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Invoice Currency Choice in Malawi's Imports from Asia: Is there any evidence of Renminbi Internationalization?*

Angella Faith Lapukeni[†] and Kiyotaka Sato[‡]

Abstract

This is the first study that presents detailed information on the Chinese renminbi (RMB) invoiced trade between Malawi and Asian countries. By processing the unpublished customs level data on Malawi's imports at the HS8-digit level, we show that the RMB is rarely used in Malawi's imports from China, while more than 20% of Malawi's imports from Japan are invoiced in the yen. This evidence suggests that the internationalization of the RMB lags far behind yen internationalization. The U.S. dollar and, to a lesser extent, the South African Rand are used as a vehicle currency in Malawi's imports from Asian countries. By estimating a panel logit model, we demonstrate that product differentiation and market share of imported products have positive influences on yen invoiced imports from Japan, while bilateral nominal exchange rate volatility has negative effects on exporter currency invoicing in imports from Asian countries. Thus, we may say that stable exchange rates will be able to promote the exporter's currency invoicing instead of vehicle currency invoicing in Malawi's imports from Asian countries.

Keywords: Invoice currency, renminbi (RMB) internationalization, yen internationalization, vehicle currency, U.S. dollar, South African Rand, Asia JEL classification: F31, F40

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1. Introduction

Africa is now one of China's strategic economic partners. Trade is a major focus of this relationship in that the total African trade with China increasing from 4 billion U.S. dollars in 1995 to 40 billion U.S. dollars in 2005 (*China Monitor*, May 2006). As China-Africa trade has been growing over the last few decades, China's trade policies have moved towards a more accommodative stance with Africa. In 2005, China agreed to exempt from tariffs of 190 commodities from 25 least developed African countries (Olu, 2006). The first "China Africa Policy" was released in 2006, followed by the second one in 2015. African imports from China have opened a new path for their own opportunities and challenges.

Such an increase in African trade with China calls for a discussion about growing use of Chinese renminbi (henceforth, RMB) as a trade invoicing currency. There have been a large number of studies on RMB internationalization (e.g., Eichengreen and Kawai, 2014; Zhang and Tao, 2014; Xu and He, 2015; Ito, 2011, 2017). These studies show that the RMB-invoiced trade increased in the 2010s, whereas it has declined considerably since 2015 likely due to the China's large devaluation in August 2015.¹ However, such discussion is typically based on the aggregated data on the use of the RMB in Chinese trade. The destination (source) country breakdown data as well as commodity breakdown data on RMB-invoiced trade has not been presented in previous studies. A few exceptions are Ito *et al.* (2018) and Sato and Shimizu (2018) that conducted two-times large-scale questionnaire survey with Japanese overseas subsidiaries and presented the information on to what extent Japanese subsidiaries operating in China and other Asian countries used the RMB for trade invoicing. It is revealed that the RMB is used only in trade of Japanese subsidiaries operating in China; otherwise, the RMB is rarely used by Japanese subsidiaries.

Although the RMB internationalization has not progressed evidently in recent years, further use of the RMB may be possible in China's trade with developing countries. China started an initiative for the RMB internationalization in 2008 with the purpose of facilitating the use of RMB in China's trade transactions. In addition to the pilot scheme that permitted the RMB-denominated trade settlements with Hong Kong, Macao,

¹ See Box Figure 9 in Kadogawa *et al.* (2018).

mainland cities, and ASEAN countries, China initiated a RMB-denominated bilateral currency swap agreement with various countries mainly including Asia and other emerging countries, which helps to provide RMB abroad to be used for trade settlement.²

The main purpose of this paper is to empirically investigate the choice of invoicing currency in Malawi's imports from Asian countries, with a particular emphasis on imports from China and Japan. As discussed earlier, African countries are strategically important economic partners for China, and Malawi is one of the smallest African countries. It is interesting to check whether Chinese exporters can choose the RMB as invoicing currency in their exports to a small African country, Malawi.

The major contribution of this paper is to use the unpublished transaction-level data of Malawi customs at Harmonized System (HS) 8-digit level in imports from 2004 to 2016. This paper focuses on Malawi's imports from Asia and reveals which currency is used in its imports by source country and by industry. To our knowledge, such detailed information on invoicing currency choice have never been published nor disclosed in the literature on RMB internationalization. By showing the data on invoicing currency choice, we reveal whether the RMB is internationalized in China's exports to Malawi (i.e., Malawi's imports from China) and whether the progress of the RMB internationalization.³

By processing the transaction-level data, we first reveal that the RMB is rarely used even in Malawi's imports from China. In contrast, the share of yen-invoiced transactions in Malawi's imports from Japan is more than 24% in terms of import amounts. If measuring in terms of shipments, the share of yen-invoiced transactions was 44.6% in the fixed exchange rate period, while the share declined to 16.9% in the floating exchange rate period. This evidence suggests that the internationalization of the RMB lags far behind the yen internationalization process. Second, the U.S. dollar is dominantly used in terms of import amounts in Malawi's imports from China and other Asian countries. However, if calculated in terms of shipments, the share of the South African Rand becomes quite large, 25.1% in imports from China and 24.6% in imports from other

 $^{^2}$ See, for instance, Eichengreen and Kawai (2014) and Ito and Kawai (2016) for a brief history of the RMB internationalization.

