worker and factory sides. Despite the fact that a considerable proportion of workers are indifferent to the currency type for wage payments, a sizable proportion advocate for the prominent role of KHR. This suggests that the awareness of the importance of the KHR's role in the country is on the rise.

In addition, there is a notable number of worker-side and factory-side respondents expressing preferences for the government to initiate policies facilitating wage payments in KHR, as well as a desire for a national awareness campaign to promote its broader usage. These findings highlight that government interventions and awareness campaigns can play a crucial role in guiding the de-dollarization process in Cambodia. Maintaining a stable exchange rate is also important for improving the predictability and stability of economic transactions. This can encourage more holding and usage of KHR. From our survey, the main reason for both workers and factories being against wage payments in KHR is the fear of exchange rate fluctuations. However, it is important to note that the KHR exchange rate has been relatively stable over the last decade, with an exchange rate of approximately KHR 4,000 per USD. This implies that limited awareness of the long-term stability of the KHR exchange rate against USD may negatively affect the willingness to accept wage payments in KHR. Therefore, maintaining the stability of the KHR exchange rate and raising public awareness of this stability can create a favorable environment for enhancing the de-dollarization process.

Furthermore, to enhance the de-dollarization process in Cambodia, more active participation from the private sector is important. The private sector can participate in policy dialogues, providing insights into the challenges and opportunities of transitioning to KHR for wage payments and other transactions. Additionally, it can voluntarily commit to paying wages in KHR and encourage its supply chains and business partners to do the same, thus setting an example for wider adoption. The private sector can work with the public sector to establish mechanisms for more convenient and more efficient KHR transactions, such as digital payment platforms. This cooperative approach can create a conducive environment for de-dollarization in Cambodia. To incentivize private sector participation, it might be crucial to implement policies that recognize and appreciate businesses in the private sector that voluntarily adopt the KHR for wage payments and encourage their business networks to do the same. This could include a moral suasion campaign highlighting the long-term advantages of KHR adoption for these businesses, as well as public recognition of those taking proactive steps in this direction.

Our analyses also suggest that it might be possible to provide a significant portion of workers' wages in KHR, as there is a demand for KHR in their daily transactions, especially for necessity goods such as foods. This could be a potential solution, particularly for workers with relatively low household incomes (for instance, based on our analysis, those earning less than KHR 1.9 million, who show a greater willingness to receive wages in KHR), to address currency mismatches in their transactions. This policy approach may prove effective if the exchange rate between KHR and USD remains stable.

