

Alma Mater Studiorum Università di Bologna
Archivio istituzionale della ricerca

Out of sight but not out of mind: Home countries' macroeconomic volatilities and immigrants' mental health

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Nguyen, H.T., Connelly, L.B. (2018). Out of sight but not out of mind: Home countries' macroeconomic volatilities and immigrants' mental health. HEALTH ECONOMICS, 27(1), 189-208 [10.1002/hec.3532].

Availability:

This version is available at: <https://hdl.handle.net/11585/610899> since: 2022-02-28

Published:

DOI: <http://doi.org/10.1002/hec.3532>

Terms of use:

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>).
When citing, please refer to the published version.

(Article begins on next page)

This is the final peer-reviewed accepted manuscript of:

Nguyen H and Connelly LB (2018) Out of Sight But Not Out of Mind: Home Countries' Macroeconomic Volatilities and Immigrants' Mental Health, *Health Economics*, 27:189-208.

The final published version is available online at: DOI: 10.1002/hec.3532

Rights / License:

The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>)

When citing, please refer to the published version.

Out of sight but not out of mind: Home countries' macroeconomic volatilities and immigrants' mental health

Ha Trong Nguyen*

Curtin University, Bankwest Curtin Economics
Centre

Luke Brian Connelly

The University of Queensland, Centre for
the Business and Economics of Health

We provide the first empirical evidence that better economic performances by immigrants' countries of origin, as measured by lower CPI or higher GDP, improve immigrants' mental health. We use an econometrically-robust approach that exploits exogenous changes in macroeconomic conditions across immigrants' home countries over time and controls for immigrants' observable and unobservable characteristics. The CPI effect is statistically significant and sizeable. Furthermore, the CPI effect diminishes as the time since emigrating increases. By contrast, home countries' unemployment rates and exchange rate fluctuations have no impact on immigrants' mental health.

Key words: GDP, unemployment, inflation, exchange rate, health, immigrants, Australia.

JEL classification: I12, J15.

* Corresponding author: Bankwest Curtin Economics Centre | Curtin Business School | Curtin University | Tel:+61 8 9266 5711 | Fax:+61 8 9266 2373 | Postal: GPO Box U1987, Perth WA 6845, Australia | Email: ha.nguyen@curtin.edu.au.

Acknowledgements: We thank the Editor and two anonymous referees for their suggestions. This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute. Any errors are the responsibility of the authors.

1. Introduction

Since the seminal work of Ruhm (2000) on the relationship between macroeconomic conditions and health, there has been a large literature devoted to studying the subject. The recent Global Financial Crisis has ignited a new wave of research on the subject (McInerney *et al.*, 2013; Cotti *et al.*, 2014; French and Gumus, 2014; Frijters *et al.*, 2015). While a variety of empirical approaches and findings have been reported, it is now well-established that macroeconomic conditions in the place where people live do have an impact on their health (Ruhm, 2000; Ruhm and Black, 2002; Ruhm, 2005; McInerney *et al.*, 2013; Ruhm, 2015). However, little is known about how - and to what extent - macroeconomic fluctuations in the place where people do not live but are, in some way, connected to, can affect their health. This paper contributes to the existing body of economic literature by exploring the impact of macroeconomic conditions in the country of emigration on mental health of international immigrants. While the topic is important to understand factors that contribute to individuals' mental health as well as the assimilation of immigrants, there has been no empirical evidence on this specific subject to date.

Theoretical considerations suggest that an improvement of macroeconomic conditions in emigrating countries may have an impact on the mental health of immigrants, they do not give a clear prediction on the expected direction of the impact. On the one hand, an improvement in macroeconomic conditions in home countries can increase the mental health of immigrants who are emotionally- or altruistically- linked with their homes (Becker, 1974; Schwarze and Winkelmann, 2011). Immigrants, on the other hand, may feel worse off if they view home countries as a natural point of comparison, and feel that the benefits they receive from migration are reduced when their home countries' economies strengthen (Stark and Taylor, 1991; Ferrer-i-Carbonell, 2005; Luttmer, 2005). The combination of these opposite forces leaves the impact of macroeconomic fluctuations in home countries on immigrants' mental health an empirical matter.

This paper contributes to the literature by providing the first empirical evidence from a large Australian household panel. Australia is an interesting study case for three reasons. First, Australia has the third largest share of residents born overseas (OECD, 2013). Second, Australian immigrants come from almost all continents (DIBP, 2014). The diversity of Australian immigrants thus allows us to study immigrants from a sizable number of countries of origin with wide-ranging sources of macroeconomic fluctuations. Third, the Household

Income and Labour Dynamics in Australia (HILDA) is an annually nationally representative dataset covering a large number of immigrants surveyed consecutively for up to 14 years. This dataset also provides us with various reliable mental health measures, as well as detailed individual and household information, which make this research in macroeconomic fluctuations and mental health possible.

With this high quality household panel, we are able to make two contributions to the existing literature. First, in the literature to date, this is the only study to examine the impact of macroeconomic conditions in home countries on mental health of immigrants. Second, to our knowledge, this is also the first paper to consider the impact of exchange rate fluctuations on mental health.

We provide the first robust evidence that improvements in home countries' macroeconomic conditions (as measured by a lower Consumer Price Index (CPI) or a higher Gross Domestic Product (GDP) per capita) increase the mental health of immigrants. We achieved this by exploiting exogenous changes in macroeconomic conditions across 62 home countries over 14 years as a source of identification and controlling for immigrants' observable and unobservable characteristics. The CPI effect is highly statistically significant and quite large in size. Additionally we show that, consistent with the disintegration theory, the CPI effect does decline as the time since emigrating increases. However, we do not find any significant impact of home countries' unemployment rates or exchange rates on immigrants' mental health.

The paper proceeds as follows. Section 2 briefly reviews related literature. Section 3 describes the data and Section 4 presents our econometric models. Section 5 discusses empirical results, while Section 6 reports results from several robustness checks. Section 7 presents heterogeneous macroeconomic effects and Section 8 concludes the paper.

2. Literature review

The content of this paper is germane to three existing strands of literature. The first strand of literature, which is now well-developed, is devoted to examining the relationship between business cycles or macroeconomic conditions and health. Some studies have found that recessions are associated with better health outcomes and behaviours (Ruhm, 2000, 2003; Dehejia and Lleras-Muney, 2004; Ruhm, 2005; Böckerman *et al.*, 2007; Charles and DeCicca, 2008; Ásgeirsdóttir *et al.*, 2014; French and Gumus, 2014). Most recent studies, though, have documented a weak relationship between macroeconomic conditions and health

(Tekin *et al.*, 2013; Ruhm, 2015) or an inverse relationship: worse health outcomes have been observed at times of less favourable macroeconomic conditions (McInerney *et al.*, 2013; Cotti *et al.*, 2014; French and Gumus, 2014; Currie *et al.*, 2015; Frijters *et al.*, 2015).

The second strand of literature provides quite rich empirical evidence on the impact of macroeconomic fluctuations in the environment where individuals live on their well-being. For instance, studies have constantly found that inflation and unemployment have a negative impact on well-being (Frey and Stutzer, 2000; Di Tella *et al.*, 2001; Graham and Pettinato, 2001; Di Tella *et al.*, 2003; Wolfers, 2003; Alesina *et al.*, 2004; Welsch, 2007; Clark *et al.*, 2010; Ochsen, 2011; Ruprah and Luengas, 2011; Welsch, 2011; Deckers *et al.*, 2013; Blanchflower *et al.*, 2014). Several studies have also shown that national GDP per capita (Di Tella *et al.*, 2003; Welsch, 2011) and GDP growth (Di Tella *et al.*, 2003; Welsch, 2007) are positively associated with individual life satisfaction.

The third, and developing, strand of literature examines the impact of macroeconomic conditions (either in the emigrating or host countries) on immigrants' decisions. For example, several studies have found that exchange rate shocks (Gordon and Spilimbergo, 1999; Yang, 2006, 2008; Nekoei, 2013; Nguyen and Duncan, 2017) have an impact on some behaviours such as migration, work and transfer of international immigrants. Furthermore, there is evidence that emigrating countries' GDP levels also affect immigrants' general wellbeing. However, that evidence is mixed: while Akay *et al.* (2016) find a negative impact among German immigrants, Nguyen and Duncan (2015) document a positive impact among Australian immigrants. To our knowledge, none of the literature to date examines the impact of home countries' macroeconomic fluctuations on different (mental) health measures.¹

This paper also examines the impact of macroeconomic conditions on health, but differs from the first two foregoing strands of literature by investigating how macroeconomic conditions in the place individuals do not live, but are related to, can affect their health. By doing so, we mitigate the roles of unobservable macroeconomic conditions in which individuals live that may have an impact on their health. In addition, we are able to observe the same individuals at different points in time, giving us an effective control for unobservable individual time invariant characteristics that most of the prior literature, using cross-sectional data from multiple countries (Di Tella *et al.*, 2001; Di Tella *et al.*, 2003; Wolfers, 2003; Welsch, 2007, 2011; Blanchflower *et al.*, 2014) or data from the same country (Charles and DeCicca, 2008;

¹ While self-reported wellbeing and mental health measures are positively correlated, the magnitude of correlations is not very high, ranging from 0.26 to 0.47, depending on the mental health measures that are used.

French and Gumus, 2014; Frijters *et al.*, 2015), could not. Furthermore, by exploiting the changes in macroeconomic conditions between the home countries and the host country over time, we are able to examine for the first time in this literature the impact of exchange rate fluctuations on mental health.²

3. Data and sample

3.1. Data

Three main data sources are used for this study. The primary data source is the Household Income and Labour Dynamics in Australia (HILDA) survey. HILDA is an annual nationally representative longitudinal survey of private households in Australia that collects a wide range of social and economic information at the individual and household level. We use the first 14 waves of data which covers a period from 2001 to 2014 for this analysis.³ The second data source for macroeconomic variables such as GDP, CPI, and unemployment rates are from the World Bank's World Development Indicators database. The third data source for historical daily exchange rates is from the Oanda website (<http://www.oanda.com>).

3.2. Macroeconomic variables

Several macroeconomic variables are used in this study. The first variable is GDP per capita which is used as a proxy for the home countries' income level. We use GDP per capita in nominal US dollar (USD) and measure it in terms of level and growth rate (%). We choose nominal GDP instead of real GDP because a previous study by Nguyen and Duncan (2015) suggests that Australian immigrants' well-being is more responsive to changes in the former than changes in the later. To gauge price volatilities in home countries we use the percentage changes in CPI. We also examine the impact of home countries' unemployment rates on immigrants' mental health by including these rates in the regressions. These macroeconomic variables are measured at a calendar year basis (i.e. from 1st January to 31st December each year).

We then take the advantage of our unique empirical approach to look at the impact of another and unexplored price measure – the price of money as represented by exchange rates. In our study, the exchange rate is measured as the number of foreign currency units per Australian

² An exception is a study by Nguyen and Duncan (2015) who examine the effects of exchange rate volatilities on general well-being of immigrants.

³ Unfortunately, we could not use the latest HILDA wave 15, which was surveyed in 2015, mainly because macroeconomic data (including CPI, GDP, and unemployment) for 2015 are not available for all countries considered. Furthermore, historical exchange rate data are only available up to October 2014.

dollar (AUD).⁴ Therefore an increase in the exchange rate is to be viewed as the appreciation of the AUD against the foreign currency. This could be also viewed as a favourable change for immigrants originating from that country, possibly because their remittances abroad thereby come at a lower cost and also because more favourable exchange rates may enable them to visit their country of origin more often, or for longer. While other macroeconomic variables are measured on a calendar year basis, exchange rates are measured over the 365 days before the survey time for each individual.⁵ We exploit the exogenous survey time and use the exact survey date to link each individual responses with the precise daily exchange rates that applied on that day. This approach is adopted in order to capture the full impact (if any) of exchange rates on mental health. We measure exchange rate fluctuations in two alternative ways: (1) the average of daily exchange rates for a full 12 months prior to the survey time, and (2) the standard deviation (SD) of daily exchange rates during the 12 months before the survey time. While exchange rates and home country's CPI are statistically significantly correlated (at the 1 % level as can be seen in Appendix Table A3), their correlation is not high (0.33). This correlation suggests that these two price measures are not the same, and as such may influence the mental health of immigrants in different ways.

3.3. *Outcomes*

Our outcome measures are based on detailed and repeated survey information that distinguishes different dimensions of mental health. Specifically, we use the 36-Item Short Form Health Survey (SF-36).⁶ The SF-36 items can be broadly classified into two subgroups: “mental health” and “physical health” (Ware *et al.*, 1994). We focus on the mental health subgroup which is constructed using 14 items. The mental health sub-group, in turn, comprises of four scales, each of them measures a particular dimension of mental wellbeing.

⁴ For example, exchange rates are measured as 18,000 Vietnam Dong (VND) per AUD. We do not use an alternative exchange rate measure (i.e. units of AUD per unit of home currency) because for some currencies (such as Indonesian Rupiah or VND), such measures result in a loss of precision.

⁵ In HILDA, the interviews are conducted annually with most of interviews occurring in September and October. In particular, 20, 50, 21, and 6 % of immigrants in our sample were interviewed in August, September, October, and November, respectively.

⁶ HILDA data are collected via a household questionnaire, person questionnaire, and a self-completion questionnaire. The SF-36 questions are asked in the self-completion questionnaire. About 90 % of surveyed individuals returned a self-completion questionnaire. HILDA started collecting the Kessler Psychological Distress Scale (K10) from wave 7 (Kessler *et al.*, 2003; Wooden, 2009). However, questions about K10 were asked biannually instead of annually as have been done for the SF-36 questions. Due to the small number of waves that have K10 scores (and hence the number of observations which can be used) and the time discontinuity of the K10 scores, we do not use this mental health measure in this paper. Our data (See Appendix Table A3) show that K10 scores and all mental health measures used in this paper, when both observed, are strongly correlated with the pairwise correlation ranges from 0.51 (for the Role Emotional scale) to 0.76 (for the Mental Health scale) and is highly statistically significant (at the 1 % level).

The first scale is the Social Functioning (SF) score constructed from two items to measure the frequency of interference with normal social activities due to emotional or physical issues. The second scale is the Vitality (VT) scale constructed using four items to measure tiredness. The third scale is the Role Emotional (RE) scale, which is composed of three items to pick up the difficulties with daily activities due to emotional problems. The fourth scale is the Mental Health (MH) score constructed from five items to measure the level of nervousness and depression. These four scales are measured between 0 and 100 with a higher score indicating a lower level of mental health issues. Together they can be summarised into an aggregate measure of mental health – the Mental Component Summary (MCS) using a standard scaling method. The MCS also ranges between 0 and 100 with higher scores indicating better mental well-being. Population norms are applied to the MCS, so that its mean value is 50 and one standard deviation is equal to 10 points (ABS, 1997).

The SF- 36 has become the most widely used health measure in clinical studies throughout the world (Ware *et al.*, 1994; Räsänen *et al.*, 2006; Francesca *et al.*, 2014). In Australia, the SF-36 measures have been also used to examine various economic issues such as the relationship between mental health and labour market outcomes (Frijters *et al.*, 2014), between local area crime and mental health for both victims and non-victims of crime (Francesca *et al.*, 2014), or between stock market fluctuations and mental health (Frijters *et al.*, 2015).

3.4. *Sample*

Because we are interested in the impact of home countries' macroeconomics volatilities on mental health of immigrants, we restrict our sample to individuals born outside Australia. We also restrict our empirical sample to countries with large enough observations and to countries with macroeconomic data available in any year.⁷ We also restrict the sample to individuals of age 15 or over simply because health outcomes for younger individuals are not observed in our data. We also exclude individuals with missing information on any variable used in our empirical model. These sample restrictions result in a sample of 33,959 individual-year observations from 5,435 unique individuals obtained over 14 years of data

⁷ Specifically, we include countries with at least 50 individual-year observations surveyed between 2001 and 2014. We exclude Taiwan because macroeconomic data for Taiwan are not available from the World Bank's database. In addition we exclude ex-Yugoslavia due to its separation before or during our study period and we cannot determine which new country the Australian immigrants actually came from. We also exclude Zimbabwe because the country experienced hyper-inflation during the study period (for example, its CPI was above 24,000 % in 2007). In Section 7, we check the robustness of our results using other alternative sample restrictions.

and immigrants from 62 countries (See Appendix Table A1 for variable description and Appendix Table A2 for summary statistics by countries).

