Education Outcomes of Children of Asian Intermarriages: Does Gender of the Immigrant Parent Matter?

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Abstract:
Studies about the effects of native and immigrant intermarriage on the human capital of children generally ignore disparate impacts by gender, ethnicity, or other attributes. Using 2000 U.S. Census data, we compare the high school dropout rates of 16-17-year-old children of Asian intermarriages and intra-marriages. We study differences between Asian-father and Asian-mother only families, controlling for observable child, parental and residential characteristics, as well as unobservable selection into intermarriage. Despite the higher average education and income levels of intermarried families, the children of Asian-father-native-mother households have higher dropout rates compared to both Asian intra-married and Asian-mother-native-father households. Children of less-educated fathers do worse, relative to children of less-educated mothers, suggesting the importance of intergenerational paternal transmission of education. Racial self-identity is also important: Children identify as "non-Asian" more often when the mother is native, and their families may under-emphasize education bringing them closer to native levels.

Keywords: Education of children, intermarriage, ethnic identification

JEL Classification: J15, J12, I21

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1. Introduction

Since the Immigration and Nationality Act relaxed national origin quotas in 1965, the foreign-born population in the U.S. has surged, sparking debates over the socio-economic assimilation of immigrants (Borjas, 1985, 1994; Lalonde and Topel, 1992). The cultural assimilation of immigrants—particularly their propensity to intermarry with natives and their child-rearing techniques—has also received attention. In this paper we examine the impact of a facet of cultural assimilation for a particular rapidly growing group: Asians. We study the effect of intermarriage between Asian immigrants and natives on the human capital of their children. Furthermore, marriage decisions may differ for male and female immigrants, so we investigate the presence of heterogeneous outcomes for children conditional on the sex of the Asian parent.

Intermarriage between minority and majority groups is often considered the "final stage" of assimilation for ethnic minorities (Gordon, 1964). The common perception is that intermarriage "closes the socio-economic gap" between immigrants and natives not only for the current generation *but also for future generations*. Early studies find better educational outcomes for children of intermarriages in the U.S. compared to both children of intra-marriages and those of native parentage (Chiswick and Deb-Burman, 2004; Ramakrishnan, 2004). More recent studies control for observable parental characteristics like education and income, as well as unobservable selection into marriage, and instead find negative outcomes for children of intermarriages (Furtado, 2009; Emonds and van Tubergen, 2015).[1] The selectivity of spouses, particularly on the basis of human capital, can differ for native men and women (Jasso et al., 2000). Studies find that, upon controlling for parental heterogeneity, education outcomes of children of immigrant-fathers and immigrant mothers within intermarriages do not differ significantly (Furtado, 2009; Emonds and van Tubergen, 2015).[2]

The productivity hypothesis states that intermarriage boosts the labor market potential and assimilation of the immigrant spouse by encouraging investment in host-country specific capital

[1] Studies in Europe find that, even after controlling for parental traits, children with one native parent have outcomes closer to the native population and perform better than immigrants (Muttarak, 2010; van Ours and Veenman, 2010).

[2] In another version of her 2009 paper using National Education Longitudinal Study 88 data, Furtado finds that the grades obtained by 8th grader children of intermarried immigrant fathers are lower than children of intra-married or native-only families. On the other hand, children of intermarried immigrant mothers perform significantly better than all groups. She attributes the differences to connections to ethnic networks.

(like language and citizenship) and improving access to native networks (Furtado and Theodoropoulos, 2010). These benefits can also spillover to the child in the form of greater family income and assets, better schools, and movement out of ethnic enclaves. However, causal estimates of the effects of intermarriage are difficult to obtain because intermarriage is not randomly assigned. An immigrant who is attractive to a native spouse can be positively selected into the labor market (Meng and Gregory, 2005; Kantarevic, 2004) on the basis of both observable and unobservable characteristics. Causal identification is further compromised if child-rearing responsibilities determine intermarriage.

Besides the concerns of causality in intermarriage studies, the research generally groups ethnicities together. If the impact of intermarriages differs by immigrant gender *and* ethnicity, average evidence may not apply.[3] Our contribution to the literature is to compare children of Asian intermarriages to children of Asian intra-marriages, and investigate the role of the immigrant parent's gender. Following the 1965 Immigration Act, inflows from previously under-represented developing countries in Asia have increased. Asian-native intermarriages and the number of children of mixed-Asian ethnicity have increased in the last decade (Pew Research Center, 2013): Of all children in the U.S. today with at least one immigrant parent, 12% claim to have Asian ancestry.[4] It is well-known that immigration laws in the U.S. affect marital decisions of immigrants.[5] Furthermore, certain immigration policies, like the H1-B specialty occupation visa approvals introduced in 1990, mainly favor Asian immigrants (USCIS, 2014). Outcomes of the second generation differ by ethnicity and family formation, and must be considered when evaluating the effectiveness of U.S. immigration policy.

Family structure and child-rearing practices in Asian families may differ from non-Asian households.[6] Asian households place greater cultural importance on education as a path to

[3] Previous research has acknowledged this problem and provided theoretical analysis and descriptive statistics to explore differences (Furtado 2009, Emonds and van Tubergen, 2015).

[4] Asian population in the U.S. is expected to quadruple by 2050 (U.S. Census Bureau Population Projections, 2010) http//www.census.gov/newsroom/releases/archives/population/cb12-243.html

[5] Marriage to a U.S. citizen is the most common way for an immigrant to get legal permanent residence (LPR) status in the U.S. (Department of Homeland Security Statistics, multiple years).

[6] Asian Americans are the highest-income ethnic group in the U.S. (Pew Research Center, 2013). This obviously affects resources available for children's education.

economic success (Schneider and Lee, 1990; Cheng and Starks, 2002).[7] The presence of a native parent instead of two Asian parents can alter children's aspirations if the importance of education differs by ethnicity. Furthermore, depending on which parent is the primary care-giver, the emphases on household human capital production and cultural identification can differ across Asian intermarriages by gender of the immigrant parent. Duncan and Trejo (2007, 2011) have emphasized the role of a non-immigrant identity and intermarriage in shaping human capital outcomes.

Previous research also indicates that labor market effects of intermarriage can differ by the gender of the immigrant. Asian wives draw wage and employment penalties from intermarriage (compared to marrying an immigrant), but there is no such penalty when male Asian immigrants or female non-Asian immigrants marry natives (Basu, 2015). Baker and Benjamin (1997) describe the heterogeneity in labor supply decisions of married immigrant men and women, and how these patterns change over their stay in the host country. It is natural to expect the provision of resources and household labor, including childcare, will differ across spouses by gender and ethnicity.

In our study, the primary outcome variable is whether children, aged 16-17, have dropped out of high school. Dropping out of high school is correlated with poor labor market outcomes, future legal troubles, etc. (Sum et al., 2009; Bjerk, 2012). We estimate the impact of intermarriage of the Asian parents on the dropout probability of their children, compared to children of intra-married Asian parents. We present results for Asian-father and Asian-mother households separately. Besides controlling for a host of observable parental and child characteristics, we also use an instrumental variables (IV) strategy to address unobservable heterogeneity in marriage choice. Using 2000 U.S. Census data, we find that—despite the higher human capital and income levels of intermarried families with Asian fathers and native mothers—their children have higher dropout rates compared to Asian intra-married families. The disadvantages are insignificant when comparing children of Asian-mother-native-father families to intra-married Asian families. For robustness, we also replicate some results of Furtado (2009) for non-Asian families; we find no

[7] Asian Americans have been stereotyped as the "model minority" in the U.S., compared to other immigrant groups, in terms of socio-economic outcomes. Hartlep (2015) discusses how the increasing heterogeneity within the Asian group has sparked a backlash against the idea.

significant differences in scholastic achievement of children of non-Asian intermarriages and intra-marriages, and these do not differ by gender of the immigrant parent.

We also investigate the mechanisms behind these parental gender-based differences in outcomes. Scholars debate the relative roles of maternal and paternal education in the intergenerational transmission of education. We find that children of intermarried less-educated fathers do worse than children of intermarried more-educated fathers, compared to children of intra-married fathers of the relevant education group. We do not observe a similar penalty that depends on mother's education. We further investigate the role of the mother in the identity formation of the child. U.S. natives on average attain less education than Asians. If a child identifies as "non-Asian"—and this is more likely when the mother is native (compared to when the father is native)—then both child and household may put less emphasis on education. Upon controlling for child's self-identity and native parent's race, the intermarriage penalties for Asian father families become insignificant. Thus the intermarriage penalty tends to be transmitted to children either via a less-educated father or through a mother's "more-native" cultural identity.

The paper is organized as follows. Section 2 presents the theoretical background and empirical approach to identifying the effects of intermarriage on children's education. Section 3 introduces the data and presents descriptive statistics. Section 4 presents OLS and IV estimates of the effects of intermarriage. Section 5 seeks explanations for the findings in section 4. Section 6 presents sensitivity analyses. Section 7 concludes.

