

Revisiting the Family Investment Hypothesis

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Abstract

The family investment hypothesis predicts that credit-constrained immigrant families adopt a household strategy for financing post-migration human capital investment in which the “primary worker” engages in investment activities and the other partner undertakes labour market activities that finance current consumption. Empirical tests of this hypothesis have assumed that the primary worker is the male partner. A substantial portion of immigrants to Australia are admitted on the basis of a “points test” in which points are awarded for labour market skills. Once an principal applicant applies for and is granted a visa, dependent family members are automatically granted visas as well. Thus principal applicant status provides an alternative way to identify primary and secondary workers in immigrant households. We exploit this idea to reevaluate the family investment hypothesis. (*JEL* D10, J22, J61)

I. Introduction

Previous researchers have hypothesized that credit-constrained immigrant families wishing to make post-migration human capital investments must finance that investment themselves (Long, 1980; Beach and Worswick, 1993; Duleep and Sanders 1993; Worswick, 1996; Baker and Benjamin, 1997; Blau, et al, 2002; Duleep and Dowhan, 2002). This results in specialization among immigrant family members with one partner investing in host country-specific human capital and the other partner undertaking labour market activities that finance current consumption. Specifically, secondary workers in immigrant families are expected to be more likely to work, to work longer hours, and to forego their own investment in human capital by initially taking better paying, but dead-end, jobs.

Researchers attempting to evaluate this ‘family investment hypothesis’ have struggled with important empirical challenges. First, decisions about which partner will invest and which partner will finance current consumption are in principle driven by economic factors that are difficult to observe. In all research of which we are aware, researchers have designated the male partner as the “primary worker” and the female partner as the “secondary worker”. It is further assumed that it is the primary workers who are undertaking investment activities, though why this should be the case is rarely, if ever, explored. While empirically convenient, this approach is only loosely connected to any underlying model. Moreover, this approach makes it very difficult to distinguish the family investment hypothesis from other, gender-based explanations of the stylized facts.

Second, while family units at the time of data collection are identified, family units at the time of migration are completely unknown. This raises the possibility that the observed assimilation profiles are the result of selectivity into marriage rather than immigrant settlement. Researchers often do not know which individuals were married at the time of migration let alone whether they were married to their current spouse. Because this is likely to be a smaller problem for recent rather than established immigrants, there exists the possibility that household formation plays a role in generating observed earnings-age profiles.

The Longitudinal Survey of Immigrants to Australia (LSIA) is a new data set that allows us to explore these limitations. It contains detailed data for a recent cohort of migrating households including principal applicant status and detailed visa category. A substantial portion of immigrants to Australia are admitted on the basis of a “points test” in which points are awarded for labour market skills.¹ So long as skill-based couples designate the partner most likely to satisfy the test as their principal applicant, information about principal applicant status would seem to be a natural measure of “primary worker” status.

In this paper we examine the distribution of labour market skills within couples who migrate to Australia together and investigate how that skill distribution determines which partner is designated as the principal applicant. We then re-examine the family investment hypothesis by using principal applicant status - rather than gender - to identify the primary and secondary worker in a couple. Thus, we present an alternative to the usual empirical strategy. Given suitably detailed data, this alternative empirical strategy is feasible in countries, such as Australia and Canada, where skill-based migrants comprise a significant fraction of the immigrant inflow. It is not feasible with data from countries (notably the United States) where skill-based immigrants represent a small fraction of total immigration. Our analysis is also novel in that we can and do limit the analysis to immigrant couples who migrated together.

Our results indicate that more than 16 percent of skill-based couple-households migrating to Australia are “nontraditional” in the sense that it is the female partner who is the principal applicant. The probability that the female partner is the principal applicant has a strong positive correlation with her education and work experience, and is negatively related to the male partner’s work experience and education. Thus, principal applicant status does appear to be related to our notion of primary worker status. Perhaps surprisingly, the fraction of

¹Once a principal applicant applies for and is granted a visa, dependent family members are automatically granted visas as well.

nontraditional families does not appear to vary substantially across region of origin. This is helpful for tests of the family investment hypothesis because it means that conditional on gender, primary worker status is not collinear with region of origin (and hence possibly culture).

With this information in hand we implement tests of the family investment hypothesis that follow Baker and Benjamin (1997) in comparing secondary workers in immigrant couples to immigrant, secondary workers married to Australian residents. Following that, we carefully consider the role of gender and primary worker status in determining individual labour market activity among our sample of immigrant families. While we find some support for the family investment hypothesis among traditional households, nontraditional households appear to behave quite differently.

Any formal version of the family investment hypothesis, as a model of the specialization of household members in either financing current consumption or in investment (that is, in future consumption), must be about the *comparative* advantage of household members *in these activities*. How this relates to the notions of “primary” and “secondary” workers is not at all clear. The final contribution of the paper is to explore these connections.

In the next section of the paper, the existing literature on the family investment hypothesis is reviewed. Section 3 reviews the important features of immigration to Australia and presents an overview of the LSIA data. Section 4 reports an exploration of the relationship between gender, principal applicant status and labour market skills in that data. Our tests of the family investment hypothesis follow in Section 5. Section 6 discusses alternative interpretations of our results, paying particular attention to the relationship between labour market skills, the notion of a primary worker, and absolute and comparative advantage within immigrant families. Conclusions are presented in Section 7.

II. The Family Investment Hypothesis

Early immigration research focused on the relationship between relative immigrant-native earnings on the one hand, and year of arrival (cohort effects) and the number of

years since migration (typically called assimilation) on the other hand.² Male immigrants were found to have lower earnings immediately after arrival, but relatively high earnings growth over time.³ These patterns were thought to be explained by the difficulties in completely transferring human capital across countries and the resulting need to accumulate host country-specific human capital (Chiswick, 1978). Long (1980) was the first to demonstrate that although immigrant women often have higher earnings than native-born women immediately after migration, relative immigrant-native earnings declined as the number of years since migration increased. The contrast between the patterns for women and those for men lead Long to speculate that immigrant wives were working to finance their husbands' investment in U.S.-specific human capital.