³ There have been a large number of studies on the yen internationalization. See, for instance, Fukuda and Ji (1994), Kawai (1996), and Sato (1999).

Asian countries in the floating exchange rate period. Thus, the South African Rand plays the second largest role of vehicle currency in Malawi's imports from Asia.

We also estimate a panel logit model to analyze possible determinants of invoicing currency in Malawi's imports from China, Japan, and other Asian countries. We test whether the conventional determinants of invoicing currency, i.e., product differentiation, market share, and the exchange rate volatility, can explain the invoicing currency choice in Malawi's imports from Asian countries. We reveal that the degree of product differentiation and the market share of imported products have positive influences on exporter's currency (yen) invoicing in Malawi's imports from Japan. The degree of bilateral nominal exchange rate volatility also has negative effect on exporter's currency invoicing in imports from China, Japan, and other Asian countries. On the other hand, vehicle currency invoicing is generally chosen in imports from China and other Asian countries. Our panel logit estimation shows that the larger the exchange rate volatility, the more likely vehicle currencies are to be chosen in Malawi's imports. Thus, the exchange rate stability plays an important role in facilitating exporter's currency invoicing.

The rest of this paper is organized as follows; Section 2 describes the data and shows the detailed information on invoicing currency choice in Malawi's imports. Section 3 presents the empirical method and explanatory variables, and Section 4 discusses the empirical results. Section 5 concludes the paper.

2. Data and Descriptive Analysis

2.1 Unit Price by Invoicing Currency

This paper uses the monthly series of customs-level transaction data for Malawi's imports from January 2004 to December 2016 obtained from the Malawi National Statistical (NSO). The NSO data contains information on the total value and the number of volume (net kilograms) of each import transaction at the HS 8-digit product classification. Information on exporting (source) country is available, but exporting firms are not identified. More importantly, we can obtain the information on the choice of invoicing currency for each import transaction.

We construct the monthly series of HS 8-digit products from the transaction-level data obtained from the Malawi NSO. Since we use highly disaggregated transaction data, it often happens that the same HS8-digit product is imported many times from the same source country and priced in the same invoicing currency in the same month. We follow Devereux *et al.* (2017) and construct the monthly series of HS8-digit product by source (exporting) country and by invoicing currency. Specifically, we define a specific HS8-digit product based on HS classification code (*pro*), exporting country (*exc*), and invoicing currency (*cur*) as follows: s = (pro, exc, cur). Let *l* be an individual import transaction and IM_{lst} is defined as an import amount of good *s* in month *t* for import transaction *l*, which is denominated in Malawian Kwacha (MWK). Then, an import unit price in MWK can be expressed as:

$$P_{lst} = \frac{IM_{lst}}{Unit_{lst}} \tag{1}$$

where $Unit_{lst}$ is the number of units. If the total number of product *s* import transactions is *n* in month *t*, we can compute a weight of each import transaction *l* in total import transactions in a month *t* as:

$$\alpha_{lst} = \frac{IM_{lst}}{\sum_{l=1}^{n} IM_{lst}}$$
(2)

Then, we can construct an import unit price of product s at month t by source country and by invoicing currency as:

$$P_{st} = \sum_{l=1}^{n} (\alpha_{lst} \cdot P_{lst})$$
(3)

The raw data includes a total of 2.2 million import transactions for the whole sample period from January 2004 to December 2016. After assembling all import transactions into *s* products at HS8-digit level and collecting the data on imports from Asian countries only, the number of observations is reduced to 193,225. In this paper, Asia is defined to include 17 countries reported in Table 1. As the import unit price is constructed by invoicing currency, we can set up three types of invoicing choice, producer (exporter) currency pricing (PCP), local currency (i.e., MWK) pricing (LCP), and vehicle currency pricing (VCP) for each import unit price, which will be discussed below.

2.2 Product Share by Source Country

By dividing 17 Asian countries into three group, i.e., China, Japan, and the rest of Asia (ROA), Figure 1 presents the Malawi's import amounts in MWK by three groups and by HS2-digit level product classification. First, in terms of the total amount of imports, China is the largest exporter for Malawi, followed by ROA. Second, in imports from China, Machinery & Electrical accounts for 33%, followed by Chemicals & Allied Industries (20.4%). Similarly, in imports from ROA, Chemicals & Allied Industries accounts for 28.5%, followed by Machinery & Electrical (18.8%). Third, 72.7% of imports from Japan are accounted for by Transportation.

