

## Immigrants' Labor Supply and Exchange Rate Volatility<sup>†</sup>

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*Are an immigrant's decisions affected in real time by her home country's economy? I examine this question by exploiting exchange rate variations as exogenous price shocks to immigrants' budget constraints. I find that in response to a 10 percent dollar appreciation, an immigrant decreases her earnings by 0.92 percent, mainly by reducing hours worked. The exchange rate effect is greater for recent immigrants, married immigrants with absent spouses, Mexicans close to the border, and immigrants from countries with higher remittance flows. A neoclassical interpretation of these findings suggests that the income effect exceeds the cross-substitution effect. Remittance targets offer an alternative explanation. (JEL F24, F31, J22, J61)*

Are an immigrant's decisions affected in real time by her home country's economy? We might expect this to be the case, given the substantial amount of remittances they transfer and their high rate of return. This paper demonstrates this effect by showing that an immigrant changes her labor behavior based on the purchasing power of her income in her home country. In particular, immigrants consider both the current home country value of remittances as well as the future home country value of their savings. This means that an immigrant's intra and intertemporal labor decisions are affected by her home country's economy in addition to the factors that influence native workers.

This paper explores exchange rate variation as exogenous price shocks to the purchasing power of immigrants' earnings. Using CPS March data for 1994–2011, I estimate the exchange rate elasticity of earnings to be  $-0.092$ , so that in response to a 10 percent appreciation of the US dollar relative to a currency, an average immigrant from that country reduces her annual earnings by 0.92 percent. This implies that, for instance, a one standard deviation appreciation of the US dollar relative to the peso (0.11) reduces annual earnings of the average Mexican immigrant by 1 percent.

More than 60 percent of that earnings variation can be explained by changes in annual hours worked. Two-thirds of these changes (40 percent of all earnings variation) stem from changes in the number of weeks worked. For example, an average

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Mexican immigrant facing a one standard deviation depreciation of the peso relative to the dollar reduces her annual full-time weeks worked by 0.23 weeks, which are divided equally into part-time weeks and weeks off. All these exchange rate effects on labor supply do not differ significantly between female and male immigrants.

Consistently, the exchange rate effect is most pronounced for immigrants who are more likely to have close ties to their home countries. For instance, the effect is greatest for a married immigrant whose spouse is absent, and least for an immigrant who lives with a spouse. Similarly, the effect is greater for immigrants from countries with higher remittance flow. Mexicans, the largest immigrant group, are similarly responsive to exchange rate variations as other immigrants. Additionally, for those Mexicans living close to the Mexican border, the exchange rate effect is doubled.

Intuitively, we would also expect that immigrants' ties to their home countries would weaken over time, i.e., an immigrant's amount of remittances and likelihood of return decrease as she spends a longer time abroad. I define this concept as "disintegration"—a natural counterpart to the process of assimilation à la Chiswick. I offer suggestive evidence that an immigrant's exchange rate effect decreases as she spends more time in the United States. As such, disintegration indeed seems to occur. However, the slow speed of disintegration means that US immigrants remain at least somewhat sensitive to their home countries' exchange rates throughout their lifetimes.

The sign and magnitude of the estimated exchange rate elasticity of earnings also sheds light on the characteristics of individual preferences. In a neoclassical framework where remittances enter household utility, exchange rate plays the role of the price of remittances. In this case, the sign of this elasticity implies that the income effect of exchange rate on earnings exceeds the substitution effect, i.e., leisure is a gross complement of remittances.

To better understand the mechanisms behind the empirical results presented, the exchange rate effect is analyzed using a collective model of the household. In such a setting, intrahousehold efficiency implies that exchange rate affects consumption and labor supply of immigrants only through its effect on remittances. Therefore the negative exchange rate elasticity of earnings implies negative exchange rate elasticities of remittances and consumption. The combination of the empirical findings and these theoretical results implies that an appreciation of the dollar leads immigrants to work fewer hours per week and fewer weeks per year, earn less per hour, consume more, and send fewer dollars home.

The relatively large income effect of the exchange rate is also consistent with an alternative explanation. Similar to Camerer et al. (1997), it can be interpreted in the context of reference-dependent preferences (here either target remittances or target earnings). Given the persistent nature of the shocks in this setting, I argue that both neoclassical and reference-dependent preferences remain plausible explanations.

This paper lies at the intersection of two research strands. The first strand studies the determinants of remittance flows. The existing literature has, for the most part, documented a set of correlations between various macroeconomic variables and remittance flows. In contrast, this paper uses exchange rate variation as a set of exogenous shocks to the price of remittances, which affect the labor supply decisions of immigrants. This is closely related to Yang (2008), who exploits exchange rate variations to study the effect of changes in remittance flows on recipient families.

The second segment of related literature investigates the determinants of immigrants' economic decisions. In particular, Fox and Stark (1987) study a small group of temporary Mexican workers in the United States during the period from 1982 to 1983. They estimate a positive correlation between immigrants' labor supply and the purchasing power of the dollar in Mexico. In comparison, the present study attempts to identify the causal relationship between the home-country economic situation and immigrants' labor supply by comparing similar immigrants from different countries.

The remainder of the paper is organized as follows. Section I formalizes the conceptual framework. Section II describes the data. Section III presents the empirical findings, and Section IV discusses several robustness tests. Section V offers different interpretations of the findings. Section VI concludes.

### I. Conceptual Framework

This section presents a theoretical model in order to capture the channels through which an immigrant's home country economy may affect her behavior in the host country. There are two main channels for this effect. First, immigrants send remittances to their home country. The purchasing power of remittances depends on the real exchange rate between host and home countries. Second, most immigrants face a possibility of returning to their home countries after a period in the host country. The higher the possibility of returning to the home country, the stronger the effect of the home country situation on an immigrant's intertemporal economic decisions, namely saving.

A static model can capture the intratemporal effect of exchange rate on immigrants' decisions through its effect on remittances. Consider a two-member household, of which one member lives in another country. Assuming efficient intrahousehold allocation of resources (collective model of the household)<sup>1</sup>, the household maximizes the weighted sum of individual utilities, that is:

$$\max_{c, z, \hat{c}, \hat{z}} u(c, z/w) + \eta u(\hat{c}, \hat{z}/\hat{w}),$$

$$Ec + \hat{c} = Ez + \hat{z}$$

where  $w$ ,  $c$ , and  $z$  are wage rate, consumption, and earnings of the immigrant, respectively. Variables with a hat represent the same variables for his/her spouse in the home country. The only difference from the familiar collective household model is that the real exchange rate  $E$  (US dollar with respect to the other currency) multiplies all home country variables in the budget constraint.

