Happiness Assimilation Amongst Migrants: Evidence from Australia[*]

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Abstract

In this paper we use an Australian panel dataset to see whether the happiness of migrants co-moves with that of the country they live in or the country they originate from. We find evidence that immigrants who have moved more recently to Australia are more affected by happiness changes in their country of origin than in their country of residence, though the speed with which migrants' happiness level co-move with native Australians is very quick: within one year of arrival the happiness level of the median migrant already co-moves some 93% with that of natives and only 7% with that of residents in the country of origin. Even for migrants married to someone from a different country, changes are more responsive to local happiness levels than to residents in their country of origin. Immigrants' social support, economic status, age at arrival and family structure were also found to play a significant role in explaining the speed with which migrants integrate into the host society.

Keywords: International immigration, life satisfaction, happiness and assimilation.

JEL Classification: F15, J61, O57.

1 Introduction

"When in Rome, do as the Romans do" (St. Ambrose, bishop of Milan, 384 AD).

Individual happiness has been shown to co-move with macroeconomic fluctuations of the country of residence (DiTella, MacCulloch, and Oswald, 2001; Alesina et al., 2004; Easterlin and Angelescu, 2009; Vemuri and Costanza, 2006; Helliwell and Huang, 2006; and Abdallah et al., 2008; Oswald and Wu, 2011). This complements a wider economic literature on the individual determinants of happiness, life satisfaction, and subjective wellbeing in general, in which researchers have looked at the importance of socio-economic shocks (Frijters, Johnston, & Shields, 2012), culture (Senik, 2011), news stories (Becchetti, Clark and Ricca, 2011), relative income (Easterlin et al., 2010; Bejamin et al., 2012; Clark, Frijters and Shields, 2008), airport noise (van Praag and Baarsma, 2005), terrorism (Metcalf, Powdthavee, and Dolan, 2011; Frey et al., 2009), unemployment (Luechinger, Meier, and Stutzer, 2010), and the happiness of peers (Powdtvahee, 2009; Schwarze and Winkelmann, 2011).

In this paper we extend this literature by using the dependence of the happiness of migrants in Australia on the circumstances in the host country to define an index of 'Happiness Assimilation'. The essential idea is to look at the dynamics of happiness over time and to compare the degree to which a migrant's happiness co-moves with that of the average in the host country or the origin country. The more a migrant's happiness co-moves with that of the host country, the more assimilated he is.

The closest paper to ours in the happiness literature is that by Becchetti, Clark and Ricca (2011) who matched migrants in Germany to news stories concerning their country of origin, finding that migrants' happiness was sensitive to good news and bad news. Their paper thus finds that there is such a thing as co-movement between the happiness of a migrant and aggregate circumstances in the country of origin, an idea we extend to define an index of assimilation. Rather than use information on news stories though, we use the actual dynamics in happiness in the country of origin. With migrants from 84 countries living in Australia in our dataset, this means we need to map happiness data of all those countries for all the years we have Australian data (2002-2010). In turn, this requires us to combine eight different international happiness datasets, as well as impute some 60% of the missing year-country observations.

The assimilation issue has come under greater scrutiny following the terrorist attacks in the United States and United Kingdom in 2001 and 2005, involving migrants who had lived in those countries for a long time. The 2005 attack in the UK on the London underground by British-born citizens brought into greater focus that simply living in a country and being a citizen does not mean automatic assimilation into the culture and

values of the host country. The fear is that the lack of full identification with the host country due to social networks in the origin countries can result in social or political unrest, a worry that is explicitly recognised in Australian discussions (Lalonde and Topel, 1991).

Many studies looking at this assimilation issue show that immigrants sustain strong social relations with friends and relatives in their country of birth even after migration through the regular exchange of letters, videos, and telephone calls (Dreby, 2006; Hirsch, 2003). While some authors have argued that the persistence of cross-border social networks, also called "transnationalism", is compatible with assimilation (Moraskawa, 2003; Lucassen, 2003; Levit and Shiller, 2004) such that one can assimilate and adapt to a new culture while retaining one's individuality and identity (Aguilera, 2004; Alba and Nee, 1997; Portes and Rumbaut, 2001), other assimilation scholars emphasize the importance of shedding the initial cultural background in order to fully integrate into the host country (Handlin, 1951; Gordon, 1964). This line of thought holds that immigrants to a new country will exhibit a behaviour that will lie somewhere between the behavioural patterns prevalent in their country of origin and those in the country of residence (Wallendorf and Reilly, 1983). Full assimilation is then said to have occurred when the impact of the country of origin becomes very small and the person effectively identifies with the country of residence. It then becomes very important to properly measure this identification with the host country.

Earlier studies on assimilation of immigrants into the host country have mainly focused on economic assimmilation, such as convergence of wages (Chiswick and Miller, 1995, McDonald and Worswick, 1999). Recent studies on assimilation have also focussed on native language acquisition (Chiswick and Miller, 1992, 1995; Lazaer, 1999; Dustmann and Van Soest, 2002; and Dustmann and Fabbri, 2003), the role of intermarriage between immigrants and natives (Meng and Gregory, 2005; and Meng and Meurs, 2009), and health (Chen et al., 1996; McDonald and Kennedy, 2004; Newbold, 2005), but there has been no study as yet that looks at happiness assimilation, which is arguably a cleaner measure of the degree of identification with the host country.

The paper makes three distinct contributions, one conceptual and two methodological. Our conceptual innovation is the novel notion of happiness assimilation and to empirically define it as the degree of co-movement between the happiness of the migrant and the happiness of those born in the host country rather than the country of origin. This constitutes an innovation in both the happiness and the assimilation literature. In order to prepare the data to find the levels and determinants of happiness assimilation, we make two methodological innovations to the practise of combining multiple datasets and the imputation of missing values. In particular, we develop a new technique to map the results of different surveys using different happiness questions and different answer categories into a single comparable index, which is not just useful for the study of happiness but also for other analyses that by necessity need to combine many

datasets which use different questions for the same broad concepts, such as international studies of health. Our new method nests and augments the existing approaches deriving from range theory (such as used by Easterlin and Angelescu, 2009) and the Leyden school (surveyed in Van Praag and Frijters, 1999). Lastly, we extend the happiness-imputation techniques of Vemuri and Costanza (2006), Helliwell and Huang (2006), and Abdallah et al (2008) by including happiness dynamics and country specific effects into the explanation of aggregate happiness, greatly increasing the predictive fit of the imputations.

The paper is organized as follows. The next section introduces the background details of Australian immigration and assimilation. Section 3 then focuses on the concept of happiness assimilation. Section 4 describes the data relevant to life satisfaction estimation and our novel techniques for aggregating multiple datasets and imputation of missing values. Section 5 discusses the main results of the paper, and gives assimilation indices by migrant communities as well as over time. Section 6 concludes.

2   Institutional Background

Australia was gradually colonised by Anglo-Saxons in the late 18th century, early 19th century. Whilst in the early period, the settlers largely came involuntarily as convicts from the United Kindom, the discovery of gold in the mid 19th century made Australia a 'regular' destination for migrants looking to improve their lot. This not only included Anglo-Saxons but also large groups of Chinese, French, Germans, and others. When Australia became a single country in 1901, rather than a loose connection of independent states, it adopted a White Australia policy under which it actively discouraged migration by anyone but white migrants of European descent. Australia thus received large waves of migration from Italy, Greece, the Netherlands, and other non-Anglo Saxon countries, particularly after the second world war. Yet, the White Australia Policy was progressively dismantled[1] between 1949 and 1973 and since then the emphasis first shifted from English speaking countries to other OECD countries, and, then since the mid-1970s, to non-OECD countries. Owing to its proximity to Asia, Australia currently receives a large proportion of its immigrants from countries in Asia and the Americas, more for instance than the intake by Canada or the US.

In terms of the current stock of migrants living in Australia, whom we will empirically define as having been born outside of Australia, the biggest group is from the United Kingdom (UK) and New Zealand (NZ) who make up 5.3% and 2.5% of the whole population in 2011. Next are migrants from China and India who make up 1.8% and 1.5% of the total population now. Over the last decade, the number of Australian born

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[1] After the end of the Second World War, the Menzies and Holt Governments effectively dismantled the Anglo-Saxon oriented policies and the Whitlam Government passed laws to curb immigration on the basis of race in 1973.

grew at an average rate of 1.0% per year, while the number of overseas-born residents increased at an average 3.1% per year (ABS, 2010). This reflects the very high rate of current migration into Australia, i.e. around 150,000 a year which in turn is around 0.7% of the current population of Australia (which is 23 million).

The main avenue for migrants into Australia is a points system wherein prospective migrants have to score a sufficient number to get permanent residency. Points are given for education, command of English, wealth, health, work experience, and youth (Birrell, 1990), meaning that Australia effectively cream-skims potential migrants and has done so since at least 1989. Some two-thirds of migrants in the last 20 years have come in under a skilled-visa scheme or its variants (such as the scheme to let in very wealthy migrants), either as the principal migrant or his/her family (including children). The main other category is made up of migrants who came in under humanitarian schemes, currently making up around 10% of the total stock of migrants with 750,000 humanitarian migrants out of a total number of 7.2 million migrants coming since 1945.