Researchers attempting to empirically evaluate the family investment model have generally adopted one of three approaches. The first approach has been to compare the employment behaviour and earnings of immigrants, who are assumed to be credit constrained, with the behaviour of the native born, who are assumed not to be credit constrained (Long, 1980; Beach and Worswick, 1993; Worswick 1996; 1999). The difficulty with this, however, is that one cannot separate the effects of credit constraints from other the dimensions of the immigrant experience—for example, a lack of skill transferability (Chiswick, 1978), cultural differences in the preferences for work (Reimers, 1985; Antecol, 1999), or the selectivity associated with endogenous migration decisions (Borjas, 1987)—which lead the behaviour of immigrants and natives to differ. A second approach has been to compare the labour market outcomes of those immigrant families believed to require human capital investments with immigrant families who do not. Duleep and Sanders (1993) focus on potential country-of-origin differences in the need

²A more limited number of studies has focused on participation or unemployment.

³See Borjas (1985) and LaLonde and Topel (1992) for a discussion of the methodological issues involved in estimating the magnitude of the assimilation effect.

for post-migration human capital investment, while MacPherson and Stewart (1989) incorporate information about husbands' post-migration human capital investments directly into a model of immigrant wives' labour force participation decision. Without corresponding data on the variation in the credit constraints faced by immigrant families, however, this approach does not provide a means of assessing the role of credit constraints *per se* and again the effects of credit constraints may be confounded by regional/cultural variation in preferences for work.

These early empirical tests of the family investment hypothesis have produced somewhat mixed results. While some researchers find evidence in support of the hypothesis (Duleep and Sanders, 1993), others find only limited (MacPherson and Stewart, 1989) or ambiguous support (Worswick, 1996) for the notion that labour market outcomes in immigrant families can be explained by a family investment strategy.

More recently, Baker and Benjamin (1997) have pursued the third approach that uses variation in family nativity (i.e., native, immigrant and mixed families) to assess both the need to invest and the presence of credit constraints.⁴ In addition, their analysis extends previous analyses of the family investment hypothesis in two other important ways: first, by using pseudo-panel techniques to identify wage and hours assimilation⁵ and second, by explicitly considering alternative explanations for the observed wage and hours profiles. They find that employment assimilation among immigrants to Canada cannot be solely explained by underlying wage assimilation because estimated hours/wage elasticities are too small. Variation in outcomes across immigrant families (who are assumed to be credit constrained) and mixed families (who are not) is, however, consistent with the predictions of the family investment hypothesis leading the authors to conclude that “the family investment model has more empirical

⁴Baker and Benjamin (1997) refer to this as variation in “family type”.

⁵Using cross-sectional rather than longitudinal data leads to well-known methodological problems in identifying earnings assimilation (Borjas, 1985; LaLonde and Topel, 1992).

support than previously thought.”

As Baker and Benjamin note, however, cultural differences in the preference for work between immigrants married to immigrants (in immigrant families) and immigrants married to natives (in mixed families) are also potential explanations for the patterns of hours and wage assimilation that they observe. In particular, if having a native-born spouse promotes the adoption of native preferences (or if there is selectivity into intermarriage) then there may be systematic differences in the behaviour of mixed and immigrant families that are unrelated to the presence of credit constraints. Their data soundly reject the hypothesis that own assimilation profiles are the same for immigrant husbands and immigrant wives in mixed families, however. Thus, Baker and Benjamin are able to rule out gender-constant variation in preferences across immigrant and mixed families concluding instead that “the heterogeneity in the sample has both a family and gender component.” This conclusion is consistent with the inter-ethnic variation in the gender wage gap observed among immigrants to the United States (Antecol, 1999) that provides additional evidence that cultural differences in gender roles within the family may in fact be quite important. Unfortunately, however, Baker and Benjamin’s data do not exhibit sufficient variability to allow them to also rule out this type of more complex preference-based explanation of their results.

Following Baker and Benjamin, Blau, et al., (2002) also use variation in family nativity to analyse whether the assimilation patterns of immigrants to the United States are consistent with a model of family investment. In contrast to the Canadian results, assimilation patterns for U.S. immigrant husbands and wives are found to be quite similar, suggesting that both groups are investing in their own human capital and leading the authors to conclude that, for the United States at least, the family investment model cannot adequately explain immigrant assimilation. Duleep and Dowhan (2002) also find that the U.S. earnings profiles of recent immigrant women resemble those of recent immigrant men, but present evidence that this represents a structural change in the relative earnings profiles of foreign-born women entering after 1980. Although, these earnings profiles are no longer consistent with the simple version of the family investment

model put forth by Long (1980), Duleep and Dowhan argue for a more expansive notion of family investment in which family, life-time earnings are potentially maximized by a wife's investment in her own career path.

Despite the fact that the data available to previous researchers has not allowed them to disentangle gender from the economic factors it is intended to proxy, there are nevertheless other hints in the previous research literature that the family investment hypothesis cannot be a complete explanation of immigrant household behaviour and assimilation patterns. For example, if the behaviour of immigrant families is driven by credit constraints, we should observe very recent immigrant families acting consistently with the family investment hypothesis. Credit constraints are almost certainly more binding immediately after migration (Worswick, 1999). Yet there is evidence that while the family investment hypothesis holds for more established immigrants, it does not describe the behaviour of very recent immigrants.⁶

Our objective is build upon Baker and Benjamin's work by distinguishing between the family investment hypothesis and variation in preferences as potential explanations of immigrant behaviour. We do this by using detailed information about the immigration process itself to identify the primary and secondary worker in an immigrant couple, independently of gender. This additional dimension of variability in our data allows us to investigate the relative importance of the family investment hypothesis - which is based on economic factors captured by the notion of primary and secondary workers – on the one hand, and gender based explanations – such as heterogeneity in preferences for traditional gender roles –on the other. In addition, we also exploit variation in family types to assess whether immigrant behaviour is

⁶Baker and Benjamin find that the sum of the estimated cohort effects for immigrant husbands and wives are negative for the most recent cohort of immigrants (see Baker and Benjamin, 1997:Table 2). Similarly, Worswick (1996) finds that immigrant women do not supply more hours than native-born women in the first few years after migration.

consistent with the presence of credit constraints.