If we denote the indirect utility function by  $v(y, w) \equiv \max_{c \leq z+y} u(c, z/w)$ , we can rewrite the household optimization using two-stage budgeting as:

$$(1) \quad \max_{\substack{c, z, T \\ c = z - T}} u(c, z/w) + \eta v(ET, \hat{w}),$$

<sup>1</sup>Such an intrahousehold efficiency assumption is supported by empirical evidence. For the case of immigrant households, see Osili (2007). For a general case, see Bobonis (2009) and references therein.

where  $T$  represents remittances: the transfer from the immigrant to her spouse.

Equation (1) provides us with two intuitions. First, because the real exchange rate,  $E$ , appears as the inverse of the price of remittances, we can separate the effect of a change in the real exchange rate on earnings into substitution and income effects. The substitution effect of an increase in  $E$  (a relative appreciation of the dollar) implies an increase in labor supply because a reduction in the price of remittances equals an increase in the relative price of leisure. However, the income effect of this currency appreciation entails a decrease in labor supply because a reduction in the price of remittances makes the household richer overall. The total effect of an appreciation thus depends on the relative magnitude of income and substitution effects. Note that this intuition is independent of the intrahousehold efficiency assumption and holds in any neoclassical model as long as remittances enter the household's utility function.

Second, one can think of household optimization as a two-step decision, where agents first share their nonlabor income, and then each agent chooses her own labor supply and consumption.<sup>2</sup> An immediate implication of this interpretation is that the exchange rate affects consumption and labor supply decisions of each member only through its effect on remittances. Therefore,<sup>3</sup>

$$(2) \quad \varepsilon_{z,E} = -\varepsilon_{T,E} \times \varepsilon_{z,y},$$

or the exchange rate elasticity of earnings,  $\varepsilon_{z,E}$ , is equal to the exchange rate elasticity of remittances,  $\varepsilon_{T,E}$ , multiplied by the elasticity of labor earnings with respect to unearned income (ELE). Section IA in the online Appendix shows that the magnitude of  $\varepsilon_{T,E}$  depends on the coefficient of relative risk aversion (CRRA) with respect to wealth. Therefore, estimating the exchange rate elasticity of earnings provides some information about the ELE and CRRA (see Section V).

The empirical findings of this paper are also consistent with an alternative explanation based on reference-dependent preferences. In their seminal paper, Camerer et al. (1997) find a seemingly large income effect. The authors and the literature that followed their work, which studies the effect of temporary wage shocks on the labor supply of workers with flexible working hours, explain the large income effect in the context of target-earning behavior, rather than a neoclassical framework. Given the persistent nature of the shocks studied in the present paper, Section V argues that both frameworks are equally apt at explaining the empirical findings.

## II. Data and Descriptive Statistics

This paper uses two sources of data: immigrants' individual-level and country-level data on their home countries. For the individual data, the main source is the March Current Population Survey (CPS) for the period of 1994–2011.<sup>4</sup> The March

<sup>2</sup> See the "sharing rule interpretation" in Chiappori (1992).

<sup>3</sup>  $\varepsilon_{y,x} \equiv \frac{|x|}{|y|} \frac{\partial y}{\partial x}$  represents the elasticity of  $y$  with respect to  $x$ .

<sup>4</sup> The March CPS (King et al. 2010) includes information on labor supply and earnings for the year prior to the interview, so my analysis covers the calendar years 1993–2010.

TABLE 1—DESCRIPTIVE STATISTICS

	Mexican immigrants (1)	Non-Mexican immigrants (2)	All immigrants (3)	Native-born Americans (4)
Male	53%	47%	49%	48%
Age	36.3 (11.1)	40.9 (11.4)	39.1 (11.5)	40.7 (12.2)
Years since arrival	15.8 (10.6)	17.2 (11.9)	16.6 (11.4)	— —
Education	7.6 (3.2)	11.6 (3.8)	10.0 (4.1)	11.7 (2.8)
Employment rate	74%	79%	77%	83%
Annual earnings	24,733 (27,904.8)	44,472 (54,553.7)	36,874 (47,142.8)	43,803 (49,716.9)
Annual hours worked	1,857 (634.1)	1,941 (696.5)	1,909 (674.4)	1,924 (724)
Annual weeks worked	46.5 (11.5)	47.7 (10.5)	47.2 (10.9)	47.5 (10.8)
Full time	40.8 (18)	41.5 (18.6)	41.3 (18.4)	40.2 (19.5)
Part time	5.7 (13.9)	6.2 (15.1)	6.0 (14.6)	7.2 (16.1)
Hourly wage	14.0 (42.4)	23.8 (196.1)	20.1 (156.1)	24.1 (422.9)
Observations	96,732	144,446	241,178	1,556,037

*Notes:* The sample is limited to (nonmilitary) individuals, ages 16–64. Standard deviations in parentheses. Earnings as well as labor supply variables are conditional of being employed. CPS weights have not been used. See Table A1 in the online Appendix for detailed data by country.

CPS data for this period is suited to this study because the survey distinguishes between immigrants and native workers and also because it covers a large sample of immigrants. I consider only data on immigrants from those countries for which enough observations and exchange rate data were available. This leaves us with data on immigrants from 73 countries (1,272 country-year combinations).<sup>5</sup>

Table 1 presents summary statistics of the individual-level data. The sample includes 241,178 immigrants of working age (16 to 64). The average immigrant in the sample is 49 years old with 10 years of education, and has lived in the United States for around 17 years. Seventy-seven percent of immigrants are employed, and conditional on being employed, immigrants annually earn \$36,874, on average, for around 1,909 hours of work (implying an average hourly wage of \$20).<sup>6</sup> Table 1 also shows that the difference between natives and immigrants mainly stems from Mexican immigrants, who constitute 40 percent of the sample.

<sup>5</sup>The panel is balanced, apart from the first year, where there are immigrants from 31 countries. Table A11 in the online Appendix shows that the results are independent of including the first year.

<sup>6</sup>All US dollar amounts are in 2010 US dollars. In the calculation of the averages no weights have been used. Table A1 in the online Appendix provides additional detailed summary statistics.

