

Exchange rate movements and foreign consumption*

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Abstract

We investigate how exchange rate movements affect inbound consumption (consumption in the domestic market by non-residents) and outbound consumption (consumption abroad by domestic residents). We find evidence of almost complete exchange rate pass-through into the price of outbound consumption while no pass-through into the price of inbound consumption. However, the exchange rate is an important determinant of both real inbound and real outbound consumption and a rise in exchange rate improves the balance of foreign consumption. We also find that there are strong substitution effects 1) between domestic consumption and outbound consumption and 2) inbound consumptions between Korea and Japan with respect to the changes in exchange rate.

Keywords: inbound consumption, outbound consumption, exchange rate pass-through, substitution effect

JEL Classification: E31, F31, F41

* This paper is an extension of Jung-yong Lee's master thesis at the graduate school of Hanyang University.

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1 Introduction

Before the COVID-19 crisis, Korea witnessed a solid growth of both inbound and outbound travel expenditures. In the balance of payments, the credit in the travel account (inbound travel) more than tripled from USD 6.8 billion in 2000 to USD 20.9 billion in 2019. The debit in travel account (outbound travel) increased even more rapidly from USD 7.1 billion in 2000 to USD 32.7 billion in 2019. As the debit has outpaced the credit in travel account since 2000, the balance of travel account has recorded deficits during the last two decades. In 2019, the deficit of travel account amounted to USD 11.8 billion. The credit and the debit in travel account, however, collapsed in 2020 due to the COVID-19 crisis.

The travel account in the balance of payments is almost equivalent to foreign consumption in the national income and product account. The credit in travel account is similar to consumption expenditure in the domestic market by non-resident households, which we call inbound consumption. The debit in the balance of travel (outbound travel) is similar to consumption expenditure abroad by resident households, called outbound consumption.

In this paper, we attempt to investigate how exchange rate movements affect inbound consumption and outbound consumption. We use the national income and product account data instead of credit and debit in travel account from the balance of payments data. Since the national income account data provides nominal and real consumption series, we can examine the behavior of real consumption as well as its deflator, which is impossible with the balance of payments data. To our knowledge, there has been no empirical studies using the inbound consumption and outbound consumption.

Specifically, the purpose of this paper is threefold. First, we estimate the rates of exchange rate pass-through into the prices of inbound and outbound consumptions and compare the estimates with the rate of pass-through into export and import prices.¹ Second, we set up a simple

¹ Campa and Goldberg (2005) present evidence on the exchange rate pass-through into the import prices of 23 OECD countries. Ha, Stocker and Yilmazkunday (2020) present empirical evidence that the rate of exchange rate pass-through into consumer prices tends to be lower in countries with flexible exchange rate regimes and credible inflation targets.

VAR model to examine the dynamic effects of exchange rate shock on the growth rates of real inbound consumption and real outbound consumption as well as the balance of two foreign consumptions. Third, we also examine the role of exchange rate in the potential substitution effect 1) between outbound consumption and domestic consumption and 2) between the inbound consumptions to Korea and Japan.

This paper organized as follows. Section II reviews the behaviors of inbound and outbound consumption in Korea. Section III provides empirical results on the rate of exchange pass-through, the impulse response analysis from VAR, and the substitution effects by exchange rate movements. Section IV concludes.

2 Recent Trend in Inbound and Outbound Consumption in Korea

In the national income and product account in Korea, final consumption expenditure of resident households is the sum of consumption of all households (residents and non-residents) on the territory and consumption of resident households abroad net of consumption of non-resident households on the territory. In this paper, we call consumption of resident households abroad as outbound consumption and consumption of non-resident households on the territory as inbound consumption.

Inbound consumption is closely related to credit of travel and outbound consumption is associated with debit of travel in the current account. An important advantage to using the national income and product account data is that both nominal and real inbound consumption and outbound consumption are available and thereby we can compute the deflators. These deflators of inbound and outbound consumptions enable us to estimate the rate of exchange rate pass-through.²

Figure 1 shows the outbound consumption and the inbound consumption between 2000 and 2021 along with the difference between the two consumptions divided by GDP, which is similar to the travel account deficit relative to GDP. The outbound consumption increased

² In contrast, the balance of payments data provides the credit and debit of travel only in nominal US dollar terms. The price data, therefore, is not available from the balance of payments data.

rapidly from KRW 6.2 trillion in 2000 to KRW 37.3 trillion in 2019 but it plummeted to KRW 14.7 trillion in 2020 due to the COVID-19 pandemic. The inbound consumption was stagnated until 2007, but it started to grow rapidly from KRW 3.9 trillion in 2007 to KRW 20.6 trillion in 2019. The COVID-19 shock also had significant adverse impact on the inbound consumption which fell to KRW 7.5 trillion in 2020.