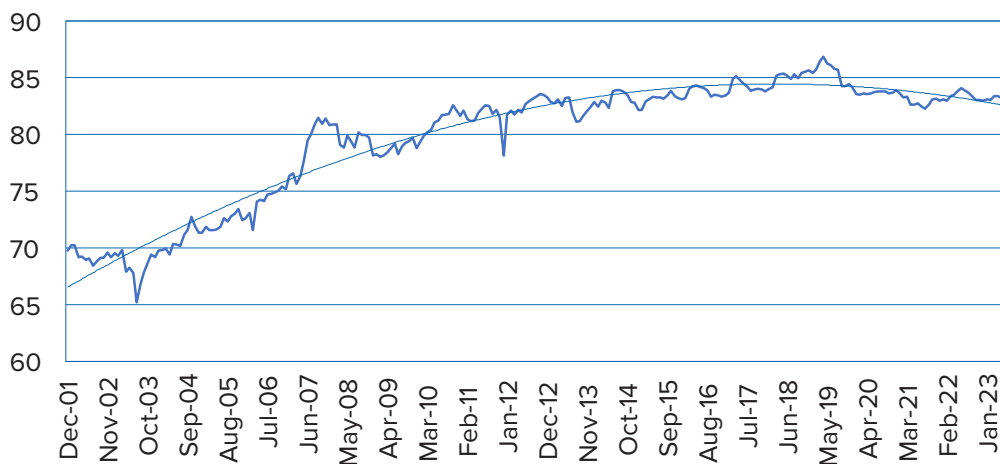
Appendix

Appendix A

Overview of the current status of dollarization in Cambodia

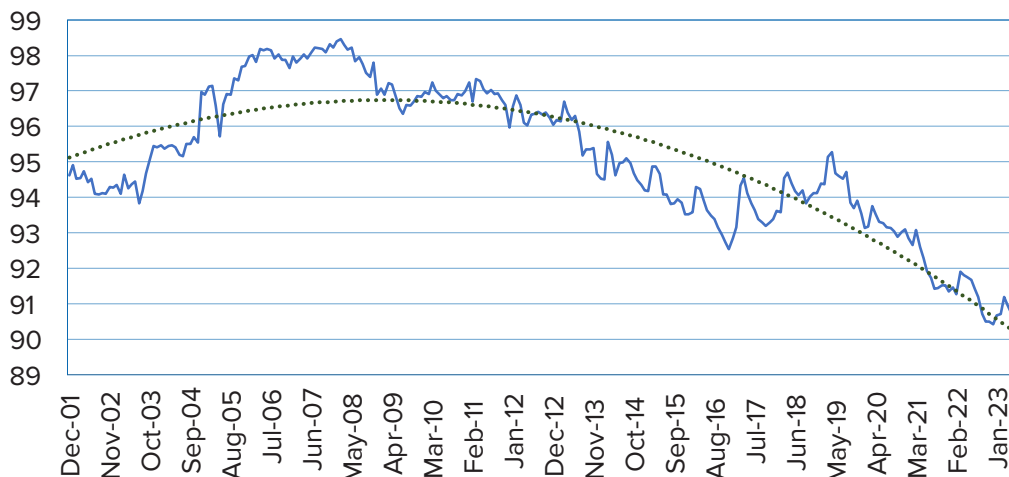
The trend of dollarization in Cambodia has been increasing steadily at the same time as the use of Khmer riel. The KHR currency in circulation to nominal GDP ratio (CIC/GDP) has improved from only around 4% in 2001 to 13% in 2022, according to the NBC. The degree of dollarization proxied by foreign currency deposits (FCD) to the broad money ratio (M2) has increased from 70% in 2021 to 84% and has been stagnant at this level (Figure A1). Another indicator of dollarization, which is the foreign currency deposit to total deposit (FCD/TD) ratio, has shown a gradual decline trend from 94.6% to 90.3% as of 2001 and 2023, respectively (Figure A2). The later indicator indicates the change in people's saving behavior from only in USD to KHR and has shown a good trend and the effectiveness of the local currency promotion.

Figure A1: Foreign currency deposits (FCD) to broad money (M2) ratio (%), Dec 2001-Jul 2023



Source: Produced by the National Bank of Cambodia (NBC)'s staff based on the NBC's data

Figure A2: Foreign currency deposits (FCD) to total deposit (TD) (%), Dec 2001-Jul 2023



Source: Produced by the National Bank of Cambodia (NBC)'s staff based on the NBC's data

The dollarization of Cambodia’s economy is often argued to have a positive relationship with growth. The correlation between FCD/M2 and nominal GDP is 83% using the data from 2001 to 2022 (Figure A3). Over the decade before the pandemic, Cambodia enjoyed a strong growth rate, on average around 7%, according to the World Bank data.