Once accepted as a permanent resident, migrants are treated much the same as citizens for most work and state-related activities apart from being allowed to vote, which is reserved for citizens. The typical migrant on skilled visas however would spend two years on a visa before being granted permanent residency, and in that interim period would not have the same access to health care and various subsidies, in effect cross-subsidising citizens. Migrants with poor English, such a many humanitarian migrants or the family of migrants who come under a skill visa, are offered intensive immersion courses on English, implying that there is a large immediate assimilation investment expended by both the migrant and the Australian migration institutions, meaning that one should not think of migrants who have been in the country for a few month as being truly 'un-assimilated'.

3   Specification and Methodology

To illustrate the basic ideas in our methodology, Figure 1 shows the average life satisfaction scores for three distinct groups: Australian-born residents, immigrants living in Australia, and residents in the migrant's country of birth. As the figure shows, the happiness of residents in the migrant's home country is more volatile but also displays a different time profile than the happiness of the Australian-born, reflecting different ups and downs inside those countries. The degree to which the profile of the migrants in Australia mimicks that of the local-born population in either the origin or destination country then defines their degree of happiness assimilation.

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Figure 1: Average Life satisfaction of Australian born, immigrants and residents from their country of birth
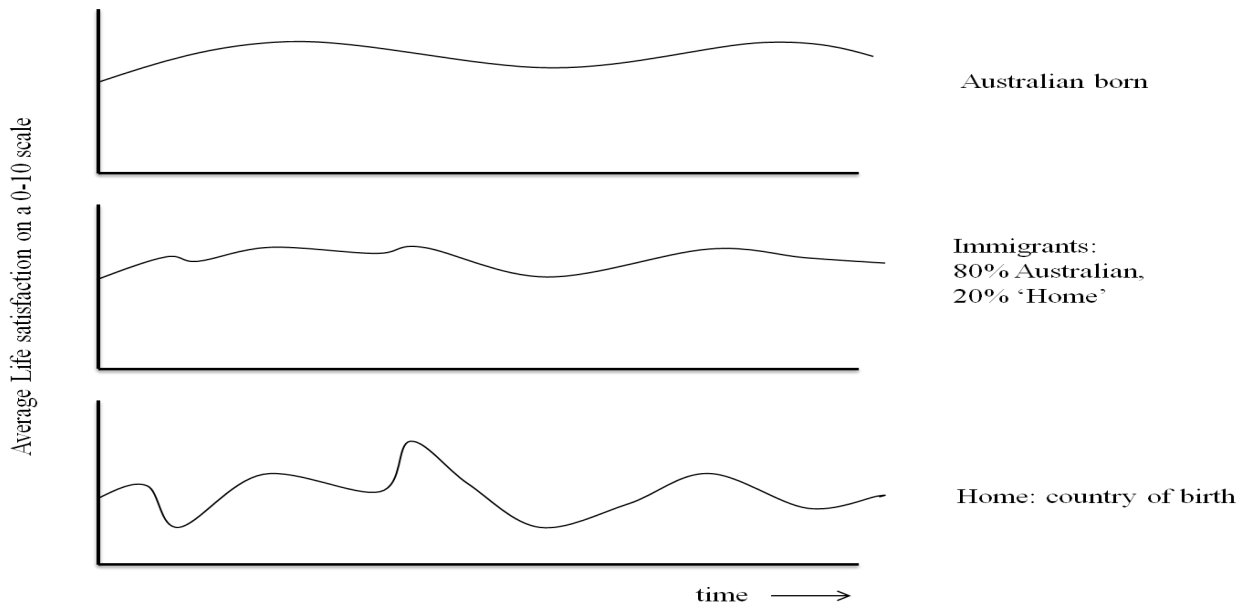
Our basic equation relates the happiness of an individual to a blend of the happiness of the local-borns in the origin and destination countries, effectively conceiving of a migrant as partly a local and partly a foreigner (Glick-Schiller, 2003; Waldinger, 2007):

$$lifesat_{ijkt} = x_{it}\beta + \{f(w_{ijt})z_{jt} + f(w_{ikt})z_{kt}\}\gamma + \varepsilon_{ijkt}$$

where $lifesat_{ijkt}$ represents the life satisfaction of immigrant i born in country j, currently residing in country k at time t. x_{it} is a column-vector of individual specific characteristics; z_{lt} is the average life satisfaction of individuals born in country l at time t. The parameter γ picks up happiness spillovers: the changes in life satisfaction derived from changes in the happiness of their peers in both the host and home countries. The dynamics in the life satisfaction averages from country j and k will in turn derive from the social, economic, cultural and poltical changes occurring in those particular countries and will change with recessions, recoveries, exogeneous weather shocks, and institutional upheavals.

$f(w_{ilt})$ is a non-linear function of individual characteristics that measures $i's$ assimilation to country l, where w_{ilt} denotes a vector of characteristics important for assimilation, including years in Australia, age at arrival, english language skills, citizenship, family structure, inter-marriage, economic status, and other factors. Since identities must sum up to one, we contrain the sum of $f(w_{ilt})$. We specify this function to satisfy monotonicity and non-negativity:

$$\sum_l f(w_{ilt}) = f(w_{ijt}) + f(w_{ikt}) = 1$$

where $f(w_{ilt})$ is defined as follows:

$$f(w_{ijt}) = \frac{e^{w_{it}\eta}}{1 + e^{w_{it}\eta}} \equiv a_{it}$$

$$f(w_{ikt}) = \frac{1}{1 + e^{w_{it}\eta}} = 1 - a_{it} \equiv p_{it}$$

a_{it}, thus measures the extent to which an individual immigrant co-moves with the happiness in the country of origin whilst p_{it} measures the degree of assimilation to the happiness dynamics of the host country, Australia.

Given this specification, the marginal effects of the elements in w_{ilt} are now functions of just η and a:

$$\frac{\partial a}{\partial w} = \frac{\eta e^{w\eta}}{(1 + e^{w\eta})^2} = \eta a(1 - a)$$

$$\frac{\partial p}{\partial w} = \frac{-\eta e^{w\eta}}{(1 + e^{w\eta})^2} = -\eta a(1 - a)$$

(where we have suppressed the subscripts i and t). We thus find that the sign of $\frac{\partial a}{\partial w}$ is now the same as that of η, with the sign of $\frac{\partial p}{\partial w}$ being the opposite.

An important challenge is to construct an appropriate series for z_{lt} for all the countries from which large groups of migrants arrive in Australia. In our case, we thus need happiness series for 9 continuous years for all the countries from which there is at least 1 migrant in our Australian panel data.

4 Data

The main data comes from waves 2-10 of the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA Survey began in 2001 as a representative sample of 7,682 households and 15,127 individuals aged 15 years or more. Collected through both face-to-face interviews and self-completion

questionnaires, the data contains detailed information on personal characteristics and migration history. The key dependent variable used in this analysis is subjective life satisfaction asked of all respondents over 15 in all waves:

"All things considered, how satisfied are you with your life? Pick up a number between 0 and 10 to indicate how satisfied you are".

Variables used to explain life satisfaction include socioeconomic status (educational attainment, occupation, and household income adjusted by inflation) and basic demographics (age, gender, marital status, health). Variables that affect both the level of life satisfaction and the degree of assimilation (see appendix for a brief discussion of the variables used in the regression analysis) include the number of years in the country, age at arrival, whether or not someone is in a mixed-marriage, whether English was the first language (McManus, Gould, & Welch, 1983; Chiswick & Miller, 1995, 1996; Dustmann & Fabbri, 2003), having citizenship, having finished the highest level of education attained in Australia, and having kids at school.

In order to assess the role that social support play in the assimilation process, we include an indicator for being socially stressed: we expect them to socialize less, have lower social support and friends, and therefore might be less likely to assimilate. To this end we use the average of 10 questions on social support in the Self-Completion Questionnaire (SCQ) in the HILDA dataset. The questions include "People don't come to visit me as often as I would like", "I often need help from other people but can't get it", "I seem to have a lot of friends", "I don't have anyone that I can confide in", "I have no one to lean on in times of trouble", "There is someone who can always cheer me up when I'm down", "I often feel very lonely", "I enjoy the time I spend with the people who are important to me", "When something's on my mind, just talking with the people I know can make me feel better", and "When I need someone to help me out, I can usually find someone". Answers are on a 1 (strongly disagree) to 7 (strongly agree) scale. The answers to some questions are reversed such that for each a 1 corresponds to having social support and a 7 to lacking social support and being socially stressed.

We construct three different variables for whether a migrant is intermarried (Meng and Gregory, 2005). The first is whether the individual's partner was born in a different country than the migrant. The second is whether the migrant is married to someone from a different broad religion. The third captures the length for which the migrant has been married to someone from a different country of birth. Each of these definitions captures some degree to which the migrant is partnered to someone outside of their origin country or culture and thus might more likely assimilate to the Australian culture rather than remain in a home culture.

