Labor Supply of Married Women in Credit-Constrained Households: Theory and Evidence

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August 2012

Abstract

According to the family investment hypothesis (FIH), married women in credit-constrained households participate in the labor market to financially sustain their families. We show that a simple two-period labor supply model produces testable implications for the occupational choices and work hours of married women. The test requires that the sample be confined to women working in dead-end jobs that do not necessarily involve much skill. Our results, based on the matched March Current Population Survey, support the FIH. We also find that the previous U.S. results which refute the FIH are reversed when the confined sample is used.

Keywords: Family Investment Hypothesis, Female Labor Supply, Occupation Mobility

JEL Classification Number: J12, J24, J61

[0] We have benefited from helpful comments made by Yoram Barzel, Delia Furtado, Lawrence Kahn, Shelly Lundberg, Claus Pörtner, and seminar participants at the annual meeting of the European Society for Population Economics, the annual meeting of the Population Association of America, the Asian meeting of the Econometric Society, University of Seoul, University of Washington, and the UW Center for Statistics and the Social Sciences. Seik Kim is grateful for support from the Tim Jenkins Faculty Career Development Fund.

1 Introduction

This paper analyzes the labor market behavior of family members in credit-constrained or liquidity-constrained households. In credit-constrained households, some family members participate in the labor market to financially sustain their families. However, these family members would have not worked if their families were not under constraints. As a consequence, the labor supply provided by these family members usually takes the form of working in dead-end jobs that do not necessarily require much skill and will decrease as their families overcome credit constraints. These predictions enable one to test the family investment hypothesis (FIH) by comparing the labor supply of secondary workers in credit-constrained families with that in families that are not credit-constrained.

In the literature, researchers have found a simple way of identifying out credit-constrained families from those who are not by exploiting the immigration status of families.[1] A common assumption made is that recent immigrant families are more likely to be credit-constrained than native families or other immigrant families who arrived earlier.[2] This assumption is made because, upon entry to the United States, source country skills are not perfectly transferable and immigrants need time to refine their skills and learn about the U.S. labor market. This circumstance gives rise to specialization among couples where primary workers (usually husbands) invest in acquiring U.S. specific skills and secondary workers (usually wives) take on low-skill jobs to sustain their families in the interim.[3] Once primary workers begin to assimilate into the U.S. labor market, secondary workers reduce their work hours or withdraw from the labor force.

We study the FIH for three reasons. First, it helps policy makers to understand the labor market behavior of family members in credit-constrained, not limited to immigrant, households. Second, while a large literature investigates the FIH (e.g., Long, 1980; Baker and Benjamin, 1997; Blau,

[1] We use the terms "foreign-born person" and "immigrant" interchangeably. Our sample possibly includes aliens in an illegal status.

[2] Analyses based on this assumption, however, will fail if one cannot separate the effects of credit-constraints from other effects that are specific to immigrants' experiences. Cobb-Clark and Crossley (2004) discuss that imperfect skill transferability, cultural differences in family roles with respect to working, or non-random migration decisions may cause the behavior of immigrants and natives to differ.

[3] An exception is Cobb-Clark and Crossley (2004). They allow the possibility of female primary workers and male secondary workers.

Kahn, Moriarty, and Souza, 2003; Cobb-Clark and Crossley, 2004; among others), the testing procedure has not been formally established by economic theory. Cohen-Goldner, Gotlibovski, and Kahana (2009a) is an exception, but our approach presents a much simpler model. Third, the evidence of the FIH has been controversial. While Baker and Benjamin (hereafter, BB), using the 1986 and 1991 Canadian Survey of Consumer Finances, find that foreign-born women's labor supply patterns are consistent with the FIH; Blau, Kahn, Moriarty, and Souza (hereafter, BKMS), using the 1980 and 1990 U.S. Census data, find no support for the FIH.

This study improves upon previous research in several ways. First, we present a two-period labor supply model for married women that provides new testable implications for the occupational choices and work hours of married women. Married women with low productivity and low taste for work do not participate in the labor market unless their families are credit-constrained. Among these women, more immigrant females participate in the labor market since their families are more likely to be credit-constrained than native ones. As the credit-constraint problems get resolved, more immigrant females in dead-end or low-skill jobs will drop out of labor force than their native counterparts. A test of the FIH is, therefore, to examine the immigrant-native difference in the occupation mobility and the labor supply of married women working in dead-end jobs in response to increases in husband's earnings and family non-labor income.

Second, previous studies test the FIH by comparing the average annual hours worked of foreign-born women with those of native-born women without conditioning on their occupations or skills. For example, BKMS (2003) find that immigrant women work less hours than comparable native women upon arrival, but eventually work more hours than native women. The theory part of this paper argues that the test has to be limited to immigrant and native women who work in dead-end jobs. The role of dead-end jobs has been noted in most previous papers, but occupational status has received little attention in testing the FIH. By replicating the previous specifications using our data, we show that we can reproduce the findings of other U.S. studies and that these results are reversed when the sample is confined to women working in dead-end jobs.

Third, to characterize the dynamic feature of occupation choices and labor supply, this paper uses longitudinal data, the matched March Current Population Survey (CPS). It consists of multiple two-year panels. To specify occupation choices, we fit a first-order Markov switching model with three occupation states (not working, working in dead-end jobs, and working in career-oriented jobs). We explicitly investigate whether foreign-born women in dead-end jobs leave the labor market or decrease their work hours with increased stay in the United States conditioning on their spousal occupation status and earnings, family non-labor income, and own and spousal demographic variables. The longitudinal nature of the data is valuable for use in the annual hours worked specifications because we can identify individuals who work in dead-end sectors in the first year of the panel and observe their actual labor supply in the second year of the panel.

The paper proceeds as follows. Section 2 develops a two-period labor supply model for married women, presents its implications for work hours and occupational choices, and reviews related studies. Section 3 introduces the data sets used in this study. Section 4 proceeds with the empirical specification of dynamic occupation choices and estimates the model. Section 5 replicates the annual hours worked specification employed in the previous literature using our sample. We compare the results from the full sample and the sample confined to women in dead-end jobs. Section 6 concludes.

2 Testing the Family Investment Hypothesis

2.1 Labor Supply of Married Women: Theory

This section presents a simple two-period labor supply model for married women, which produces testable implications for the FIH. The labor market is competitive and offers two kinds of occupations. The first occupation is a career-oriented job. Individuals working in career-oriented jobs earn w_1 in the first period (when young) and w_2 ($> w_1$) in the second period (when old) if they continue to work. Occupations in this category require that workers meet certain schooling, training, and experience criteria. The second occupation is a dead-end job. The wages in dead-end jobs are set to w_0 regardless of labor market experience. Skills required for these occupations are minimal.

We assume that the discounted lifetime earnings from working in career-oriented jobs are greater than those from working in dead-end jobs. That is, $w_1 + w_2/(1+r) > w_0 + w_0/(1+r)$, where r is the interest rate. However, there are two sources of costs associated with learning the required skills for career-oriented jobs: pecuniary costs and disutility from effort in acquiring the skills. For some women, these costs are higher than for others, and they choose to work in dead-end jobs.

We assume that husbands and wives are primary and secondary workers, respectively.[4] All males participate in the labor market, but there is selection among females. Women are heterogeneous. They have different labor market productivity and preferences for leisure. For simplicity, we consider four types of females: high/low productivity and high/low taste for work. Suppose that, given the wage structure, high productivity (HP) and low productivity (LP) females work in career-oriented and dead-end jobs, respectively, if they choose to work.[5] For those who are not working, their productivity types are not observed. Other things equal, females with high taste for work (HW) are more likely to work than those with low taste for work (LW).

For example, a married women maximizes her utility

$$\max_{\{c_t, l_t\}} U(c_1, l_1, x_1|\delta) + \frac{1}{1+\rho} U(c_2, l_2, x_2|\delta),$$

subject to an asset accumulation rule, where c_t, l_t, and x_t are consumption, leisure, and observable individual as well as husband and family variables in period t; δ is the taste for work parameter; and ρ represents the discount rate. The first order conditions are $U_c(c_t, l_t, x_t|\delta) = \lambda_t$ and $U_l(c_t, l_t, x_t|\delta) \geq \lambda_t w_t$, for $t = 1, 2$, and an Euler equation, where λ_t is the marginal utility of wealth. From these equations, we obtain the labor supply function, $h_t(\lambda_t, w_t, x_t|\delta) \geq 0$, which is increasing in λ_t and δ.

We assume that a foreign-born female is more likely to face liquidity constraints than a native-born female when she is young, but the constraints disappear as husband's earnings and family non-labor income grow. This implies that λ_t is likely to be larger for immigrants than natives for

[4] We abstract from bargaining within married couples.

[5] However, some highly productive females may take dead-end jobs at $t = 1$ due to severe liquidity constraints. In this case, they cannot move to career-oriented jobs at $t = 2$ because they did not acquire human capital at $t = 1$. As a result, their labor market behavior will be similar to those of LP females. To keep our discussion simple, we classify this specific group of highly productive females as LP females.

$t = 1, 2$, but λ_2 is sufficiently small even for immigrants. Under these conditions, some women, who would otherwise not have worked, work in the first period because λ_1 is too high. In the second period, these women reduce their labor supply or drop out of the labor force. The majority of these women are LP-LW females. Since they have low δ's and receive low wage offers during their work lives, they work in the first period when λ_1 is high and then reduce or quit their labor supply in the second period because λ_2 is lower than λ_1. LP-HW females are likely to work in both periods because they have high δ. HP females are less likely to be affected by their non-labor income because their life-time career decisions depend on the increasing wage structure of career-oriented jobs. To test the FIH, one needs to examine the changes in the labor market behavior of LP-LW females over time.