2.3 Share of Invoicing Currency

Figures 2a–2c show the share of invoicing currency in Malawi's imports from China, Japan, and ROA. The share is calculated based on all HS8-digit import data for two sub-sample periods: one is for fixed exchange rate period from January 2004 to April 2012 and the other is for floating exchange rate priod from May 2012 to December 2016, where 34 currencies were used. First, in imports from China (Figure 2a), the U.S. dollar accounts for more than 92% in terms of import amounts for both sub-sample periods, while the share of the U.S. dollar in terms of shipments declined to 71.4% for fixed exchange rate period and to 67.1% for floating exchange rate period., followed by the South African Rand with the share of 14.5% and 25.1%, respectively. This implies that the number of Rand-invoiced transactions is surprisingly large, whereas such transactions are in practice very small in terms of import amounts. In Malawi's imports from China in terms of shipments, *two* vehicle currencies are dominantly used: the U.S. dollar and South African Rand.

Second, PCP accounts for a certain share in Malawi's imports from Japan. Specifically, in the fixed exchange rate period, the yen accounts for 26.5% in terms of import amounts, while it accounts for 44.6% in terms of shipments (Figure 2b). In the floating exchange rate period, however, the share of the yen in terms of shipments declined to 16.9%, while it accounts for 24.3% in terms of import amounts. Moreover, VCP including not only the U.S. dollar but also the South African Rand accounts for the largest share in Malawi's imports from Japan. I

Third, in Malawi's imports from other Asian countries (Rest of Asia), the U.S. dollar accounts for the largest share in terms of both import amounts and number of shipments. Again, the share of the South African Rand in terms of shipments is 16.2% in the fixed exchange rate period and 24.6% in the floating exchange rate period. Thus, PCP is rarely observed in imports from Asian countries.

Overall, PCP is conducted only in Malawi's imports from Japan, and LCP (i.e., MKW invoiced trade) is unlikely to be conducted in Malawi's total imports. VCP is generally observed in Malawi's imports, and not only the U.S. dollar but also South African Land is typically used as an invoicing currency if we use the count data in terms of shipments.

Table 2 shows the share of PCP in Malawi's imports from selected Asian countries. The Japan's PCP share ranges from 21% to 35% in most years, while Asian countries do not show a high share of PCP except for some years in some countries. Even when looking at the industry- and source country-breakdown data (Table 3), Asian countries use the U.S. dollar in their exports to Malawi. The RMB is rarely used in Malawi's imports from Asia except for imports of Animals & Vegetables from China.

3. Empirical Strategy

3.1 Empirical Method

In this section, we use a panel logit model to investigate determinants of invoicing currency choice in Malawi's imports from China, Japan and ROA.⁴ The dependent variables are binary variables similar to previous studies such as Goldberg and Tille (2016) and Deveraux *et al.* (2017): producer currency pricing (PCP=1, LCP=VCP=0); local currency pricing (LCP=1, PCP=VCP=0); and vehicle currency pricing (VCP=1, PCP=LCP=0). For the local currency (MWK) pricing, we analyze a subset of observations whose HS2-digit industry share of the local currency is at least 20 percent in value.

We estimate the following equation:

⁴ Panel logit model has been used in the previous studies of invoicing currency choice, such as Devereaux *et al.* (2017) and Donnenfeld and Haug (2008).

$$\Pr(X) = \frac{\exp(v_{st})}{1 + \exp(v_{st})}$$
(4)

where

$$v_{st} = \alpha + \mathbf{Z}'_{st} \mathbf{\beta} + \varepsilon_{st} \,. \tag{5}$$

X represents either PCP_{st} , LCP_{st} , or VCP_{st} as explained above. For instance, $Pr(PCP_{st})$ takes one if a product *s* is invoiced in the producer's (exporter's) currency. **Z**_{st} includes the exchange rate volatility, the relative price as a proxy for product differentiation, and the market share, and other control variables.

As the importer is Malawi, one of developing countries, it will be sufficient to apply the standard model of invoicing currency choice based on a partial equilibrium model, developed by Friberg (1998) and Bacchetta and van Wincoop (2005), even though recent studies tend to consider invoicing currency decision in intra-firm trade along production chains.⁵ The standard model shows that invoicing currency choice is conditional on the product differentiation (Giovannini, 1988; Friberg, 1998) or exporter's market share (Goldberg and Tille, 2016; Devereaux *et al.* 2017), and the exchange rate volatility (Bacchetta and van Wincoop, 2005).

3.2 Explanatory Variables

Relative Price (RP) is a variable that we construct as a proxy for product differentiation. We assume that all firms in the producing/exporting country *j* face the same production costs (\overline{P}_{sjt}) that can be calculated by taking average of each HS8-digit product for each country in each month (P_{sjt}). We make additional assumption that the degree of product differentiation is proportional to the difference between the export price (P_{sjt}) and the production costs (\overline{P}_{sjt}), which can be regarded as a mark-up. The relative price, RP, is calculated as:

⁵ See Ito *et al.* (2015, 2018) for an empirical analysis of invoicing currency choice in intra-firm trade.

$$RP_{sjt} = \frac{P_{sjt}}{\overline{P}_{sjt}}.$$
(6)

Exchange Rate volatility is defined as the bilateral nominal exchange rate volatility between the exporter's currency and the MWK (*EXR Volatility*). The monthly series of the exchange rate volatility is calculated as the standard deviation of the bilateral nominal exchange rate during the last 12 months.