Two kinds of country variables are used. First, I use macroeconomic variables from the World Bank's World Development Indicators and the International Monetary Fund's (IMF) International Financial Statistics databases. Real exchange rate here is constructed using IMF data, as  $E_i = e_i \cdot (p_{US}/p_i)$ , where  $e_i$  and  $p_i$  are the nominal exchange rate (units of home country currency per US dollar, e.g., 14 pesos/dollar) and the CPI index of country  $i$ , respectively.<sup>7</sup> Second, I construct country-level proxies for remittances and return channels. For remittances, I construct the average remittances per immigrant for each country using micro-level data from the CPS August 2008 Immigration/Emigration Supplement. The advantage of this method as opposed to other remittances estimates is that it is based on micro-level data on the flow of income, in kind and cash, between immigrants and their families. To construct a proxy for immigrants' return, the American Community Survey (ACS) is used to estimate the rate of return for a given cohort and home country. Two additional country-level variables are used: the distance between the United States and the home country, and the Index of Democracy by the Economist Intelligence Unit.<sup>8</sup>

### III. Empirical Strategies and Findings

#### A. Home Country Effect: Earnings

Does the economic situation in an immigrant's home country affect her economic behavior in the United States? Figure 1 illustrates the relationship between an immigrant's earnings and the exchange rate of her home country, after controlling for time and country fixed effects. To construct this figure, I bin exchange rate into equally sized bins and plot the mean of immigrant earnings for each bin.<sup>9</sup>

The negative relationship revealed in this figure is further investigated using the following regression:

$$(3) \quad Z_{c,t,i} = \delta_i + \delta_c + \beta \cdot E_{c,t} + \theta X_{c,t,i} + \varepsilon_{c,t,i},$$

where the indices  $c$ ,  $t$ , and  $i$  stand for home country, time, and individual immigrant, respectively.  $Z$  and  $E$  represent log of earnings and real exchange rate, and  $X$  is the vector of observed individual characteristics of an immigrant: a polynomial of age and years since arrival (YSA), as well as gender, education and marital status. The repeated cross-sectional nature of the data allows us to control for year and country effects,  $\delta_i$  and  $\delta_c$ . Time dummies control for common effects among all immigrants observed in the same year, e.g., the macroeconomic situation of the US economy, whereas the country dummies control for particularities of immigrants from different countries.

<sup>7</sup>Two alternative measures of real exchange rate based on the GDP deflator lead to similar results (Table A8 in the online Appendix). I prefer the CPI-based measure because immigrants' decisions are driven by the price of their consumption basket in each country.

<sup>8</sup>From Rose (1999) and *Economist* (2008), respectively.

<sup>9</sup>This implies that each point does not represent the same number of observations. In particular, as small deviations from the average exchange rate are more frequent, the variance for those bins is smaller in Figure 1. Figure A1 in the online Appendix shows that the same relationship holds when bins are constructed to have an equal number of observations.

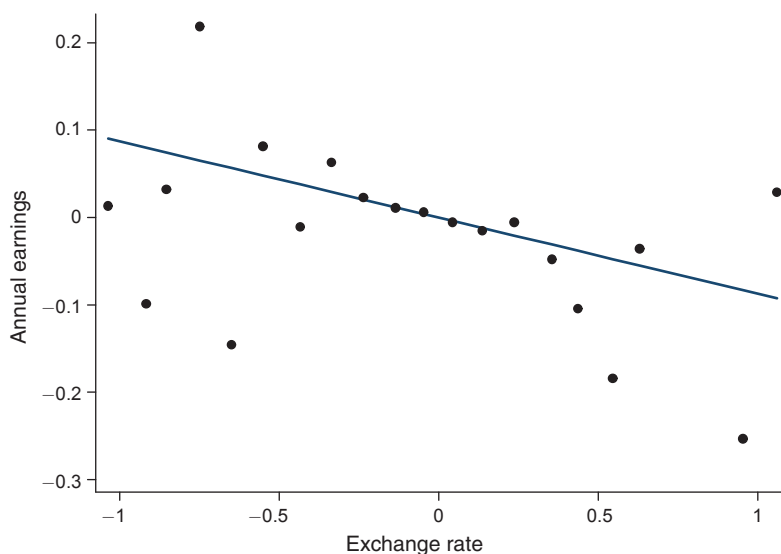


FIGURE 1. RELATION BETWEEN EARNINGS AND EXCHANGE RATE

*Notes:* This figure plots raw correlations between immigrants' earnings and exchange rate, after controlling for time and country dummies. To construct this figure, I bin exchange rate into 20 equal-sized bins and plot the mean of immigrants' earnings for each bin. The solid line shows the best linear fit estimated on the underlying data using OLS. Bins that contain less than ten observations were neglected.

A nonzero  $\beta$  shows that an immigrant's earnings are affected by the economic situation of her home country. In this case, the relative earnings of two otherwise similar immigrants from two different countries are correlated with the exchange rate between their home countries' currencies.<sup>10</sup>

Table 2 presents the results for regression 3 under different specifications. The first column replicates Figure 1 by controlling only for time and country dummies. The result is a negative and significant coefficient of  $-0.087$ . Column 2 shows the result of a regression without exchange rate, using only individuals' characteristics. Column 3 combines both sets of dummies, as well as individual controls. The coefficient of interest does not change significantly relative to column 1.

The results from Table 2 and Figure 1 imply, for instance, that, in response to a one standard deviation depreciation of the peso relative to the dollar, an average Mexican immigrant reduces her annual earnings by 1 percent.<sup>11</sup> The intuition is that a depreciation of the peso increases the value of the immigrant's wage in peso terms, and through the income effect induces her to work less, (see Section V for alternative interpretations).

A concern in regression models with a mixture of individual and group-level data is that failure to account for the presence of common group errors can generate

<sup>10</sup>This is based on the absence of triangular arbitrage in currency markets.

<sup>11</sup>The median standard deviation among the sample of countries is 0.137, which implies a 1.3 percent change in earnings, for a one standard deviation variation in the exchange rate.



TABLE 2—EFFECT OF EXCHANGE RATE ON EARNINGS AND HOURS

	Dependent variable							
	log of annual earnings				log of annual hours worked			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log (real exchange rate)	-0.087*** (0.031)		-0.092*** (0.027)	-0.090*** (0.023)	-0.055*** (0.019)		-0.055*** (0.02)	-0.059*** (0.018)
Years since arrival (YSA)		0.236*** (0.024)	0.235*** (0.024)	0.234*** (0.023)		0.092*** (0.011)	0.092*** (0.011)	0.091*** (0.011)
YSA squared		-0.028*** (0.005)	-0.028*** (0.005)	-0.028*** (0.005)		-0.016*** (0.002)	-0.016*** (0.002)	-0.016*** (0.002)
Age		1.684*** (0.187)	1.683*** (0.187)	1.688*** (0.188)		0.681*** (0.055)	0.681*** (0.055)	0.680*** (0.055)
Age squared		-0.337*** (0.04)	-0.336*** (0.04)	-0.337*** (0.04)		-0.126*** (0.015)	-0.125*** (0.015)	-0.125*** (0.015)
Age cubed		0.021*** (0.003)	0.021*** (0.003)	0.021*** (0.003)		0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)
Married		0.081*** (0.006)	0.081*** (0.006)	0.080*** (0.006)		-0.016*** (0.004)	-0.016*** (0.004)	-0.016*** (0.004)
Gender		0.506*** (0.028)	0.506*** (0.028)	0.507*** (0.028)		0.250*** (0.023)	0.250*** (0.023)	0.250*** (0.023)
Time dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
log(GDP)				Yes				Yes
Observations	185,419	185,419	185,419	184,977	185,640	185,640	185,640	185,196
R <sup>2</sup>	0.1	0.29	0.29	0.29	0.01	0.07	0.07	0.07

Notes: "YSA" stands for "Years since arrival." The unit of time for age and years since arrival is one decade. The sample is limited to foreign-born (nonmilitary) employed individuals, ages 16–64. Robust standard errors in parentheses, adjusted for clustering at country level.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

biased standard errors. This may cause misleading inference. In order to address this issue, all standard errors reported in this paper are clustered at the country level (73 clusters). This corrects the standard errors for the intracluster correlation. Given that the data used are based on a repeated cross section, one may also worry about serial correlation.