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4.1 Life Satisfaction in the Origin Countries

Most studies on cross-national differences in life satisfaction, like Helliwell (2003, 2006) and Vemuri and Costanza (2006), have used the World Values Survey (WVS) explained in Inglehart et al. (2005). We augment information from the WVS with that of six other international happiness surveys, using imputation techniques to fill in missing years, extending the methods of Abdallah et al (2008) and Helliwell (2006). The six additional surveys are the European Social Survey, the Latinobarometer, the Pew Attitudes Survey, the Gallup World Poll, the British Household Panel Survey and the German Socio-Economic Panel. These different surveys all use a different question to measure happiness and furthermore use different numerical scales ranging from 1-4 to 0-10. To date, the standard approach has been to ignore the differences in questions and to use a simple conversion method. We take a different approach and use the fact that for many countries we have more than one observation of aggregate happiness in the same year.

We thus aim to estimate

$$\bar{F}_{jt} = (F^{max} - F^{min} + \delta_0)\frac{2\bar{c}_{jkt} - \delta_1}{2[c^{max} - c^{min} + 1]} + g_k$$

where $\bar{F}_{jt}$ denotes the average happiness level on a (0-10) scale corresponding to the average response $\bar{c}_{jkt}$ of survey k in country j at time t. Here, F^{max} and F^{min} denote the maximum and minimum in the scale being transformed to (i.e., 0 and 10) and c^{max} and c^{min} are the maximum and minimum in the scale being transformed from. δ_0 and δ_1 are now key stretching parameters to be estimated whilst g_k denotes a survey-specific intercept also to be estimated that captures differences in the question format and the style of the survey (see figure 2 for a schematic representation of the transformation). Now, Veenhoven (1993) and Easterlin and Angelescu (2009) used the stretching methodology based on range theory. Some other authors, such as those in the Leyden approach surveyed by Van Praag and Frijters (1999), but also Parducci (1995), use the equal quantile assumption (EQA), where $\delta_0 = 1$; $\delta_1 = 1$; $g_k = 0.5$. Instead of assuming these parameters, we will estimate them by Nonlinear least squares (NLS) using the averages of the different surveys (adding a normally distributed error term), yielding $\delta_0 = 0.733$; $\delta_1 = 1.508$ (see Table 5 in the appendix), showing considerable intercept effects (g_k) for the difference surveys. We note that the goodness-of-fit is very high (R^2=0.998) for this specification, much higher than the implied R^2 of either range theory (where the R^2 would be 0.928) or the EQA (where the R^2 would be 0.854).

Next we briefly introduce the various datasets.

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Figure 2: Rescaling different happiness surveys

How satisfied? Survey B

Survey shifter is estimated.

How happy? Survey C

How happy? Survey A

Stretching is estimated.

$\frac{10 - 0 + \delta_0}{4 - 0 + 1}$

Survey-specific shifters plus general stretch parameters.
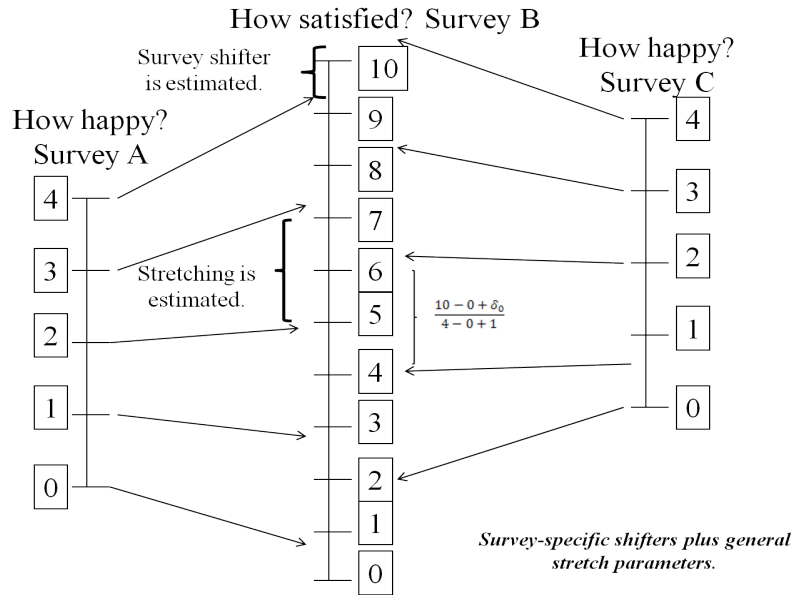
4.1.1 European Social Survey

The European Social Survey (the ESS) established in 2001 is a biennial social survey designed to explain the interaction between Europe's changing institutions and the attitudes, beliefs and behaviour patterns of its diverse population. Currently in its sixth round, the biennial multi-country survey of social attitudes in Europe covers 30 nations over a period of five years between 2002-2010 and report the individual's response to the following well-being question:

"Taking all things together, how happy would you say you are?"

measured on a scale of 0-10 where 10 represents situations where the respondent feels "extremely happy" and 0 when they are "extremely unhappy".

4.1.2 Latinobarometer

Collected annually from 18 Latin American countries since 1995 by Latinobarómetro Corporation, a non-profit NGO based in Chile, Latinobarometer covers responses from about 19,000 respondents on different indicators of public opinion, attitudes, behaviour and values. The relevant question used in this survey measured on a 4 point response scale is given as

"In general, would you say that you are satisfied with your life? Would you say that you are very satisfied, fairly satisfied, not very satisfied or not satisfied at all?"

The response is reverse coded on a 1-4 scale where 4 is equivalent to "not at all satisfied" while 1 represents "very satisfied". We reverse coded the answers.

4.1.3 World Value Survey

The World Value Survey (WVS) is the largest cross national dataset that has consistently used the life satisfaction question to study changing values and social and political life. The WVS includes representative national surveys in 97 societies over five waves of surveys between 1981 to 2008. Respondents in each survey were asked to respond to

"All things considered, how satisfied are you with your life as a whole these days?"

on a 1-10 scale with 1 representing "dissatisfied" and 10 "satisfied".

4.1.4 Pew Attitudes Survey

The Pew Attitudes Survey conducted by the Pew Research Center's Global Attitudes Project (2002-) conducts public opinion surveys around the world and uses the Cantril's self-anchoring striving scale to measure people's assessment of their own lives and their views about the state of the world. Respondents were shown a diagram of a ladder and asked

"Here is a ladder representing the "ladder of life." Let's suppose the top of the ladder represents the best possible life for you; and the bottom, the worst possible life for you. On which step of the ladder do you feel you personally stand at the present time?"

which was answered on a scale of 0 (worst possible life) to 10 (best possible life). For our analysis, we use 44 countries from 2002, 6 countries from 2005, 45 nations from 2007, 10 from 2009 and 22 nations from the 2010 survey.

4.1.5 Gallup World Poll

We use the Gallup World Poll dataset that is publicly available from the Gallup World view and the OECD database. From it, we take information on the Cantril (1965) ladder question:

"Please imagine a ladder/mountain with steps numbered from zero at the bottom to ten at the top. Suppose we say that the top of the ladder/mountain represents the best possible life for you and the bottom of the ladder/ mountain represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder/mountain do you feel you personally stand at the present time?''

4.1.6 Other Sources

In addition we use two other national datasets: the British Household Panel Survey (BHPS), and the German Socioeconomic Panel Study (SOEP). Both SOEP and BHPS are longitudinal datasets, with the same individuals being interviewed every year. In BHPS, the life satisfaction question takes the form: "How dissatisfied or satisfied are you with your life overall?" and is coded on a scale from 1 (not satised at all) to 7 (completely satised). In the SOEP the life satisfaction question is phrased as "We would like to ask you about your satisfaction with your life in general", coded on a scale from 0 (completely dissatisfied) to 10 (completely satisfied).

Two issues arise in the use of these different datasets. One is that for some countries and years we have multiple candidates to use as an estimate for the happiness of those born in that country. The second is missing years for particular countries and periods.

For the first problem we prioritise the datasets in terms of how reliable we judge them to be, choosing the most reliable and comparable datasets when available. Of greatest priority were the SOEP, the BHPS, the Latinobarometer and the European Social Survey because they are consistent over time, were organised centrally, and have wide coverage. Next in terms of priority was the data from the World Values Survey, followed by the Gallup World Poll, and the Pew Attitudes Survey.

The prioritised data assembled as a source of information consist of 516 separate year-country observations for the period 2002-2010, far short of the 1188 we ideally need[2]. The countries with most years missing are in Asia, Africa and Oceania, requiring an imputation, though we show in the appendix that many of the main results are similar if we do not impute and use only migrants from countries with full information as to the happiness of their residents in the 9 year period.

4.2 Imputation

We extend the imputation technique adopted by Vemuri and Costanza (2006), Helliwell and Huang (2006), and Abdallah et al (2008) by linking happiness data to information gathered on the socio-economic conditions in the country. Whilst the happiness data is only available for selected years, important socio-economic conditions like per capita GDP, weather, and life expectancy has been gathered (or estimated) for nearly all these countries for nearly all years.