2. Theoretical Background and Empirical Approach

2.1 Theory and Model Specification

The equation identifying the effects of parental intermarriage on the human capital of children is:

$$E_i = \alpha + \beta \,\text{Inter}_i + \gamma Z_i + \lambda F_i + \theta M_i + \delta_i + \varepsilon_i \qquad (1)$$

where E_i is 0 if child i is currently enrolled in high school (Grades 9 and above) or has a high school (or equivalent) degree. Otherwise the variable is set to one. $Inter_i$ equals 0 if both

parents are immigrants, and it equals 1 if exactly one parent is U.S.-born.[8] This paper seeks to investigate the premium or penalty for children from cross-nativity marriages, not additionally the effects of cross-racial marriages. Hence, intermarriages are cross-country marriages. The β coefficient is interpretable as a premium or penalty for the children of intermarriages, compared to children of intra-marriages. In our baseline analysis, we focus on the effect of type of marriage on children's outcomes, first controlling only for child characteristics Z_i like age and sex. F_i includes additional controls that influence both marriage type and children's human capital: parental and family characteristics. M_i are region-of-stay characteristics. δ_i are immigrant parents' country-of-birth fixed effects.[9] Below we discuss the theoretical foundations for these controls.

The mechanisms through which the "type of marriage" can affect the education of children is dependent on the "child-rearing technology" of the parents. Education and income of the parents affect children's education via the accessibility of quality schooling. As discussed earlier, intermarried parents exhibit positive assortative mating in terms of socio-economic and human capital characteristics compared to intra-married couples (Furtado, 2012; Meng and Gregory, 2005; Kantarevic, 2004). Besides higher levels of human capital, intermarriages can exhibit equal division of bargaining power in the household, which includes the decision to invest in children. Studies have found strong inter-generational links between the levels of parental and child's education (Mulligan, 1999); though there is debate regarding which parent's education is more influential for the child.[10]

Asian parents have higher average education and income than other immigrant groups and native households (Pew Research Center, 2013). However, Asian-mother and Asian-father families can differ in the inter-generational transmission of human capital and assets. On the one hand, spouses with similar human capital levels, as in intermarriages, may have similar labor market opportunities. Alternatively, natives may marry immigrants from traditional societies for non-labor market reasons. Basu (2015) finds that educated Asian women who marry native men have a wage penalty that is explained by a combination of spousal income effects and labor market

[8] If parents are born in two different non U.S.-countries, the child is still considered the offspring of an intra-marriage. Parents born in U.S. territories are treated as immigrants.

[9] ε_i is a random error term.

[10] See Black and Devereux (2011) for a review of the effects of parental background on child's outcomes.

prospects forgone for "home-building." The study further shows that these motives are not evident in intermarriages between native women and Asian men. If spouse selection criteria are different for natives who marry Asian women versus Asian men, this gender disparity in intermarriages can spell differences in education outcomes for the children of these unions.

As a special case of the exchange theory (Grossbard-Schectman, 1993), Asian intermarried women may forego their labor market aspirations and marry a native to invest in their children's education as a form of higher social status. Ex ante, it is difficult to specify whether this tradeoff improves her children's scholastic outcomes.

It is unclear whether assimilation variables like English proficiency, and duration of stay of the immigrant parents should be included in F_i, since these variables can both "cause" and be "affected by" intermarriage. For example, the English proficiency of the immigrant parent can improve by marrying a native spouse (Kulczycki and Lobo, 2014), but an immigrant more fluent in English is likely to intermarry. Intergenerational transmission of language is associated with positive outcomes for children's education (Bleakley and Chin, 2008). On the other hand, children of intra-marriages may gain cultural and cognitive benefits from "bilingualism" (Portes and Rumbaut, 2001).[11] Intermarriage can also affect the immigrant parent's attachment to the host country and extend their stay in the U.S., thereby reducing interruptions in the children's studies. Given the importance of these variables in determining the human capital of children, F_i includes *observable* parental characteristics: parents' years of education, their labor market employment status, their log income, years of stay for immigrant parents,[12] and English ability.

Fertility rates of immigrant families are higher than native ones, although there is heterogeneity across countries of origin (Sevak and Schmidt, 2008). Even after accounting for socioeconomic conditions of parents, prior research indicates that only children complete more education than others (Falbo and Polit, 1986). Number of siblings and birth order also affect educational outcomes (Black et al., 2005). Asian mothers have lower fertility rates compared to other minority groups in the U.S. (Lee, 1998). We include controls for family size, birth order, and number of siblings in equation (1).

[11] Mouw and Xie (1999) show that the academic importance of bilingualism for Asian American children is transitional.

[12] The years of stay variable is the maximum time spent in the U.S. since immigration, across the two parents.

Previous studies have showcased that socio-economic and cultural traits are important determinants of Asian intermarriages, but the importance of macro-structural factors should not be overlooked (Hwang, Saenz and Aguirre, 1997). The "nature" of the immigrant community and social interactions affect partner matches and children's education. Immigrants tend to choose neighborhoods based on the availability of co-ethnics, which can affect intermarriage rates (Chiswick and Houseworth, 2011). Native networks can be superior to immigrant networks for labor market prospects (Furtado and Theodoropoulos, 2010), and these benefits pass into children's education outcomes. On the other hand, both size and quality of the enclave affect the outcomes of the child (Bygren and Szulkin, 2010). If a family follows a father-breadwinner-mother-homemaker model, the extent of association with a labor market network will differ for immigrant father and immigrant mother families. To address these considerations, M_i includes the relative size of the metropolitan area population from the immigrant parent's country of birth, a binary control for living in a metropolitan area, and fixed effects for current state of residence. Within middle and high income families—in which Asian families are over-represented—parents choose locations based on school quality (Lankford and Wyckoff, 2005). To account for better overall education policies and infrastructure in an area, we include an additional control for the proportion of native-born 16-17-year old high school graduates in the metropolitan area.[13][14] Finally, childrearing practices and cultural norms affecting marriage differ across countries, hence we include parental birthplace fixed effects.

If immigrant groups predisposed towards education are growing in size, the number of intermarriages can increase. The matching theory of marriage, based on social interactions, predicts that stable marriages are based on men and women accepting the "best proposal" according to their preferences. The impact on human capital of future generations will depend on which groups intermarry. As the effect on children's outcomes may differ by immigrant parent gender, our econometric specification compares native-male-Asian-female and native-female-Asian-male households *separately* to intra-married Asian families.

[13] Geographic-area specific variables, for those not in an identifiable metropolitan area, use the state-wide numbers.

[14] The presence of native friends can also aid the assimilation and scholastic achievement of children of immigrants (Emonds and van Tubergen, 2015). While we do not have a variable for a "friends' network", the proportion of native teenagers can also identify the "integration" of the neighborhood.

2.2 Alternative Estimation Strategy: Instrumental Variables

Ordinary Least Squares (OLS) estimation of equation (1) treats the marriage decision as exogenous, which is likely unrealistic. While we have a host of controls for parent quality, we cannot account for parental unobservable selection into type of marriage. The direction of the effect of unobservable characteristics on children's education outcomes is difficult to determine *ex ante*. For example, immigrants more attached to U.S. lifestyle or motivated to adapt to host-country culture may intermarry and also be more familiar with U.S. education systems. In this way, the observed least-squares estimate of β suggests that intermarriage reduces dropout rates by *more* than the real return. On the other hand, two Asian parents who emphasize education can differ in aspirations for their children, compared to one native and one Asian parent, in which case the OLS estimate of β is lower than the true impact. Causality is further questioned if partners model their gains from marriage when considering potential spouses, and a potential gain could be sharing of public goods like children. In other words, child-rearing practices affect the choice of spouse. We want a variable that affects the marriage decision but not children's education. This paper follows previous literature (Meng and Gregory, 2005; Basu, 2015) and employs two instrumental variables to correct for endogeneity and selection bias in intermarriage.

The first instrument is the "relative group size" ($RGS_{i,c,s,a}$) which shows the availability of mates of the opposite sex from one's home country, relative to potential native partners. People are usually attracted to those of their own age, ethnic, and religious groups (Qian and Lichter, 2001). People who belong to a larger group also identify strongly with their ethnic group, increasing the chances of intra-marriage (Kalmijn and Van Tubergen, 2010). $RGS^{1980}{}_{i,c,s,a} = \left(\frac{UM_{c,s,a}}{UM_{USA,s,a}}\right)^{1980}$ where $UM_{c,s,a}$ is the number of unmarried people of the opposite sex from immigrant parent's country-of-birth *c* and age-group *a*, and child's state of birth *s*. $UM_{USA,s,a}$ is similarly defined for unmarried individuals born in the U.S. To reduce skewness, the logarithm of the instrument is used.[15]

[15] When comparing immigrant-father-native-mother marriages to intra-marriages, the instrument uses the ratios of unmarried women. The instrument uses ratios of unmarried men when studying immigrant-mother-native-father marriages.

The second instrument is the "sex ratio" ($SR_{i,c,s,a}$). $SR^{1980}{}_{i,c,s,a} = \left(\frac{SS_{i,c.s,a}}{OS_{i,c,s,a}} \right)^{1980}$ where $SS_{i,c.s,a}$ is the number of people of the same sex (as the parent) from country *c* in state *s* and the parent's age-group *a*. $OS_{i,c.s,a}$ is similarly defined for people of the opposite sex. Increased competition for mates from one's own country reduces intra-marriage.