In practice, it is difficult to separate LP-LW females from LP-HW females, although it is possible to identify LP females among working females. Accordingly, we develop a test of the FIH using working LP females. The FIH accompanied by a conventional assumption that immigrant households are more likely to be credit-constrained provides the following two testable implications. First, among females working in dead-end jobs in the first period, immigrant women are more likely than native women to decrease their work hours in the second period. Second, among females working in dead-end jobs in the first period, immigrant women are more likely to quit their jobs in the second period relative to native women.

· **Testable Implication 1.** Among females currently working in dead-end jobs, immigrant women are more likely than native women to decrease their work hours in the next period.

· **Testable Implication 2.** Among females currently working in dead-end jobs, immigrant women are more likely to quit their jobs in the next period relative to native women.

Our testable implications are different from those in previous studies. Earlier papers test the first implication for the FIH, but they use the entire female sample neglecting the importance of distinguishing dead-end jobs from career-oriented jobs. In Section 5, we can compare two sets of test results: one using the entire female sample and the other confining the sample to working females in dead-end jobs. The second implication concerns occupation choices and is a new testable implication. Section 4 presents these test results.

2.2 Previous Literature

This section reviews the existing literature on the FIH and the occupational choices of immigrant women. Long (1980) documents negative correlation between years since migration and earnings for married immigrants using the 1970 Census. He speculates that this may be because married women in immigrant families initially work to provide financial support for their husbands' human capital investments required in U.S. labor market and then reduce their labor supply as their husbands' earnings rise with time in the United States. Subsequent studies have explicitly tested this speculation and coined the term the Family Investment Hypothesis.

BB (1997) test the FIH against an alternative hypothesis, the pricing model, using the 1986 and 1991 Canadian Survey of Consumer Finances. The pricing model explains the observed labor supply pattern of immigrant women by the labor supply responses to each spouse's wages. They reject the pricing model based on the fact that their estimated hours/wage elasticities are too large. They have tried to disentangle immigrant specific effects by looking at the composition in family nativity. They show that immigrant women married to native men, who are assumed to not be credit-constrained, behave like native women.

BKMS (2003) use the 1980 and 1990 U.S. Census data and reject the FIH. They find that immigrant women work less hours than comparable natives upon arrival, but eventually overtake the labor supply of natives, which conflicts with the FIH. They also find that the positive assimilation profiles for women and men have similar magnitudes. Blau, Kahn, and Papps (2008), using the 1980, 1990, and 2000 Census data, find that source country characteristics impact the labor supply assimilation profiles (annual hours worked) of immigrant wives, but not immigrant husbands.

Cohen-Goldner, Gotlibovski, and Kahana (2009b) provide the most recent evidence for the FIH using the 1980 and 1990 U.S. Census. They reject the FIH. They compare the labor market outcomes between married and single immigrants with the assumption that under the FIH, only married immigrant women finance household consumption. Then, married women should work longer on arrival and reduce their hours with continued stay in the host country relative to single immigrants. To account for bias due to selection into marriage, they use the difference-in-difference estimator by comparing married and single natives.

Studies that test the FIH in other countries provide mixed results. Cobb-Clark and Crossley (2004), using data from Australia, identify primary and secondary workers in immigrant families based on 'points' which are assigned in accordance to an individual's skill set. They find support for the FIH in households where the primary worker is male, but reject the FIH in households where the primary worker is female. Basilio, Bauer, and Sinning (2009) do not support the FIH based on data from West Germany. Cohen-Goldner, Gotlibovski, and Kahana (2009b) also use the Israeli Labor Force Survey (LFS) and Income Survey (IS) for the years 1991-2004 and reject the FIH in Israel.

There are studies that examine the occupational status of immigrants, but they do not link the findings to testing the FIH. Powers and Seltzer (1998) and Powers, Seltzer, and Shi (1998) analyze the occupational status of undocumented migrants using data from the Legalized Population Surveys. By comparing first jobs in the United States, occupations held at the time of legalization, and occupations after legalization was granted, they find an upward trend in job quality. Akresh (2006) and Akresh (2008) using data from the New Immigrant Survey (which follows immigrants who have received their green cards) analyze last jobs held in their home country, first jobs in the United States, and current jobs. She finds that immigrants exhibit a U-shaped pattern of economic assimilation: they experience downward mobility on arrival (first job) and upward mobility (current job) in their occupational status.

3 Data

3.1 The Job Zone Variable from the O*Net

We introduce an occupation state variable provided by the Occupational Information Network database (O*Net). It is the Specific Vocational Preparation (SVP) which the job zone variable is based on. The SVP as defined by the U.S. Department of Labor is the amount of lapsed time required by a typical worker to learn the techniques, acquire the information, and develop the facilities needed for average performance in a specific job-worker situation. Specific vocational training includes vocational education, apprenticeship training, in-plant training, on-the-job training, and essential experience in other jobs. The SVP score ranges from 1 to 9 (both inclusive). A job with a SVP score of 1 requires a skill level that can be obtained by short demonstration. A job with a SVP score of 9 requires at least 10 years of training.

We focus on jobs with SVP scores of less than 4. These jobs are defined as job zone 1 occupations by the O*Net.[6] These jobs require from no preparation to up to three months of training. Job zone 1 occupations include a large number of less complex service occupations, as well as materials handlers and machine/equipment tenders or operators. For example, these jobs include amusement and recreation attendants, bartenders, counter and rental clerks, cashiers, highway maintenance workers, couriers and messengers, lobby attendants, parking enforcement officers, phlebotomists, refuse and recyclable material collectors, solderers, taxi drivers, ticket takers, ushers, waiters/waitresses, and yard workers.

In this study, we classify dead-end jobs as the occupations with SVP scores less than 4 (or job zone 1 occupations).[7] Career-oriented jobs are the occupations with SVP scores greater than or equal to 4 (or occupations in job zone 2 or above). We aggregate occupations in job zones 2 through 5 to keep our model simple. In sum, we consider three occupation states: not participating in the labor market, working in dead-end jobs, and working in career-oriented jobs.

3.2 The Current Population Survey

The CPS is a monthly survey based on the civilian non-institutionalized population of the United States. The CPS sample provides basic information on the demographic status and the labor force situation of the population 16 years of age and older. The Annual Social and Economic Supplement

[6] The job zones range from 1 (occupations that need little or no preparation) to 5 (occupations that need extensive preparation). For details, see Oswald, Campbell, McCloy, Rivkin, and Lewis (1999).

[7] We analyze the Mincer earnings regression for each job zone separately for the period 1996-2002 and find that the returns to education and experience for job zone 1 are significantly different from those of job zone 2 as classified by the O*NET (results not shown). We find this difference in earnings growth between job zone 1 and 2 occupations is consistent over time. For example, over 20 years, there is an earnings gap of $42,000 between job zones 1 and 2 assuming 40 hours/week and 48 weeks in a year. Hence, we categorize all jobs with SVP<4 (or job zone 1) as dead-end jobs and job zone 2 and above as career-oriented jobs.

of the CPS or the March CPS additionally provides data on labor market outcomes and income in addition to the basic CPS sample. We exploit the longitudinal structure of the March CPS. Our sample is a collection of two-year panels with overlapping periods, e.g. 1996-1997, 1997-1998, ... , 2001-2002. The balanced part of the panel is called the matched March CPS.[8]

We collect data for 146,520 married foreign-born and native-born individuals (or 73,260 couples) of ages 24-65 for 1996-2002.[9] The sample consists of married couples with their spouses present in the same addresses over the two year panel sample period. The sample excludes immigrants who came to the United States before the age of 18 and who entered the U.S. before 1950. Arrival years are given by intervals, so they are defined to be the mid-points of each period. Then we drop 853 couples because we require both spouses to be not in the armed forces during the entire sampling period. Another 2,313 couples are dropped because the job zone variable does not include some of their occupation codes. We end up with 70,094 couples (63,857 native-native couples, 4,298 immigrant-immigrant couples, 1,126 immigrant women married to native men couples, and 813 native women married to immigrant men couples).[10]

3.3 Summary Statistics

We link the job zone variable to the matched March CPS. Table 1A tabulates the distribution of occupation states for husbands and wives. Over 90% of married men were employed irrespective of their wife's job zone. About 73.7% of native husbands and 60.4% of immigrant husbands had

[8] A drawback of using the matched March CPS is its large attrition rate. We address this problem by applying an attrition correcting method. The method assigns weights to the individuals in the balanced panel in such a way that the weighted panel becomes a representative sample in each period. For details, see Bhattacharya (2008) or Kim (2009a). To make our analysis robust, we make two separate approaches, one using and the other not using attrition correcting weights. We find that the two sets of empirical findings are similar. This paper reports results that do not use weights.

[9] The foreign sample includes foreign-born individuals who were not U.S. citizens at the time of birth. Following Warren and Peck (1980), our foreign sample consists of persons born outside the United States, the Commonwealth of Puerto Rico, and the outlying areas of the United States. Foreign-born persons may have acquired U.S. citizenship by naturalization or may be in illegal status. The reference group consists of native-born individuals. The native sample includes persons born in the Unites States, but excludes persons born in the Puerto Rico and the outlying areas.

