Title: Uncertainties and Saving: how idiosyncratic shocks affect saving behaviors of immigrants in Australia

Name of Author	Sun Ly, Ngcebo Gwebu, Haoyu Wang, Pulrith Chan, Omar V. Arroyave
Name of University	Monash University
Country of Study	Australia
Major	Business and Economic
Degree	Master
Course Title	Economics
Type of Document	Research Project
Year	2010

Uncertainties and Saving: How idiosyncratic shocks affect saving behaviours of immigrants in Australia

Ngcebo Gwebu

Haoyu Wang

Pulrith Chan

Ly Sun

Omar V. Arroyave

Abstract

The subject area of savings in the context of uncertainty has been examined for decades in the United States. This paper brings new knowledge to this topic by focusing on immigrants' and locals' saving behaviour in response to uncertainties in Australia. Results are derived using the model derived from Lusardi (1997) using the Household Income and Labour Dynamics in Australia (HILDA) database. One key finding is that immigrants save more than locals, which is consistent which was what was hypothesised. Another intuitive result obtained is that health status is negatively correlated to savings rates. However there are counter-intuitive discernments. To start with, both immigrants and locals do not alter their savings behaviour when there are income shocks. In addition, in agreement with Carroll, Rhee, and Rhee (1999), we found no significant cultural effects on savings. For instance, Asian immigrants are not the highest savers among the all the immigrants even though Asians countries have the highest savings rate in the world.

1. Introduction

The high private debt levels of developed economies which played a major role in causing the Global Financial Crisis (Eggertsson & Krugman, 2012) has brought a new urgency in the need to understand the divergent savings behaviours of different cultures. A meticulous understanding of saving behaviour can help uncover crucial insights for effective public policy-making decisions related but not exclusive to social security programs and tax policy. Precautionary saving is considered as a signal of the prevailing uncertainty levels. The risk of job loss should increase an individual's saving rate in order to maintain future consumption in case of an elimination of an income source, especially for immigrants since they are not entitled to social benefits. A secondary objective is to compare savings behaviour of natives and immigrants. Consequently, inferences on cultural effects on savings behaviours can be made. A thorough evaluation of related literature was conducted to provide an important pathway for our research.

2. Literature review

The main thrust of this literature review proves that there is incomplete knowledge of this subject area and will identify the major limitations of previous studies. Those gaps necessitate further research into the dynamics of precautionary savings under prevailing uncertainties, such as labour income risk and family health shocks with a focus on immigrants and how their behaviour compares to that of natives in the context of Australia. In the following, some literature related to this area will be critically examined.

Li (2012) presents a theoretical model on savings behaviour, labour-income and interest-rate uncertainties. A unique two-period model is used that allows for simultaneous movements of both types of uncertainties. The results indicate that precautionary savings fluctuate accordingly to maintain a utility maximising savings rate. The author arrives at the conclusion that uncertainty and precautionary savings are positively correlated variables. A non-intuitive finding is that, precautionary savings rise only when the positively quadrant dependent uncertainty about investment returns and labour income when the partial relative prudence is greater than two. These findings are crucial in that they elucidate the time periods in which precautionary savings will rise or fall. For a study comparing locals and immigrants, this model would be efficacious because it allows for different risk aversion levels to determine expected precautionary saving. The findings may be mathematically robust, but they lack the empirical research support that other authors depend on.

Although published much earlier, Kazarosian (1997) lends empirical credibility to Li's model. The author used a panel data structure to analyse the responsiveness of precautionary savings to income uncertainty using panel data from the US Longitudinal Survey. Consistent with Li (2012), Kazarosian