We construct both instruments using population counts from the 1980 U.S. Census. We assume that the parent's state of residence and marriage market in 1980 and the child's state of birth are the same. The children are 16 or 17 years old in 2000, thus we assume marriage occurred between 3-4 years before childbirth. States are the only areas across which we can link families in 1980 and 2000. Smaller geographic areas such as metropolitan statistical areas (MSAs) or Public Use Microdata Areas (PUMAs) see changes in their boundaries across years, which compromises links across U.S. Censuses. Some of these changes are arbitrary decisions of the U.S. Office of Management and Budget. Others occur due to changes in economic activity across MSAs. If intra-married immigrants are more likely to settle in expanding cities and intermarried immigrants locate in suburbs, and these groups make different fertility or child-rearing decisions, the changing MSA/PUMA boundaries may result in incorrectly estimated immigrant share coefficients.[16] For these reasons, we focus on states but are mindful that the relevance of our instruments might be weakened.

Instrument validity relies on the assumption that "relative group size" and "sex ratios" affect a child's human capital only through the marriage decision of the parents, conditional on other controls. Immigrants make residence and marriage decisions based on local economic conditions, so this exclusion restriction might be questioned. The "relative group size" instrument is closely related to the overall, as well as country-of-origin-specific, concentration of immigrants in a state. Immigrants tend to congregate in certain states: 60% of immigrants live in the five U.S. states of California, Texas, New York, Florida and New Jersey (Migration Policy Institute, 2014). Overcrowding and the size of ethnic enclaves can affect the quality of education. Immigrants invested in the education of their children may move to states with better schools and robust labor

[16] An attempt to link Censuses across "consistent PUMAs" for our selected sub-population resulted in the loss of one-third of the data. The attrition is unlikely to be random.

markets. Similarly, the "sex-ratio" variable can respond to the gender wage ratio and occupational composition of an area. These variables can affect education outcomes by field-of-study, as well as intermarriage rates for different sexes.[17]

The use of state-specific IVs from the 1980s is less problematic because our instruments are based on 1980-economic conditions and the child's outcome variable is observed in 2000, possibly in a different state. About one-third of our sample moves to a state that is different from their U.S. state of birth between the 1980 and 2000 censuses.[18] However, for immigrants who do not move or move internally over short distances, our instruments may not be valid. Our OLS regressions already include current state-of-residence fixed effects, controls for size of own-ethnic network in the metropolitan area (relative to the country), and share of native high school graduates in the 16-17-year-old population in 2000. In addition, we include economic controls for the current metropolitan area that can affect children's education and instruments: native unemployment rate and female/male wage ratio in 2000.[19]

Instruments can also be correlated with unobservables like "open-mindedness" of the local native population. For example, immigrant-fathers—who are more likely to be primary earners—could be more affected by discrimination, relative to immigrant-mothers. In less open-minded areas, there could be fewer available mates from the native population, *as well as* poorer scholastic performance of immigrants' children because of discrimination in school. The geographic controls included in the estimations can address some of these social. However, for families that may have migrated to different states as a result of social factors, the instrument "relative group size" is not actually excludable in equation (1). This could lead to a downwards bias on intermarriage's effect on dropout rates for immigrant-father families.

[17] For example, states with booming STEM industries will have wage ratios and employment rates skewed in favor of men. This can affect gender ratios, as well as the quality of education in STEM and non-STEM fields.

[18] This is another reason to be concerned about "errors" if we did not match marriage market area to the child's state of birth. People tend to move. If we attributed 2000 PUMA/MSA as a parent's 1980 marriage market, the rate of error might be even higher since these geographic areas are smaller than states.

[19] This small change in the control variable set (going from OLS to IV) is a modeling choice to support instrument validity. If we include native unemployment rate and female/male wage ratio in the OLS regressions, our findings are unchanged; results are available upon request.

3. Description of the Data

3.1 Sample Selection

Our analysis uses the 5% sample of the 2000 U.S. Census, specifically the Integrated Public Use Microdata Series (IPUMS) (Ruggles et al., 2013). The Census is particularly suitable for our study due to its large sample of immigrants and ability to identify their birthplaces. The Census has rich information on race, ethnicity, and immigrants' source countries, as well as data on earnings, labor market status, education, English proficiency, and age of all household members.

In the Census, we can link parents to their children as long as they live in the same household. If husband and wife live together, we can identify the type of marriage. We define an Asian intermarriage as a legal union between an immigrant born in Asia and a native. Conversely, an Asian intra-marriage occurs between two immigrants born in Asia. We restrict our sample to 16-17-year-old children with both parents present.[20] The standard view in the literature is that ethnic exogamy is less stable than endogamy. Even after controlling for a host of observable socio-economic and ethnic traits, marriages between natives and immigrants or cross-racial marriages have a high risk of dissolution (Bratter and King, 2008; Milewski and Kulu, 2014).[21] Children's academic performance is negatively impacted by divorce, usually in the immediate aftermath (Kaye, 1989). Restricting data to intact marriages, while a practical choice, also means we may focus our analysis on children with "better outcomes," though the extent may be different by type of marriage. We also restrict the sample to biological children of the parents, to minimize the possibility of remarriages.

Parents are 35-65 years old in 2000. We include households in which at least one parent earns a positive income.[22] We also restrict our sample to those who "get married in the U.S. marriage market," in the following manner. The 2000 Census does not provide information on duration, incidence, or age at first marriage, but it does report immigrants' year of arrival to the

[20] Other data sources like the Current Population Surveys which mention the birthplaces of adult children, and hence would be ideal to study completed education, are not used because parents and children cannot be linked. This will be further discussed in later sections.

[21] About 90% of Asian intermarriages involve a non-Asian native.

[22] Parental incomes are top coded. If a parent is not working, their income is zero. To avoid losing this observation when a logarithm function is imposed, a parent with zero income, provided the spouse has a positive income, are assigned an income of 10 cents.

U.S. and their current age. Following median age-of-marriage statistics for Asian immigrants, the sample is restricted to "young entrants" who immigrated at ages 25 or below (Simmons and Dye, 2004). We also verify this median age-of-marriage statistic using year and duration of marriage and immigration data from the American Community Survey (ACS) 2010.

Parents and children born to U.S.-born parents abroad are excluded. Only children born in the U.S. and attaining U.S. education are included.

3.2 Descriptive Statistics

Table 1 compares descriptive characteristics of non-Asian and Asian immigrant households, which are differentiated by type of marriage and gender of the intermarried immigrant. Intermarriage is more common for non-Asian parents; almost 50% have a native spouse. The ethnic and gender differences in intermarriages are evident. While non-Asian immigrant men are more likely to intermarry, Asian women have higher intermarriage rates. Children of intra-married non-Asian immigrants have higher dropout rates, compared to children with at least one native parent. The opposite is true of children in Asian families. Children of intermarried Asian parents have higher dropout rates than children of intra-married Asian parents, and the rates are highest when the father is Asian and the mother is native (4.73%, compared to the 3.75% dropout rate of children of Asian mothers and native fathers).

Consistent with assortative mating (Chiswick and Houseworth, 2011), natives and immigrants with more schooling tend to intermarry. Within non-Asian intermarriages, the immigrant partner has lower average years of education. For Asian marriages, the husband is usually the more educated member. Market employment rates are high for both husband and wife in Asian intermarriages. The combined household income is also high, with Asian-father-native-mother families having the highest average household income.

Average years of stay in the U.S. are relatively lower for Asian parents. Asians are a relatively new group of immigrants, arriving in large numbers after the Immigration Act of 1965.

4. Estimation Results

4.1 Ordinary Least Square Estimates of Intermarriage on Children's Dropout Rates

Tables 2(A) and 2(B) shows results from OLS estimation of equation (1) for non-Asian and Asian families respectively. Columns 1 and 2 compare the children of immigrant mothers and native fathers to the children of intra-married immigrant parents. Columns 3 and 4 compare children of immigrant fathers and native mothers to the children of intra-married immigrant. Columns 1 and 3 include only child controls: sex and a binary indicator for being 16 years old. Columns 2 and 4 add parental and family controls. Finally, columns 3 and 6 include geographic controls as well as fixed effects for current state of residence and parental birthplace.

As a basis of comparison, Table 2(A) first presents the regression results for children of *non-Asian* families. Previous research finds that intermarriage is associated with better raw human capital outcomes for the children of these unions (Chiswick and DebBurman, 2003); however, these advantages reverse when controlling for parental socio-economic conditions, and results do not differ by gender of the immigrant parent (Furtado, 2009). We find this to be true for non-Asian families and reproduce similar results in Table 2(A). Positive selection on parental characteristics contributes to better human capital outcomes of children of intermarried non-Asian mothers. Given that we find no significant difference in intermarriage returns between immigrant mother and immigrant father non-Asian families, we turn our attention to Asian households in Table 2(B).

In the case of Asian families, the differences in high school dropout probabilities are not significantly different for children of intra-married Asians and Asian-mothers-and-native-fathers. Among Asian immigrant families, only when the father is the immigrant are his children's dropout probabilities significantly higher than children of intra-marriages (2-2.4%), even under controls for parental and geographic characteristics.[23] This is distinctly different from the results of Table 2(A). The χ^2 values for the test-of-difference in intermarriage coefficients, by gender of the immigrant parent, show that the difference is significant at the 5% level.