III. The Longitudinal Survey of Immigrants to Australia

Like Canada and the United States, Australia is an affluent⁷, democratic, English speaking country whose identity has been shaped by large-scale immigration. Nearly six million individuals have migrated to Australia since the start of the post-war migration program in October of 1945. Australia's annual intake is small relative to that of Canada and the United States, yet net overseas migration accounts for approximately half of Australia's population growth (DIMA, 1998). The size of its foreign-born population also attests to Australia's importance as a major immigrant-receiving nation. Of the 18.3 million individuals enumerated in the 1996 Australian Census, 23.0 percent were born overseas and an additional 18.6 percent of people were first generation Australians (DIMA, 1998). During the same period, 17.4 percent of the Canadian and 9.3 percent of the U.S. population was foreign born (OECD, 1995).

Immigrants to Australia--like those to Canada and the United States--are selected on the basis of either labour market skills, family relationships, or out of humanitarian concerns. Australia's skilled immigration program is modelled closely on Canada's and with minor exceptions the policies of the two countries are broadly the same (Clarke, 1994). In both countries points tests are the primary mechanism for regulating the level and influencing the characteristics of skilled immigrants.⁸ Cobb-Clark, et al., 2001 compare the flow of immigrants

⁷In 1999 at purchasing power parity, Australia's GDP per capita was 76 percent of the U.S. figure and 97 percent of Canadian GDP per capita. In its 2001 Human Development Index - which is often taken to measure something like 'quality of life' - the United Nations Development Programme ranked Australia (2nd) ahead of both Canada (3rd) and the United States (6th) (United Nations Development Programme, 2001).

⁸The specifics of the points system can change from year to year, but in general both Australia's

into Australia, Canada and the United States in 1994-1995, by region of origin and broad class of admission. They report that in 1994-1995, 32.2 percent of immigrants to Australia were admitted on the basis of labour market skills, while more than half (50.5 percent) of new entrants to Canada were skill-based. In contrast, only 15.4 percent of immigrants to the United States were skill-based in 1994, while 31.5 percent entered as immediate relatives of U.S. citizens and an additional 26.5 percent entered through the numerically-limited family categories. Compared to flows into both Canada and Australia, a larger fraction of the immigrants entering the United States were from the Americas (including Canada, Central, and South America) and a smaller fraction was from Asia. Australia's immigrants were relatively more likely to come from outside Europe, Asia and the Americas than was the case for either Canada or the United States.

The Longitudinal Survey of Immigrants to Australia (LSIA) offers us a unique opportunity to re-examine the role of the family in immigrants' early labour market experiences. The LSIA collected a considerable amount of demographic, human capital, and labour market information for a cohort of principal applicants and their spouses. Spanning the first three and a half years of the settlement process, the three waves of data present the opportunity to follow a cohort of recent immigrants to Australia as they enter the labour market and begin looking for work. As the LSIA data provide no information about native families and only limited information about Australia-resident partners in mixed families it will not be possible to make statements about how immigrant status in and of itself matters. Still, our data for mixed and immigrant households provide a direct test of the family investment hypothesis.

The LSIA sample generalizes to principal applicants aged 15 and older who arrived in Australia between September 1993 and August 1995. Along with interviewing principal

and Canada's points tests take into account an individual's age, education, occupation (or intended occupation) and language ability (AADILEGA, 1991; Green, 1995; Green and Green, 1995).

applicants, complete information was also collected for migrating-unit spouses and limited information was collected for other members of the household.⁹ Throughout the analysis our estimation samples are restricted to couples in which both partners were separately interviewed (more than 95 percent of eligible cases) and between the ages of 19 and 60.¹⁰

Unlike earlier studies of the family investment hypothesis, we are able to identify family structure at the time of migration and to follow these families forward in time. This reduces the extent to which our results may be confounded by assortative mating after immigration.¹¹ Not surprisingly, our data do suggest that household formation and dissolution are important demographic phenomena within the (recent) immigrant population. At the time of the Wave 3 interview, more than 20 percent of immigrant/Australian-resident couples had formed new relationships since Wave 1. Approximately two percent of couples migrating together had split up over the first three years of the settlement process.

IV. Gender, Skills and Principle Applicants

At the core of the family investment hypothesis is the notion that primary workers will specialize in human capital investment, while credit constraints lead secondary workers to undertake labour market activities to finance post-migration consumption. Although gender is an imperfect proxy of primary worker status, a lack of an alternative identification strategy has led previous researchers to assume that, within couples, men are the primary workers and women are

⁹ See Cobb-Clark. (2001) for data details.

¹⁰ Unlike the case in other countries – notably Canada – all individuals (including spouses of principal applicants) holding permanent resident visas are allowed to work in the Australian labour market immediately upon arrival.

¹¹ See Beach and Worswick (1993) for a discussion of the importance of linked husband/wife panel data in directly testing the family investment hypothesis.

the secondary workers (Long, 1980; MacPherson and Stewart, 1989; Duleep and Sanders, 1993; Beach and Worswick, 1993; Worswick 1996; 1999; Baker and Benjamin, 1997). Unfortunately, this assumption makes it impossible to disentangle explanations for immigrant behaviour that are based on optimal economic specialization (i.e., the family investment hypothesis) from those based on gender (i.e., heterogeneity in preferences).