3.5. *Summary statistics*

Australia is a country of immigrants from a wide variety of countries. Appendix Table A2 displays the distribution of countries of birth of Australian immigrants, the majority of whom come from the following countries: United Kingdom, New Zealand, the Philippines, Germany, Netherlands, Italy, South Africa, India, Vietnam, and China. The geographical diversity of Australian immigrants means that there were large differences in levels of economic development, as well as a considerable source of macroeconomic fluctuations across home countries during the study period. We also notice a considerable variation in all mental health measures across home countries and within the same countries. These large fluctuations in the macroeconomic conditions and mental health measures within countries over time validate our empirical strategy of exploiting the changes in macroeconomic conditions across home countries over time to identify the causal impact of macroeconomic conditions on immigrants' mental health.

Appendix Table A3 reports the correlation among home countries' macroeconomic indicators and immigrants' mental health measures. As expected, macroeconomic indicators are highly correlated: their correlations are all statistically significant at the 1 % level. In the same vein, all mental health measures are strongly correlated as demonstrated by the fact that their pairwise correlation coefficients are high, ranging from 0.49 to 0.83, and statistically significant at the 1 % level. The immigrants' home countries' macroeconomic indicators and immigrants' mental health measures are also strongly correlated. More detailed information on the summary statistics and correlation structure of the main variables can be found in Appendix Tables A2 and A3.

4. *Empirical methodology*

4.1. *Econometric models*

We first estimate the mental well-being index Y of immigrant i from home country c at time t as follows:

$$Y_{cti} = \alpha_c + \alpha_t + \alpha_{ct} + X_{cti}\beta + Z_{ct}\gamma + \varepsilon_{cti} \quad (1)$$

In equation (1), X is a vector of individual time-variant characteristics; Z is a vector of macroeconomic variables; and ε_{cti} represents an idiosyncratic error term. Equation (1)

includes home country fixed effects (α_c) to remove time-invariant heterogeneity in immigrants' home countries. Equation (1) additionally includes time fixed effects (α_t) to control for any shock that are the same for all countries each year. Since macroeconomic variables are highly correlated intertemporally across countries, we also include country-specific time trend (α_{ct}) to capture any different time trend in mental health by country. In equation (1) the impact of a macroeconomic variable on immigrants' mental health is captured by γ which, in turn, is identified from changes in that macroeconomic variable (say, CPI) across home countries over time. We apply equation (1) to a pooled sample of all immigrants and name results from these regressions as "pooled" results. We then exploit the panel nature of our data to include individual fixed effects (α_i) in the equation (1) to estimate the following regression:

$$Y_{cti} = \alpha_t + \alpha_i + X_{cti}\beta + Z_{ct}\gamma + \varepsilon_{cti} \quad (2)$$

Equation (2) is our preferred specification because it controls not only for time and country fixed effects, but also for time invariant unobservable individual characteristics (such as ability, neuroticism, optimism, or culture). While home countries' macroeconomic variables are reasonably considered as exogenous to immigrants' behaviours, controlling for individual fixed effects is preferred to derive unbiased parameter estimates for two reasons. First, it is understood from the existing literature that individuals may have different scales of reference in answering the same question on the assessment of their health status (Groot, 2000; Bertrand and Mullainathan, 2001; Crossley and Kennedy, 2002; Powdthavee and van den Berg, 2011). As such, controlling for time invariant unobservable individual characteristics helps reduce any scale-of-reference bias. Second, controlling for time-invariant unobservable individual characteristics also helps mitigate against the possible endogeneity of some common explanatory variables such as the marital status⁸ or the duration of stay in Australia in the mental health equations. We name the regression results obtained from regression equation (2) "Fixed Effects" (FE) results.

4.2. Other explanatory variables

Other explanatory variables include gender, age (and age-squared), duration of stay in Australia (and its square), education, English Speaking Background (ESB),⁹ marital status of the individual immigrants, and the number of other household members at various age

⁸ We also experimented with excluding marital status from all regressions and found results largely unchanged.

⁹ ESB countries include the United Kingdom (UK), New Zealand, Canada, USA, Ireland and South Africa. Note that time invariant variables such as gender or ESB will be dropped in FE regressions.

cohorts. We deliberately exclude some economic variables that could reasonably be influenced by home countries' macroeconomic fluctuations such as own employment status or household income (Nekoei, 2013; Nguyen and Duncan, 2017). We also control for differences in socio-economic conditions across regions by including the regional unemployment rates, regional relative socio-economic advantage index, metropolitan dummy, and state dummies¹⁰ in all equations. In addition, we control for the heterogeneity in the time of the survey's conduct by controlling for year and month fixed effects. To capture the assimilation profile of the immigrants (Borjas, 1999), in regression (1), we also include dummy variables for various groups of immigrants with time of arrival in five-year-bands.¹¹

Macroeconomic variables such as GDP per capita, unemployment rates and exchange rates are introduced in a log form to capture any non-linear effects. The coefficient estimates of these variables can thus be interpreted as changes in mental health scales with respect to percentage changes in any of the above mentioned macroeconomic variables. However, other macroeconomic variables such as GDP growth rates or CPI entail non-positive values so they cannot be included in a log form. We use the Ordinary Least Squares (OLS) method to estimate all equations. Due to the panel nature of our data, standard errors are clustered by individual.

5. Empirical results

5.1. *Home countries' CPI and immigrants' mental health*

The first 10 columns of Table 1 present regression results on CPI impacts for each of the five mental health measures using each of the foregoing specifications.¹² The first row of Table 1 shows effects of current CPI from pooled and FE specifications. The pooled results suggest that CPI has a negative effect on all five mental health measures and this effect is statistically insignificant. The pooled estimates are, however, likely to be biased for the reasons explained

¹⁰ The inclusion of state/territory dummies also accounts for possible internal migration patterns. Our data show that about 10 % of immigrants moved interstate each year.

¹¹ All variables representing time since arrival in Australia are not identified in regression (2) since this model has already included other three time-dimension variables (i.e. immigrant's age, year dummies, and individual FE). It is also noteworthy that our FE models which control for individual-specific heterogeneity associated with arrival cohorts also capture cohort-specific unobserved characteristics affecting immigrant's outcomes.

¹² To measure price fluctuations in home countries, we also experimented with GDP deflator data. While the CPI and the GDP deflator are highly correlated (in our data, their correlation coefficient is 0.87 and statistically significant at the 1 % level) each of them may represent a different aspect of the home country's price fluctuations. Results from this experiment (reported in Appendix Table A5) show no statistically significant impact of GDP deflator on mental health of immigrants.

in Section 4.1.¹³ Turning to the FE results, we observe that, with the exception of the Role Emotional scale, an increase in home country's CPI has a negative and highly statistically significant (at least at the 5 % level) effect on all mental health measures we consider here. For example, the FE estimate for the Mental Component Summary (MCS) score indicates that an increase of 1 % in home country's CPI is associated with a 0.04 points lower MCS for immigrants originating from that country and this impact is statistically significant at the 5 % level. Furthermore, the CPI effects are greater (i.e. more negative) and more statistically significant (at the 1 % level) for three mental health scales that make up the MCS. For example, an increase of 1 % in home country's CPI is found to reduce immigrants' Vitality scale by 0.13 points. On the contrary, a negative and statistically insignificant impact of CPI on the Role Emotional scale suggests that immigrants whose countries experience an increase in CPI can still perform normal social activities without interference due to emotional problems. This CPI impact on the Role Emotional scale also explains the lower and less statistically significant CPI impact on the summary scale MCS observed earlier. Variations between the CPI effects on different mental health sub-scales suggest that different dimensions of mental health are affected differentially by macroeconomic conditions. It is interesting to note that the pattern of CPI impacts found in this paper is very similar to that of victimization impacts in an Australian study by Francesca *et al.* (2014). In particular, the authors report that to have been a victim of a violent crime is associated with a deterioration of all mental health measures except the Role Emotional scale, and the observed impact is lowest (i.e. less negative) on the MCS as a result of their aggregation in this summary measure of mental health.

[Table 1 around here]

¹³ Indeed, F test statistics (reported at the bottom in Appendix Table A4) confirm that FE models are preferred to pooled models for all mental health outcomes. FE results for other variables (reported in Appendix Table A4) show that the impact of other commonly controlled variables like age and marital status is largely similar to that reported in other studies (e.g. age has a U-shape impact on all mental health measures and individuals represent a higher level of mental health when being together with their spouse/partner). Local unemployment rates are found to have no impact on all mental health measures while an improvement in local socio-economic indicators increases the migrants' Social Functioning scale (FE results in columns 7 and 8). Results from Appendix Table A4 also highlight the importance of controlling for individual unobserved characteristics as demonstrated by noticeable changes in both the magnitude and statistical significance of estimates of some variables such as age, marital status, education, or regional factors from pooled to FE regressions. We also note that the inclusion of macroeconomic variables basically does not affect the signs, magnitudes or statistical significance of any individual characteristic variables in either the pooled or FE regressions.

To account for the dynamics of the CPI effects and to check robustness of our results, we introduce lagged CPI measures to the equation (2).¹⁴ Estimates for different lags of CPI, reported in rows 2 and 3 in Table 1, suggest that CPI fluctuations have an immediate impact on all mental health outcomes because most of the parameter estimates on lagged CPI values are not statistically significant. Specifically, only CPI in the year prior to the survey time (the second row) has a less statistically (at the 5 % level) significant effect on the Vitality scale. In addition, the estimated coefficient for the Vitality scale drops from -0.13 to -0.08. The lack of a statistically significant impact of lags of CPI on mental health may be explained by the adaptation effects as found in the literature (Wilson and Gilbert, 2008; Frijters *et al.*, 2011).

Table 1 also includes two placebo tests that provide additional support for the finding that these results are not simply statistical artefacts, i.e. that the home country's CPI indeed affects immigrants' mental health. First, if the home country's CPI has an impact on mental health, we would not expect CPI in the future to affect an immigrant's mental health today. This is shown in rows 4 and 5 of Table 1 where the FE estimates of future CPI are not statistically different from zero. Second, although we expect the CPI fluctuations in home countries will affect mental health, we do not expect them to affect physical health in any significant way. This appears to be true in columns 11 and 12 in Table 1, where CPI has no statistically significant impact on the immigrants' two physical functioning scales, which are also extracted from the SF-36 questionnaire.¹⁵

We also examine whether introducing other macroeconomic variables together with the CPI measure in regression (2) affects our findings. Regression results (rows 6 to 9 in Table 1) demonstrate that the incorporation of GDP (whether specified in levels or as GDP growth), unemployment rates, and exchange rates in the specification does not affect our earlier findings in any noteworthy way. These results suggest that CPI does indeed matter and its effects are not removed by the inclusion of other macroeconomic variables, including exchange rates, in the regressions.

¹⁴ Because macroeconomic variables are highly correlated both temporally and inter-temporally, to get a separate impact of each macroeconomic variable, we include each macroeconomic variable or its lags separately.

¹⁵ These two physical health scales are also measured between 0 and 100 with a higher score indicating better physical health. We do not include two other measures of physical health "bodily pain" and "general health" and a Physical Component Summary (PCS) in the placebo test because they are correlated with mental health measures.

5.2. Interpretation of the magnitudes of the CPI effects

To obtain a sense of the magnitude of the CPI effects, we compare them to the effects of other events that may reasonably be expected to worsen mental health and that may also be reasonably considered as exogenous in the mental health equations. Specifically, we introduce indicators for two adverse events into equation (2): the death of a close friend and the serious injury or illness of a family member in the year prior to the survey time.¹⁶ These two events may have taken place randomly to the individual immigrants so their estimates from equation (2) are unbiased (Frijters *et al.*, 2014; Nguyen and Connelly, 2014; Le and Nguyen, 2017b, a). The results of this exercise (reported in Table 2) show the well-determined CPI impact: it is negative and statistically significant for all mental health measures, except the Social Functioning and Role Emotional scales. By contrast, the death of a close friend has no statistically significant impact on any mental health measures of immigrants in our sample.¹⁷ These results together suggest that an increase in the home country's CPI actually has more detrimental effect on immigrants' mental health, on average, than does the death of a close friend.

[Table 2 around here]

Unlike the death of a close friend, the serious injury/illness to a family member has a negative and highly statistically significant (at the 1 % level) effect on all mental health measures. In particular, serious injury/illness of a family member is associated with 1.15 points lower in MCS. If the home country CPI increases by one standard deviation per year (equivalent to 3.61 % per year as can be seen in Appendix Table A2), the impact of this annual increase in CPI would bring the impact of CPI to about 16 % of the impact of the serious injury/illness to family member on MCS. In the same vein, our estimates (the last row in Table 2) suggest that an increase of CPI by 3.61 % per year would have a detrimental impact on the Vitality and Mental Health scales equivalent to about 31 % of the impact of the serious injury/illness to a family member. Thus, the CPI effects are quite substantial in size given that a serious injury/illness to family member is considered to have a more direct effect on the immigrants' mental health than their home country's CPI.

¹⁶ Information about these events is provided in the self-completed questionnaire. Due to missing data, we lose about 10 % of our original sample. These two events are quite frequent in our data with precisely 11 (15) % of immigrants reporting the death of a close friend (the serious injury or illness of a family member).

¹⁷ In contrast, Frijters *et al.* (2014) find a negative and statistically significant impact of a death of a close friend on a mental health measure of Australians. Differences in the construction of mental health measures (their mental health measure consists of 9 items while ours contains 5 items) and samples (they use the sample of all Australians while we focus on Australian immigrants) may explain the differences between our findings.

Having established that their home country's CPI is negatively associated with immigrants' mental health, we turn to other macroeconomic variables to investigate whether they have any impact on immigrants' mental health.

5.3. *Effects of exchange rates on immigrants' mental health*

Next we examine the impact of another price measure, exchange rates, on immigrants' mental health. We first examine the impact when exchange rate is measured by the mean of daily exchange rates observed over the 12 months prior to the survey time (See Table 3a).¹⁸ Both pooled and FE results (reported in the first row of Table 3a) suggest that none of the mental health measures of immigrants in our sample are affected by exchange rate fluctuations that take place one year prior to the survey time. We also observe that exchange rate fluctuations have no long term impacts on immigrants' mental health as all estimates of lagged exchange rates are statistically insignificant (rows 2 and 3 in Table 3a) for all mental health measures. We observe that including other macroeconomic variables (rows 6 to 9 in Table 3a), in addition to the existing exchange rate variable in the regressions, also does not change the results in any significant way. Estimates of two physical health scales (results are reported in columns 11 and 12)—also suggest that exchange rate fluctuations also do not affect immigrants' physical health.

[Table 3a and 3b around here]

Table 3b reports the results when exchange rate fluctuations are measured by the standard deviation of daily exchange rates during the 12 months prior to the survey time. Pooled and FE results (reported on the first row of Table 3b) point to a statistically insignificant effect of current exchange rate fluctuations (as measured by higher S.D.) on all mental health measures. Turning to the dynamics of the impact, only estimates for lagged fluctuations of exchange rates on the Vitality scale are found negative and marginally statistically significant (at the 10 % level). These estimates suggest that greater fluctuations in exchange rates in the previous years would worsen some current year Vitality of immigrants. Other results from Table 3b indicate that our finding of an insignificant exchange rate impact is robust to several robustness checks as we outlined above. Unexpectedly, the FE estimates of the 2-year advance S.D. of exchange rates on the MCS and Vitality scale are positive and marginally statistically significant (at the 10 % level).

¹⁸ We also experimented with other time windows such as a week, a fortnight, a month and 6 months prior to the survey time and found largely similar results presented here.