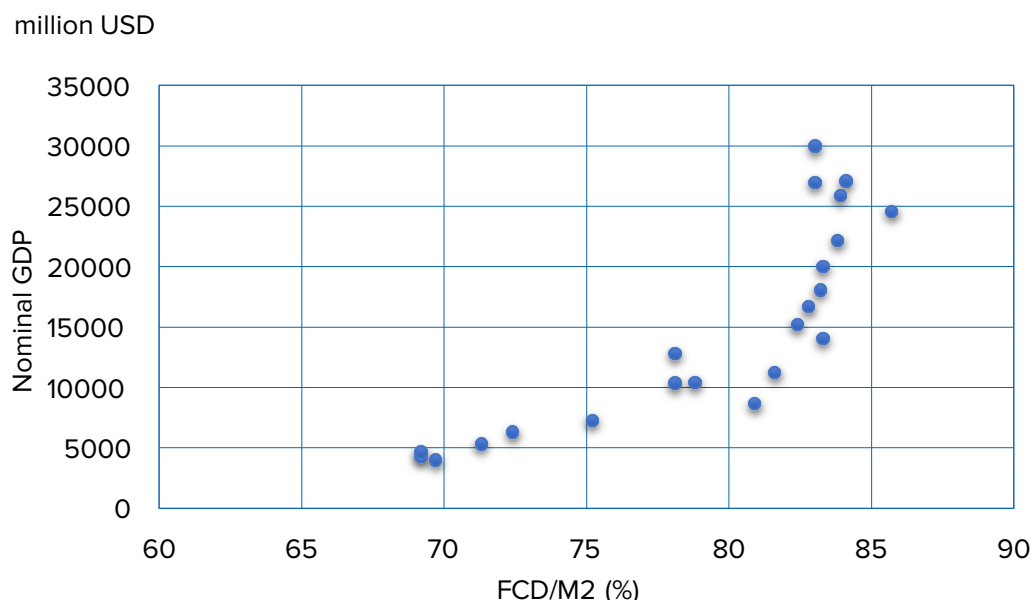
Under dollarization and a stable exchange rate, Cambodia could attract more capital inflows, with positive effects on domestic investments in the fundamental sectors that support growth, such as construction, real estate, and services. If we consider the resilience of the economy in terms of international reserves in the context of highly dollarized economies, Cambodia has attained a high level of international reserves.

However, when considering the impossible trinity theorem, which comprises the independence of monetary policy, a stable exchange rate policy, and a free capital flow policy, it becomes apparent that a country cannot achieve all three policies simultaneously and must make a trade-off between them (Figure A4). In this regard, Cambodia is somehow in between.

Aizenman et al. (2013) developed an index for each of the three policy components (monetary policy, exchange rate, and capital flow) on a scale from 0 to 1. A higher value on these indices indicates a greater degree of liberalization, except for the exchange rate index, where a higher value indicates greater stability.

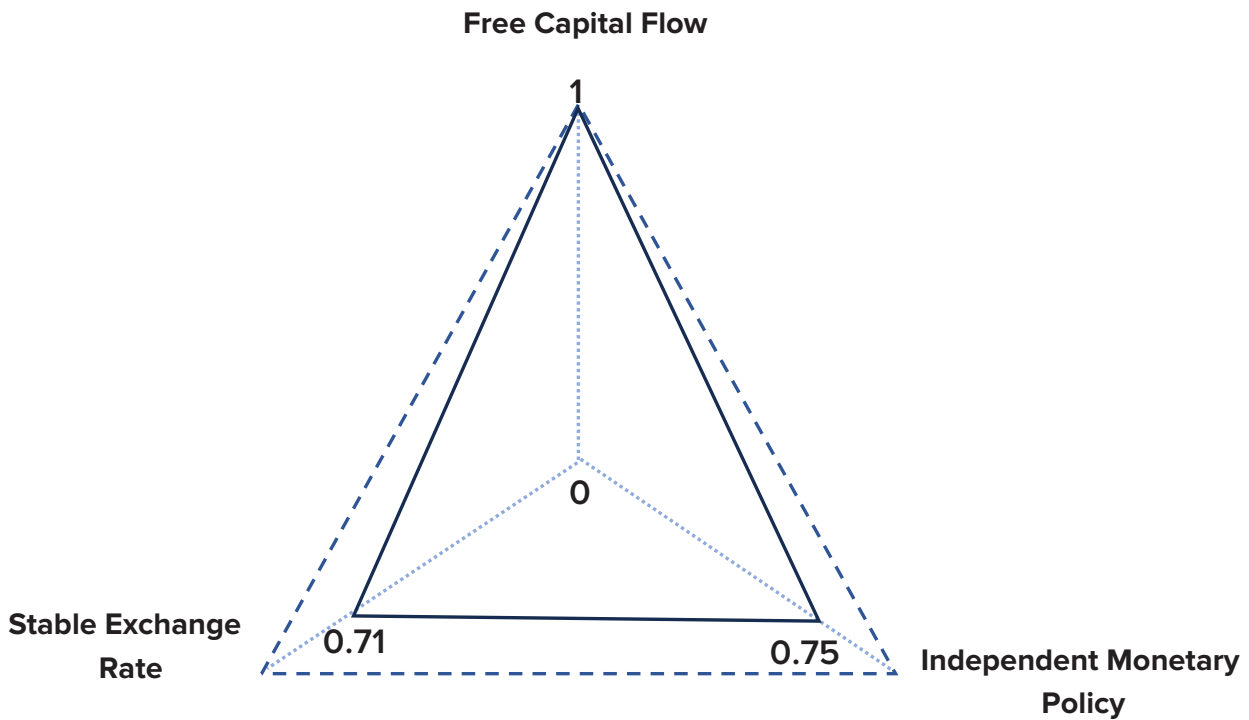
As of 2019, for Cambodia, the capital flow index was 1, the exchange rate stability index was 0.71, and monetary policy independence was 0.75. These values highlight a limitation in the implementation of monetary policy, primarily attributed to the high level of dollarization in Cambodia’s economy. In essence, Cambodia is effectively importing US monetary policy involuntarily. Therefore, reducing the level of dollarization is essential, as it would enable Cambodia to implement monetary policy more effectively and timely.

