Immigrant Mental Health and Unemployment: A study of Immigrants and their Families

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Abstract

The objective of this research is to assess whether stress associated with the transition to a new country combined with additional stress arising from unemployment affects not only principal immigrants but also other immigrant family members. I use the Longitudinal Survey of Immigrants to Australia (LSIA) to examine the effect of labour force status on the mental health of immigrants. By using a rich longitudinal data set I am able to control for individual differences between immigrants and to examine whether changes in mental health are causing changes in labour force status rather than changes in labour force status causing changes in mental health. I find that causality runs from unemployment to mental health and that unemployment significantly adversely affects the mental health of immigrants. Other characteristics associated with poor mental health include, age, gender, Visa category, marital status and educational attainment. I also examine the impact of the family in alleviating the stress of migration and unemployment. I find that the mental health of immigrant couples is positively correlated. I also find that the negative effects of immigrant unemployment are not alleviated by spouse employment.

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1. Introduction

> *It is apparent from studies in Australia and overseas that migration itself does not necessarily threaten mental health. The mental health status of immigrants and refugees becomes a concern when additional risk factors (pre-migration and post-migration factors) combine with the stresses of migration (Jayasuriya et al., 1992).*

The impact of unemployment on the mental health of immigrants is an essential piece of information for policy makers who seek to improve the welfare of all citizens and reduce the potential for increased health care costs. This paper examines the effect of labour force status in particular, unemployment, on the mental well being of Australian immigrants. The paper examines whether the stresses associated with the transition to a new country (or culture) combined with additional stress arising from unemployment affects not only principal immigrants but also other immigrant family members.[2]

There is a large literature exploring the mental health of immigrants. Studies have typically focused on the incidence of psychiatric illness amongst immigrants (for a review of Australian studies see Jayasuriya et al., 1992). Some studies have focused on the transition experience of immigrants. For example, Kuo et al. (1986) examined the impact of social support networks on the transition experiences of immigrants. This paper focuses primarily on the transition experience of immigrants and uses a well-known psychiatric evaluation instrument to measure mental health.

There is also a literature that explores the effect of unemployment on mental health or well being (see for example, Clark and Oswald, 1994; Flatau et al., 1998; Theodossiou, 1998; Warr, 1987). In general, this literature finds that the unemployed have poorer mental health compared to those whom are employed. The relationship between unemployment and mental health depends in part on individual characteristics and the duration of unemployment. This paper takes an informal theoretical approach (similar too much of the unemployment mental health literature) in identifying causal links between labour force status and mental health.

[2] Principal immigrants (termed principal applicants in this Australian data set) being persons who applied to migrate.

Most studies of unemployment and mental health focus on individual responses to employment status. However, many decisions such as participation in the labour market and the decision to migrate are made in a family or household setting. In addition to exploring how an immigrant's labour force status affects them, I examine mental health responses to different labour force states in a family context. This aspect of the paper is an important contribution to the existing literature, (for a review of related studies see Mathers and Schofield, 1998).

Section 2 of the paper briefly examines the existing literature on unemployment, immigration and mental health. Section 3 discusses the data set and presents some descriptive results. In section 4, a number of regression models and associated results are presented and discussed. Section 5 concludes with a discussion of key results.

2. Literature Review

2.1 Unemployment and Mental Health

There are a number of good reviews of the unemployment and mental health literature (for example, Flatau et al., 1998; Ezzy, 1993; Warr et al., 1988; Jahoda, 1988). It is not my intention to repeat this work instead; I focus on theoretical underpinning of this literature and relevant empirical studies.

Most studies of the effect of unemployment on mental health are in what Clark and Oswald (1994) describe as the psychologists' tradition. That is, researchers use broad descriptive models to represent the effects of different stresses on individuals. [3] [4] The theoretical focus of

[3] Psychologists have developed many sophisticated models of stress and there are a number of different psychological models through which behaviour can be interpreted. The psychological or behavioural model underlying most unemployment mental health studies appears to be a simple model of stress or perhaps more accurately chronic stress. According to Talyor et al (1997), Seyle (1956) first discussed the effect of chronic stress on health in his articulation of the General Adaptation Syndrome. The General Adaptation Syndrome is a model of stimulus – resistance – exhaustion. Seyle suggested repeated cycling through these phases would lead to health problems. Models similar to that suggested by Seyle (1956) and other psychologists are starting to find their way into the economic literature see for example, Smith (1999).

[4] See Jahoda (1988) and Theodossiou (1998) for a discussion of why studies in this area have tended to be descriptive rather than directed by economic theory.

this literature has been on why unemployment stresses the individual (not how stress itself impacts on the individual). Flatau et al. (1988) notes that Jahoda (1982) and (1992) further developed the theoretical basis of her work by relating how the unemployment experience equates to the deprivation of positive influences associated with work. Some of the positive influences of work include income, social contact and structured time. Deprivation of the positive aspects of work even in comparison to poorly paid work is also a feature of other authors work (for example, Theodossiou, 1998).

Warr's (1987) Vitamin model is a more elaborate model of the mechanism by which unemployment stresses individuals. This model treats different aspects of the work environment as if they were vitamins contributing towards mental health. In this model too much of some aspects of work can be deleterious to mental health in the same way too much of some vitamins can adversely affect physical health. Similarly, too little (deprivation) of some aspects of work through unemployment will also adversely affect mental health. The Vitamin model also carefully reflects the notion of equilibrium. That is, persons need stimulation but not too much or not too little.[5]

A nice illustration of how individual health states are built around equilibrium is in Warr's (1988) paper in which he discusses the adaptation of individuals to a long duration of unemployment. Warr (1988) proposes that there is a inverted U shaped response to a duration of unemployment where initially stress levels rise (mental health declines), followed by a period of higher sustained stress (further decline in mental health) followed in turn by adaptation to unemployment and an increase in mental health. However, this final (equilibrium) level of mental health is still below the pre-unemployment mental health level.

Other studies have also found evidence of mental health adaptation to labour market shocks. For example, Kasl et al. (1975) examined individuals' health in firms that were about to close down and the effect of different social support networks on mental health. Differences in social networks were isolated through a rural urban differentiation where it was assumed that social networks would be stronger in the rural setting. Kasl et al. (1975) found that stress

[5] One important notion in this psychological literature which also central to economics is that of equilibrium. As Seyle in Kutash et al (1980) points out "complete freedom from stress is death". That is, not all stress is bad there is some healthy level of stress (or stimulation) at which people function optimally.

levels were highest in the anticipatory phase of firm shutdown (prior to actual unemployment) and some evidence that the stress of unemployment was alleviated for individuals with stronger support networks.

An aspect of an individual's life that may alleviate stress caused by unemployment is their family. It may be the case that when one member of a family is unemployed their stress is partly offset by another member of the family being in employment. It might also be the case that the family is negatively affected by having any unemployed members. Warr (1987) reviews studies of the effect of unemployment on families and finds mixed evidence, some studies suggesting adverse effects of unemployment on families other studies showing no effect.

The role of economic theory in the unemployment and mental health literature is small. Some authors have displayed a clear preference not to incorporate existing economic theory suggesting that a descriptive based approach is most appropriate, see Jahoda (1988) and Theodossiou (1998). Clark and Oswald (1994) whilst adopting a psychological (stress based) approach interpret their results in a utility framework. They treat a decline in mental health as an indicator of a person's utility thus when they observe that poorer mental health is associated with unemployment they infer that unemployment is primarily an involuntary phenomena with an associated reduction in utility. Flatau et al. (1998) notes that Grossman's (1972) model of health capital is an economic model whereby unemployment might be related to mental health (or health more generally). In this model, an episode of unemployment could be treated as a negative shock to health investment or acceleration in the depreciation of the stock of health.

2.2 Immigrants and Mental Health

Studies of the mental health of immigrants have tended to focus on the incidence of mental illness in immigrant populations usually comparing this to the incidence in native populations. Jayasuriya et al. (1992) reviewed Australian studies of the mental health of immigrants and found that it was difficult to draw conclusions about the relative health of immigrants compared to other Australians. Vega and Rumbaut (1991) reviewed USA studies

of the mental health of ethnic minorities and found mixed evidence for a higher incidence of mental illnesses.[6]

Longitudinal studies of the transition experience of immigrants have found that immigrants typically adjust to their new country in an approximate 3 year cycle of euphoria, disenchantment, and finally acceptance or equilibrium, see for example Rumbaut (1985), Portes and Rumbaut (1989), and Ying (1988) (as cited in Vega and Rumbaut, 1991). The pace of adjustment is affected by a number of factors including; the ability to speak the adopted countries language, social support mechanisms, family issues and the situation from which the immigrant has come (for example, immigrants leaving a stressful situation for humanitarian reasons have been found to be more anxious in their new environment).

Kuo et al. (1986) examined the impact of different social networks on immigrants well being and found that ethnic support networks can play an important role in promoting immigrant mental health. The role of the family is central in most support networks, particularly where family members or relatives have sponsored an immigrant.