5.4. *Effects of home country's GDP on immigrants' mental health*

Table 4a turns our attention to the impact of home country's GDP per capita level.¹⁹ Pooled results (reported in the first row of Table 4a) suggest a positive but statistically insignificant GDP effect. FE results while maintain the sign of the effect on all mental health measures (with the Role Emotional scale as an exception as its sign reverses) indicate that GDP has a marginally statistically (at the 10 % level) significant effect on the Mental Health scale only. The FE estimate for current GDP suggests that an increase of 1 % in home country's GDP²⁰ is associated with an increase by 1.07 points in immigrants' Mental Health scale. Turning to the dynamics of the GDP effect, the estimates from Table 4a (rows 2 and 3) suggest that previous GDP has no significant impact on current mental health.. We also observe that estimates for all mental health measures are largely unchanged when we include other macroeconomic variables (rows 5 to 9 in Table 4a) in the regressions. An exception is that the GDP estimate for the Mental Health scale is no longer statistically significant when we further control for CPI or exchange rates in the regressions. Results in the last two columns of Table 4a additionally suggest that home country's GDP volatility has no impact on physical health of immigrants.

[Table 4a and 4b around here]

Consistent with the estimates of GDP levels, estimates for GDP growth (results are reported in Table 4b) also point to an insignificant impact of this GDP measure since its estimates are all statistically insignificant.

5.5. *Effects of home country's unemployment rates on immigrants' mental health*

Finally, we examine the effect of the home country's unemployment rates on immigrants' mental health (Table 5). Pooled estimates (the first row in odd columns from 1 to 10) suggest a negative and statistically significant (at least at the 10 % level) effect of the home country's unemployment rates on MCS and its two sub-scales – Vitality and Mental Health. By contrast, FE estimates point to a statistically insignificant effect of unemployment rates on all mental health measures. FE estimates also show that none of the mental health measures for immigrants are statistically significantly affected by 1-year and 2-year lags or the future of

¹⁹ Unreported results using the level (and growth) of real GDP per capita show no statistically significant effects of these macroeconomic variables on all health outcomes. Results are available upon request. Results using Gross National Income (GNI) per capita to represent the home countries' income also show similar patterns (See Appendix Table A6).

²⁰ Note that as indicated in Section 4, GDP is included in a log form so its estimate can be interpreted as percentage changes in GDP.

their home countries' unemployment rates (rows 2 to 5). Similarly, FE results suggest our finding of no statistically significant impact of unemployment rates is robust to the inclusion of GDP per capita levels, GDP per capita growth rates, CPI and exchange rates (rows 6 to 9). The results in columns 11 and 12 of Table 5 also indicate that the physical health of immigrants is not affected by fluctuations in their home country's unemployment rates either.

[Table 5 around here]

In summary, above we found that the home country's CPI has a strong negative effect on immigrants' mental health and a (mild) positive effect of GDP on immigrants' mental health. These results indicate that better economic performances in home countries improve Australian immigrants' mental health. These findings are also consistent with the view that Australian immigrants may be linked to their home countries altruistically or emotionally. They are also in line with a possible explanation that Australian immigrants may view an improvement in their home countries' macroeconomic performances as an improvement in national prestige (Di Tella *et al.*, 2001; Di Tella *et al.*, 2003). Another possible channel thorough which home countries' macroeconomic conditions may influence immigrants' mental health is their general well-being. This is consistent with the findings from the work by Nguyen and Duncan (2015) in which immigrants feel happier when their home countries' economies perform better.²¹ Therefore, our findings when viewed together with a finding in the work by Nguyen and Duncan (2015) suggest that better performances of immigrants' home countries economies improve both the general wellbeing and mental health of Australian immigrants. These findings appear encouraging for home countries that are increasingly paying attention to encouraging their diasporas to contribute more to the development of their homelands (The Economist, 2015).

6. Robustness checks

6.1. Return immigrants

Precisely 0.9 % of immigrants in our sample moved overseas during the study period. It is possible that macroeconomic volatilities in emigrating countries influence the immigrants in our sample to return. Thus, the question arises as to whether or not panel attrition, driven by returning immigrants, leads to selectivity bias. We investigate whether attrition bias is an issue by applying Verbeek and Nijman (1992)'s method of adding a selectivity dummy to

²¹ Unfortunately, remittances are unavailable in the HILDA dataset for us to explore a possible pathway through which home countries' macroeconomic conditions may influence the immigrants' mental health.

equation (2). The selectivity dummy for individual i in year t equals 1 if an individual participates to the survey in year t and $t + 1$, whereas it takes the value of zero if that individual moves overseas (and hence is not surveyed) in year $t + 1$. A statistical insignificant coefficient on the selectivity dummy (which is tested using an F test) suggests no selectivity bias due to attrition. For all mental health measures, we fail to reject the null hypothesis of no significant selectivity (the lowest p value for the selectivity dummy is 0.146)²² and therefore may reasonably rule out that attrition bias due to return immigrants are driving the results of this study.

6.2. *Threats to individual FE identification approach*

Despite the advantages of the individual FE models of removing time-invariant unobserved characteristics, the individual FE approach cannot address reverse causality. It is very unlikely, though, that individual mental health has any effect on the macroeconomic conditions of migrants' home countries. For this reason, we do not regard the possibility of reverse causality as a threat to our identification strategy. There is, however, still the concern that our empirical models may omit some time-variant variables that are important and may also be correlated with both home country's macroeconomic conditions and immigrants' mental health. For instance, a regional macroeconomic crisis that affects both Australia and the country where its immigrants come may be one such unobservable factor. Nevertheless, recall that in all regressions we have included time fixed effects (α_t) to control for any shocks that are shared by countries in a given year. We have also controlled for local macroeconomic conditions (as represented by regional unemployment rates and socio-economic index) to address a further concern that such event may affect the immigrants' mental health via changing local macroeconomic conditions for immigrants.²³ In this section, we experiment with including the immigrants' own employment and income separately to directly control for the impact of international and Australian macroeconomic conditions on the immigrants' mental health. The results of these robustness checks (reported in Panels B, C and D of Table 6) are virtually identical to the baseline results (re-reported in Panel A in Table 6), suggesting that our findings are indeed not driven by the impact of a global phenomenon that has driven macroeconomic changes in both the immigrant's country of origin as well as Australia.

²² Full test results are available from the authors upon request.

²³ For brevity purposes, we present results from robustness checks on the impact of CPI on mental health measures. We also conducted similar robustness checks for other macroeconomic variables and found largely similar results as reported in Section 5. Results for other macroeconomic variables will be available on request.

We also address the variable omission bias concern by additionally including more variables describing such possible factors in the regressions. Previously, in our extended regressions, we included some variables representing business cycles at home countries such as GDP and unemployment rates in addition to the existing CPI variable to the regressions and found our results robust to the inclusion of such macroeconomic variables (See Section 4.1). In this section, to measure macroeconomic shocks in the immigrants' home countries, we also introduce the home country's terms of trade in the regressions, but find that the estimates are largely unchanged (See Panel E of Table 6). Furthermore, to control for weather shocks from home countries, we include a set of variables describing the frequency and magnitude of natural disasters occurring at home countries during the survey year.²⁴ These variables include the number of natural disasters, the number of people affected and the amount of damage to property, crops, and livestock occurred because the natural disasters happened during the survey year.²⁵ Results of this robustness check (reported in Panel F) suggest that our findings are largely not driven by weather shocks either. Overall, the above robustness checks confirm that CPI has an effect separate from that of other macroeconomic and weather variables, and increase the credibility of the identification strategy.

6.3. *Other robustness checks*

We also conduct several sensitivity analyses to check the robustness of our results on the impact of CPI on mental health measures. First, we determine whether the results change when UK immigrants--who represent about one third of our sample--are excluded from the regression. The results of this experiment (reported in Panel G in Table 6) are almost identical to the baseline results, suggesting that the CPI effects are not driven by UK-originating immigrants. Second, excluding immigrants from New Zealand who represent about 11% of our original sample does not change our findings either (Panel H). Third, including 137 individual-year observations from Zimbabwe in the regressions is found to remove all the impact of CPI (See Panel I). This change is consistent with the hyperinflation that occurred in that country during the study period. This result also lends support to our earlier sample choice. Fourth, using a sample of 45 countries with 100 or more year-individual observations we get results (reported in Panel L in Table 6) that are very similar to the baseline results. Fifth, we examine the robustness of our results to the recent Global Financial Crisis. Results (Panel J in Table 6) are largely unchanged after excluding the years 2008 and 2009 from our sample. Sixth, applying the regression (2) to a sample of working

²⁴ We are grateful to a referee's suggestion which leads us to further control for other time variant variables.

²⁵ These variables are achieved from the International Disaster Database (Guha-Sapir *et al.*).

age (between 24 and 64) Australian immigrants (Panel K in Table 6) does not change prior findings. Seventh, our results do not change when immigrants surveyed in the top-up sample in 2011 are excluded from our original sample (Panel M in Table 6).²⁶ Eighth, the majority (91%) of immigrants in our sample were born overseas in the same country as their mothers or fathers, suggesting that family members of Australian immigrants may not tend to scatter. As such, the country of birth of the immigrants not only reflects their origins but the possible residing locations of their family members. It is therefore not surprising to observe that the results are largely unchanged when immigrants whose country of birth is different from their parents' are excluded from the regressions (Panel O in Table 6). Finally, we experiment with clustering standard errors by the country of origin and find largely similar results (Panel P in Table 6).

[Table 6 around here]

7. Heterogeneity of CPI effects among immigrants

Above, using FE models, we found that the mental health of immigrants is negatively affected by the fluctuations in their home countries' CPI.²⁷ It may be that immigrants with different socio-economic background respond differently to CPI fluctuations. We investigate the heterogeneity of the effect by estimating the regression (2) for two sub-populations, separated by each variable of a series of variables which represent socio-economic background of the immigrants, their ties with home countries or return probabilities. We expect a larger (i.e. more negative) effect for immigrants with closer ties or a higher chance of return. Individual characteristics of immigrants include age, the duration of stay in Australia, marital status, the presence of children, education level, citizenship status²⁸, the

²⁶ We thank an anonymous referee for his or her comments which have led us to implement this robustness check. Watson (2012) notes the first 10 waves of HILDA (from 2001 to 2010) include a representative sample of immigrants permanently settling in Australia since 2001. Newly immigrants are under-representative in more recent waves of the first ten waves. The lack of recent immigrants was a motivating factor for the inclusion of the top-up sample in 2011 which makes the sample of the Australian immigrants to be representative to the whole immigration population.

²⁷ We also implemented the same exercise for other macroeconomic variables. Unreported regression results indicate that, in line with the estimates obtained for the whole sample that we presented in Section 5, estimates by sub-groups are statistically insignificant for all other macroeconomic variables.

²⁸ Questions about citizenship are only asked once for all surveyed individuals, starting from wave 2 for all respondents and only for new entrants from wave 3. Roughly 70 % of immigrants in our sample have Australian citizenship. Similarly, questions about residential locations of relatives are only surveyed in Waves 8 and 12. We use the panel nature of our data to fill in missing information for these variables in other waves. It is possible that these variables change over time in ways that our data does not capture. Unfortunately, HILDA does not provide the exact overseas locations of family members so that we cannot identify whether family members live in the immigrants' home countries. Approximately 53 % of immigrants have any close family member overseas.

presence of a close family member (i.e. parents and siblings) overseas, whether the immigrant speaks a language other than English at home, and whether the immigrant reports that he or she speaks English very well.²⁹

In addition to the above individual characteristics, we also consider the immigrant's home country characteristics such as whether the country is an English-Speaking Background (ESB) country, the travel distance between the home country and Australia, whether the country is classified as a low income country by the World Bank, whether the country allows its citizens to hold multiple citizenships, the home country's democracy index, and the country's remittance inflow/GDP ratio.³⁰ For each of the non-binary variables (for instance: age, the duration of stay in Australia, the distance between the home country and Australia, the home country's democracy index, and the home country's remittance inflow/GDP ratio), sub-groups are defined relative to the median of the sample.

Appendix Figures 1A to 1E report the CPI effects on five mental health measures of immigrants with or without a particular characteristic. The magnitude of estimates by sub-populations suggests that CPI may have differential effects according to particular characteristics. However, taking the statistical differences of CPI estimates by sub-populations into account indicates the impact of CPI fluctuations is not statistically significantly different by most characteristics we consider here.³¹

Disintegration

The sub-population estimates by migration duration reported in Appendix Figures 1A to 1E also reveal that the CPI effect is greater, on all mental health measures, for recent immigrants and is statistically significant at least at the 5 % level (with the Role Emotional scale as an exception). This heterogeneity in the CPI effect, while being statistically insignificant, suggests that the longer the immigrants stay in the host country, the less are they affected by their home countries' macroeconomic fluctuations. To further investigate the possibility of "disintegration", a process in which immigrants lose ties with their home countries over time,

²⁹ Roughly 32 % of immigrants speak a language other than English at home and 87 % indicate that they speak English very well. While these two language indicators are highly correlated (in our data, their correlation coefficient is minus 0.56 and is statistically significant at the 1 % level), we examine them separately because they may represent immigrants' ties with home countries or their assimilation to Australia differently.

³⁰ The remittance/GDP ratio is averaged over the study period (i.e. 2001-2014) because, for some countries, data are not available for all years studied. Similarly, the democracy index, which is provided by the Economic Intelligent Unit with a higher index indicating a higher level of democracy, is averaged over the 2006-2012 period.

³¹ Visually, +/- one standard error intervals which do not include zero indicate a statistically significant (at the 5 % level) estimate. The statistically significant differences in the estimates by sub-population are indicated visually by the observation that the +/- one standard error intervals do not overlap.

we follow Nekoei (2013) and add an interaction term between CPI and length of stay in Australia in the equation (2). For demonstration purposes, we apply this extended regression to the whole sample and to the MCS measure.

Appendix Figure 2 shows that the CPI effect decreases along years since arrival and is statistically significant (at the 5 % level) for immigrants with a length of stay in Australia that is less than 23 years. By contrast, the CPI effect is not statistically significant for immigrants who arrived in Australia more than 22 years ago: for those immigrants, the confidence intervals of estimates are wide and include zeros. Our estimates on the GDP impact along the length of stay are also consistent with the “disintegration” theory that we discussed above. Our finding on the evidence supporting the “disintegration” theory is also in line with that in other studies for Australia (Nguyen and Duncan, 2015), Germany (Akay *et al.*, 2016) and USA (Nekoei, 2013).

8. Conclusion

The previous work in this literature has focused mainly on how macroeconomic conditions in the place where people live affect their health. In contrast, this paper has provided the first empirical evidence on the impact of macroeconomic conditions in the place people don’t live but remain connected to, on their mental health. We have exploited exogenous changes in macroeconomic conditions in home countries and controlled for individual fixed effects to examine the impact of home countries’ CPI, GDP, unemployment and exchange rates on mental health of Australian immigrants.

This paper has presented the first evidence, based on a robust econometric approach, that improvement in home countries’ macroeconomic conditions as measured by lower CPI or higher GDP increases mental health of Australian immigrants. In addition, while the CPI effect is highly statistically significant the GDP impact is mild in terms of statistical significance. Unemployment rates and exchange rate fluctuations, though, are found to have no impact on immigrants’ mental health. Furthermore, when statistically significant, the impact of macroeconomic conditions also varies according to the mental health measure that is used. The impact of home countries’ macroeconomic conditions has been shown here to be authentic, since we rule out any effects of these macroeconomic indicators on either contemporaneous physical health or mental health in the past. The estimated effects are also robust as a range of robustness checks, such as the inclusion of other macroeconomic

variables or alternative selections of country, year, age and return immigrants, showed these findings to be persistent.

The investigations of the CPI effect conducted here also show that, in relative terms, it is of a substantial magnitude: an increase of one standard deviation in the CPI is found to have a detrimental impact on mental health that is equivalent to about a quarter of the impact of the serious injury/illness to family member. In addition, the CPI impact appears to be immediate. We also provide additional evidence that the CPI impact tends to fade away as immigrants stay longer in Australia: a finding that is consistent with the disintegration theory.

Our findings of a positive impact of home countries' better economic performance on immigrants' mental health adds new variables to the list of factors that contribute to the individual mental health of immigrants. In future work extensions of the approach adopted here to other countries may extend our understanding of the macroeconomic determinants of mental health. Further research on the impact of home countries' macroeconomic conditions on other aspects of immigrant behaviour, such as their consumption, saving and remittance decisions is another promising area for future research, based on the results produced here.