Figure A3: Relationship between FCD/M2 (%) and nominal GDP



Source: Produced by the National Bank of Cambodia (NBC)’s staff based on the NBC’s data

Figure A4: “Impossible Trinity” diagram and Cambodia’s position



Note: The solid lines reflect the index values of the three policy components for Cambodia.

Source: Produced by the National Bank of Cambodia (NBC)’s staff based on Aizenman et al. (2013) and the NBC’s data

There are several challenges for de-dollarization in Cambodia. While tax payments and public servants’ salaries are in KHR, USD remains the dominant currency for salaries in the private sector. Many shops in urban areas still quote the prices of their goods in USD. When people purchase high-value items like smartphones, tablets, cars, and the like, the prices are often quoted in USD.

According to the NBC-JICA survey in 2017, there has been a mismatch between income and borrowing from banks and financial institutions. Many households borrow in USD despite their incomes being mainly in KHR. This mismatch could be the source of risks for them if KHR depreciates.

These factors highlight the persistent level of dollarization driven by the demand for USD in the economy. Cambodia has consistently made efforts to promote the use of KHR; however, these efforts have not been sufficient to reduce the prevalence of USD. To expedite the de-dollarization process, a national strategy involving various stakeholders, including the public and private sectors, should be implemented. Without a well-defined plan and substantial efforts, the transition away from USD usage is likely to be slow, if not impossible, and challenging.

Appendix B

The elasticity of substitution, ε , measures the percentage change in the ratio of C_D to C_R , resulting from a one percent change in their relative prices, while keeping the utility of the representative household constant. It can be calculated as follows.

$$(B1) \quad \varepsilon = - \frac{d\left(\frac{C_D}{C_R}\right)}{d\left(\frac{1}{p_{RD}}\right)} \times \frac{\frac{1}{p_{RD}}}{\frac{C_D}{C_R}},$$

where C_D and C_R are expenditures paid in USD and KHR, respectively; p_{RD} is the price of C_R converted into USD. Note that the prices of goods are normalized so that the price of C_D is unity.