(1997) finds that uncertainty engenders a positive impact on savings. He establishes that a doubling of uncertainty increases wealth to permanent income by 29%. The two papers differ in that Kazarosian (1997) looks at one source of uncertainty - labour-income uncertainty. However, Kazarosian (1997) tries to capture the impact of transitory income shocks which could also include investment returns. Having said that, knowledge of how other idiosyncratic events impact precautionary savings, such as the role played by the health expenditures for spouses or other individual financially dependent on the subject observed is still absent. Another shared finding between Li (2012) and Kazarosian (1997) is that differences in risk preferences play a significant role on precautionary saving. Furthermore,Kazarosian (1997) goes further than Li (2012) by concluding that there is a downward bias on the impact of uncertainty as risk-loving subjects are likely put themselves in risky situations and they are also less likely to save. Even though Kazarosian makes other interesting discoveries such as education levels being positively correlated with savings rates, he does not compare savings rate differentials between immigrants and locals. Admittedly, Kazarosian (1997) did not intend to explore those specific potential differences. Therefore, other journals were sought.

Focusing on the effects of the cultural origin, Carroll et al. (1999) examined whether immigrants in the US from the countries with higher saving rate tend to save more than the countries with lower saving rate, by using data from the US Census. The findings from this paper do not support the proposition that differences in saving rates across countries simply reflect uniformly different national cultural attitudes toward saving. In the contrast of the authors' previous work, Carroll and Rhee (1994), the study found that saving patterns of immigrants are significantly different across country of origin, however, the saving patterns of immigrants do not match up with the countries' saving patterns in aggregate data. One possible explanation of the paper's results is that they reflect sample selection effects.

Although the methodology of the paper is logical in that it seeks to estimate the evolution of savings over a ten year period, it has its drawbacks on the other hand. First of all, there was no panel data structure for the two data sets, even though the authors had estimated the values for both of the years, there would still be a degree of sampling bias so that the results tend to be not that convincing. In addition, the paper did not pay much attention on the changes of the immigrants' saving rates and the reasons of the changes, e.g. the job loss or unanticipated health issues etc., which is the area that our paper intends to focus on.

Al-Awad and Elhiraika (2003) intended to further explore the effects of cultural origin on the saving behaviour of immigrants. Based on the study Carroll et al. (1999), the findings are supportive of the

hypothesis that the saving behaviours are different across immigrants from different places of origin. In addition, the outcome had showed the relationship between the migrants' saving behaviours and their country of origins' wage rate. The authors stated that "…migrants coming from countries with low-wage rates save more than those coming from countries with high-wage rates (Al-Awad & Elhiraika, 2003). Therefore, the results suggest that cultural differences are an important factor to explain differences in saving rates of migrants from diverse countries. On the other hand, households from different cultural backgrounds possibly have similar saving behaviours, which indicate that cultural differences do not always cause differences in saving habits.

Compared with the former studies, one particular characteristic of this paper's methodology is that the authors unpacked saving behaviour into two main parts: the capacity to save and the willingness to save. The capacity to save is assumed to depend on economic variables such as house hold total income and life-cycle variables including the age structure of population and the dependency ratio. The willingness to save is assumed to depend primarily on cultural factors and other factors, such as the interest rate, inflation, etc. In this way, the factors which affect migrants' saving behaviours could be shown more clearly by the study. Moreover, there is an important departure in this study in that the household data provided information on both consumption and income, which facilitates the isolation of savings.

An ailment of this paper might be the time period of the data. Even though the data set is very large, it was only from the year 1997. Given that saving behaviour is not static, it cannot be established how savings change over an extended period. Generally, different periods bring different shocks. This is a void our research project will seek to fill.

Amuedo-Dorantes and Pozo (2002) made a credible attempt to fill this gap of knowledge. They also use the National Longitudinal Survey to monitor the wealth accumulation patterns of natives and immigrants. Part of the econometric treatment of the data by the authors looked at the impact of labour-earnings uncertainty and how it influences savings behaviour as represented by wealth and financial wealth accumulation. In their results, the researchers discovered that immigrants accumulate less wealth than do comparable natives as captured by wealth relative to permanent income. When net wealth was considered, the authors found that immigrants saved at considerably lower rates. The econometric model proposed by Amuedo-Dorantes and Pozo (2002) was more comprehensive than the paper by Kazarosian (1997) as it added explanatory variables related to ethnic background, industry dummy variables and an instrumental variable interacting income uncertainty with the local unemployment rate. This distinction produced the new insights on the impact of cultural origins on savings behaviour. None the less, the journal by Amuedo-Dorantes and

Pozo (2002) did not include other variables related to health shocks as eluded to before. Moreover, it did not further examine the differences in savings rates between the different cultures. Another short-coming is that is it known that many immigrants have remittances serve as one of their primary tools of saving (Osili, 2007). A journal that has absent the role of remittances on savings is therefore less credible due to the fact that remittances constitute a noteworthy proportion of savings.