[10] Credit-constraints are more likely to be binding for couples who move together at the time of immigration, but this is not identifiable in the CPS. Using a sample that includes only couples who married after migration would make the results difficult to interpret since marriage decisions are not exogenous and would result in less power to detect the FIH. However, any significant result using this sample will serve as strong evidence for the FIH.

career-oriented occupations and about 17.1% of native husbands and 31.0% of immigrant husbands were in dead-end jobs. For married women, however, 23.9% of native wives and 38.6% of foreign-born wives do not work. These facts are consistent with one of our assumptions, which is that men and women are primary and secondary workers, respectively.

Table 1A. Occupation States

		Wife			
		Not Working	Dead-End	Career-Oriented	Total
Native Sample					
Husband	Not Working	4.1	1.4	3.7	9.2
	Dead-End	4.0	4.3	8.9	17.1
	Career-Oriented	16.0	9.7	48.0	73.7
	Total	24.0	15.4	60.6	100.0
Immigrant Sample					
Husband	Not Working	4.4	2.3	1.9	8.6
	Dead-End	12.6	12.2	6.2	31.0
	Career-Oriented	21.8	11.9	26.7	60.4
	Total	38.9	26.4	34.8	100.0

We find that the transition probabilities from dead-end jobs to not working status are sensitive to husband's earnings especially for immigrant women, which is consistent with the FIH. By exploiting the two-year panel structure of the CPS, Table 1B tabulates women's occupation in year 2 conditional on the occupation in year 1 by husband's earnings. Husband's earnings are grouped into four quartiles. The table lists the occupation mobility of wives sorted by the first quartile (lowest earnings) to the fourth quartile (highest earnings). For native married women, we find that about 8.6-11.6% move from dead-end jobs in year 1 to not working status in year 2. For immigrant women, we find the percentage of women transitioning from dead-jobs in year 1 to not working status in year 2 increases with an increase in husband's earnings: from 9.1% for women married to husbands with earnings in the first quartile to 21.1% for those in the fourth quartile. We find that the transition probabilities are not sensitive to education or years since migration.

Table 1B. Wife's Occupation State in Year 2 conditional on that in Year 1 by Husband's Earnings Quartile

		Occupation State in Year 2							
		Not Working		Dead-End		Career-Oriented		Total	
		Native	Immig.	Native	Immig.	Native	Immig.	Native	Immig.
Husband's Earnings in 1st Quartile									
Occupation State	Not Working	85.4	84.3	6.5	10.7	8.1	5.1	100.0	100.0
in Year 1	Dead-End	9.7	9.1	65.6	77.0	24.8	13.9	100.0	100.0
	Career-Oriented	6.2	11.4	9.0	14.1	84.9	74.6	100.0	100.0
Husband's Earnings in 2nd Quartile									
Occupation State	Not Working	77.4	82.0	9.4	8.2	13.2	9.8	100.0	100.0
in Year 1	Dead-End	8.6	14.4	66.1	66.4	25.4	19.2	100.0	100.0
	Career-Oriented	5.2	8.9	7.0	12.0	87.8	79.1	100.0	100.0
Husband's Earnings in 3rd Quartile									
Occupation State	Not Working	80.6	78.1	6.2	4.8	13.2	17.1	100.0	100.0
in Year 1	Dead-End	9.7	18.5	63.9	61.5	26.4	20.0	100.0	100.0
	Career-Oriented	4.8	31.6	5.5	18.4	89.7	50.0	100.0	100.0
Husband's Earnings in 4th Quartile									
Occupation State	Not Working	82.6	87.5	3.5	5.6	13.9	6.9	100.0	100.0
in Year 1	Dead-End	11.6	21.1	58.7	50.0	29.6	29.0	100.0	100.0
	Career-Oriented	7.2	8.4	4.5	3.5	88.3	88.1	100.0	100.0

Table 2 provides summary statistics of own and spouse demographic and family control variables.[11] Occupations are closely related to education. Women working in career-oriented jobs and their husbands have higher education than others. Immigrant women working in career-oriented jobs and their husbands have higher education than their native counterparts, but the other groups of immigrants have lower education that their native counterparts. Native-born and foreign-born women in career-oriented jobs have 1-2 and 3-4 additional years of education, respectively, than those who choose not to work or those in dead-end jobs. A similar pattern applies to men.

For both native and immigrant women, husband's earnings and family non-labor income are highly correlated with the decision to work. These two factors are highest for women who are not

[11] Table 2 provides summary statistics for families where both husbands and wives are either natives or immigrants, but the main analysis in section 4 also includes native-immigrant couples.

working followed by women in career-oriented jobs and dead-end jobs. Husband annual earnings of women not working are \$57,100 and \$41,900 for natives and immigrants, which are about \$14,000-17,000 higher than those of women working in dead-end jobs. Family non-labor income of women not working are \$11,340 and \$5,420 for natives and immigrants, which is also much larger than those of women working in dead-end jobs.[12]

In order to examine differences based on ethnic origin, we divide the foreign sample into 4 groups: immigrants from Central and South America, from Europe (including Australia, New Zealand, and Canada), from Asia, and from other countries.[13] Among immigrant women, 43% are from Central and South America, 15% are from Europe, and 38% are from Asia.[14] We do not report summary statistics for the group of the other countries (Africa, Oceania, and unclassified ones) due to its small sample size and heterogeneity. In terms of years since migration, women who are in career-oriented jobs have on average stayed longest in the United States followed those who are in dead-end jobs and those who are not working. For men there is no significant pattern. Among immigrant wives, Central and South American women are most likely to not work (49%) and to be in dead-end jobs (55%). Asian women are most likely to be in career-oriented jobs (49%).

[12] A wife who reported that she was not working may also report non-zero earnings because she may have had earnings in the previous year while she was not working at the time of interview.

[13] We combine Australia, New Zealand, and Canada with Europe because of sample size considerations and so that immigrants from countries that are predominantly white and are at a similar stage of political and economic development are grouped together. We refer to the group as Europe. The data do not identify mother tongue. The impact of language proficiency has been studied in a large literature. LaLonde and Topel (1997) provide a survey.

[14] The numbers do not add to 100% since we exclude the other group of immigrant population.

Table 2. Summary Statistics

	Wife's Occupation State							
	Not Working		Dead-End		Career-Oriented		Total	
	Native	Immig.	Native	Immig.	Native	Immig.	Native	Immig.
Age	44.13	41.44	42.56	42.87	42.16	43.62	42.69	42.58
	(10.42)	(10.19)	(9.30)	(8.20)	(9.07)	(8.45)	(9.48)	(9.15)
Husband Age	46.25	44.66	44.74	45.80	44.29	46.56	44.83	45.63
	(10.38)	(10.21)	(9.60)	(8.67)	(9.45)	(8.54)	(9.74)	(9.28)
Years Since Migration (YSM)		12.68		13.51		15.67		13.94
		(9.03)		(7.66)		(8.70)		(8.66)
Husband YSM		15.11		15.10		16.94		15.74
		(9.49)		(8.10)		(8.93)		(8.98)
Education	13.16	10.60	12.65	10.33	14.35	14.33	13.81	11.83
	(2.34)	(4.73)	(1.79)	(4.26)	(2.22)	(3.68)	(2.30)	(4.64)
Husband Education	13.77	11.64	12.90	10.92	14.27	14.88	13.94	12.58
	(3.04)	(5.22)	(2.33)	(4.37)	(2.53)	(4.14)	(2.67)	(4.94)
Wife Earnings	2.11	1.35	15.94	14.81	30.61	34.20	21.60	16.38
(×1000 in 2004 dollars)	(9.77)	(13.59)	(13.98)	(11.23)	(29.49)	(38.76)	(26.95)	(28.74)
Husband Earnings	57.10	41.90	39.68	26.99	52.01	57.01	51.30	43.20
(×1000 in 2004 dollars)	(69.11)	(56.36)	(38.65)	(25.01)	(50.58)	(68.52)	(54.28)	(56.22)
Family Non-Labor Income	11.34	5.42	5.66	3.49	7.65	6.22	8.21	5.18
(×1000 in 2004 dollars)	(22.14)	(14.71)	(13.56)	(9.25)	(18.29)	(17.12)	(18.75)	(14.47)
# of Children below Age 6	0.42	0.52	0.23	0.24	0.27	0.25	0.30	0.35
	(0.76)	(0.75)	(0.54)	(0.54)	(0.58)	(0.54)	(0.63)	(0.65)
# of Children below Age 18	1.17	1.52	1.07	1.34	0.99	1.09	1.05	1.32
	(1.35)	(1.45)	(1.19)	(1.31)	(1.11)	(1.10)	(1.19)	(1.31)
Wife Continent of Origin								
Central and South American		0.49		0.55		0.27		0.43
European		0.12		0.12		0.19		0.15
Asian		0.35		0.28		0.49		0.38
N (sample size)	8255	807	5421	558	21246	730	34922	2095