The behavioural model underlying studies of the mental health of immigrants appears to be a model of stress (similarly to the literature on unemployment and mental health) where immigration or factors associated with immigration stress the individual. Vega and Rumbaut (1991) noted that most research on whether there are inherent features of minorities (including immigrant minorities) that cause mental illnesses is "guided by social psychological stress theory". This theory suggests that life stresses are more significant and numerous for minority groups. The concepts of alienation and conflicts of cultural practise feature strongly in the immigration mental health literature as sources of stress. This literature also highlights pre-migration stresses such as persecution and torture and how this impacts on the transition experience of refugees (for example, Krupinski et al., 1986).

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[6]Vega and Rumbaut (1991) noted that the recorded high incidence of mental illnesses in some ethnic groups could be because a large proportion of these ethnic groups are part of lower socioeconomic groups and it is these groups that are more likely to experience mental illness.

3. Data

The Longitudinal Survey of Immigrants to Australia (LSIA) first collected information from 5192 principal applicant immigrants and their spouses commencing in March 1994 (approximately 6 months after arrival).[7] Of the 5192 principal applicants, 1837 had spouses. The LSIA was designed to be representative of the principal applicant immigrant population arriving in Australia in the period September 1993 to August 1995, (approximately 75,000 people). Waves 2 and 3 of the survey were subsequently collected commencing March 1995 (approximately 18 months after arrival) and then again in March 1997 (approximately 42 months after arrival). In wave 3, 3752 of the original 5192 principal applicants where able to be interviewed. See appendix 3 for a discussion of attrition in this data set.

The focus of this paper is on all (adult) immigrants and immigrant families (couples). All immigrants include the 5192 principal applicants and 1837 spouses of principal applicants. After excluding those who did not respond to all 12 mental health questions there was 6889 immigrants in wave 1. Household income, number of children and visa category data were only collected from principal applicants, all other information was collected from principal applicants and their spouses via separate personal interviews.

All variables of interest and their definitions are listed in Table 1. The measure of mental health used in this study was the 12-question version of the General Health Questionnaire (GHQ). The 12 questions that comprise the GHQ are presented in Appendix 1. The GHQ was primarily developed in the UK in the 1960 and 1970s and has been used in numerous studies mainly as an instrument for "detecting psychiatric disorders" see Goldberg (1972), (1988). The GHQ has been widely tested, used in many countries and is considered to be an instrument largely free of cultural biases, see Bowling (1991). Argyle (1989) as cited in Oswald and Clark (1994) suggests that the GHQ is a very good measure of psychological disadvantage.

There are primarily two ways to code responses to the GHQ. Firstly, using a Likert scale where the four possible responses to each question are coded 0, 1, 2 or 3. In this scale 0 corresponds to a good outcome and 3 to a bad outcome. Secondly, using binary scoring

[7] The survey and associated data sets are maintained and released by the Australian Department of Immigration and Multicultural Affairs (DIMA).

where responses are scored 0, 0, 1, 1. In this case 0 scores correspond to the two better health responses and 1 scores to the two feeling worse responses.[8] Using binary scoring the minimum GHQ score a person can obtain is 0 and the maximum is 12. I use binary scoring in this study.

In many studies a benchmark GHQ score is adopted. Scores above the benchmark indicate a higher probability of psychiatric disorder or psychological disadvantage. This is known as a caseness score as the benchmark score corresponds to those found in typical psychiatric cases. The benchmark commonly used for the 12 question GHQ is 2. This benchmark is adopted in this study.

3.1 Descriptive Features of the Data

GHQ mean and caseness (the percentage of respondents scoring 2 or more) scores for each wave are presented by gender, age, labour force status and visa category in tables 2 and 3. GHQ mean and caseness scores for other variables of interest are presented in Appendix 2 tables A2.1 and A2.2. GHQ mean and caseness scores were higher for all groups in wave 1 than in wave 2 and wave 3 indicating that psychological disadvantage is on average worse for immigrants 6 months after arrival in Australia than at 18 months and 42 months. Whilst the pattern of adjustment observed in other studies of euphoria, disenchantment and acceptance is not observed in this study it is possible that the initial period of euphoria observed in other studies has passed before immigrants are surveyed in this study.

Female GHQ mean and caseness scores were higher than male scores in all waves a result often observed, see Vega and Rumbaut (1991), Goldberg (1988). Immigrants aged 35 to 54 years tended to have higher GHQ scores in waves 1 and 2.[9] However, this age effect was not present in wave 3.

Unemployed persons displayed higher levels of psychological disadvantage compared to employed persons for all waves and the relative disadvantage of the unemployed compared to

[8] Binary scoring has the advantage that "it eliminates errors due to 'end users' and 'middle users', since they will score the same irrespective of whether they prefer Columns 1 and 4 or Columns 2 and 3" (Goldberg, 1972).

[9] T statistics where calculated for GHQ caseness scores for gender and age both set of differences where significant at the 5 percent level.

the employed grew over time. In waves 2 and 3 immigrants who had been unemployed for less than 6 months tended to have higher caseness scores compared to immigrants' unemployed for greater than 6 months.[10] This result is consistent with Ware et al (1987) observation that unemployed persons adapt to their situation though ultimately their mental health is still worse than employed persons. There were some minor differences in caseness scores for employed persons disaggregated by the number of hours worked with higher scores (poorer mental health) for those working 15 to 34 hours. This maybe indicative of some underemployment in these groups, for a discussion of immigrant underemployment issues see Wooden et al. (1994). Persons immigrating on humanitarian grounds had higher GHQ scores than all other immigrant groups. The difference between the humanitarian visa category and other visa categories was greatest at 42 months possibly indicating that this group experiences greater transition difficulties.[11]

In waves 1 and 2, immigrants with higher education tended to have higher GHQ scores compared to less well educated immigrants, see table A2.1 and A2.2. However, in wave 3 there was little or no difference in GHQ scores between different education groups. Vega and Rumbaut (1991) note that other authors (Portes et al., 1990 and Ying et al., 1988) found that more highly educated immigrants adjust more rapidly to their new environment than less well educated immigrants. The results of this analysis suggest that more highly educated immigrants also have more pronounced adjustment phases compared too less well educated immigrants. Immigrants who reported their marital status as separated had higher caseness scores than all other martial status groups. Differences in family size (the number of children) did not appear strongly related to differences in GHQ scores. As expected immigrants who report poor general health also report poor mental health. Immigrants who spoke English poorly had higher GHQ scores in wave 3 than other immigrants perhaps indicative of a relatively harder adjustment process for this group of immigrants.

Immigrants in households with higher household income, particularly those in households with more than 50000 AUD per annum had lower GHQ scores than those in households with less than 35000 AUD per annum. Low income household GHQ scores remained the same or

[10] However, this difference was not significant for GHQ caseness scores at the 5 percent level.

[11] For a discussion of attrition issues and possible impacts on these descriptive statistics see Appendix 3.

increased through time whilst higher income household caseness scores fell, thus by wave 3 the difference in GHQ scores between high and low income households had increased.

Immigrants were also asked about how they felt about their job. Immigrants who did not like their job had higher GHQ caseness scores than those who did like their job and interestingly, those who were unemployed. This is an indication that a 'bad' job can be worse than no job at all.

The GHQ mean and caseness scores from this data set were broadly consistent with those found in other studies. For example, Clark and Oswald (1994) found that 49% of unemployed males and 58% of females had GHQ caseness scores of 2 or more whilst in this study 33% of males and 38.5% of females had caseness scores of this order. An Australian study of teenagers by Rickwood et al. (1996) also reports broadly similar GHQ caseness scores apart from scores for young females, which were much higher in Rickwood et al. (1996).[12]

4. Method and Results

4.1 Probit Regressions on Immigrants

Probit regressions were run separately on each wave (cross-section) where the dependent variable was the GHQ caseness score.[13] Independent variables were selected after considering possible stresses, individual characteristics and the relevant literature. Independent variables included disaggregated labour force status, age and age squared, sex, family size, household income, martial status, education, visa category and country of birth. Table 4 displays the marginal effects (calculated at the mean of regressors) on aggregate and disaggregated labour force status variables from probit regressions on wave 1.[14]

[12] In Rickwood et al (1996) 40.8% of females aged 16 to 24 had GHQ scores of 2 or more whilst in this study 25.7% of females aged 15 to 24 scored 2 or more.

[13] Ordered probit regressions were also run on each wave where the GHQ variable was ordered 0 to 12. A series of fixed and random effects panel models were also run where the GHQ variable was treated as continuous. The results from these regressions are discussed where they varied substantially from the probit regressions on GHQ caseness scores.

[14] The regression results from other waves were very similar. Similar coefficients were also obtained when regressions were also run separately for males and females.

The marginal effect of unemployment was positive and significant indicating that unemployed immigrants were more likely to report lower levels of mental health compared to those out of the labour force whilst employed immigrants were more likely to report higher levels of mental health. In regressions, where unemployment and employment variables were disaggregated according to the duration of unemployment and hours worked the marginal effect of full-time employment was negative, relatively large and significant. The marginal effects of other hours worked variables were insignificant. The marginal effects of unemployment duration of 2 to 6 months and greater than 6 months were positive and significant indicating these groups tended to report poorer mental health after controlling for other stresses and individual characteristics.