The LSIA data, however, separately identify principal applicants and their spouses giving us the opportunity to use this information to identify primary and secondary workers. This seems reasonable for several reasons. First, our sample consists of only of immigrants selected on the basis of their labour market skills. Specifically, we selected Concessional Family, Independent, and Employer Nomination Scheme (ENS) immigrants. The Concessional Family program selects immigrants on the basis of both family connections and labour market skills, while Independent migrants are those without family relationships who are admitted solely on the basis of skills. ENS migrants are admitted as the result of pre-arranged offers of employment from Australian employers. Others who were selected as a result of humanitarian concerns, close family relationships, or for their intention to establish a business in Australia have been dropped from the sample.¹²

Second, the points test used to select skilled immigrants closely corresponds to common notions of labour market skills and experience and hence to the idea of a primary worker. Principal applicants in both Concessional Family and Independent categories are subject to a points test. Although the exact test differs in the two programs, applicants are awarded points on the basis of age, educational qualifications, English language ability, occupation, and previous work experience.

Finally, it is reasonable to assume that couples maximize the probability of successfully

¹² Information about visa status comes from Department of Immigration and Multicultural Affairs administrative records not self-reports.

obtaining a visa by designating the partner with the strongest case as the principal applicant.

We begin by investigating the relationship between principal applicant status, gender, and productivity-related characteristics. The first row of Table 1 demonstrates that skill-based principal applicants are not always male; more than 16 percent of the time the principal applicant is the female partner. Furthermore, principal applicant status appears closely related to the usual notion of a primary worker. The probability that the wife is the principal applicant has a strong, positive, and statistically significant correlation with the wife's education and work experience, and is negatively correlated with the husband's work experience and education. Interestingly, the presence of children in the household does not have a significant effect on the probability that the female partner is the principal applicant.

[Table 1 about here]

The final row of Table 1 summarizes the incidence of female principal applicants by region of origin. Perhaps surprisingly, the fraction of nontraditional families does not appear to vary substantially across region of origin and the differences are not statistically significant. This is helpful for tests of the family investment hypothesis because it means that, conditional on gender, variation in primary worker status is not collinear with region of origin (and hence possibly with culturally based preferences for work or particular gender roles). Further, traditional and non-traditional families are distributed across visa categories in much the same way (see Appendix Table 1) reducing concern about sample selection tied to specific visa programs.¹³

V. Investment and Labour Market Activity of Recent Immigrant Couples

¹³Further information about the demographic characteristics, human capital characteristics, and labour market outcomes of the immigrants in our sample are reported in Appendix Tables 1 and 2.

In this section we implement tests of the family investment hypothesis that use principal applicant status rather than gender to identify primary workers. Given this, the family investment hypothesis predicts that relative to native-born couples who are not credit constrained, principal applicants in immigrant families will have relatively high rates of school enrolment and spend more time searching for and shopping among jobs resulting in lower employment and lower labour market participation. Spouses in immigrant families are expected to specialize in financing current consumption while their partner invests. They are predicted to have higher labour market participation and employment rates along with a lower probability of being enrolled in school.¹⁴

Immigrant Spouses: The Role of Credit Constraints

In Table 2 we follow the empirical strategy of Baker and Benjamin (1997) in comparing spouses (secondary workers) in immigrant couples with spouses in mixed immigrant/Australian-

¹⁴In addition, the family investment hypothesis makes a number of other predictions about job turnover, tenure, and wage growth. Predictions about labour supply--in particular, labour market participation or hours of work--are not clear, but rather depend on the nature of the investment. If human capital investment takes place primarily off the job then we would expect participation and hours to be relatively low for principal applicants and relatively high for their spouses. Alternatively, if human capital investment takes place primarily on the job, then we would expect principal applicants to work relatively more, while their spouses worked relatively less.

resident couples in order to assess the importance of credit constraints themselves.¹⁵ Our sample of “mixed” couples consists of immigrants migrating as “spouses” or “fiancées” who are married to (or living as if married to) native-born Australians or to immigrants residing in Australia for more than eight years. Mixed couples are expected to differ from couples that recently migrated together in two ways: first, they are less likely to be making human capital investments, and second, they are less likely to be credit constrained. Given this, the family investment hypothesis suggests that the behaviour of immigrant spouses (i.e., secondary workers) in mixed couples will differ from that of spouses (also secondary workers) in immigrant couples even though given our sample definitions both are themselves foreign born. Spouses in immigrant couples are expected to be more likely to finance their immigrant partners’ post-migration human capital investment than spouses in mixed couples and are therefore expected to be less likely to invest in job search (either on- or off-the-job) and formal education, but have higher employment and participation rates. Given enough time, we would expect these differences to disappear as credit constraints become less important. Alternatively, if the behaviour of foreign-born spouses is driven by heterogeneity in preferences about the appropriate division of labour between men and women rather than variation in credit constraints across mixed and immigrant families we would expect to see little difference in outcomes across

¹⁵While Baker and Benjamin (1997) focused on assimilation over time, our short panel does not allow us to consider patterns of hours or wage assimilation. Therefore, our focus will be on testing the family investment hypothesis through direct measures of human capital investment shortly after migration. We also explicitly consider labour force participation and employment since Australia’s complicated system of occupation- and skill-specific minimum wages and centralized wage bargaining leads to an environment where wage rates are relatively fixed (particularly at the low end). Thus, it is employment – and not wages – which is the dimension along which the Australian labour market adjusts

mixed and immigrant families after we hold constant the gender of the principal applicant.

The numbers in Table 2 are coefficients from linear probability models. The common specification is:

$$Y_i = I_i\forall + X_i\exists + (D_i*I_i)* + (D_i*X_i)\Delta + \epsilon_i$$

where Y_i is a measure of human capital investment or labour market activity, I_i is a dummy indicating the individual is in a household that migrated together (rather than a mixed household), X_i is a vector of individual and household characteristics (and a constant), and D_i is a dummy variable indicating the observation is from the third (rather than first) interview. The model is estimated on the pooled first and third interview data for samples of secondary workers (spouses) only, so that \forall (the coefficient on I_i) captures the difference six months after migration (in percentage points) in the outcomes of secondary workers who migrated with their partner ($I_i = 1$) and secondary workers who are partnered with an Australian resident, controlling for observable characteristics. Again, the former are more likely to be liquidity constrained than the latter, so that \forall captures the effect of liquidity constraints on immigrant secondary worker behaviour. Further, $*$ captures the change in this effect between the first and third interviews. The observable characteristics we control for are: age and education of the secondary worker, age of their partner, number of children in the household, number of adults in the household, region of origin, and state of residence in Australia. We use White's heteroscedasticity consistent variance-covariance estimate, and report t-statistics in square parenthesis.