As the outbound consumption has exceeded the inbound consumption since 2000, the net foreign consumption (inbound consumption minus outbound consumption) has been negative, resulting in deficit in the balance of travel. The average deficit relative to GDP was -0.76% between 2000 and 2021. The largest deficit to GDP ratio was -1.31% in 2007.

Figure 1. Outbound and inbound consumption (nominal)

(unit: KRW billion, %)

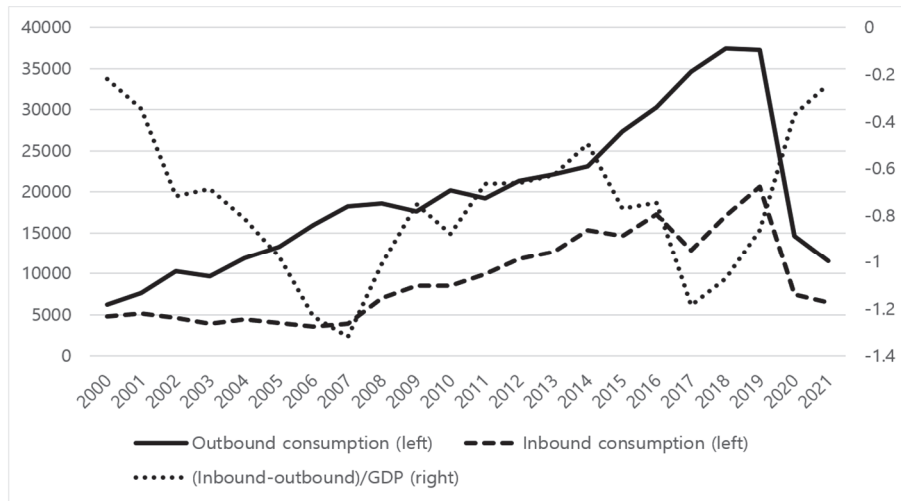


Table 1. Summary statistics

	Exchange rate	Inbound consumption		Outbound consumption	
		Price	Quantity	Price	Quantity
Mean	0.096	0.656	2.390	0.536	2.800
Median	-0.358	0.913	0.939	0.377	1.907
Maximum	28.246	5.578	106.499	24.548	33.846
Minimum	-8.941	-7.332	-36.578	-8.029	-27.911
Std dev	4.592	2.884	17.073	4.104	9.521

Table 1 reports the summary statistics for the changes in exchange rate (won/dollar exchange rate), the changes in deflators (prices) and the change in real consumption (quantity) for both inbound consumption and outbound consumption. The average quarterly change in the price of inbound consumption is 0.656% which is 0.12% points higher than the average price change of outbound consumption. Although the price of inbound consumption has increased faster than the price of outbound consumption, the volatility of price changes is higher for outbound consumption. The standard deviation for the price of outbound consumption is 4.104 which is higher than 2.884 for the price of inbound consumption.

The average growth rate of real outbound consumption is 2.800%, which is higher than 2.390% of the average growth rate of real inbound consumption. In contrast, the standard deviation of inbound consumption is higher than that of outbound consumption.

Table 2 reports the correlation coefficients among the changes in exchange rate, the changes in price and the changes in real consumption. For inbound consumption, both the changes in exchange rate and the changes in price are not correlated with the changes in real consumption as the correlation coefficients are 0.002 and -0.055, respectively. In contrast, the change in exchange rate is strongly correlated with the changes in real inbound consumption with the correlation coefficient of 0.620.

Outbound consumption, compared to inbound consumption, shows very different correlations among the three variables. The correlation coefficient between the changes in exchange rate and the changes in price is 0.868, implying that the two variables move together very closely. The changes in real outbound consumption is negatively correlated with the changes in exchange rate with correlation coefficient of -0.552.

