Gender Identity Norms and Relative Age in the Marriage Market

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March 2019

Preliminary—Please do not cite without contacting the author.

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Abstract

We provide evidence of an "older husband-younger wife" social norm in the marriage market. The penalty for violating the norm is increasing in the wife's relative age, leading to a kink in the distribution of age gaps between husbands and wives. We use a regression kink estimator to describe the distribution of relative marital ages that arises as a consequence of the norm. Three main sets of results emerge. First, we document that the norm appears, to varying degrees, in almost all countries across the world, in historical data, and in new marriages throughout the lifecycle in the United States. Second, in households that violate the norm, we show wives are relatively more educated than their husbands, work more hours, and have fewer children at age 40. As a consequence, the gender gap in labor income is $7000 smaller in households where the wife is one year older than her husband compared to households with equal ages or a slightly older husband. We then embed our estimates in a marriage matching model. Transfers seem to flow from wives to husbands, implying that men experience a relatively larger utility loss due to violating the norm, and are compensated by transfers from their wives.

In the *Treatise on the Family* and other work, Gary Becker proposed that marriage partnerships can be interpreted as the outcome of a matching process in a marriage market (Becker, 1973, 1981). The resulting model allows marriage matching patterns to be used to infer the underlying values, or "shadow prices," the market places on the characteristics of potential spouses and partnerships. The subsequent literature has identified the relative ages of spouses as an important dimension on which partners match (Choo and Siow, 2006; Browning, Chiappori and Weiss, 2014). According to Beckerian theory, the relative age of spouses is interpreted as serving the joint production and joint consumption goals of the household, such as returns to fertility, care-giving, and shared consumption and time together. Search efficiencies may also play a role in explaining spousal age gaps, as in pairings between cohort-mates in school or work (Mansour and McKinnish, 2014).

Recent work argues, however, that gender identity norms may also influence marriage matching patterns and the behavior of households (Akerlof and Kranton, 2000; Bertrand, Kamenica and Pan, 2015). Gender identity norms, as a force distinct from the joint production and joint consumption motives in traditional economic models of marriage, are important because they create a channel through which previous gender norms continue to impact households after the fundamental economic causes of those gender roles have dissipated. This type of hysteresis may have particular importance in explaining women's power in the household. A long literature in economics, sociology, and demography documents the evolution of the household over the course of development from production-based pairings, based on a division of labor that usually assigned women to the household sector, towards consumption-based pairings, based on shared preferences for children, goods, and services. The shift from production- to consumption-based pairings has been accompanied by the rise in female labor force participation, greater control of fertility and its timing, and a resulting blurring of gender roles within the household. If, however, gender norms within households persist from the previous mode of household organization, women may not be able to realize the full benefits of their increased economic power. Put simply, today's gender gaps may reflect norms from an earlier era. And yet, despite the potential explanatory power of this theory, direct empirical evidence on social and gender identity norms is scant, and their importance

remains the subject of debate.[1]

In this paper, we identify a previously unstudied pattern of matches in marriages between men and women, which we argue arises from a gender identity norm. Specifically, we document that the distribution of the relative age of spouses exhibits a distinct kink in the distribution at equality in age—far fewer wives are slightly older than their husband than would be suggested by smooth preferences (see Figure 1). The resulting distribution corresponds to one in which the penalty for violating this norm being an increasing function of the degree to which it is violated. We believe this is sensible, given the demand for homophily and practical difficulty in assessing the exact age of husbands and wives. This kink is not explained by the well-known fact that wives tend to be younger than husbands, which shows up as a shift of the entire age distribution. We argue that none of the traditional economic explanations for marriage market matching patterns can generate this kink. Of particular importance, we find that the kink appears in newly-formed marriages throughout the age distribution, meaning that cohort patterns in schools and careers are unlikely to explain away our findings. After considering alternative explanations, we conclude that departures from a smooth distribution are evidence of another factor in marriage matching, and argue that this is other factor is a social norm.[2] This is the first main insight of this paper.

The second insight of the paper is that we can summarize the bunching created by the social norm using the regression kink estimator (Card et al., 2015*b*)). The regression kink estimator isolates the change in slope of a distribution; it is equivalent to a regression discontinuity estimator applied to the first derivative. To our knowledge, our setting is a novel use of this method, as previous applications have focused on regression kink designs for public policy formulas, such as unemployment insurance benefit schedules (Card et al. (2015*a*) and Landais (2015) and college benefit aid (Guryan (2001), Nielsen, Sørensen and Taber (2010) and Marx and Turner (2018)). We first use the regression kink estimator to describe the kink in the probability a marriage forms at a given age gaps between the husband and wife. The resulting model fit appears as dashed lines in

[1] A growing number of papers correlate gender gaps to measures of social norms without excluding alternative explanations, e.g., Kleven, Landais and Søgaard (2018) and Kleven et al. (2019).

