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The Return Motivations of Legal Permanent Migrants: Evidence from Exchange Rate Shocks and Immigrants in Australia

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Abstract—Why do legal permanent migrants return to their home countries? How do home country conditions influence this decision? This paper uses exogenous home country exchange rate shocks arising from the 1997 Asian Financial Crisis to distinguish return motivations of a national sample of Australian immigrants. On average, a 10% favorable exchange rate shock (a depreciation in the home country currency) leads to a reduced likelihood of return of 0.37 percentage points for migrants. The effect is found to be stronger for those who had pre-existing intentions to return, weaker for those undecided, and zero for those who initially stated their desire to stay. These results favor a life-cycle explanation for migrant behavior and reject the theory that migrants are target earners who seek to invest upon return home.

I. Introduction

Many individuals who live and work outside their countries of birth eventually return home. While the official government statistics are lacking, indirect estimates from different countries over time suggest considerable flows: Jasso and Rosenzweig (1982) report that over 20 percent of immigrants chose to re-migrate from the US in the 1970s. Dustmann (2007) approximates that 40% of all male immigrants and 55% of female immigrants left the UK after five years of arriving in the 1990s. Most recently, Gibson and McKenzie (2011) find that over a quarter of the “best and brightest” students who ever migrated from three pacific countries ultimately end up returning (33% in Tonga, 27% in Papua New Guinea, and 26% in New Zealand).

Why do migrants return? To traditional economic models that emphasize income maximization (such as Sjaastad 1962 or Harris and Todaro 1970), migrant return is a puzzle. If migrants indeed permanently move to where they earn the most, yet income differentials between countries rarely reverse, then these models predict little or no return. This does not seem to conform to reality. More nuanced theories appeal to other considerations like the inclination to invest or consume at home by migrants. These models rationalize the decision to return without requiring a reversal in wages between sending and receiving countries. More importantly, these theories allow for marginal changes in home country conditions to matter for a migrant’s behavior.

Two competing models are at the forefront: those that see migrants as target earners or life-cycle agents. In the former, individuals are credit constrained, so they move abroad in order to accumulate enough savings to finance an enterprise upon returning home (as in Piore 1979 and Mesnard 2004). The primary motive for return is

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investment. In the latter, migrants weigh the marginal benefits of obtaining higher income in the host country versus the marginal costs of remaining overseas, since home country consumption is preferred (see for instance Stark et al. 1997 or Dustmann 2003). The goal upon return is to consume. The two have separate predictions on how migrants respond to home country factors. For example, target earners are thought to cut their stays abroad *shorter* when their purchasing power for the home country increases while life-cycle migrants react by making their stays *longer*².

Distinguishing between the two is of interest because, as some assert, return migrants may contribute greatly to general economic prosperity. Migrant sending countries, for example, often lament losing their highly skilled nationals to richer countries through international migration, pejoratively calling this a “brain drain.” Return migration is seen as a reverse to this loss, as migrants bring back essential human capital acquired from abroad. In addition, returnees are thought of as potential investors, with relatively large amounts of savings accumulated from abroad and who may generate entrepreneurial activity at home. While there are good reasons to believe these occur, it is unclear whether return migrants behave this way in practice. The last scenario, for instance, is only more likely if return migrants are target earners instead of life-cycle migrants. Moreover, policymakers looking to enact measures to encourage return may benefit from learning what motivates returnees. Target earners will be more responsive to programs that promote better access to credit markets while lifecycle migrants will be less so.

The empirical investigation for reasons of migrant return related to home country considerations is scant and limited to particular contexts. An obvious reason is the lack of data that track migrants’ locations over time but an additional and important consideration is the difficulty of isolating exogenous variation in factors that affect return, which limits the ability to make causal inference. Most studies look at correlations. Constant and Massey (2002), for instance, relate covariates of social and economic attachments in the home country with migrant return and find that these are strongly associated for a sample of German guest workers. Dustmann (1996) similarly finds that for Italian, Spanish, Yugoslavian, Turkish, and Greek migrants residing in Germany in 1984-1993, having a partner residing in the home country increases the probability that they intend to go home. Investigating purchasing power parity, Kirdar (2010) demonstrates that German immigrants shorten their stays overseas when their purchasing power rises in their home countries. The chief concern in these studies is omitted variable bias, as source country attachments are possibly endogenous to other unobservable factors, such as innate ability and entrepreneurial mindset, which may also affect the individual’s propensity to return.

Yang (2006) perhaps comes closest to identifying the causal impact of changing home country conditions on return. Alleviating concerns about endogeneity, the author utilizes an unexpected event, the 1997 Asian Financial Crisis, when substantial and varied exchange rate shocks were realized between the Philippine peso and foreign currencies. Now Filipino migrants worked in a diverse set of countries abroad so it was as

² This is true if the substitution effect dominates the income effects.

if each of them were randomly allocated different exchange rate shocks during this time. By comparing the behavior of Filipino migrants who attained greater or smaller shocks, the paper establishes how exchange rates affected the decision of these migrants to return home. The finding is that Filipino migrants are primarily driven by life-cycle considerations, prolonging their stay abroad when they experience favorable changes in their purchasing power at home. Since his sample is mostly composed of short-term Filipino migrants in temporary work contracts though, it is unclear whether the conclusion should hold for other types of migrants as well, such as those granted permanent legal status and are joined by other family members in the host country. For this set of individuals, a reasonable prior in fact is that there could be no motivation for return at all.

This paper focuses on Australian permanent immigrants and their motivations for return. I employ a strategy similar to Yang (2006) in using exchange rate shocks brought about by the Asian Financial Crisis, except I look at a mirror image: data from one destination country on immigrants from multiple origin countries. As opposed to observing one source country whose migrants were located in different destinations, this has the added advantage of capturing not only transnational households, but also a sample whose whole households have migrated. In addition, the dataset identifies current migrant economic status and activities. Australia is an ideal context to study migration because it is a large immigrant country with 24.7% of its population foreign-born. Most of these immigrants are legal permanent residents whose immediate relatives are already present in the host country.

The main contribution is the finding that a 10% increase in the exchange rate, a home country currency depreciation, leads to a 0.37 percentage point reduction in the probability that a migrant returns³. The 2-year permanent return rate in this period is small at 4.1% so this effect is almost equivalent to a considerable 10% of the return rate. That these migrants continue to be sensitive to home country conditions is a somewhat surprising result, given that these individuals are granted permission for indefinite stay in Australia. The result is robust and consistent with the story that migrants return due to life-cycle considerations. A substantially larger effect is found for migrants who have pre-determined that they would want to return, evidence that migrants optimally time their return to favorable conditions. Moreover, I show evidence that this exchange rate shock effect is not merely a proxy for the influence of other macroeconomic conditions, such as GDP per capita growth or the change in unemployment in the home country. This suggests that return is primarily a function of purchasing power and consumption rather than employment possibilities in the origin country.

The rest of the paper is structured as follows: the next section presents the life cycle and target earnings models of return migration; the third part reviews the Asian Financial Crisis and its effects on Australia; the fourth describes Australian migration policy and the data; the fifth outlines the empirical strategy and results; the sixth presents robustness checks; and finally, the last part concludes.

³ A standard deviation change in the exchange rate during this period was 29%.

II. Theoretical Framework

What can responses to exchange rate shocks tell about the motivations of migrants to return? In this section, I present the life cycle and target earnings models of return migration patterned substantially after the ones presented by Dustmann (2003) and Mesnard (2006). To save space, I provide abridged versions of these models but highlight the role played by exchange rate variation in a migrant's choice of her optimal migration duration. Readers interested in a fuller treatment are encouraged to consult the aforementioned articles.