Our estimation equation at the level of the country (not the individual) models average life satisfaction:

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[2]Data from only 84 countries from which Australia received migrants in our dataset were used in the main regression but we have imputed missing life satisfaction values for all the 132 countries between 2002-2010 for which atleast one life satisfaction value was available.

$$Averagelifesat_{jt} = X_{jt}\beta_1 + \theta_j + \lambda(Averagelifesat_{jt-1}) + \varepsilon_{jt}$$

where X_{jt} is a large vector of available country-year circumstances (natural capital, human capital, GDP per capita, governance, services and particular health outcomes); θ_j is a country-specific intercept; $Averagelifesat_{jt-1}$ is the average level of happiness for the period $t-1$. This lag is included in the estimation to capture dynamic effect of changes in previous periods, effectively reducing the volatility of the predicted level of satisfaction (without this term volatility is unreasonably high). This equation can only be run for countries with at least two observations over time as the first observation drops out due to the missing $Averagelifesat_{jt-1}$ in the estimation equation. We have a total of 328 observations for this imputation regression which is shown in the Appendix (we only report a subset of all regressions-those with the highest R-squared), which also gives details on all the variables used in the imputation. Note that we in no way interpret any of these coefficients as causal since all we are interested in with this estimation is prediction.

We can now impute missing observations by calculating the implied average life satisfaction using the estimated β_1, θ_j, and λ. For periods and countries with missing $Averagelifesat_{jt-1}$(those where there is no information preceding 2002), and for countries with only one observation we assume stationarity to get an estimate of both θ_j and $Averagelifesat_{jt-1}$.

4.3   Results for imputations

The imputation regression results laid out in the appendix show reasonable coefficients and signs, even though we are not claiming causality. Measures of governance indicators like overall governmental quality are found to have a significant positive effect on life satisfaction, similar to Helliwell and Huang (2006) and Abdallah (2008). The most important variables in terms of explanatory power are lagged life satisfaction, and overall governmental quality. Our prefered model in column six has the highest R-squared of 0.857.

After imputing 665 missing values, we get a total of 1181 country-year observations. Fig. 3 shows the observed versus estimated life satisfaction values for those countries where both data were available. The degree of association between the observed and estimated life satisfaction values is high with a Pearson's correlation coefficient of 0.89 and a Spearman's rank correlation coefficient of 0.88.

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Figure 3: Scatterplot of Observed versus Estimated Life Satisfaction
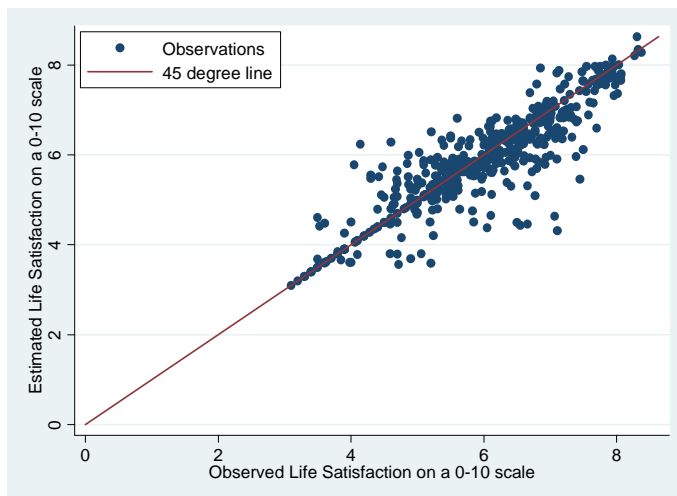
5 Main Regression Results

5.1 Baseline Results

We show the results of our basic estimation equation in Table 1, where the top panel shows the effects of individual characteristics on the level of happiness, and the bottom panel contains the marginal effects of variables on assimilation to the host country, Australia ($= \frac{\partial p}{\partial w}$). These marginal effects are calculated as the average of the individual marginal effects with bootstrapped confidence intervals and multiplied by 100 so that they can be interpreted as percentage changes.

The estimated effects on the level of life satisfaction are in line with most of the findings of the literature on the determinants of life satisfaction. The coefficients on age and age-squared of -0.055 (t-val -34.60) and 0.0007 (t-val 41.65) are almost the same as those found in other cross-sectional studies (e.g. Blanchflower & Oswald, 2004; Ferreri- Carbonell, & Gowdy, 2007). The gender coefficient of -0.0708 (t-val -8.01) presented in column 1 in table 1 similarly fits the fairly universal finding of higher reported happiness levels by women (Alesina, Di Tella, & MacCulloch, 2004, Dolan, Peasgood and White, 2008).

The results on marital status, income, employment and health status are also in line with the literature that has similarly found a strong positive relationship between subjective well being and physical health (Shields & Wheatley Price, 2005), a negative association with education (e.g. Clark, 2003) and a large negative effect of individual unemployment on subjective well being (Di Tella et al., 2001; Frey & Stutzer, 2000; Helliwell, 2003; Stutzer, 2004).

Similarly, socialising with family and friends is found to be positively associated with life satisfaction (e.g.

Lelkes, 2006; Pichler, 2006) and individuals who are socially stressed in nature are significantly less satisfied with life. Finally, we find that those who are relatively better off compared to their reference group perform better in terms of life satisfaction (Dorn, Fischer, Kirchgassner, & Sousa-Poza, 2007; Ferrer-i-Carbonell, 2005; Luttmer, 2005; Weinzierl, 2005).

5.2 Results on Assimilation

The lower panel of Table 1 shows the factors influencing assimilation with a positive marginal effect implying a greater degree of co-movement between the happiness of the migrant and that of the Australian-born population. The positive marginal effect of Years in Australia in the fifth column, 0.023 (not significant) shows that an extra year of residence in Australia increases assimilation by 0.023% on average. Immigrants who arrive in Australia young also seem to assimilate quickly. In line with expectations, those who learnt English as their first language before their arrival in Australia are found to be 1% more assimilated, though insignificantly so.

The most significant factors in assimilation turn out to be social stress, relative income status and having a school going child, with those who socialize infrequently being less assimilated and those with higher relative incomes more assimilated: individuals with a one-point higher economic standing in the host society are 1.07% more assimilated (significant at the 5% level), in line with expectations in the literature. Conditional on the other variables, Australian citizenship seems to have no effect on the degree of assimilation. Yet, individuals with a school going child in the family are more assimilated to the host country though the large effect is only significant at the 5% level.

The coefficient of 1.099 (t-val 6.07) for γ, referred to as the "measure of spillover effect" demonstrate people's happiness is positively affected by the changes in the lives of the "peers". One can interpret this either as a "warm glow" peer effect or else simply the result of unobserved common factors. For the purposes of this paper, where our interest is in happiness assimilation, it does not actually matter whether the spillover coefficient captures common factors or peer effects.

5.2.1 Intermarriage

Next we look in greater detail at the effect that various measures of intermarriage have, where we expect intermarriage to reduce the ability of either parent to retain a consistent ethnic culture (Meng and Gregory, 2005) and thus facilitate their assimilation to the host country. To see whether this is true, Table 2 shows the results of the most comprehensive specification for those with partners, where intermarriage has been added to both the set of variables explaining the level of life-satisfaction as well as the degree of assimilation. The

Table 1: Non-linear Regression estimates for Life Satisfaction

Independent variables	Dependent variable: Life satisfaction				
Personal characteristics					
Constant	6.136***	-0.617	-0.732	0.222	-0.826
Age	-0.0550***	-0.0684***	-0.0507***	-0.0550***	-0.0530***
Age squared/100	0.0705***	0.0702***	0.0553***	0.0552***	0.0524***
Male dummy	-0.0708***	-0.0728***	0.0349***	0.0353***	0.0314***
Completed Year 12	-0.200***	-0.186***	-0.203***	-0.203***	-0.203***
Ln of Household Income (in thousand)	0.0760***	0.0746***	0.0408***	0.0215**	0.0211**
Number of Children	-0.0189***	-0.0139***	-0.00955***	-0.00830**	-0.00221
Married dummy	0.332***	0.341***	0.274***	0.275***	0.290***
Divorced dummy	0.0406**	0.0375*	0.0391**	0.0397**	0.0420**
Employed dummy	-0.0766***	-0.0830***	-0.105***	-0.0925***	-0.0942***
Unemployed dummy	-0.354***	-0.352***	-0.272***	-0.273***	-0.276***
Own house dummy	0.121***	0.114***	0.0945***	0.0941***	0.0959***
Health Status	0.531***	0.531***	0.403***	0.403***	0.404***
English language proficiency		0.0828***	0.0669**	0.0443	0.0368
Years in Australia		0.0136	0.00892	0.0133	0.0132
Age at Arrival		0.0153	0.0115	0.0162	0.0161
Social stress			-0.440***	-0.440***	-0.438***
Relative Income Status				0.0156**	0.0150*
Naturalization				0.0457**	0.0405*
School going age kid dummy					-0.0967***
Highest education in Australia dummy					0.0318
Primary Characteristics to assess Immigrant Assimilation					
Measure of Spillover Effect		0.842***	1.072***	0.972***	1.099***
Constant		9.141***	9.812***	6.732***	5.721***
Marginal Effects for Immigrant Assimilation to Australia*					
English as first language		0.769	0.302	0.792	0.995
Years in Australia		0.037	0.020	0.026	0.023
Age at Arrival		-0.112***	-0.088***	-0.068***	-0.051***
Social stress			-0.527**	-0.471**	-0.426**
Relative Income Status				1.098**	1.071**
Naturalization				0.107	0.289
School going kid dummy					1.315**
Highest education in Australia dummy					-0.375
No of observations	92402	92402	92402	92402	92402
Adjusted R squared	0.166	0.169	0.252	0.252	0.252

*Marginal effects for assimilation to Australia are multiplied by 100

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: Non-linear Regression estimates for Life Satisfaction with marriage behaviour

Non-linear Regressions with Life Satisfaction as the Dependent variable			
Personal characteristics	Inter-country	Inter-religion	Length of Inter-country
Intermarriage	-0.0845***	-0.0524***	-0.00272***
Primary Characteristics to assess Immigrant Assimilation			
Measure of Spillover Effect	1.203***	1.166***	1.227***
Constant	5.470***	5.434***	6.370***
Marginal Effects for Immigrant Assimilation to Australia*			
English language proficiency	1.533*	1.155	2.152*
Years in Australia	0.0046	0.0179	-0.020
Age at Arrival	-0.021	-0.037**	0.034
Social stress	-1.006***	-0.717***	-1.571***
Relative Income Status	3.602***	1.808***	5.198***
Naturalization	0.633	0.370	0.953
School going kid dummy	2.159**	1.537**	3.274**
Highest education in Australia dummy	0.500	-0.011	1.019
Intermarriage	3.612***	0.494	0.564*
Number of observations	62463	62182	62463
Adjusted R squared	0.238	0.237	0.238

*Marginal effects for assimilation to Australia are multiplied by 100

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

three columns show results for the three different definitions of intermarriage.