The fluctuations of exchange rate are closely related to the growth rate of inbound consumption positively and the growth rate of outbound consumption negatively, suggesting that exchange rate is an important determinant of inbound and outbound consumptions. The changes in exchange rate, however, is correlated with only the changes in price of outbound consumption, not with the changes in price of inbound consumption. The different pattern of the correlations between exchange rate and price implies a different pass-through of exchange rate into the domestic currency denominated prices of inbound consumption and

outbound consumption.

Table 2. Correlation between exchange rate and consumption

	Inbound consumption		Outbound consumption	
	Price	Quantity	Price	Quantity
Exchange rate	0.002	0.620	0.868	-0.552
Price		-0.055		-0.641

3 Empirical Results

3.1 Exchange Rate Pass-through

To estimate the rate of exchange rate pass-through into the prices of inbound and outbound consumptions, the change in the deflators of each consumption are regressed on the change in exchange rate, controlling for the change in oil price.³ Oil price proxies for general inflationary pressure and also reflects the cost of air fare which may affect the deflators. For comparison, we compute the deflators of export and import of goods from the national income and product account to examine the rate of exchange rate pass-through into these prices. We estimate both short-run and long-run rate of exchange rate pass-through. The short-run rate is given by the estimated coefficient on the current change in exchange rate while the long-run relationship is given by the coefficient estimate on the average of the changes in exchange rate over the current and the past three quarters.

We consider two exchange rates defined by the domestic currency (Korean won) per unit of foreign currencies. One of the exchange rates is Korean won/US dollar rate and the other is effective exchange rate. The effective exchange rate is computed by weighted average of exchange rates of major cross-border travel destination and origin countries. The weights in effective exchange rate are calculated using the number of travelers to Korea and from Korea. Specifically, we include won/US dollar rate, won/Chinese yuan rate, won/Japanese yen rate, won/euro rate, won/Thai

³ In theory, there are endogeneity problem in that changes in price may affect exchange rate. But this problem may not be serious in our estimation equation because the prices of inbound and outbound consumptions are only a small part of overall price.

baht rate and won/Hong Kong dollar rate with the weights of 0.131, 0.363, 0.296, 0.066, 0.075, and 0.069, respectively in computing the effective exchange rate. The sample period is from the first quarter of 2000 to the fourth quarter of 2019. We exclude the post-2020 period because borders were almost closed due to the COVID-19 after 2020.

Table 3 presents the estimated coefficients along with Newey-West standard errors in parentheses for the deflator of inbound consumption. As shown in the first column in Table 3, the estimated short-run rate of pass-through of the won/dollar exchange rate is only 0.116 and not statistically significant. The short-run pass-through rate of the effective exchange rate (EER) into the price of inbound consumption in the second column is also estimated to be low at 0.128 although it is statistically significant at 10% level. The coefficient estimates on oil price are also low at 0.041 but they are statistically significant at 5% level. The estimated long-run rates of exchange rate pass-through into the price of inbound consumption are also low and statistically insignificant.

Table 3. Exchange rate pass-through into the prices of inbound consumption and export of goods

	Inbound consumption				Export of goods	
	Short-run		Long-run		Short-run	Long-run
Constant	0.521 (0.108)***	0.501 (0.109)***	0.543 (0.144)***	0.540 (0.125)***	-0.191 (0.332)	-0.706 (0.345)**
Won/dollar	0.116 (0.079)		0.031 (0.112)		0.603 (0.126)***	0.547 (0.398)
EER	0.128 (0.065)*		0.043 (0.077)			
Oil price	0.041 (0.019)**	0.041 (0.016)**	0.031 (0.033)	0.034 (0.028)	0.024 (0.026)	0.174 (0.086)**
R2	0.06	0.07	0.01	0.01	0.46	0.11

Note: *, **, *** mean significant at the 10%, 5%, and 1% level, respectively.