Overall Market Share is a variable we include to assess the relative bargaining power of both exporters and importers. The variable is calculated as the local currency share of imports from an exporting country in the corresponding month. Since we do not have firm identifiers, this country share variable shows the trade relations between source (exporting) countries and Malawi. This is therefore a macro- or country-level variable.

Industry Market Share is a share of an exporting country in imports of a particular HS2-digit category in a given month. For estimations of RMB invoicing as a vehicle currency, we use China's industry market share instead.

Product Market Share is a share of an exporting country in imports of a specific HS8-digit product in a month, which is likely to be the best measure, because we use the product or transaction level data. A large market share of a specific product may indicate that an exporter has some monopoly power, which likely has positive impact on PCP.

4. Empirical Results

This section presents the estimated results of a panel logit model in Malawi's imports from China, Japan and other Asian countries (ROA). We report the average marginal effects based on the maximum likelihood estimates, with the standard errors provided in parentheses. The reported magnitudes represent the expected difference in outcome probability associated with a one-unit increase (or the discreet change from the base level for dummy variables). The results for LCP and PCP are based on a population averaged regression, due to the small number of positive response for the dichotomous dependent variables. However, when estimating PCP in imports from Japan as well as estimating VCP in all cases, we use a random effect model.

4.1 Producer Currency Pricing

Table 4 presents the results of panel logit estimation when the dependent variable is PCP. First, the exchange rate volatility variable has significantly negative effect on PCP in imports from China, Japan and ROA. This negative effect is found when using three different market share variables respectively. Thus, the larger the exchange rate volatility, the less likely exporter's currency is to be chosen as an invoicing currency.

Second, the relative price variable, which is used as a proxy for product differentiation, is positive and statistically significant in Malawi's imports from Japan. This indicates that the higher the product price, the more likely the yen is to be used in imports from Japan. Our proxy variable for product differentiation works well in imports from Japan, and the results support the hypothesis that differentiated products tend to be invoiced in the exporter's currency in exports from an advanced country to a developing country.⁶ In contrast, the relative price variable is not statistically significant in imports from other Asian countries (ROA). Moreover, the relative price variable takes negative and statistically significant coefficients in imports from China, although only 10% significance level in two out of three cases.

Third, the coefficient of the overall market share variable is positive and statistically significant in imports from China, Japan, and other Asian countries (ORA), which indicates that the larger the exporter's country size, the more likely the exporter's currency is to be chosen. This result is convincing, but if using two other market share variables, the estimated results show inconsistent results. When using the industry market share variable, the estimated coefficient becomes negative in imports from Japan and positive in imports from China. The negative coefficient in imports from Japan may be due to the fact that Transportation products account for the largest share in Malawi's imports from Japan and automobiles and related products are invoiced not in the yen but

⁶ This hypothesis comes from the well-known stylized facts. One is that trade between an advanced country and a developing country is typically invoiced in the advanced country's currency (Grassman, 1973, and Page, 1977, 1981). Another stylized fact is that differentiated products tend to be invoiced in the exporter's currency (McKinnon, 1979). See Ito *et al.* (2018) for the stylized facts of invoicing currency choice.

in the U.S. dollar in Japanese exports.⁷ However, when using the product market share variable, positive and significant coefficients are found only in imports from Japan.

Since we use the product level data of invoicing currency choice for the dependent variable, it will be more appropriate to measure the market share effect at the product level. Significantly positive effect of market share is not found in Malawi's imports from China, while the relative price variable has negative effect on PCP in imports from China. These results may be due to the relatively small number of PCP in Malawi's imports from China, and hence population averaged estimation was conducted. In contrast, we have found significantly positive effect of the relative price (product differentiation) and the product-level market share on PCP in imports from Japan. Thus, we may say that the RMB internationalization is not comparable to the international use of the yen.

4.2 Local Currency Pricing

As shown in Figure 2, MKW appears to be rarely used in Malawi's imports. But, Table 3 indicates that MKW is used in imports of Foodstuffs: 65% of imports from Korea and 94% from the Philippines, for instance, are invoiced in MKW. Although it is just suggestive, we conduct population averaged estimation of the panel logit model to examine the determinants of LCP. According to Table 5, the coefficient of the relative price is negative and statistically significant in all cases, which indicates that the higher the relative price, the less likely exporters are to choose LCP. This result is consistent with the stylized fact discussed in the previous sub-section. The coefficient of the exchange rate volatility is significantly negative in imports from China and other Asian countries (ROA), although not statistically significant in imports from Japan. But, the sign of coefficients differs considerably across source countries as well as market shares.