A nonparametric method to verify the relevance of these concerns is a permutation test.<sup>12</sup> The test works as follows. Instead of matching the exchange rate of each country to immigrants from that country, I randomly "mismatch" the exchange rates to immigrants and run the same Regression 3. Figure A2 in the online Appendix compares the distribution of the resulting coefficients from 10,000 repetitions of this exercise with the result of Table 2. The nonparametric *p*-values obtained are almost the same as those obtained by clustering at the country level (0.0011 versus 0.0013). This confirms the significance of the findings in Figure 1 and Table 2, that an average immigrant reduces her annual earnings when she faces a depreciation of her home country currency relative to the dollar.

<sup>12</sup> Table A9 in the online Appendix provides a parametric approach to this issue. It shows that the largest standard errors are achieved by clustering errors at the country level. For a general reference on permutation tests see Mielke and Berry (2001), and Chetty et al. (2011) for a recent application.



Intuitively, when time dummies control for the US economic situation, the variation in exchange rate may be correlated with variation in the home country's macroeconomic variables. Columns 4 and 8 offer a measure for the latter after controlling for GDP per capita. The coefficient of interest remains almost unchanged. Table A2 in the online Appendix additionally controls for household consumption per capita, and unemployment rates of home countries, in addition to GDP per capita. The results are unchanged, though less precise as the sample size is reduced due to unavailability of macroeconomic variables. This suggests that the exchange rate effect as measured does not contain the effect of other macroeconomic variables. Moreover exchange rate's predictive power for those variables is limited, (Stock and Watson 2003). Thus, the estimated coefficient mainly captures the direct effect of the exchange rate.<sup>13</sup>

### B. Home Country Effect: Labor Supply

An important question is whether the described reduction in an immigrant's earnings stems from changes in hours worked, or changes in other dimensions of labor supply. The latter is captured in the residual (earning divided by hours), which is commonly called hourly earnings or wage. The second part of Table 2 measures how much of the change in earnings can be explained by the change in working hours. The negative and significant coefficient of  $-0.055$ , which is unchanged by the inclusion of individual controls in column 7, implies that an average Mexican immigrant facing a 1 standard deviation depreciation of the peso relative to the dollar reduces her annual hours worked by 0.6 percent.

A comparison between columns 3 and 7 shows that around 60 percent of the effect on earnings is explained by changes in hours worked. The remaining 40 percent is the result of changes in the hourly earnings that should correspond to changes in other dimensions of labor supply, such as effort. I will return to this issue momentarily.

How specifically do immigrants work fewer hours when the dollar appreciates? In Table 2, the annual number of hours worked is calculated as the product of the number of weeks worked per year and the number of hours worked in a usual week. Table 3 estimates the exchange rate effect on each of those variables separately. The results show that immigrants adjust their labor supply on both margins, but the reduction in the number of weeks worked is more than twice the reduction in the number of hours worked per week. For instance, in response to a 1 standard deviation depreciation of the peso relative to the dollar, an average Mexican reduces her number of annual weeks worked by 0.4 percent, whereas she reduces the number of weekly hours worked only by 0.2 percent.

Immigrants also respond by working fewer full-time weeks and more part-time weeks. The last two rows of Table 3 imply that an average Mexican immigrant facing a 1 standard deviation depreciation of the peso relative to the dollar reduces her

<sup>13</sup>In addition, I investigate the timing of the effect. Intuitively, immigrants' decisions should be unaffected by future shocks to the exchange rate, but can be affected by contemporary and also past shocks. Consistently, Figure A3 in the online Appendix illustrates that only the past shocks have negative and significant effects on immigrants' earnings.

TABLE 3—EXCHANGE RATE EFFECT ON LABOR SUPPLY COEFFICIENT ON LOG OF REAL EXCHANGE RATE

Dependent variable	In log (1)	In level (2)
Annual hours worked	-0.055*** (0.02)	-63.540*** (21.631)
Hours worked in a usual week	-0.017* (0.009)	-0.599** (0.256)
Annual weeks worked	-0.038*** (0.013)	-1.024*** (0.358)
Annual weeks worked full time		-2.129*** (0.752)
Annual weeks worked part time		1.113** (0.466)

*Notes:* Coefficient of log (real exchange rate) reported in each cell. Full-time weeks are defined as weeks with more than 35 hours worked. Column 2 replicates the regressions of column 1, but uses levels instead of logs for the dependent variables. All regressions include the same sample and control variables as the baseline regression reported in column 3 of Table 2. Robust standard errors in parentheses, adjusted for clustering at country level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

her annual full-time weeks worked by 0.23 weeks, which are divided equally into part-time weeks and weeks off.

It is important to note that the comparison of the exchange rate effect on hours worked and full-time versus part-time weeks highlights a potential source of measurement error. In fact, the latter implies a minimum reduction of 66 hours per annum,<sup>14</sup> which is greater than the change of 63.5 hours worked reported in Table 3. Our measure of average hours worked per week does not seem to capture the entire variation in the number of hours. This can be explained by the fact that the number of hours worked in “a usual week” refers to the median, rather than average week.<sup>15</sup> As a result we detect a smaller effect, as the median is more stable than the mean in this case.

An equally important question is whether exchange rate variation affects immigrants’ employment decisions, or their propensity to change occupation or industry. Column 1 of Table 4 reports the result of a probit regression similar to Regression 3 with an employment dummy as the dependent variable. The small and statistically insignificant coefficient shows that exchange rate does not have a significant effect on immigrants’ employment status.

The remainder of Table 4 is based on a panel aspect of the March CPS data: some of its questions have been asked with two different time references, once for the year prior to the interview, and once for the week prior. For instance, the dependent variable of column 2 is a dummy variable that takes value 1 when the immigrant was not working during the previous year, but was working in the week prior to the interview. The only statistically significant result, noted in column 3, implies that a 1 standard deviation depreciation of the peso relative to the dollar would increase

<sup>14</sup>Using CPS averages of 43 and 23 hours for hours worked in a full- and part-time week. The reduction of 66 hours is a lower bound, as it assumes no reduction in hours worked other than moving from full to part time.

<sup>15</sup>See Nekoei (2011) for details on this unnoticed shortcoming of calculating labor supply using March CPS data.