From Eq. (8) and Eq. (9), we can derive $\frac{C_D}{C_R}$ as follows.

$$(B2) \quad \frac{C_D}{C_R} = \left[\frac{(1-\alpha)}{\alpha p_{RD}} \right]^{-\frac{1}{1-\rho}}$$

By differentiating Eq. (B2) with respect to $\frac{1}{p_{RD}}$, we obtain the following equation.

$$(B3) \quad \frac{d\left(\frac{C_D}{C_R}\right)}{d\left(\frac{1}{p_{RD}}\right)} = - \frac{1}{1-\rho} \left[\frac{(1-\alpha)}{\alpha} \right]^{-\frac{1}{1-\rho}} \left(\frac{1}{p_{RD}}\right)^{\frac{\rho-2}{1-\rho}}$$

From Eq. (B2), we derive the following equation.

$$(B4) \quad \frac{\frac{1}{p_{RD}}}{\frac{C_D}{C_R}} = \left[\frac{(1-\alpha)}{\alpha} \right]^{\frac{1}{1-\rho}} \left(\frac{1}{p_{RD}}\right)^{\frac{2-\rho}{1-\rho}}$$

By substituting Eq. (B3) and Eq. (B4) into Eq. (B1), we obtain the elasticity of substitution between C_D and C_R as follows.

$$\varepsilon = - \frac{d\left(\frac{C_D}{C_R}\right)}{d\left(\frac{1}{p_{RD}}\right)} \times \frac{\frac{1}{p_{RD}}}{\frac{C_D}{C_R}} = \frac{1}{1-\rho},$$

Appendix C

By substituting Eq. (11) into Eq. (14), the share of the expenditure paid in KHR, β , can be expressed as follows.

$$(C1) \quad \beta = \frac{(1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}}{\alpha^\varepsilon + (1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}}$$

where α is the share of expenditures paid in USD, C_D , in yielding the utility; ε is the elasticity of substitution between C_R and C_D (expenditures paid in KHR); p_{RD} is the price of C_R converted into USD.

By some arrangements, we can derive the following equations.

$$(C2) \quad \begin{aligned} \frac{1}{\beta} &= \frac{\alpha^\varepsilon}{(1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}} + 1 \\ \Rightarrow \frac{1-\beta}{\beta} &= \frac{\alpha^\varepsilon}{(1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}} \\ \Rightarrow \frac{\beta}{1-\beta} &= \frac{(1-\alpha)^\varepsilon p_{RD}^{1-\varepsilon}}{\alpha^\varepsilon} \\ \Rightarrow \frac{1-\alpha}{\alpha} &= \frac{\beta^\varepsilon}{(1-\beta)^{\frac{1}{\varepsilon}} p_{RD}^{\frac{1-\varepsilon}{\varepsilon}}} \end{aligned}$$

Solving Eq. (C2) for α , we obtain the following equation.

$$\alpha = \frac{(1-\beta)^{\frac{1}{\varepsilon}}}{(1-\beta)^{\frac{1}{\varepsilon}} + \beta^{\frac{1}{\varepsilon}} p_{RD}^{\frac{1-\varepsilon}{\varepsilon}}}$$

Appendix D

Table D1: Estimation results of food and beverage expense (share of total income) and household characteristics

Variables	Share of housing expense	Share of remittance expense	Other expense	Share of housing expense	Share of remittance expense	Other expense
	(1)	(2)	(3)	(4)	(5)	(6)
Female household head	-0.001 (0.004)	0.001 (0.010)	-0.043*** (0.013)	-0.003 (0.003)	-0.000 (0.010)	-0.041*** (0.012)
Education of household head (1=higher than elementary level, 0=other)	0.004 (0.004)	0.004 (0.009)	0.020* (0.010)	0.002 (0.003)	0.001 (0.008)	0.013 (0.010)
ln(household income)	-1.180*** (0.264)	-0.900 (0.635)	-1.479* (0.766)	-1.097*** (0.207)	-0.762 (0.615)	-1.587** (0.736)
Squared ln(household income)	0.039*** (0.009)	0.031 (0.022)	0.047* (0.027)	0.036*** (0.007)	0.026 (0.021)	0.052** (0.026)
Household size	-0.013*** (0.002)	-0.037*** (0.004)	0.021*** (0.005)	-0.006*** (0.001)	-0.031*** (0.004)	0.016*** (0.005)
Average age of household members	0.005*** (0.001)	0.012*** (0.003)	-0.006 (0.004)	0.001 (0.001)	0.008** (0.003)	-0.004 (0.004)
Squared average age of household members	-0.000*** (0.000)	-0.000*** (0.000)	0.000* (0.000)	-0.000 (0.000)	-0.000*** (0.000)	0.000 (0.000)
Loan (1=Yes, 0=No)	0.005 (0.004)	0.005 (0.009)	0.038*** (0.010)	0.007*** (0.003)	0.008 (0.008)	0.034*** (0.010)
Loan*informal (moneylender)	0.019 (0.014)	-0.040 (0.033)	0.088** (0.040)	-0.001 (0.011)	-0.062* (0.032)	0.086** (0.038)
Constant	8.853*** (1.902)	6.607 (4.576)	11.593** (5.520)	8.277*** (1.489)	5.638 (4.430)	12.268** (5.303)
Factory type dummies	No	No	No	Yes	Yes	Yes
Phnom Penh/Province dummies	No	No	No	Yes	Yes	Yes
Observations	767	767	767	767	767	767
R ²	0.255	0.149	0.124	0.548	0.210	0.200