Piracha and Zhu (2012) acknowledged the remittances component. Using the German Socio-Economic Panel data (GSOEP), the paper also included a variable omitted by the above mentioned journals, which is the uncertainty related to the immigrants' legal status. The findings contain two main parts. First, the difference of saving behaviours between immigrants and natives is affected more by the uncertainties associated with their legal status and future income, rather than just cultural differences. Secondly, that when remittances are accounted for, immigrants save at a higher rate than locals. Hence, the impact of remittances is pivotal, as the study by Amuedo-Dorantes and Pozo (2002) did not incorporate remittances and they arrived at a different result.

This paper used a difference-by-difference approach. Utilizing this method, it could be seen clearly how uncertainties affect saving behaviours of both immigrants and natives. In addition, it is unique for the authors defining total saving as traditional saving plus remittances, which effectively demonstrate how different purposes of migration affect saving behaviours.

There are several strengths of this journal, for example it is using panel data to obtain outcomes through different time periods, which makes the results more convincing. However, a weakness of this paper is that it does not specify the immigrants' cultural origins, thus it is not very clear to discern the effect of the culture. The model used by Carroll et al. (1999) complements this model by including cultural variables. In addition, this paper shows that uncertainty about future income and legal status is a key element in the determination of the level of precautionary saving. Given its importance, the uncertainty brought by legal issues will be considered in our study.

Utilizing the same data set, GSOEP, Bauer and Sinning (2011) paid particular attention to the differences between permanent migrants and temporary migrants. Similar to the results ofPiracha and Zhu (2012), the findings of this study show that the inclusion of remittances narrows the difference in savings behaviour between immigrants and locals. In addition, the findings do not provide strong evidence for an assimilation process of saving behaviours between immigrants and natives in Germany, so that the results imply that there are deficits in the long-term integration of permanent migration in Germany.

Utilising panel data, between 1996 to 2003, oscillations in savings behaviours can be observed. It is important for the paper to separate the immigrants into two groups so that we could see that immigrants saving tendencies are diverse according to their different reasons for emigrating. However, a flaw of this paper is that it did not mention what happened during this seventeen-year period, which might influence the resultant conclusions considerably. This is the part that we intend to focus on further.

During this literature review we highlighted the strengths and weaknesses of all the papers. We have seen the brilliant theoretical structure proposed by Li (2012). Our research project will provide empirical validation or repudiation of his theory. Several empirical studies do not have information on the national backgrounds of the subjects, so we will take the strengths of the long term data modelling approach of Al-Awad and Elhiraika (2003) and Piracha and Zhu (2012) and fortify it with the national background specific data of Carroll et al. (1999). This fusion of the different models allows us to ascertain the significance of uncertainty and cultural origins on precautionary savings. Subsequently, we will able to discover new empirical insights for the context of Australia which may match the findings of the previously evaluated journals.

3. Data and Methodology

Data

For the purpose of our research, we will use the data sets from the HILDA (Household, Income and Labour Dynamics in Australia) database. The HILDA data is a yearly household-based panel study which started in 2001. Due to time constraint and insufficient data provided in other waves, we will use 3 waves, which is wave 5, 8 and 10, in order to provide a better comparison over the 5 years timeframe. Wave 5, 8 and 10 contains datasets from the year 2005, 2008 and 2010 respectively.