4.3 Vehicle Currency Pricing

Table 6 presents the results of random effect estimation for VCP determinants. First, the relative price variable is not statistically significant in imports from China,

⁷ See Ito *et al.* (2018) that reveals that Japanese automobile exporters typically conduct the pricingto-market (PTM) behaviour by choosing LCP in exports to advanced countries and VCP (mainly U.S. dollar-invoicing) in exports to developing countries.

Japan, and other Asian countries (ROA), which suggests that the degree of product differentiation does not affect the choice of VCP significantly. Second, the coefficient of the exchange rate volatility is significantly positive in imports from China, Japan, and other Asian countries. This implies that the larger the exchange rate volatility, the more likely exporting countries are to choose not PCP but VCP. Third, the industry market share variable takes a positive coefficient only in imports from Japan, which is consistent with the result of Table 3 where the coefficient of the industry market share variable is significantly negative.

5. Concluding Remarks

By processing the unpublished customs level data on Malawi's imports at HS8digit level, we show the detailed information on invoicing currency choice in Malawi's imports from China, Japan, and other Asian countries. While there are a large number of studies on the RMB internationalization, this paper is the first study that reveals to what extent the RMB is used in Malawi's imports from China at a detailed commodity level.

We have found that the RMB is rarely used in Malawi's imports from China. In contrast, the share of yen-invoiced transactions in Malawi's imports from Japan is more than 20% in terms of import amounts and more than 30% in terms of shipments. This evidence suggests that the internationalization of the RMB lags far behind the yen internationalization process. The U.S. dollar is dominantly used in terms of import amounts in Malawi's imports from China and other Asian countries. However, if calculated in terms of shipments, the share of the South African Rand becomes quite large, 24% in imports from China and 18% in imports from other Asian countries. Thus, the South African Rand plays the second largest role of vehicle currency in Malawi's imports from Asia.

By estimating a panel logit model, we have also analyzed possible determinants of invoicing currency in Malawi's imports from China, Japan, and other Asian countries. We have revealed that the degree of product differentiation and the market share of imported products have positive influences on PCP (yen invoicing) in Malawi's imports from Japan. The degree of bilateral nominal exchange rate volatility has negative effect on PCP (exporter's currency invoicing) in imports from China, Japan, and other Asian countries. When analyzing the determinants of VCP, it is found that the larger the exchange rate volatility, the more likely vehicle currencies are to be chosen in Malawi's imports. Thus, we may say that exporter's currency invoicing will be growing instead of vehicle currency invoicing if the bilateral exchange rate becomes more stable.

We can develop our research by investigating more on the role of vehicle currency in Malawi's imports from Asian countries. The South African Rand is found to play a surprisingly large role as a vehicle currency in imports from Asia. It will be informative to analyze why one of African currencies can be used as a vehicle currency. We have used customs-level trade data to construct possible determinant variables for invoicing currency. But, financial factors such as transaction costs and availability of a currency in question are not analyzed at all in this study. These issues need to be taken into consideration in our future research.

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Figure 1. Industry Share in Malawi's Imports from Asia (%) 2004-2016

Figure 2. Invoicing Currency Share in Malawi's Imports from Asia (%)

2a. China





A2. Floating Exchange Rate Regime (Value)

B1. Fixed Exchange Rate Regime (Count)



B2. Floating Exchange Rate Regime (Count)



Figure 2. Invoicing Currency Share in Malawi's Imports from Asia (%) (cont.)



<u>2b. Japan</u>





B1. Fixed Exchange Rate Regime (Count)



B2. Floating Exchange Rate Regime (Count)







USD 69.0%

2c. Rest of Asia

period ranges from May 2012 to December 2016.

Note: "Value" share is in terms of import amounts, and "Count" share is in terms of shipments. "Fixed exchange rate" period ranges from January 2004 to April 2012. "Floating exchange rate"

Source: Authors' calculation from the Malawi National Statistical Office (NSO) data.

USD

69.6%

Country Code	Country Name	Observations
BD	Bangladesh	209
BN	Brunei Darussalam	84
CN	China	128,612
HK	Hong Kong	11,627
ID	Indonesia	2,442
JP	Japan	25,171
KH	Cambodia (Kampuchea)	75
KR	Korea, Republic Of (South)	6,261
LA	Lao PDR	1
MM	Myanmar	29
MO	Macau	10
MY	Malaysia	3,420
PH	Philippines	494
SG	Singapore	2,050
TH	Thailand	5,763
TW	Taiwan Prov. China	6,329
VN	Vietnam	648

Table 1. List of Asian Countries

Table 2. Share of Exporter's Currency Invoicing (by Value) in Selected Asian Countries