References

- ABS, 1997. 4399.0 - National Health Survey: SF36 Population Norms, Australia, 1995 In: Australian Bureau of Statistics (Ed.). Canberra.
- Akay, A., Bargain, O., Zimmermann, K.F., 2016. Home Sweet Home? Macroeconomic Conditions in Home Countries and the Well-Being of Migrants*. *Journal of Human Resources* forthcoming (DOI: 10.3368/jhr.52.2.0115-6900R1).
- Alesina, A., Di Tella, R., MacCulloch, R., 2004. Inequality and happiness: are Europeans and Americans different? *Journal of Public Economics* 88, 2009-2042.
- Ásgeirsdóttir, T.L., Corman, H., Noonan, K., Ólafsdóttir, Þ., Reichman, N.E., 2014. Was the economic crisis of 2008 good for Icelanders? Impact on health behaviors. *Economics & Human Biology* 13, 1-19.
- Becker, G.S., 1974. A Theory of Social Interactions. *The journal of political economy* 82, 1063-1093.
- Bertrand, M., Mullainathan, S., 2001. Do People Mean What They Say? Implications for Subjective Survey Data. *American Economic Review: Papers & Proceedings* 91, 67-72.
- Blanchflower, D.G., Bell, D.N.F., Montagnoli, A., Mor, M., 2014. The happiness tradeoff between unemployment and inflation. *Journal of Money Credit and Banking* 46, 117-141.
- Böckerman, P., Johansson, E., Helakorpi, S., Prättälä, R., Vartiainen, E., Uutela, A., 2007. Does a slump really make you thinner? Finnish micro-level evidence 1978-2002. *Health Economics* 16, 103-107.
- Borjas, G.J., 1999. Chapter 28 The economic analysis of immigration, In: Orley, C.A., David, C. (Eds.), *Handbook of Labor Economics*: Elsevier, pp. 1697-1760.
- Charles, K.K., DeCicca, P., 2008. Local labor market fluctuations and health: Is there a connection and for whom? *Journal of Health Economics* 27, 1532-1550.
- Clark, A., Knabe, A., Rätzl, S., 2010. Boon or bane? Others' unemployment, well-being and job insecurity. *Labour Economics* 17, 52-61.
- Cotti, C., Dunn, R.A., Tefft, N., 2014. The DOW is killing me: Risky health behaviors and the stock market. *Health Economics* 24, 803-821.
- Crossley, T.F., Kennedy, S., 2002. The reliability of self-assessed health status. *Journal of Health Economics* 21, 643-658.
- Currie, J., Duque, V., Garfinkel, I., 2015. The Great Recession and Mothers' Health. *The Economic Journal* 125, F311-F346.
- Deckers, T., Falk, A., Schildberg-Hörisch, H., 2013. Nominal or Real? The Impact of Regional Price Levels on Satisfaction with Life. *IZA Discussion Paper No. 7345*.
- Dehejia, R., Lleras-Muney, A., 2004. Booms, Busts, and Babies' Health. *The Quarterly Journal of Economics* 119, 1091-1130.
- Di Tella, R., MacCulloch, R.J., Oswald, A.J., 2001. Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness. *The American Economic Review* 91, 335-341.

- Di Tella, R., MacCulloch, R.J., Oswald, A.J., 2003. The macroeconomics of happiness. *Review of Economics and Statistics* 85, 809-827.
- DIBP, 2014. The People of Australia. Canberra: Department of Immigration and Border Protection.
- Ferrer-i-Carbonell, A., 2005. Income and well-being: an empirical analysis of the comparison income effect. *Journal of Public Economics* 89, 997-1019.
- Francesca, C., Naomi, E.F., Andrew, L., 2014. Crime and Mental Well-Being. *Journal of Human Resources* 49, 110-140.
- French, M.T., Gumus, G., 2014. Macroeconomic fluctuations and motorcycle fatalities in the US. *Social Science & Medicine* 104, 187-193.
- Frey, B.S., Stutzer, A., 2000. Happiness, Economy and Institutions. *The Economic Journal* 110, 918-938.
- Frijters, P., Johnston, D.W., Shields, M.A., 2011. Life Satisfaction Dynamics with Quarterly Life Event Data*. *Scandinavian Journal of Economics* 113, 190-211.
- Frijters, P., Johnston, D.W., Shields, M.A., 2014. The effect of mental health on employment: Evidence from Australian panel data. *Health Economics* 23, 1058-1071.
- Frijters, P., Johnston, D.W., Shields, M.A., Sinha, K., 2015. A Lifecycle Perspective of Stock Market Performance and Wellbeing. *Journal of Economic Behavior & Organization* 112, 237-250.
- Gordon, H.H., Spilimbergo, A., 1999. Illegal Immigration, Border Enforcement, and Relative Wages: Evidence from Apprehensions at the U.S.-Mexico Border. *The American Economic Review* 89, 1337-1357.
- Graham, C., Pettinato, S., 2001. Happiness, Markets, and Democracy: Latin America in Comparative Perspective. *Journal of Happiness Studies* 2, 237-268.
- Groot, W., 2000. Adaptation and scale of reference bias in self-assessments of quality of life. *Journal of Health Economics* 19, 403-420.
- Guha-Sapir, D., Below, R., Hoyois, P., 2009. EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
- Kessler, R.C., Barker, P.R., Colpe, L.J., Epstein, J.F., Gfroerer, J.C., Hiripi, E., Howes, M.J., Normand, S.-L.T., Manderscheid, R.W., Walters, E.E., 2003. Screening for serious mental illness in the general population. *Archives of general psychiatry* 60, 184-189.
- Le, H.T., Nguyen, H.T., 2017a. The Impact of Maternal Mental Health Shocks on Child Health: Estimates from Fixed Effects Instrumental Variables Models for two Cohorts of Australian Children. *American Journal of Health Economics*, forthcoming.
- Le, H.T., Nguyen, H.T., 2017b. Parental health and children's cognitive and non-cognitive development: New evidence from the Longitudinal Survey of Australian Children. *Health Economics* forthcoming (DOI: <https://doi.org/10.1002/hec.3501>).
- Luttmer, E.F.P., 2005. Neighbors as Negatives: Relative Earnings and Well-Being. *The Quarterly Journal of Economics* 120, 963-1002.
- McInerney, M., Mellor, J.M., Nicholas, L.H., 2013. Recession Depression: Mental Health Effects of the 2008 Stock Market Crash*. *Journal of Health Economics* 32, 1090-1104.

- Nekoei, A., 2013. Immigrants' Labor Supply and Exchange Rate Volatility. *American Economic Journal: Applied Economics* 5, 144-164.
- Nguyen, H.T., Connelly, L.B., 2014. The effect of unpaid caregiving intensity on labour force participation: Results from a multinomial endogenous treatment model. *Social Science & Medicine* 100, 115-122.
- Nguyen, H.T., Duncan, A., 2015. Macroeconomic fluctuations in home countries and immigrants' well-being: New evidence from Down Under. Bankwest Curtin Economics Centre working paper number 15/2.
- Nguyen, H.T., Duncan, A., 2017. Exchange rate fluctuations and immigrants' labour market outcomes: New evidence from Australian household panel data. *Journal of International Economics* 105, 174-186.
- Ochsen, C., 2011. Subjective well-being and aggregate unemployment: further evidence. *Scottish Journal of Political Economy* 58, 634-655.
- OECD, 2013. *International Migration Outlook 2013*.
- Powdthavee, N., van den Berg, B., 2011. Putting different price tags on the same health condition: Re-evaluating the well-being valuation approach. *Journal of Health Economics* 30, 1032-1043.
- Räsänen, P., Roine, E., Sintonen, H., Semberg-Konttinen, V., Ryyänänen, O.-P., Roine, R., 2006. Use of quality-adjusted life years for the estimation of effectiveness of health care: A systematic literature review. *International Journal of Technology Assessment in Health Care* 22, 235-241.
- Ruhm, C.J., 2000. Are Recessions Good for Your Health? *The Quarterly Journal of Economics* 115, 617-650.
- Ruhm, C.J., 2003. Good times make you sick. *Journal of Health Economics* 22, 637-658.
- Ruhm, C.J., 2005. Healthy living in hard times. *Journal of Health Economics* 24, 341-363.
- Ruhm, C.J., 2015. Recessions, healthy no more? *Journal of Health Economics* 42, 17-28.
- Ruhm, C.J., Black, W.E., 2002. Does drinking really decrease in bad times? *Journal of Health Economics* 21, 659-678.
- Ruprah, I.J., Luengas, P., 2011. Monetary policy and happiness: Preferences over inflation and unemployment in Latin America. *The Journal of Socio-Economics* 40, 59-66.
- Schwarze, J., Winkelmann, R., 2011. Happiness and altruism within the extended family. *Journal of Population Economics* 24, 1033-1051.
- Stark, O., Taylor, J.E., 1991. Migration Incentives, Migration Types: The Role of Relative Deprivation. *The Economic Journal* 101, 1163-1178.
- Tekin, E., McClellan, C., Minyard, K.J., 2013. Health and health behaviors during the worst of times: evidence from the Great Recession. National Bureau of Economic Research Working Paper No 9234.
- The Economist, 2015. Gone but not forgotten. *The Economist* 415, 50-51.
- Verbeek, M., Nijman, T., 1992. Testing for Selectivity Bias in Panel Data Models. *International Economic Review* 33, 681-703.
- Ware, J.E., Kosinski, M., Keller, S., 1994. SF-36 physical and mental health summary scales: a user's manual. Boston: Health Assessment Lab.

- Watson, N., 2012. Longitudinal and cross-sectional weighting methodology for the HILDA Survey. HILDA project technical paper series - Technical paper 2/12.
- Welsch, H., 2007. Macroeconomics and life satisfaction: Revisiting the 'misery index'. *Journal of Applied Economics* 10, 237-251.
- Welsch, H., 2011. The magic triangle of macroeconomics: how do European countries score? *Oxford Economic Papers* 63, 71-93.
- Wilson, T.D., Gilbert, D.T., 2008. Explaining Away: A Model of Affective Adaptation. *Perspectives on Psychological Science* 3, 370-386.
- Wolfers, J., 2003. Is Business Cycle Volatility Costly? Evidence from Surveys of Subjective Well-Being. *International Finance* 6, 1-26.
- Wooden, M., 2009. Use of the Kessler Psychological Distress Scale in the HILDA Survey. HILDA project discussion paper series No. 2/09, February 2009.
- Yang, D., 2006. Why do migrants return to poor countries? Evidence from Philippine migrants' responses to exchange rate shocks. *The Review of Economics and Statistics* 88, 715-735.
- Yang, D., 2008. International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks*. *The Economic Journal* 118, 591-630.

Table 1: Effects of home country's CPI on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
Estimate of CPI (%)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Current	-0.07	-0.04**	-0.27	-0.10**	-0.25	-0.13***	-0.43	-0.03	-0.18	-0.10***	-0.04	-0.05
	[0.09]	[0.02]	[0.22]	[0.05]	[0.19]	[0.04]	[0.36]	[0.07]	[0.15]	[0.04]	[0.05]	[0.07]
Lag 1 year		-0.02		-0.06		-0.08**		0.02		-0.06*		
		[0.02]		[0.04]		[0.04]		[0.06]		[0.03]		
Lag 2 years		-0.02		-0.04		-0.01		-0.04		-0.04		
		[0.02]		[0.04]		[0.03]		[0.05]		[0.03]		
Forward 1 year		0.00		0.08*		-0.03		0.13*		-0.06*		
		[0.02]		[0.05]		[0.04]		[0.07]		[0.03]		
Forward 2 years		0.00		0.00		-0.01		-0.06		-0.02		
		[0.02]		[0.05]		[0.04]		[0.09]		[0.04]		
With inclusion of GDP		-0.04**		-0.10**		-0.13***		-0.05		-0.09**		
		[0.02]		[0.05]		[0.04]		[0.07]		[0.04]		
With inclusion of GDP growth		-0.04**		-0.10**		-0.13***		-0.02		-0.10***		
		[0.02]		[0.05]		[0.04]		[0.07]		[0.04]		
With inclusion of unemployment		-0.04**		-0.10**		-0.13***		-0.03		-0.10***		
		[0.02]		[0.05]		[0.04]		[0.07]		[0.04]		
With inclusion of exchange rate		-0.05**		-0.13***		-0.14***		-0.06		-0.10***		
		[0.02]		[0.05]		[0.04]		[0.07]		[0.04]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Interpretation of the magnitudes of CPI effects

Variables		MCS	Social Functioning	Vitality	Role Emotional	Mental Health
Coefficient estimates						
CPI (%)	(A)	-0.05*	-0.09	-0.14***	-0.01	-0.13***
		[0.02]	[0.05]	[0.04]	[0.08]	[0.04]
Death of a close friend	(B)	-0.08	-0.52	0.05	-0.41	-0.44
		[0.15]	[0.36]	[0.26]	[0.59]	[0.23]
Serious injury to family member	(C)	-1.15***	-2.30***	-1.57***	-3.31***	-1.51***
		[0.15]	[0.35]	[0.24]	[0.55]	[0.22]
Comparison						
CPI / Serious injury to family member (%)	(D)=(A)/(C)*100	4.35	3.91	8.92	0.30	8.61
One S.D of CPI / Serious injury to family member (%)	(E) = (D)*3.61	15.70	14.13	32.19	1.09	31.08

Notes: Number of observations: 30,821. FE results are from the regression (2). Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3a: Effects of levels of exchange rates on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Estimate of exchange rate (log)												
Current	1.53	0.01	0.03	0.56	10.29	-0.34	-13.24	1.07	5.61	-1.12	0.54	-0.16
	[5.99]	[0.58]	[14.13]	[1.24]	[11.26]	[1.05]	[20.52]	[1.88]	[10.56]	[0.93]	[1.13]	[1.76]
Lag 1 year		0.03		0.41		-0.51		-0.48		-0.04		
		[0.50]		[1.17]		[1.03]		[1.74]		[0.92]		
Lag 2 years		0.65		1.77		0.41		1.52		0.84		
		[0.59]		[1.35]		[1.12]		[1.98]		[1.00]		
Forward 1 year		0.28		1.53		0.24		2.66		-1.08		
		[0.69]		[1.55]		[1.23]		[2.35]		[1.10]		
Forward 2 years		-0.15		-0.40		-0.06		0.79		-1.15		
		[0.80]		[1.77]		[1.45]		[2.75]		[1.27]		
With inclusion of GDP		0.11		0.75		-0.16		0.60		-0.68		
		[0.62]		[1.33]		[1.15]		[1.98]		[1.01]		
With inclusion of GDP growth		0.02		0.49		-0.19		1.34		-1.07		
		[0.58]		[1.26]		[1.06]		[1.88]		[0.93]		
With inclusion of unemployment		0.00		0.53		-0.31		0.98		-1.11		
		[0.58]		[1.25]		[1.06]		[1.88]		[0.93]		
With inclusion of CPI		0.32		1.34		0.50		1.45		-0.54		
		[0.60]		[1.29]		[1.09]		[1.93]		[0.96]		

Notes: Number of (unique) observations: (5,290) 30,970. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3b: Effects of standard deviations in exchange rates on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Estimate of exchange rate deviations												
Current	0.000	0.000	0.000	0.000	0.001	0.001	-0.002	-0.002	0.001	0.000	0.000	-0.004*
	[0.002]	[0.000]	[0.004]	[0.001]	[0.003]	[0.001]	[0.006]	[0.002]	[0.003]	[0.001]	[0.001]	[0.002]
Lag 1 year		0.000		-0.002		-0.002*		-0.001		0.000		
		[0.001]		[0.001]		[0.001]		[0.002]		[0.001]		
Lag 2 years		-0.001		-0.003		-0.003*		-0.001		-0.002		
		[0.001]		[0.002]		[0.001]		[0.004]		[0.001]		
Forward 1 year		0.000		0.000		0.000		0.000		0.001		
		[0.001]		[0.001]		[0.001]		[0.002]		[0.001]		
Forward 2 years		0.001*		0.002**		0.002**		0.000		0.001**		
		[0.000]		[0.001]		[0.001]		[0.002]		[0.001]		
With inclusion of GDP		0.000		0.000		0.001		-0.001		0.000		
		[0.000]		[0.001]		[0.001]		[0.002]		[0.001]		
With inclusion of GDP growth		0.000		0.000		0.001		-0.001		0.000		
		[0.000]		[0.001]		[0.001]		[0.002]		[0.001]		
With inclusion of unemployment		0.000		0.000		0.001		-0.002		0.000		
		[0.000]		[0.001]		[0.001]		[0.002]		[0.001]		
With inclusion of CPI		0.000		0.000		0.002**		-0.001		0.001		
		[0.001]		[0.001]		[0.001]		[0.002]		[0.001]		