[23] Certain parental characteristics like language, income, and duration of stay can affect intermarriage and be affected by type of marriage. Upon exclusion of these controls, we find that the children of Asian-mother-native-fathers have an insignificant 0.002 (standard deviation 0.0055) difference compared to intra-married families, and this difference is 0.025 (0.012) for children of Asian-father-native-mothers. Hence inclusion of parental traits like language (columns 2 and 5 of table 2 (B)) does not significantly change our results.

We have a sample of 2,224 children of intra-married parents, 800 children with an intermarried Asian immigrant mother, and 550 children born to an intermarried immigrant Asian father. Lack of significance of some of the coefficients in Table 2(B) could result from small sample size.[24] A solution is often to use the ACS. The ACS spans multiple years and asks survey questions similar to the long-form decennial Census. However, changes in the universe of the surveyed population and changes in variables and coding have occurred across the ACS years.[25] Unlike the 5% decennial Census, the ACS only samples 1% of the population. For our purposes, this raises concerns about being able to compare outcomes of small select populations, such as married Asian migrants, even when aggregated across years. Appendix Table A1 uses the post-recession ACS-es from 2009-2015.[26] The individual-year samples are small. There is year-to-year variability in the impact of intermarriage of parents on the education of their children, and the impact is mostly insignificant. The combined impact for the entire time period is also insignificant, although the direction of the impact, by gender of the parent, mimics our estimates from 2000 Census data. For these reasons, our preferred data source will continue to be the 2000 U.S. Census.

4.2 Instrumental Variables Estimates of Intermarriage on Children's Dropout Rates

The previous section does not account for the influence of unobservable selection or endogeneity of the marriage decision. We circumvent these concerns via two instruments, "relative group size" and "sex ratio," discussed in Section 2. We carry forward all controls from the OLS estimations[27] and include additional controls for native unemployment rate and native female-male wage ratio within an individual's metropolitan area.[28] Table 3 shows first (columns 1 and 3) and second stage (columns 2 and 4) estimates from models with a full set of own, parental, and

[24] Controls in Table 2(A) and 2(B) are not significant at standard levels. However parental controls pass a test of joint significance at the 5% level.

[25] After 2000, the annual ACS-es are the Census Bureau's primary survey method for analyzing the demographics of the U.S. population. Sources: https://usa.ipums.org/usa/acs_multyr.shtml and http://www.prb.org/Publications/Articles/2009/differences.aspx

[26] These ACS-es specify age at first marriage and the number of times married which are used as sample selection criterion.

[27] Parental birthplace controls are removed since a large part of the variation in instruments depends on these effects.

[28] As before, if a person does not live in an identifiable metropolitan area, the state-wide numbers are used.

metropolitan area controls. We first compare the outcomes of children of Asian mothers and native fathers to outcomes of children of intra-married Asians; we next compare the latter to children of Asian fathers and native mothers. Standard errors are clustered by child's state of birth, parent's age-group and place of birth cells.

Instruments have the expected signs. If the number of own-country individuals of the same sex per member of the opposite sex increases by 1, the likelihood of intermarriage increases by 6.5% for Asian women, and 5.9% for Asian men. These increases are in line with previous estimates of the effects of sex-ratios on intermarriage probabilities (Furtado and Theodoropoulos, 2010; Basu, 2015). Coefficients are significant at the 1% level. A 10% increase in the percent of unmarried mates from one's own country in the immigrant's age group and regional marriage market reduces the probability of intermarriage by around 0.04% for women and 0.2% for men, although this decrease is only significant for men at the 10% level.

The model passes under-identification and weak instrument tests. The values of the Kleibergen-Paap χ^2-test and the F-test of excluded instruments are sufficiently high to reject the respective nulls of an under-identified model and an identified model that suffers from a weak correlation between the instruments and the endogenous variable. The second-stage Hansen J-statistic shows that validity of instruments, conditional on the set of controls, is less concerning for our sample.

According to the second-stage IV estimates, the children of intermarriages with Asian mothers face a high school dropout penalty of 1.2% (compared to the children of Asian intra-marriages), although this effect is not significant. The penalty is 7.5% for children of Asian fathers and native mothers, much larger relative to children of intra-marriages and economically significant. The differences by gender of the Asian parent persist. The IV estimates show that children of intermarriages are more likely to dropout from school than estimated by OLS models. Thus OLS estimates may be downward biased, and the higher IV estimates are closer to the true impact of intermarriage on children's dropout outcomes. Intra-married Asian parents may have

higher aspirations for their children's education compared to intermarried parents, leading to worse outcomes for the children of the latter.[29]

Another explanation for the larger IV estimates may be that the instruments are unable to generate enough variation to identify the marriage equation from the dropout equation. The dependent variable "high school dropout" is a binary variable and about 3.5% of its observations equal 1. The predicted values of the dependent variable in a linear probability model can be negative, and the coefficient estimates may be "too large." Since the explanatory variable "intermarriage" is also a binary variable, we also estimated the model via probit estimation, and results confirm the larger penalty for children of Asian fathers and native mothers. The concern with an IV-probit model is that coefficients are estimated off the exclusion restriction as well as the structure of the model, thus requiring stronger identifying assumptions.

While the coefficients on the instruments seem reasonable, we are cautious about over-emphasizing the magnitude of this finding given the concerns cited above. For the rest of the paper, we present only OLS estimates, and acknowledge that the results may not be able to deal with unobservable selection into type of parental marriage.

5. Explanations for the Heterogeneous Asian Intermarriage Outcomes, by Parent Gender

Children of intermarried Asian fathers incur a significant education penalty vis-à-vis children of intra-marriages. Cultural assimilation, in this case, has occurred with lower human capital assimilation of the second generation. We find no evidence that children of Asian intra-marriages and children of intermarriages involving Asian mothers have different dropout rates. The differences in children's outcomes, by gender of the immigrant parent, cannot be explained by unobserved heterogeneity of the parents. We investigate other explanations in this section.

[29] IV estimates only identify local average treatment effects. If marriage decisions were based on random match probabilities, an increase in the relative group size or a decline in the sex ratio would encourage all immigrants to intra-marry. That is not likely to be the case, and it is important to understand that the observed effect of intermarriage is specific to the Asian subpopulations whose marriage decisions are sensitive to changes in the values of the instruments. Others are not. For example, some immigrants might always intermarry, such as those who immigrated at young ages and lived all their lives in the U.S. Other immigrants—for instance, from traditional societies—may always be inclined to marry immigrants, perhaps arranging to find a partner in the home country. In these cases, changes in the instruments will not change outcomes.

5.1 Impact of Immigrant Parent's Education on Children's Outcomes in an Intermarriage

Previous research debates the relative importance of maternal versus paternal education for children's scholastic achievement (Behrman and Rosenzweig, 2002; Ermisch and Pronzato, 2010). While a highly educated mother is more likely to work and make higher wages, she may substitute childcare for labor market work, and hence the impact of maternal education is smaller.[30] A more educated father increases income resources available for the child's education. A child whose father is more involved with his or her schooling has better education outcomes and enjoys school more (Cooksey and Fondell, 1996).

In this analysis, we separate the sample by both father's and mother's education level. The idea is to capture heterogeneity in returns for the children of intermarriages by parent-education type, conditional on child's characteristics, other family traits, and metropolitan area controls. We consider three parental education categories: high school dropout, high school graduate, and tertiary education (college degree or more). The baseline comparison is to intra-married Asians of the pertinent education category.

Table 4 shows OLS estimates of intermarriage on children's dropout status that differ by parental level of education. In column 1, the sample is stratified by Asian father's schooling and in column 2 by mother's education. The intermarriage coefficients highlight the importance of paternal education. Children of fathers with less than a high school degree have the largest intermarriage penalty. The penalty falls in size as the father's education increases. On the other hand, the penalty does not differ by mother's level of education.[31]

Despite the greater impact of father's education on the child's outcomes, it alone cannot explain the results of Table 2(B). Appendix figure 1 presents the education proportions of fathers and mothers, by type of marriage. The number of Asian fathers (and mothers) who have less than a high school degree is very small, and thus unlikely to create such a large influence on overall estimates. Only 9% of intermarried Asian fathers have less than a high school degree, versus 19% of intra-married fathers. A majority of intermarried mothers, unlike intra-married mothers, are high

[30] Conversely, Carneiro et al. (2013) discuss investments in the home environment made by educated mothers as important channels through which a child's cognitive and behavioral outcomes can improve.

[31] The coefficients in column 2 do not pass an *F*-test for difference at all accepted levels of significance.

school graduates. We only see an insignificant and small intermarriage penalty for children of this group of mothers (row 2 of table 4).

5.2 Impact of Ethnic Identity on Education Outcomes of Children of Asian Intermarriages

Duncan and Trejo (2007, 2011) study the effect of ethnic identity and intermarriage on education outcomes of second-generation Mexicans. In the case of Mexican marriages, the authors find that intermarried parents have higher human capital and incomes, on average, than intra-married parents, and these advantages percolate to the next generation. Simultaneously, children of intermarried Mexican-Americans whose education levels are closer to American averages (rather than Mexican averages) are less likely to identify with their foreign-born parent. We confront similar concerns in our discussion of the education levels of children of Asian intermarriages. The average education outcomes of Asians are higher than native human capital levels (as shown in Table 1); a child whose education levels are in line with native averages may adopt a non-Asian identity and thus be *more* likely to dropout.