These estimation results show that the price of inbound consumption is not associated with the exchange rate movements. This finding, however, does not imply that exchange rate is not an important determinant for the demand of inbound consumption. Because the deflator of inbound consumption is computed from the national income and product account data, it is denominated by the local currency, Korean won. To the potential

foreign consumers or travelers, however, it is the foreign currency denominated price that determines the demand for inbound consumption. Indeed, no pass-through of exchange rate into domestic currency denominated price implies a complete pass-through of exchange rate into foreign currency denominated price. One percent increase in exchange rate leads to a proportional decrease in the foreign currency denominated price and no change in the domestic currency denominated price. A depreciation of Korean won, therefore, increases the demand for travel to Korea but does not change the price of inbound consumption measured in Korean won.

Inbound consumption is similar to exports in the sense that both contribute to current account surplus. To examine whether the pass-through of exchange rate is different between the price of inbound consumption and export price, we estimate the exchange rate pass-through for the deflator of exported goods with the same specification. The estimation results, presented in the last two columns in Table 3, show that the price of exports shows very different rate of exchange rate pass-through. The short-run coefficient estimate on the change in won/dollar exchange rate is 0.603 and statistically significant at 1% level. It means that 1% point increase in the change in exchange rate leads to 0.6% point increase in export price denominated in Korean won or 0.4% point decrease in export price in US dollar term. This partial pass-through of exchange rate into export price suggests that exporting firms adjust markups to changes in exchange rate in setting the price.

Table 4 presents the estimated pass-through rate for price of outbound consumption. From the first and the second column in Table 4, we find that the short-run coefficient estimate on exchange rate is close to one and statistically significant at 1% level. In contrast to the results in Table 3, we find almost complete pass-through of exchange rate into the price of outbound consumption. Exchange rate movements are transmitted to the price nearly one for one, implying that consumers in Korea bear all costs incurred from exchange rate fluctuations in outbound consumption. The demand for outbound consumption, then, is determined by the changes in price which fluctuates with exchange rate changes. The long-run rate of pass-through is not much different from the short-run rate, implying that the pass-through of exchange rate into the price of outbound consumption is essentially a short-run phenomenon.

We also estimate the pass-through rate of won/dollar exchange rate into

the import price of goods with the same specification. We find statistically significant coefficient estimate on exchange rate yet the estimated short-run pass-through rate is 0.487 which is low relative to the case of outbound consumption. Similar to the exchange rate pass-through into export price, we find a partial pass-through into import price. The estimated long-run coefficient on exchange rate is slightly higher than short-run coefficient but it is not statistically significant.

Table 4. Exchange rate pass-through into the prices of outbound consumption and import of goods

	Outbound consumption				Import of goods	
	Short-run		Long-run		Short-run	Long-run
Constant	0.365 (0.190)*	0.291 (0.127)**	0.221 (0.311)	0.311 (0.300)	0.279 (0.525)	-0.673 (0.348)
Won/dollar	0.858 (0.087)***		0.871 (0.421)**		0.487 (0.157)***	0.571 (0.470)
EER	0.827 (0.046)***		0.757 (0.339)**			
Oil price	0.030 (0.017)*	0.015 (0.012)	0.080 (0.068)	0.015 (0.045)	0.002 (0.043)	0.273 (0.095)***
R2	0.77	0.82	0.20	0.25	0.22	0.15

Note: *, **, *** mean significant at the 10%, 5%, and 1% level, respectively.

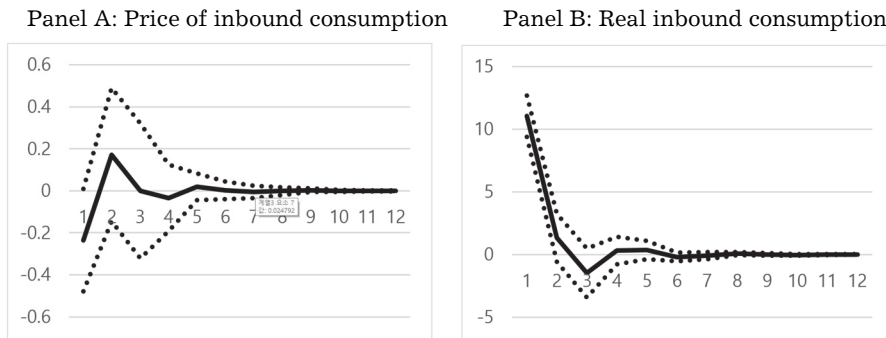
3.2 VAR

In the previous subsection, we find evidence of almost complete exchange rate pass-through into the price of outbound consumption whereas no pass-through rate into the price of inbound consumption. Regardless of exchange rate pass-through, however, the exchange rate movements may be an important determinant of real inbound outbound consumption. In fact, exchange rate is correlated with real inbound consumption despite no exchange rate pass-through into its price.