In this analysis, we consider four separate outcomes: employment, labour market participation, school enrollment and hours of work. Models are estimated separately for traditional (female, secondary worker) and nontraditional (male, secondary worker) households using the pooled first and third interview information.¹⁶ The first interview occurs some 6

¹⁶ The coefficients in Table 2 in effect then come from a balanced panel. Cross-sectional results

months after migration while the third interview occurs approximately 42 months after migration.

[Table 2 about here]

Consider first traditional families (column 1). Controlling for observable characteristics, foreign-born women who are secondary workers married to immigrants (and hence likely to be credit constrained) are more likely to be participating in the labour market at the first interview (about six months after migration) than are foreign-born women who are secondary workers married to Australian residents (and hence less likely to be credit constrained). By the third interview, some three and a half years after migration, secondary workers in immigrant households are significantly more likely to be participating and employed in the Australian labour market.¹⁷ To the extent that first, Australia's institutional implies a delay in new immigrants finding employment and second, the first few years after migration are not sufficiently long to eliminate credit constraints, these results for traditional families are consistent with the family investment model.

At the same time, we also find that foreign-born women who are secondary workers are more likely to be enrolled in formal education if their husbands are immigrants (and credit constrained) than if their husbands are Australian residents who are less likely to be credit constrained. This is inconsistent with the family investment hypothesis which suggests that credit constraints lead secondary workers to not only work more but also to forgo investment in

for the first interview are virtually the same whether the balanced or unbalanced panel is used.

These unbalanced panel results are available from the authors upon request.

¹⁷ Although the change over time in the employment differential between spouses in immigrant and mixed couples is itself not significant, at the third interview spouses in immigrant couples are significantly more likely to be employed than those in mixed couples.

their own human capital.

When we examine nontraditional families (column 2), we find a pattern that is completely at odds with the predictions of the family investment hypothesis. Controlling for observable characteristics, foreign-born men who are secondary workers married to immigrant women are less likely to participate in the labour market, less likely to be employed and more likely to be students investing in their own human capital than are foreign-born men who are secondary workers married to Australian residents. Over time, the disparity in education rates largely disappears, though the divergence in employment and participation rates remain.

Thus, we find mixed evidence on the family investment hypothesis among traditional families while the evidence for nontraditional families is completely at odds with the family investment hypothesis. Note that in these comparisons we are comparing immigrant women to immigrant women and immigrant men to immigrant men so that the comparisons are not confounded by a gender effect nor are they driven by nativity-based preference differences.

Disentangling the Effects of Gender and Principal Applicant Status

In the previous section we considered only the behaviour of secondary workers in immigrant and mixed families as a means of isolating the effects of credit constraints. In this section, our focus is on both principal applicants and secondary workers in immigrant households. This allows us to compare behaviour simultaneously across gender and primary/secondary worker status (as measured by principal applicant/spouse status). Our model controls for the effects of being female, a spouse, and in a traditional family (an interaction of the previous two) on behaviour at the first interview as well as on the change in behaviour between the first and third interviews (over the first three and a half years after arrival).

As in Table 2, the results (coefficients and t-statistics) reported in Table 3 are from linear probability models (except when we model hours, in which case we estimate a linear regression).

These models are estimated on a balanced sample that pools first and third interviews, secondary workers and principal applicants, and traditional and nontraditional households. The sample, however, includes only individuals from immigrant families (not from mixed families), so that everyone in the sample is a recent migrant. In addition to allowing for potential correlation of unobservables across individuals in the same household (as well as for heteroscedasticity) we also allow for correlation within individuals across time effectively using a random effects specification.

The common specification is:

$$Y_i = S_i\forall + F_i2 + T_i(\alpha + X_i\beta + (D_i * S_i)B + (D_i * F_i)N + (D_i * T_i)0 + (D_i * X_i)\Delta + \epsilon_i$$

where Y_i is a measure of human capital investment or labour market activity, S_i is a dummy indicating the individual is a secondary worker (not the principal applicant), F_i is a dummy indicating the individual is female, T_i is a dummy indicating that the individual is from a traditional household (in which the secondary worker is female), X_i is a vector of individual and household characteristics (and a constant), and D_i is a dummy indicating the observation was drawn from the third interview. Note that $T_i = 1$ iff $S_i = F_i$ so that T_i is like an interaction effect. The set of additional controls is the same as in Table 2.

The first panel in Table 3 reports the coefficients from the four outcomes we consider: employment, labour market participation, school enrollment and hours of work. These four models include the constant effects of being a secondary worker, female and in a traditional household (\forall , 2 and α). The second panel reports the coefficients on interaction terms (B , N and 0) which capture how change over time differs between secondary workers and principal applicants, between females and males, and between immigrants in traditional and nontraditional households, or equivalently, how each of those three differentials change over time.¹⁸

¹⁸ As a robustness check, we again compared the cross-sectional results at the first interview

[Table 3 about here]

Because we are comparing men with women and primary workers with secondary workers within immigrant families (and not across family types), it is not clear that the family investment hypothesis makes predictions about the *levels* of labour market and human capital investment activity. For example, Table 3 indicates that among immigrant families, shortly after migration, conditional on gender, secondary workers are considerably less likely than principal applicants to be employed or participating in the labour market. However, this is not necessarily inconsistent with the family investment hypothesis, which says that secondary workers work a lot initially to finance consumption, while principal applicants invest and then see earnings growth. It could be that principal applicants consistently work more than their partners. If the family investment hypothesis holds, however, the gap should eventually increase over time as principal applicants assimilate into the new labour market and the need for consumption financing by the secondary worker decreases. At the same time, the gap in school enrolment rates are expected to decrease as principal applicants complete their human capital investments.