Notes: Number of (unique) observations: (5,290) 30,970. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4a: Effects of home country's GDP per capita level on immigrants' mental health

Estimate of GDP (in nominal USD, log)	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Current	0.16 [0.49]	0.15 [0.35]	0.74 [1.12]	0.17 [0.81]	0.50 [1.05]	0.29 [0.66]	1.01 [1.63]	-1.39 [1.25]	0.80 [0.86]	1.07* [0.61]	-0.43 [0.81]	-1.31 [1.28]
Lag 1 year		0.10 [0.34]		0.44 [0.80]		0.41 [0.63]		-1.62 [1.20]		0.95 [0.61]		
Lag 2 years		0.10 [0.34]		0.49 [0.81]		0.32 [0.63]		-1.04 [1.20]		0.66 [0.61]		
Forward 1 year		-0.19 [0.35]		-0.35 [0.82]		-0.36 [0.66]		-2.19* [1.25]		0.58 [0.61]		
Forward 2 years		-0.21 [0.39]		-0.10 [0.88]		-0.17 [0.71]		-1.97 [1.35]		0.41 [0.64]		
With inclusion of GDP growth		0.15 [0.35]		0.17 [0.81]		0.32 [0.65]		-1.41 [1.25]		1.09* [0.61]		
With inclusion of unemployment		0.32 [0.39]		0.42 [0.90]		0.23 [0.73]		-1.11 [1.38]		1.31* [0.69]		
With inclusion of CPI		0.00 [0.36]		-0.19 [0.82]		-0.18 [0.68]		-1.57 [1.27]		0.75 [0.63]		
With inclusion of exchange rate		0.23 [0.40]		0.43 [0.90]		0.41 [0.76]		-1.07 [1.38]		1.02 [0.69]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects. Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4b: Effects of home country's GDP growth on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
Estimate of GDP growth (%)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Current	0.12	0.01	0.01	0.00	0.16	-0.05	0.03	0.05	0.14	-0.02	-0.09	-0.13
	[0.09]	[0.03]	[0.24]	[0.06]	[0.19]	[0.04]	[0.38]	[0.10]	[0.16]	[0.04]	[0.06]	[0.10]
Lag 1 year		0.00		0.05		0.02		0.06		0.00		
		[0.02]		[0.05]		[0.04]		[0.09]		[0.04]		
Lag 2 years		0.00		-0.01		-0.01		-0.08		0.04		
		[0.02]		[0.06]		[0.04]		[0.08]		[0.04]		
Forward 1 year		0.00		0.00		0.00		0.02		-0.01		
		[0.02]		[0.06]		[0.04]		[0.09]		[0.04]		
Forward 2 years		0.01		0.06		0.00		0.02		0.01		
		[0.03]		[0.06]		[0.05]		[0.10]		[0.04]		
With inclusion of GDP growth		0.01		-0.01		-0.05		0.05		-0.03		
		[0.03]		[0.06]		[0.04]		[0.10]		[0.04]		
With inclusion of unemployment		0.01		0.00		-0.06		0.06		-0.03		
		[0.03]		[0.06]		[0.04]		[0.10]		[0.04]		
With inclusion of CPI		0.01		0.00		-0.06		0.05		-0.03		
		[0.03]		[0.06]		[0.04]		[0.10]		[0.04]		
With inclusion of exchange rate		0.01		0.01		-0.05		0.06		-0.02		
		[0.03]		[0.06]		[0.05]		[0.11]		[0.04]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Effects of home country's unemployment rates on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
Estimate of unemployment (% , log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Current	-1.09*	0.16	-0.39	0.26	-2.35*	-0.20	-1.59	0.88	-3.10***	-0.10	0.47	-0.66
	[0.58]	[0.27]	[1.33]	[0.64]	[1.28]	[0.49]	[1.88]	[0.98]	[1.07]	[0.45]	[0.60]	[1.03]
Lag 1 year		0.24		0.56		-0.17		1.36		-0.06		
		[0.27]		[0.64]		[0.50]		[1.00]		[0.45]		
Lag 2 years		0.09		0.52		-0.30		1.04		-0.29		
		[0.27]		[0.64]		[0.48]		[0.98]		[0.44]		
Forward 1 year		0.06		0.45		-0.07		0.59		-0.12		
		[0.29]		[0.67]		[0.52]		[1.03]		[0.48]		
Forward 2 years		0.01		0.26		0.16		-0.10		-0.13		
		[0.30]		[0.71]		[0.55]		[1.10]		[0.50]		
With inclusion of GDP		0.28		0.42		-0.11		0.45		0.40		
		[0.30]		[0.71]		[0.55]		[1.09]		[0.51]		
With inclusion of GDP growth		0.17		0.19		-0.22		0.98		-0.07		
		[0.27]		[0.65]		[0.50]		[0.99]		[0.45]		
With inclusion of CPI		0.16		0.27		-0.19		0.88		-0.10		
		[0.27]		[0.64]		[0.49]		[0.98]		[0.45]		
With inclusion of exchange rate		0.09		0.18		-0.22		0.59		-0.10		
		[0.29]		[0.67]		[0.52]		[1.02]		[0.47]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

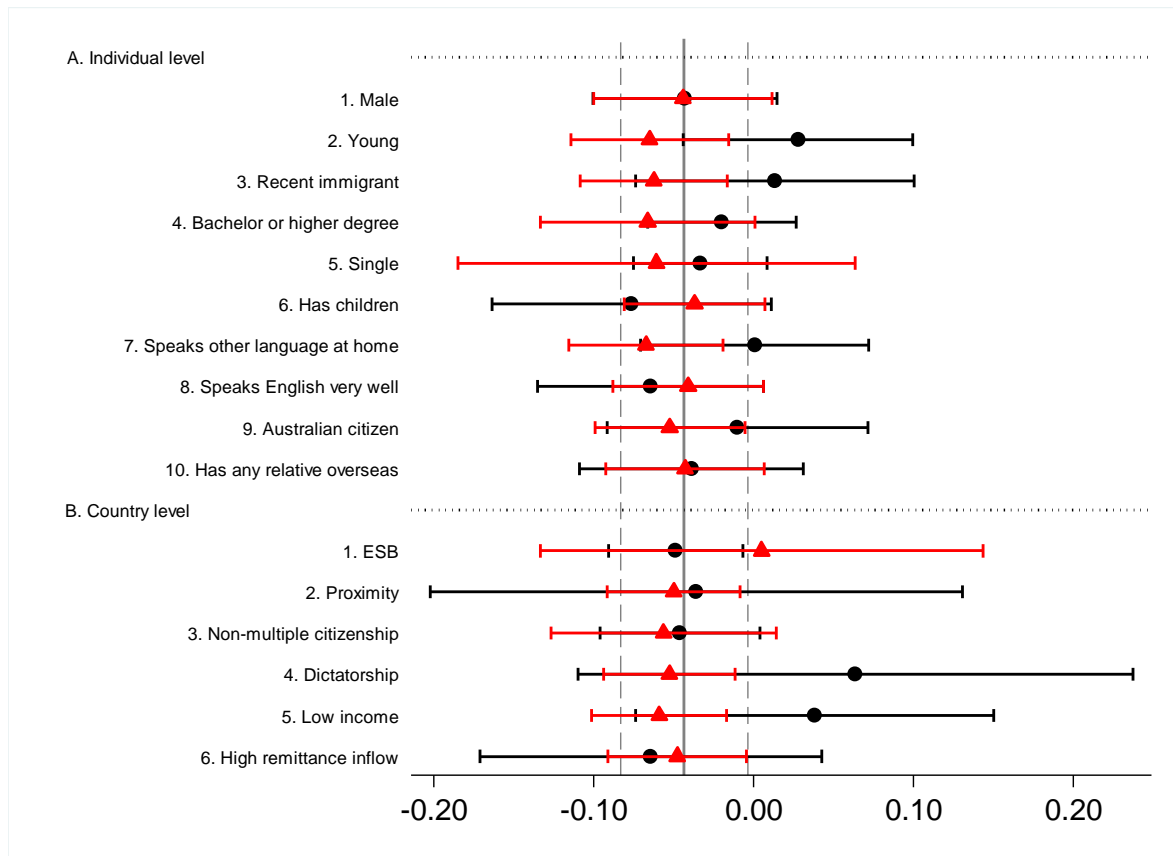
Table 6: Other robustness checks on the CPI impact

Robustness checks	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	No of obs.
Panel A: Baseline	-0.04** [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.03 [0.07]	-0.10*** [0.04]	33959 {5436}
Panel B: with inclusion of weekly working hours	-0.04* [0.02]	-0.09* [0.05]	-0.14*** [0.04]	0.01 [0.08]	-0.12*** [0.04]	31246 {5084}
Panel C: with inclusion of gross financial year wages and salaries	-0.04 [0.03]	-0.07 [0.06]	-0.11** [0.05]	0.05 [0.08]	-0.13*** [0.05]	18329 {3708}
Panel D: with inclusion of real household financial year disposal income	-0.04** [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.02 [0.07]	-0.10*** [0.04]	33860 {5433}
Panel E: with the inclusion of terms of trade	-0.04** [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.03 [0.07]	-0.10*** [0.04]	33900 {5421}
Panel F: with the inclusion of weather shocks	-0.03 [0.02]	-0.13*** [0.05]	-0.14*** [0.04]	0.01 [0.08]	-0.10*** [0.04]	28458 {5148}
Panel G: Excluding UK	-0.05** [0.02]	-0.09** [0.05]	-0.13*** [0.04]	-0.05 [0.07]	-0.11*** [0.04]	22833 {3899}
Panel H: Excluding New Zealand	-0.04** [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.03 [0.07]	-0.10*** [0.04]	30266 {4780}
Panel I: Including Zimbabwe	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	34096 {5455}
Panel J: Excluding 2008 and 2009	-0.05** [0.02]	-0.09* [0.05]	-0.14*** [0.04]	-0.03 [0.08]	-0.11*** [0.04]	29961 {5392}
Panel K: Working age population	-0.07*** [0.02]	-0.14*** [0.05]	-0.14*** [0.04]	-0.14* [0.07]	-0.12*** [0.04]	24743 {4273}
Panel L: Countries with at least 100 obs.	-0.04* [0.02]	-0.09* [0.05]	-0.14*** [0.04]	-0.01 [0.07]	-0.10*** [0.04]	32691 {5181}
Panel M: Excluding 2011 top-up sample	-0.04** [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.03 [0.07]	-0.10*** [0.04]	30348 {4217}
Panel O: Excluding individuals with different country of birth from both parents'	-0.05** [0.02]	-0.08 [0.05]	-0.15*** [0.04]	-0.04 [0.08]	-0.11*** [0.04]	30867 {4940}
Panel P: Clustering at the country of birth	-0.04* [0.02]	-0.10** [0.05]	-0.13*** [0.04]	-0.03 [0.08]	-0.10** [0.05]	33959 {5436}

Notes: Results from FE regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Number of unique individuals is in curly brackets. Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

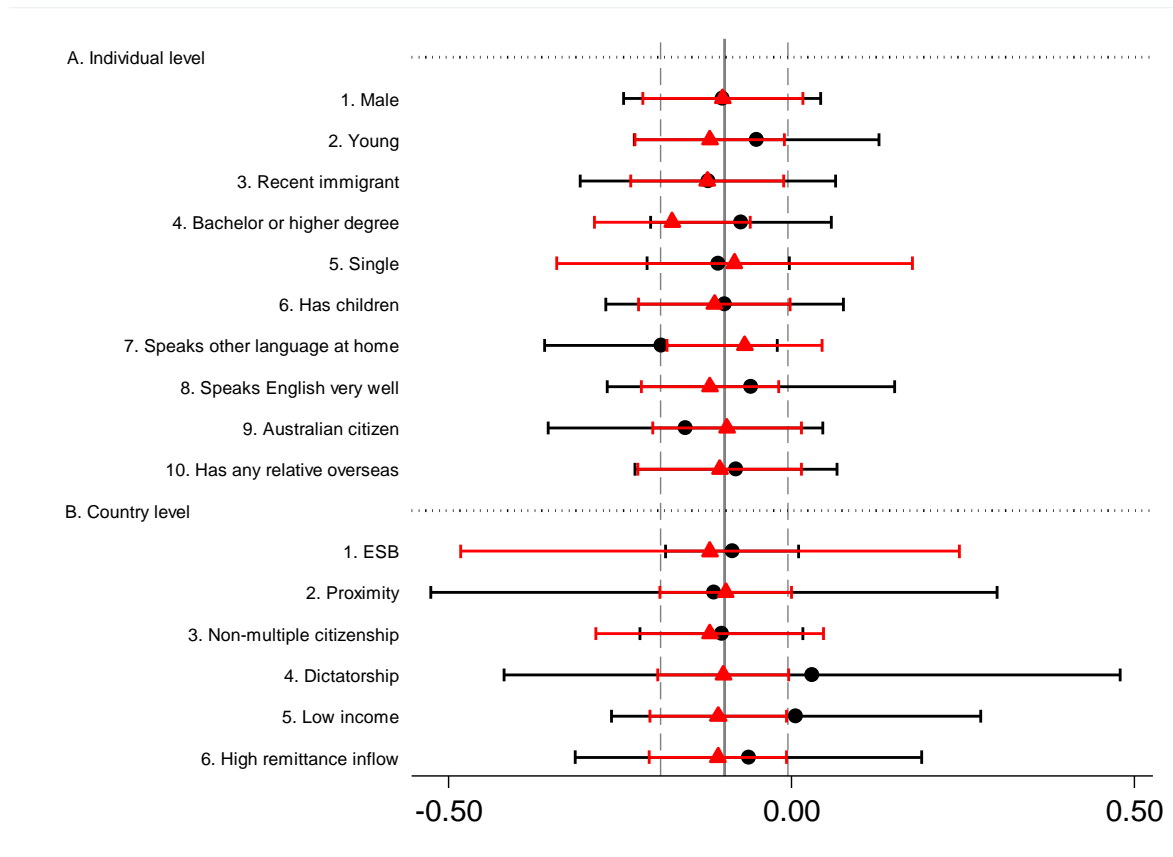
Appendix Tables and Figures to be published online

Appendix Figure 1A: Heterogeneity of CPI effects on MCS



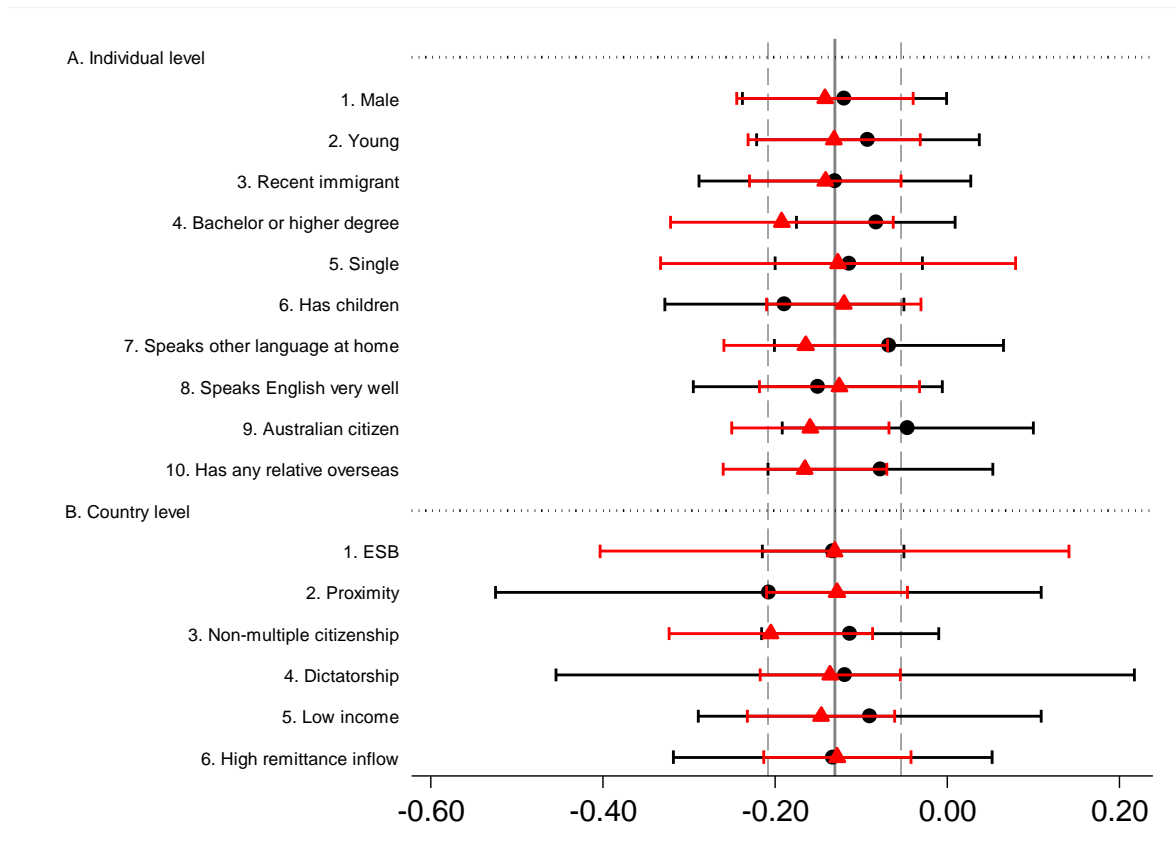
Notes: Results for different sub-populations are obtained from FE regression (2). The (red) triangles indicate the CPI coefficient estimate in the regression for the sub-population mentioned on the y axis while the (black) circles represent the estimate for the other sub-population. The solid (dash) vertical line shows the CPI coefficient (95% confidence interval) estimates for the whole population. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies.