Previous literature also documents that adolescents may experience social costs with academic success, and this differs across race (Fryer, 2010; Fuller-Rowell and Doan, 2010). Such costs for children of two Asian immigrants may be lower than those for white or black native parents (stemming from racial and cultural differences in the relationship between social status and academic achievement). Thus, children of intra-marriages who identify with their Asian parents and draw social status from education may aspire to higher levels of education compared to children of intermarriages.

We observe ethnic identity in the U.S. Census, as it allows individuals to self-report their race or ethnicity. Respondents can report a single race or multiple races. We define non-Asian identity to equal 1 if a child reports to be of a single non-Asian race or multiple races that do not include any Asian races. 16-17-year-old children who report being “Asian,” or “multi-racial” are not randomly distributed in the population. Ethnic identity can be influenced by type of parental marriage and other family characteristics. The main causes for identifying with a non-Asian race are “looking like one race” or “raised as one race” (Pew Research Centre, 2015). Thus, the race of the non-Asian parent is important.

Whether a child of an intermarriage will develop a non-Asian identity can depend not only on the immigrant parent's gender, but also on its corollary, the gender of the native parent. If the primary care-giver is the mother, and she is native, then children of Asian-father-native-mother families may be more likely to claim non-Asian identities. In this sense, ethnic identity is a proxy for the perpetuation of social norms, via parenting, which in turn affect education.

Children who do not identify as Asian or multi-racial are over-represented among children of mixed-race parents (e.g., children of intermarriages). About 10% of children of intra-marriages report a non-Asian identity, and 50% of children of intermarriages claim the same. Table 5 presents the determinants of non-Asian identity *within* intermarriages—not by type of marriage—because we are interested if the differences between Asian-father and Asian-mother families contribute to identity formation of the child, and consequently to the education differences of the children across these intermarried families. Column 1 includes all controls from Table 2(B), but does not include racial identifiers for the parents. Children of Asian-fathers-native-mothers are 19% more likely to have a non-Asian identity compared to children of Asian-mothers-native-fathers. This is consistent with the idea that the mother more commonly shapes the identity. In column 2, we include indicators for native parents' race. The probability of identifying as non-Asian in Asian-father-native-mother households is no longer statistically different from Asian-mother-native-father households. The mother's race is more important in determining the child's identity than the father's race. The difference is significant and confirmed by a difference-of-coefficients test. In other words, effects of type-of-Asian-intermarriage seen in column 1 have shifted to race of native parent in column 2.

Table 6 re-estimates equation (1), including controls for child's non-Asian identity and native parent's race. Due to space constraints, only the coefficients on intermarriage and identity are presented. The results look different from Table 2(B). The intermarriage penalty observed for children of Asian-fathers-native-mothers compared to Asian intra-married families is now insignificant. Clearly, the ethnic identity of the child is important in determining the child's education. "Non-Asian identity" and dropout rates are positively correlated for the children of

Asian-fathers-native-mothers, as expected, although the coefficient is not significant. Some of the effect of non-Asian identity is absorbed by the "race of the native parent" variables (not shown).[32]

The "racial identity" variable can be sensitive to which family member completes the Census form. One or both parents may answer questions on behalf of their teenage children. If the native parent is more likely to fill in a Census form, then we are concerned that the child artificially "takes on" the ethnicity of the native parent. Furthermore, if the more educated parent or the stay-at-home parent (often the mother) answers the question, racial identity is likely to vary between intra-marriages and intermarriages, and by gender of the immigrant parent.

To explore these concerns, we examine data from the 2000 Current Population Surveys (CPS), all months, to see the differences in Asian racial identification for teenage and adult respondents. The race categories in the CPS are broad, and Asians are grouped with Pacific Islanders. The CPS identifies the birthplace of parents, so both teenage and adult respondents (aged 25-40) can be differentiated on the basis of parental marriage. We cannot connect adult children to parents who live in different households, hence parental characteristics, beyond birthplace, cannot be observed. These reasons also preclude the CPS from being our primary data source.

Nevertheless, we use the 2000 CPS to inform our racial identity results in appendix table A2. Children of intra-marriages, even as adults, are more likely to identify as being "Asian." There are differences in racial identification between adult and teenage children. Teenage children of Asian-father-native-mother unions are less likely to identify as Asian, compared to adult children of these unions. The presence of a native mother is strongly associated with the non-Asian identity of the teenager. Overall we do see that the racial identification outcomes of adult children of intermarriages follows that of teenagers.

One of the missing key characteristics in the CPS is the age-of-arrival of parents. We do not know if parents were married in the U.S. or abroad. Hwang and Saenz (1990) particularly point to the case of Asian intermarriages as producing misleading results across immigrant cohorts if pre-migration marriages are not separated from post-migration marriages. Our own analysis of the

[32] We also estimated the regressions in Table 6 with identity and native parent race interactions. The coefficient for "Asian intermarriage" continues to be insignificant between Asian-father-native-mother and Asian-mother-native-father households. Results available upon request.

Census data shows that children of immigrants who arrived at ages above 25 have different outcomes from those who immigrate at younger ages. In fact, for the children of these older entrants, immigrant-father-native-mother households have better outcomes compared to immigrant-mother-native-father households.[33] Adults, ages 25-40 in 2000, who we observe in the CPS, were born between 1960-1975, a period of skilled and professional immigration from Asia. Presumably parents of the adult respondents in the CPS were "older" entrants, compared to the parents of teenage children. Hence we cannot compare education outcomes of adult CPS respondents and teenage CPS respondents.[34]

6. Sensitivity Analysis

6.1 Impact on Younger Children

This paper uses "high school dropout probability" as the indicator of human capital outcomes, and restricts the sample to 16-17-year-old children. These children are no longer bound by compulsory education laws. Children under 18 usually live with their parents and are their legal responsibility.[35] The 2000 U.S. Census, however, shows that almost 8% of 16-17-year-old U.S.-born children do not live with any parent, and almost 16% of such children have dropped out of high school.[36] The other concern with using a sample of older teens is that they often dropout to enter the labor force.

We now use a sample of younger teenagers ages 14-15 who are more likely to live with their parents, and less likely to dropout due to labor market concerns (most U.S. states have employment restrictions for individuals younger than 16). Here we use grade-for-age as our measure of human capital (Bleakely and Chin, 2008). If a 14-year old's highest grade attained is lower than grade 7 or 8, then he or she is in the wrong grade, and similarly if a 15-year-old is attending a grade lower than grade 9.

[33] Results available upon request.

[34] Average outcomes for teenage respondents (high school dropout rates) in the CPS are similar to the Census outcomes.

[35] Under special cases of legal emancipation, the child may not live with the parents despite not turning 18 yet.

[36] Some children may live with an adult who is not their parent. 4% of U.S. born 16-17-year-old children live with a non-parent employed adult, and 20% of these children have dropped out of high school.

As shown in columns 1 and 2 of Table 7, results for younger children, without controls for parental traits and metropolitan area, follow the trends seen for older teenagers. The children of Asian-mothers and native fathers are more likely to be in the correct grade for their age, compared to children of intra-marriages or Asian-father-only intermarriages. Under the full set of controls, this qualitative result remains but estimates are not significant. The differences in the impact of intermarriage on human capital of older and younger teenagers point to different mechanisms affecting children as they age. For younger children, similar to Furtado (2009)'s results for non-Asian groups, parental heterogeneity explains the differences. For older teenagers who are capable of making schooling decisions somewhat independently, the interaction of ethnic identity and intermarriage is important.

6.2 Heterogeneous Asian Sub-Ethnicities

The term "Asian" encompasses a number of sub-ethnicities. If the impact of intermarriage differs between children of Asians and other groups, it is plausible that returns are heterogeneous across Asian sub-groups. We consider four Asian subcategories: Southeast Asia, East Asia, Indian Subcontinent, and Islamic Nations of the Middle East. 30% of the households are from East Asia, and about 45% from Southeast Asia. Smaller proportions come from Islamic countries and the Indian subcontinent (approximately 9% and 15% respectively). The rates of intermarriage (available upon request) are highest for East and Southeast Asians, while Islamic and Indian societies tend to intra-marry.

For each of these subgroups, we estimate equation (1) and present results in Table 8. Models include the same controls as in Table 2. The sample sizes for most of the sub-groups, are too small for significant estimates, except for Southeast Asia. The OLS point estimates indicate, however, that for all sub-ethnicities, the children of Asian-fathers and native mothers have higher dropout rates.[37]

[37] Given the possible correlation between parental and children's human capital investigated in section 5.1, appendix figure 2 also provides a graphical snapshot of the sub-Asian ethnic distribution within each education category and gender. Parents in the dominant sub-ethnicity (Southeast Asian) also tend to have less schooling. East Asian parents and those from the Indian subcontinent are prominently represented in the college graduate plus category.

One could posit that our baseline results are relevant only for the high school dropout variable, which is primarily driven by parents with less education. Children of college graduates could situate at the higher end of the education distribution, and exhibit different correlations vis-à-vis type of marriage of their parents. This is unlikely since parents from East Asia and the Indian subcontinent have higher levels of average education compared to other Asians, and their children continue to exhibit similar dropout patterns as the overall sample. Ideally, we would use data that links adult children to their immigrant parents and investigate adult education further. We discussed the drawbacks of the CPS in section 5.2. We are unaware of any other dataset with a large sample of Asian households in the U.S. that links parents to adult children.