Standard errors are in parentheses.

***, ** and * indicate the statistical significance at 1%, 5% and 10%, respectively.

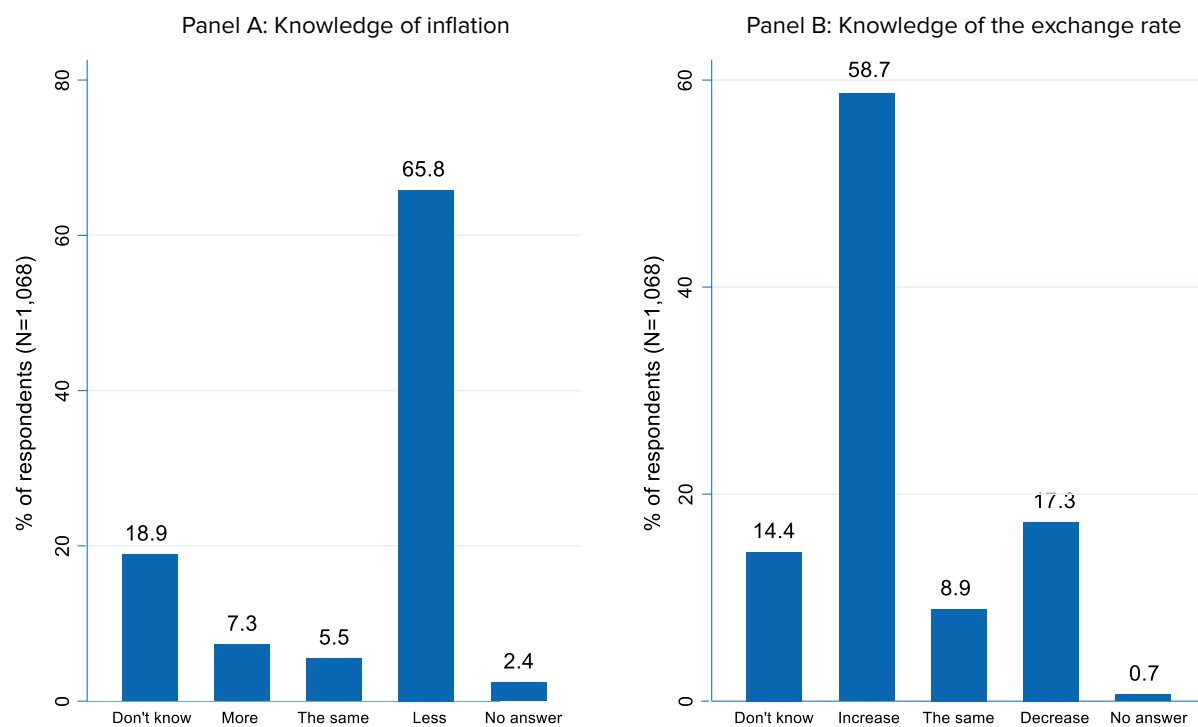
Appendix E

Knowledge of inflation and knowledge of the exchange

In order to assess the inflation and exchange rate knowledge of worker-side respondents, the following questions are used in our survey: “Assume that the annual percentage yield on your savings account was 4% and that inflation was 5%. Would you be able to purchase more, the same, or less with the funds in this account a year from now, assuming there are no bank fees?” for inflation knowledge and “Assume you have taken out a loan in USD. Then, the KHR exchange rate depreciates relative to the USD. How does this affect the quantity of Riel required to make loan repayments?” for knowledge of the exchange rate.