4 A Dynamic Model of Occupation Choices

4.1 Empirical Specification

This section tests the second testable implication discussed in Section 2. Let S_{it} be the state of an individual i in calendar year t. We consider three states: not working ($S_{it} = 0$), working in a dead-end job ($S_{it} = 1$), and working in a career-oriented job ($S_{it} = 2$). We are interested in a first-order Markov-switching model that defines a transition probability from state s_{t-1} to state s_t by

$$p_{s_t|s_{t-1}} \equiv \Pr\left[S_{it} = s_t | S_{i,t-1} = s_{t-1}\right], \tag{1}$$

for $s_{t-1}, s_t \in \{0, 1, 2\}$. Suppose that the probability (1) is a function of a vector of covariates, X, and is given in a parametric form. Then (1) can be rewritten as

$$p_{s_t|s_{t-1}}\left(X_{i,t-1}; \theta_{s_{t-1}}\right) \equiv \Pr\left[S_{it} = s_t | S_{i,t-1} = s_{t-1}, X_{i,t-1}; \theta_{s_{t-1}}\right], \tag{2}$$

for $s_{t-1}, s_t \in \{0, 1, 2\}$. For any given state, $S_{i,t-1} = s_{t-1}$, let $\theta_{s_{t-1}}$ be the vector of parameters. One may estimate the probabilities by maximum likelihood (ML) estimation. Conditional on $S_{i,t-1} = s_{t-1}$, the ML estimator is given by the maximizer of

$$L\left(\theta_{s_{t-1}}\right) = \sum_{i=1}^{n} \sum_{j=0}^{2} 1\left\{S_{it} = j\right\} \log p_{j|s_{t-1}}\left(X_{i,t-1}; \theta_{s_{t-1}}\right).$$

For each $s_{t-1} = 0, 1, 2$, we apply a separate maximum likelihood estimation procedure and obtain the ML estimator, $\widehat{\theta}_{s_{t-1},ML}$. Then the estimated probabilities are

$$\widehat{p}_{s_t|s_{t-1}}\left(X_{i,t-1}\right) \equiv p_{0|s_{t-1}}\left(X_{i,t-1}; \widehat{\theta}_{s_{t-1},ML}\right), \qquad \text{for } s_{t-1}, s_t \in \{0, 1, 2\}. \tag{3}$$

We specify a multinomial logit model and apply the maximum likelihood estimation procedure to estimate (2). To fix ideas, partition the parameter vector $\theta_{s_{t-1}}$ by $\theta_{s_{t-1}} = \left(\beta'_{0|s_{t-1}}, \beta'_{1|s_{t-1}}, \beta'_{2|s_{t-1}}\right)'$.

The conditional probability of $s_t|s_{t-1}$ is given by

$$p_{s_t|s_{t-1}}\left(x;\theta_{s_{t-1}}\right)=\frac{e^{x'\beta_{s_t|s_{t-1}}}}{e^{x'\beta_{0|s_{t-1}}}+e^{x'\beta_{1|s_{t-1}}}+e^{x'\beta_{2|s_{t-1}}}},\qquad \text{for } s_t=0,1,2. \tag{4}$$

A necessary identification condition is to set $\beta_{s_t|s_{t-1}}=0$ when $s_t=s_{t-1}$, which is the case where an individual does not change her occupation status between $t-1$ and t. We need this identification restriction because (3) sum up to one: $1=\widehat{p}_{0|s_{t-1}}\left(X_{i,t-1}\right)+\widehat{p}_{1|s_{t-1}}\left(X_{i,t-1}\right)+\widehat{p}_{2|s_{t-1}}\left(X_{i,t-1}\right)$, for each $s_{t-1}=0,1,2$.

The vector of covariates, $X_{i,t-1}$, includes a constant, age, age squared, education, the number of children below 6, the number of children below 18, husband's labor income, non-labor family income, and husband's occupational status.[15] All these variables are interacted with a dummy for immigrants since the impact of these control variables may be different across native and foreign-born women. In addition, years since migration, years since migration squared, country of birth, and entry year and calendar year dummies are added. The dummy variables of country of birth and entry year control for different skill composition across birth country and entry year cells.

A concern is that there is possible endogeneity due to the inclusion of husband's income, family non-labor income, and husband's occupation in the model, but there are three reasons why endogeneity should not be problematic. First, the summary statistics are consistent with the assumption that husbands are primary workers and wives are secondary workers. We find that more than 90% of native and immigrant males participate in the labor market. This implies that the wife's occupational status is affected by the labor market outcome of her husband, but not the other way around. Second, our theory suggests that, to test the FIH, one needs to focus on low-skilled women. Low-skilled women are more likely to be secondary workers than high-skilled women. Third, the left hand side variable is from period t whereas the right hand side variables are from period $t-1$. The model errors are likely to be innovations that are realized at t. In sum, we can assume that most husbands are working and analyze the occupational mobility of wives conditional on their husband's job zone.

[15] See Blundell and MaCurdy (1999) and Blau and Kahn (2007) for a survey of female labor supply.

Another possible concern is that the panel may be to short to evaluate the FIH. However, it is still true that if at every age and years since migration immigrant women are more credit constrained than native women, then at every age and years since migration immigrant women will have a higher likelihood of transitioning from dead-end job to not working if the FIH is at work. Therefore, testing whether immigrant women have higher transition rates out of dead-end jobs is a valid way to assess the FIH.

4.2 Empirical Findings

We estimate $\theta_{s_{t-1}} = \left(\beta'_{0|s_{t-1}}, \beta'_{1|s_{t-1}}, \beta'_{2|s_{t-1}}\right)'$ in (2).[16] Table A1 in the Appendix reports the multinomial logit model estimates, $\widehat{\theta}_{s_{t-1}}$. These estimates are not directly interpretable, but give the signs of the impact of corresponding covariates on the probabilities of moving to other occupation states. The first column 'From 0' shows estimates using women who did not work in the first year. The second and third columns 'From 1' and 'From 2' show estimates using the sub-sample of women in dead-end jobs and in career-oriented jobs, respectively, in the first year. For each of the regression results, those who stay in the same occupation are the reference group.

The FIH predicts that immigrant women in dead-end jobs are more responsive to increases in non-labor income than native women in dead-end jobs. In our empirical specification, the coefficient of spouse earnings (or family non-labor income) interacted with an immigrant dummy is expected to be positive significant for $S_{t-1} = 1$ (dead-end jobs). In Table A1, we do find that the coefficient estimate of spouse earnings, 0.022, is statistically different from zero and large for $S_{t-1} = 1$. This estimate implies a differential impact of husband's earnings on foreign-born women relative to native women. For a one dollar increase in husband's earnings, foreign-born women are more likely to switch from dead-end jobs to not working status relative to native women. In contrast, the same coefficient estimates for $S_{t-1} = 2$ (career-oriented jobs), 0.002, is not statistically different from zero. This implies that immigrant wives in dead-end jobs are more likely to quit working with an increase in their spousal labor income than natives in dead-end jobs and that

[16] We estimate the same model using attrition-correcting weights and find qualitatively the same results. The results are not presented, but are available upon request.

immigrants in career-oriented jobs are not.

To understand the meanings of the coefficient estimates, we turn to the implied function estimates. We analyze the immigrant-native differences in transition probabilities from one state to another, which are given by $p^{imm}_{s_t|s_{t-1}}\left(x;\widehat{\theta}_{s_{t-1}}\right)-p^{nat}_{s_t|s_{t-1}}\left(x;\widehat{\theta}_{s_{t-1}}\right)$. Since the functions are non-linear and multi-dimensional, we evaluate the differences in transition probabilities at some selected points. More specifically, we consider hypothetical immigrant couples from Central and South America, Europe, and Asia entering the United States at age 24 (wife) and 27 (husband) in year 1990. We follow them for the next 24 years until they become 48 and 51 years old, respectively. We assume that they have their first child between ages (24,27) and (30,33) and have a second child between ages (30,33) and (36,39). Both wife and husband are assumed to have 12 years of education.

The hypothetical husbands work in career-oriented jobs. We also assume husband's earnings and family non-labor income for this hypothetical couple to be the age-occupation specific income averages over the native population. For example, for couples of ages 30 (wife) and 33 (husband) and men working in career-oriented jobs, husband's earnings and family non-labor income are evaluated at \$48,670 and \$2,680, respectively. The evaluation values are (\$60,180,\$3,990) and (\$63,860,\$5,480) as these couples become (36,39) and (42,45) ages old.

The upper panel of Table 3 reports the transition probability estimates from state 1 (dead-end jobs) to each of the three occupation states evaluated at the above control variables. The table reports the probability estimates evaluated at 6, 12, and 18 years since migration. The lower panel of Table 3 presents the foreign-native difference in the reported probabilities in the upper panel. The probabilities of transitioning from state 0 (not working) and from state 2 (career-oriented jobs) are presented in the Appendix. Overall, we do not find much immigrant-native difference in the transition probabilities of those who do not work or who work in career-oriented jobs in year 1.