6.3 Cross-nativity marriages and cross-race marriages

Equation (1) estimates the premium/penalty for children in cross-nativity marriages. The equation does not distinguish between the cases when intermarried parents are of the same race versus different races. We have seen the importance of the race of the native parent in determining the child's ethnic identity (Table 5). In this section we investigate the importance of cross-racial and cross-national pairings on children's outcomes. Over 80% of Asian intermarriages are with a white native, 10% are with an Asian native, and 10% are with a black or Hispanic native. We now divide the observed intermarriages by three races of the native parent: white, Asian, and black/Hispanic.

Table 9 shows that there are no significant differences for children born to intermarried Asian mothers, by race of the native father. However, there are differences for children of Asian fathers and native mothers. In these cases, the presence of a native white mother has a large negative influence, and a native Asian mother has a significantly positive influence. Once again this supports our hypothesis that the mother's observable role—with respect to the intermarriage penalty in Asian-father, native-mother families—is her influence on her child's identity and therefore, the child's scholastic achievement.

6.4 Role of the sex of the child

This paper has focused on the gender of each parent as a source of differences in education outcomes for children of intermarriages. It is natural to assume that the gender of the child could also be important. The regressions reported previously include controls for the child's sex, but they assume that effect of other variables is similar on sons and daughters. For example, son preference is common in Asian cultures (Das Gupta et al., 2003). Resource allocation with preference towards male children, may be more common in Asian intra-marriages as opposed to intermarriages, and we can expect sons to have better education outcomes in intra-marriages. Similarly, instead of the mother influencing identity formation, it is possible that daughters are more likely to abide by traditional identities, in which case girls will have better education outcomes.

Results for daughters and sons only are reported for Asian-mother-native-father families in columns 1 and 2 of Table 10. Columns 3 and 4 report results for the Asian-father-native-mother families. We continue to see an intermarriage penalty in the scholastic achievement of children of these families, irrespective of their gender.[38]

7. Conclusion

The cultural and socio-economic assimilation of the first generation of immigrants, and the linkages with the human capital assimilation of the second generation is of great interest to immigration researchers. Intermarriage is often considered emblematic of the level of integration between the minority and majority populations. Furthermore, there may be heterogeneity in the effects of intermarriage by gender and ethnicity of the immigrant. Our paper is the first to examine the human capital of children of a large and specific group of immigrants, Asian Americans, who in particular culturally value education. Data from the 2000 U.S. Census show that the high school dropout rates of 16-17-year-old children of Asian intermarriages differ from children of Asian intra-marriages, which is not seen in non-Asian immigrant households. The differences are statistically significant between Asian-father and Asian-mother only families, controlling for a host of observable parental, child, and residential characteristics. Despite the higher human capital and income levels of Asian intermarried families, the children of Asian-father native-mother

[38] The effects, within Asian-intermarriage-type, conditional on child's gender do not pass a differences test.

households have higher dropout rates, compared to both Asian intra-married families and Asian-mother native-father intermarried households. These results are in contrast to previous literature's findings that parental observable and unobservable characteristics can explain the education premium for children of intermarriages, and remove any heterogeneity by gender of the intermarried parent (Furtado, 2009).

Previous research has shown that intermarriage does not necessarily provide labor market gains for immigrants, and this is particularly true for Asian women (Basu, 2015). Yet in this paper we see no significant education penalty for children of Asian-women-native-male households. An education penalty exists for children of intermarried Asian fathers, who do enjoy socio-economic success.

Given these complicated patterns that can differ by parent sex and ethnicity, our paper also examines the mechanisms behind intermarriage effects. Children of less-educated fathers do worse, relative to those of less-educated mothers, suggesting the importance of intergenerational transmission of education from fathers to children. When we include additional controls for the native mother's race and the child's self-identity, the intermarriage penalty becomes insignificant. Thus in households where a child identifies as "non-Asian"—which is more likely when the mother is native—families may under-emphasize education, converging to native households.

Future research should further investigate these potential channels of identity, and the role intermarriage plays in its development. If non-Asian identity is generated by reduced educational transmission or "self-identity" that stymies human capital accumulation, then we need to better understand these factors. For instance, more detailed educational data might show an under-emphasis of STEM education in Asian-father-native-mother households. Since factors affecting the human capital of children differ by gender of the immigrant parent—and self-identity often depends on the primary care-giver—the family structure of immigrants informs our understanding of the assimilation by future generations, which in turn will affect broad immigration policy.

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Table 1: Summary Statistics for Children aged 16-17, differentiated by Type of Marriage of Parents

	Non-Asian Immig. & Native		*Non-Asian Intra-married*	*Asian Immig. & Native Spouse*		*Asian Intra-married*
	Immig. Mother	Immig. Father	Both Immig.	Immig. Mother	Immig. Father	Both Immig.
Percentage	21.96	27.08	50.96	22.38	15.39	62.23
Child Characteristics						
% HS dropout	5.1 (21.99)	6.01 (23.78)	6.21 (24.13)	3.75 (19.01)	4.73 (21.24)	3.11 (17.34)
Male	51.3 (49.99)	51.2 (49.99)	52.27 (49.95)	52.5 (49.97)	53.82 (49.9)	53.51 (49.89)
Parent Characteristics						
Father Years of Educ.	13.84 (3.39)	12.11 (4.42)	9.36 (4.9)	14.73 (3.01)	14.99 (3.42)	13.9 (4.65)
Mother Years of Educ.	12.8 (3.38)	12.81 (2.9)	9.31 (4.56)	13.29 (3.29)	14.07 (2.85)	12.66 (4.68)
Father Working	88.86 (31.46)	87.3 (33.3)	77.3 (41.9)	89.5 (30.67)	92.9 (25.69)	85.84 (34.88)
Mother Working	71.7 (45.07)	67.79 (46.73)	55.15 (49.74)	71.75 (45.05)	70.55 (45.63)	66.41 (47.24)
Number of Siblings	1.44 (1.23)	1.63 (1.33)	2.06 (1.36)	1.26 (1.21)	1.57 (1.44)	1.82 (1.6)
Household Income	$90,582.61 (73258.84)	$82,811 (71861.55)	$63,568.78 (54761.56)	$95,587.97 (73088.73)	$104,251.90 (83571.32)	$91,828.55 (68014.27)
Years in USA	31.82 (9.37)	32.62 (10.02)	28.59 (7.29)	27.06 (7.66)	30.36 (8.42)	26.29 (5.82)
Father Prob. of good Eng.	94.19 (23.4)	76.83 (42.2)	40.38 (49.07)	97.38 (16)	88 (32.53)	53.67 (49.88)
Mother Prob. of good Eng.	84.43 (36.27)	92.5 (26.34)	40.22 (49.04)	77.88 (41.53)	97.27 (16.3)	48.47 (49.99)
N	**3493**	**4307**	**8104**	**800**	**550**	**2224**

Source: 2000 U.S. Census. Appropriate Census weights were used in calculation of sample statistics.

Table 2(A): OLS Estimates of the Effects of Intermarriage on the High School Dropout Probability of 16-17-year-old children in non-Asian households

	Dependent = Probability of dropping out of high school					
VARIABLES	Immigrant Mother/Native Father			Immigrant Father/Native Mother		
Intermarriage	**-0.0097****	**0.0019**	**0.0017**	**-0.0036**	**0.0062**	**0.0055**
	(0.0038)	(0.0045)	(0.0055)	(0.0039)	(0.0043)	(0.0047)
Binary Variable for 16-year old	-0.0250***	-0.0266***	-0.0248***	-0.0229***	-0.0254***	-0.0231***
	(0.0038)	(0.0036)	(0.0038)	(0.0037)	(0.0036)	(0.0037)
Male Child	0.0108***	0.0105***	0.0111***	0.0119***	0.0118***	0.0114***
	(0.0038)	(0.0036)	(0.0037)	(0.0037)	(0.0035)	(0.0037)
Mother Yrs. Of Educ.		-0.0015**	-0.0020***		-0.0019***	-0.0017**
		(0.0006)	(0.0007)		(0.0007)	(0.0007)
Father Yrs. Of Educ		-0.0010*	-0.0004		-0.0007	-0.0003
		(0.0005)	(0.0005)		(0.0005)	(0.0006)
Father Employed		-0.0045	0.0023		-0.0028	0.0012
		(0.0061)	(0.0070)		(0.0058)	(0.0068)
Mother Employed		0.0020	0.0032		-0.0019	0.0060
		(0.0068)	(0.0075)		(0.0064)	(0.0073)
log Father Income		-0.0007	-0.0021		-0.0010	-0.0021
		(0.0009)	(0.0019)		(0.0009)	(0.0019)
log Mother Income		-0.0002	-0.0005		0.0001	-0.0009
		(0.0006)	(0.0014)		(0.0005)	(0.0014)
Immigrant Parent Years Of Stay		-0.0004	-0.0001		-0.0007***	-0.0006**
		(0.0002)	(0.0003)		(0.0002)	(0.0003)
Father Good English		0.0013	-0.0013		-0.0052	-0.0072
		(0.0056)	(0.0056)		(0.0052)	(0.0052)
Mother Good English		0.0036	0.0026		0.0109**	0.0105*
		(0.0050)	(0.0052)		(0.0052)	(0.0054)
Prop. of 16-17 natives in high school			-0.0004			0.0013
			(0.0015)			(0.0015)
Metro Prop. Of Imm. From Parent's			-0.0003**			-0.0003*
birthplace			(0.0001)			(0.0002)
Observations	9616	9,616	9,616	10187	10,187	10,187
R-squared	0.0077	0.0224	0.0346	0.0057	0.0223	0.0407
State & Parents' Birthplace Effects	No	No	Yes	No	No	Yes
χ^2 for diff. of coeff. test (by spouse gender)	*2.05*	*0.77*	*0.58*			
p-value	*0.1519*	*0.3788*	*0.4473*			

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations.