Appendix Figure 1B: Heterogeneity of CPI effects on Social Functioning scale



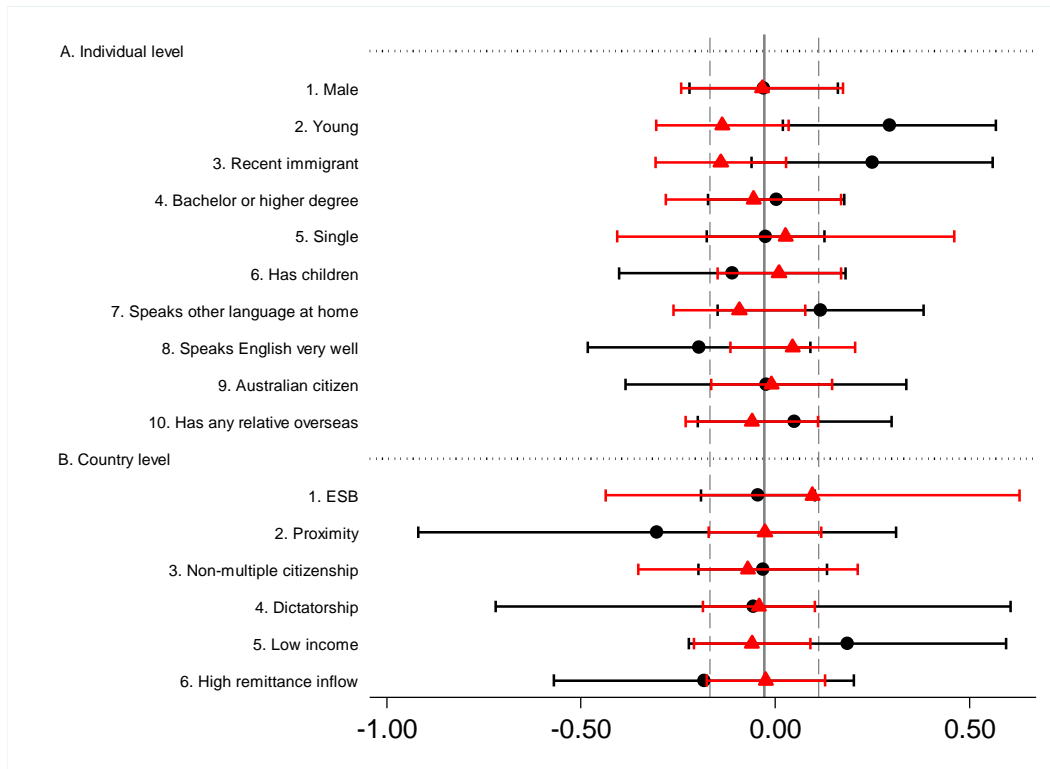
Notes: Results for different sub-populations are obtained from FE regression (2). The (red) triangles indicate the CPI coefficient estimate in the regression for the sub-population mentioned on the y axis while the (black) circles represent the estimate for the other sub-population. The solid (dash) vertical line shows the CPI coefficient (95% confidence interval) estimates for the whole population. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies.

Appendix Figure 1C: Heterogeneity of CPI effects on Vitality scale



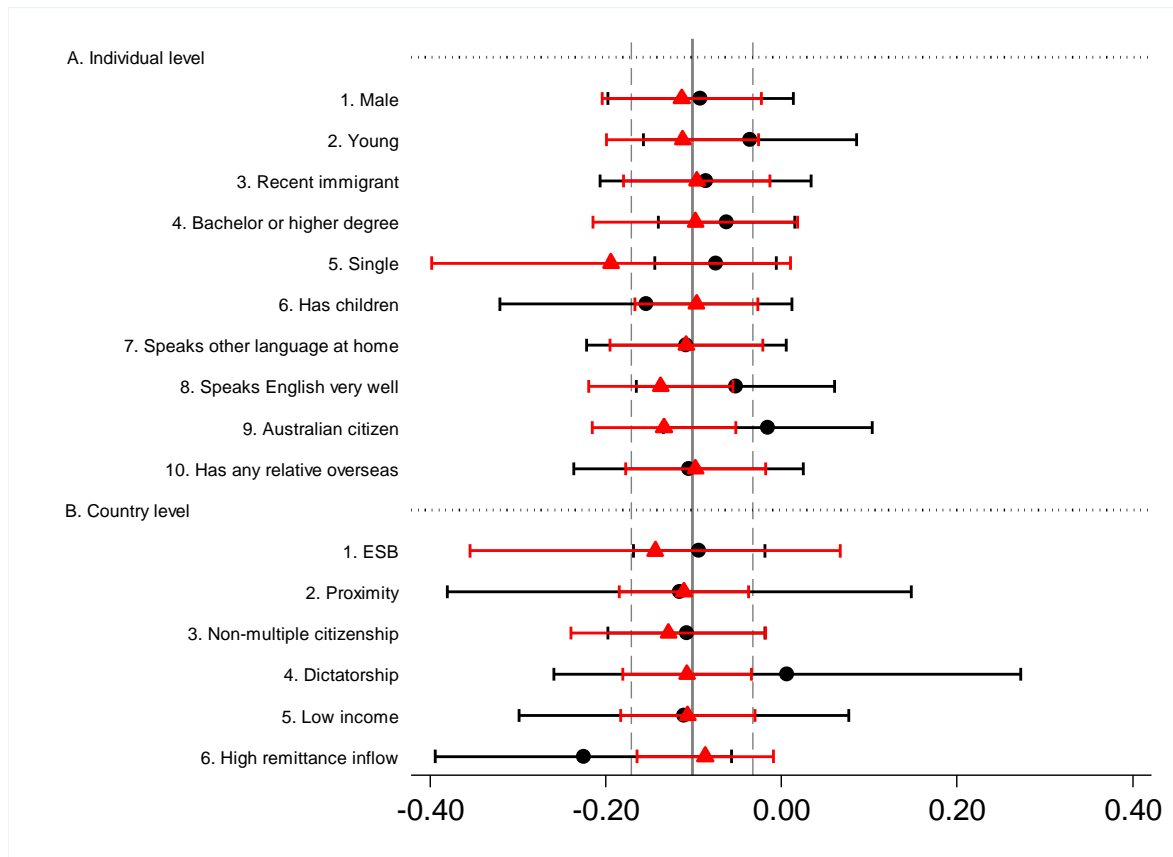
Notes: Results for different sub-populations are obtained from FE regression (2). The (red) triangles indicate the CPI coefficient estimate in the regression for the sub-population mentioned on the y axis while the (black) circles represent the estimate for the other sub-population. The solid (dash) vertical line shows the CPI coefficient (95% confidence interval) estimates for the whole population. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies.

Appendix Figure 1D: Heterogeneity of CPI effects on Role Emotional scale



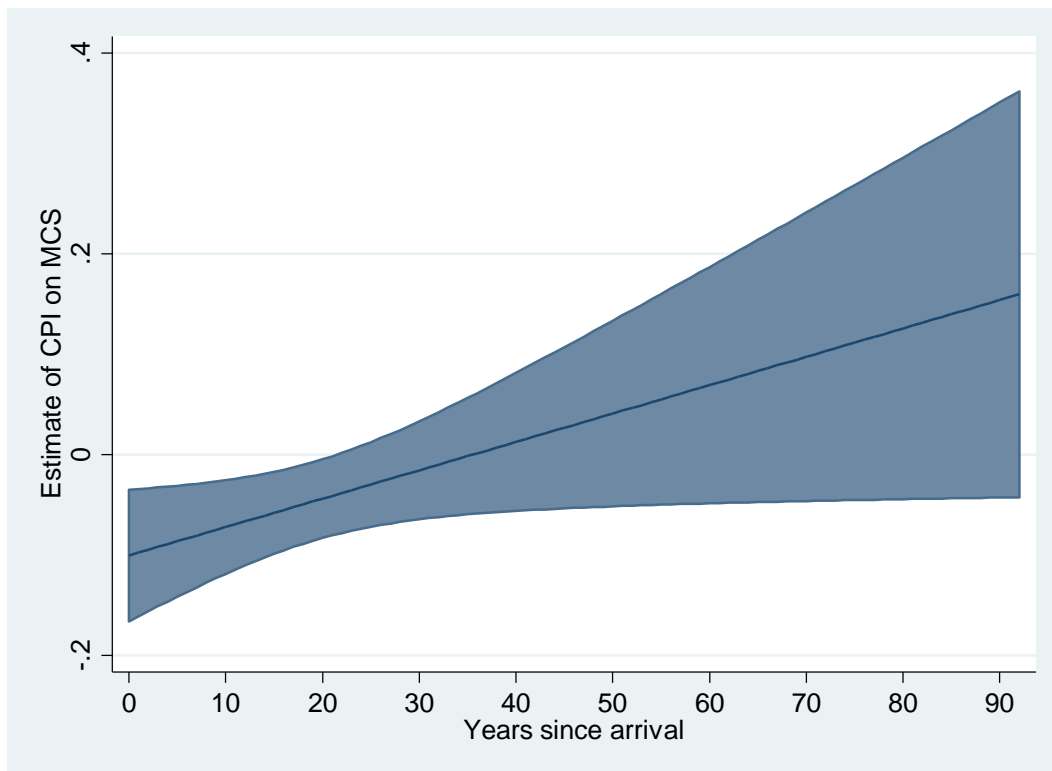
Notes: Results for different sub-populations are obtained from FE regression (2). The (red) triangles indicate the CPI coefficient estimate in the regression for the sub-population mentioned on the y axis while the (black) circles represent the estimate for the other sub-population. The solid (dash) vertical line shows the CPI coefficient (95% confidence interval) estimates for the whole population. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies.

Appendix Figure 1E: Heterogeneity of CPI effects on Mental Health scale



Notes: Results for different sub-populations are obtained from FE regression (2). The (red) triangles indicate the CPI coefficient estimate in the regression for the sub-population mentioned on the y axis while the (black) circles represent the estimate for the other sub-population. The solid (dash) vertical line shows the CPI coefficient (95% confidence interval) estimates for the whole population. Other explanatory variables include age, education, marital status, number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies.

Appendix Figure 2: Disintegration process



Notes: Shaded areas are the 95 % confidence intervals. Results are from FE regression (2). Explanatory variables include length of stay, CPI, linear interaction between length of stay and CPI, age group dummies, education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, year and month dummies.

Appendix Table A1: Variable description

Variable	Definition
<i>Dependent variable</i>	
Mental health measures	Various measures as defined in the main text: scale from 0 to 100 where higher scale indicates a better mental health
<i>Independent variables</i>	
Age	Age
Education	Dummy variables of highest education level achieved: Year 11 and below (the base group), Year 12, vocational education and training (VET) certificate, bachelor or higher
Marital status	Dummy variables of current marital status: Never married (the base group), Married/ de facto, Separated/divorced/widowed
Number of residents	Number of people in the household in various age cohorts (0-4; 5-9; 10-14; 15-23;24-64; and others), excluding self (person)
Length of stay	Length of time since first arrived in Australia to live (years)
ESB	Dummy variable: = 1 if was born in an English Speaking Background country, = 0 if otherwise
Urban	Dummy variable: = 1 if region of current residence is major city, = 0 if otherwise
State	Dummy variables for state of residence: NSW/ACT (the base group), VIC, QLD, SA, WA, TAS/NT
Regional unemployment rate	ABS unemployment rate in major statistical region (October of interview year) (%)
Socio-economic indicators	ABS decile of Index of relative socio-economic advantage where higher index indicates a more advantageous region
Distance to home country	The direct distance between Sydney (Australia) and the home country's capital (km)
GDP	Home country's GDP per capita (nominal USD)
GDP growth	Home country's GDP growth rate (%)
Unemployment rate	Home country's unemployment rate (%)
Exchange rate	Mean (or standard deviation) of daily exchange rates over 12 months prior to the survey time
CPI	Home country's percent changes in Consumer Price Index (%)