TABLE 4—EFFECT OF EXCHANGE RATE ON LABOR SUPPLY (*Further Extensive Margins*)

		Dependent variable				
		Employment (1)	Finding job (2)	Losing job (3)	Changing occupation (4)	Changing industry (5)
Mean of dependent variable		77%	9%	10%	9%	12%
log(real exchange rate)	Coefficient	0.008 (0.046)	-0.004 (0.052)	0.121*** (0.047)	0.008 (0.03)	-0.008 (0.024)
	Marginal effect	0.002 (0.012)	-0.001 (0.007)	0.019*** (0.007)	0.001 (0.005)	-0.001 (0.005)
Observations		241,178	55,538	185,640	167,863	167,863

*Notes:* All regressions are probit. The dummy on the LHS in column 1 takes value 1 for employed immigrants. In column 2, it takes value 1 when an immigrant was not employed during the previous year, but was employed at the time of interview. In column 3, it takes value 1 when an immigrant was employed during the previous year, but was not employed at the time of interview. In columns 4 and 5, they take value 1 if an immigrant works in a different occupation or industry, respectively, at the time of the interview, compared with the previous year. All regressions include the same sample and control variables as the baseline regression reported in column 3 of Table 2. Robust standard errors in parentheses, adjusted for clustering at country level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

the likelihood of an immigrant losing her job by 0.2 percent. This is equivalent to a 0.02 percentage point change, which cannot be considered economically significant.

One of the mechanisms by which a worker can affect her wage rate is through job changes. The last two columns of Table 4 investigate the importance of this mechanism. The dummies on the left-hand side of column 4 and 5 take value 1 if the immigrant worked in a different occupation or industry, respectively, at the time of the interview relative to the previous year. The results show no effect of exchange rate variation on change in sector or industry of immigrants.<sup>16</sup>

In sum, exchange rate variation causes workers to adapt their labor decisions in many dimensions, such as the number of hours worked per week. It does not cause them to rethink major labor decisions, such as whether to change jobs or industries. However, I find some evidence that it might affect their decision of exiting the labor market. These findings are consistent with the idea that some degree of exchange rate variation is expected, and that this variation is persistent (see Section V for further discussion).

### C. Heterogeneous Responses

How does the exchange rate effect vary across immigrants? We might expect a larger effect for immigrants with a higher chance of return, or with closer ties. In this spirit, I look for heterogeneous responses along observables. For each relevant observable characteristic, the sample is divided into two subpopulations, and the exchange rate effect is estimated separately for each subpopulation. The results from these regressions are reported in Figure 2. Consistently, the exchange rate effect is greatest for immigrants who are more likely to have close ties to their home countries.

<sup>16</sup>These measures do not include changing firms, internal promotions, or job changes within the same firm or establishment, as long as they do not lead to a change in either occupation or industry code.

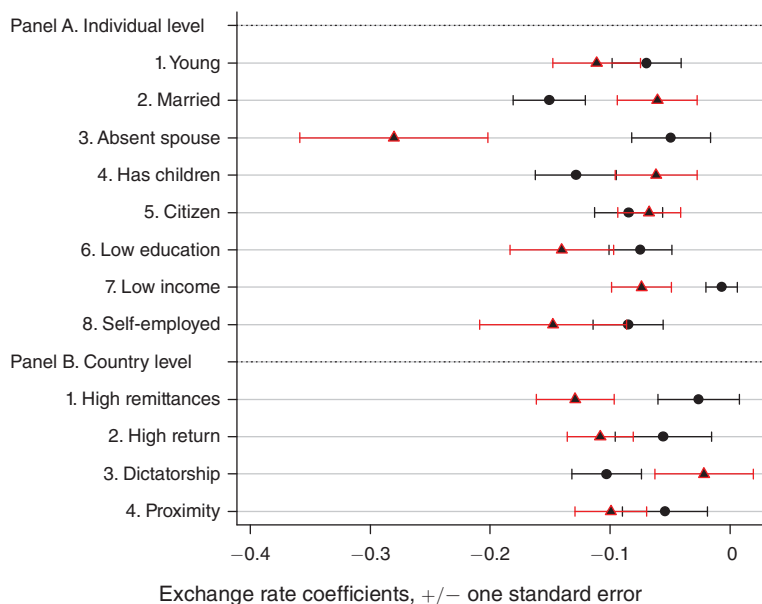


FIGURE 2. HETEROGENEOUS RESPONSES

*Notes:* Regression 3, using the specification in column 3 of Table 2, is repeated for different subpopulations. Triangles represent the coefficients of exchange rate in a regression for the subpopulation mentioned on the y-axis, whereas circles show the coefficient for the remaining population. Only for the third row, “absent spouse”, the analysis is conditional on being married. The vertical line represents the coefficient for the whole population. For nonbinary variables i.e., age, education, income, years since arrival, remittances subpopulations are defined relative to the median. An exception is the dictatorship dummy, which takes value 1 only if the democracy index of the immigrant’s home country is below the first quartile of the whole sample.

Three main patterns emerge from Figure 2. The first is that the exchange rate effect is greater for immigrants who have fewer family members living with them. Exchange rates have the greatest effect on married immigrants who do not live with their spouse, and the least effect on immigrants who live with their spouse. The effect on single immigrants’ earnings lie between these two extremes. Figure 3 illustrates this relationship. As such, heterogeneity in the exchange rate effect stems from both inter and intratemporal channels. Immigrants who live without spouses and families in the United States send relatively more remittances and have a higher chance of return.<sup>17</sup>

The second pattern in Figure 2 is that the effect is different for immigrants with different income levels. In fact, the exchange rate effect seems to be absent for immigrants with above median earnings. Table 5 investigates the heterogeneity of the effect from a different angle by reporting quantile regression estimates at the median, upper, and lower quartiles, and the upper and lower deciles. As a benchmark, the first column of Table 5 reports OLS estimates, replicating the results of Table 2. There is evidence of a shift at all quantiles. However, the exchange rate effect is

<sup>17</sup> A large empirical literature supports these claims. For a recent study of remittances, see Sinning 2011 and references therein. For evidence on rates of return, see Constant and Massey 2003. Moreover, Table A12 in the online Appendix shows further evidence using CPS August 2008 data.