Panels A and B of Figure E1 depict the answers for knowledge of inflation and knowledge of the exchange rate, respectively. From the figure, approximately 66% and 59% of respondents have an accurate understanding of inflation and the exchange rate, respectively.

Figure E1: Knowledge of inflation and knowledge of the exchange rate



Source: Produced by authors based on survey data

Appendix F

Frequency of using digital payments and currency exchange from USD to KHR

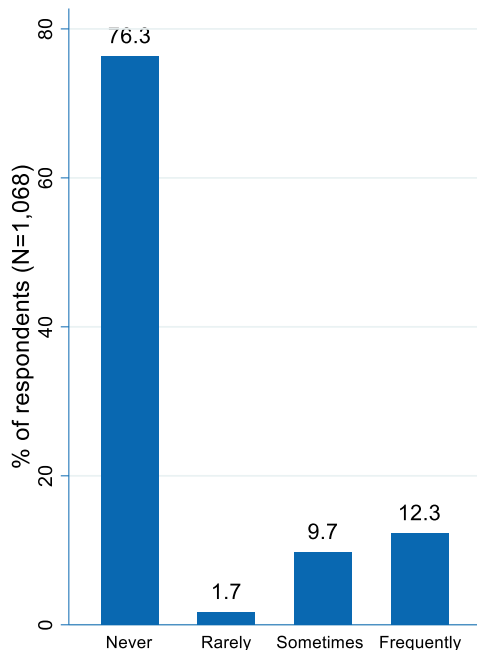
Figure F1 illustrates the frequency with which worker-side respondents use digital payments and make currency exchanges from USD to KHR.

From Panels A and B of Figure F1, the majority of respondents (approximately 76.3% of the total) never use digital payments, and a substantial proportion of them (approximately 86.7% of the total) frequently make currency exchanges from USD to KHR.

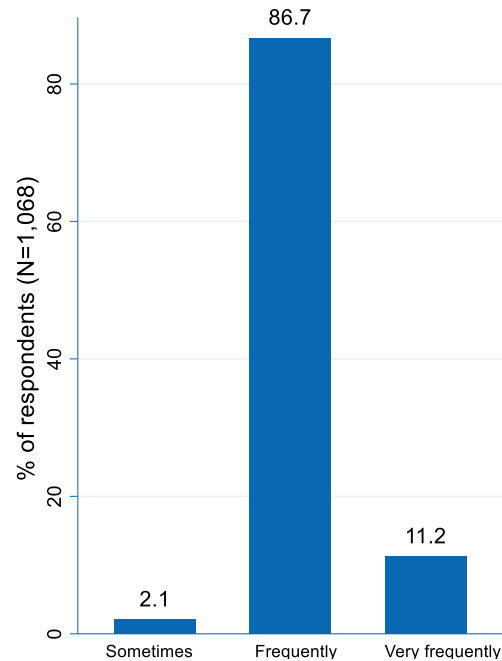
In our survey, we also asked about respondents' awareness of the National Bank of Cambodia's Bakong digital payment platform. Approximately 24% of respondents are aware of this payment platform.

Figure F1: Frequency of using digital payments and currency exchange from USD to KHR

Panel A: How often do you use digital payment?



Panel B: How often do you make currency exchange from USD to KHR?