Consider a migrant, who currently resides in a foreign country (Australia in this case) at time 0 and whose lifespan extends until time 1. To make things simple, assume that there is no discounting between periods, the interest rate equals zero, and each individual has perfect foresight. Hence, given preferences for foreign and home consumption, $u_f(c_f)$ and $u_h(c_h)$, a migrant maximizes her lifetime utility by concurrently choosing the amount of consumption in the foreign country c_f , consumption at home c_h , and her duration of stay abroad t , where $0 < t \leq 1$. Assume that prices are normalized to 1 in both countries. Further, migrants favor consumption at home than consumption abroad.

There are two types of migrants: lifecycle consumers who are only capable of being wage earners at home⁴, and target earners whose goal abroad is to accumulate resources in order to invest in a small business at home. Wages per period abroad for both types is given by w_f . Savings from these wages can be converted to home country currency through an exchange rate E expressed as home country currency over the currency abroad. Upon return, lifecycle migrants work for a wage w_h per period. Target earners however may opt instead to invest in a business that provides a high-income stream of y and $y > Ew_f > w_h$. Self-employment cannot be done simultaneously with working for a wage. In addition, starting a business requires collateral, C , which can only be financed through savings abroad due to credit constraints both abroad and at home. This difference between life-cycle consumers and target earners allows deriving conditions such that the two are distinguishable from their response to exchange rate shocks to their home country currencies.

IIA. Lifecycle Consumers

The maximization problem for a lifecycle consumer is as follows:

$$\begin{aligned} \max_{c_f, c_h, t} \quad & tu_f(c_f) + (1-t)u_h(c_h) \\ \text{s. t.} \quad & tc_f + S_t \leq tw_f \quad (1) \\ & (1-t)c_h \leq (1-t)w_h + ES_t \quad (2) \end{aligned}$$

⁴ Perhaps because they do not have the appetite for self-employment or simply do not have access to business ideas.

where (1) and (2) are the budget constraints for the periods spent abroad and at home respectively. S_t represents accumulated savings up to time t . Let us consider for the moment only interior solutions. Note that for an interior solution to hold, (1) and (2) are satisfied with equality and (2) can be substituted into (1) for S_t .

The first order condition of the corresponding Lagrangian with respect to t is given by (3) where λ is the marginal utility of wealth:

$$u_f(c_f) - u_h(c_h) + \lambda(Ew_f - w_h + c_h - Ec_f) = 0 \quad (3)$$

This result is fairly intuitive. The migrant balances the marginal cost of remaining abroad $u_f(c_f) - u_h(c_h)$ due to the preference to consume at home, with the marginal benefit of earning higher abroad represented by the term $\lambda(w_f - w_h + c_h - c_f)$.

The more interesting part though is how the solution to t^* evolves in response to a shock in E . The details of this solution are relegated to the appendix but they closely follow the derivation of Mesnard (2004). Equation (4) describes the response

$$\frac{dt}{dE} = \left(w_f - c_f - \frac{\partial c_f}{\partial E} \right) \left[\frac{-b\lambda + at}{a^2} \right] \quad (4)$$

where $(w_f - c_f) \geq 0$ and $\frac{\partial c_f}{\partial E} < 0$ because of a first order condition, $b = Et \frac{\partial c_f}{\partial \lambda} + (1-t) \frac{\partial c_h}{\partial \lambda}$, and $a = -(Ew_f - w_h + c_h - Ec_f)$. Since the marginal utility of wealth is positive and it can be shown that $b < 0$ and $a \leq 0$, the response to a favorable (positive) change to the exchange rate depends on two effects. First, a substitution effect, $\frac{-b\lambda}{a^2} > 0$, induces the migrant to stay longer abroad, but an opposing income effect, $\frac{at}{a^2} < 0$, encourages the migrant to cut their stay abroad short because of the higher spending power permitted at home by an increase in E . While the total effect is ambiguous, the overall result if the substitution effect turns out to dominate the income effect is that migrants prolong their stay in the foreign country due to a favorable exchange rate shock. This prediction allows us to identify life-cycle consumers because, as I will show in the next part, target earners do not quite respond to the same exchange rate shock in the same manner.

IIA. Target Earners

The corresponding optimization problem for a target earner is as follows:

$$\begin{aligned} \max_{c_f, c_h, t} \quad & tu_f(c_f) + (1-t)u_h(c_h) \\ \text{s.t.} \quad & tc_f + S_t \leq tw_f & (5) \\ & (1-t)c_h \leq (1-t)y + ES_t - C & (6) \\ & ES_t \geq C & (7) \end{aligned}$$

Consider here once again only an interior solution such that (5), (6), and (7), hold with equality. In particular, note that at the optimum, $ES_t = C$, where a migrant stays abroad only up to the point where her target savings are met. This makes sense; otherwise there is no point delaying return until $ES_t > C$ since investment at home fetches greater per period income y than w_f and consumption at home is preferred. Also consider the other possibility that the collateral C needed to start up a business is so high that it cannot be financed by accumulated savings even when the migrant stays abroad until the end of his life ($w_f < C$). Here, the migrant will simply revert to acting like a lifecycle consumer and solves the corresponding optimization problem.

The solution is straightforward and the details are left to the appendix. The first order condition that describes the optimal choice of t is given by (8).

$$u'_f \left(w_f - \frac{C}{Et} \right) \left(\frac{C}{Et} \right) + u_f \left(w_f - \frac{C}{Et} \right) - u_h(y) = 0 \quad (8)$$

Consequently, the change in t^* that results from a change in the exchange rate amounts to

$$\frac{dt}{dE} = -\frac{t}{E} \quad (9)$$

This is always negative. Hence, for target earners, a favorable exchange rate shock leads to an unambiguous shorter stay abroad.

To summarize, if the motivation of migrants for return is mostly to invest, then we should expect their response to a favorable exchange rate shock to *shorten* their stays abroad. Observing otherwise allows us to reject this target earnings model in favor of one where migrants are dominated by life-cycle considerations and the concern is primarily consumption at home. In such a model, migrants *lengthen* their stays abroad at the onset of a favorable exchange rate shock if the substitution effect dominates the income effect. However, it is of course plausible that the return decisions of migrants do not at all respond to exchange rate shocks, in which case migrants may not actually prefer consumption at home (a starting assumption) or that the solution to the above models are at the corner and $t^* = 1$. These observations inform the interpretation of the results that will come from the empirical section, where I provide evidence that legal permanent migrants in Australia are likely to be life-cycle consumers and do in fact respond to home country considerations.

III. The Asian Financial Crisis of 1997 and its Impact on Australia

Although some observers had hinted at the possibility of some crash⁵, the crisis that eventually beset the booming East and Southeast Asian economies of the 1990s is largely regarded to have been unexpected. There were few signals. In fact, as Radelet and Sachs (1998) note, macroeconomic fundamentals remained sound in these countries:

⁵ See for instance Park (1996).