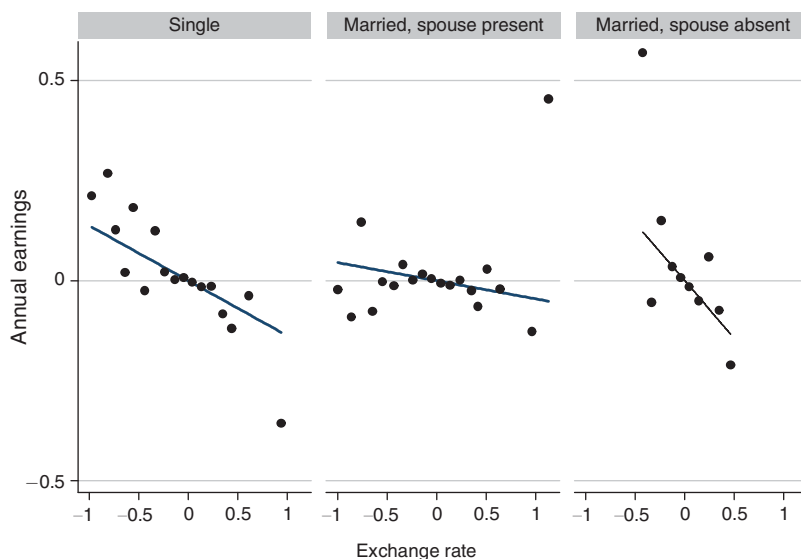


FIGURE 3. HETEROGENEOUS RESPONSES BY MARITAL STATUS

*Notes:* The sample is divided by marital status of immigrants. For each subsample, this figure plots raw correlations between immigrants' earnings and exchange rate, after controlling for time and country dummies. To construct this figure, I bin exchange rate into 20 equal-sized bins and plot the mean of immigrants' earnings for each bin. The solid line shows the best linear fit estimated on the underlying data using OLS. Bins that contain less than ten observations were neglected.

TABLE 5—DISTRIBUTIONAL EFFECT OF EXCHANGE RATE

Dependent variable:	OLS	Quantile regression				
	(1)	10 (2)	25 (3)	50 (4)	75 (5)	90 (6)
log of annual earnings	-0.092*** (0.027)	-0.134*** (0.039)	-0.108*** (0.02)	-0.070*** (0.013)	-0.054*** (0.013)	-0.043** (0.017)
log of annual hours worked	-0.055*** (0.02)	-0.124*** (0.036)	-0.058*** (0.016)	-0.000*** (0)	0 (0.002)	-0.008 (0.008)
log of wage	-0.038*** (0.013)	-0.060*** (0.02)	-0.045*** (0.013)	-0.020* (0.011)	-0.02 (0.013)	-0.023 (0.017)

*Notes:* Coefficient of log of real exchange rate reported in each cell. All regressions include the same sample and control variables as the baseline regression reported in column 3 of Table 2. Standard errors are not clustered at the country level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

larger at the lower part of the earnings distribution. The effect on the first decile ( $-0.13$ ) is more than three times larger than the effect on the ninth decile ( $-0.04$ ).<sup>18</sup>

The third pattern in Figure 2 is that immigrants from countries with a higher chance of return, or with high remittance flows, exhibit a larger exchange rate

<sup>18</sup>Table 5 also investigates the distributional effect of exchange rate on hours and wages of immigrants. It shows that, in contrast to earnings, the upper part of the hours distribution does not exhibit an exchange rate effect. This is due to the fact that many of the immigrants in the sample report 52 weeks of work at 40 hours per week.

TABLE 6—MEXICAN IMMIGRANTS, AND PROXIMITY TO MEXICAN BORDER

	Dependent variable							
	log of annual earnings				log of annual hours worked			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\log(ExR)$	-0.092*** (0.027)	-0.089*** (0.033)	-0.093*** (0.027)	-0.089*** (0.034)	-0.055*** (0.02)	-0.052** (0.024)	-0.055*** (0.02)	-0.052** (0.025)
$\log(ExR)$ × <i>Mexico</i>		-0.021 (0.054)		0.064 (0.059)		-0.019 (0.039)		0.029 (0.042)
$\log(ExR)$ × <i>Mex border</i>			0.002 (0.006)	-0.001 (0.005)			0.001 (0.003)	0.000 (0.002)
$\log(ExR)$ × <i>Mexico</i> × <i>Mex border</i>				-0.101*** (0.014)				-0.064*** (0.009)
Observations	185,419	185,419	185,419	185,419	185,640	185,640	185,640	185,640
R <sup>2</sup>	0.29	0.29	0.29	0.29	0.07	0.07	0.07	0.07

Notes: *Mexico* is a dummy for Mexican immigrants, *Mex border* is a dummy for immigrants who live in the states that border with Mexico, and *ExR* stands for real exchange rate. All regressions include the same sample and control variables as the baseline regression reported in column 3 of Table 2. Moreover, columns 4 and 8 also include *Mex border* as a control variable, as well as the interaction term *Mexico* × *Mex border*. Robust standard errors in parentheses, adjusted for clustering at country level.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

effect. A direct way to explore the heterogeneity in responses would be to contrast the exchange rate effect for immigrants with high and low remittance flows or probability of return. In the absence of data for such a distinction at the individual level, two country-level proxies are used.<sup>19</sup> Row 1 of the second part of Figure 2 suggests that immigrants from countries with higher remittance flows exhibit a larger exchange rate effect. The difference between subsamples divided by likelihood of return is relatively smaller (row 2). Immigrants from countries with repressive governments exhibit a lower exchange rate effect (row 3), which may stem from lower likelihood of return, as well as higher cost of sending remittances. The last row shows the exchange rate effect seems not to vary by distance of home country from the United States.

One concern might be that Mexican immigrants are driving the results, given that they compose 40 percent of the sample. This would be the case if the exchange rate effect is different for Mexican immigrants compared to other immigrants. There are two reasons to consider this possibility. First, Mexican immigrants have different characteristics than other immigrants (see Table 1). Second, the long border between Mexico and the United States might make their ties to Mexico different than other immigrants' ties to their home countries. Table 6 reveals that the effect of exchange rates on Mexican immigrants is not significantly different from the rest of the immigrant population (columns 2 and 6). In fact, the only significantly different exchange rate effect is for Mexicans in border states (columns 4 and 8). For example, in column 4, the coefficient of  $-0.101$  (with a  $t$ -statistic of 7.24) indicates that the exchange rate effect is doubled for Mexicans living in border states compared to the rest of the immigrant population. Living close to the Mexican border has no

<sup>19</sup> See Section II, and the online Appendix on how those variables are constructed.

significant effect on non-Mexican immigrants. Importantly, the coefficient of the exchange rate is almost unaffected throughout, which implies that the effect for Mexicans in border states is additive to the baseline effect.

Mexican immigrants living in US border states may react differently to exchange rate variations due to two opposite effects. On one hand, this group may have closer ties to Mexico due to the lower cost of sending remittances, or simply by self-selection into the border states (proximity effect). On the other hand, this group may experience a general equilibrium effect; as a depreciation of the peso reduces the labor supply of Mexican workers, the wage rises in areas with a considerable proportion of Mexicans, which in turn should moderate the initial exchange rate effect.<sup>20</sup> The result of Table 6 indicates that the proximity effect exceeds the general equilibrium effect.<sup>21</sup>

Table A3 in the online Appendix shows that the main results are surprisingly similar for the female and male subpopulations.