Full regression results are presented in Appendix 2 see table A2.3. The marginal effects of most explanatory variables were signed similarly to those in previous studies. In particular, age was nonlinearly related to mental health, the martial status category separated had a negative and significant effect on mental health, whilst the visa category humanitarian had a negative and significant effect on mental health compared to other visa categories.

4.2 Panel Regressions on Immigrants

A second series of regressions were estimated to take advantage of the longitudinal aspect of the data.[15] The coefficients on disaggregated labour force status variables are presented for a probit regression on wave 1, a balanced panel random effects probit model and an unbalanced panel random effects probit model. Full regression results are presented in Appendix 1, see table A2.4. A Hausman (1978) test between the balance and unbalanced panel random effects models was used to test for the effect of attrition. The test indicates that attrition was not affecting these regressions. A likelihood ratio test of whether panel level variance is an important component of overall variance is significant. Thus, the panel model is preferred to a pooled regression model.

[15] The longitudinal data set allows me to control for individual differences in responses to unemployment and immigration. In examining, how individuals respond to changes in their environment there is likely to be common or average response across all individuals. However, due to personality differences or learnt coping mechanisms, each individual's response will differ. When data is not available on these individual differences panel models are able to control, in part, for these effects unlike models estimated on cross-section data.

In general, panel results were similar to those obtained from the probit regression on wave 1. The coefficient on immigrants employed full time was significant and negative indicating that this group relative to those out of the labour force has lower GHQ caseness scores (or higher levels of mental health). All coefficients on unemployment duration variables were positive and significant except for the coefficient on unemployed for less than 2 months, which was insignificant.[16]

The ordered probit and the panel regression results are largely consistent with the picture provided by the descriptive results. In terms of labour force status, immigrants who are unemployed particularly those who have been unemployed for more than 2 months appear least mentally healthy. Adjustment to unemployment is also consistent with descriptive results with immigrants who are unemployed for greater than 6 months having poorer mental health than employed persons but better than those who have been unemployed for 2 to 6 months. Similarly to the descriptive results the regression results indicate that other characteristics associated with poor mental health include, marital status - separated, the humanitarian visa category, immigrants in households with low income and poor English language skills. It is also clear that the general immigrant population goes through some adjustment process after arrival in Australia with psychological disadvantage higher at 6 months after immigration than after 18 months and after 42 months.

4.3 Testing for Causality

Studies that use cross-section data are unable to determine whether changes in mental health are causing changes in labour force status rather than changes in labour force status (unemployment) causing changes in mental health. Bank et al (1982) and Jackson et al (1983) (as cited in Warr et al., 1988) have found evidence that causality runs from unemployment to mental health. Banks et al (1982) examined causality in the context of school leavers where GHQ scores were taken before leaving school and at a latter time when persons were in the labour force. They found that early GHQ scores (during schooling) did not predict labour force status.

[16] Models were also estimated for males and females separately, results were very similar to those for all immigrants.

The issues of causality between mental health and unemployment are complicated by a number of other factors. Studies have found that job insecurity or impending plant closures also have large mental health effects, see for example Kasl et al. (1975). These results suggest that it would be easy to ascribe to poor mental health a causal relationship with labour force status when in fact job insecurity is the underlying mechanism of change.

In this study, I tested the notion that underlying mental health might be predicting labour force status. Multinomial logit models were estimated with wave 2 labour force status as the dependent variables and GHQ scores in wave 1 as an independent variable. [17] Other independent variables were age, education, gender, English language ability and visa category. Three multinomial logit models were estimated with each model conditioned on immigrant labour force status in wave1. Most coefficients on wave 1 GHQ scores were insignificant, indicating that the mental health status of immigrants did not predict labour force status (in particular the transition from employment to unemployment) in wave 2, see table 6.[18] Full regression results are presented in Appendix 2, see tables A2.5a, A2.5b and A2.5c.

4.4 Immigrant Families and Mental Health Regressions

Results discussed thus far have focused on immigrants as individuals, examining the relationship between labour force status and their mental health. There is an important emerging literature that focuses on immigrant behaviour from a family perspective (for example, Baker et al., 1997). I examine the impact of labour force status and mental health on couples. For example, if a male partner is finding it difficult to obtain work is his psychological distress somewhat offset by his female partner working.[19]

[17] The period between waves 1 and 2 was 1 year.

[18] In the regression results presented GHQ scores in wave 1 were treated as a set of dummy variables. Results from regressions where the GHQ score is treated as a continuous variable were similar with the coefficient on the GHQ score always being insignificant. Regressions were also run where wave 2 GHQ scores were used to predict wave 3 labour force status, the results from these regressions were consistent with regressions results obtained using wave 1 and wave 2 data.

[19] All couples in this analysis are male female couples.

GHQ caseness scores for immigrant couples for nine family labour force status groups are presented in tables 7a and 7b. Combinations of couples labour force status define family labour force status groups. For example, one group is both partners employed; another group is both partners unemployed and so on. There are substantial differences in mental health for different couple labour force groups and over time. The most consistent result to emerge from tables 7a and 7b is that male and female mental health is usually higher when they are in employment. However, there does not appear to be a clear story emerging for differences in partners labour force status. For example, in wave 1 males who are unemployed with partners who are employed have significantly higher GHQ caseness scores (report poorer mental health) than males who are unemployed and their partner is unemployed whilst in waves 2 and 3 there is no significant difference between these 2 groups.[20]

In table 7c, the GHQ caseness scores for couples and non-couples by labour force status are presented. It is not clear from this table whether unemployed males and females in couples are better off than those who are not in couples. Whilst in wave 1 GHQ caseness scores were higher for the unemployed not in couples compared to those in couples there is little or no difference between these groups in waves 2 and 3.[21]

Correlation coefficients were calculated for partners' GHQ scores. A significant correlation coefficient of 0.34 was estimated indicating that partners mental health is positively associated. Descriptive results suggest that whilst there is a relationship between the mental health of partners the labour force status of partners (a possible source of poor mental health for partners) is not strongly associated with immigrant mental health

Panel probit regression models were estimated separately on males and females (in couples) to further examine the effect of partner labour force status. Independent variables included the set of independent variables used in earlier regressions as well as the labour force status of partners and the labour force status of partners interacted with labour force status of immigrants. Panel regression results for coefficients on labour force status variables are presented in table 8. Hausman tests indicate that attrition was not affecting these regressions.

[20] T tests at the 5 percent level.

[21] Only female GHQ caseness scores were significantly different at a 5 percent level,

In male panel probit regressions, employment remains an important and significant predictor of good mental health. Interestingly, the coefficient on female partners' employment is significant and positive indicating a negative effect on male mental health. The coefficient on the interaction of male unemployment and their female partner's employment whilst not significant in panel probit regressions was significant in panel regressions where the GHQ variable was treated as continuous.[22] Using the panel probit model, a Likelihood ratio test calculated after excluding female partners labour status and interaction terms suggests that these variables are important in explaining male GHQ caseness scores. However, their lack of individual significance in panel probit models means that the individual effects of partner labour force states are difficult to identify.

For female panel probit regressions, coefficients on their male partners labour force status are insignificant as are coefficients on their own labour force status. Coefficients on interaction variables were also mostly insignificant. Likelihood ratio tests on the exclusion of their male partners labour force status and interaction variables indicate that these variables were not statistically important in explaining variations in female GHQ caseness scores. When these variables are excluded the effect of female labour force status on female mental health is also better identified but surprisingly with a positive coefficient on employment compared to out of the labour force.[23]

It appears from these regressions that an immigrant's employment positively impacts on their mental health compared to unemployment and out of the labour force. When a female is employed and their male partner is unemployed this may be having a negative effect on the mental health of the unemployed male. When both partners are employed this may be positively impacting on the mental health of male immigrants. Female mental health appears to be unaffected by their male partners labour force status.

[22] Similarly when the GHQ score was treated as continuous, where both partners are unemployed and where both are employed, the effects on GHQ scores were significantly negative and positive respectively.

[23] In regressions where the GHQ variable is treated as continuous, the results for female mental health are very similar to those described for males. For example, when females are unemployed they are negatively affected by their partners' employment.

5. Conclusions

An interesting feature of this study was the examination of the effect of labour force status on couples. Whilst the mental health of partners was strongly positively associated, the effect of labour force status on partners mental health was less clear. A tentative conclusion that can be drawn about partners labour force status is that it appears that when male partners are unemployed and their female partner employed this has a negative effect on their mental health. Also, females appear to be unaffected by their partners labour force status. These effects would seem to run counter to a model of household utility whereby each partners utility is essentially the same. It suggests that each partners utility is derived independently though decisions maybe made in a household setting.[24] A more robust conclusion that can be drawn from the analyses of individuals and couples is that immigrant employment is a strong predictor of good mental health compared to both unemployment and being out of the labour force.

An examination of the issue of causality between immigrant mental health and labour force status found that causality ran primarily from labour force status to mental health, and not visa versa.