Exporter	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Japan	21.5	31.1	24.3	31.8	34.6	29.4	24.3	25.7	32.0	35.3	23.5	23.5	16.1
Singapore	1.7	1.1	47.9	2.8	7.7	1.2	0.4	0.1	0.0	2.2	0.0	0.2	30.0
Hong Kong	38.4	9.6	10.6	4.0	5.8	5.3	0.9	5.8	1.7	2.7	1.2	2.6	1.1
South Korea	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taiwan	11.2	0.2	1.5	1.7	2.9	8.4	0.0	0.0	0.7	0.0	0.0	4.3	3.7
Thailand	2.0	2.5	8.4	0.9	0.5	0.3	0.3	0.7	1.7	0.5	0.2	0.2	0.0
China	0.0	0.4	0.6	0.1	0.2	0.9	0.3	0.6	2.2	0.3	0.1	0.2	3.6
Malaysia	1.6	0.0	0.0	0.8	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.3	0.0

Note: Countries in the sample that are excluded in this table are those that had values of 0 percent. *Source*: Authors' calculation from the Malawi National Statistical Office (NSO) data.

Animal & Vegetable	BD	BN	CN	HK	ID	JP	KH	KR
USD	100%		15%	99%	100%	92%	100%	100%
RMB	0%		85%	0%	0%	0%	0%	0%
GBP	0%		1%	0%	0%	0%	0%	0%
Other	0%		0%	1%	0%	8%	0%	0%
Chemicals	BD	BN	CN	HK	ID	JP	KH	KR
USD	100%	0%	99%	100%	100%	83%	100%	99%
EUR	0%	0%	0%	0%	0%	12%	0%	0%
ZAR	0%	0%	1%	0%	0%	3%	0%	1%
Other	0%	100%	0%	0%	0%	2%	0%	0%
Foodstuffs	BD	BN	CN	HK	ID	JP	KH	KR
USD	0%		75%	92%	96%	22%	100%	35%
MWK	0%		22%	0%	0%	36%	0%	65%
ZAR	0%		2%	0%	4%	1%	0%	0%
Other	100%		1%	8%	0%	41%	0%	1%
Mach. & Electrical	BD	BN	CN	HK	ID	JP	KH	KR
USD	35%	9%	91%	95%	87%	38%	97%	71%
ZAR	0%	0%	6%	1%	7%	29%	3%	28%
JPY	0%	0%	0%	0%	0%	31%	0%	0%
Other	65%	91%	3%	4%	7%	3%	0%	1%
Minerals	BD	BN	CN	HK	ID	JP	KH	KR
USD		100%	92%	100%	96%	69%		100%
ZAR		0%	0%	0%	4%	30%		0%
AED		0%	6%	0%	0%	1%		0%
Other		0%	2%	0%	0%	0%		0%
Miscellaneous	BD	BN	CN	HK	ID	JP	KH	KR
USD	73%	18%	93%	99%	56%	49%	90%	99%
ZAR	0%	0%	5%	0%	39%	1%	10%	0%
JPY	0%	0%	0%	0%	0%	47%	0%	0%
Other	27%	82%	2%	0%	5%	3%	0%	0%

Table 3. Invoicing Currency Choice by Industry and by Country

Plastics & Rubbers	BD	BN	CN	HK	ID	JP	KH	KR
USD	98%	0%	98%	97%	70%	47%	100%	100%
ZAR	1%	0%	1%	0%	20%	36%	0%	0%
JPY	0%	0%	0%	0%	0%	16%	0%	0%
Other	1%	100%	1%	3%	10%	2%	0%	0%
Stone, Glass, Metals	BD	BN	CN	HK	ID	JP	KH	KR
USD	100%	0%	96%	99%	93%	34%	100%	99%
GBP	0%	0%	0%	0%	0%	64%	0%	0%
ZAR	0%	0%	3%	1%	7%	1%	0%	1%
Other	0%	100%	1%	1%	0%	1%	0%	0%
Textiles etc	BD	BN	CN	HK	ID	JP	KH	KR
USD	90%	92%	97%	98%	66%	79%	88%	100%
ZAR	7%	0%	2%	0%	1%	2%	10%	0%
AED	0%	0%	1%	0%	0%	0%	0%	0%
Other	3%	8%	1%	2%	33%	19%	3%	0%
Transportation	BD	BN	CN	HK	ID	JP	KH	KR
USD	100%	0%	96%	97%	95%	70%	100%	99%
JPY	0%	0%	0%	0%	0%	24%	0%	0%
ZAR	0%	0%	3%	1%	4%	4%	0%	1%
Other	0%	100%	1%	2%	1%	3%	0%	0%
Wood, rawhides	BD	BN	CN	HK	ID	JP	KH	KR
USD	40%	0%	94%	90%	96%	9%	100%	98%
EUR	60%	0%	0%	0%	0%	17%	0%	0%
ZAR	0%	0%	4%	4%	0%	33%	0%	2%
Other	0%	100%	1%	6%	4%	42%	0%	0%

Table 3. Invoicing Currency Choice by Industry and by Country (cont.)