#### D. Disintegration

A controversial concept in immigration studies is assimilation, a process by which the gap between a native's earnings and a new immigrant's earnings closes as the immigrant stays longer in the host country.<sup>22</sup> Because assimilation happens as immigrants invest in host-country-specific human and social capital, we might also consider the possibility that they simultaneously disinvest from home-country-specific counterparts. To explore this idea, I define "disintegration" as a process by which an immigrant loses ties with her home country. Specifically, if immigrants' home country ties weaken over time, i.e., the amount of remittances and the likelihood of return decrease, the effect of home-country variables on immigrants should diminish.<sup>23</sup> This allows me to use the exchange rate effect over time in order to measure the speed of the disintegration process, and thus to uncover a previously overlooked facet of assimilation.

Consider the following regression that adds to (3) an interaction term of exchange rate and length of stay:

$$(4) \quad Z_{c,t,i} = \delta_t + \delta_c + \beta_1 \cdot E_{c,t} + \beta_2 \cdot YSA_{c,t,i} \times E_{c,t} + \theta X_{c,t,i} + \varepsilon_{c,t,i},$$

where  $YSA$  measures the length of stay of an immigrant.

Table 7 illustrates the results of these regressions and suggests at first glance that immigrants are disintegrating from their home countries slowly (column 2 shows a significant and positive  $\beta_2$ ). In a panel dataset, this would be sufficient evidence for

<sup>20</sup>The general equilibrium effect is larger, the smaller the elasticity of substitution between immigrants and natives. The debate about the magnitude of this elasticity is inconclusive. For recent contributions, see the 2012 symposium of the *Journal of the European Economic Association* on "The Impact of Immigration on Wages," as well as Braun and Omar Mahmoud (2011).

<sup>21</sup>Table A13 in the online Appendix directly investigates the existence of a general equilibrium effect. It does so by studying the difference in the exchange rate effect for an immigrant who lives close to other immigrants with correlated exchange rate variation. I find no evidence of such a general equilibrium effect.

<sup>22</sup>Chiswick (1978); Borjas (1985); and for a recent contribution Damas de Matos (2011).

<sup>23</sup>This is closely related to the long-debated remittance decay hypothesis; the amount of remittances sent by an immigrant declines over time (Stark 1978).



TABLE 7—DISINTEGRATION PROCESS

	Dependent variable					
	log of annual earnings			log of annual hours worked		
	(1)	(2)	(3)	(4)	(5)	(6)
$\log(ExR)$	-0.092*** (0.027)	-0.107*** (0.028)	-0.121** (0.054)	-0.055*** (0.02)	-0.058*** (0.02)	-0.037 (0.039)
$\log(ExR) \times YSA$		0.010*** (0.003)	0.015*** (0.004)		0.002 (0.001)	0.003* (0.002)
$\log(ExR) \times YSA \times High\text{-}return$			-0.008* (0.004)			-0.001 (0.002)
Observations	185,419	185,419	185,092	185,640	185,640	185,313
$R^2$	0.29	0.29	0.29	0.07	0.07	0.07

Notes: “YSA” stands for “Years since arrival,”  $ExR$  is for real exchange rate, and *High return* is a dummy indicating countries whose immigrants have a high likelihood of return. All regressions include the same sample and control variables as the baseline regression reported in column 3 of Table 2. Moreover, columns 4 and 8 also include the interaction terms  $\log(ExR) \times High\text{-}return$  and  $\log(ExR) \times YSA$  as control variables. Robust standard errors in parentheses, adjusted for clustering at country level. The unit of YSA is one decade.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

a disintegration process. With repeated cross sections, however,  $\beta_2$  captures attrition in addition to the disintegration effect. To address this problem, I divide the immigrant population into low- and high-return countries of origin. For immigrants with a low probability of return, attrition is lower, and  $\beta_2$  mainly captures the disintegration effect. Column 3 shows that for this subpopulation,  $\beta_2$  is still positive and significant.<sup>24</sup> This suggests that disintegration occurs, albeit at a slow pace.

#### IV. Robustness Tests

##### A. Composition Effect

Exchange rate variation may also affect the composition of immigrants in the host country.<sup>25</sup> In the following, I present three pieces of evidence to support that my results are *not* driven by a selection effect. First, the composition of immigrants at time  $t$  is the result of previous immigration decisions, and thus a function of past economic and political situations. However, changes in the exchange rate at time  $t$  are independent of the history, and thus independent of the composition of immigrants at time  $t$ . Table A4 in the online Appendix uses this fact and shows that the effect of the most recent change in the exchange rate is indistinguishable from the exchange rate effect (compare columns 1 and 2, or 5 and 6).

Second, if we consider only the subsample of immigrants who arrived more than a year ago, then an exchange rate shock cannot affect the sample through its effect

<sup>24</sup> Following a referee’s suggestion, Table A14 provides suggestive evidence that the disintegration rate is higher for more recent cohorts Antecol, Kuhn, and Trejo (2006).

<sup>25</sup> Exchange rate variation affects an immigrant’s decision to migrate to the host country (Davila 1983), and to return to the home country (Yang 2006).

on immigration decisions. Results of similar regressions using only this subsample of immigrants show that the exchange rate effect is unchanged (compare, for example, columns 1 and 3).

Third, I perform a direct test by replicating our baseline regression (3) with different characteristics of immigrants as dependent variables. The results, presented in Table A5 in the online Appendix, suggest that exchange rate does not affect the composition of immigrants. In sum, the above pieces of evidence suggest that exchange rate variations are not driving changes in the composition of the sample under study.<sup>26</sup>

### B. Labor Demand

Could the measured exchange rate effect reflect changes in labor demand rather than labor supply? For this to be the case, there would have to be home-country-specific demand shocks. A possible scenario is that a substantial number of immigrants work in industries trading with their respective home countries. In this case, an immigrant's home-country situation may affect the demand for her labor. To answer this concern, I replicate regression (3) for immigrants who work in industries that produce nontradable goods and services (Table A6 in the online Appendix). The exchange rate effect is actually larger for immigrants working in nontradable sectors. Table A7 investigates this issue further by controlling for labor demand. To this end, it compares an immigrant's labor decisions with American workers who live in the same state, work in the same industry, and have the same level of education. Again, the point estimates are quite similar and not statistically distinguishable.

### C. Sensitivity Analyses

Section II in the online Appendix presents three additional robustness tests. First, Table A9 replicates the baseline regression using average country-level data instead of individual-level data, and shows that the results remain intact. Second, Table A10 shows that the results differ trivially with an extended set of dummies (namely, cohort and state dummies, and state interacted with time dummies), as well as a country-specific time trend.<sup>27</sup> Finally, Table A11 shows that the exchange rate effect varies insignificantly over the period studied.

## V. Implications for Preference Parameters

What does the exchange rate effect on immigrants' earnings reveal about their preferences? In a neoclassical setting, the estimated negative exchange rate elasticity of earnings suggests that the income effect of the exchange rate on earnings exceeds the substitution effect. Equivalently, leisure is a gross complement of remittances.