The results of this study are largely consistent with the unemployment and mental health and the immigrant and mental health literature. Unemployment has a significant negative effect on the mental health of immigrants. Other variables associated with immigrant mental health include age, marital status, education level, household income and visa category. Australian immigrants also display a pattern of adjustment to their new country similar to immigrants to other countries. In this study, psychological disadvantage is highest at 6 months after immigration compared to immigration after 18 months and after 42 months.

Unemployed immigrants also seem to display a pattern of adjustment to unemployment similar to that found in other studies of unemployment and mental health. That is, mental health was poorest for those who had been unemployed for 2 to 6 months and slightly better for those unemployed for more than 6 months. However, immigrants' unemployed for longer than 6 months still reported poorer mental health than employed immigrants.

[24] See Browning et al (1998) for a discussion of intra-household allocation issues.

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Table 1: Variable Definitions

Variable	Definition
General Health Questionnaire	Persons answer 12 questions related to their mental health. Details about the scoring and construction of this instrument can be found on page 6.
Age	Age is defined 2 ways either as a continuous variable or in 10-year age groups.
Gender	The dummy variable in regressions is (Males=0, Females=1)
Labour force status	Persons are asked which category best describes their current main activity. Answers are coded into 3 groups employed, unemployed or out of the labour force. People who report their main activity as wage and salary earner, conducting own business but not employing others, conducting own business and employing others, other employed are coded employed. People who report their main activity as unemployed looking for full time work or unemployed looking for part time work are coded unemployed. People who report their main activity as student, home duties, retired, aged pensioner, other pensioner or other are coded out of the labour force.
Visa categories	There are 5 visa categories, Preferential Family, Concessional Family, Business skills, Independent, and Humanitarian.
Country of birth	A persons country of birth.
Qualifications	This refers to qualifications obtained prior to immigrating to Australia. It does not include qualifications since arriving in Australia.
English Speaking / Non English Speaking	This includes people who speak English and people for who English is a second language. For those people whom English is not their first language there are 4 self rated groups, speaks English very well, well, not well or not at all.
Number of children	This collected only for Principal Applicants and is therefore has to be matched to Principal Applicants spouses
Marital status	The marital status of all persons at the time of survey
Self assessed health status	Self assessed health status is assessed as excellent, very good, good, fair, or poor.
Household income	Principal Applicants are asked to match to a list of categories what their total household income is before tax from all sources. This information is only collected from Principal Applicants.
Hours worked	Employed persons are disaggregated according to hours worked in main job.
Attitude to current job	Persons are asked how they feel about their current job
Duration of unemployment	Currently unemployed people are disaggregated according to the duration of their unemployment

Table 2: Mean General Health Questionnaire Scores

	Wave 1			Wave 2			Wave 3		
	Number	Mean	SD	Number	Mean	SD	Number	Mean	SD
All	6889	1.35	2.26	5956	1.03	1.98	5017	1.05	2.06
Male	3274	1.22	2.09	2828	0.97	1.95	2400	0.94	1.92
Female	3615	1.47	2.39	3128	1.09	2.00	2617	1.16	2.17
AGE 15-24	803	1.13	1.98	700	0.94	1.79	567	1.12	1.96
AGE 25-34	3160	1.41	2.26	2721	1.00	1.87	2228	1.03	1.98
AGE 35-44	1781	1.45	2.39	1572	1.11	2.10	1362	1.01	2.08
AGE 45-54	630	1.32	2.45	525	1.18	2.24	471	1.20	2.36
AGE 55-64	306	1.11	2.16	259	0.90	2.02	235	0.95	1.99
AGE 65+	209	0.74	1.32	179	0.97	2.26	154	1.05	2.39
Employed	2235	1.05	1.88	2743	0.84	1.76	2787	0.77	1.64
Unemployed	1447	1.78	2.57	771	1.45	2.29	453	1.77	2.78
Out of L.F.	3207	1.36	2.32	2442	1.12	2.08	1777	1.31	2.34
Unemployed < 2 mths	249	1.49	2.46	66	1.53	2.36	47	2.02	2.86
Unemployed 2-6 mths	1101	1.84	2.59	123	1.50	2.08	60	2.15	2.96
Unemployed > 6 mths	50	2.06	2.64	563	1.42	2.34	324	1.65	2.76
Unemployed other	47	1.57	2.59	19	1.53	2.04	22	1.95	2.38
Hours < 15	123	1.37	2.27	89	0.99	2.02	94	0.79	1.89
Hours 15-24	173	1.55	2.52	167	0.80	1.61	197	0.85	1.77
Hours 25-34	162	1.09	1.87	201	1.00	1.97	185	0.86	1.81
Hours 35+	1758	0.98	1.77	2152	0.80	1.71	2162	0.73	1.57
Hours other	19	0.79	1.40	134	1.08	2.07	149	1.07	2.09
Visa Pref Family	2269	1.30	2.20	1924	1.02	1.98	1614	1.15	2.12
Visa Con Family	1251	1.38	2.28	1095	0.98	1.86	986	0.85	1.85
Visa Bus Skills	897	0.97	1.90	764	0.93	1.88	659	0.76	1.70
Visa Independent	1277	1.41	2.22	1112	1.02	1.95	879	0.92	1.87
Visa Humanitarian	1195	1.62	2.57	1061	1.21	2.18	879	1.43	2.50

Table 3: Caseness Proportions General Health Questionnaire Scores

	Wave 1		Wave 2		Wave 3	
	Proportion	SEs	Proportion	SEs	Proportion	SEs
All	0.273	0.005	0.215	0.005	0.214	0.006
Male	0.253	0.008	0.193	0.007	0.190	0.008
Female	0.292	0.008	0.235	0.008	0.237	0.008
AGE 15-24	0.249	0.015	0.211	0.015	0.235	0.018
AGE 25-34	0.287	0.008	0.211	0.008	0.218	0.009
AGE 35-44	0.290	0.011	0.228	0.011	0.202	0.011
AGE 45-54	0.251	0.017	0.244	0.019	0.223	0.019
AGE 55-64	0.222	0.024	0.170	0.023	0.213	0.027
AGE 65+	0.158	0.025	0.173	0.028	0.175	0.031
Employed	0.224	0.009	0.177	0.007	0.165	0.007
Unemployed	0.356	0.013	0.310	0.017	0.333	0.022
Out of L.F.	0.270	0.008	0.229	0.008	0.261	0.010
Unemployed < 2 mths	0.277	0.028	0.364	0.059	0.383	0.071
Unemployed 2-6 mths	0.374	0.015	0.341	0.043	0.417	0.064
Unemployed > 6 mths	0.400	0.069	0.295	0.019	0.306	0.026
Unemployed other	0.298	0.067	0.368	0.111	0.409	0.105
Employed Hours < 15	0.260	0.040	0.202	0.043	0.160	0.038
Employed Hours 15-24	0.289	0.034	0.186	0.030	0.193	0.028
Employed Hours 25-34	0.247	0.034	0.199	0.028	0.195	0.029
Employed Hours 35+	0.213	0.010	0.170	0.008	0.158	0.008
Employed Hours other	0.211	0.094	0.231	0.036	0.208	0.033
Visa Pref Family	0.265	0.009	0.207	0.009	0.243	0.011
Visa Con Family	0.273	0.013	0.212	0.012	0.169	0.012
Visa Bus Skills	0.211	0.014	0.202	0.015	0.155	0.014
Visa Independent	0.304	0.013	0.214	0.012	0.193	0.013
Visa Humanitarian	0.302	0.013	0.244	0.013	0.279	0.015

Table 4: Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score (Probit) – Wave 1

Variables	Marginal Effect	t statistic	Marginal Effect	t statistic
Employed	-0.060	3.93		
Unemployed	0.079	5.10		
Hours < 15			-0.029	0.74
Hours 15-24			0.003	0.09
Hours 25-34			-0.417	1.16
Hours 35+			-0.079	4.72
Hours other			0.024	0.23
Unemployed < 2 mths			-0.002	0.07
Unemployed 2-6 mths			0.096	5.63
Unemployed > 6 mths			0.123	1.85
Unemployed other			0.027	0.42
No of Obs	6889		6889	
Log Likelihood	-3906		-3897	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Table 5: Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score

	Probit Wave1		Random Effects Probit Panel (Balanced)		Random Effects Probit Panel (Unbalanced)	
Variables	Coefficients	t statistic	Coefficients	t statistic	Coefficients	t statistic
Hours < 15	-0.094	0.73	-0.165	1.42	-0.181	1.75
Hours 15-24	0.009	0.09	-0.147	1.68	-0.130	1.66
Hours 25-34	-0.132	1.16	-0.140	1.57	-0.145	1.83
Hours 35+	-0.251	4.72	-0.276	5.96	-0.272	6.63
Hours other	0.072	0.22	-0.221	1.91	-0.110	1.07
Unemployed < 2 mths	-0.006	0.07	0.132	1.32	0.138	1.59
Unemployed 2-6 mths	0.279	5.63	0.320	5.26	0.332	6.49
Unemployed > 6 mths	0.344	1.84	0.235	3.63	0.251	4.25
Unemployed other	0.082	0.41	0.396	2.13	0.329	1.97
Intercept	-0.812	2.97	-1.219	8.52	-1.108	4.40
				SE		SE
Sigma_u			0.724	0.027	0.733	0.025
Rho			0.343	0.017	0.349	0.015
Hausman test					38.30	(0.90)
No of Obs	6889		14268		17860	
Log Likelihood	-3897		-7136		-9214	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none, Wave 1.