The coefficients in the top panel of table 2 show that individuals who are coupled with someone from a different culture are significantly less happy, whatever the definition. The lower panel results show that those with a partner have life satisfactions that seem to co-move more with that of others (the estimate for γ is higher, though not significantly so). We also find that under all measures of intermarriage, the intermarried are more assimilated with the host country, though only significantly so for those with partners born in different countries (column 1) and length of intermarriage (column 3), where the intermarried are 3.61% and 0.56% more assimilated. Inter-religion relationships however do not seem to have a large or significant effect.

5.2.2 Fixed effect results

Unobserved person-specific factors such as genetic background, motivation, optimism, and family values

may be correlated with the regressors and may bias the coefficients obtained from the non-linear regression. Reverse causality is also an issue in the cross-sectional results above. For instance, one might think that intermarriage and assimilation are both endogenous to particular motivations and interests of the migrant (Price and Zubrzycki, 1962). Intermarriage may for instance be substantially higher for those with better language skills before migration and for migrants who are richer, leading to biased coefficients in the cross-section. Similar objections can be raised for years in Australia, income, and other variables in the analyses.

To see how sensitive the results are to the omission of fixed traits, we next include fixed effects, effectively following the individual over time. Table 3 shows the results of the fixed-effect regression in which the influence of time-invariant factors on happiness levels can no longer be estimated, though their influence on assimilation can still be estimated due to the non-linear relation. In order to get tight estimates, we only control for time-varying variables in both happiness levels and the assimilation index.

The table shows changes in the effects of variables on the level of life satisfaction in line with what others who use fixed effects find: for instance, we now find that education is no longer a significant influence on life satisfaction (e.g. Meier & Stutzer, 2006), and that the U-shape in age disappears with the introduction of fixed-traits (Beatton and Frijters, 2012). Overall, the results on happiness levels are still as expected: marriage, employment, health, and higher income all still increase happiness. Individuals who become less social beget a lower life satisfaction while income status seem to have no significant effect.

We still find evidence of significant spillovers from the changes in the life satisfaction of their peers with a coefficient of 0.825. Regarding the factors that increase assimilation, we now do not find any significant effect of years in Australia, but we continue to find that those with higher income status are more assimilated. Somewhat surprisingly, we find that the effect of social support has switched signs and that those who are less social are found to be more assimilated with the host country, rather than less. This might indicated that individuals who become more social first start interacting more with their native culture rather than the Australian one.

5.3 Levels of Assimilation across Migrant Groups and over time

We can now use the estimated results to predict the assimilation index of each individual migrant and to aggregate over migrants from different countries and continents. To this end, we use the point-predictions of the inidividual degree of assimilation:

$$\hat{p} = 1 - \hat{a} = \frac{1}{1 + e^{w_{it}\hat{\eta}}}$$

Table 3: Fixed Effect estimates for Life satisfaction

Independent Variables	Dependent variable: Life Satisfaction			
Personal characteristics				
Age	-0.0496***	0.0911	0.0946	0.0940
Age squared/100	0.0389***	0.0327***	0.0331***	0.0333***
Completed Year 12	-0.0461	-0.0436	-0.0438	-0.0438
Ln of Household Income (in thousand)	0.0324***	0.0288***	0.0148	0.0152
Number of Children	-0.0249***	-0.0138**	-0.0138**	-0.0126**
Married dummy	0.261***	0.258***	0.258***	0.258***
Divorced dummy	0.207***	0.195***	0.196***	0.196***
Employed dummy	0.0369**	0.0385**	0.0494**	0.0493**
Unemployed dummy	-0.139***	-0.135***	-0.135***	-0.135***
Own house dummy	0.0650***	0.0639***	0.0644***	0.0645***
Health Status	0.230***	0.211***	0.212***	0.212***
Years in Australia		-0.134	-0.138	-0.137
Social stress		-0.198***	-0.198***	-0.198***
Relative Income Status			0.0122	0.0121
Naturalization				0.0237
Primary Characteristics to assess Immigrant Assimilation				
Measure of Spillover Effect		0.837***	0.836***	0.825***
Constant		8.606**	1.839	1.368
Marginal Effects for Immigrant Assimilation to Australia*				
Years in Australia		-0.098	-0.041	-0.036
Social stress		3.483	2.716*	2.473*
Relative Income Status			5.443*	4.504*
Naturalization				0.650
No of observations	74288	74288	74288	74288
Adjusted *R* squared	0.020	0.034	0.034	0.034

*Marginal effects for assimilation to Australia are multiplied by 100

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

where $\hat{p}$ denotes the estimated the degree of assimilation of individual migrants to the host country. We use our most prefered specification in column 5 of table 1 to compare the level of assimilation amongst different groups of migrants (communities) in Table 4, which shows the level of assimilation for the 70 biggest migrant groups in Australia (those groups with at least 30 migrant observations).

Australian born residents are provided with the highest assimilation index of all residents (an index of one) as by definition they are 100% Australian. The average migrant in Australia was found to be very much assimilated to Australia in terms of life satisfaction with an assimilation index of 0.957 (23rd). Immigrants from the major Anglo Saxon nations like Canada (0.973; 3rd), United States (0.969; 5th), United Kingdom (0.969; 6th), Ireland (0.968; 8th), South Africa (0.966; 10th), and New Zealand (0.966, 11th), were found to be the most assimilated to the host country. In terms of continents, North America was found to have the highest assimilation index of all the regions (0.971; 4th) followed by Europe in second place (0.962; 17th) and Africa (0.959; 20th) in third, partially reflecting the fact that Africa includes migrants from South Africa and Zimbabwe whose first language was English. Oceania as a region (excluding Australia and New Zealand) came in fourth (0.959; 21st), followed by Asia in fifth place (0.940; 52nd), and South America with the lowest assimilation score of 0.939.

The main thing to note from Table 4 is the high degree of assimilation right at the start of the migration experience. Even migrants from Cyprus, the country with lowest level of assimilation, are assimilated almost 89.3%, though this averages a lower initial level and a higher eventual level. This high overall degree of assimilation might be due to the point system for visas in Australia[3].

Figure 4 shows the degree of assimilation of migrants born in different countries but residing in Australia. The figure shows a non-monotonic profile because different 'years since migration' now belong to different individuals in the dataset, but one can nevertheless see that assimilation gets closer and closer to 1 as the years since migration increases.

The figure shows that new migrants from United Kingdom and New Zealand start off as being extremely integrated to Australia, with otherwise fairly stable assimilation indices. On the other hand, new migrants from Asia, Africa, Americas, and Oceania are found to be less integrated to Australia in the early years where their assimilation index is around 0.85, but they slowly integrate more and more into the Australian community.

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[3]Unfortunately, the data does not include information as to whether a migrant came under a humanitarian visa for it is possible that assimilation rates are lower in that group.

Table 4: Life Satisfaction Assimilation Index and Ranking for immigrant communities in Australia

Country of Interest	Index	Rank	Country of Interest	Index	Rank
Australia	1.000	1	Indonesia	0.948	36
Papua New Guinea	0.979	2	Africa (ex. SA & Zambia & Zimbabwe)	0.948	37
Canada	0.973	3	Latvia	0.947	38
North America	0.971	4	Iran	0.947	39
United States	0.969	5	Mauritius	0.947	40
United Kingdom	0.969	6	Singapore	0.947	41
Zimbabwe	0.968	7	Sweden	0.946	42
Ireland	0.968	8	Fiji	0.946	43
Portugal	0.967	9	Philippines	0.946	44
South Africa	0.966	10	Croatia	0.945	45
New Zealand	0.966	11	Poland	0.944	46
Oceania (ex. Aus)	0.964	12	Czech	0.944	47
Malta	0.964	13	Bangladesh	0.943	48
Belgium	0.964	14	Hong Kong	0.943	49
Zambia	0.963	15	Japan	0.942	50
Turkey	0.963	16	Sri Lanka	0.941	51
European Region	0.962	17	Asian Region	0.940	52
Lebanon	0.961	18	Denmark	0.940	53
Austria	0.960	19	South America	0.939	54
African Region	0.959	20	Thailand	0.939	55
Oceania (ex. Aus & NZ)	0.959	21	Macedonia	0.936	56
India	0.958	22	Peru	0.935	57
World (ex. Aus)	0.957	23	Hungary	0.934	58
Greece	0.957	24	Chile	0.932	59
Uruguay	0.957	25	Vietnam	0.931	60
Ukraine	0.957	26	Spain	0.928	61
Germany	0.956	27	Malaysia	0.927	62
Netherlands	0.956	28	Nepal	0.923	63
Italy	0.955	29	Cambodia	0.923	64
Argentina	0.954	30	China	0.921	65
Switzerland	0.953	31	Colombia	0.920	66
Egypt	0.953	32	Russia	0.904	67
Africa (ex. SA)	0.953	33	Iraq	0.904	68
France	0.951	34	Bulgaria	0.903	69
Europe (ex. UK & Ireland)	0.950	35	Cyprus	0.893	70

Note: The index is rounded off to three decimal places but ranked according to the assimilation index.