<sup>26</sup>There is no contradiction between this fact and the findings of Yang (2006) and Davila (1983). I show the absence of a composition effect, whereas the above authors illustrate changes in the number of immigrants/emigrants following exchange rate shocks. Moreover, while I use small frequent exchange rate shocks, the above authors use large, infrequent shocks that are more likely to affect immigration/emigration decisions (see footnote 34).

<sup>27</sup>I am grateful to a referee who pointed out the importance of country-specific time trends.

The empirical findings provide us with four further corollaries, using the model of Section I (For more details and proofs, see the online Appendix).

The negative sign of the exchange rate elasticity of earnings implies:

- a negative exchange rate elasticity of remittances, i.e., remittances are normal goods;
- a negative exchange rate elasticity of consumption;
- a lower bound for the CRRA with respect to wealth equal to one (the bound is consistent with mainstream estimations of CRRA);<sup>28</sup>

and the magnitude of the exchange rate elasticity of remittances (0.92) implies:

- a lower bound of 0.92 for the elasticity of labor earnings with respect to unearned income (ELE).<sup>29</sup>

The combination of the empirical findings and this theoretical result implies that an appreciation of the dollar causes immigrants to work fewer hours, earn less per hour, consume more, and send fewer dollars home.

There are two alternative interpretations of the empirical findings. First, immigrants may have a target (commitment) for the amount of remittances in terms of their home-country currency, i.e.,  $\varepsilon_{T,E} = -1$ .<sup>30</sup> In this case, equation (2) still holds and implies an ELE equal to 0.92. Second, immigrants may act as target earners. As Camerer et al. (1997) note, this implies a high degree of risk aversion. The empirical evidence in this paper is consistent with both above hypotheses, either that immigrants have commitments on the amount of remittances, or that they are target earners.

A common issue among all above interpretations is that the magnitude of the exchange rate elasticity of earnings seems to be rather large. Two important differences in my empirical strategy with respect to the nature of exogenous shocks are worth emphasizing here. First, exchange rate shocks are persistent, i.e., the expected future exchange rate changes are zero. This is perhaps the most important difference between the present exercise and the literature following Camerer et al. (1997). The latter studies analyze temporary wage shocks, whereas here workers face a persistent shock to the price of their consumption basket. In the context of daily wage shocks, a large income effect is rather implausible, leading the authors to prefer a reference-dependence preference interpretation. However, in the context of persistent exchange rate shocks, a large income effect might be less surprising.

Second, here the identification approach is based on an experimental design with small but frequent and unpredictable shocks. The conventional wisdom is that small shocks are inadequate tools for identification due to frictions such as adjustment

<sup>28</sup>In fact, while some argue for a CRRA of one (e.g., Metrick 1995; Chetty 2006), most of the literature estimates a substantially higher level of CRRA (e.g., Gertner 1993; Cohen and Einav 2007).

<sup>29</sup>This is consistent with most macro estimations, but not the majority of micro estimations (e.g., Chetty 2006).

<sup>30</sup>Yang (2008) offers the only direct estimate of the exchange rate elasticity of remittances. Interestingly, he rejects  $\varepsilon_{T,E} = -1$ , but cannot reject  $\varepsilon_{T,E} = 0$ .

costs.<sup>31</sup> For example, agents with large consumption commitments may not react to small shocks, whereas large shocks may make it worthwhile for them to pay the adjustment costs. However, frequent shocks, such as exchange rate variations used in this paper, likely imply reduced levels of consumption commitments to start with.<sup>32</sup>

Therefore, it is possible to estimate friction-free elasticities using either large, infrequent shocks (where adjustment costs are ex post worthwhile) or using small, frequent shocks (which likely imply reduced ex ante commitments). In both cases, these friction-free elasticities will be larger relative to regular (friction-containing) elasticities for variables with adjustment costs.<sup>33</sup> However, each way of calculating friction-free elasticities produces a slightly different result for the following reasons. On the one hand, when shocks are more frequent, individuals are ex ante more prepared to accommodate them. In this case, we would expect the reaction of variables with associated adjustment costs to be relatively higher. On the other hand, if shocks are smaller there is less incentive to pay the adjustment cost ex post, implying a lower reaction in variables with associated adjustment costs. In sum, even though these two friction-free elasticities are theoretically comparable to regular elasticities, comparison between their relative magnitudes requires empirical investigation.<sup>34</sup>

## VI. Concluding Remarks

Economists have not yet investigated how an immigrant's decisions are affected in real time by her home-country economy. Previous work mainly focused on how immigrants are selected and how they assimilate over time. In contrast, this paper investigates the role of home-country determinants of immigrants' economic behavior. The intuition is that, given the substantial amount of remittances that immigrants transfer and their high rate of return, we might also expect that immigrants' decisions are affected in real time by the price of their home country's currency, and thus by their home country's economy. Hence, an immigrant's intra and intertemporal decisions are affected by her home country. I develop a means to investigate this question by exploiting exchange rate variation as exogenous price shocks to the purchasing power of immigrants' earnings.

This paper's key finding is that, in response to a dollar appreciation, immigrants earn less, mainly by reducing annual hours worked. This effect is most pronounced for immigrants who are more likely to have close ties to their home countries. Moreover, the exchange rate effect seems to be decreasing over the length of an immigrant's stay in the United States, suggesting that an immigrant's ties to her home country are weakening over time.

<sup>31</sup> See Chetty (2012) and references therein.

<sup>32</sup> In the same vein, Shore and Sinai (2010) argue that consumption commitments are lower for households with more risky incomes.

<sup>33</sup> In contrast, note that friction-free elasticities are lower for variables without adjustment costs relative to the friction-containing elasticity. This is because frictions in some dimensions imply overreaction in other dimensions. In the following, I will only discuss the case of variables with adjustment costs.

<sup>34</sup> The main difference between Yang's and my use of exchange rate shocks is that he uses a large, infrequent shock (Asian financial crisis), whereas this paper uses frequent but small exchange rate shocks.

To interpret the exchange rate effect, I use a neoclassical model, as well as a model with reference-dependent preferences. Broadly speaking, the magnitude of the estimated elasticity is rather large relative to the existing literature. I argue that this may be due to the fact that this estimate is friction-free, as immigrants will choose relatively fewer labor and consumption commitments ex ante in expectation of frequent exchange rate shocks. In contrast, previous work has estimated frictionless elasticities using large, infrequent shocks that make it worthwhile for agents to pay the adjustment cost ex post to overcome friction. The difference in magnitude between my elasticity estimate and the elasticity estimates generated by the large shock method is a matter for further empirical analysis.

In future work, it will also be desirable to exploit consumption, remittances, and saving data to directly test the effect of exchange rate variation on other aspects of immigrant behavior.

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