Table 2(B): OLS Estimates of the Effects of Intermarriage on the High School Dropout Probability of 16-17-year-old children in Asian households

	Dependent = Probability of dropping out of high school					
VARIABLES	Asian Mother/Native Father			Asian Father/Native Mother		
Intermarriage	**-0.0010**	**0.0006**	**-0.0023**	**0.0202****	**0.0241****	**0.0241***
	(0.0053)	(0.0061)	(0.0066)	(0.0100)	(0.0110)	(0.0126)
Binary Variable for 16-year old	-0.0020	-0.0019	-0.0017	-0.0031	-0.0026	-0.0024
	(0.0045)	(0.0048)	(0.0048)	(0.0057)	(0.0059)	(0.0060)
Male Child	0.0023	0.0013	0.0019	0.0077	0.0073	0.0079
	(0.0045)	(0.0047)	(0.0051)	(0.0056)	(0.0059)	(0.0060)
Mother Yrs. Of Educ.		-0.0010	-0.0009		-0.0012	-0.0011
		(0.0010)	(0.0011)		(0.0010)	(0.0012)
Father Yrs. Of Educ		-0.0011	-0.0009		-0.0012	-0.0012
		(0.0010)	(0.0009)		(0.0011)	(0.0010)
Father Employed		-0.0061	-0.0060		0.0000	-0.0016
		(0.0120)	(0.0120)		(0.0097)	(0.0102)
Mother Employed		-0.0120	-0.0134		0.0044	0.0031
		(0.0107)	(0.0114)		(0.0126)	(0.0132)
log Father Income		-0.0003	-0.0006		-0.0009	-0.0013
		(0.0012)	(0.0012)		(0.0014)	(0.0014)
log Mother Income		0.0004	0.0006		-0.0007	-0.0005
		(0.0010)	(0.0010)		(0.0011)	(0.0012)
Immigrant Parent Yrs. Of Stay		-0.0004	-0.0006		-0.0007	-0.0005
		(0.0004)	(0.0004)		(0.0006)	(0.0006)
Father Good English		-0.0004	-0.0004		-0.0038	-0.0021
		(0.0063)	(0.0069)		(0.0087)	(0.0093)
Mother Good English		0.0081	0.0093		0.0133	0.0126
		(0.0059)	(0.0067)		(0.0084)	(0.0090)
Prop. of 16-17 natives in school			0.0812			0.0433
			(0.0513)			(0.0800)
Metro Prop. Of Imm. From Parent's			-0.1362**			-0.1015
birthplace			(0.0547)			(0.0643)
R-squared	0.0003	0.0128	0.0361	0.0059	0.0175	0.0496
Observations	3022	2884	2884	2772	2639	2639
State & Parents' Birthplace Effects	No	No	Yes	No	No	Yes
χ^2 for diff. of coeff. test (by spouse gender)	*3.98***	*4.10***	*4.60***			
p-value	*0.0498*	*0.043*	*0.0319*			

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations.

Table 3: IV Estimates of the Effects of Intermarriage – First and Second Stage Results

VARIABLES	Dependent = Probability of dropping out of high school			
	Asian Mother/Native Father		Asian Father/Native Mother	
	First	*Second*	*First*	*Second*
Intermarriage	-	**0.0118**	-	**0.0752***
		(0.0309)		(0.045)
Male Child	-0.0025	0.0004	0.0003	0.0042
	(0.0146)	(0.0046)	(0.0146)	(0.0057)
Mother Yrs. Of Educ.	-0.0075**	-0.0010	-0.0009	-0.0009
	(0.0033)	(0.0009)	(0.0029)	(0.0011)
Father Yrs. Of Educ	-0.0063**	-0.0001	-0.0060**	-0.0002
	(0.0031)	(0.0007)	(0.0028)	(0.0010)
log Father Income	-0.0019	-0.0001	-0.0009	-0.0011
	(0.0040)	(0.0009)	(0.0031)	(0.0013)
log Mother Income	-0.0012	-0.0002	-0.0029	-0.0000
	(0.0026)	(0.0009)	(0.0022)	(0.0008)
Immigrant Parent Yrs. Of Stay	0.0000	-0.0004	0.0117***	-0.0012
	(0.0018)	(0.0004)	(0.0018)	(0.0008)
Father Good English	0.3350***	0.0023	0.0162	0.0009
	(0.0240)	(0.0113)	(0.0206)	(0.0103)
Mother Good English	0.0511**	0.0032	0.2527***	-0.0073
	(0.0254)	(0.0061)	(0.0237)	(0.0143)
School Proportion	-0.0077	0.0006	-0.0112**	0.0003
	(0.0060)	(0.0012)	(0.0057)	(0.0016)
Metro Prop. Of Imm.	-0.0051***	0.0002	-0.0020	0.0004
	(0.0018)	(0.0007)	(0.0020)	(0.0007)
Female/Male Wage Ratio	0.1820	-0.0042	-0.2616	0.0093
	(0.1728)	(0.0344)	(0.1969)	(0.0519)
Native Unemployment Rate	0.0097	0.0014	0.0021	0.0009
	(0.0087)	(0.0024)	(0.0073)	(0.0030)
Instruments				
Relative Group Size	-0.0020		-0.0211***	
	(0.0091)		(0.0072)	
Sex Ratio	0.0653***		0.0588***	
	(0.0095)		(0.0113)	
Observations	2,774	2,774	2,333	2,333
R-Squared	0.2338		0.2202	
Angrist-Pischke F test	23.80		22.20	
Kleinbergen-Paap rK LM χ^2	30.29		23.36	
Hansen's J stat		2.499		0.0841
Hansen p-value		0.114		0.772

Robust standard errors in parentheses, clustered at child's state-of-birth, Immigrant parent's birthplace and age-group in 1980. *** p<0.01, ** p<0.05, * p<0.1. Data from the 2000 U.S. Census. Appropriate Census weights used in estimations.

Table 4: Estimates of the Effects of Intermarriage – By Immigrant Parent's Level of Education

	Dependent = HS Dropout Prob.	
	Asian Father	Asian Mother
Immigrant Parent's Education		
< High School	0.1136*	-0.0164
	(0.0627)	(0.0228)
N	468	710
High School Grad	0.0203	0.0022
	(0.0199)	(0.0093)
N	1,086	1,236
College Grad & Over	0.0043	-0.0047
	(0.0126)	(0.0075)
N	1,085	938

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimation.

Table 5: Determinants of Non-Asian Identity for Children of Asian Intermarriages

VARIABLES	Dependent: Non-Asian Identity	
Type of Asian Intermarriage = 1	0.189***	-0.0026
if father immigrant/mother native	(0.0312)	(0.061)
Native Parent Race:		
Father white		0.219***
		(0.047)
Father black		0.197**
		(0.092)
Father Hispanic		0.014
		(0.103)
Mother white		0.451***
		(0.054)
Mother black		0.726***
		(0.078)
Mother Hispanic		0.107
		(0.0997)
Child, Parental & Metro Controls	Yes	Yes
Observations	1,321	1,321
R-squared	0.1904	0.248

Table 6: Effect of Intermarriage on High School Dropout Probability, controlling for Non-Asian Identity

	OLS Results	
	Dependent = HS Dropout	
VARIABLES	Immigrant Mother	Immigrant Father
Asian Intermarriage	-0.0068	-0.0084
	(0.0094)	(0.0071)
Non-Asian Identity	-0.0103	0.012
	(0.008)	(0.018)
Observations	2884	2,639
R-squared	0.0398	0.0503
χ^2 value for diff. in coeff.	0.03	
p-value	0.86	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations. There are no intra-married families in Table 5. Intra-married families are the base-group for regressions in table 6.

Table 7: Effect of Intermarriage on Appropriate-Grade-for-Age for children aged 14-15 years

	Dependent = Wrong Grade for Age			
VARIABLES	Asian Mother	Asian Father	Asian Mother	Asian Father
Asian Intermarriage	-0.0162**	0.0038	-0.0090	0.0095
	(0.0082)	(0.0103)	(0.0098)	(0.0124)
Child Controls	Yes	Yes	Yes	Yes
Parental/Area Controls	No	No	Yes	Yes
Observations	3,424	3,121	3,424	3,121
R-squared	0.0019	0.0006	0.0663	0.0838
χ^2 value for diff. in coeff.	3.00*		1.58	
p-value	0.0835		0.2082	

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations.