Figure 4: Degree of Migrant's Life Satisfaction Assimilation to Australia over Time

Graphs by Source Region of Immigrants
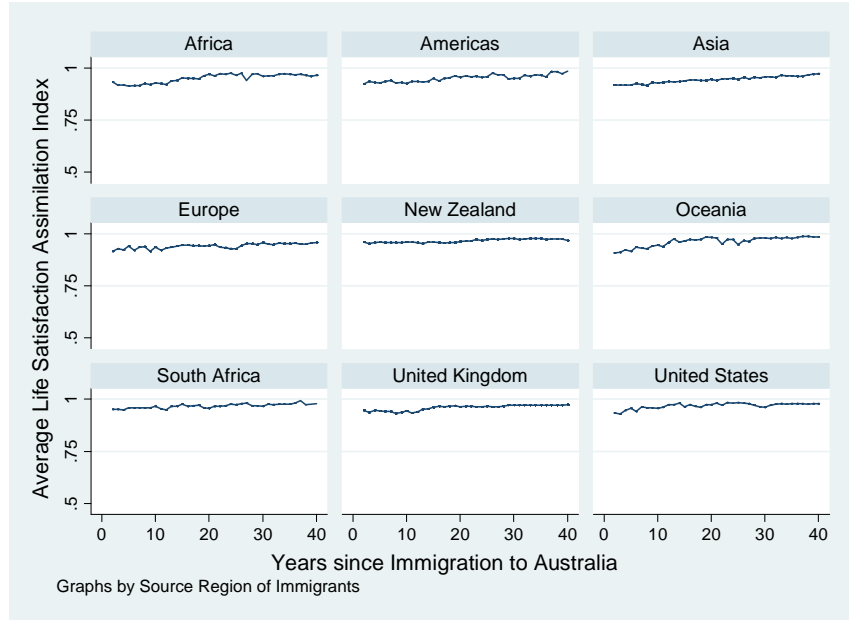
6 Conclusion

In this paper, we have conceived of immigrant's wellbeing to depend partially on the circumstances in the country they live in and partially on the circumstances in the country they come from: we term the degree to which the changes in their happiness co-moves with the average of the country they live in rather than the one they were born in 'happiness assimilation'. We computed this for around 3415 migrants from 84 different countries, all living in Australia.

The bottom line result was that the degree of happiness assimilation is very high in Australia: it is around 85% for migrants from non-English speaking countries within months of arrival, and close to 98% for migrants from North America and other English-speaking countries. The happiness of a migrant already co-moves some 93% with that of natives and only 7% with that of residents in the country of origin within a year of arrival. A possible reason for this high degree of assimilation is the fact that Australia selects its migrants on desirable characteristics, most notably including employability and English language proficiency. As expected, we found that migrants with higher incomes and who were more sociable had higher degrees of happiness assimilation.

In terms of the wider literature, happiness assimilation provides another empirical measure of assimilation, augmenting the literature on wage-assimilation and language assimilation. In that regard, the main result is that happiness assimilation is far higher and occurs far more quickly than either wealth assimilation or

language assimilation, which is relatively slow by comparison (Beenstock, Chiswick, & Paltiel, 2010; Chiswick & Miller, 2008).

Thinking of policy, our main result implies that national policies on recessions, health, disasters, institutions, and other factors that change aggregate happiness will have almost the same effects on migrants as they have on natives, and that the happiness changes in the country of origin will have almost no effect on the happiness levels of migrants living in Australia.

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7 Appendix

7.1 Optimal re-scaling of happiness surveys.

Our conversion methodology which is an extension of the Leyden approach (discussed in section 4) is used to re-scale the responses to the life satisfaction questions to a 11 step 0-10 scale by 'stretching' the responses on the original scale using a suitable estimated transformation. The NLS estimator $\hat{\delta}$ minimize the sum of squared residuals for the following objective function

$$Q(\delta, \ g) = \sum_{i=1}^{N} \left\{ \bar{F}_{jt} - m\left(\bar{c}_{jkt}, \delta, g\right) \right\}^2$$

where δ denotes the parameter vector and $m(c, \delta, g)$ is the specified functional form for the transformation. Table 5 provides the stretching parameters estimated by nonlinear least squares.

Table 5: Estimated Stretching parameters

δ_0	δ_1	g_{ess}	g_{wvs}	g_{pew}	g_{gallup}	g_{bhps}
0.733***	1.508***	0.910***	-0.452**	0.876***	0.872***	0.188
(0.102)	(0.134)	(0.0751)	(0.178)	(0.0689)	(0.0688)	(0.369)

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Adjusted R Squared value of 0.998

7.2 Imputation variables and results

We consider different types of capital like natural, human and socio-political capital to estimate the life satisfaction regression model (country level) and then impute the missing values using the estimation methodology. The different variables that we use in this analysis are:

7.2.1 Natural Capital

Following Vemuri and Costanza (2006) we used Ecosystem Services Product (ESP hereafter) as a key indicator of natural capital, estimated by Costanza et al (1997b) using the International Geosphere Biosphere Programme (IGBP) land-cover dataset and unit ecosystem service values. While Gross Domestic Product (GDP) is mostly concentrated in the developed nations, some of the developing countries are rich in ESP,

the value of non-marketed ecosystem services which is not included in GDP (de Groot et al., 2002; Costanza et al., 1997a). ESP is derived from ecosystem service valuation of different types of ecosystem (Costanza et al., 1997a) and a global landcover dataset (Belward, 1996) and is calculated for each country in Sutton and Costanza (2002). In addition to ESP measured in thousands of billion dollars, we have also used different specifications of ESP like natural logarithm to explain the variation in life satisfaction across nations.

In addition, we also use a dummy for tropical climate zone. A country is referred to as lying in the tropical climate zone if the capital of the country is below 30°using the longitude and latitude information[4].

7.2.2 Human and built Capital

Objective measures like higher life expectancy and higher per capita income at purchasing power parity are often associated with better life satisfaction (Deiner and Biswas-Deiner, 2002; Frey and Sutzer, 2002; Helliwell and Putman, 2004). Life expectancy, and per capita Gross Domestic Product at 2005 international dollars obtained from the World Development Indicators (WDI) has been introduced in the life satisfaction regressions.

7.2.3 Socio-political capital: Governance Indicators:

Helliwell and Huang (2006) found that life satisfaction is affected more by the quality of services provided by the government than real per capita incomes, and several different measures of government quality can be successfully used to explain international differences in life satisfaction. The evidence suggest that income is only a part of the story as efficiency of the institutions have a more profound effect on the life satisfaction, especially for developed countries. Institutions and good governance play a complementary role in fostering economic growth and maintaining faith in the ability of the country to deliver justice and other essential services.

Kaufmann et al. (2004) define governance as the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected and replaced, the capacity of the government to formulate and implement sound policies, and the respect for citizens and the state for the institutions that govern economic and social interaction among them.

The indicators are based on several hundred individual variables measuring perceptions of governance, drawn from 35 separate data sorces constructed by 33 different organizations from around the world (Kaufmann et al, 2009). Governance scores are normally distributed with a mean of zero and a standard deviation of one in each period, and run from about -2.5 to 2.5, with higher scores corresponding to better outcomes. Global average is zero for all indicators and periods, so indicators measure countries' relative positions. They

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[4]Longitude and latitude data is available from http://www.cepii.fr/anglaisgraph/bdd/distances.htm

cover a total of 212 countries and territories during 1996, 1998, 2000 and then annually from 2002-2010. Governance indicators have been used by both Helliwell and Huang (2006) and Abdallah et. al. (2008) and were found to be better in explaining variations in life satisfaction compared to the Freedom House's press freedom rating which assesses the freedom of press within a nation by focusing on four categories: the laws, political factors, economic factors, and degree of actual violations and used by Vemuri and Constanza (2006). The six governance indicators that addresses three different dimensions of governance of a country can be categorized as follows:

1. *The process by which those in authority are selected, held accountable, monitored, and replaced;*

Voice and Accountability: captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

Political Stability & Absence of Violence: measures the perceptions of the likelihood that the government will be distabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism.