Indeed, the bottom panel of Table 3 indicates that the hours, employment and participation gaps between principal applicants and secondary workers all grew between the first and third interviews, although none of the changes are statistically significant. The results in Table 3 also indicate that, perhaps unsurprisingly, the gender effects--at least in levels-- are very

using the balanced and unbalanced panels and found them to be very similar. The unbalanced panel results are available from the authors upon request.

large, and that there are some significant interaction effects for female spouses.¹⁹ Taken together, these results suggest that the behaviour of immigrant households is complex and while there is weak evidence to support the family investment hypothesis, there is strong evidence that other factors are also at work.

VI. Discussion

Understanding the role of the family in immigrant settlement poses several challenges. In particular, many of the factors of interest (for example, age of arrival, intermarriage, region of origin, visa category, gender and transferred human capital) are highly confounded, and disentangling their effects is exceedingly difficult. One way to make progress is to utilize cross-national variation in institutional settings and to look for data that is sufficiently detailed to allow the researcher to exploit such institutional variation. In this paper, we have used the large emphasis on productivity-related characteristics in Australia's immigrant selection process and new, very detailed data (the Longitudinal Survey of Immigrants to Australia) to identify variation in the labour market activity of primary and secondary workers in immigrant families, independently of the effects of gender.

Following Baker and Benjamin (1997), we implement tests of the family investment hypothesis by comparing secondary workers in immigrant couples with foreign-born, secondary workers partnered with Australian residents. We find some support for the family investment hypothesis among traditional households (where the primary worker is male), but not among nontraditional households (where the primary worker is female).

¹⁹ In order to determine whether these results are being driven by the small number of Employer Nomination Scheme immigrants who are admitted to Australia on the basis of prearranged employment, we re-estimated the models in Table 3 dropping these households from the sample. The results were substantially unchanged, however.

The support we find among traditional households is perhaps more convincing when the nature of our sample is considered. In order to use principal applicant status as a proxy for primary worker status, we limit our sample of immigrant couples to those who qualified for immigration on the basis of pre-existing labour market skills. In these households, the partner with the greatest number of potential points - who we take to be the primary worker - should be (and appears to be) designated as the principal applicant. Note, however, that since these skill-based immigrants may have little need to make post-migration human capital investments and may not be particularly credit constrained. Thus, we may be limiting our analysis to a sample of immigrants for whom the family investment hypothesis is less relevant. This would bias us towards failing to find evidence for the family investment hypothesis. In fact, we do find some (mixed) support for the family investment hypothesis, even in this sample. The support we find however, is only among traditional households, and the considerations just noted do not diminish the fact that we find distinctly different behaviour among nontraditional households.²⁰

The final question we take up is: what is a primary (or secondary) worker, and does the family investment hypothesis really make predictions about primary and secondary workers? Any formal version of the family investment hypothesis - as a model of household members' specialization in financing current consumption or in investment (that is, in future consumption) - must be about the *comparative* advantage of household members *in these activities*. How this relates to the notions of “primary” and “secondary” workers is not at all clear

Non-convexities in human capital production technology can lead to specialization in

²⁰ Previous studies using cross-sectional data on immigrants entering the host country over many decades are of course measuring changes over a much longer time frame than is possible in this analysis. It is possible, that immigrant families' ability to access credit markets do not change much over the first three years after migration. In this case, our panel is too short to test the longer run implications of the FIH.

financing and investing roles within the household. If household members are homogeneous, then which partner should invest, and which should finance is not determined (Baker and Benjamin, 1997; Bernhardt and Backus, 1990). Heterogeneity - for example in skill endowments - can determine the optimal allocation of tasks within the household. Recent studies suggest that post-migration human capital investment - in particular learning the host-country language - increases the transferability of pre-existing skills (Duleep and Regets, 1999). This complementarity between pre- and post migration human capital investments generates a nonconvexity which, coupled with heterogeneity in pre-existing skills, could drive specialization within immigrant households.

In this paper we have identified the primary worker as the partner with greater labour market skills and experience. This would seem to correspond most naturally to current *absolute* advantage in the labour market - and hence to absolute advantage in financing current consumption. Optimal behaviour, however, is driven by comparative rather than absolute advantage. Complementarity between pre- and post-migration human capital investments, makes it more likely that an absolute advantage in financing current consumption is associated with a comparative advantage in financing future consumption, - but does not guarantee it. Furthermore, there may be other important factors in the comparative advantage calculation. For example, shorter time horizons (because of anticipated retirement or time out of the labour market to bear children) reduce the return on human capital investment and hence might shift comparative advantage between members of a couple.

Ultimately then, the interpretation of our results rests on how one interprets the family investment hypothesis. As discussed in the previous literature, the family investment hypothesis is a set of predictions about the behaviour of primary and secondary workers in immigrant families, and those predictions are not supported by our data. In particular we find no support for the family investment hypothesis - defined in this way - among “nontraditional” households in which the apparent primary worker is female. Gender roles, and perhaps cultural variation in preferences for gender roles appear to play a significant role.

On the other hand, if one views the family investment hypothesis simply as an assertion that families specialize - and that this specialization is determined by comparative advantage - then our results and those in the previous literature are open to various interpretations. In this case, it is not clear that a measure of absolute labour market advantage such as we have used here provides us with a test of the mechanism we would expect to be driving behaviour. It is even less clear that gender as has been used in the previous literature would provide a sensible test. Comparative advantage is not observable,²¹ and it is hard to imagine how a researcher could distinguish between, say comparative advantage driven by biological gender differences and cross cultural differences in preferences for gender roles. In either case, gender is the observable determinant of behaviour.