Table 3. Transition Probability Estimates, from $S_{t-1} = 1$ (Dead-End Jobs) to S_t evaluated at (age^w,age^h,ysm)

	$p_{s_t\|s_{t-1}=dead-end}(x;\theta_{s_{t-1}})$											
	Native			C.S. America			Europe			Asia		
S_t :	0	1	2	0	1	2	0	1	2	0	1	2
(30, 33, 6)	0.13***	0.55***	0.32***	0.16	0.53***	0.31**	0.19	0.44***	0.36**	0.08	0.46***	0.46***
	(0.02)	(0.02)	(0.02)	(0.10)	(0.13)	(0.13)	(0.13)	(0.14)	(0.15)	(0.06)	(0.14)	(0.15)
(36, 39, 12)	0.11***	0.59***	0.30***	0.52***	0.33**	0.15	0.58***	0.26*	0.16	0.33*	0.38***	0.29*
	(0.01)	(0.02)	(0.02)	(0.20)	(0.15)	(0.10)	(0.21)	(0.14)	(0.12)	(0.19)	(0.15)	(0.16)
(42, 45, 18)	0.08***	0.64***	0.28***	0.63**	0.22	0.15	0.69***	0.16	0.15	0.43	0.26	0.31
	(0.01)	(0.02)	(0.02)	(0.27)	(0.17)	(0.15)	(0.27)	(0.14)	(0.17)	(0.31)	(0.17)	(0.25)

	$p^{imm}_{s_t\|s_{t-1}=dead-end}(x;\theta_{s_{t-1}}) - p^{nat}_{s_t\|s_{t-1}=dead-end}(x;\theta_{s_{t-1}})$								
	C.S. America			Europe			Asia		
S_t :	0	1	2	0	1	2	0	1	2
(30, 33, 6)	0.03	-0.02	0.00	0.06	-0.11	0.04	-0.05	-0.09	0.14
	(0.10)	(0.13)	(0.13)	(0.12)	(0.14)	(0.15)	(0.06)	(0.14)	(0.15)
(36, 39, 12)	0.40**	-0.26*	-0.15	0.47**	-0.33**	-0.14	0.22	-0.21	-0.01
	(0.20)	(0.15)	(0.10)	(0.21)	(0.14)	(0.12)	(0.19)	(0.15)	(0.16)
(42, 45, 18)	0.55**	-0.43**	-0.13	0.61**	-0.48***	-0.13	0.35	-0.38**	0.03
	(0.27)	(0.17)	(0.16)	(0.27)	(0.15)	(0.17)	(0.31)	(0.18)	(0.25)

From the upper panel of Table 3, the estimates in the first three columns (Native) and the first row are 0.13, 0.55, and 0.32. The estimates are all significant at the 1% level. These estimates imply that for native women (30 years old, high school graduates, and not working) married to native men (33 years old, high school graduates, working in career-oriented jobs with national average earnings conditional on age and occupation), 13% are likely to not work, 55% are likely to work in dead-end jobs, and 32% are likely to work in career-oriented jobs in the following year.

The corresponding estimates for Central and South Americans are 0.16, 0.53, and 0.31. The last two estimates are statistically significant. The point estimates suggest that for Central and South American women (30 years old, 6 years since migration, high school graduates, and not working) married to Central and South American men (33 years old, 6 years since migration, high school graduates, working in career-oriented jobs with national average earnings conditional on age and occupation), 16% are likely to not work, 53% are likely to work in dead-end jobs, and 31% are likely to work in career-oriented jobs in the following year.

The second row calculates the transition probabilities for women (36 years old, 12 years since migration if immigrant, high school graduates, and not working) and men (39 years old, 12 years since migration if immigrant, high school graduates, not working with national average earnings conditional on age). These transition probabilities are shown graphically in Figures 1a, 1b, and 1c. Figure 1a suggests that, with age or years since migration, immigrant women working in dead-end jobs are more likely to drop out of the labor force than native women. These short-term transition patterns suggest that immigrant women in dead-end jobs are more likely to leave the labor force than native women over the longer-term. According to Figure 1b, immigrant women working in dead-end jobs are less likely to stay in dead-end jobs than their native counterparts. Again, these short-term transition patterns suggest that fewer immigrant women will work in dead-end jobs than native women over the longer-term.

To determine whether the immigrant-native gaps are statistically significant, we examine the lower panel of Table 3. The lower panel of Table 3 reports the immigrant-native difference in the state transition probabilities. These estimates correspond to the difference between the probability for each group of immigrants and that of natives in Figures 1a, 1b, and 1c. According to the lower panel of Table 3, the immigrant-native difference in transition probability from dead-end job to not working for women from Central and South America and Europe becomes statistically significant at the 5% level at 12 and 18 years since migration. For women from Asia, the difference is not significant, but the sign of the estimate is consistent with the theoretical prediction. Overall we find, conditional on being in a dead-end job in year 1, with an increase in years since migration, immigrant women decrease their participation in the labor force relative to native women and this difference is statistically significant. The probability of being in dead-end jobs also decreases significantly with an increase in years since migration; this is evidence in favor of the FIH. This result is also consistent with the prediction made by the coefficient estimates.

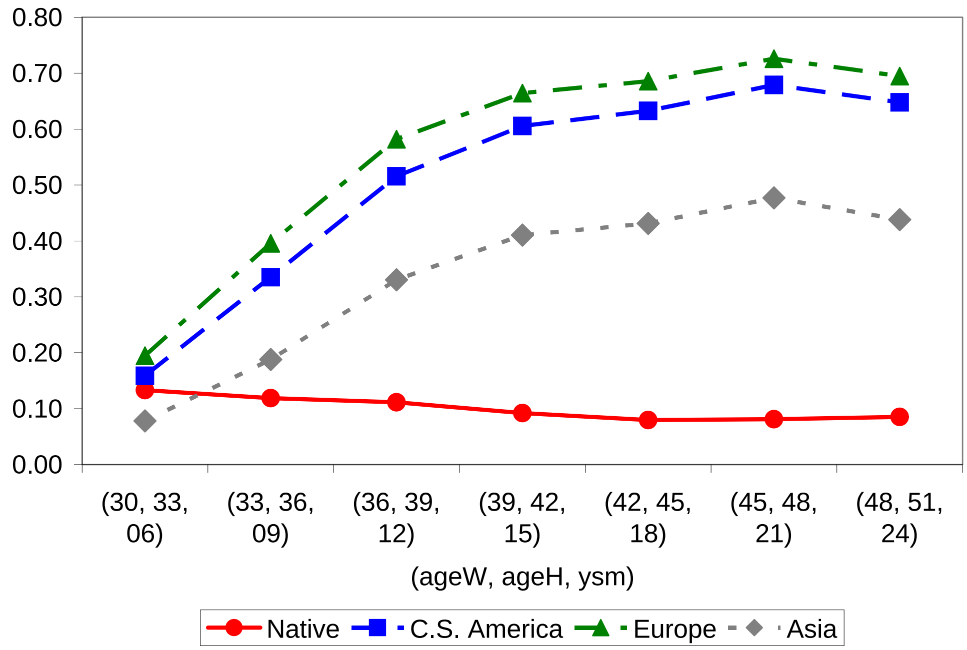

Figure 1a. Transition Probabilities from 1 to 0 by Continent of Origin

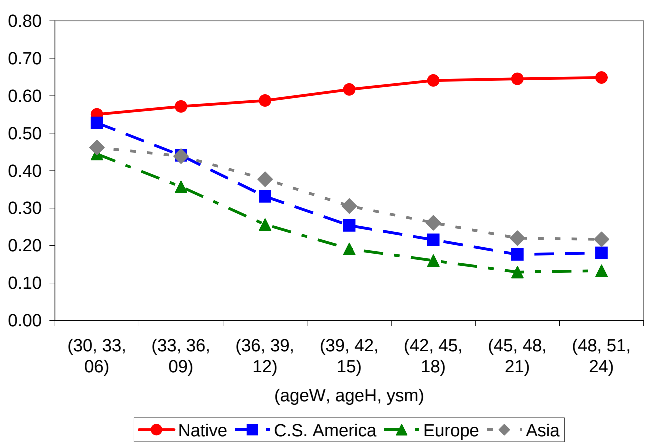

Figure 1b. Transition Probabilities from 1 to 1

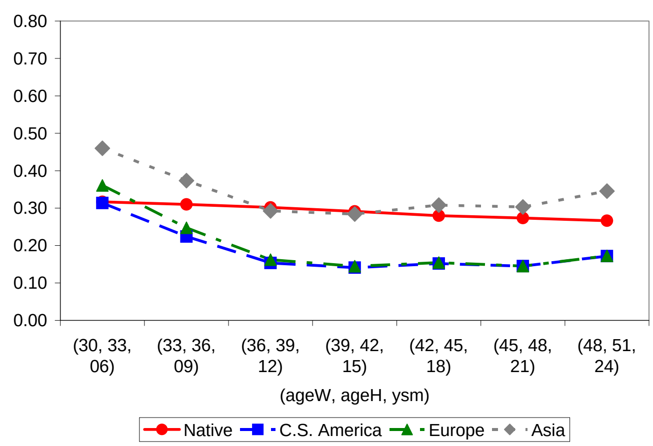

Figure 1c. Transition Probabilities from 1 to 2

A robustness check for the test is to look at mixed couples, such as immigrant women married to native men or native women married to immigrant men. We predict that immigrant women married to native men will behave like native women in native couples because their families are expected to be less credit-constrained than immigrant couples. Similarly, native women married to immigrant men will behave different from native women in native couples because their families are expected to be more credit-constrained than native couples.