2. *The capacity of governments to manage resources efficiently and formulate, implement, and enforce sound policies and regulations; and*

Government Effectiveness: captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Regulatory Quality: captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

3. *The respect of citizens and the state for institutions that govern economic and social interactions among them.*

Rule of Law: captures perceptions of the extent to which agents have confidence in and abide by the rules of the society, and in particular the quality of contract enforcement, property rights, the police, and the courts as well as the likelihood of crime and violence.

Control of Corruption: captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

In an attempt to find the association between overall government quality and life satisfaction of a country, we use an average of all the six indicators (GOVTOT) following Helliwell (2003), and Helliwell and Huang (2006). We also use two different dimensions of government indicators that focusses on the democratic process (GOVDEM), an average of voice and political stability, and the quality of services provided (GOVDO),

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which is an average of the governmental effectiveness, regulatory, rule of law and the control of corruption components, following Helliwell and Huang (2006). Finally, each of them was introduced separately in the regressions.

Table 6 provides the regression results that is used to fill the missing values.

7.3 Predicted Life Satisfaction

The main regression model allowed us to predict the missing life satisfaction values for countries particularly in Asia, Africa, and Oceania. Table 7 reports both the observed and estimated life satisfaction for 90 countries selected from all the countries in our dataset. The reported life satisfaction values presented in table 7 is the average over all the years for which data is available from all different sources or has been estimated using our imputation methodology. Figure 5 on the other hand shows how well our estimation methodology fills in the missing values by presenting both the observed and estimated life satisfaction scores from 2002-2010 for 35 countries considered in the dataset.

7.4 Description of the variables

The variables that we use in the non-linear regression estimation of individual life satisfaction are:

7.4.1 Variables used for the level effects:

Age, age-squared (divided by 100), gender, education (whether the respondent has completed an A level education, which implies that they stayed in secondary level education until approximately 18 years), log household income held constant at 1989-90 prices (gross household income in thousand dollars adjusted for inflation, by dividing it by the consumer price index available from the Australian Bureau of Statistics), number of live children, marital status (married, divorced, and others), employment status (employed, unemployed, and 'not in the labour force'), own house dummy ('own/currently paying off mortgage' and others), self assessed health status from the SF-36 Health Survey in the Self Completition Questionnaire (SCQ), which is the response of an individual to the following question, 'In general, would you say your health is:' on a 1-5 scale, with 5 being the worst possible health. The health variable has been recoded to get 1 as "poor" and 5 "excellent".

In addition, we control for english language proficiency based on their reponse to the following question "Is English the first language you learned as a kid?" recoded to get a 0-1 dummy, years in Australia and age at arrival calculated from the date of arrival question in the New Person Questionnaire ("In what year did you first come to Australia to live for 6 months or more (even if you have spent time abroad since)?"),

Table 6: Final Regression Model for Global Life Satisfaction Estimation

Variables of Interest	Life Satisfaction					
Past Life Satisfaction	-0.212**	-0.217**	-0.227**	-0.212**	-0.217**	-0.227**
	(0.0980)	(0.0968)	(0.0944)	(0.0981)	(0.0970)	(0.0945)
Life Expectancy	0.0453	0.0462	0.0297	0.0453	0.0462	0.0297
	(0.123)	(0.123)	(0.120)	(0.123)	(0.124)	(0.121)
ESP (in thousand billion $)				0.108	0.106	0.129
				(0.204)	(0.207)	(0.222)
Log of ESP (in thousand billion $)	-0.387	-0.435	-0.0975			
	(0.628)	(0.644)	(0.616)			
Tropical climate	-1.507	-1.936**	0.858	-0.867	-1.815*	-0.235
	(2.023)	(0.913)	(2.074)	(1.010)	(0.985)	(3.909)
Voice and Accountability			0.845			0.845
			(0.674)			(0.675)
Control of Corruption			0.456			0.456
			(0.399)			(0.400)
Political Stability			0.280			0.280
			(0.342)			(0.343)
Government Effectiveness			0.631			0.631
			(0.702)			(0.703)
Regulatory Quality			-0.584			-0.584
			(0.429)			(0.430)
Rule of Law			0.382			0.382
			(0.657)			(0.658)
GOVTOT	1.446**			1.446**		
	(0.676)			(0.677)		
GOVDEM		0.908			0.908	
		(0.575)			(0.576)	
GOVDO		0.537			0.537	
		(0.630)			(0.631)	
Per capita GDP (in thousand $)	-0.0536	-0.0572	-0.0409	-0.0536	-0.0572	-0.0409
	(0.0630)	(0.0663)	(0.0706)	(0.0631)	(0.0664)	(0.0707)
Constant	3.198	3.160	5.671	4.458	4.575	5.984
	(6.381)	(6.425)	(5.954)	(6.103)	(6.109)	(5.772)
Observations	327	327	327	328	328	328
R-squared	0.850	0.851	0.856	0.851	0.852	0.857
Adjusted R-squared	0.751	0.751	0.755	0.751	0.751	0.755

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 5: Observed and Estimated Life Satisfaction over the years

Year of Survey

● Observations ——— Estimated Line
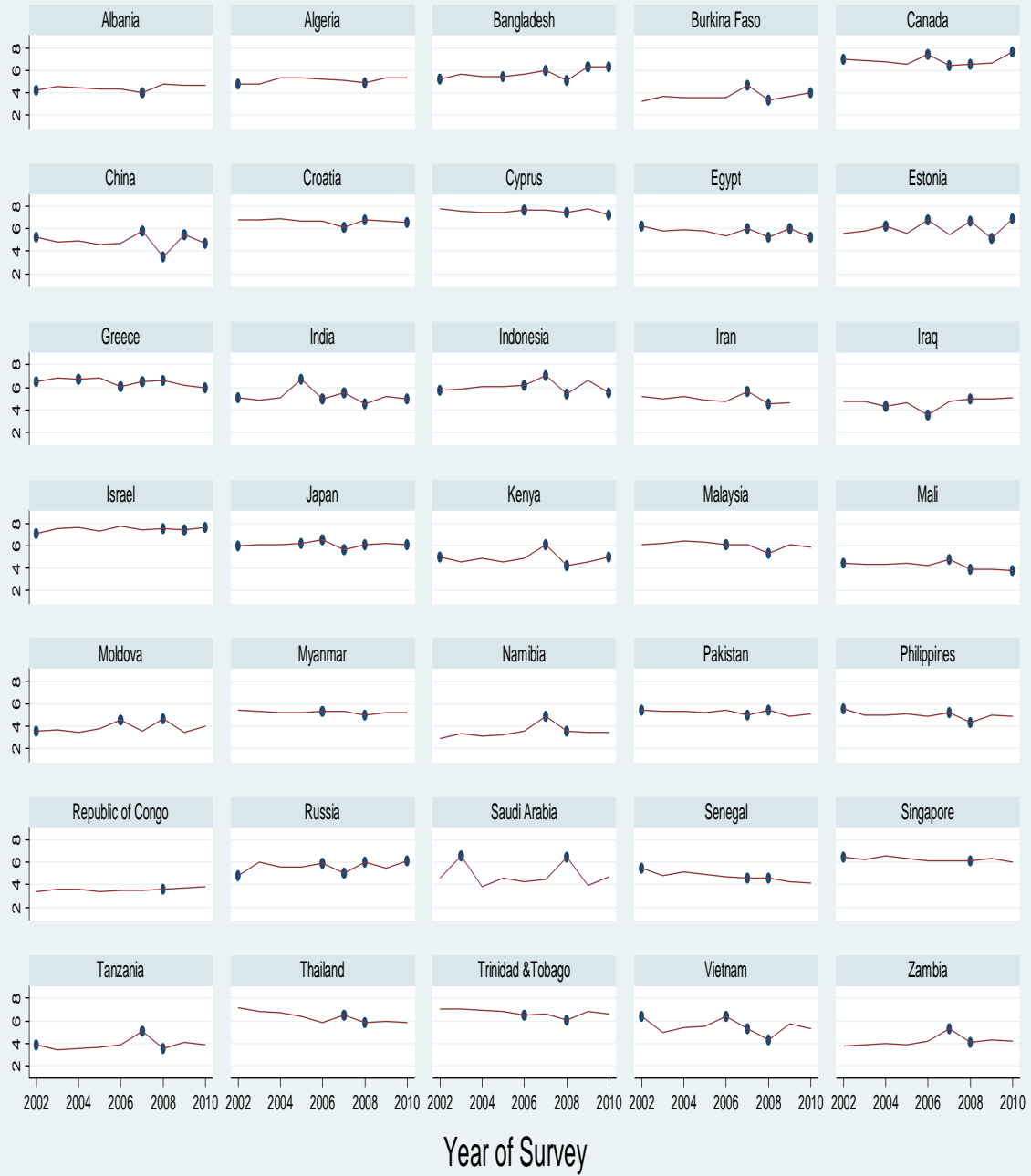
Graphs by Country of Interest