Animal &									
Vegetable	MM	MO	MY	PH	SG	TH	TW	VN	Av
			100	98	100			100	81
USD			%	%	%	91%	98%	%	%
DMD			00/	00/	00/	00/	00/	00/	18
RIVID			0%	0%	0%	0%	0%	0%	% 00/
GBP			0%	0%	0%	0%	0%	0%	0%
Other			0%	2%	0%	9%	2%	0%	0%
Chemicals	MM	<u>MO</u>	MY	PH	SG		TW	<u>VN</u>	Av
LICD		100	000/	79	070/	100	0.40/	100	99
USD		%	99%	%	9/%	%	94%	%	% 1.0/
EUR		0%	0%	0%	0%	0%	4%	0%	1%
7 A D		004	0%	21 04	304	0%	104	004	004
ZAK Other		0%	070	70 004	00/	070	1 70	0%	0%
		0%	0%	0%	0%	0%	0%	0%	0%
Foodstuffs	IVIIVI	MO	IVI Y	PH	SG	IH	1 W	VN	AV 75
USD		0%	87%	6%	Q1%	87%	100	75%	73 %
USD		070	0770	94	94 /0	0770	/0	1370	21
MWK		0%	0%	%	6%	0%	0%	0%	%
ZAR		0%	13%	0%	0%	13%	0%	25%	2%
		100	1070	070	070	1070	070	2070	270
Other		%	0%	0%	0%	0%	0%	0%	2%
Mach. & Electrical	MM	MO	MY	PH	SG	TH	TW	VN	Av
	100			74					88
USD	%	23%	92%	%	99%	88%	94%	88%	%
				18					
ZAR	0%	0%	5%	%	1%	8%	3%	2%	7%
JPY	0%	0%	0%	0%	0%	0%	0%	0%	2%
Other	0%	77%	4%	7%	0%	4%	2%	10%	3%
Minerals	MM	MO	MY	PH	SG	TH	TW	VN	Av
	_		100		100	100	100		93
USD	0%		%		%	%	%		%
ZAR	0%		0%		0%	0%	0%		5%
AED	0%		0%		0%	0%	0%		2%
~ 1	100		0.04		0.04	0.04	0.04		0.04
Other	%		0%		0%	0%	0%		0%
Miscellaneous	MM	MO	MY	PH	SG	TH	TW	VN	Av
	100	100	070/	53	760/	070/	000/	070/	94
02D	%	%	8/%	% 22	/6%	8/%	90%	9/%	%
ZAR	0%	0%	12%	33 %	0%	6%	10%	1%	3%
IDV	070 00/2	0%	Ω0/2	/0 	0%	0%	1070 00/-	1 /0 ()0/2	20/2 20/2
JI 1	070	070	070	14	070	070	070	070	<i>2</i> 70
Other	0%	0%	2%	%	24%	7%	1%	1%	1%

Table 3. Invoicing Currency Choice by Industry and by Country (cont.)

Plastics & Rubbers	MM	MO	MY	PH	SG	TH	TW	VN	Av
				100	100	99		100	97
USD			99%	%	%	%	97%	%	%
ZAR			0%	0%	0%	1%	2%	0%	2%
JPY			0%	0%	0%	0%	0%	0%	0%
Other			1%	0%	0%	0%	0%	0%	1%
Stone, Glass,									
Metals	MM	MO	MY	PH	SG	TH	TW	VN	Av
	100			100	100	81			81
USD	%		89%	%	%	%	92%	87%	%
									15
GBP	0%		4%	0%	0%	0%	0%	0%	%
	0.04		0.04	0.04	0.04	13	0.04	1001	•
ZAR	0%		0%	0%	0%	%	8%	13%	2%
Other	0%		7%	0%	0%	5%	1%	0%	1%
Textiles etc	MM	MO	MY	PH	SG	ТН	TW	VN	Av
		100				96			97
USD	99%	%	95%	98%	99%	%	99%	99%	%
ZAR	0%	0%	4%	0%	0%	1%	1%	0%	1%
AED	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other	1%	0%	1%	2%	0%	3%	0%	1%	2%
Transportation	MM	MO	MY	PH	SG	TH	TW	VN	Av
	100	100	100	100		63			74
USD	%	%	%	%	94%	%	77%	1%	%
						16			20
JPY	0%	0%	0%	0%	0%	%	0%	0%	%
	_		_	_		19		_	
ZAR	0%	0%	0%	0%	2%	%	23%	0%	4%
Other	0%	0%	0%	0%	3%	1%	1%	99%	2%
Wood, rawhides	MM		MY	PH	SG	TH	TW	VN	Av
	100			100		98	100		90
USD	%		27%	%	97%	%	%	40%	%
EUR	0%		65%	0%	1%	0%	0%	58%	4%
ZAR	0%		0%	0%	1%	0%	0%	2%	4%
Other	0%		8%	0%	0%	1%	0%	0%	3%