Table 4. Differences in the Transition Probability Estimates for Mixed Couples evaluated at (age^w,age^h,ysm)

	$p^{w=imm,h=nat}_{s_t\|s_{t-1}=dead-end}\left(x;\theta_{s_{t-1}}\right)-p^{nat}_{s_t\|s_{t-1}=dead-end}\left(x;\theta_{s_{t-1}}\right)$, from $S_{t-1}=1$ (Dead-End Jobs) to S_t								
	C.S. America			Europe			Asia		
S_t :	0	1	2	0	1	2	0	1	2
$(30, 33, 6)$	0.25	-0.04	-0.21**	-0.04	0.17	-0.13	0.21	-0.06	-0.15
	(0.22)	(0.20)	(0.09)	(0.09)	(0.14)	(0.12)	(0.18)	(0.16)	(0.10)
$(36, 39, 12)$	0.10	-0.11	0.01	-0.07	-0.04	0.11	0.06	-0.17	0.10
	(0.17)	(0.19)	(0.19)	(0.05)	(0.22)	(0.22)	(0.13)	(0.16)	(0.19)
$(42, 45, 18)$	-0.01	-0.47**	0.49*	-0.07***	-0.49**	0.55***	-0.03	-0.52***	0.56***
	(0.13)	(0.20)	(0.27)	(0.03)	(0.21)	(0.22)	(0.09)	(0.15)	(0.20)

	$p^{w=nat,h=imm}_{s_t\|s_{t-1}=dead-end}\left(x;\theta_{s_{t-1}}\right)-p^{nat}_{s_t\|s_{t-1}=dead-end}\left(x;\theta_{s_{t-1}}\right)$, from $S_{t-1}=1$ (Dead-End Jobs) to S_t								
	C.S. America			Europe			Asia		
S_t :	0	1	2	0	1	2	0	1	2
$(30, 33, 6)$	-0.07	0.11	-0.04	-0.11***	-0.17	0.28	-0.13***	0.21	-0.07
	(0.06)	(0.18)	(0.18)	(0.04)	(0.22)	(0.22)	(0.02)	(0.25)	(0.25)
$(36, 39, 12)$	0.25	0.00	-0.24***	0.13	-0.03	-0.10	-0.11***	0.34***	-0.23**
	(0.29)	(0.27)	(0.07)	(0.27)	(0.26)	(0.19)	(0.01)	(0.10)	(0.10)
$(42, 45, 18)$	0.37	-0.10	-0.27***	0.28	-0.04	-0.24***	-0.08***	0.35***	-0.27***
	(0.53)	(0.53)	(0.03)	(0.52)	(0.50)	(0.07)	(0.01)	(0.03)	(0.03)

Tables 4 is analogous to the lower panel of Table 3, but list the differences in transition probabilities between women in mixed couples. The upper panel of Table 4 presents the foreign-native difference in transition probabilities for foreign-born women married to native-born men conditional on these women having dead-end jobs in year 1. We do not find a significant difference in occupation mobility from 1 to 0 between foreign-born women married to native-born men and native-born women married to native-born men. These foreign-born women also decrease their participation in dead-end jobs with increased stay in the United States but they transition to career-oriented jobs instead of not working status. In the lower panel of Table 4, we find that the transition probabilities for native women married to immigrant men are significantly different from those for native women married to native men, although the signs are different from our prediction.

This robustness check is useful because in BB (1997), mixed couples are used to disentangle immigrant specific unobserved characteristics from the FIH. Drawbacks of this analysis include the fact that selection into marriage is not random. Immigrants or natives in mixed couples may be different from average immigrants and natives. In addition, there is potential for bias since the sample sizes of mixed families are quite small. Nonetheless, our findings are consistent with the FIH.

5 Evidence from a Model of Hours Worked

This section tests the first implication discussed in Section 2. We replicate BB (1997) and BKMS (2003) using our sample. They estimate a common model given by

$$H_{it} = x_{it}'\beta + \gamma_{Wc} + \gamma_{Hc} + a_1 ysm_{it}^W + a_2 \left(ysm_{it}^W\right)^2 + b_1 ysm_{it}^H + b_2 \left(ysm_{it}^H\right)^2 + k_t + u_{it},$$

where for individual i in year t, H_{it} is annual hours worked in the previous year, γ_{Wc} and γ_{Hc} are fixed effects for immigrants who entered in period c for wives and husbands, ysm_{it}^W and ysm_{it}^H are years since migration for wives and husbands, k_t is a common year effect, and x_{it} is a vector of control variables. The control variables include education for wives and husbands, the number of children, and dummy variables that indicate country of birth and year of entry. Table 5 reports estimation results. IM7579 and IM7680 are the coefficients for dummies for immigrants who entered in years 1975-1979 and 1976-1980, respectively.

Table 5. Assimilation Profiles of Hours of Married Women

	(1)	(2)	(3)	(4)
Selected Covariates	BB (1997)	BKMS (2003)	CPS Full Sample	CPS Dead End
YSM, wife	28.779	25.207	51.820	41.582
	(10.780)	(2.170)	(23.116)	(58.259)
YSM^2, wife	–0.244	–0.416	–0.440	–0.879
	(0.159)	(0.036)	(0.577)	(1.399)
YSM, husband	–38.874	–2.054	–21.176	–76.895
	(10.982)	(2.233)	(24.752)	(61.714)
YSM^2, husband	0.334	–0.043	0.103	1.807
	(0.158)	(0.036)	(0.594)	(1.498)
...				
IM7579 or IM7680, wife	–338.155	–264.592	76.703	96.586
	(98.301)	(19.893)	(180.697)	(491.092)
IM7579 or IM7680, husband	560.985	51.897	168.710	363.556
	(99.900)	(20.730)	(190.821)	(521.092)
...				
N	34,445	650,266	75,968	6,166

The results from BB and BKMS are reported in the first and second columns of Table 5, respectively. The third column reports the same model estimates using the matched March CPS for 1996-2002.[17] In the fourth column, we restrict our sample to women who work in dead-end jobs in the first year of the panel and replace H_{it} with $H_{i,t+1}$ to make it consistent with the dynamic labor supply model. Using the estimates in Table 5, one can obtain hours profiles for immigrant women relative to native women. The four columns are depicted in four lines in Figure 2.

[17] Instead of English skill indicator, we use continent of origin since this information is not provided in the CPS data. We do not include race indicators, but add continent of origin indicators with immigrants from Central and South America being the omitted category. These are innocuous since dummy variables do not affect the slope estimates.

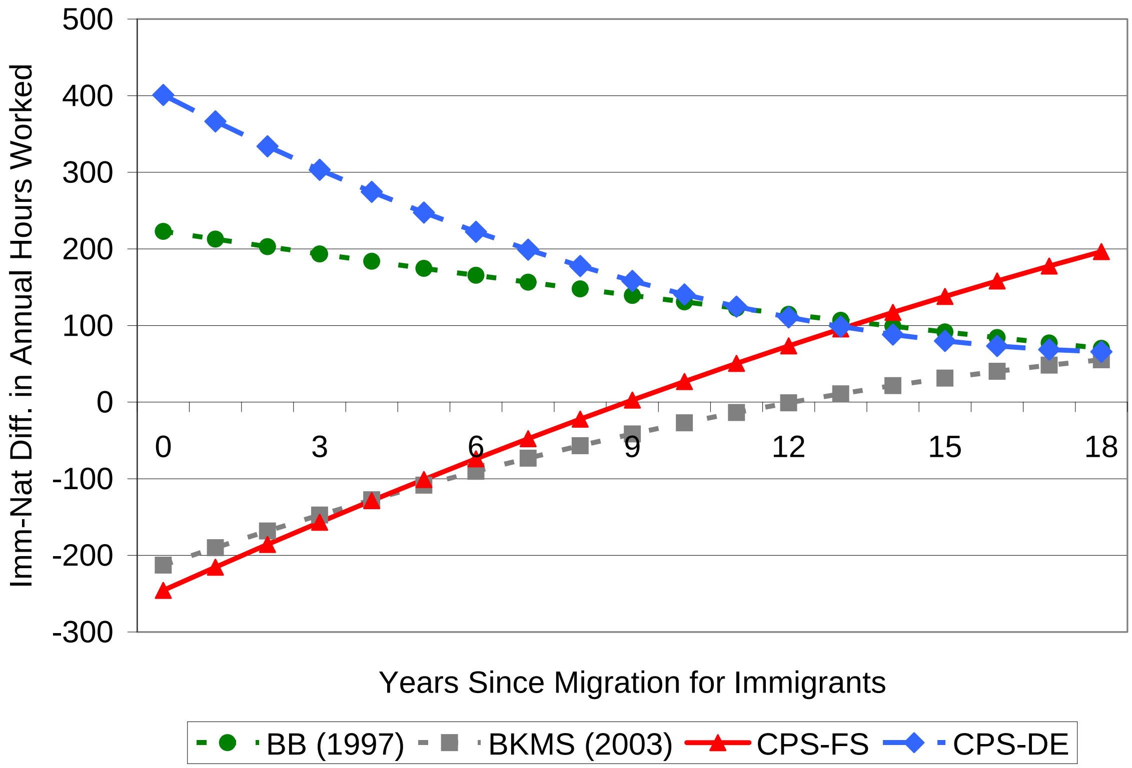

Figure 2. Annual Hours Worked for Immigrant Women relative to Native Women

First of all, Figure 2 shows the contrasting hours assimilation profiles obtained by BB and BKMS. The former find immigrant women reduce their work hours with continued stay in Canada, while the latter find the opposite for the U.S. case. The two hours assimilation profiles corresponding to BB and BKMS are reproduced from Figure 1 of BKMS. We add two more profiles obtained using our sample. Our full sample (CPS-FS) results produce a profile that is similar to the one obtained by BKMS. This is due to similar estimates of own and spouse years since migration obtained by the Census and the CPS in columns 2 and 3 of Table 5. They are common in that the negative impact of husband's years since migration is not strong enough to offset the positive impact of wife's years since migration.

A striking finding is that once our sample is restricted to women who work in dead-end jobs (CPS-DE), we find that the negative impact of the husband's years since migration dominates the positive impact of wife's years since migration on work hours, which is similar to BB (see columns

1 and 4). The hours assimilation profile of wives who work in dead-end jobs, as shown in Figure 2, indicate that these women work more than natives on arrival, but decrease their work hours over the years.[18]

This is consistent with the first testable implication in Section 2. It is also consistent with the evidence we find for occupational mobility of immigrant women relative to their native counterparts: immigrant women working in dead-end jobs are more likely to transition to not working status relative to natives and immigrant women working in career-oriented jobs do not have this tendency. A caveat is that our replication results for the restricted sample of women in dead-end jobs suffer from small sample size and are not statistically significant. Nevertheless, our replication results suggest that the results of BKMS may change when the sample is confined to women in dead-end jobs.