Table 6: Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 (Multinomial Logits).

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
Wave 1 Condition - Employed				
GHQ = 0	0.01	0.02	-0.55	-2.40
GHQ = 1	0.31	0.70	-0.35	-1.24
GHQ = 2	-0.58	-0.84	-0.65	-1.80
Wave 1 Condition - Unemployed				
GHQ = 0	0.26	1.51	-0.05	-0.29
GHQ = 1	0.33	1.58	-0.01	-0.05
GHQ = 2	0.26	1.01	0.03	0.12
Wave 1 Condition – Out of L.F.				
GHQ = 0	0.25	1.32	0.12	0.96
GHQ = 1	0.30	1.30	0.10	0.66
GHQ = 2	0.62	2.23	0.26	1.38

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table 7a. Caseness Proportions GHQ Scores - Males in Couples

Family Labour Force Status		Wave 1		Wave 2		Wave 3	
Male	Female	Proportion	SEs	Proportion	SEs	Proportion	SEs
Employed	Employed	0.183	0.023	0.120	0.013	0.073	0.008
Employed	Unemployed	0.173	0.042	0.150	0.046	0.027	0.027
Employed	Out of LF	0.203	0.019	0.122	0.015	0.133	0.016
Unemployed	Employed	0.514	0.084	0.447	0.081	0.351	0.078
Unemployed	Unemployed	0.292	0.036	0.377	0.067	0.455	0.106
Unemployed	Out of LF	0.274	0.026	0.269	0.030	0.268	0.045
Out of LF	Employed	0.304	0.068	0.220	0.065	0.347	0.068
Out of LF	Unemployed	0.182	0.082	0.348	0.099	0.143	0.094
Out of LF	Out of LF	0.253	0.021	0.184	0.024	0.249	0.032

Table 7b. Caseness Proportions GHQ Scores – Females in Couples

Family Labour Force Status		Wave 1		Wave 2		Wave 3	
Male	Female	Proportion	SEs	Proportion	SEs	Proportion	SEs
Employed	Employed	0.252	0.025	0.117	0.013	0.089	0.009
Unemployed	Employed	0.257	0.074	0.132	0.055	0.243	0.071
Out of LF	Employed	0.152	0.053	0.171	0.059	0.082	0.039
Employed	Unemployed	0.395	0.054	0.333	0.061	0.297	0.075
Unemployed	Unemployed	0.317	0.037	0.302	0.063	0.364	0.103
Out of LF	Unemployed	0.227	0.089	0.174	0.079	0.214	0.110
Employed	Out of LF	0.296	0.021	0.213	0.018	0.202	0.019
Unemployed	Out of LF	0.274	0.026	0.255	0.030	0.258	0.044
Out of LF	Out of LF	0.275	0.021	0.211	0.025	0.249	0.032

Table 7c. Caseness Proportions GHQ Scores – Males and Females by Couples

Labour Force Status		Wave 1		Wave 2		Wave 3	
		Proportion	SEs	Proportion	SEs	Proportion	SEs
Females in Couples	Employed	0.220	0.029	0.166	0.021	0.169	0.019
	Unemployed	0.304	0.033	0.290	0.045	0.308	0.064
	Out of LF	0.276	0.014	0.210	0.014	0.208	0.017
Females not in Couples	Employed	0.311	0.020	0.242	0.017	0.202	0.016
	Unemployed	0.429	0.026	0.328	0.035	0.377	0.043
	Out of LF	0.268	0.012	0.250	0.013	0.294	0.016
Males in Couples	Employed	0.212	0.038	0.152	0.029	0.115	0.025
	Unemployed	0.287	0.044	0.339	0.062	0.405	0.081
	Out of LF	0.172	0.035	0.228	0.047	0.333	0.064
Males not in Couples	Employed	0.191	0.011	0.155	0.009	0.155	0.009
	Unemployed	0.345	0.017	0.303	0.022	0.303	0.030
	Out of LF	0.280	0.016	0.213	0.018	0.266	0.024

Table 8: Family Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score

	Random Effects Probit Panel Model Male Partners				Random Effects Probit Panel Model Female Partners			
Variables	Coef	t stat	Coef	t stat	Coef	t stat	Coef	t stat
Male partner employed	-0.236	2.39	-0.339	3.95	-0.047	0.51		
Male partner unemployed	0.102	1.08	0.172	2.17	0.008	0.09		
Female partner employed	0.325	2.01			-0.238	1.19	-0.199	2.85
Female partner unemployed	-0.092	0.41			-0.161	0.69	0.172	2.07
Both partners employed	-0.326	1.82			0.031	0.15		
Both partners unemployed	0.242	0.94			0.265	1.01		
Male employed Female unemployed	-0.121	0.44			0.506	1.92		
Male unemployed Female employed	0.234	1.04			0.286	1.05		
		SE				SE		
Sigma_u	0.741	0.05			0.701	0.04		
Rho	0.354	0.03			0.329	0.03		
Hausman test for attrition	46.2	(0.40)			50.96	(0.25)		
Likelihood Ratio test			16.99	(0.01)			6.96	(0.32)
No of Obs	4777				4667			

* Omitted categories: Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Appendix 1 - General Health Questionnaire

Have you recently been able to concentrate on whatever you're doing? Better Same Less Much less	Have you recently been able to enjoy your normal day-to-day activities? More so Same Less Much less
Have you recently lost much sleep over worry? Not at all No more than usual Rather more Much more	Have you recently been able to face up to your problems? More so Same Less Much less
Have you recently felt that you are playing a useful part in things? More so Same Less Much less	Have you recently been feeling unhappy and depressed? Not at all No more than usual Rather more Much more
Have you recently felt capable of making decisions about things? More so Same Less Much less	Have you recently been losing confidence in yourself? Not at all No more than usual Rather more Much more
Have you recently felt constantly under strain? Not at all No more than usual Rather more Much more	Have you recently been thinking of yourself as a worthless person? Not at all No more than usual Rather more Much more
Have you recently felt that you couldn't overcome your difficulties? Not at all No more than usual Rather more Much more	Have you recently been feeling reasonably happy all things considered? More so Same Less Much less