VII. Conclusion

Researchers interested in immigrant settlement are turning their focus from methodological debates about how best to measure assimilation to an examination of the mechanisms by which immigrants assimilate. Given that immigration streams are composed of family units rather than individuals, it is important that this process also moves us beyond simple analyses of individuals and allows us to begin to consider entire immigrant households. This is particularly important in light of recent policy changes that move the selection process away from a system of applying selection criteria to one member of the household (and automatically granting visas to dependent family members) and towards joint selection of partners.²²

In the face of these trends a re-examination of the family investment hypothesis seems

²¹Identifying comparative advantage from labour market activity and specialization would of course be circular, and assume exactly what we want to test.

²²Since 1999, Australia grants points-tested principle applicants additional points if their partners also meet the minimum age, occupation, and language criteria (Cobb-Clark, 2002).

particularly timely. This hypothesis has been the primary theoretical framework for thinking about the assimilation of married immigrant men and women since it was first proposed by Long in 1980. Our results imply, however, that the family investment hypothesis as it has evolved over the intervening years is not sufficiently developed so as to allow us to explain all of the complexities of household behaviour that have been illuminated with the advent of more detailed data. This suggests to us that the family investment hypothesis needs to be extended (or alternative theoretical constructs developed) if we are to make progress in understanding immigrant settlement in the household context. More generally, our analysis provides an example of how cross-national variation in institutions and immigration policy can shed light on aspects of immigrant behaviour. This would also seem to us to be a promising avenue of future research.

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Table 1: Percent of Immigrating Couples with a Female Principal Applicant			
		%	Test of Independence Pearson χ^2 (p-Value)
Overall		16.4	
Female's Education	Less than High School High School University Trade	2.0 1.9 26.4 16.9	86.9 (0.00)
Female Worked in 12 Months Prior to Migration	No Yes	3.5 22.0	60.0 (0.00)
Male's Education	Less than High School High School University Trade	27.2 54.0 17.1 10.6	58.1 (0.00)
Male Worked in 12 Months Prior to Migration	No Yes	27.1 15.9	4.16 (0.07)
Young Children in Household	No Yes	16.6 16.1	0.057 (0.98)
Any Children in Household	No Yes	18.0 15.8	0.728 (0.77)
Regions of Origin	United Kingdom Asia North West Europe South East Europe Other	17.0 16.6 13.5 17.2 13.6	1.00 (0.95)
Notes:			

TABLE 2: The Role of Credit Constraints in the Behaviour of Foreign-Born, Secondary Workers by Household Type (Immigrant versus Mixed Households)		
	Effect of Immigrant HH Status for Traditional Families (Female Secondary Workers)	Effect of Immigrant HH Status for Nontraditional Families (Male Secondary Workers)
At First Interview Balanced Panel		
employed	0.019 [0.60]	-0.129 [-1.83]
participant	0.093 [2.50]	-0.109 [-1.87]
student	0.075 [2.78]	0.103 [1.94]
Change from First Interview to Third Interview Balanced Panel		
employed	0.049 [1.17]	0.001 [0.02]
participant	-0.008 [-0.18]	0.018 [0.26]
student	-0.032 [-1.03]	-0.068 [-1.16]
Notes:		
<ol style="list-style-type: none"> 1. For traditional families, the comparison is between immigrant women married to immigrant men (all of whom are principal applicants) and immigrant women married to Australian residents. For non-traditional families, the comparison is between immigrant men married to immigrant women (all of whom are principal applicants) and immigrant men married to Australian residents. 2. There are 1062 traditional families (2124 observations) and 367 nontraditional families (734 observations). 3. Other regressors include: the inverse hyperbolic sine (ihs) of the number of adults and of the number of children in the household, a dummy for the presence of children aged 0-5, months since migration, state of residence dummies, region of origin dummies, education dummies, and a quadratic in age for both head and spouse. The ihs is an alternative transformation that, unlike the logarithm, handles zeros (see Burbidge et al., 1988.). Full regression results available from the authors. 4. t-statistics are in square parenthesis. White's heteroscedasticity consistent variance-covariance estimates are used throughout. 5. Individuals who are not employed, but indicate that their principal activity in the reference period is education are coded as students. 		

TABLE 3: The Role of Comparative Labour Market Advantage Within Immigrant Families (Principal Applicants vs. Secondary Workers)			
	Secondary Worker Effect	Female Effect	Traditional Household
At First Interview Balanced Panel 3296 observations (824 households x Principal Applicant and Spouse x 2 Interviews)			
employed	-0.153 [-6.10]	-0.225 [-8.09]	-0.028 [-0.87]
participant	-0.160 [-6.88]	-0.238 [-9.39]	-0.090 [-2.74]
enrolled	-0.004 [-0.24]	-0.034 [-1.86]	-0.001 [-0.03]
hours	-7.986 [-7.54]	-11.965 [-10.24]	-0.688 [-0.51]
Change from First Interview to Third Interview Balanced Panel 3296 observations (824 households x Principal Applicant and Spouse x 2 Interviews)			
employed	0.034 [0.99]	0.027 [0.72]	-0.047 [-1.22]
participant	0.047 [1.54]	0.019 [0.56]	0.014 [0.37]
enrolled	0.063 [2.14]	0.050 [1.57]	-0.010 [-0.28]
hours	1.637 [1.23]	-0.778 [-0.54]	-1.412 [-0.91]
Notes:			
<ol style="list-style-type: none"> 1. Linear probability models (employed, participant, and enrolled) and linear regression (hours). 2. White's heteroscedasticity consistent variance-covariance estimates are used throughout and allowance is made for within household (across principal applicant and spouse and across interviews) correlations. t-statistics are in parentheses. 3. Other regressors include: the inverse hyperbolic sine (ihs) of the number of adults and of the number of children in the household, a dummy for the presence of children aged 0-5, months since migration, state of residence dummies, region of origin dummies, education dummies, and a quadratic in age for both head and spouse. The ihs is an alternative transformation that, unlike the logarithm, handles zeros (see Burbidge et al., 1988.). Full regression results available from the authors. 4. "Enrolled" indicates individuals who report that they are enrolled in formal education. 			