Appendix Table A2: Summary statistics by country of origin

Country	Sample size	No of unique individuals	GDP (p/c, nominal USD)	GDP (p/c, nominal) growth (%)	Unemployment rates (%)	CPI (%)	Mean of exchange rate	Deviation of exchange rate	Yearly exchange rate growth (%)	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	Male (%)	Age (years)	Length of stay (years)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Argentina	70	18	0.95	6.14	9.89	9.85	3.24	0.18	20.68	43.17	72.86	54.95	77.14	61.16	37	37.73	18.59
S.D.			0.37	23.27	4.06	5.62	1.43	0.14	38.47	12.01	25.80	19.48	34.31	19.74		8.10	11.79
Austria	128	15	4.31	5.25	4.47	2.08	0.64	0.02	0.99	50.70	78.22	60.60	80.21	76.97	40	52.75	42.61
S.D.			0.86	7.75	0.45	0.69	0.08	0.01	8.29	9.87	24.76	20.96	33.58	15.83		20.38	13.71
Bangladesh	179	27	0.07	7.69	4.31	6.97	55.86	3.00	6.14	50.24	81.35	66.85	84.36	71.28	59	37.66	14.40
S.D.			0.02	4.80	0.40	2.18	17.27	1.50	9.58	9.15	21.83	17.20	32.05	18.06		9.94	10.23
Belgium	62	10	3.89	5.70	7.77	2.00	0.64	0.02	0.13	49.80	83.67	61.29	86.02	75.95	47	39.87	28.23
S.D.			0.89	8.05	0.71	1.05	0.08	0.01	7.08	9.96	22.81	21.13	30.51	16.21		13.74	11.02
Bulgaria	57	7	0.52	13.39	11.61	4.55	1.22	0.05	0.00	43.90	65.57	54.47	57.89	59.11	61	60.11	26.05
S.D.			0.23	12.26	3.97	3.21	0.15	0.02	4.98	11.22	28.96	28.28	46.52	19.03		15.13	12.37
Cambodia	120	28	0.06	9.13	1.03	4.11	3091.52	137.07	3.16	44.64	71.15	52.15	74.17	61.51	39	38.47	18.51
S.D.			0.03	4.34	0.81	4.92	820.19	64.35	10.71	8.33	21.24	16.80	37.04	15.51		13.07	8.45
Canada	355	57	4.33	5.01	7.13	1.92	0.94	0.03	1.09	50.67	89.72	61.20	88.50	76.49	40	43.99	22.13
S.D.			0.98	8.06	0.59	0.69	0.07	0.01	4.40	8.76	18.05	17.80	26.69	14.12		12.46	12.05
Chile	234	44	1.07	7.57	7.73	2.98	440.22	16.09	3.61	46.54	73.50	60.79	71.79	68.61	46	43.34	20.62
S.D.			0.40	12.23	1.14	1.86	51.12	5.80	6.48	10.71	28.70	19.43	39.21	17.82		16.05	11.94
China	937	208	0.44	15.34	4.39	2.65	5.96	0.24	0.01	48.57	80.86	61.44	84.97	69.68	39	40.49	13.87
S.D.			0.24	6.23	0.22	1.82	0.76	0.11	7.57	8.82	20.66	16.19	30.40	16.47		14.78	9.88
Colombia	179	32	0.59	8.26	11.50	4.07	1748.23	71.22	2.05	49.48	82.05	65.37	85.85	70.92	41	33.68	9.20
S.D.			0.21	10.01	1.69	1.75	191.65	21.12	8.23	10.30	25.93	21.83	28.89	21.27		9.22	7.62
Croatia	320	59	1.14	7.85	13.89	2.54	4.71	0.18	0.17	48.73	74.06	55.84	72.92	70.80	53	53.79	34.42
S.D.			0.33	10.59	3.42	1.36	0.60	0.07	7.75	8.79	26.23	20.38	41.34	15.49		14.31	14.87
Cyprus	77	17	2.59	5.09	6.76	2.24	0.64	0.02	0.88	44.05	62.99	50.30	56.28	67.18	51	54.43	25.26
S.D.			0.60	9.72	4.04	1.40	0.08	0.01	6.93	10.29	27.61	17.97	45.00	16.98		12.55	11.81
Czech Republic	166	25	1.55	10.01	6.98	2.41	17.95	0.76	-1.68	50.84	83.36	59.35	87.15	72.23	58	55.73	33.49
S.D.			0.55	11.25	1.03	1.65	1.70	0.19	8.87	8.59	20.34	18.61	28.82	16.38		16.93	18.96
Denmark	99	15	5.20	4.78	5.60	1.95	4.76	0.17	0.14	51.97	84.60	63.89	90.24	75.03	38	57.13	31.99
S.D.			1.12	7.56	1.48	0.77	0.60	0.07	7.81	8.30	19.22	16.44	26.62	16.22		14.87	14.83
East Timor	59	15	0.08	7.95	5.65	6.80	0.84	0.04	4.55	48.87	79.87	63.39	81.36	71.24	61	44.83	27.22

Country	Sample size	No of unique individuals	GDP (p/c, nominal USD)	GDP (p/c, nominal) growth (%)	Unemployment rates (%)	CPI (%)	Mean of exchange rate	Deviation of exchange rate	Yearly exchange rate growth (%)	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	Male (%)	Age (years)	Length of stay (years)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
S.D.			0.03	8.73	1.69	4.65	0.14	0.02	5.96	9.30	19.70	14.34	33.49	16.27		12.50	9.24
Egypt	281	41	0.21	6.48	10.80	8.46	4.55	0.23	8.78	49.60	75.89	60.16	77.40	71.56	52	53.74	32.89
S.D.			0.09	10.53	1.55	3.92	1.34	0.14	14.44	10.69	27.59	21.88	36.95	19.54		15.65	15.62
Fiji	502	73	0.38	7.45	7.56	3.55	1.49	0.04	1.87	50.20	81.27	65.55	84.76	74.21	54	38.24	16.44
S.D.			0.09	9.89	1.42	2.01	0.27	0.05	6.04	9.68	21.83	18.27	30.71	17.45		12.89	12.33
Finland	55	11	4.21	5.59	8.17	1.91	0.65	0.02	0.36	50.67	90.00	66.88	81.82	78.05	18	47.11	40.33
S.D.			0.95	8.42	0.79	1.11	0.08	0.01	7.55	9.82	20.47	16.69	32.60	13.87		10.19	8.75
France	204	29	3.71	4.62	9.08	1.59	0.64	0.02	0.32	51.06	82.72	65.88	84.64	73.98	56	52.52	30.12
S.D.			0.71	7.95	0.75	0.65	0.08	0.01	7.90	10.08	26.41	20.84	32.14	18.51		14.35	12.46
Germany	1156	155	3.80	5.36	7.80	1.59	0.64	0.02	0.46	50.40	81.27	60.10	78.17	74.70	44	58.47	42.02
S.D.			0.79	7.32	1.91	0.56	0.08	0.01	7.93	10.72	24.37	21.12	37.26	18.26		14.89	16.98
Greece	207	59	2.08	5.55	14.48	2.38	0.63	0.02	-0.83	51.01	77.84	62.66	79.87	72.64	45	59.72	41.39
S.D.			0.55	11.71	7.02	1.81	0.08	0.01	7.08	9.18	24.48	19.43	36.83	18.37		13.12	11.86
Hong Kong	531	81	3.10	3.32	4.76	1.72	6.20	0.27	2.43	48.69	82.58	59.93	87.38	71.53	44	40.69	19.14
S.D.			0.53	3.87	1.51	2.69	1.34	0.13	9.00	9.18	19.17	18.21	27.66	15.75		16.05	12.36
Hungary	213	30	1.13	9.43	7.98	5.06	166.18	7.21	1.78	47.62	75.47	57.03	75.12	67.51	40	58.71	38.69
S.D.			0.31	12.02	1.97	2.39	28.58	3.09	8.13	9.53	25.64	20.96	35.19	18.12		16.34	16.54
India	1055	207	0.12	7.67	3.78	7.55	41.15	1.57	6.23	49.34	79.18	61.82	81.14	72.13	51	45.61	19.58
S.D.			0.04	7.94	0.28	2.68	10.75	0.70	7.17	10.06	24.04	19.12	34.65	17.30		15.73	15.09
Indonesia	363	63	0.24	10.13	7.91	7.38	7595.41	313.67	5.76	52.38	84.09	68.53	87.88	79.32	37	42.29	21.58
S.D.			0.12	11.91	1.59	2.72	1647.08	85.14	6.63	7.70	20.06	17.75	28.57	13.52		16.82	17.40
Iran	122	23	0.48	8.65	12.33	18.24	7653.68	806.22	38.87	49.04	83.91	63.48	81.15	73.89	66	44.34	21.41
S.D.			0.21	14.32	1.04	8.05	3953.22	1118.56	80.12	10.96	21.53	19.70	33.74	17.28		11.18	11.79
Iraq	136	37	0.47	15.51	16.92	10.90	1192.88	88.59	-1.63	48.24	75.64	60.89	79.66	66.53	51	36.79	9.61
S.D.			0.19	18.44	3.79	14.72	287.71	134.76	20.36	11.55	23.98	22.63	38.31	21.07		12.13	6.73
Ireland	531	93	4.80	6.20	8.32	2.27	0.64	0.02	0.27	51.98	84.63	63.97	84.15	78.58	54	57.00	34.90
S.D.			0.97	9.99	4.51	2.46	0.08	0.01	7.02	9.17	23.00	19.58	32.74	15.73		15.09	15.25
Italy	950	171	3.21	4.49	8.86	2.12	0.63	0.02	0.15	47.55	72.55	53.27	69.74	67.29	53	62.04	46.51
S.D.			0.63	8.24	1.81	0.83	0.08	0.01	7.51	10.55	25.96	19.74	42.30	19.27		12.14	9.89
Japan	262	41	3.82	-0.36	4.48	0.08	80.95	3.85	2.98	51.02	84.35	67.26	93.38	75.50	15	39.18	14.53
S.D.			0.50	8.43	0.52	1.07	10.06	1.77	7.85	7.76	19.38	16.93	21.21	14.98		10.57	8.88

Country	Sample size	No of unique individuals	GDP (p/c, nominal USD)	GDP (p/c, nominal) growth (%)	Unemployment rates (%)	CPI (%)	Mean of exchange rate	Deviation of exchange rate	Yearly exchange rate growth (%)	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	Male (%)	Age (years)	Length of stay (years)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Kenya	53	9	0.08	10.05	9.40	9.61	62.35	2.97	2.68	53.76	91.27	71.51	93.71	81.58	66	47.83	26.89
S.D.			0.04	9.85	0.21	5.40	17.16	1.86	9.63	7.59	15.23	16.72	19.67	12.46		8.03	17.68
Laos	50	12	0.09	11.21	1.58	7.39	6580.64	367.85	6.24	46.06	69.50	60.13	58.00	66.64	44	47.80	23.46
S.D.			0.06	7.99	0.32	2.87	1738.97	215.74	10.24	8.87	22.61	16.59	43.54	15.75		12.53	6.39
Latvia	63	9	1.09	11.21	12.28	3.52	0.65	0.02	0.63	54.17	78.77	67.51	76.72	79.92	35	77.13	59.06
S.D.			0.45	15.30	3.52	3.80	0.09	0.01	9.54	7.62	26.62	18.35	35.74	14.25		7.95	4.34
Lebanon	95	36	0.84	2.03	6.26	3.06	1366.61	76.66	4.53	45.99	70.00	54.28	70.53	64.56	52	52.40	34.48
S.D.			0.02	8.89	0.09	2.12	168.81	25.46	7.63	10.31	24.56	18.50	42.07	20.30		11.84	13.46
Malaysia	568	84	0.76	7.80	3.25	2.28	2.73	0.11	2.13	51.16	85.50	65.05	88.62	75.59	36	48.80	23.05
S.D.			0.27	9.05	0.42	1.20	0.40	0.05	7.75	8.81	20.99	17.95	28.54	16.50		14.97	10.60
Malta	188	31	1.71	6.20	6.83	2.35	0.63	0.02	1.01	47.92	75.27	56.21	72.34	69.26	42	57.29	46.63
S.D.			0.43	8.17	0.41	0.82	0.08	0.01	8.12	10.07	26.05	17.54	42.78	16.21		10.92	9.70
Mauritius	231	28	0.71	7.52	8.00	5.32	24.29	0.96	3.79	50.33	78.52	63.43	83.55	72.90	35	47.50	24.02
S.D.			0.21	8.26	0.73	2.29	5.25	0.50	7.14	9.52	24.57	18.44	33.17	16.41		14.82	11.74
Nepal	133	43	0.06	4.85	2.63	7.88	69.23	2.73	5.91	52.51	81.86	68.13	92.73	74.03	68	28.53	6.09
S.D.			0.02	7.09	0.28	2.23	17.32	1.10	6.58	8.50	18.17	15.43	22.60	14.67		5.63	7.00
Netherlands	1122	137	4.49	5.33	4.21	2.09	0.64	0.02	0.56	51.99	81.15	63.39	80.39	77.28	54	62.20	44.95
S.D.			0.93	8.22	1.39	0.90	0.08	0.01	8.00	9.78	23.07	19.01	35.39	16.44		13.02	14.21
New Zealand	3693	656	3.16	9.06	5.37	2.30	1.21	0.03	-1.50	50.89	83.76	62.38	84.66	76.14	53	45.11	23.21
S.D.			0.93	10.43	1.09	1.12	0.07	0.01	4.64	9.54	22.72	18.60	30.98	15.90		15.13	13.22
Pakistan	100	25	0.11	5.85	5.71	8.28	72.33	3.08	6.54	50.02	81.25	67.35	79.33	74.55	55	39.63	12.92
S.D.			0.03	7.64	1.03	3.47	26.70	1.31	7.41	10.10	23.60	18.31	35.38	16.44		12.45	9.78
Papua New Guinea	305	47	0.13	10.55	2.60	5.94	2.23	0.09	4.02	49.32	83.03	62.70	81.20	75.13	48	40.83	30.10
S.D.			0.06	11.71	0.14	3.94	0.23	0.04	9.79	10.06	23.69	18.72	34.99	16.46		11.96	12.99
Peru	76	12	0.46	8.15	4.52	2.78	2.47	0.09	1.31	46.96	82.40	58.49	81.14	68.74	45	50.58	23.17
S.D.			0.18	6.82	0.72	1.18	0.32	0.03	7.20	11.64	24.17	20.56	33.26	21.19		14.22	9.80
Philippines	1386	213	0.19	7.64	8.32	4.29	38.23	1.51	2.81	49.29	78.67	62.92	83.33	73.45	30	39.78	16.75
S.D.			0.07	7.59	1.80	1.52	5.81	0.75	8.26	9.09	21.96	17.37	32.96	15.42		13.85	9.43
Poland	468	67	1.00	9.41	13.45	2.70	2.56	0.12	1.31	49.11	78.87	57.37	75.57	71.21	40	52.53	30.23
S.D.			0.36	10.08	4.64	1.58	0.39	0.05	10.22	9.35	24.73	20.04	37.58	16.86		17.98	16.85
Portugal	82	22	1.87	5.68	9.13	2.39	0.63	0.02	-0.91	48.19	84.60	60.14	89.43	69.99	49	37.12	22.27

Country	Sample size	No of unique individuals	GDP (p/c, nominal USD)	GDP (p/c, nominal) growth (%)	Unemployment rates (%)	CPI (%)	Mean of exchange rate	Deviation of exchange rate	Yearly exchange rate growth (%)	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	Male (%)	Age (years)	Length of stay (years)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
S.D.			0.43	8.93	4.24	1.61	0.08	0.01	6.82	8.85	20.53	15.97	26.65	16.54		12.07	10.95
Romania	205	33	0.65	15.32	7.11	10.07	0.63	0.02	3.35	45.96	66.28	51.93	61.46	63.73	42	47.79	22.05
S.D.			0.30	15.61	0.52	8.67	0.08	0.01	7.49	11.59	29.10	20.97	44.10	18.42		18.07	14.65
Russian Federation	201	26	0.93	16.39	6.88	10.66	23.74	0.91	6.06	49.14	76.00	56.18	82.42	70.63	51	56.98	19.73
S.D.			0.49	18.28	1.17	4.16	5.51	0.63	8.79	7.24	20.97	15.11	33.67	14.28		16.94	13.56
Singapore	170	29	4.05	6.02	3.55	2.24	1.19	0.04	0.62	47.76	81.76	59.12	79.41	67.36	55	46.95	27.56
S.D.			1.29	8.19	0.76	1.96	0.13	0.02	6.03	11.24	23.32	19.48	38.90	19.45		13.75	13.78
South Africa	998	165	0.59	4.39	24.64	5.87	6.42	0.28	7.36	49.01	84.86	61.26	84.74	73.74	49	40.25	18.24
S.D.			0.17	15.93	1.29	2.13	1.54	0.12	7.47	9.59	20.40	17.33	30.74	16.17		15.52	10.23
Spain	97	18	2.73	4.34	17.01	2.38	0.65	0.02	1.01	48.10	83.63	61.68	85.91	68.01	63	43.19	23.37
S.D.			0.55	9.47	6.79	1.29	0.08	0.01	7.81	8.60	22.78	19.63	28.80	13.49		15.60	12.70
Sri Lanka	610	86	0.22	10.95	6.01	9.07	88.56	4.54	7.06	52.80	85.68	69.10	90.49	78.53	50	46.72	19.95
S.D.			0.11	8.97	1.67	4.83	27.10	2.56	8.71	7.99	20.01	16.46	26.20	14.92		16.84	12.94
Sweden	93	21	4.60	4.82	7.05	1.29	5.87	0.19	0.91	53.19	90.32	66.51	94.27	78.45	59	45.63	25.76
S.D.			1.17	11.02	1.25	1.13	0.61	0.07	5.32	6.77	15.32	16.18	16.76	12.37		17.88	16.12
Switzerland	106	18	7.06	5.11	4.03	0.33	0.92	0.04	-1.32	52.41	87.74	66.12	91.51	79.19	50	48.55	26.56
S.D.			1.66	7.17	0.55	0.69	0.04	0.01	6.99	8.06	20.84	17.20	23.03	14.69		16.57	20.92
Thailand	146	33	0.47	5.94	1.13	2.60	28.82	1.10	1.14	47.15	77.57	60.27	77.40	69.83	20	34.47	11.78
S.D.			0.16	7.52	0.56	1.31	2.93	0.43	5.33	10.12	24.03	16.90	37.33	17.66		10.68	9.20
Turkey	172	25	0.84	6.54	10.12	14.96	1.28	0.07	16.95	49.36	81.90	62.34	83.91	71.89	44	40.88	23.99
S.D.			0.27	14.75	1.28	14.31	0.41	0.04	19.93	9.84	21.64	18.99	33.72	17.44		11.41	9.59
Ukraine	107	22	0.28	12.07	7.88	8.64	5.65	0.28	8.21	46.94	76.17	56.12	74.77	69.86	42	46.85	22.43
S.D.			0.11	19.66	1.14	6.40	2.17	0.21	13.23	9.43	25.38	21.43	39.35	16.28		20.51	18.71
United Kingdom	11126	1537	3.90	4.69	6.17	2.30	0.48	0.02	2.12	51.09	82.92	60.16	82.72	75.62	50	55.33	35.80
S.D.			0.63	8.44	1.30	0.97	0.11	0.01	7.36	10.02	24.04	20.23	33.66	17.02		15.64	15.42
United States of America	642	101	4.72	2.86	6.84	2.23	0.82	0.04	2.94	50.50	84.00	62.08	84.42	74.90	42	49.22	25.99
S.D.			0.52	1.98	1.70	1.02	0.17	0.02	8.45	9.83	25.22	18.95	31.32	16.53		15.14	15.65
Uruguay	92	13	0.92	6.79	7.93	8.69	16.80	0.98	9.95	49.09	84.38	59.04	79.71	70.65	46	44.17	28.80
S.D.			0.47	16.85	1.29	4.00	4.67	0.63	20.25	10.07	21.58	17.91	36.30	15.70		11.51	9.54
Vietnam	883	177	0.11	11.39	2.28	7.76	13844.57	665.16	5.53	48.63	76.66	61.16	80.90	70.31	43	41.09	20.02
S.D.			0.06	5.52	0.26	5.67	4792.46	387.80	9.64	9.65	22.59	18.89	34.63	17.08		13.59	8.29