The results in column 4 cannot be reproduced by using the Census sample because a panel sample is necessary for our analysis.[19] However, a possible concern is whether our results are driven by the fact that H_{it} is replaced with $H_{i,t+1}$. To verify that it is not the case, Figure 3 presents the $H_{i,t+1}$ results. CPS-T2 uses the same specification and data as CPS-FS except that it uses $H_{i,t+1}$ rather than H_{it}. Similar to BKMS or CPS-FS, the CPS-T2 line is an increasing function of years since migration. We find the same tendency when the sample is confined to women who work in career-oriented jobs (CPS-CO). Only CPS-DE is downward sloping, which is consistent with the theory.

[18] Cohen-Goldner, Gotlibovski, and Kahana (2009a) provide theoretical explanation about why BB and BKMS may find contradictory results, but they do not provide empirical evidence.

[19] It is possible to perform similar exercises using Canadian panel data, but we leave it for future research.

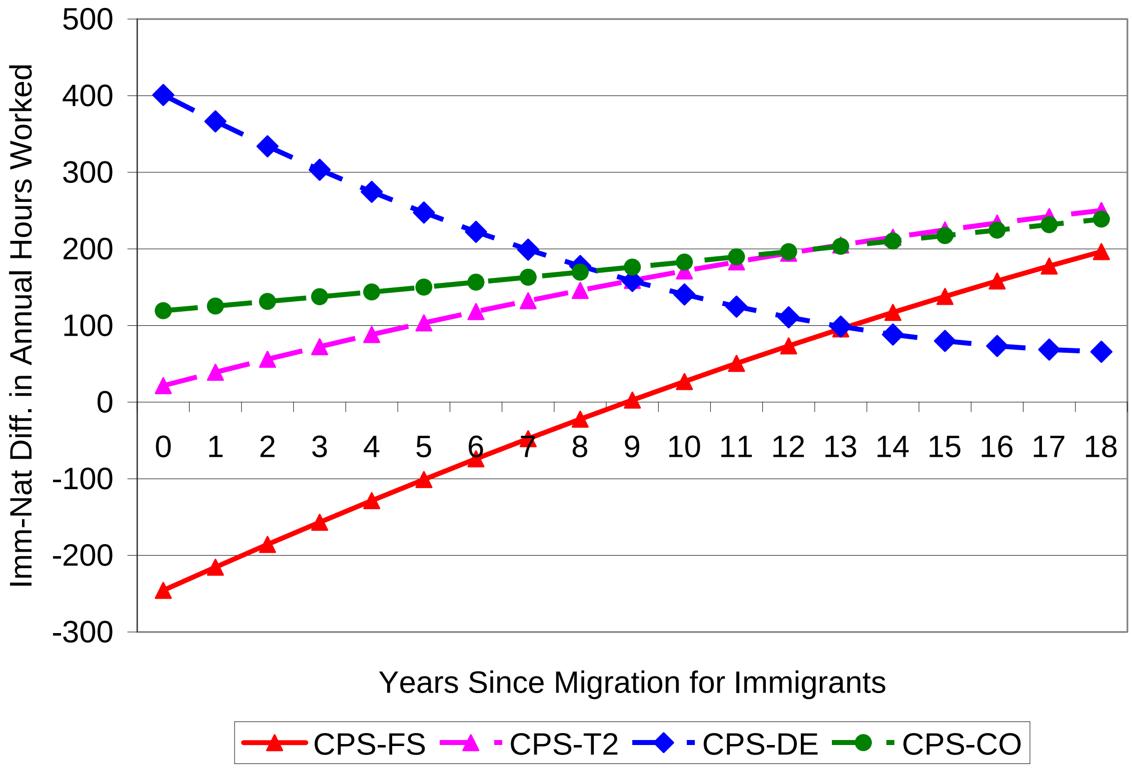

Figure 3. Annual Hours Worked for Immigrant Women relative to Native Women by Job Type

While the testable implications developed in Section 2 explicitly make predictions on the labor supply of women in low-skilled and high-skilled jobs, a possible concern would be whether the use of this grouping favors our test. For example, immigrant women in jobs with lower SVP may have systematically fewer opportunities for upward mobility than do natives and thus have less incentive to remain in the labor force. To check this point, we introduce grouping by education as a more neutral measure of skills. Figure 4 illustrates results by three education groups (less than high school, high school, and college and above), and we find that the least educated immigrant women decrease their labor supply relative to their native counterparts.

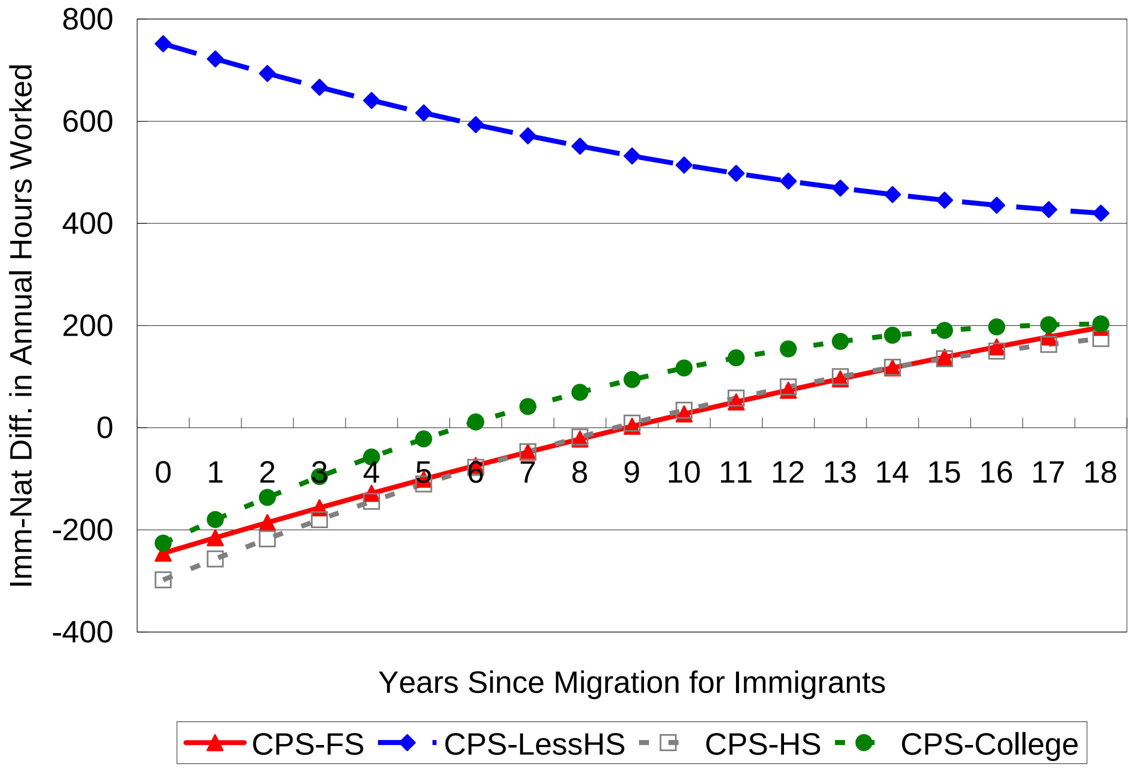

Figure 4. Annual Hours Worked for Immigrant Women relative to Native Women by Education Level

6 Concluding Remarks

This paper develops a novel test for the FIH. We formally specify a two-period labor supply model of heterogeneous married women. This model provides two testable implications for the occupation choices and work hours of married women. To test the implication for occupation choices, we employ a first-order Markov switching model and analyze the dynamic feature of occupation choices. We find that immigrant women working in dead-end jobs are more likely to drop out of the labor force than their native counterparts, which is consistent with the prediction. We find that husband's earnings play a key role in this dynamics. Evidence from mixed couples provides further support of the FIH.

To test the implication for work hours, we replicate the existing model used in previous papers using our sample. We first show that the U.S. census and the CPS share similar patterns. That is the CPS results are very similar to BKMS when the entire sample is used. Then we show that the conventional results get reversed when the CPS sample is confined to women working in dead-end jobs. This is consistent with the prediction that women in credit-constrained households work longer hours upon arrival and decrease labor supply with time spent in the United States. Our results suggest that the increasing annual hours worked with years since migration found in previous U.S. studies used to reject the FIH are driven by the labor supply of women working in career-oriented jobs.