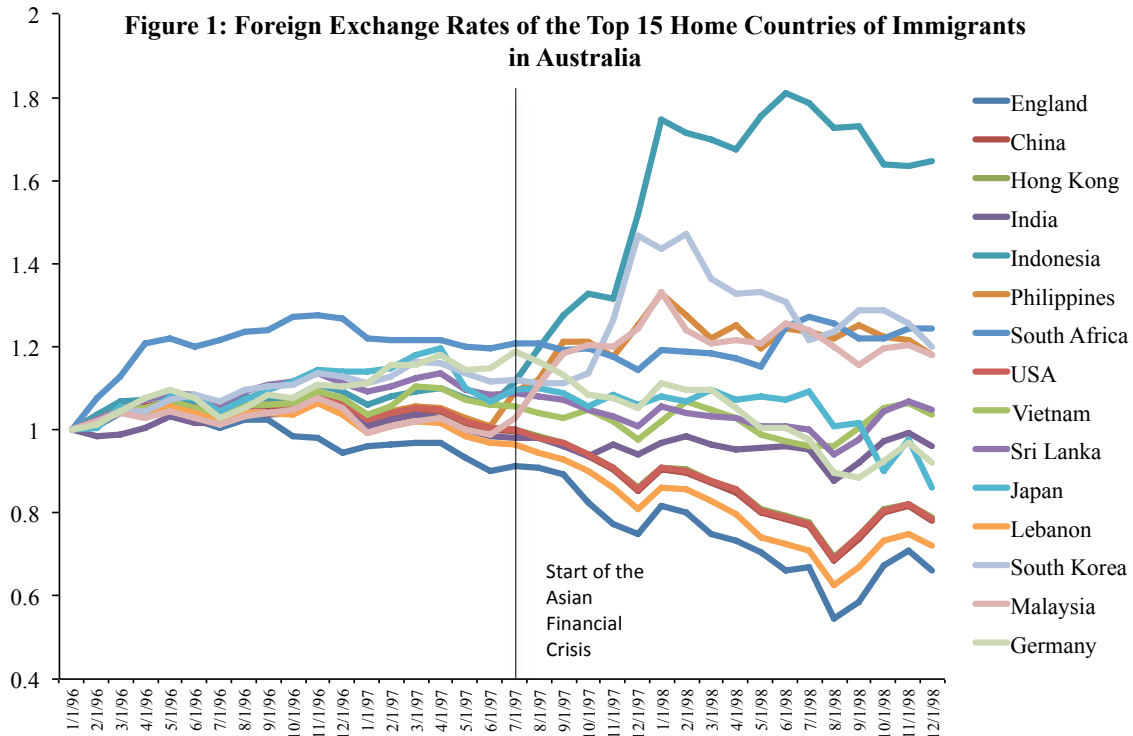
savings rates were high; inflation was low; and fiscal accounts were generally balanced. Credit agencies such as Standard and Poor's and Moody's gave no indication of changing risk in these countries' ratings until after the crisis had begun.

The Asian Financial Crisis is credited to have officially started in July 1997 with the devaluation of the Thai baht. This singular event triggered a wave of capital flight from the region as foreign investors withdrew their funds, speculating on the weakness of surrounding economies. The five countries most affected were Thailand, Indonesia, South Korea, Malaysia, and the Philippines. The statistics tell the story: In 1996, the year before the crisis, these countries enjoyed inflows of foreign capital worth \$97.1 billion in total. In just a year, this reversed to an outflow estimated to be \$18.1 billion (Radelet and Sachs 1999). This was followed by currency devaluations, which were not only confined to the hardest hit. Other countries in the region such as Hong Kong, Singapore, Taiwan, and Laos also suffered economic losses, albeit less so. What economic analysts had previously dubbed as the "Asian Economic Miracle" had come to an end.

For the most part, Australia came out of the episode unscathed. Diminished regional demand for its exports was briefly a concern, but while this did subsequently decline (Gunawardana 2006), the impact on the local economy was negligible. In fact, real GDP continued to grow by 4.0% during 1997-98, up from 2.8% in the previous period; unemployment fell from 8.7% to 8.3%; and private consumption and business investment rose by 4.6% and 11.6% respectively from the previous year (Queensland Annual Economic Report). Makin (1999) attributes the resilience to international capital being switched from Asian markets to Australasia, North America, and Western Europe, helping keep interest rates low and asset values high in these advanced economies.

This study takes advantage of the simple fact that immigrants in Australia come from a variety of countries, each of whom experienced different home country shocks during this event, embodied by the exchange rate changes that occurred between their home country currency and the Australian dollar. Australia was relatively unaffected and migrants presumably faced the same local economic conditions while in the country yet had their home country currencies appreciate or depreciate to varying degrees. Hence, to understand what motivates migrants to return, an approach would be to observe which immigrants were more likely to return home by comparing the behavior of those who were faced with more positive or more negative home country exchange rate shocks.

Figure 1 depicts the exchange rate fluctuations that occurred during the Asian financial crisis between the Australian dollar and foreign currencies of the top 15 home countries of migrants in Australia. The exchange rates are expressed as foreign currency over Australian dollar (e.g. PHP/AUD) and are normalized to 1 in January 1, 1996 for ease of comparison. An increase (decrease) represents foreign currency depreciation (appreciation) with respect to the Australian dollar; it signifies a higher (lower) purchasing power for the migrant looking to come home. It is apparent that a structural break in the trends occurs around July 1, 1997, the start of the crisis. Variation around this period is what this study exploits.



IV. Data and Descriptive Statistics

I employ data from the Longitudinal Survey of Immigrants to Australia (LSIA1), a nationally representative study of principal immigrant applicants issued permanent visas offshore and arrived in Australia between 1993 and 1995.⁶ This panel was conducted in three waves of interviews and I focus on the 2nd and 3rd waves, which were implemented from 1995-1997 and 1997-1999 respectively. This nicely corresponds to years prior to and after the Asian Financial Crisis. The main sample thus consists of 3069 principal immigrants aged 15 to 60 years old, who have identifiable countries of birth and historical exchange rate data available for their origin countries.

As part of its migration program, the Australian government allocates permanent visas under five broad categories: the Preferential Family, Concessional Family, Business Skills and Employer Nomination Scheme, Independent, and Humanitarian. The labor market has always played a crucial role in this structure. Applicants under the independent and concessional family streams are subject to a points test, where they are allocated points by satisfying criteria deemed in demand by the Australian labor market (such as age, education, experience, English language ability, etc.). Visa eligibility is determined by passing a predetermined threshold of points. Employment Nomination is reserved for firms sponsoring workers. On the other hand, Business Skills are granted for entrepreneurs who have invested a certain amount of capital in the country. The Preferential Family and Humanitarian visa streams are the only categories that do not depend on economic circumstances. The former is reserved for close relatives of

⁶ The survey excludes New Zealanders, who comprise majority of immigrant inflows to Australia.

Australian citizens or permanent residents while the latter are for refugees and their family members. The number of visas issued per year is capped. For 1993-1994, the total number granted for all streams was 76,870 (Phillips et al. 2010).

Table 1: Descriptive Statistics for the Sample of Immigrants

Panel A: Immigrant Characteristics (N=3069)	Mean	St. Dev	Min	Max
Prop. Male	0.57			
Age	32.72	8.59	15	60
Marital Status				
Married	0.72			
Never Married	0.24			
Separated	0.01			
Divorced	0.02			
Widowed	0.01			
Highest Formal Qualification				
Higher Degree	0.12			
Post Graduate Diploma	0.06			
Bachelor's Degree	0.24			
Technical/Professional Qualification	0.23			
Trade	0.07			
12 or more years of schooling	0.13			
10-11 years of schooling	0.06			
7-9 years of schooling	0.05			
6 or fewer years of schooling	0.03			
Visa Classification				
Preferential Family	0.45			
Concessional Family	0.18			
Business Skills & Employer Nomination	0.13			
Independent	0.20			
Humanitarian	0.05			
Panel B: Household Characteristics (N=3069)	Mean	St. Dev	Min	Max
Household Size	3.53	1.85	1	14
Number of Household Members in Home Country				
0	0.60			
1	0.27			
2	0.07			
3	0.03			
4	0.01			
5	0.01			
AUD value of funds arrived with when first immigrated	26,332	94,439	0	1,100,000
Average weekly income⁷				
None	0.09			
\$1 to \$57 per week	0.05			
\$58 to \$96 per week	0.03			

⁷ To minimize missing observations, I construct average weekly income by taking the max between the average weekly income of the primary applicant and the spouse. This is an imperfect measure of household income although all the following regressions are robust to using average income only of the principal applicant. Alternate measures that the LSIA provides include total household income or total weekly income from all sources but these contain too many missing observations.