Appendix 2

Table A2.1: Mean General Health Questionnaire Scores

	Wave 1			Wave 2			Wave 3		
	Number	Mean	SD	Number	Mean	SD	Number	Mean	SD
Higher Degree	659	1.44	2.32	563	1.06	2.00	473	0.90	1.87
Post Graduate Diploma	409	1.69	2.47	347	1.24	2.30	289	1.02	1.83
Bachelor Degree	1523	1.57	2.35	1304	1.15	2.08	1097	1.03	1.98
Technical / Diploma	1448	1.34	2.28	1272	1.02	1.93	1078	1.09	2.12
Trade	424	1.40	2.59	376	0.95	1.98	326	1.07	2.23
12 + Years of Schooling	1153	1.17	2.03	986	0.93	1.87	841	0.98	1.90
10-11 Years Schooling	509	1.00	2.00	422	0.84	1.67	363	1.05	2.11
7-9 Years of Schooling	394	1.10	2.11	347	1.10	2.12	281	1.20	2.39
6 - Years of Schooling	323	1.10	2.00	275	0.94	1.81	237	1.19	2.26
Other	48	1.42	2.27	44	0.98	2.10	30	2.30	3.43
Married	5295	1.33	2.23	4680	0.99	1.90	4043	0.97	1.95
Separated	79	2.30	3.40	121	2.08	3.20	156	1.95	2.75
Divorced	129	1.50	2.76	115	1.30	2.22	149	1.74	2.81
Widowed	165	1.38	2.39	145	1.30	2.46	132	1.55	2.85
Never married	1220	1.35	2.21	891	1.05	2.00	536	1.06	2.01
No KIDS	5054	1.34	2.26	4045	1.02	2.00	3124	1.05	2.10
KIDS 1	876	1.50	2.38	949	1.07	1.97	871	1.08	2.02
KIDS 2	668	1.33	2.22	681	1.09	1.96	746	1.03	1.94
KIDS 3	200	1.06	1.83	198	0.88	1.66	193	0.84	1.61
KIDS 4+	91	1.11	1.91	83	1.17	1.97	83	1.34	2.80
Health Very good	3578	0.98	1.82	2603	0.69	1.52	1990	0.63	1.48
Health Good	2717	1.51	2.35	2641	1.04	1.94	2284	0.96	1.90
Health Fair	480	2.47	3.15	563	1.90	2.65	575	1.83	2.54
Health Poor	96	4.21	3.66	126	3.35	3.38	143	4.36	3.62
Health Very Poor	14	4.50	4.33	22	4.73	4.23	24	5.33	4.08
English Speaking	1752	1.31	2.24	1589	1.01	1.95	1357	0.87	1.82
Speaks English v well	796	1.42	2.26	735	0.99	1.97	753	0.87	1.75
Speaks English well	1552	1.34	2.21	1788	1.04	2.01	1659	1.05	2.01
Speaks English not well	1998	1.30	2.21	1563	1.03	1.91	1076	1.32	2.42
Speaks English notat all	791	1.48	2.51	281	1.25	2.32	172	1.58	2.79
Income None	139	1.42	2.48	29	1.34	1.86	16	2.75	3.24
Income 1 to 8000	243	1.43	2.42	140	1.31	2.52	92	1.29	2.29
Income 8001 to 16000	682	1.51	2.53	425	1.38	2.37	316	1.73	2.80
Income 16001 to 25000	1225	1.59	2.48	1014	1.12	2.00	628	1.43	2.52
Income 25001 to 35000	799	1.35	2.27	852	1.02	2.00	719	1.14	2.09
Income 35001 to 50000	826	1.23	2.09	953	0.98	1.91	838	0.81	1.68
Income >50000	1318	1.19	2.04	1513	0.84	1.69	1780	0.84	1.77
Income NA	1658	1.27	2.15	1030	1.11	2.12	628	1.05	2.08
Job Love it	316	0.51	1.19	366	0.46	1.26	472	0.54	1.19
Job Like it	932	0.83	1.59	1152	0.67	1.42	1235	0.65	1.39
Job okay	837	1.18	1.91	1150	1.00	1.96	1116	0.92	1.88
Job Don't care	118	1.91	2.58	208	1.18	2.22	131	1.47	2.59
Job Dislike	74	3.09	3.20	62	1.68	2.41	35	3.03	3.48
Job Dislike a lot	14	2.29	3.36	16	1.69	2.47	13	2.92	3.30
Job Hate it	17	3.82	3.30	31	4.00	3.49	17	2.94	3.29
Oceania	140	0.90	1.91	120	0.58	1.56	112	0.61	1.25
Europe & USSR	2262	1.49	2.43	1981	1.10	2.10	1654	1.04	2.03
Middle East North Africa	791	1.27	2.05	689	1.12	2.08	574	1.64	2.63
Southeast Asia	1110	1.08	1.94	931	0.77	1.63	824	0.78	1.62
Northeast Asia	898	1.40	2.30	764	1.03	1.97	585	0.88	1.81
Southern Asia	630	1.28	2.13	558	1.00	1.87	497	0.98	2.02
Northern America	175	1.38	2.10	140	1.16	1.94	117	0.80	1.79
South America	388	1.43	2.39	339	1.20	2.14	276	1.30	2.28
Africa	495	1.48	2.47	434	1.13	2.02	378	1.18	2.35

Table A2.2: Caseness Proportions General Health Questionnaire Scores

	Wave 1		Wave 2		Wave 3	
	Proportion	SEs	Proportion	Mean	Proportion	Mean
Higher Degree	0.303	0.018	0.226	0.017	0.188	0.018
Post Graduate Diploma	0.350	0.024	0.245	0.023	0.215	0.024
Bachelor Degree	0.321	0.012	0.236	0.012	0.210	0.012
Technical / Diploma	0.263	0.012	0.222	0.012	0.225	0.013
Trade	0.248	0.021	0.191	0.020	0.215	0.023
12 + Years of Schooling	0.252	0.013	0.198	0.013	0.209	0.014
10-11 Years Schooling	0.193	0.018	0.164	0.018	0.209	0.021
7-9 Years of Schooling	0.234	0.021	0.219	0.022	0.224	0.025
6 - Years of Schooling	0.220	0.023	0.196	0.024	0.232	0.027
Other	0.250	0.063	0.205	0.061	0.400	0.089
Married	0.272	0.006	0.207	0.006	0.203	0.006
Separated	0.342	0.053	0.364	0.044	0.365	0.039
Divorced	0.248	0.038	0.270	0.041	0.315	0.038
Widowed	0.291	0.035	0.241	0.036	0.280	0.039
Never married	0.274	0.013	0.226	0.014	0.215	0.018
No KIDS	0.269	0.006	0.210	0.006	0.207	0.007
KIDS 1	0.306	0.016	0.216	0.013	0.224	0.014
KIDS 2	0.277	0.017	0.244	0.016	0.233	0.015
KIDS 3	0.215	0.029	0.207	0.029	0.207	0.029
KIDS 4+	0.264	0.046	0.241	0.047	0.229	0.046
Health Very good	0.212	0.007	0.146	0.007	0.140	0.008
Health Good	0.312	0.009	0.226	0.008	0.200	0.008
Health Fair	0.427	0.023	0.380	0.020	0.381	0.020
Health Poor	0.646	0.049	0.595	0.044	0.713	0.038
Health Very Poor	0.571	0.132	0.636	0.103	0.792	0.083
English Speaking	0.265	0.011	0.213	0.010	0.178	0.010
Speaks English v well	0.302	0.016	0.205	0.015	0.185	0.014
Speaks English well	0.277	0.011	0.213	0.010	0.225	0.010
Speaks English not well	0.261	0.010	0.216	0.010	0.256	0.013
Speaks English notat all	0.286	0.016	0.260	0.026	0.267	0.034
Income None	0.304	0.039	0.379	0.090	0.500	0.125
Income 1 to 8000	0.276	0.029	0.236	0.036	0.272	0.046
Income 8001 to 16000	0.271	0.017	0.278	0.022	0.313	0.026
Income 16001 to 25000	0.314	0.013	0.232	0.013	0.285	0.018
Income 25001 to 35000	0.270	0.016	0.211	0.014	0.245	0.016
Income 35001 to 50000	0.268	0.015	0.198	0.013	0.177	0.013
Income >50000	0.253	0.012	0.186	0.010	0.172	0.009
Income NA	0.261	0.011	0.227	0.013	0.215	0.016
Job Love it	0.104	0.017	0.101	0.016	0.127	0.015
Job Like it	0.186	0.013	0.150	0.011	0.143	0.010
Job okay	0.260	0.015	0.210	0.012	0.192	0.012
Job Don't care	0.390	0.045	0.236	0.029	0.290	0.040
Job Dislike	0.581	0.057	0.339	0.060	0.543	0.084
Job Dislike a lot	0.429	0.132	0.375	0.121	0.462	0.138
Job Hate it	0.765	0.103	0.742	0.079	0.529	0.121
Oceania	0.186	0.033	0.117	0.029	0.125	0.031
Europe & USSR	0.291	0.010	0.226	0.009	0.212	0.010
Middle East North Africa	0.279	0.016	0.231	0.016	0.324	0.020
Southeast Asia	0.229	0.013	0.166	0.012	0.176	0.013
Northeast Asia	0.292	0.015	0.216	0.015	0.178	0.016
Southern Asia	0.252	0.017	0.220	0.018	0.201	0.018
Northern America	0.286	0.034	0.243	0.036	0.137	0.032
South America	0.278	0.023	0.230	0.023	0.264	0.027
Africa	0.291	0.020	0.247	0.021	0.230	0.022

Table A2.3: Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score (Probit)

Variables	Marginal Effect	t statistic	Marginal Effect	t statistic
Employed	-0.061	-3.93		
Unemployed	0.079	5.10		
Hours < 15			-0.030	-0.74
Hours 15-24			0.003	0.09
Hours 25-34			-0.042	-1.16
Hours 35+			-0.079	-4.72
Hours other			0.024	0.23
Unemployed < 2 mths			-0.002	-0.07
Unemployed 2-6 mths			0.097	5.63
Unemployed > 6 mths			0.123	1.85
Unemployed other			0.028	0.42
Age	0.008	2.57	0.008	2.51
Age Squared	0.000	-3.36	0.000	-3.35
Separated	0.075	1.43	0.076	1.45
Divorced	-0.026	-0.64	-0.025	-0.61
Widowed	0.084	2.03	0.086	2.07
Never married	0.001	0.03	0.000	-0.02
KIDS 1	0.003	0.21	0.002	0.1
KIDS 2	0.007	0.41	0.006	0.33
KIDS 3	-0.031	-1.16	-0.034	-1.27
KIDS 4+	-0.013	-0.33	-0.015	-0.38
Post Graduate Diploma	0.025	0.92	0.026	0.95
Bachelor Degree	-0.004	-0.20	-0.006	-0.27
Technical / Diploma	-0.062	-3.03	-0.061	-3
Trade	-0.065	-2.43	-0.064	-2.38
12 + Years of Schooling	-0.081	-3.76	-0.082	-3.83
10-11 Years Schooling	-0.121	-4.86	-0.123	-4.94
7-9 Years of Schooling	-0.097	-3.51	-0.098	-3.55
6 - Years of Schooling	-0.113	-3.76	-0.113	-3.75
Speaks English well	-0.037	-2.34	-0.039	-2.45
Speaks English not well	-0.036	-2.12	-0.038	-2.28
Speaks English notat all	0.020	0.83	0.019	0.8
Visa Pref Family	-0.022	-1.20	-0.019	-1.02
Visa Con Family	-0.047	-2.36	-0.042	-2.12
Visa Bus Skills	-0.098	-4.33	-0.094	-4.15
Visa Independent	-0.035	-1.70	-0.031	-1.46
Female	0.042	3.50	0.038	3.13
Europe & USSR	0.117	2.64	0.117	2.64
Middle East North Africa	0.082	1.74	0.081	1.7
Southeast Asia	0.042	0.92	0.041	0.91
Northeast Asia	0.143	2.92	0.143	2.91
Southern Asia	0.034	0.73	0.032	0.69
Northern America	0.124	2.10	0.127	2.15
South America	0.095	1.86	0.092	1.79
Africa	0.127	2.55	0.127	2.53
Income 1 to 8000	-0.058	-1.29	-0.058	-1.3
Income 8001 to 16000	-0.069	-1.73	-0.070	-1.76
Income 16001 to 25000	-0.028	-0.69	-0.029	-0.71
Income 25001 to 35000	-0.050	-1.24	-0.049	-1.21
Income 35001 to 50000	-0.040	-0.98	-0.037	-0.91
Income >50000	-0.045	-1.15	-0.040	-1.01
Income NA	-0.049	-1.26	-0.048	-1.22