Table 7: Average Observed and Estimated Life Satisfaction

	Average Life Satisfaction scores				
Country of Interest	Observed	Estimated	Country of Interest	Observed	Estimated
Afghanistan	3.30	3.49	Macedonia	4.70	4.58
Argentina	5.71	5.71	Madagascar	4.50	4.62
Australia	7.90	7.90	Mali	4.24	4.13
Austria	7.30	7.47	Mexico	6.39	6.39
Bangladesh	5.74	5.76	Mongolia	3.90	4.04
Belarus	5.30	5.32	Morocco	5.10	5.20
Belgium	7.73	7.49	Mozambique	3.90	3.82
Benin	3.80	3.68	Myanmar	5.15	5.30
Bolivia	5.45	5.45	Nepal	3.90	3.71
Bosnia	4.40	4.50	Netherlands	7.72	7.72
Brazil	5.64	5.64	New Zealand	7.07	6.95
Bulgaria	4.98	5.12	Nicaragua	5.80	5.70
Cambodia	3.50	3.51	Niger	3.95	3.86
Cameroon	4.40	4.37	Pakistan	5.32	5.31
Chile	5.77	5.81	Panama	6.62	6.62
China	4.96	4.76	Paraguay	5.82	5.63
Colombia	6.44	6.35	Peru	5.39	5.39
Costa Rica	6.95	6.99	Philippines	5.10	5.00
Cuba	5.40	5.45	Poland	6.64	6.61
Cyprus	7.48	7.67	Portugal	6.56	6.65
Czech Republic	6.45	6.28	Republic of Congo	3.60	3.57
Denmark	8.32	8.34	Republic of Korea	5.78	5.72
Dominican Republic	5.89	5.90	Romania	5.11	4.93
Ecuador	5.24	5.12	Russia	5.58	5.63
Egypt	5.76	5.62	Sierra Leone	3.40	3.16
El Salvador	5.96	5.80	Singapore	6.36	6.28
Ethiopia	4.40	4.32	Slovakia	6.27	6.45
Georgia	4.06	4.05	Slovenia	7.06	6.89
Germany	7.01	7.01	South Africa	5.25	5.13
Greece	6.42	6.64	Spain	6.93	6.84
Guatemala	6.33	6.33	Sri Lanka	3.60	3.70
Guyana	5.85	5.82	Sudan	3.50	3.53
Honduras	5.97	5.97	Sweden	7.87	7.77
Hong Kong	5.62	5.53	Switzerland	7.83	7.71
Hungary	6.26	6.06	Syria	5.30	5.33
Iceland	6.80	6.95	Thailand	6.14	6.31
Indonesia	5.98	6.16	Togo	3.20	2.97
Iran	5.07	4.84	Turkey	5.42	5.28
Israel	7.42	7.47	Ukraine	5.50	5.63
Italy	6.52	6.66	United Kingdom	7.00	6.89
Jamaica	5.20	5.04	United States	7.05	7.00
Japan	6.11	6.14	Uruguay	5.70	5.69
Laos	3.90	3.72	Venezuela	6.53	6.44
Latvia	4.80	4.98	Vietnam	5.58	5.37
Lithuania	5.40	5.65	Yemen	4.90	4.90

a social stress variable on a 1-7 scale derived from a set of 10 questions asked in the SCQ (the ten items provide a measure of social support and comprises of seven items from Henderson et al. (1978) and three items from Marshall and Barnett (1993), see Appendix 1b of the User Manual for details), where 1 means the individual has "social support" while 7 means lack of "social support" or that the individual is socially stressed. We also control for relative income status (where the peer group is defined on gender, employment status, state of residence and the year of survey), naturalization/citizenship status, a dummy indicating whether the individual has a resident school going child in the 5-14 age group, and whether the country of highest education is Australia.

7.4.2 Variables used to determine the degree of assimilation:

English language proficiency, years in Australia and age at arrival from the date of arrival, social stress, relative income status, naturalization/citizenship status, a dummy for whether the individual has a resident school going child in the 5-14 age group, and whether the country of highest education is Australia. In addition to these variables, we also include the "intermarriage" variable in table 2, a dichotomous variable that captures whether the individual's partner is from a different country of birth, a different religion (where religion is broadly defined: Buddhism, Catholic, Anglican, Protestant, Baptist, Orthodox, Hinduism, Islam, Judaism, etc) and the length of intermarriage to someone from a different country of birth.

Table 8: Non-linear Regression estimates for Life Satisfaction without imputation

Independent variables	Dependent variable: Life satisfaction				
Personal characteristics					
Constant	6.213***	0.766	0.0325	0.965	-0.211
Age	-0.0542***	-0.0503**	-0.0377*	-0.0466**	-0.0437*
Age squared/100	0.0695***	0.0694***	0.0546***	0.0546***	0.0518***
Male dummy	-0.0671***	-0.0687***	0.0396***	0.0402***	0.0365***
Completed Year 12	-0.195***	-0.187***	-0.203***	-0.203***	-0.201***
Ln of Household Income (in thousand)	0.0691***	0.0692***	0.0367***	0.0160	0.0162
Number of Children	-0.0209***	-0.0160***	-0.0108***	-0.00970**	-0.00340
Married dummy	0.340***	0.343***	0.275***	0.276***	0.291***
Divorced dummy	0.0524**	0.0491**	0.0449**	0.0453**	0.0476**
Employed dummy	-0.0854***	-0.0880***	-0.110***	-0.0963***	-0.0985***
Unemployed dummy	-0.331***	-0.329***	-0.251***	-0.251***	-0.253***
Own house dummy	0.120***	0.117***	0.0951***	0.0950***	0.0971***
Health Status	0.529***	0.527***	0.399***	0.399***	0.400***
English language proficiency		0.0725*	0.0529	0.0186	0.00687
Years in Australia		-0.00395	-0.00361	0.00530	0.00445
Age at Arrival		-0.000656	-0.000218	0.00876	0.00841
Social stress			-0.443***	-0.442***	-0.440***
Relative Income Status				0.0191**	0.0186**
Naturalization				0.0466*	0.0428*
School going age kid dummy					-0.0949***
Highest education in Australia dummy					0.0898***
Primary Characteristics to Assess Immigrant Assimilation					
Measure of Spillover Effect		0.677***	0.985***	0.890***	1.025***
Constant		7.212***	6.028***	2.946***	1.984***
Marginal Effects for Immigrant Assimilation to Australia*					
English language proficiency		1.377	0.850	1.227*	1.170**
Years in Australia		0.046	0.021	0.014	0.007
Age at Arrival		-0.140***	-0.084***	-0.053***	-0.030***
Social stress			-0.068	-0.035	-0.066
Relative Income Status				0.740**	0.523**
Naturalization				0.309	0.418
School going age kid dummy					0.608
Highest education in Australia dummy					-0.273
No of observations	85927	85927	85927	85927	85927
Adjusted R squared	0.166	0.167	0.250	0.251	0.251

*Marginal effects for assimilation to Australia are multiplied by 100

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Non-linear Regression estimates for Life Satisfaction

	Dependent variable: Life satisfaction			
Independent variables	Ordinary Non-linear Regressions			
Primary Characteristics to Assess Immigrant Assimilation				
Measure of Spillover Effect	0.842***	1.072***	0.972***	1.099***
Constant	-3.020***	-4.094***	-3.433***	-3.345***
English language proficiency	-0.254	-0.126	-0.404	-0.582
Years in Australia	-0.0121	-0.00844	-0.0131	-0.0133
Age at Arrival	0.0371***	0.0368***	0.0347***	0.0296***
Social stress		0.220**	0.240**	0.249**
Relative Income Status			-0.560**	-0.626**
Naturalization			-0.0548	-0.169
School going kid dummy				-0.769**
Highest education in Australia dummy				0.219
No of observations	92402	92402	92402	92402
Adjusted R squared	0.169	0.252	0.252	0.252

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Non-linear Regression estimates for Life Satisfaction with marriage behaviour

Ordinary Non-linear Regressions with Life Satisfaction as the Dependent variable			
Personal characteristics	Inter-country	Inter-religion	Length of Inter-country
Intermarriage	-0.0845***	-0.0524***	-0.00272***
Primary Characteristics to Assess Immigrant Assimilation			
Measure of Spillover Effect	1.203***	1.166***	1.227***
Constant	-2.263***	-3.026***	-2.125***
English language proficiency	-0.634*	-0.643	-0.718*
Years in Australia	-0.0019	-0.00996	0.00671
Age at Arrival	0.00872	0.0204**	-0.0112
Social stress	0.416***	0.399***	0.524***
Relative Income Status	-1.490***	-1.007***	-1.734***
Naturalization	-0.262	-0.206	-0.318
School going kid dummy	-0.893**	-0.856**	-1.092**
Highest education in Australia dummy	-0.207	0.0059	-0.340
Intermarriage	-1.494***	-0.275	-0.188*
Number of observations	62463	62182	62463
Adjusted R squared	0.238	0.237	0.238

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Fixed Effect estimates for Life satisfaction

	Dependent variable: Life Satisfaction			
Independent Variables	Fixed Effect Estimates			
Primary Characteristics to Assess Immigrant Assimilation				
Measure of Spillover Effect		0.837***	0.836***	0.825***
Constant		-2.224**	-0.604	-0.522
Years in Australia		0.0253	0.0135	0.0139
Social stress		-0.900	-0.892*	-0.944*
Relative Income Status			-1.788*	-1.719*
Naturalization				-0.248
No of observations	74288	74288	74288	74288
Adjusted R squared	0.020	0.034	0.034	0.034

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1