\$97 to \$154 per week	0.10			
\$155 to \$230 per week	0.09			
\$231 to \$308 per week	0.07			
\$309 to \$385 per week	0.07			
\$386 to \$481 per week	0.10			
\$482 to \$577 per week	0.10			
\$578 to \$673 per week	0.07			
\$674 to \$769 per week	0.05			
\$770 to \$961 per week	0.07			
\$962 or more per week	0.11			
Household Sent Money Overseas to Relatives/Friends	0.20			
Place of Residence				
New South Wales	0.43			
Victoria	0.23			
Queensland	0.11			
South Australia	0.05			
Western Australia	0.12			
Tasmania	0.02			
Northern Territory	0.01			
A.C.T	0.03			
Panel C: Other	Mean	St. Dev	Min	Max
Return Rate	0.04	0.20	0	1
Exchange Rate Shock	0.10	0.29	-0.29	3.10
GDP per capita (in USD, PPP)	\$13,977	\$11,353	\$472	\$67,170

Table 1 describes the resulting composition of immigrants in the main sample. Those that come are young (aged 33), typically married, with relatively good education (42% have at least a bachelor's degree). The most common channel through which individuals obtained visas was through family sponsorship and they initially arrive with a significant amount of funds, over 25,000 AUD on average. Interestingly, majority of these principal applicants declare typical household members to be already present with them in Australia by 1995-1997. 60% of households do not have members left in their home countries. This number becomes 71% if one only considers close relatives (spouse, son, or daughter) that remain. In addition, only 20% said that they sent money to relatives or friends overseas in the course of the past 2 years.

Migrants to Australia come from a diverse set of countries. Table 2 presents the tabulation of individuals from the top 15 source countries in the sample. England is the primary source with 281 individuals, but countries are fairly evenly represented. Asian countries most affected by the 1997 crisis (Indonesia, South Korea, Thailand, Malaysia, the Philippines) take up a considerable share of the top 15.

For the analysis, migrants are assigned exchange rate shocks by calculating the change in their home country exchange rate that occurred in the period between their wave 2 and wave 3 interviews.⁸ Consistent with Yang (2006), I use nominal instead of

⁸ Specifically, I compute the average exchange rate a year prior to a migrant's interview date in wave 2 and correspondingly for wave 3 then calculate the percentage change between periods by subtracting the log values of the former from the latter. Alternatively,

real exchange rates since data on the former are available daily, allowing for the exchange rate changes for each observation to be calculated exactly prior to and after interview dates. Daily historical exchange rates were obtained online from Oanda Corporation.⁹ The exchange rates for each country are uniformly expressed in home country currency over Australian dollars such that an increase represents a depreciation of the home currency while a decrease signifies an appreciation with respect to the Australian dollar. Increases in the exchange rate can be thought of as favorable to immigrants since it raises the foreign currency value of their earnings and savings when utilized for home country consumption.

Table 2: The Top 15 Source Countries with Mean Exchange Rate Changes Experienced

Origin country	n	% of sample	% cumulative	mean exchange rate change
England	281	9.16	9.16	-0.08
Hong Kong	187	6.09	15.25	-0.05
China (excluding Taiwan)	153	4.99	20.23	-0.07
India	145	4.72	24.94	0.08
Philippines	126	4.11	29.06	0.14
South Africa	121	3.94	33.01	0.18
United States of America	105	3.42	36.43	-0.04
Japan	78	2.54	38.97	0.16
Lebanon	78	2.54	41.51	-0.10
Malaysia	74	2.41	43.92	0.14
South Korea	73	2.38	46.30	0.24
Indonesia	72	2.35	48.65	0.72
Turkey	72	2.35	53.27	1.12
Germany	70	2.28	55.33	0.08
Thailand	63	2.05	57.25	0.20
Other	1371	44.67	100	0.08
Total	3069	100	100	0.10

How were country currencies of migrants affected by the Asian financial crisis? The fifth column of table 2 reports the calculated mean exchange rate shocks experienced by individuals from origin countries going from wave 2 to 3 of the survey. On average, countries experienced depreciation in their currencies of 0.10 (10 percent) with respect to the Australian dollar but the spread is large with a standard deviation of 0.2 and a number of countries also saw their currencies appreciate. There were some countries that experienced extreme depreciations with Bulgaria having its currency depreciate by 310%, Turkey by 112%, and Romania by 98%. I continue to include migrants from these countries in my sample for lack of any non-arbitrary rule with which to exclude them, but I conduct robustness checks later showing that my results do not rely on including or

computing exchange rate shocks by simply calculating the change in the exchange rates between waves 2 and 3 *at the exact day* the migrants were interviewed does not change the results in the analysis. For migrants who were not interviewed in wave 3 and were therefore not assigned an interview date, I assume a most likely interview date. This is taken from the interview group they belonged to and I use the mean interview date of that group.

⁹<http://www.oanda.com/currency/historical-rates/>

excluding these migrants. The highly varied exchange rate shocks make this period appropriate to consider in investigating the effect of exchange rates on return. While conceding that the financial crisis was a highly unusual event, the shocks were unexpected during this period, hence, plausibly exogenous (an assumption I more carefully investigate later on), minimizing usual concerns about omitted variable bias. In addition, substantial variation in the exchange rates allow for more accurate estimation that cannot typically be done when looking at exchange rate changes in normal times.

The main outcome variable of interest is return migration captured by an attrition indicator. Enumerators noted the reasons a respondent could not be interviewed in a particular wave, as described in table 3. Since the baseline interview obtained contact details for friends and relatives most likely to know where interviewees were for future waves, the study was able to track whether individuals left permanently for overseas. I use “Overseas Permanently” as the indicator for return, assuming that this accurately reflects return migration. All individuals registered as having moved overseas permanently had their spouses in this status as well, so this may well be interpreted as potentially whole households returning. This is distinct presumably from “Overseas Temporarily” which more aptly describes visits home or trips to other countries, although redoing the whole analysis considering this too as an indicator for return does not change results.

Obviously, measuring return migration in this way could present some issues due to measurement error. For instance, permanently overseas could mean that the migrant moved to another country overseas instead of back to the home country. In a later section, I discuss implications of such threats and present robustness checks to verify that results are insensitive to relaxing measurement error assumptions.

Table 3: Main reasons for sample attrition

Reason	Description
Unable to Track	Address information not current or inadequate. Migrant was not contacted and current location unknown
Refused	Migrant refused interview.
Overseas Temporarily	Information given that migrant has left Australia for the scheduled interview period, but intends to return to Australia
Overseas Permanently	Information given that migrant has left Australia and does not intend to return.
Out of area	Migrant settled in area too distant from capital city to be economically viable to interview.
Other	Migrant too sick to interview, deceased, other reasons.

V. Empirical Results

The main equation I estimate is as follows:

$$RETURN_{ic} = \alpha + \beta_1 \Delta \ln ERATE_{ic} + \beta_3 \Delta YEARS_{ic} + \beta_4 YEAR_{ic} + \varepsilon_{ic} \quad (10)$$

where $RETURN_{ic}$ is a dummy indicating whether migrant i from country c returned between waves 2 and 3 of the survey and $\Delta \ln ERATE_{ic}$ is the percentage change in home country exchange rate between interviews. β_1 is the coefficient of interest, indicating the effect of a 1% increase in exchange rates on the probability of return. Since the number of years between interviews varied per migrant, I account for this by including $\Delta YEARS_{ic}$, although this is typically two for most. $YEAR_{ic}$ are year dummies which indicate when the interview for wave 2 was conducted for migrant i . This is either 1995, 1996, or 1997 and allows for time trends in migrant return. ε_{ic} is the disturbance term which is assumed to be uncorrelated with $\Delta \ln ERATE_{ic}$. In all regressions, I cluster standard errors at the country level to allow ε_{ic} to be correlated between individuals with the same origin country.