The samples will be restricted to only include individuals who are employed in a full-time job, since these are the people whose saving is affected by unforeseen circumstances. Hence, only individuals, between the age of 25 and 60 years old will be studied. Also, we also excluded individuals whose savings are less than or equal to zero, since we only want to study the characteristics of people with people who have positive saving values. For analytical purposes, it is important for our study to include a vector of socio-economic variables such as: age, education level, health status and time living in Australia. These variables help us to identify special features of the saving behaviour and categorize them within the sample of individuals studied.

For this exercise we will assume that the amount of income not consumed is saved. Hence, in order to calculate the saving per individual we use the financial year disposable income, which is equal to the sum of all wages and salary, business income, investment income, private transfer and government support deducted by the amount of tax, minus the expenditure of that year. Since the data sets provide the observations on income directly, we will use the financial year disposable income from the data sets. Consequently, the datasets only provide the yearly expenditure by item and not the yearly total expenditure. Hence, we calculate the total expenditure by summing up all the expenditures recorded in the dataset. However, this measure of expenditure may not be accurate since some of the daily expenditure components are missing from the datasets.

The cross-sectional data used in this study includes around 4,000 observations from each wave. All of the observations are from diverse socio-economic background, in which more than 1,000 observations are immigrants from all over the world. The rest of the observations are native born Australians, which we will also include for comparison purposes. Although the range of nationalities included in the HILDA database is limited, making difficult to identify the origin of those individuals outside the options given in the survey, which might create a limitation on our socio-economic group specific analysis. In response to this problem, we will also make cross-continent comparisons in order to provide a deeper insight on how the immigrants groups behave differently.

Model

This study aims at estimating the effect that uncertainty caused by changes in the economic environment has on the saving behaviour of immigrants in Australia within a set of socioeconomic characteristics such as age, health status, education level, mortgage payment and time since migrating to Australia.

Our model will focus on performing linear regressions using the least square method allowing us to identify the elasticity of Australian immigrant's saving rate given the changes in transitory shocks and permanent income according to their socio-economic characteristics.

The uncertainty variable will be included in the model as the error term obtained after performing a regression of disposable income against some variables that affect individuals' preference for saving. This will be elaborated further in the later part of the paper.

In essence, this is a simple model that will be studied using OLS methods and expected to provide an insight of how individuals from other countries living in Australia adjust their saving behaviours in time of uncertainties. Hence, we seek to answer questions such as: Is the saving rate for immigrants

more sensitive to income change than that of the locals? Is the level of uncertainty in the immigrant community more volatile than it is for the locals? How the time living in Australia correlates with the way immigrants adjust their saving behaviour to their expectation regarding the economic environment? According to Carroll et al. (1999), the longer an individual born in a foreign country lives in a different country, the more he/she behaves as a local. We are curious to know whether this is the case for immigrants in Australia.

A priori, we would expect the saving rate of immigrants to be substantially more sensitive to changes in the economic environment and increasing uncertainty than that of the locals. The intuition behind this hypothesis relies upon the fact that there exist a sizeable gap in terms of rights and conditions of living providing insurance to locals in the case of adverse economic circumstances, whereas for immigrants lacking such a protection, the only way to protect themselves against unforeseeable downturns is to save more by increasing their hours of work. It is still unpredictable whether immigrants from the sample who have been living the longer time in Australian, adopt closer patterns in their saving behaviour to that of the locals, given that we are using a cross-sectional data, the results will be limited but it will provide an interesting insight to the questions we are trying to answer.

Empirical Approach

First, we will introduce a model derived from Lusardi (1997), on the relationship between savings, permanent income and uncertainty to estimate the individual saving behaviour.

$$S_i = \beta_0 + \beta_1 X_i + \beta_2 Y_i^P + \beta_3 {Y_i^P}^2 + \beta_4 T_i + \beta_5 I_i + \beta_6 I_i \times w + \varphi w + \varepsilon_i \quad (1)$$

where S_i is individual i's saving defined by the difference between the total disposable income and the total expenditure. X_i is a vector of regressors that represent individual i's preference for saving. T_i is the variable for time since migrating to Australia. I_i is the dummy variable for immigrants which is given a value of 1 if the person is and immigrant and 0 if the person is a native-born Australian. w is the measure of uncertainty and ε_i is the measurement error in saving. Y^P is permanent income, representing the component of income that he household would earn in the absence of idiosyncratic shocks and uncertainties, for immigrants the main source of income is wages and salaries since they do not receive government welfare support as part of their income. Since we think that income will

have a non-linear effect on saving, hence we will include a square term for income ${Y^P}^2$ to capture the non-linearity effect of income on savings. Lastly, the interaction term between the immigrant dummy and the transitory income shocks is intended to capture the effect of how differently the income shocks affect the immigrants than native Australians.