Country	Sample size	No of unique individuals	GDP (p/c, nominal USD)	GDP (p/c, nominal) growth (%)	Unemployment rates (%)	CPI (%)	Mean of exchange rate	Deviation of exchange rate	Yearly exchange rate growth (%)	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	Male (%)	Age (years)	Length of stay (years)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Zambia	88	10	0.11	13.83	14.45	12.96	0.79	0.03	5.12	51.13	91.76	63.47	93.18	75.76	45	41.41	20.86
S.D.			0.05	16.90	1.05	5.80	0.17	0.02	10.68	8.41	11.67	20.18	17.62	16.45		9.73	8.99
All immigrants	33959	5436	2.60	6.72	6.99	3.50	516.21	25.90	2.34	50.26	81.58	61.18	82.33	74.12	48	49.99	29.08
S.D.			1.78	9.82	4.24	3.61	2518.92	152.36	9.95	9.82	23.57	19.44	33.76	17.05		16.66	16.71
Natives	156561	22257	4.55	8.10	5.41	2.83				49.98	82.70	59.98	83.37	74.35	47	42.39	
S.D.			1.69	12.59	0.68	0.77				10.03	23.43	19.78	32.48	17.09		18.62	

Notes: Standard Deviations (S.D) are reported right below mean values.

Appendix Table A3: Correlation matrix of macroeconomic and mental health measures

	CPI	Mean of exchange rate	Deviation of exchange rate	GDP	GDP growth	Unemployment rates	MCS	Social Functioning	Vitality	Role Emotional	Mental Health	K10
CPI	1***											
Mean of exchange rate	0.31***	1***										
Deviation of exchange rate	0.33***	0.82***	1***									
GDP	-0.47***	-0.28***	-0.23***	1***								
GDP growth	0.13***	0.1***	0.05***	-0.20***	1***							
Unemployment rates	0.12***	-0.14***	-0.09***	-0.16***	-0.12***	1***						
MCS	-0.04***	-0.02***	-0.02***	0.07***	-0.02***	-0.03***	1***					
Social Functioning	-0.03***	-0.03***	-0.02***	0.05***	-0.01**		0.68***	1***				
Vitality	0.01*	0.01**	0.01**	-0.03***		-0.02***	0.68***	0.62***	1***			
Role Emotional						-0.01**	0.78***	0.61***	0.49***	1***		
Mental Health	-0.04***	-0.03***	-0.02***	0.08***	-0.02***	-0.02***	0.83***	0.62***	0.70***	0.53***	1***	
K10	-0.05***	-0.05***	-0.04***	0.12***	-0.04***		0.70***	0.61***	0.60***	0.51***	0.76***	1***

Notes: *** p<0.01, ** p<0.05, * p<0.1. Unlisted correlation coefficient is statistically insignificant at any conventional level.

Appendix Table A4: Mental health estimates with alternative specifications

	MCS				Social Functioning				Vitality				Role Emotional				Mental Health			
	Pooled 1	Pooled 2	FE 1	FE 2	Pooled 1	Pooled 2	FE 1	FE 2	Pooled 1	Pooled 2	FE 1	FE 2	Pooled 1	Pooled 2	FE 1	FE 2	Pooled 1	Pooled 2	FE 1	FE 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Male	0.78***	0.78***			2.89***	2.89***			2.95***	2.95***			3.30***	3.30***			1.52***	1.52***		
	[0.24]	[0.24]			[0.57]	[0.57]			[0.53]	[0.53]			[0.75]	[0.75]			[0.45]	[0.45]		
Length of stay in Australia	-0.02	-0.02			-0.03	-0.04			-0.13	-0.14			-0.11	-0.13			-0.06	-0.07		
	[0.09]	[0.09]			[0.21]	[0.21]			[0.19]	[0.19]			[0.27]	[0.27]			[0.16]	[0.16]		
Length of stay in Australia sq.	0.00	0.00			0.00	0.00			0.00	0.00*			0.00	0.00			0.00	0.00		
	[0.00]	[0.00]			[0.00]	[0.00]			[0.00]	[0.00]			[0.00]	[0.00]			[0.00]	[0.00]		
Age	0.03	0.03	0.58	0.58	0.13	0.14	3.16**	3.16**	0.24***	0.24***	0.27	0.27	0.60***	0.60***	0.84	0.84	-0.03	-0.03	0.19	0.19
	[0.04]	[0.04]	[0.62]	[0.62]	[0.10]	[0.10]	[1.50]	[1.50]	[0.09]	[0.09]	[1.02]	[1.02]	[0.14]	[0.14]	[2.19]	[2.19]	[0.08]	[0.08]	[1.03]	[1.03]
Age squared	0.00	0.00	-0.00***	-0.00***	-0.00**	-0.00**	-0.01***	-0.01***	-0.00**	-0.00**	-0.01***	-0.01***	-0.01***	-0.01***	-0.02***	-0.02***	0.00*	0.00*	-0.00***	-0.00***
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
Married/de facto ^(a)	1.48***	1.48***	0.78*	0.78*	2.68***	2.67***	-0.54	-0.55	-0.04	-0.06	-2.25***	-2.26***	3.85***	3.82***	2.34	2.34	1.62**	1.61**	0.60	0.59
	[0.40]	[0.40]	[0.45]	[0.45]	[0.90]	[0.90]	[0.99]	[0.99]	[0.87]	[0.87]	[0.81]	[0.81]	[1.27]	[1.27]	[1.49]	[1.49]	[0.73]	[0.73]	[0.74]	[0.74]
Separated/divorced/widowed ^(a)	-0.88*	-0.88*	-1.82***	-1.83***	-4.28***	-4.27***	-4.35***	-4.36***	-3.68***	-3.66***	-4.45***	-4.47***	-2.80	-2.78	-3.73*	-3.73*	-2.77***	-2.77***	-3.70***	-3.72***
	[0.53]	[0.53]	[0.60]	[0.60]	[1.29]	[1.29]	[1.34]	[1.34]	[1.17]	[1.17]	[1.00]	[1.00]	[1.75]	[1.75]	[2.02]	[2.02]	[0.97]	[0.97]	[0.98]	[0.98]
ESB country	1.48*	1.37			3.73*	3.27			2.58	2.15			4.04	3.30			4.22***	3.91**		
	[0.88]	[0.90]			[1.93]	[2.01]			[2.11]	[2.14]			[2.70]	[2.82]			[1.60]	[1.63]		
Year 12 ^(b)	0.14	0.15	-0.53	-0.50	0.95	0.97	-1.93	-1.86	0.87	0.88	-1.89*	-1.81*	0.85	0.88	-1.74	-1.72	0.65	0.66	-0.73	-0.67
	[0.41]	[0.41]	[0.66]	[0.66]	[0.98]	[0.98]	[1.30]	[1.30]	[0.91]	[0.91]	[0.98]	[0.97]	[1.29]	[1.28]	[2.26]	[2.26]	[0.78]	[0.78]	[1.03]	[1.03]
Vocational education training ^(b)	1.01***	1.01***	-0.40	-0.41	2.09***	2.10***	-1.13	-1.14	1.98***	1.99***	-1.20	-1.22	3.09***	3.10***	-1.83	-1.83	2.62***	2.63***	-0.54	-0.55
	[0.33]	[0.33]	[0.64]	[0.64]	[0.81]	[0.81]	[1.35]	[1.35]	[0.74]	[0.74]	[1.08]	[1.08]	[1.07]	[1.08]	[2.09]	[2.09]	[0.63]	[0.63]	[1.06]	[1.06]
Bachelor or honours or higher ^(b)	1.16***	1.16***	0.03	0.00	3.66***	3.67***	-2.08	-2.13	2.15***	2.16***	-2.23	-2.30*	4.42***	4.43***	-2.47	-2.49	3.49***	3.49***	-0.35	-0.41
	[0.36]	[0.36]	[0.83]	[0.83]	[0.87]	[0.87]	[1.63]	[1.62]	[0.82]	[0.82]	[1.40]	[1.39]	[1.12]	[1.12]	[2.73]	[2.73]	[0.67]	[0.67]	[1.27]	[1.26]
Regional unemployment rates	0.10	0.10	0.09	0.09	0.35	0.35	0.00	0.01	0.24	0.24	0.01	0.02	0.30	0.30	0.22	0.23	0.13	0.13	0.14	0.15
	[0.12]	[0.12]	[0.08]	[0.08]	[0.27]	[0.27]	[0.18]	[0.18]	[0.25]	[0.25]	[0.14]	[0.14]	[0.38]	[0.38]	[0.28]	[0.28]	[0.21]	[0.21]	[0.12]	[0.12]
Index of relative socio-economic advantage	0.24***	0.24***	0.04	0.04	0.97***	0.96***	0.29**	0.28**	0.53***	0.53***	0.08	0.08	1.09***	1.09***	0.11	0.11	0.48***	0.47***	0.12	0.12
	[0.05]	[0.05]	[0.05]	[0.05]	[0.11]	[0.11]	[0.11]	[0.11]	[0.10]	[0.10]	[0.08]	[0.08]	[0.14]	[0.14]	[0.16]	[0.16]	[0.08]	[0.08]	[0.08]	[0.08]
CPI (%)		-0.07		-0.04**		-0.27		-0.10**		-0.25		-0.13***		-0.43		-0.03		-0.18		-0.10***
		[0.09]		[0.02]		[0.22]		[0.05]		[0.19]		[0.04]		[0.36]		[0.07]		[0.15]		[0.04]
Sample size	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959	33959
R squared	0.08	0.08	0.01	0.01	0.09	0.09	0.01	0.01	0.06	0.06	0.01	0.01	0.08	0.08	0.01	0.01	0.08	0.08	0.01	0.01
F test statistics			6.75	6.75			6.75	6.73			10.28	10.29			4.95	4.95			9.27	9.26
P F test			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00			0.00	0.00

Notes: Pooled results are from the regression (1) while FE results are from the regression (2). Other explanatory variables include the number of co-residing members of various age cohorts, state dummies, and year and month dummies. Pooled regressions also include migration cohort fixed effects, home country fixed effects and home country specific time fixed effects. ^(a) Being single is the base group; and ^(b) Year 11 and below is the base group. F test (and P F test) statistics are from an F test that all $\alpha_i = 0$. Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A5: Effects of home country's GDP deflator on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
Estimate of GDP deflator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Current	-0.09 [0.08]	-0.03 [0.02]	-0.37* [0.20]	-0.05 [0.04]	-0.30* [0.16]	-0.04 [0.03]	-0.55* [0.33]	-0.05 [0.06]	-0.23* [0.12]	-0.05 [0.03]	-0.02 [0.04]	0.06 [0.06]
Lag 1 year		-0.03* [0.02]		-0.11*** [0.04]		-0.06* [0.03]		-0.07 [0.06]		-0.04 [0.03]		
Lag 2 years		-0.01 [0.01]		-0.03 [0.03]		-0.02 [0.03]		0.03 [0.05]		-0.04 [0.02]		
Forward 1 year		-0.01 [0.02]		0.00 [0.04]		-0.01 [0.03]		0.04 [0.06]		-0.03 [0.03]		
Forward 2 years		0.00 [0.02]		0.02 [0.05]		0.00 [0.04]		-0.05 [0.07]		0.03 [0.03]		
With inclusion of GDP		-0.03 [0.02]		-0.05 [0.04]		-0.04 [0.03]		-0.06 [0.06]		-0.04 [0.03]		
With inclusion of GDP growth		-0.03 [0.02]		-0.04 [0.04]		-0.04 [0.03]		-0.05 [0.06]		-0.05 [0.03]		
With inclusion of unemployment		-0.03 [0.02]		-0.04 [0.04]		-0.05 [0.03]		-0.04 [0.06]		-0.05 [0.03]		
With inclusion of exchange rate		-0.03 [0.02]		-0.06 [0.04]		-0.05 [0.04]		-0.06 [0.06]		-0.04 [0.03]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table A6: Effects of home country's GNI per capita on immigrants' mental health

	Mental health measures										Physical health measures	
	MCS		Social Functioning		Vitality		Role Emotional		Mental Health		Physical Function	Role Physical
	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	Pooled	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Estimate of GNI (in nominal USD, log)												
Current	0.20	0.16	0.86	0.71	0.68	0.35	1.21	-1.16	0.91	0.92	0.01	-0.59
	[0.50]	[0.36]	[1.15]	[0.85]	[1.09]	[0.67]	[1.65]	[1.28]	[0.89]	[0.64]	[0.84]	[1.34]
Lag 1 year		0.03		0.69		0.23		-1.61		0.68		
		[0.36]		[0.86]		[0.66]		[1.27]		[0.64]		
Lag 2 years		-0.01		0.68		0.06		-1.72		0.41		
		[0.37]		[0.88]		[0.68]		[1.30]		[0.67]		
Forward 1 year		-0.05		0.21		0.08		-1.99		0.86		
		[0.37]		[0.86]		[0.69]		[1.30]		[0.64]		
Forward 2 years		-0.11		0.05		0.09		-1.98		0.80		
		[0.40]		[0.90]		[0.75]		[1.41]		[0.68]		
With inclusion of GDP growth		0.15		0.71		0.36		-1.19		0.93		
		[0.36]		[0.85]		[0.67]		[1.28]		[0.64]		
With inclusion of unemployment		0.32		1.05		0.33		-0.77		1.11		
		[0.39]		[0.93]		[0.74]		[1.39]		[0.71]		
With inclusion of CPI		0.02		0.33		-0.04		-1.30		0.65		
		[0.37]		[0.86]		[0.69]		[1.29]		[0.65]		
With inclusion of exchange rate		0.20		0.89		0.42		-1.02		0.88		
		[0.41]		[0.95]		[0.78]		[1.44]		[0.72]		

Notes: Number of (unique) observations: (5,436) 33,959. Pooled results are from the regression (1) while FE results are from the regression (2). Each coefficient is estimated from a separate regression. Other explanatory variables include age (and its square), education, marital status, the number of co-residing members of various age cohorts, the regional unemployment rate, regional relative socio-economic advantage index, state dummies, and year and month dummies. Pooled regressions also include gender, ESB, duration of stay in Australia (and its square), migration cohort dummies, home country fixed effects and home country specific time fixed effects.

Robust standard errors clustered at the individual level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.