One might still worry about potential omitted variables in this specification. In particular, certain migrant households might just happen to have been differently impacted by the Asian Financial crisis in a way that is correlated with both their exchange rate shock and return. This is a violation of the exogeneity assumption and biases the estimate of β_1 . Hence, I estimate an augmented equation (11) that includes, \mathbf{X}_{ic} , a vector of controls for migrant and household characteristics recorded pre-crisis for each individual (refer to Panel A and B of Table 1 again for this list of covariates). I also include country of origin variables that incorporate information on common language and colonial history with Australia, distance from Sydney, GDP per capita, and indicators for whether the country is included in the list of those hardest hit by the Asian financial crisis.¹⁰

$$RETURN_{ic} = \alpha + \beta_1 \Delta \ln ERATE_{ic} + \beta_3 \Delta YEARS_{ic} + \beta_4 YEAR_{ic} + \beta_5 \mathbf{X}_{ic} + \varepsilon_{ic} \quad (11)$$

If $\Delta \ln ERATE_{ic}$ is indeed exogenous, then the estimate of β_1 should be unaltered by the addition of controls. To the extent that these controls also help explain return migration, their inclusion should make estimates of β_1 more precise.

Main Result

The results are as follows: Table 4 produces estimates of β_1 using OLS. The 1st column begins with a specification that uses no control variables but I progressively introduce a set of country of origin, household, and migrant characteristics as covariates. The exchange rate shocks are generally negatively related to the probability of return. When Column 2 includes the log of GDP per capita of the migrant's origin country, the estimated impact of exchange rates on return diminishes but remains negative and statistically significant. This turns out to be an important control variable since migrants from richer countries are more likely to return but also happened to experience more negative exchange rate shocks (an appreciation in their currencies) than poorer countries during the financial crisis.¹¹ Accounting for this, however, does not completely overturn the result. The negative estimate remains robust to including a host of additional controls on country of origin, household, and migrant characteristics in columns 3, 4, and 5. There

¹⁰ These are taken from Mayer and Zignago (2011) and the World Development Indicators of the World Bank.

¹¹ The correlation between $\Delta \ln ERATE$ and $\ln(\text{GDP per capita})$ is -0.18.

is no evidence that certain types of individuals or households were impacted differentially by the financial crisis in Australia in a way that is correlated with their experienced exchange rate shocks.

Table 4: The Effect of Exchange Rate Shocks on Permanent Return Migration

	(1)	(2)	(3)	(4)	(5)
$\Delta \ln \text{ERATE}$	-0.0512*** (0.0128)	-0.0380*** (0.00948)	-0.0366*** (0.0109)	-0.0389*** (0.00988)	-0.0373*** (0.0104)
$\ln(\text{GDP per capita of origin country})$		0.0172*** (0.00321)	0.0161*** (0.00340)	0.0139*** (0.00396)	0.0155*** (0.00441)
Other Country of Origin controls	N	N	Y	Y	Y
Household controls	N	N	N	Y	Y
Individual Migrant controls	N	N	N	N	Y
N	3069	3069	3069	3069	3069
R^2	0.007	0.016	0.016	0.027	0.028

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The dependent variable is a dummy indicating if the individual is reported to be “overseas permanently” (assumed here to have returned to country of origin).

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, highest educational attainment, household size, marital status, type of visa upon admission, state of residence, average weekly income and Australian dollar value of funds arrived with when first immigrated.

Overall, the results indicate that a 10% increase in the exchange rate leads to a 0.37 percentage point decline in the probability that a migrant returns. This is not trivial, provided that a standard deviation change in the exchange rate during the period was 0.29 and the permanent return rate of migrants was small at 4.1% of the sample. The effect is equivalent to almost accounting for a tenth of the return rate. This suggests that households of migrants in Australia remain sensitive to home country conditions. They seem to be dominated by life-cycle considerations more than target earnings motives for return; that is, when exchange rates increase and the migrants’ foreign wages and savings increase in value with respect to home country currencies, they stay *longer* at the destination. This is similar to the finding of Yang (2008) for his sample of overseas Filipino migrants, mostly temporary contract workers abroad with family members remaining behind. That this effect more generally holds for a sample of immigrants in Australia is a new finding. These are immigrants who hold permanent residence status and hold the option to stay, but they appear to remain influenced by home country considerations.

Differential Effects By Intention to Return

Next, I investigate whether this effect of the exchange rate shocks varies depending on the subgroup considered. I present evidence that the influence of exchange rates mostly operate on immigrants who had decided beforehand that they would like to return, but also that undecided individuals were persuaded to return by exchange rate changes, albeit with lesser impact. LSIA1 asked individuals at the baseline survey, prior to the crisis, whether they intended to return to their home countries sometime in the

future. Possible answers were: yes, no, and not sure. I look at whether the exchange rate shocks had different impacts between individuals with different answers to this question. To do this, I re-estimate equation (2) with interaction terms for intention to return and the exchange rate shocks. Table 5 below presents the results with different specifications that include or leave out certain controls, while always controlling for country of origin variables, including log GDP per capita which has been found to be important. In these regressions, those who had no intention to return are the reference group.

Unsurprisingly, those who were unsure or stated their desire to return at the onset were more likely to return in wave 3 versus those that said they did not want to return. I cannot reject the null hypothesis that changing exchange rates had no effect on those that said they do not plan to return. On the other hand, favorable exchange rate shocks to migrants seem to have considerably delayed the return of those who expressed desire to do so. The effect is smaller but still statistically significant for those who were unsure of return at the beginning. This is evidence that migrants optimally time their return but also that home country conditions have some influence at the extensive margin of whether they eventually decide to return or not among those who are unsure.

Table 5: The Effects of Exchange Rate Shocks By Intention of Return

	(1)	(2)	(3)
Intend to Return=NOT SURE	0.0555*** (0.0104)	0.0502*** (0.0106)	0.0501*** (0.0103)
Intend to Return=YES	0.178*** (0.0433)	0.172*** (0.0429)	0.169*** (0.0425)
$\Delta \ln \text{ERATE}$	-0.0119 (0.0106)	-0.0151 (0.00942)	-0.0130 (0.0157)
$(\Delta \ln \text{ERATE}) * (\text{Intend to Return} = \text{NOT SURE})$	-0.0625*** (0.0172)	-0.0551*** (0.0175)	-0.0568*** (0.0184)
$(\Delta \ln \text{ERATE}) * (\text{Intend to Return} = \text{YES})$	-0.233*** (0.0757)	-0.225*** (0.0747)	-0.224*** (0.0748)
Country of Origin controls	Y	Y	Y
Household controls	N	Y	Y
Individual Migrant controls	N	N	Y
N	3069	3069	3069
R^2	0.050	0.057	0.057

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is a dummy indicating if the individual is reported to be “overseas permanently” (assumed here to have returned to country of origin).

Intend to Return is an indicator variable that captures the immigrant’s response to the question in wave 2, “Do you intend to return to your home country?” Possible answers were: ‘yes’, ‘no’, and ‘not sure.’

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, highest educational attainment, household size, marital status, type of visa upon admission, state of residence, average weekly income and Australian dollar value of funds arrived with when first immigrated.