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Table A1-1. Multinomial Coefficient Estimates

	From $S_{t-1}=0$		From $S_{t-1}=1$		From $S_{t-1}=2$	
	To $S_t=1$	To $S_t=2$	To $S_t=0$	To $S_t=2$	To $S_t=0$	To $S_t=1$
Husband in dead-end job	0.246	0.741***	-0.294	0.070	-0.509***	0.098
	(0.187)	(0.173)	(0.182)	(0.145)	(0.140)	(0.131)
Husband in career-oriented job	0.103	0.912***	-0.308*	0.326**	-0.361***	-0.119
	(0.182)	(0.158)	(0.178)	(0.141)	(0.121)	(0.124)
Husband in dead-end*Imm.	-0.479	-0.931	-0.259	0.229	0.023	0.762
	(0.634)	(0.615)	(0.548)	(0.553)	(0.624)	(0.708)
Husband in career-oriented*Imm.	0.272	-0.868	-0.418	0.299	-0.208	0.175
	(0.618)	(0.577)	(0.576)	(0.564)	(0.572)	(0.693)
Age	0.126**	0.072	-0.216***	-0.055	-0.192***	-0.057
	(0.064)	(0.049)	(0.061)	(0.046)	(0.042)	(0.043)
Age squared	-0.002***	-0.001**	0.002***	0.000	0.002***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Husband age	-0.065	-0.085*	-0.071	0.016	-0.050	0.049
	(0.063)	(0.050)	(0.061)	(0.045)	(0.042)	(0.042)
Husband age squared	0.001	0.001*	0.001	-0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Age * Imm.	0.426**	-0.060	-0.048	-0.062	0.125	0.112
	(0.194)	(0.169)	(0.172)	(0.148)	(0.175)	(0.174)
Age squared * Imm.	-0.005**	0.001	0.000	0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Husband age *Imm.	-0.240	0.043	0.247	-0.130	0.181	-0.009
	(0.179)	(0.168)	(0.175)	(0.147)	(0.175)	(0.194)
Husband age squared*Imm.	0.002	-0.000	-0.003	0.001	-0.003	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Years since migration (YSM)	-0.104	0.239	-0.047	0.127	0.512**	-0.102
	(0.247)	(0.255)	(0.272)	(0.245)	(0.234)	(0.221)
YSM squared	0.002	0.002	0.004	0.005	-0.018***	0.007
	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Husband YSM	-0.069	-0.126	0.533*	-0.144	-0.565**	0.077
	(0.253)	(0.271)	(0.310)	(0.255)	(0.229)	(0.247)
Husband YSM squared	0.001	-0.002	-0.015**	-0.003	0.016***	-0.006
	(0.007)	(0.006)	(0.007)	(0.006)	(0.005)	(0.006)
Education	-0.066**	0.162***	-0.075**	0.105***	-0.150***	-0.288***
	(0.026)	(0.020)	(0.030)	(0.021)	(0.016)	(0.017)
Husband Education	-0.025	-0.009	0.024	0.009	0.023	-0.038**
	(0.023)	(0.016)	(0.024)	(0.016)	(0.014)	(0.015)
Education*Imm.	0.094*	-0.052	0.036	-0.010	0.005	0.141***
	(0.051)	(0.049)	(0.055)	(0.047)	(0.047)	(0.044)
Husband education*Imm.	-0.026	-0.017	-0.030	-0.039	-0.026	0.048
	(0.048)	(0.045)	(0.052)	(0.046)	(0.042)	(0.043)
Number of children below age 6	-0.418***	-0.325***	0.318***	0.071	0.223***	-0.066
	(0.084)	(0.061)	(0.099)	(0.072)	(0.061)	(0.065)
Number of children below age 18	0.119***	0.048	0.067	-0.006	0.058*	0.057*
	(0.043)	(0.035)	(0.051)	(0.033)	(0.035)	(0.032)
# of children below age 6*Imm.	0.416*	-0.088	-0.086	-0.496	-0.087	0.468*
	(0.224)	(0.251)	(0.306)	(0.302)	(0.293)	(0.269)
# of children below age 18*Imm.	-0.030	0.051	-0.220	-0.042	-0.091	-0.188
	(0.126)	(0.128)	(0.151)	(0.122)	(0.151)	(0.142)
Husband's income	-0.006***	-0.002***	0.004***	0.001	0.003***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
Husband's income*Imm.	-0.001	0.003	0.022***	0.010*	0.002	-0.001
	(0.004)	(0.002)	(0.007)	(0.006)	(0.002)	(0.004)
Family non-labor income	-0.023***	-0.004*	0.004	0.005**	0.004***	0.002
	(0.006)	(0.002)	(0.004)	(0.002)	(0.001)	(0.002)
Family non-labor income*Imm.	0.015	-0.007	-0.010	0.010	-0.010	-0.022
	(0.014)	(0.010)	(0.019)	(0.010)	(0.007)	(0.015)
Dummy Variables						
Calendar Year	Yes		Yes		Yes	
Country of Origin	Yes		Yes		Yes	
Wife & Husband Entry Year	Yes		Yes		Yes	
Family Type	Yes		Yes		Yes	
Number of Observations	9331		6166		22487	

Standard errors are reported in parentheses. Confidence levels: 99% (***), 95% (**), 90% (*).

Table A2. Transition Probability Estimates, from $S_{t-1} = 0$ (Not Working) to S_t evaluated at (age^w,age^h,ysm)

	$p_{s_t \mid s_{t-1}=not-working}(x;\theta_{s_{t-1}})$											
		Native			C.S. America			Europe			Asia	
S_t :	0	1	2	0	1	2	0	1	2	0	1	2
$(30, 33, 6)$	0.77***	0.10***	0.13***	0.79***	0.17**	0.04	0.84***	0.11	0.05	0.82***	0.14**	0.04
	(0.02)	(0.01)	(0.01)	(0.08)	(0.08)	(0.02)	(0.08)	(0.08)	(0.04)	(0.07)	(0.07)	(0.03)
$(36, 39, 12)$	0.80***	0.09***	0.12***	0.84***	0.09**	0.07*	0.85***	0.05	0.09	0.85***	0.07*	0.08*
	(0.01)	(0.01)	(0.01)	(0.06)	(0.05)	(0.05)	(0.07)	(0.04)	(0.06)	(0.06)	(0.04)	(0.05)
$(42, 45, 18)$	0.78***	0.09***	0.13***	0.78***	0.03	0.18	0.76***	0.02	0.22	0.77***	0.02	0.20
	(0.02)	(0.01)	(0.01)	(0.15)	(0.03)	(0.15)	(0.18)	(0.02)	(0.18)	(0.16)	(0.02)	(0.17)
	$p^{imm}_{s_t \mid s_{t-1}=not-working}(x;\theta_{s_{t-1}}) - p^{nat}_{s_t \mid s_{t-1}=not-working}(x;\theta_{s_{t-1}})$											
					C.S. America			Europe			Asia	
S_t :				0	1	2	0	1	2	0	1	2
$(30, 33, 6)$				0.02	0.08	-0.10***	0.07	0.01	-0.08**	0.05	0.04	-0.09***
				(0.08)	(0.08)	(0.03)	(0.08)	(0.08)	(0.04)	(0.07)	(0.07)	(0.03)
$(36, 39, 12)$				0.04	0.00	-0.04	0.06	-0.03	-0.02	0.05	-0.02	-0.03
				(0.06)	(0.05)	(0.05)	(0.07)	(0.04)	(0.06)	(0.06)	(0.04)	(0.05)
$(42, 45, 18)$				0.01	-0.06*	0.05	-0.02	-0.07***	0.09	-0.01	-0.07**	0.08
				(0.15)	(0.03)	(0.15)	(0.18)	(0.02)	(0.19)	(0.16)	(0.03)	(0.17)

Table A3. Transition Probability Estimates, from $S_{t-1} = 2$ (Career Jobs) to S_t evaluated at (age^w,age^h,ysm)

	$p_{s_t \mid s_{t-1}=career-oriented}(x;\theta_{s_{t-1}})$											
		Native			C.S. America			Europe			Asia	
S_t :	0	1	2	0	1	2	0	1	2	0	1	2
$(30, 33, 6)$	0.07***	0.12***	0.81***	0.06	0.27**	0.67***	0.08	0.17*	0.75***	0.08	0.15**	0.76***
	(0.01)	(0.01)	(0.01)	(0.04)	(0.13)	(0.12)	(0.05)	(0.09)	(0.10)	(0.05)	(0.08)	(0.09)
$(36, 39, 12)$	0.06***	0.12***	0.82***	0.04	0.27**	0.69***	0.05	0.17*	0.78***	0.06	0.15*	0.79***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.12)	(0.12)	(0.04)	(0.10)	(0.10)	(0.04)	(0.08)	(0.09)
$(42, 45, 18)$	0.05***	0.12***	0.83***	0.02	0.23	0.75***	0.02	0.14	0.84***	0.03	0.13	0.85***
	(0.00)	(0.01)	(0.01)	(0.02)	(0.17)	(0.17)	(0.03)	(0.12)	(0.13)	(0.03)	(0.11)	(0.11)
	$p^{imm}_{s_t \mid s_{t-1}=career-oriented}(x;\theta_{s_{t-1}}) - p^{nat}_{s_t \mid s_{t-1}=career-oriented}(x;\theta_{s_{t-1}})$											
					C.S. America			Europe			Asia	
S_t :				0	1	2	0	1	2	0	1	2
$(30, 33, 6)$				-0.01	0.15	-0.14	0.00	0.05	-0.05	0.01	0.03	-0.04
				(0.04)	(0.12)	(0.12)	(0.05)	(0.09)	(0.10)	(0.05)	(0.08)	(0.09)
$(36, 39, 12)$				-0.02	0.15	-0.13	-0.01	0.05	-0.04	-0.01	0.03	-0.03
				(0.03)	(0.12)	(0.12)	(0.04)	(0.10)	(0.10)	(0.04)	(0.08)	(0.09)
$(42, 45, 18)$				-0.03	0.10	-0.07	-0.02	0.02	0.01	-0.02	0.00	0.02
				(0.02)	(0.17)	(0.17)	(0.03)	(0.12)	(0.13)	(0.03)	(0.11)	(0.11)