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Table A2.4a: Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score

	Probit Wave1		Random Effects Probit Panel (Balanced)		Random Effects Probit Panel (Unbalanced)	
Variables	Coefficients	t statistic	Coefficients	t statistic	Coefficients	t statistic
Hours < 15	-0.094	-0.74	-0.166	-1.43	-0.181	-1.76
Hours 15-24	0.010	0.09	-0.147	-1.68	-0.130	-1.66
Hours 25-34	-0.133	-1.16	-0.141	-1.58	-0.145	-1.83
Hours 35+	-0.252	-4.73	-0.276	-5.96	-0.273	-6.64
Hours other	0.073	0.23	-0.221	-1.91	-0.111	-1.07
Unemployed < 2 mths	-0.006	-0.07	0.133	1.32	0.139	1.59
Unemployed 2-6 mths	0.280	5.63	0.320	5.27	0.333	6.50
Unemployed > 6 mths	0.344	1.85	0.236	3.63	0.252	4.26
Unemployed other	0.083	0.42	0.396	2.13	0.330	1.98
Age	0.024	2.52	0.028	2.93	0.026	3.20
Age Squared	0.000	-3.35	0.000	-3.64	0.000	-3.99
Separated	0.220	1.45	0.536	5.44	0.509	5.74
Divorced	-0.077	-0.61	0.238	2.32	0.197	2.13
Widowed	0.246	2.07	0.248	2.09	0.287	2.82
Never married	-0.001	-0.02	0.109	1.94	0.091	1.90
Wave 2			-0.127	-3.64	-0.156	-5.21
Wave 3			-0.073	-2.01	-0.108	-3.30
KIDS 1	0.005	0.10	0.029	0.65	0.016	0.41
KIDS 2	0.018	0.33	0.079	1.63	0.070	1.63
KIDS 3	-0.107	-1.27	-0.048	-0.65	-0.042	-0.62
KIDS 4+	-0.045	-0.38	-0.027	-0.25	-0.033	-0.33
Post Graduate Diploma	0.078	0.95	0.053	0.59	0.036	0.47
Bachelor Degree	-0.017	-0.27	-0.042	-0.64	-0.033	-0.57
Technical / Diploma	-0.193	-3.00	-0.137	-2.02	-0.157	-2.67
Trade	-0.207	-2.38	-0.151	-1.69	-0.161	-2.05
12 + Years of Schooling	-0.266	-3.83	-0.281	-3.83	-0.295	-4.65
10-11 Years Schooling	-0.427	-4.94	-0.342	-3.79	-0.393	-5.04
7-9 Years of Schooling	-0.332	-3.55	-0.279	-2.85	-0.282	-3.38
6 - Years of Schooling	-0.393	-3.75	-0.298	-2.77	-0.345	-3.72
Speaks English well	-0.120	-2.46	-0.039	-0.90	-0.037	-0.97
Speaks English not well	-0.119	-2.28	-0.020	-0.39	-0.030	-0.67
Speaks English not at all	0.057	0.80	0.111	1.39	0.097	1.42
Visa Pref Family	-0.057	-1.02	0.146	3.73	0.163	4.80
Visa Con Family	-0.132	-2.12	-0.042	-0.75	-0.049	-0.99
Visa Bus Skills	-0.312	-4.15	-0.167	-2.68	-0.183	-3.31
Visa Independent	-0.095	-1.46	-0.194	-2.61	-0.273	-4.19
Female	0.117	3.14	-0.082	-1.23	-0.126	-2.16
Europe & USSR	0.346	2.64	0.465	3.50	0.462	3.82
Middle East North Africa	0.233	1.70	0.494	3.54	0.450	3.56
Southeast Asia	0.123	0.92	0.182	1.33	0.195	1.57
Northeast Asia	0.403	2.91	0.466	3.29	0.437	3.42
Southern Asia	0.096	0.69	0.315	2.24	0.292	2.29
Northern America	0.355	2.15	0.494	2.83	0.469	3.05
South America	0.263	1.79	0.490	3.30	0.438	3.26
Africa	0.356	2.53	0.525	3.66	0.504	3.88
Income 1 to 8000	-0.189	-1.30	-0.315	-1.79	-0.262	-1.84
Income 8001 to 16000	-0.226	-1.76	-0.269	-1.68	-0.269	-2.09
Income 16001 to 25000	-0.089	-0.71	-0.266	-1.69	-0.258	-2.05
Income 25001 to 35000	-0.154	-1.21	-0.293	-1.85	-0.280	-2.21
Income 35001 to 50000	-0.116	-0.91	-0.378	-2.39	-0.327	-2.58
Income >50000	-0.126	-1.01	-0.387	-2.46	-0.365	-2.90
Income NA	-0.149	-1.22	-0.323	-2.05	-0.293	-2.35
Intercept	-0.812	-2.98	-1.219	-4.16	-1.108	-4.41

Sigma u		0.724	0.027	0.733	0.025
Rho		0.343	0.017	0.349	0.015
Hausman test				38.30	(0.90)
No of Obs	6889	14268		17860	
Log likelihood	-3897	-7136		-9214	

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income -- none, Wave 1.

Table A2.5a: Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Employed (Multinomial Logits)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.01	0.02	-0.55	-2.40
GHQ = 1	0.31	0.70	-0.35	-1.24
GHQ = 2	-0.58	-0.84	-0.65	-1.80
Age	-0.06	-0.54	-0.20	-2.90
Agesq	0.00	0.54	0.00	3.00
Bachelor Degree	0.85	1.76	0.17	0.59
Technical / Diploma	0.55	1.08	-0.15	-0.49
Trade	0.07	0.11	-0.11	-0.26
12 + Years of Schooling	0.68	1.15	0.04	0.11
10-11 Years Schooling	1.70	2.91	-0.19	-0.43
7-9 Years of Schooling	0.42	0.48	-0.15	-0.30
6 - Years of Schooling	1.98	2.76	-1.30	-1.20
Speaks English well	0.61	1.99	0.81	3.87
Speaks English not well	1.11	2.90	1.73	6.74
Speaks English notat all	0.85	0.95	-33.38	0.00
Visa Pref Family	-0.27	-0.52	0.03	0.07
Visa Con Family	-0.34	-0.60	-0.26	-0.57
Visa Bus Skills	-0.90	-1.44	-0.58	-1.21
Visa Independent	-0.01	-0.02	-0.62	-1.31
Female	-0.19	-0.65	1.59	8.32
Constant	-3.01	-1.38	0.40	0.29
No of Obs	2235			
Log Likelihood	-753			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table A2.5b: Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Unemployed (Multinomial Logits)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.26	1.51	-0.05	-0.29
GHQ = 1	0.33	1.58	-0.01	-0.05
GHQ = 2	0.26	1.01	0.03	0.12
Age	0.02	0.30	-0.19	-3.58
Agesq	0.00	0.21	0.00	4.11
Bachelor Degree	-0.49	-2.33	-0.23	-0.99
Technical / Diploma	-0.36	-1.53	-0.10	-0.40
Trade	-0.58	-1.81	-0.72	-1.78
12 + Years of Schooling	-0.49	-1.89	-0.35	-1.24
10-11 Years Schooling	-0.53	-1.66	-0.50	-1.45
7-9 Years of Schooling	-0.36	-1.15	-0.90	-2.39
6 - Years of Schooling	-0.15	-0.36	-0.13	-0.29
Speaks English well	1.23	7.44	1.48	8.19
Speaks English not well	1.62	8.35	1.87	8.90
Speaks English notat all	1.48	2.70	2.37	4.35
Visa Pref Family	-0.58	-2.95	-0.30	-1.49
Visa Con Family	-0.36	-1.75	-0.44	-1.96
Visa Bus Skills	-1.45	-2.19	-0.10	-0.20
Visa Independent	-0.48	-2.10	-0.62	-2.39
Female	0.03	0.17	1.27	8.18
Constant	-1.71	-1.59	1.33	1.25
No of Obs	1447			
Log Likelihood	-1308			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table A2.5c: Labour Force Status Regressions: Dependent variable Labour Force Status in Wave 2 - Base Case Employment Wave 2 - Condition Wave1 = Out of Labour Force (Multinomial Logits)