In regressions not shown, I also investigate differential effects of the exchange rates depending on the migrant’s pre-crisis income levels or their country of origin GDP per capita. The coefficient estimates are imprecise but generally show that increases in exchange rates are accompanied by a reduced likelihood of return for all income categories and country of origin GDP per capita. There do not appear to be differential effects on these dimensions.

Are Exchange Rate Shocks Merely a Proxy for Other Macroeconomic Variables?

Table 6A: Are the Exchange Rate Shocks Merely Capturing the Effect of Other Changing Macroeconomic Variables in the Home Country?

	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \ln \text{ERATE}$	-0.0483*** (0.0124)			-0.0440*** (0.0114)	-0.0469*** (0.0120)	-0.0438*** (0.0115)
$\Delta \ln \text{GDPPCAPITA}$		0.175* (0.0995)		0.0928 (0.0966)		0.0838 (0.0896)
$\Delta \text{UNEMPLOYMENT}$			-0.00241 (0.0025)		-0.0013 (0.0024)	-0.0005 (0.0024)
Country of Origin controls	Y	Y	Y	Y	Y	Y
Household controls	Y	Y	Y	Y	Y	Y
Individual Migrant controls	Y	Y	Y	Y	Y	Y
N	2480	2480	2480	2480	2480	2480
R^2	0.037	0.036	0.032	0.037	0.033	0.033

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is a dummy variable indicating if the individual is reported to be “overseas permanently” (assumed here to have returned to country of origin).

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, education level, household size, marital status, type of visa upon admission, average weekly income in the earlier wave and Australian dollar value of funds arrived with when first immigrated

A concern about the previous regressions might be that the exchange rate shocks merely proxy for other macroeconomic shocks that also occurred in the home countries during the financial crisis. In other words, since exchange rate changes were potentially correlated with variation in GDP per capita growth, unemployment, or prices then it could be these variables influencing return and not the higher purchasing power resulting from the fluctuations in the exchange rates. A direct test then would be to include these other macroeconomic variables in estimating the main regression equations and observe if the impact of the exchange rate changes. Table 6A displays the results of implementing this analysis using different ways of including GDP per capita growth and changes in unemployment in the home country between waves 2 and 3. Table 6B does the same for changes in prices as computed from the CPI.¹² I use only observations without missing values in all these indicators to hold the sample constant across regressions.

¹² Because data on GDP per capita, unemployment, and CPI are only provided as yearly averages, I cannot compute the change in these variables that occurs exactly between interview dates for the migrants, in the same way I did for the exchange rate for which daily data was available. I settle for using a weighted measure in calculating the changes for

Overall, the main result is insensitive to the inclusion of changes in GDP per capita or unemployment in Table 6A. Column 1 replicates the main regression for the smaller sample. In column 2, higher GDP per capita growth in the home country appears to increase the likelihood that migrants return, but this effect disappears once the exchange rate shock is accounted for. In column 3, home country unemployment is unrelated to return. The last three columns drive home the point that no matter how you include these other macroeconomic variables as controls, the effect of the exchange rate shocks on return is robust. Notice though that there might be more to this finding: these regressions suggest that migrant return is better explained by purchasing power and consumption than by employment opportunities and prospects at home. In all regressions, exchange rate changes are the most important determinant of return. This goes against the usual perception that migrants return because of a booming home country economy.

Table 6B: Are the Exchange Rate Shocks Merely Capturing the Effect of Other Changing Macroeconomic Variables in the Home Country?

	(1)	(2)	(3)
$\Delta \ln \text{ERATE}$	-0.0393*** (0.0103)		-0.0418 (0.0281)
$\Delta \ln \text{CPI}$		-0.0361*** (0.0116)	0.00312 (0.0312)
Country of Origin controls	Y	Y	Y
Household controls	Y	Y	Y
Individual Migrant controls	Y	Y	Y
N	3080	3080	3080
R^2	0.032	0.031	0.031

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is a dummy variable indicating if the individual is reported to be “overseas permanently” (assumed here to have returned to country of origin).

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, education level, household size, marital status, type of visa upon admission, average weekly income in the earlier wave and Australian dollar value of funds arrived with when first immigrated

Table 6B shows how changes in the general price level in the home country are related to return. Column 1 is again a replication of the main result while column 2 shows that changes in prices demonstrates about a similar effect on return as much as the exchange rate shocks. Including both variables in the same regression in column 3 keeps the point estimate for the effect of the exchange rate shock unchanged but precision is lost (it is now significant only at the 14% level), while it reverses the sign for the effect of a price change and estimates it to virtually be zero. I interpret this as evidence of price

these variables. For instance, if a migrant was interviewed on March 1995 for 2nd wave, I assign her country’s GDP per capita on that date as $\frac{1}{4}$ the value of the measure for that year’s plus $\frac{3}{4}$ the value of the previous year’s. I then do the same for the 3rd wave interview. The resulting change in GDP per capita is going to be the log difference between the two waves. To be consistent, I recalculate the exchange rate shock measures in the same way for these sets of regressions but note that this introduces some amount of measurement error.

changes proxying for the exchange rate shocks, if anything.¹³ It appears that including price changes in the regression takes away useful variation in the exchange rate shock while not essentially affecting the return decision, which makes the coefficient estimate imprecise.

Robustness Tests

The previous analysis relies on the assumption that exchange rate shocks during the Asian Financial Crisis were unexpected and exogenous; hence they roughly approximate a random allocation of shocks across different immigrant households in Australia. This motivates the claim that the estimates of β_1 presented above are causal effects. However, this may not hold if exchange rate shocks are systematically related to other factors that determine return for households. I have controlled for as many possible confounding factors in the analysis as the data permits. In the previous analysis, note that I discovered that richer countries, which had higher rates of return also had larger appreciations in their home country currency, hence inflating the supposed effects of exchange rates on return. After controlling for this though, the effect of exchange rate shocks remained significant and appears orthogonal to a host of other controls on country of origin, migrant and household characteristics. But there may still be remaining concerns and I explore them in detail in this section.

Table 7: The Effect of Future Exchange Rate Shocks on Permanent Return Migration in the Prior Period

	Return from wave 1 – wave 2		Return from wave 2 – wave 3
$\Delta \ln \text{ERATE}_{\text{wave2} - \text{wave3}}$	-0.0057 (0.0081)	$\Delta \ln \text{ERATE}_{\text{wave3} - 2\text{yrs after}}$	-0.0139 (0.0128)
Country of Origin controls	Y	Country of Origin controls	Y
Household controls	Y	Household controls	Y
Individual Migrant Controls	Y	Individual Migrant controls	Y
N	3535	N	3069
R^2	0.005	R^2	0.025

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

For the left panel: Dependent variable is a dummy variable indicating if the individual is reported to be “overseas permanently” for wave 2 (assumed here to have returned to country of origin). The exchange rate change is the change in the exchange rate from wave 2 to wave 3 of the survey.

For the right panel: Dependent variable is a dummy variable indicating if the individual is reported to be “overseas permanently” for wave 3 (assumed here to have returned to country of origin). The exchange rate change is the change in the exchange rate from wave 3 to two years after the survey.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, highest educational attainment, household size, marital status, type of visa upon admission, state of residence, average weekly income and Australian dollar value of funds arrived with when first immigrated.

¹³ In fact, when I re-estimate this regression using my more precise measure of the exchange rate shock that occurred exactly between interview dates from wave 2 to 3, the coefficient on the exchange rate shock is statistically significant and the same from column 1 even when including the change in the CPI as a control.