To investigate dynamic effects of exchange rate on real inbound consumption and outbound consumption, we set up simple three variable VAR models. The three variables in the VAR model include log difference of exchange rate, log difference of price of inbound (outbound) consumption

and log difference of real inbound (outbound) consumption. We also include dummy variables to control for geopolitical effects. D1 is a dummy variable for MERS which takes the value one between the 2nd quarter to the 3rd quarter in 2015 and zero for other periods. D2 is a dummy variable that takes the value one from the 1st quarter to the 4th quarter in 2017, controlling for the negative effect on inbound tourists when China effectively banned group tours to Korea in response to the diplomatic dispute about THAAD. D3 takes the value one for the 1st and 2nd quarters in 2011 when the Tohoku earthquake and tsunami occurred in Japan and zero otherwise. The impulse response analysis is based on a quarterly VAR of order 2, identified using a Cholesky factorization with the ordering of changes in exchange rate, changes in deflator and changes in real consumption.

Figure 2. Responses to one standard deviation innovation of changes in exchange rate



Note: dotted line represents the confidence interval

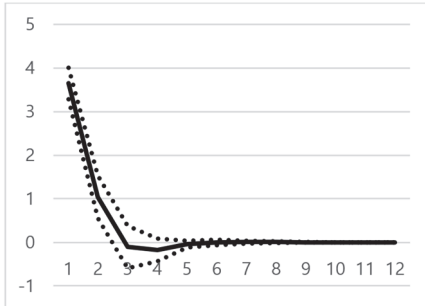
Figure 2 illustrates the responses of the price of inbound consumption and the real inbound consumption to exchange rate shock. Consistent with the estimation result in Table 3, an exchange rate shock does not affect the price of inbound consumption as the response function is not statistically significant in Panel A of Figure 2. In contrast, as shown in Panel B of Figure 2, a positive shock of the changes in exchange rate increases the growth rate of real inbound consumption.⁴ But, this positive effect on real inbound

⁴ Nguyen (2020) finds that income, relative price and visa policy have significant effect on the inbound tourism demand in Japan.

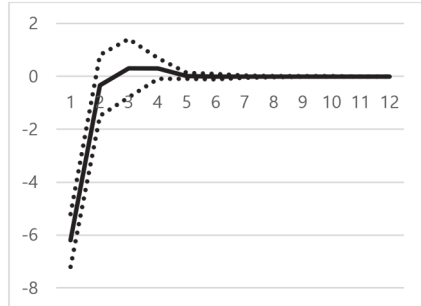
consumption is only temporary.

Figure 3. Responses to one standard deviation innovation of changes in exchange rate

Panel A: Price of outbound consumption



Panel B: Real outbound consumption

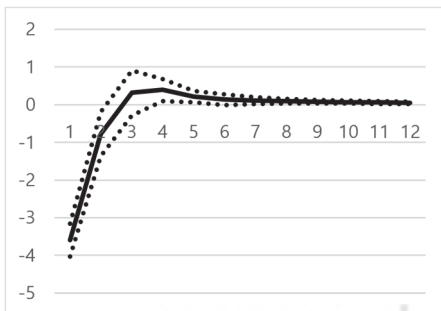


Note: dotted line represents the confidence interval

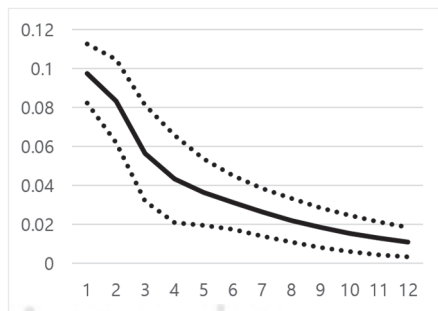
The result of impulse response analysis for outbound consumption is presented in Figure 3. To an exchange rate shock, the price of outbound consumption increases for two quarters whereas the real outbound consumption falls only in the same quarter. This result also implies that the effects of exchange rate is temporary for both price and quantity variables for outbound consumption.