In order to obtain the measure of uncertainty w we will need to estimate income Y on a few variables such as *age, year of education, mortgage payment, time in Australia, self-assessed health and the dummy for immigrant*. The error term of the equation will be the measure of uncertainties w. According to the Buffer-Stock model (Kazarosian, 1997), as uncertainties increase people tend to accumulate more wealth by increasing their saving in order to maintain their desired wealth-to-permanent income target. Hence we would expect the coefficient of W to be positive. The equation that we will estimate will be of the following form:

$$Y = \alpha_0 + \alpha_1 age + \alpha_2 year\ of\ education + \alpha_3 self\ assessed\ health + \alpha_4 mortgage\ payment + \alpha_5 time\ in\ Australia + +\alpha_6 immigrant + w$$

In essence, if β's and φ's are statistically different from zero, then we can conclude that there is evidence of the relationship between idiosyncratic shocks and saving behaviours of immigrants in our sample.

4. Estimation results

We have estimated the model specified in the methodology section using an ordinary least square method. The dependent variable is the amount of individual saving and the independent variables are the factors that affect individual's saving behaviour and uncertainties involved. The variable for uncertainty is obtained from the regression for the predicted income.

Table 1 illustrates the estimation results of our income model from all the 3 waves with log of income as the dependent variable. The outcome illustrates the relationships between the permanent income and the other four variables. It can be seen that the coefficients of age, year of education, the amount of monthly mortgage payment and time since migration are all positive. This indicates that the older the subjects are, the higher the permanent income they tend to have. The higher the education level, the higher their permanent income. Also, the larger the amount of monthly mortgage payment, the higher the permanent income they tend to have. However, the coefficient for mortgage payment indicates that mortgage payment may not have an effect on income. The coefficient for time since migration indicates that immigrants tend to have higher

income if they have been staying in Australia for longer period. However, this only happens in wave 5. In wave 8 and 10, the result implies that there is little or no relationship between income and time since migration. All the coefficients are significant at 5% except for the variable 'time since migration' and 'immigrant dummy' in wave 8 and 10. From the output, year of education seems to be the dominant factor to determine income in this model. On the same level, self-assessed health also seems to be another main factor to determine the income level. Since the variable 'self-assessed health' is recorded on a scale from 1 to 5, where 1 is perfectly healthy and 5 is poor. This states and the lower the health status of the individual, the less the permanent their income will be. This is as we expected since the poorer the health, the less efficient an individual can be in the workforce. The dummy variable for immigrant suggests that immigrants actually earn less than the locals, which is to be expected. Though, the coefficient of the immigrant dummy decrease dramatically in wave 8, also note that it is only significant in wave 5. These findings suggest that all the four variables: age, years of education, amount monthly mortgage payment, years since migration, self-assessed health and the dummy for immigrant are important factors to explain the permanent income level of the immigrants. Over the 5 year time frame, the result suggests that income has increased to a large extend and the influence of all our variables on income has also increased, except the immigrant dummy where it actually decreased over the years.