Source: Produced by authors based on survey data

References

- Aiba, D. & Tha, R. (2017). Dollarization and enterprise's behaviors: The case of Cambodia. *Hitotsubashi Economics*, 10, 49-80.
- Aizenman, J., Chinn, M. D., & Ito, H. (2013). The "Impossible Trinity" hypothesis in an era of global imbalances: measurement and testing. *Review of International Economics*, 21, 447-458.
- Arkolakis, C., Costinot, A., & Rodríguez-Clare, A. (2012). New trade models, same old gains? *American Economic Review*, 102, 94-130.
- Duma, N. (2011). Dollarization in Cambodia: Causes and policy implications. IMF Working Paper No. 11/49. International Monetary Fund.
- Kem, R. (2001). Currency substitution and financial sector developments in Cambodia. International and Development Economics Working Paper No. 014. Australian National University, Australia.
- Kubo, K., Sam, V., & Chea, Y. (2023). Currency exchange under payments dollarization: Converting a source of efficiency loss into a catalyst for financial development in Cambodia. *Journal of the Asia Pacific Economy*, 28, 216-241.
- Lay, S., Kakinaka, M., & Kotani, K. (2012). Exchange rate movement in dollarized economy. *ASEAN Economic Bulletin*, 29, 65-78.
- Menon, J. (2008). Dealing with multiple currencies: What options for the transitional economies of Southeast Asia? *Journal of the Asia Pacific Economy*, 13, 131-146.
- NBC (2016a). Prakas On Provision of Credit in National Currency of Banking and Financial Institutions. National Bank of Cambodia. Retrieved from https://www.nbc.gov.kh/download_files/legislation/prakas_eng/Prakas-on-providing-KHR-credit-eng.pdf on July 30, 2023.
- NBC (2016b). National Bank of Cambodia Arranges a Discussion Forum on Liquidity-Providing Collateralized Operation (LPCO). National Bank of Cambodia. Retrieved from https://www.nbc.gov.kh/english/news_and_events/news_info.php?id=230 on July 30, 2023.
- NBC (2017). Press Release On Riel's Day, Celebrating the 37th Anniversary of the Re-introduction of the Riel. Retrieved from https://www.nbc.gov.kh/download_files/news_and_events/press_eng/8047press-release-riel-day-en.pdf on July 30, 2023.
- Nicoló, G.D., Honohan, P., & Ize, A. (2005). Dollarization of bank deposits: Causes and consequences. *Journal of Banking and Finance*, 29, 1697-1727.
- Odajima, K., & Aiba, D. (2019). Dollarization in Cambodia: A review of recent empirical findings from a nation-wide survey. *Asian Studies (Aziya Kenkyu)*, 65, 24-44.
- Odajima, K., & Khou, V. (2017). Foreign currency usage and perception: Evidence from a survey on Cambodian households. *Hitotsubashi University Economics*, 10, 9-48.
- Okuda, H., & Chea, S. (2023). *Cambodian dollarization: Its policy implications for LDCs' financial development* (1st ed.). Routledge.
- Samreth, S. (2010). Currency substitution and seigniorage-maximizing inflation: the case of Cambodia. *Applied Economics*, 42, 1907-1916.
- Samreth, S. (2011). An empirical study on the hysteresis of currency substitution in Cambodia. *Journal of Asian Economics*, 22, 518-527.
- Samreth, S., Okuda, H., & Ojima, Y. (2023). Development and Structure of Dollarization in Cambodia. In H. Okuda & S. Chea (Eds.), *Cambodian Dollarization: Its Policy Implications for LDCs' Financial Development*. Routledge, forthcoming.
- Zamaróczy, M., & Sa, S. (2002). Economic policy in a highly dollarized economy: the case of Cambodia. IMF Working Paper No. 02/92. International Monetary Fund.
- Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of American Statistical Association*, 57, 348-368.



#53, Pasteur Street, Boeung Keng Kang I
P.O. Box 877, Phnom Penh, Cambodia
Tel: +855 23 216 167 / 214 371
Fax: +855 23 216 257 / 721 042
E-mail (General): registry.kh@undp.org
(Media Related): communications.kh@undp.org
Website: www.undp.org/cambodia