Figure 4. Responses to one standard deviation innovation of changes in exchange rate

Panel A: Price differential



Panel B: Balance of foreign consumption



Note: dotted line represents the confidence interval

We, then, examine how a change in exchange rate affects the relative price and balance of inbound and outbound consumptions. In this VAR, the variables are changes in exchange rate, the log of the price of inbound consumption relative to the price of outbound consumption, and the difference between inbound consumption and outbound consumption divided by GDP. Figure 4 shows the result of impulse response analysis for the VAR. Panel A of Figure 4 demonstrates that an exchange rate shock decreases the relative price and improves the balance of foreign consumption yet these effects gradually disappear over time. This finding can be interpreted as a typical exchange rate effect on the balance of travel. A higher exchange rate decreases the relative price of inbound travel relative to outbound travel and thereby contributes to improving the travel account balance.⁵

3.3 Substitution Effect

From the standpoint of domestic resident households, outbound consumption is a substitute for domestic consumption. For example, households can purchase durable goods or travel to domestic tourist destinations instead of spending money on traveling abroad or vice versa. This household decision is influenced by the relative price of domestic and outbound consumptions. When the price of outbound consumption is falling relative to the price of goods and services purchased in the domestic market, households are likely to switch from domestic consumption to outbound consumption. The relative price of outbound consumption, then, is affected by exchange rate movements as seen in the previous sections. If the rate of exchange rate pass-through into the price of outbound consumption is stronger than into the price of domestic consumption, a fall in exchange rate would substitute domestic consumption for outbound consumption.⁶

We examine the exchange rate effect on the substitution between domestic consumption and outbound consumption. In the regression, the

⁵ Tourism was one of the growth engines in Japan in 2010s. Thanks to the sharp depreciation of Yen, Japan has witnessed a rapid increase in travel credit and a mild decrease in travel debt since 2011. After tuning to surplus in travel account for the first time in 2015, the travel surplus reached to 0.5% of GDP in 2018.

⁶ Baggs, Fung and Lapham (2018) find that an appreciation of Canadian dollar increases Canadians' cross border travel thereby has a negative effect on the Canadian retail sales.

dependent variable is the difference between growth rate of real outbound consumption and the growth rate of real domestic consumption. The explanatory variables are changes in exchange rate (won/dollar rate and effective exchange rate) or changes in relative price (the ratio of the price of outbound consumption to the price of domestic consumption), changes in oil price, real GDP growth rate and the three dummy variables.

Table 5 presents the estimation results. In the first column of Table 5, the estimation results show that there is a strong substitution effect between domestic consumption and outbound consumption with respect to the changes in exchange rate or relative price. The short-run coefficient estimate on the changes in exchange rates is -1.002 and statistically significant. The coefficient estimate on the changes in relative price is also negative and it is statistically significant at 1% level. These results imply that a depreciation of domestic currency or a rise in relative price makes outbound consumption expensive, leading to lower growth rate of outbound consumption relative to the growth rate of domestic consumption. The long-run coefficients on exchange rate and relative price in the third and fourth columns of Table 5 are also estimated to be negative and statistically significant. But, these coefficient estimates are smaller than the short-run coefficients, suggesting that the substitution is likely to take effect in the short-run.

GDP growth rate also positively affects the growth difference of consumptions, suggesting that consumers prefer outbound consumption to domestic consumption when income increases. Among the dummy variables, the coefficient on D3 (dummy variable for Tohoku earthquake and tsunami in Japan) is estimated significantly, reflecting that the travel to Japan was halted due to the natural disaster.

Table 5. Substitution effects between outbound consumption and domestic consumption

	Short-run		Long-run	
Constant	-1.208 (1.313)	-0.835 (1.115)	-2.929 (1.011)***	-2.822 (0.969)***
Won/dollar rate	-1.002 (0.000)***		-0.620 (0.342)*	
Relative price		-1.242 (0.310)***		-0.891 (0.263)***

Oil price	-0.086 (0.053)	-0.055 (0.046)	-0.166 (0.114)	-0.157 (0.085)
GDP	3.615 (1.166)***	3.021 (1.055)***	5.550 (0.947)***	5.303 (0.935)***
D1	2.670 (1.088)**	-0.017 (1.757)	-0.744 (2.250)	-1.795 (2.237)
D2	2.834 (2.447)	3.067 (2.171)	4.457 (2.715)	4.291 (2.688)
D3	-7.956 (1.094)***	-5.973 (0.879)***	-5.406 (1.827)***	-4.926 (1.798)***
R2	0.43	0.50	0.31	0.33

Note: *, **, *** mean significant at the 10%, 5%, and 1% level, respectively.