Table 1

Econometric results - *LOG of Income equation*

	2005	2008	2010
Variable	Parameter	Parameter	Parameter
Constant	9.4753**	9.7046**	9.6022**
Age	0.0036**	0.0046**	0.0061**
Year of education	0.0781**	0.0724**	0.0796**
Mortgage payment	0.000**	0.0000**	0.0000**
Health status	-0.0607**	-0.0717**	-0.0694**
Time since migration	0.0034*	-0.0001	0.0002
Immigrant (dummy)	-0.1412**	-0.0099	-0.0664

(*) significant at 5%
(**) significant at 1%

Table 2 reports estimation outputs on the relationship between individual's saving rate in particular years and the explanatory variables including age, years of education, monthly mortgage payment, self-assessed health, time since migration, immigrant dummy, disposable income, income shocks and the interaction term between the immigrant dummy and income shocks. We also added the

squared term for the disposable income in our saving regression to capture the non-linear relationship between saving and income.

It can be seen that disposable income does not affect the rate at which individuals save over the years, which is to be expected. However, the coefficient for the variable 'self-assessed health' negative, which is implies that individuals may save more due to if they have health problem or poorer health. We would expect that older people will save more due to various factors, health status is one of them. However, we observed the opposite. The results suggests that the younger the individual, the higher their saving rate. Year of education does not seem to affect the saving rate by much. Monthly mortgage payment is essentially equal to 0 which does not implies any relationship between the saving rate and monthly mortgage payment. Our discussion earlier expects that the longer immigrants stay in Australia, the more they tend to behave like a local. However, this is not observed in this study. Since in wave 5 and 10, the data suggests that immigrants actually save more the longer they have been in Australia. Our model also suggests that immigrants actually save a much higher proportion of their income than those of local. This is what we would expect them to do, given the lack of welfare compare to the native-born Australians. The most surprising result is that the results indicate that immigrants do not response to income shocks by increasing their savings at all. We observe that in time of shocks, immigrants behave as in normal times and save the same amount throughout all the 3 waves. This also happens to the locals. The results pointed out that Australians do not increase their saving in response to shocks either. This startling result is the opposite of our hypothesis where we would expect people to increase their saving in time of uncertainties and immigrants to save even more compare to the locals.

Consequently, the findings of this outcome prove that all the five variables for explaining immigrants' saving level are important, which follows our intuition. Moreover, it could be seen from the R-squares value of 0.5993 that our model gives a fairly good explanation on saving behaviours of Australian immigrants.

Table 2

Econometric results - *LOG of Saving equation*

Variable	2005 Parameter	2008 Parameter	2010 Parameter
Constant	7.5229**	7.8242**	8.5221**
Age	-0.0054**	-0.0046*	-0.0076**
Year of education	-0.0001	0.0132	0.0070
Mortgage payment	-0.0000*	0.0000	-0.0000
Health status	0.0128	-0.441*	-0.0536**
Income	0.0000**	0.0000**	0.0000**

Income^2	-0.0000**	-0.0000**	-0.0000**
Time since migration	0.0008	-0.0038	0.0004
Immigrant dummy	0.0228	0.1995*	0.0608
Income shock	0.0000	0.0000**	0.0000**
Immigrant x Income shock	-0.0000	-0.0000**	-0.0000

(*) significant at 5%
(**) significant at 1%

Cross Continent Comparison

A significant component of the motivation of this research is to ascertain any cultural or regional differences in savings behaviour. This portion of the results section extends the analysis of immigrants and compares and contrasts the savings behaviour of different immigrants by grouping them according to their continent of birth. Ideally, a cross-country comparison would better capture cultural differences, but inadequate sample sizes proved to be an insurmountable hurdle. Thus grouping observations together to create more respectable samples was the settled on second best outcome. Regressions which illustrated the differences in savings were run. The results are displayed below in their wave groupings to make vivid the differences. The results are reported for each wave. The results below use Australian's as the reference group. To gauge the impact of culture on savings, the rankings of average national savings rates are compared to the rankings of savings relative to the reference group. Thus if culture plays a huge role, we expect Asians to save the most as their national economies save the most out of all the continents.