	Outcome - Unemployment		Outcome – Out of LF	
Variables	Coefficients	t statistic	Coefficients	t statistic
GHQ = 0	0.25	1.32	0.12	0.96
GHQ = 1	0.30	1.30	0.10	0.66
GHQ = 2	0.62	2.23	0.26	1.38
Age	0.09	2.33	-0.09	-4.15
Agesq	0.00	-2.57	0.00	5.12
Bachelor Degree	-0.19	-0.74	-0.17	-0.99
Technical / Diploma	-0.25	-0.97	0.04	0.21
Trade	-0.76	-2.16	-0.57	-2.28
12 + Years of Schooling	-0.44	-1.63	-0.15	-0.87
10-11 Years Schooling	-0.17	-0.52	-0.07	-0.35
7-9 Years of Schooling	0.07	0.19	-0.19	-0.80
6 - Years of Schooling	-1.06	-2.69	-0.72	-2.93
Speaks English well	2.10	10.32	1.65	14.31
Speaks English not well	2.66	12.48	2.27	17.93
Speaks English notat all	3.15	7.31	2.95	9.58
Visa Pref Family	-0.26	-1.39	-0.09	-0.66
Visa Con Family	-0.02	-0.10	-0.27	-1.87
Visa Bus Skills	-1.14	-3.50	-0.06	-0.35
Visa Independent	-0.10	-0.38	0.40	2.27
Female	-0.35	-2.42	1.20	11.25
Constant	-3.71	-4.35	0.17	0.35
No of Obs	3207			
Log Likelihood	-2399			

* Omitted categories: GHQ = 3 or more, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian.

Table A2.6: Family Mental Health Regressions: Dependent variable General Health Questionnaire Caseness Score (Panel Models)

	Random Effects Probit Panel Model Male Partners				Random Effects Probit Panel Model Female Partners			
Variables	Coef	t stat	Coef	t stat	Coef	t stat	Coef	t stat
Male partner employed	-0.236	2.38	-0.338	3.95	-0.047	-0.52		
Male partner unemployed	0.102	1.08	0.172	2.17	0.009	0.10		
Female partner employed	0.325	2.01			-0.239	-1.20	0.172	2.07
Female partner unemployed	-0.092	0.41			-0.161	-0.69	0.032	2.05
Both partners employed	-0.326	1.82			0.032	0.15		
Both partners unemployed	0.242	0.94			0.266	1.02		
Male employed Female unemployed	-0.121	0.44			0.507	1.92		
Male unemployed Female employed	0.234	1.04			0.286	1.05		
Age	0.072	2.04	0.075	3.20	0.032	2.04	-0.200	-2.88
Age Squared	-0.000	2.08	-0.000	3.38	0.000	-2.08	0.000	-2.07
Wave 2	-0.103	3.92	-0.089	1.54	-0.219	-3.92	-0.223	-4.02
Wave 3	-0.135	3.23	-0.098	1.53	-0.202	-3.24	-0.209	-3.38
KIDS 1	-0.208	0.33	-0.210	2.58	-0.026	-0.33	-0.027	-0.34
KIDS 2	-0.102	0.18	-0.112	1.39	-0.015	-0.19	-0.019	-0.24
KIDS 3	-0.151	0.38	-0.183	1.59	-0.043	-0.39	-0.047	-0.43
KIDS 4+	-0.097	1.12	-0.131	0.78	-0.184	-1.13	-0.184	-1.13
Post Graduate Diploma	-0.213	1.95	-0.220	1.59	0.297	1.95	0.284	1.87
Bachelor Degree	-0.006	1.26	-0.012	0.12	0.150	1.27	0.141	1.19
Technical / Diploma	-0.128	0.04	-0.133	-1.29	0.005	0.04	-0.001	-0.01
Trade	-0.163	0.40	-0.161	1.32	-0.081	-0.41	-0.097	-0.48
12 + Years of Schooling	-0.271	0.49	-0.270	2.01	-0.061	-0.50	-0.068	-0.56
10-11 Years Schooling	-0.236	1.87	-0.230	1.33	-0.277	-1.88	-0.283	-1.92
7-9 Years of Schooling	-0.253	0.21	-0.278	1.42	-0.035	-0.21	-0.046	-0.28
6 - Years of Schooling	-0.534	1.50	-0.535	2.42	-0.276	-1.51	-0.285	-1.55
Speaks English well	-0.349	2.17	-0.049	0.62	-0.171	-2.17	-0.169	-2.16
Speaks English not well	0.080	0.64	0.061	0.64	-0.056	-0.64	-0.052	-0.60
Speaks English notat all	0.376	0.59	0.360	2.40	0.075	0.59	0.080	0.63
Visa Pref Family	-0.270	2.56	-0.272	1.49	-0.428	-2.57	-0.434	-2.60
Visa Con Family	-0.112	1.26	-0.082	0.81	-0.121	-1.26	-0.125	-1.32
Visa Bus Skills	-0.253	1.29	-0.214	1.74	-0.148	-1.30	-0.161	-1.45
Visa Independent	-0.014	0.20	0.043	0.38	-0.021	-0.20	-0.029	-0.28
Income 1 to 8000	0.503	2.29	0.470	2.09	0.136	0.61	0.143	0.64
Income 8001 to 16000	-0.175	0.93	-0.195	1.04	0.071	0.41	0.057	0.33
Income 16001 to 25000	0.104	0.88	0.079	0.67	-0.086	-0.73	-0.082	-0.71
Income 25001 to 35000	0.113	1.19	0.092	0.97	-0.040	-0.43	-0.039	-0.42
Income 35001 to 50000	0.031	0.31	0.038	0.37	-0.089	-0.92	-0.085	-0.89
Income >50000	-0.087	0.85	-0.077	0.75	0.006	0.07	0.004	0.04
Income NA	-0.097	0.99	-0.090	0.93	-0.069	-0.75	-0.086	-0.94
Europe & USSR	0.605	2.02	0.565	1.91	1.042	3.43	1.025	3.38
Middle East North Africa	0.775	2.49	0.712	2.31	1.002	3.16	0.994	3.14
Southeast Asia	0.215	0.70	0.180	0.59	0.642	2.07	0.629	2.02
Northeast Asia	0.407	1.31	0.374	1.21	0.765	2.44	0.748	2.39
Southern Asia	0.445	1.45	0.379	1.25	0.787	2.53	0.777	2.50
Northern America	0.657	1.84	0.622	1.76	0.613	1.66	0.588	1.60
South America	0.623	1.93	0.573	1.79	1.041	3.20	1.020	3.15
Africa	0.825	2.64	0.784	2.54	0.870	2.74	0.852	2.69
Intercept	-2.554	4.24	-2.503	4.18	-1.975	-4.21	-1.969	-4.22
Sigma_u	0.741	0.05			0.701	0.04		
Rho	0.354	0.03			0.329	0.03		
Hausman test	46.2	(0.40)			50.96	(0.25)		
Likelihood ratio test			16.99	(0.01)			6.96	(0.32)

No of Obs	4777	4667

* Omitted categories; Out of the labour force, Married, No Kids, Higher Degree, English Speaking or speaks English very well, Visa Humanitarian, Oceania, Income – none.

Lahoda (1982, 1992)

Warr (1987) Vitamin

Appendix 3

Table A3.1 presents mean GHQ scores for immigrants in wave 1 who could not be interviewed in wave 2 and wave 3. Mean GHQ scores were significantly higher for the attrition groups compared to those who could be interviewed in all 3 waves. This means that GHQ scores for wave 2 and wave 3 are likely to be biased downwards. However, a preliminary analysis of immigrants who could be interviewed in all 3 waves indicates that the descriptive features of the data derived using all observations available in each wave remain.

Labour force status proportions are relatively stable between the different groups except for those who did not answer all GHQ questions in wave 1 where a large proportion of this group were employed.

Table A3.1: Attrition Statistics

	All	Answered all GHQ questions	Didn't Answer all GHQ questions	Out in Wave 2	Out in Wave 3	In for all 3 Waves
Number of Obs	7029	6889	140	994	1920	4756
GHQ Mean (SD)	na	1.35 (2.26)	na	1.56 (2.46)	1.55 (2.44)	1.26 (2.17)
Employed (%)	33	32.4	60.7	30.3	31.3	33.1
Unemployed (%)	20.8	21	10.0	24	21.7	20.8
Out of labour Force (%)	46.2	46.6	29.3	45.7	47.2	46.2

Note, some immigrants who couldn't be interviewed in wave 2 were able to be interviewed in wave 3 therefore the number who could be interviewed in all 3 waves is less than wave 3 attrition subtracted from wave 1.