Appendix Table 1: Sample Means (and standard errors) of Household and Individual Characteristics				
	Traditional (male head)		Nontraditional (female head)	
	Immigrant	Mixed	Immigrant	Mixed
Observations	930	593	200	399
<i>Household</i>				
months since migration	4.77 [1.58]	4.21 [1.12]	4.70 [1.53]	4.21 [1.09]
region of origin: Uk	0.270 [0.444]	0.096 [0.295]	0.240 [0.428]	0.153 [0.360]
Asia	0.382 [0.486]	0.358 [0.480]	0.450 [0.499]	0.168 [0.374]
Northwest Europe	0.043 [0.203]	0.126 [0.333]	0.040 [0.196]	0.128 [0.334]
Southeast Europe	0.143 [0.350]	0.192 [0.394]	0.140 [0.348]	0.211 [0.408]
Other	0.162 [0.369]	0.228 [0.420]	0.130 [0.337]	0.341 [0.475]
Visa: Concessional	0.419 [0.494]		0.455 [0.499]	
Employer	0.206 [0.405]		0.140 [0.348]	
Independent	0.374 [0.484]		0.405 [0.492]	
Spouse		0.744 [0.437]		0.747 [0.435]
Fiancee		0.256 [0.437]		0.253 [0.435]
state of residence: New South Wales	0.381 [0.486]	0.393 [0.489]	0.390 [0.489]	0.411 [0.493]
Victoria	0.222 [0.415]	0.234 [0.424]	0.295 [0.457]	0.266 [0.442]
Queensland	0.115 [0.319]	0.135 [0.342]	0.110 [0.314]	0.110 [0.314]
South Australia	0.070 [0.255]	0.062 [0.242]	0.045 [0.208]	0.050 [0.218]
Western Australia	0.153 [0.360]	0.103 [0.304]	0.105 [0.307]	0.108 [0.310]
Territories	0.060 [0.238]	0.073 [0.260]	0.055 [0.229]	0.055 [0.229]
number of adults	2.4 [0.8]	2.6 [1.2]	2.4 [0.9]	3.0 [1.3]
number of children	1.486 [1.171]	0.447 [0.851]	1.355 [1.173]	0.602 [0.995]
children under 5 present	0.445 [0.497]	0.135 [0.342]	0.420 [0.495]	0.246 [0.431]
<i>Head</i>				
age	36.4 [6.7]	36.1 [9.8]	33.7 [5.1]	29.1 [7.2]
education: university	0.563 [0.496]		0.710 [0.455]	
trade	0.372 [0.484]		0.245 [0.431]	
high school	0.024 [0.152]		0.030 [0.171]	
less than high school	0.041 [0.198]		0.015 [0.122]	
employed in home country	0.961 [0.193]		0.925 [0.264]	
<i>Spouse</i>				
age	33.8 [6.8]	30.2 [7.7]	35.9 [6.2]	30.1 [6.6]
education: university	0.371 [0.483]	0.267 [0.442]	0.620 [0.487]	0.248 [0.432]
trade	0.283 [0.451]	0.307 [0.462]	0.235 [0.425]	0.323 [0.468]
high school	0.206 [0.405]	0.212 [0.409]	0.095 [0.294]	0.233 [0.423]
less than high school	0.139 [0.346]	0.214 [0.411]	0.050 [0.218]	0.185 [0.389]
employed in home country	0.667 [0.472]	0.715 [0.452]	0.940 [0.238]	0.882 [0.323]
Notes:				
1. Calculations are based on first interview information. Education levels are not available for those resident Australians who are heads of mixed households.				

Appendix Table 2: Sample Means (and standard errors) of Labour Market and Investment Activity								
	Traditional				Non Traditional			
	Immigrant		Mixed		Immigrant		Mixed	
Family Position (Gender)	Head (male)	Spouse (female)	Head (male)	Spouse (female)	Head (female)	Spouse (male)	Head (female)	Spouse (male)
First Interview (approximately 6 months after migration)								
observations	930		593		200		399	
employed	0.61 [0.49]	0.20 [0.40]	0.78 [0.42]	0.25 [0.43]	0.44 [0.50]	0.48 [0.50]	0.63 [0.48]	0.56 [0.50]
unemployed	0.23 [0.42]	0.15 [0.36]	0.15 [0.35]	0.12 [0.33]	0.26 [0.44]	0.28 [0.45]	0.13 [0.33]	0.27 [0.44]
participant	0.84 [0.37]	0.35 [0.48]	0.93 [0.26]	0.37 [0.48]	0.69 [0.46]	0.77 [0.42]	0.76 [0.43]	0.83 [0.38]
student	0.12 [0.32]	0.13 [0.33]	0.03 [0.16]	0.13 [0.34]	0.12 [0.32]	0.17 [0.38]	0.06 [0.23]	0.12 [0.33]
Third Interview (approximately 42 months after migration)								
observations	681		381		143		224	
employed	0.85 [0.36]	0.46 [0.50]	0.87 [0.34]	0.41 [0.49]	0.72 [0.45]	0.80 [0.40]	0.62 [0.49]	0.86 [0.35]
unemployed	0.07 [0.25]	0.04 [0.21]	0.04 [0.21]	0.04 [0.20]	0.03 [0.18]	0.08 [0.27]	0.02 [0.15]	0.08 [0.28]
participant	0.92 [0.27]	0.51 [0.50]	0.92 [0.28]	0.45 [0.50]	0.76 [0.43]	0.88 [0.32]	0.64 [0.48]	0.94 [0.23]
student	0.05 [0.21]	0.06 [0.24]	0.02 [0.13]	0.04 [0.20]	0.08 [0.27]	0.06 [0.23]	0.03 [0.17]	0.04 [0.19]