Table 3

Econometric results - *LOG of Saving equation*

Variable	2005 Parameter	2008 Parameter	2010 Parameter
Africa	0.2209	0.1607	0.0874
America	0.0817	0.2057	-0.1050
Asia	-0.0887	0.1815*	0.1517
Europe	-0.0327	0.1041	0.0373
Africa x income shock	-0.0000	-0.0000	-0.0000
America x income shock	-0.0000	-0.0000	0.0000
Asia x income shock	-0.0000	-0.0000**	-0.0000*
Europe x income shock	-0.0000	-0.0000**	-0.0000

(*) significant at 5%
(**) significant at 1%

The output table shows interesting results. We know that Asians on average in their home countries save at the highest rates as a percentage of their respective national income (World Bank, 2012).

However, in wave 5, the results above show those Asian immigrants saved on average 9% less of their income than Australians and thus the lowest amongst all the groups. Africans surprisingly saved the most relative to all the other goods, on average saving 22% more of their income than Australians. The other results are not significant at a substantial level .Nonetheless, immigrants from the Americas saved more than Australians and more than countries from Europe which is inconsistent with national savings rates, on the average. This divergence in national rates and immigrant savings rates shows that immigrants are not a perfectly representative group of their home country and thus culture effects seem immaterial.

Looking at the impact of income shocks, we notice that the results show extremely minute differences but worth mentioning as reflected by the insignificant status of their respective coefficients.

We observe some changes in wave 8. It is important to remember that there the database used had an unbalanced panel structure, thus consistency in results is further diminished. The robustness of results is stronger than in wave 5 as the coefficients have greater credibility as shown by their significance. Immigrants from the Americas save the most in wave 8, followed by Asians with the African and European immigrants savings the least. Interestingly, all the immigrant groups save more than natives in this year which vindicates our previously stated hypothesis. This could be the fact that most of them have stayed in Australia longer and thus have boosted their incomes which increase their savings rates as the results would suggest.

Although increased income shocks brought lesser savings, in wave 8 the changes in behaviour are more significant as shown by robust coefficients. The differences between immigrant groups and locals are still miniscule but it brings forth another interesting insight that contradicts one of hypothesis. In spite of all having safety nets, Australians save more than the immigrants on average. Surprisingly, Asians, observed to be the most prudent in their home countries, save the least. This could reflect great risk tolerance, but it certainly proves that cultural background does have considerable impact on savings.

In wave 10, only the Asian group exhibits significant results, they save more than all the other groups. Africans still save more than Australians and the other groups except Asians. Immigrants from the Americans save the least, which is consistent with national data (Euromonitor, 2009). However since all the resultant coefficients are insignificant except for those of the Asian group, our hypothesis is not proven wrong in wave 10. Moreover, the results in wave 10 are more consistent with national savings data than the previous waves. The reasons for those are unknown.

Also note that, consistent with our previous analysis, the saving behaviour in response to shocks reported in this regression also shows that no immigrants increase their savings in response to income shocks in all the 3 waves.

It must be noted that the inferences gathered from each waves' results contradict each other. This may be as a result of changing survey participants. The incongruity could flow from the simple fact that human beings are not constant in their behaviour. They have different risk preferences and different levels of education which would cause different behavioural patterns under different circumstances. This comparison supports that statement. Consequently, we can conclude that there are no sweeping cultural effects on savings behaviour.

5. Conclusion

Given that there is a gap in the study of comparison between saving behaviours of immigrants and native household, therefore in this paper we use the data from wave 5, wave 8 and wave 10 from the Household, Income and Labour Dynamics in Australia *(*HILDA), with the sample size approximately 2300 households for each wave, to test and observe how idiosyncratic shocks affect saving behaviours of immigrants in Australia compared to the native over the period of these three waves. First, we look at the whole cohort of immigrants in general, and then we also look at each particular group of immigrants according to where they originally come from to see if there is any significant difference across the cohorts.

Using the data from the year 2005, 2008 and 2010 of HILDA data, firstly we need to regress on disposable income to see if there is any differences in income earned by native and immigrants. And then, we run another separate regression for savings to examine how both Australians and immigrants act in response to shocks in term of saving behaviours. It is worthy to note that, the datasets that we used are restricted to those whose age are between 25 and 60 years, with the assumption that these are the individuals who are employed full-time and have savings. Also we only includes those whose savings are positive.