One potential violation of the identification assumption may be that future exchange rate shocks are in some way systematically related to past migration trends so the effect merely captures pre-existing trends. For instance, migrants who were faced with appreciations in their home currencies and returned could have simply belonged to those nationalities in the past, which had a higher propensity to return. I conduct two tests to address this concern. First, I run a placebo test where I regress future exchange rate shocks on past return migration. Future exchange rate shocks should not systematically predict return migration in the previous period. Second, I estimate the regression equation (2) adding lagged values for previous exchange rate shocks. This verifies that the exchange rate shocks during the Asian Financial crisis do not merely reflect past trends or is due to some regression to the mean.

Table 7 presents the falsification exercise. On the left panel, I regress the exchange rate shocks from the Asian financial crisis on the return indicator for a past period, particularly from wave 1 to wave 2 of the survey. Similarly, on the right panel, I regress the return variable from wave 2 to wave 3 on the future exchange rate shock calculated from wave 3 to 2 years after. In both cases, I cannot reject the null that future exchange rate shocks predict past return.

Table 8: Are the Effect of Exchange Rate Shocks Contemporaneous?

	(1)	(2)	(3)	(4)	(5)
$\Delta \ln \text{ERATE}$	-0.0516* (0.0273)	-0.0521* (0.0277)	-0.0518* (0.0276)	-0.0565* (0.0284)	-0.0529* (0.0316)
$\Delta \ln \text{ERATE}_{\text{lag1}}$		0.0108 (0.0490)	0.00895 (0.0498)		
$\Delta \ln \text{ERATE}_{\text{lag2}}$			0.0120 (0.0236)		
$\Delta \ln \text{ERATE}_{\text{lag10yr}}$				0.00285 (0.00313)	
$\Delta \ln \text{ERATE}_{\text{future}}$					-0.00439 (0.0167)
Country of Origin controls	Y	Y	Y	Y	Y
Household controls	Y	Y	Y	Y	Y
Individual Migrant controls	Y	Y	Y	Y	Y
N	2681	2681	2681	2598	2598
R^2	0.025	0.025	0.025	0.024	0.029

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is a dummy indicating if the individual is reported to be "overseas permanently" (assumed here to have returned to country of origin).

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, highest educational attainment, household size, marital status, type of visa upon admission, state of residence, average weekly income and Australian dollar value of funds arrived with when first immigrated.

Table 8 presents the results when I account for lagged exchange rate shock variables. These variables are always computed using 2-year changes in the exchange rate in order to conform to the exchange rate shock measured between wave 2 and 3, which are typically 2-year changes. Column 1 provides the baseline result from table 4

again for comparison. I restrict the sample to those with observations for a lagged period and two lagged periods of the exchange rate shock to achieve consistency with the subsequent two columns. Columns 2 and 3 include these lagged variables as regressors. The point estimate for the coefficient of $\Delta \ln \text{ERATE}$ is unchanged in both. In column 4, I run a regression controlling for the long-term trend in country exchange rates, the change in exchange rates for the past 10 years. In column 5, I control for a future exchange rate shock, measured as the change 2 years after the last year of interview. These do not change the baseline result significantly. These regressions show that the effect of exchange rates does not merely reflect past trends; it appears that it is contemporaneous exchange rate shocks that influences return migration. In some way, this validates the focus on the period prior to and after the Asian Financial Crisis. It is during this window that shifts in the exchange rate appear to be unrelated to past trends, hence likely to be exogenous to migrants who were faced with them.

A second concern is that outliers may be driving the results. Recall, certain countries had their currencies depreciate by as much as 100% during the period vis-à-vis the Australian dollar. Table 9 depicts what happens to the main regression when extreme observations are systematically dropped from the data. Column 1 again uses the full sample. Column 2 drops the migrants from the top 3 countries with the most extreme currency depreciations (Bulgaria, Turkey, and Romania) and column 3 drops the top 5 (adding Nigeria and Venezuela to the top 3). Column 4 drops migrants who obtained above the 99th percentile of the exchange rate shock variable while columns 5 and 6 trim those above the 95th and 90th percentile respectively¹⁴. In all six cases, the effect of the exchange rate shock remains negative and significant with some evidence that trimming for extreme values even magnifies the effect. This should appease fears that outliers are driving the result.

Table 9: The Effect of Exchange Rate Shocks on Permanent Return Migration for the Trimmed Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Full sample	w/o top 3 extreme	w/o top 5 extreme	trim 99 th percentile	trim 95 th percentile	trim 90 th percentile
$\Delta \ln \text{ERATE}$	-0.0373*** (0.0104)	-0.0513** (0.0207)	-0.0518** (0.0231)	-0.0437*** (0.0130)	-0.0842*** (0.0272)	-0.104** (0.0414)
Country of Origin controls	Y	Y	Y	Y	Y	Y
Household controls	Y	Y	Y	Y	Y	Y
Individual Migrant controls	Y	Y	Y	Y	Y	Y
N	3069	2963	2948	3036	2915	2768
R^2	0.028	0.027	0.027	0.028	0.028	0.027

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable is a dummy variable indicating if the individual is reported to be “overseas permanently” (assumed here to have returned to country of origin).

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, education level, household size, marital status, type of visa upon admission, average weekly income in the earlier wave and Australian dollar value of funds arrived with when first immigrated

¹⁴ The 99th percentile exchange rate shock is 1.2; the 95th percentile is 0.73; and the 90th percentile is 0.29.

A third concern involves measurement error. The dependent variable, return, relies on information from a friend or relative of the migrant that he or she returned “overseas permanently.” There are conceivable ways in which this report might be inaccurate. “Overseas permanently” could reflect other reasons for attrition that the relative was unaware of. It may also capture instances of migrants being overseas only for some temporary trip or moving permanently to another country. Because return is a dependent variable though, it is worth noting that measurement error, in which return is randomly misreported in a way unrelated to exchange rate shocks, is less of a concern since this merely introduces noise and OLS coefficient estimates remain consistent in this case. What would bias results are instances in which the error in measuring return is systematically related to the exchange rate shocks.

In the analysis, “overseas permanently” was interpreted to mean return home but could also mean that the migrant moved to another country permanently. To be a threat to identification though, it must be that permanently migrating to other countries is somehow systematically determined by home country exchange rates. I cannot fully rule out this possibility yet it is improbable that this could yield the estimates that I find. For this explanation to fully account for the results, for example, those who moved to *another* country should also have had larger appreciations in the currency of their place *origin* than those who did not move. This is quite unlikely on two counts. One, almost zero percent of respondents in wave 2 said that they “expect to immigrate to another country [aside from their former country] in the future.” The response to this question is tabulated in table 10. Even dropping these individuals in the analysis has no effect on the results. Second, the fact that the exchange rate shocks had the most effect on those who said they intend to return to their home country during the baseline makes it improbable that migrants were moving elsewhere. Thus, while “overseas permanently” perhaps captures movement to other countries as well, this measurement error most realistically introduces itself as random noise. The fact that the regressions are still able to measure the parameter of interest with statistical significance suggests this is not a huge concern.

Table 10: Expect to Emigrate to Another Country?

	Freq.	Percent
Yes	28	0.91
No	2699	87.94
Not Sure	213	6.94
[Expect to immigrate to former country]	129	4.20

Another possibility is that measurement error arising from other reasons for sample attrition listed in table 3 is driving the results. It may, for instance, coincidentally happen that those who were noted as “unable to track” contain those who have left for home permanently, in a way also related to the exchange rate shocks. At the same time, migrants traveling home could be systematically mistaken as permanent returnees when they are in fact merely visiting.