Since Korea and Japan are geographically close, travel to Korea and Japan can be a substitute for travelers from other countries. We examine whether this substitutability is determined by relative value of Korean and Japanese currencies. To this end, we regress the difference in the growth rates of inbound consumption between Korea and Japan on the changes in won/yen exchange rate and other control variables.

Table 6 reports the estimation results. The estimated short-run coefficient on won/yen exchange rate is 1.765 and statistically significant. This result implies that 1% point increase in won/yen exchange rate leads to 1.77% point higher growth rate of inbound consumption in Korea relative to the growth rate of inbound consumption in Japan. A rise in won/yen exchange rate makes the price of a trip to Korea relatively cheaper than a trip to Japan, leading to an increase in inbound consumption in Korea and a decrease in inbound consumption in Japan. A higher won/yen exchange rate also decreases the travel from Korea to Japan and increases the travel from Japan to Korea.⁷ In contrast to short-run coefficient estimate on won/yen exchange rate, the long-run estimated coefficient is not statistically significant, suggesting that the substitution effect by exchange rate takes effect only in the short-run

The change in relative price, which is defined by the ratio of the deflators of inbound consumption in Korea and Japan, is not correlated with the difference of the growth rates of inbound consumption between the two countries. This is not surprising given the findings of no exchange rate pass-through into the deflator of inbound consumption.

⁷ Kim, Lee, and Mjelde (2018) find that Abenomics leads to a significant increase in tourist arrivals in Japan by influencing per capita GDP, relative prices, and exchange rates.

Most of the coefficients on the three dummy variables are statistically significant. The estimated coefficient on D1, dummy for MERS, is negative, implying that MERS decreased the inbound travel to Korea. The negative coefficient estimate on D2 is consistent with the sharp drop of Chinese group tours to Korea. The coefficient estimate on D3 is large and positive suggesting that Japan's inbound tourism was hit hard due to the Tohoku earthquake and tsunami.

Table 6. Substitution effects between inbound consumptions in Korea and Japan

	Short-run		Long-run	
Constant	-2.777 (2.777)	-1.402 (3.567)	-2.463 (3.299)	-0.010 (3.249)
Won/Yen rate	1.765 (0.490)***		1.614 (1.060)	
Relative price		-0.233 (0.767)		-2.732 (5.928)
Oil price	-0.031 (0.126)	-0.218 (0.287)	-0.079 (0.278)	-0.122 (0.499)
D1	-20.293 (5.892)***	-19.111 (6.543)***	-15.436 (6.722)**	-20.630 (9.509)**
D2	-7.309 (4.428)	-11.023 (5.345)**	-8.426 (4.659)*	-11.831 (3.825)***
D3	30.512 (8.691)***	28.397 (7.227)***	25.040 (8.669)***	27.912 (7.824)***
R2	0.27	0.08	0.11	0.06

Note: *, **, *** mean significant at the 10%, 5%, and 1% level, respectively.

4 Concluding Remarks

We provide empirical results on the relationship between exchange rate and inbound/outbound foreign consumption. Unlike the partial exchange rate pass-through into the prices of exports and imports of goods, we find almost complete pass-through into the price of outbound consumption and no pass-through into the price of inbound consumption. However, exchange rate is one of the most important determinants for both real inbound consumption and real outbound consumption. Empirical findings also suggest that a depreciation of domestic currency would improve the

net foreign consumption and thus contribute to economic growth. In addition, we find substitution effects 1) between domestic consumption and outbound consumption and 2) inbound consumptions between Korea and Japan in response to the changes in exchange rate.

The net foreign consumption or the balance of travel account has recorded deficit since 2000. In 2017, the net foreign consumption defined by inbound consumption minus outbound consumption amounted to -1.2% of GDP. A depreciation of domestic currency is expected to reduce the deficit in travel account when international travel restrictions are gone.

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