The empirical results that we obtained indicate that over the period of these three waves, the income gap between immigrants and natives is quite significant. It shows that the immigrants usually earn lower income compared to natives. However, it also shows that although they earn less income, immigrants actually have much higher savings rate compared to the local. This contradicts Kazarosian's findings. Moreover, regarding the saving behaviours in response to idiosyncratic shocks, the outcomes show that immigrants do not alter their saving behaviour in time of uncertainties, which totally contradicts to what we expected. Apart from this, the results also illustrated that there

are some differences in saving behaviours across each group of immigrants such as in wave 5 and 8 immigrants from Africa and America are the group that have the highest savings rate respectively; while in wave 10 immigrants from Asia is the group that save the highest.

In agreement with Carroll et al. (1999), Asians do not save the most. Nonetheless, despite these differences in savings rates, each group of immigrants' saving behaviour in response to shocks are actually the same over these three waves.

Therefore, we can conclude that the savings behaviours in response to shocks are not only the same for both immigrants and Australians, but they also do not signify any differences across each cohort of immigrants according to their continent of origin.

A short-coming of our research is that it did not include remittances which was a significant part mentioned in Piracha and Zhu (2012). However we obtained a result similar to theirs regarding immigrants saving at higher rates than the natives. Including remittances would yield a more comprehensive understanding of immigrants' savings behaviour. To extend this paper, panel data analysis could be used to bring a more rigorous analysis of savings over time. However this was not possible due to data constraints. Never the less, the conclusions are credible due to the established econometric analysis followed.

References

Al-Awad, M., & Elhiraika, A. B. (2003). Cultural Effects and Savings: Evidence from Immigrants to the United Arab Emirates. [Article]. *Journal of Development Studies, 39*(5), 139.

Amuedo-Dorantes, C., & Pozo, S. (2002). Precautionary Saving by Young Immigrants and Young Natives. [Article]. *Southern Economic Journal, 69*(1), 48.

World Bank. (2012). Gross Saving, from http://data.worldbank.org/indicator/NY.GNS.ICTR.ZS

Bauer, T., & Sinning, M. (2011). The savings behavior of temporary and permanent migrants in Germany. [Article]. *Journal of Population Economics, 24*(2), 421-449. doi: 10.1007/s00148-010-0306-z

Carroll, C. D., & Rhee, B.-K. (1994). Are there cultural effects on saving? Some cross-sectional evidence. [Article]. *Quarterly Journal of Economics, 109*(3), 685.

Carroll, C. D., Rhee, B.-K., & Rhee, C. (1999). Does cultural origin affect saving behavior? Evidence from immigrants. [Article]. *Economic Development & Cultural Change, 48*(1), 34.

Eggertsson, G. B., & Krugman, P. (2012). DEBT, DELEVERAGING, AND THE LIQUIDITY TRAP: A FISHER-MINSKY-KOO APPROACH. [Article]. *Quarterly Journal of Economics, 127*(3), 1469-1513. doi: 10.1093/qje/qjs023

Kazarosian, M. (1997). PRECAUTIONARY SAVINGS—A PANEL STUDY. [Article]. *Review of Economics & Statistics, 79*(2), 241-247. doi: 10.1162/003465397556593

Li, J. (2012). Precautionary saving in the presence of labor income and interest rate risks. [Article]. *Journal of Economics, 106*(3), 251-266. doi: 10.1007/s00712-011-0244-6

Lusardi, A. (1997). Precautionary saving and subjective earnings variance. *Economics Letters, 57*(3), 319-326. doi: 10.1016/s0165-1765(97)00239-5

Osili, U. O. (2007). Remittances and savings from international migration: Theory and evidence using a matched sample. [Article]. *Journal of Development Economics, 83*(2), 446-465. doi: 10.1016/j.jdeveco.2006.06.003

Piracha, M., & Zhu, Y. (2012). Precautionary savings by natives and immigrants in Germany. [Article]. *Applied Economics, 44*(21), 2767-2776. doi: 10.1080/00036846.2011.566202