There is little evidence, however, that exchange rate shocks are related to any of these other reasons for attrition. Table 11 presents such an exercise where I regress each

of these other reasons for attrition on the exchange rate shock. Only “out of scope” appears to be predicted by the exchange rate shocks with marginal statistical significance, and even then the association is virtually zero. Further, if I redo the analysis and expand the definition of return migration to include “overseas temporary” instead of just “overseas permanently,” the results are qualitatively unchanged. I do not show these results in the paper but they are available upon request.

Table 11: The correlation between the attrition variables and the exchange rate shocks

	(1) Unable to Track	(2) Refused	(3) Overseas Temporarily	(4) Out of Scope	(5) Deceased	(6) Other
$\Delta \ln \text{ERATE}$	0.0085 (0.0131)	0.0054 (0.0113)	-0.0117 (0.0170)	0.0078* (0.0047)	-0.0009 (0.0006)	0.0131 (0.0089)
Country of Origin controls	Y	Y	Y	Y	Y	Y
Household controls	Y	Y	Y	Y	Y	Y
Individual Migrant controls	Y	Y	Y	Y	Y	Y
N	3069	3069	3069	3069	3069	3069
R^2	0.022	0.002	0.013	0.000	0.007	0.007

Robust standard errors in parentheses, clustered at the country of origin level

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Exchange rates are in terms of foreign currency per Australian dollar.

Country of origin controls include indicators for common language and colonial relationship with Australia, the log distance from Australia, and an indicator for whether the country was one of the countries hardest hit by the Asian Financial Crisis.

Household and immigrant controls include age, sex, education level, household size, marital status, type of visa upon admission, average weekly income in the earlier wave and Australian dollar value of funds arrived with when first immigrated

Conclusion

The United Nations estimates that more than 215 million people (around 3% of the world’s population) live outside their countries of birth, 171.6 million of which originate from developing countries. Economists are just starting to understand and investigate how this growing group continues to relate to the countries where they are born and from. Most studies tend to focus on the massive amounts of remittances these migrants send home. But return is another potentially important aspect and it is less well understood.

Migrant sending countries favor return migration because it is often thought to facilitate the development process by allowing returnees to invest their accumulated savings overseas in the home country, or by making their newly acquired skills, knowledge, and connections from working abroad available in the domestic economy. How can governments encourage return and maximize potential gains from such events? The design of optimal policy depends crucially on understanding the precise motivations for return. Target earners benefit most from expanding credit markets. For example, loans at subsidized rates may facilitate the start up of local businesses.¹⁵ On the other hand, such policies may be ineffective for life-cycle migrants. Governments may probably do

¹⁵ An example of such a program is the 2 billion-peso reintegration fund that the Philippines offers to its return migrants as subsidized loans to start a business.

better for these types by identifying their preferences for consumption and promoting them.

In this paper, I examined the motivations for return of permanent migrants in Australia. These individuals are relatively well educated and for the most part have their entire families with them abroad. Despite this, I found that they continue to be influenced by home country factors in their decision to return home. In particular, a 10% decline in their home country exchange rate increases their likelihood of return in a two-year period by 0.37 percentage points. This explains almost 10% of the mean return rate during the period. This is comparable, yet slightly smaller, to what Yang (2006) finds for temporary workers abroad from the Philippines where the effect of exchange rates is a fifth of the return rate in a 12-month period. This is consistent with a lifecycle model of migration where the individual is mostly concerned about consumption rather than investment at home. It also appears that this consumption motive outweighs the consideration for employment opportunities at home. While this does not conclusively rule out the possibility that return migrants aid the development of their home countries substantially, this is evidence that the primary channel is probably not through business activity, at least for this group of mostly skilled and educated individuals from Australia.

Looking at subgroups, I found that those with predetermined expectations to migrate in the future are the most affected by exchange rate shocks, followed by those who were unsure. This is suggestive evidence that migrants mostly time their return to favorable conditions, but are also persuaded on the extensive margin. Unsurprisingly, those who have stated no intention of return beforehand do not seem to react to exchange rate shocks at all.

In the end, it is worth noting that return migration is an important but also small picture of the economic lives of immigrants; further research is needed in understanding what influences other aspects of migrant behavior and how this continues or ceases to be tied to home country factors. A recent paper in this area is Nekoei (2013) who considers how the earnings and labor supply of US immigrants are affected in real time by their home country exchange rates. Other fruitful areas to investigate would be economic decisions such savings and expenditures of workers that may be affected by exchange rate and other home country shocks. The endeavor would ultimately generate a better picture of what motivates international migrants since return migration is unlikely to be decided in isolation to these other equally important economic variables.

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Appendix

A1: Comparative Statics for the optimization of the Life-cycle migrant

The optimization problem can be reduced to

$$\begin{aligned} & \max_{c_f, c_h, t} tu_f(c_f) + (1-t)u_h(c_h) \\ & s. t. tE c_f + (1-t)c_h = tE w_f + (1-t)w_h \end{aligned} \quad (1)$$

The first order conditions of the Lagrangian are provided by the following equations:

$$u_f(c_f) - u_h(c_h) + \lambda(Ew_f - w_h + c_h - Ec_f) = 0 \quad (2)$$

$$u'_f(c_f) = E\lambda \quad (3)$$

$$u'_h(c_h) = \lambda \quad (4)$$

$$-t(Ew_f - w_h + c_h - Ec_f) + c_h - w_h = 0 \quad (5)$$

Taking the total derivative of (2) and (5) yields

$$(Ew_f - w_h + c_h - Ec_f)d\lambda = -E\lambda dw_f + \lambda dw_h - \lambda(w_f - c_f)dE \quad (6)$$

$$-(Ew_f - w_h + c_h - Ec_f)dt = \left[-tE \frac{\partial c_f}{\partial \lambda} - (1-t) \frac{\partial c_h}{\partial \lambda}\right]d\lambda + tEdw_f + (1-t)dw_h + t\left(w_f - c_f - \frac{\partial c_f}{\partial E}\right)dE \quad (7)$$

Define $a = -(Ew_f - w_h + c_h - Ec_f)$ and $b = \left[tE \frac{\partial c_f}{\partial \lambda} + (1-t) \frac{\partial c_h}{\partial \lambda}\right]$ then if we let $dw_f = dw_h = 0$ and substituting (6) into (7), the resulting equation is

$$\frac{dt}{dE} = \left(w_f - c_f - \frac{\partial c_f}{\partial E}\right) \left[\frac{-b\lambda + at}{a^2}\right] \quad (8)$$

$a \leq 0$ because the migrant cannot consume more than her foreign wages abroad ($w_f \geq c_f$) and consumption at home must at least equal to wages and savings from abroad ($c_h \geq w_h$). At the same time, $b < 0$ because it can be shown that both $\frac{\partial c_f}{\partial \lambda}$ and $\frac{\partial c_h}{\partial \lambda}$ are negative from the first order conditions (3) and (4).

A2: Comparative Statics for the optimization of the Target earner

The optimization problem can be reduced to

$$\begin{aligned} & \max_{c_f, c_h, t} tu_f(c_f) + (1-t)u_h(c_h) \\ & s. t. tc_f + S_t = tw_f \end{aligned} \quad (9)$$

$$(1-t)c_h = (1-t)y + ES_t - C \quad (10)$$

From (5) and (6), it is easy to solve for optimal c_f and c_h .

$$c_f = w_f - \frac{C}{Et}$$
$$c_h = y$$

Plugging these values into the objective function and taking the first order condition produces

$$u'_f\left(w_f - \frac{C}{Et}\right)\left(\frac{C}{Et}\right) + u_f\left(w_f - \frac{C}{Et}\right) - u_h(y) = 0 \quad (11)$$

It follows that

$$\frac{dt}{dE} = -\frac{t}{E} \quad (12)$$