Table 3. Invoicing Currency	Choice by Industry	and by Country (cont.)
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Table 4. Determinants of PCP

(A) Product Market	China	Jap	pan	ROA
Share	(PA)	(PA)	(RE)	(PA)
Relative Price	-0.0014 **	0.0018 ***	0.191 ***	0.0026
	(0.0007)	(0.0003)	(0.008)	(0.0020)
Product MS	-0.00002	0.00003 ***	0.0009 ***	-0.000007
	(0.00001)	(0.00001)	(0.0001)	(0.000019)
EXR Volatility	-0.0082 ***	-0.0195 ***	-1.370 ***	-0.0809 ***
	(0.0026)	(0.0023)	(0.058)	(0.0068)
(B) Industry	China	Jaj	pan	ROA
Market Share	(PA)	(PA)	(RE)	(PA)
Relative Price	-0.0012 *	0.0015 ***	0.191 ***	0.0026
	(0.0006)	(0.0003)	(0.008)	(0.0020)
Industry MS	0.00021 ***	-0.00039 ***	-0.0018 ***	0.000014
	(0.00002)	(0.00005)	(0.0001)	(0.000053)
EXR Volatility	-0.0127 ***	-0.0190 ***	-1.366 ***	-0.0806 ***
	(0.0027)	(0.0024)	(0.057)	(0.0069)
(C) Overall	China	Jaj	pan	ROA
Market Share	(PA)	(PA)	(RE)	(PA)
Relative Price	-0.0011 *	0.0017 ***	0.193 ***	0.0032
	(0.0006)	(0.0003)	(0.008)	(0.0020)
Overall MS	0.00038 ***	0.00004 ***	0.0060 ***	0.00069 ***
	(0.00002)	(0.00001)	(0.0003)	(0.00011)
EXR Volatility	-0.0233 ***	-0.0186 ***	-1.057 ***	-0.0817 ***
	(0.0029)	(0.0023)	(0.059)	(0.0069)
Observations	128,612	25,171	25,171	39,442

Dependent Variable: PCP=1

Note: Estimated results (average marginal effects) of the panel logit model are reported. "PA" denotes population averaged estimation. "RE" denotes random effect estimation. Standard errors are reported in parentheses. Triple (***), double (**), and a single (*) asterisk(s) indicate 1%, 5%, and 10% significance level, respectively.

Source: Authors' estimation.

Table 5. Determinants of LCI

Dependent Var	riable: LCP=1		
	Chi	na	
Relative Price	-0.000885**	-0.000905**	-0.000778*
	(0.000423)	(0.000438)	(0.000421)
EXR Volatility	-0.0445***	-0.0439***	-0.0470***
	(0.00292)	(0.00302)	(0.00316)
Product MS	-0.0000763***		
	(0.0000136)		
Industry MS		-0.000117***	
		(0.0000171)	
Overall MS			0.0000474***
			(0.0000164)
Observations	128,612	128,612	128,612
	Japa	an	
Relative Price	-0.0127***	-0.0113***	-0.0139***
	(0.00217)	(0.00201)	(0.00227)
EXR Volatility	0.00149	-0.00439	-0.0141
	(0.00990)	(0.00969)	(0.0107)
Product MS	0.000218***		
	(0.0000366)		
Industry MS		0.000406***	
-		(0.0000722)	
Overall MS			-0.000361***
			(0.0000705)
Observations	25,171	25,171	25,171
	RO	Α	
Relative Price	-0.00648***	-0.00624***	-0.00667***
	(0.00179)	(0.00176)	(0.00177)
EXR Volatility	-0.0536***	-0.0537***	-0.0543***
	(0.00608)	(0.00605)	(0.00606)
Product MS	0.0000213**		
	(0.0000106)		
Industry MS	× ,	0.000161***	
		(0.0000245)	
Overall MS		. /	0.000330***
			(0.0000601)
Observations	39,442	39,442	39,442

Variables I CD-1 Б 1

Note: Estimated results (average marginal effects) of the panel logit model are reported. Population averaged estimation is conducted. Triple (***), double (**), and a single (*) asterisk(s) indicate 1%, 5%, and 10% significance level, respectively.

Source: Authors' estimation.

Table 6. Determinants of VCP

Dependent Variable: VCP=1	l
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	China	Japan	ROA
Relative Price	-0.00002	0.0016	0.0029
	(0.00089)	(0.018)	(0.0104)
EXR Volatility	0.0187 **	0.346 ***	0.268 ***
	(0.0095)	(0.102)	(0.047)
Industry MS	-0.000018	0.0018 ***	-0.0002
	(0.000019)	(0.0001)	(0.0002)
Observations	128,612	25,171	39,442

Note: Estimated results (average marginal effects) of the panel logit model are reported. Random effect estimation is conducted. Triple (***), double (**), and a single (*) asterisk(s) indicate 1%, 5%, and 10% significance level, respectively.

Source: Authors' estimation.