Table 8: Effect of Intermarriage on High School Dropout Probabilities – By Asian Sub-Ethnicity

	Dependent = HS Dropout	
Parents' Region of Origin	Asian Father	Asian Mother
East Asia	0.0176	0.0051
	(0.0209)	(0.0113)
N	661	886
Islamic Nations	0.01	-0.0066
	(0.0223)	(0.0206)
N	315	222
Southeast Asia	0.0401*	-0.0049
	(0.0230)	(0.0092)
N	1,179	1,371
Indian Subcontinent	0.0399	0.0027
	(0.0316)	(0.0219)
N	371	322

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations.

Table 9: Effect of Intermarriage on High School Dropout Probabilities – By Race of Native Parent

	Dependent = HS Dropout	
Native Parent Race	Asian Father	Asian Mother
White	0.034**	0.005
	(0.017)	(0.0075)
Asian	-0.019*	0.0019
	(0.011)	(0.0116)
Black or Hispanic	0.0042	0.0004
	(0.0085)	(0.01)

Table 10: Effect of Intermarriage on High School Dropout Probabilities – By Sex of Child

	Asian Mother/Native Father		**Asian Father/Native Mother**	
	Dependent = HS Dropout		Dependent = HS Dropout	
VARIABLES	Daughter	Son	Daughter	Son
Asian Intermarriage	0.0052	-0.0056	0.022	0.0285*
	(0.0102)	(0.0089)	(0.0156)	(0.018)
Observations	1,353	1,531	1,229	1,410
R-squared	0.0793	0.0622	0.0741	0.0939

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All data is from the 2000 U.S. Census. Appropriate Census weights were used in estimations.

Table A1: OLS Estimates of the Effects of Intermarriage on the High School Dropout Probability: Using ACS data

	Asian Immigrant Mother / Native Father							
VARIABLES	ACS 2009 to 2015 combined	2009	2010	2011	2012	2013	2014	2015
Intermarriage	-0.0032	0.0030	-0.0206*	0.0057	-0.0016	0.0040	-0.0019	-0.0134
	(0.0053)	(0.0140)	(0.0118)	(0.0090)	(0.0058)	(0.0146)	(0.0123)	(0.0087)
Observations	5,331	671	775	700	771	765	839	810
R-squared	0.0293	0.0596	0.2970	0.1159	0.0781	0.1133	0.3420	0.0914

	Asian Immigrant Father / Native Mother							
VARIABLES	ACS 2009 to 2015 combined	2009	2010	2011	2012	2013	2014	2015
Intermarriage	0.0023	0.0151	-0.0147	-0.0081	0.0018	-0.0181	0.0022	-0.0023
	(0.0056)	(0.0161)	(0.0148)	(0.0059)	(0.0046)	(0.0114)	(0.0037)	(0.0117)
Observations	5,146	684	752	689	728	721	799	773
R-squared	0.0411	0.1378	0.2630	0.1020	0.1388	0.0790	0.1289	0.1068

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

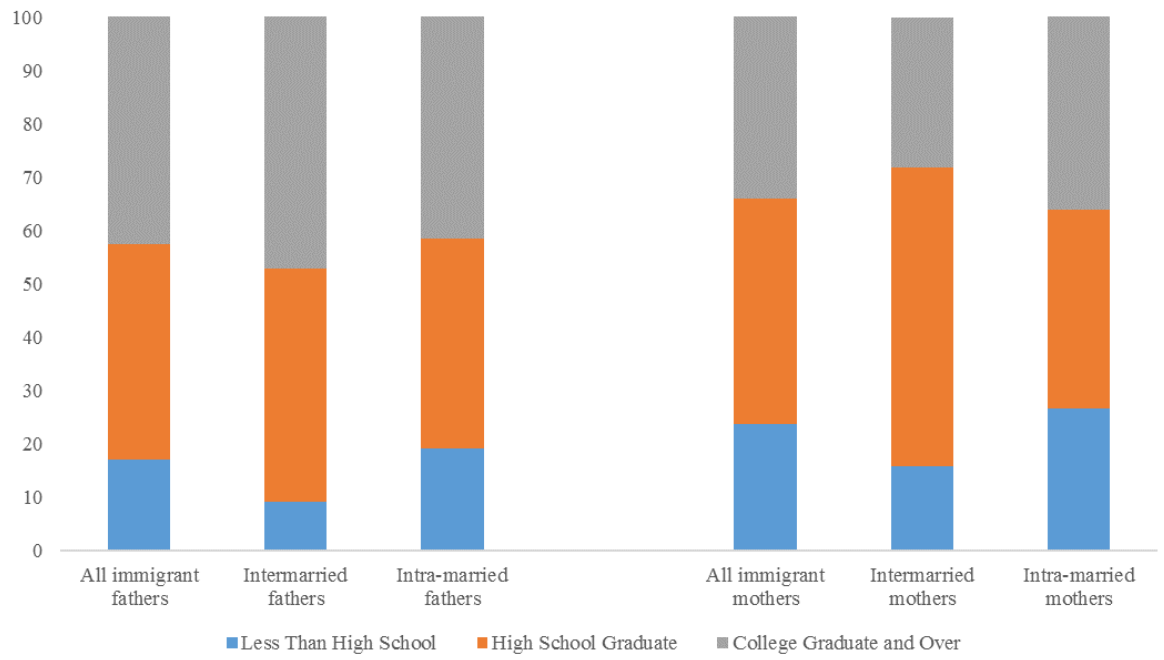
Data is from the 2009-2015 American Community Surveys. Appropriate population weights were used for the annual estimates. The combined estimate is unweighted. All regressions use the same controls as equation (1). Column 1 also includes year fixed effects.

Table A2: Racial Identity Statistics for Teenagers and Adult, differentiated by Type of Marriage of Parents from the CPS

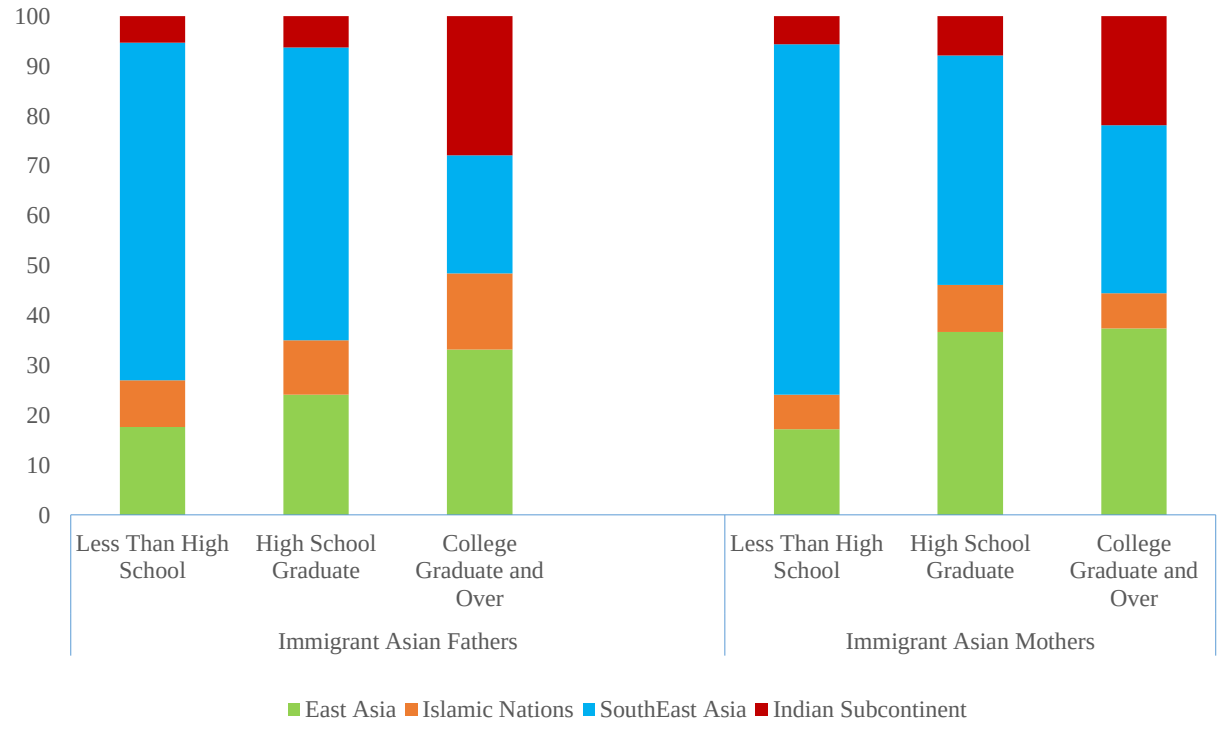
Current Population Survey: Education & Racial Identity			
	Asian Immigrant & Native Spouse		*Intra-married*
	Immigrant Mother	Immigrant Father	Both immigrant
Percentage (Teenager)	21.8	12	66.2
Percentage (Adult)	29.84	15.32	54.84
Race Characteristics			
Teenager: Identifies as Asian	49.08	16.67	83.53
Adult: Identifies as Asian	49.02	40.35	80.8

Source: Combined Current Population Surveys, 2000.

Appendix Figure A1: Education Distribution of Asian Immigrant Parents: By Type of Marriage



Appendix Figure A2: Education Distribution of Asian Immigrant Parents: By Sub-Ethnicity



Source: 2000 U.S. Census.