[2] Gallup surveys in 2018 include the question "what is the ideal age for a woman/man to get married?" The mean answer for women is 24.9, while the mean for men is 27.4. This is consistent with a older husband-younger wife norm.

Figure 1. We find that pairings between wives that are one year older than their husbands are about 1.4 percent less likely, or *half*, as likely as would be predicted by smooth preferences.

We next explore the consequences of the social norm for the distribution of gains to marriage, and work and resources within the household. We first use the Choo and Siow (2006) framework to infer how the social norm affects the gains to marriage. We find that marriages which violate the norm by one year generate 2.5 percent smaller gains to marriage. We next fit regression kink models to a variety of outcomes, including the relative education, hours of work, labor force participation, and income of spouses.[3] The kinks in many outcomes are stark and, across all dimensions, we find that older wives "bring more to the table" than their husbands. A wife who is a year older than her husband has 0.13 years of additional education relative to her husband. She also works an additional quarter hour each week. Most strikingly, older wives earn a much larger share of the household income: relative income gaps between husbands and wives fall by over $6000 at the kink, even after accounting for the (small) differences in age and education. While most of the relative income gap reflects wage income, older wives also earn $1000 more non-labor income. When we examine the relative contribution of husbands and wives, we find that most of the differences in labor market outcomes are explained by husbands earning significantly less than would be predicted by a Mincer model that controls for education and potential experience.

Our final set of empirical results examine the relationship between relative age and fertility. We find that households with older wives have lower completed fertility, measured as 0.05 fewer children present for wives between the ages of 38 and 42. The lower levels of children present at later ages masks, however, a shift towards earlier births in households which do not comply with the norm. In other words, the kink in fertility switches sign, with older wives in their 20s having more 0.1 more children in their household. The RK model is data-demanding, so it is challenging to relate these fertility findings to the age-profile of intrahousehold tradeoffs in education and income.

[3] In an Appendix, we show that the kink recovers parameters that are essentially identical to the marginal rate of substitution between marriage characteristics under the model of Chiappori, Oreffice and Quintana-Domeque (2012). In this case, we can interpret partial changes (i.e. conditional on all other characteristics) in the characteristics of the marriage at the kink as reflecting the price of violating the norm.

We conclude with a discussion of interpretation of the results with an eye towards valuing the transfers associated with violating the norm. One possibility is that individuals in marriages which violate the norm are different from those who do not. Households which violate the relative age norm may be more likely to violate other norms, such as those associated with work and careers, or caregiving. For example, lacking the data to estimate effects on time use it is difficult to say whether younger husbands' reduced earnings are a result of increased leisure or some other adjustment. In a standard marriage model, however, we should think of the marginal husband or wife as indifferent between marriages that just violate the norm. Thus, we believe we are on safer ground in interpret pre-marriage characteristics, particularly education, as reflecting transfers. These results suggest the marginal husband in the marriage market experiences a larger utility loss than their wife for violating the social norm, and are compensated by transfers from their wives. It also suggests that men enforce the norm, on the margin. The total value of this compensation likely ranges from $1000 to $4000 per year, depending on assumptions on household behavior.

In an insightful paper criticizing the use of observed marriage matching patterns to infer preferences, Binder and Lam (2018) point out that positive assortative mating can generate patterns which resemble a social norm. The evidence from our setting suggests that the concerns raised in this paper do not alter our primary conclusions.[4] First and most fundamentally, we find massive kinks at equality in age for outcomes which should have only smooth relationships with age under any standard matching model. Put simply, whether the husband or wife is older is salient in the marriage market. Second, we find the kink in new marriages over the entire lifecycle. This narrows the scope of possible explanations, for example, making it unlikely that the kink reflects patterns of promotion in schools, occupational-sorting, or is induced by cohort-based relationships formed on the job. Third, we replicate the kink, in some form, in virtually every census we can find, historical and present-day. This suggests the forces that induce the relative age pattern in marriages transcend changing economic and demographic forces. Finally, Binder and Lam demonstrate the sensitivity of the evidence on the "male-breadwinner norm" to treatment of the mass point at equal

[4]Instead, our analysis suggests that previously-studied social norms, such as in relative height (in Stulp et al. (2013)), may be properly modeled as kinks.

earnings. In contrast, there is no statistically significant excess mass in equal-age marriages, and the estimates are insensitive to our treatment of this slice of the data.

The paper proceeds as follows. We first examine the distribution in relative age, discuss the evidence for the norm, and address alternative explanations. In Section 2, we present a marriage matching model to value the change in gains to marriage associated with the norm and changes in characteristics that are required to equilibrate the market. In Section 3, we discuss the empirical evidence on the model's parameters. Section 4 discusses how the evidence informs the model and whether the norm is disappearing over time. Section 5 concludes.

1 Evidence for the Older-Husband, Younger-Wife Social Norm

We begin by describing the distribution of relative age within marriages using the 2012 to 2016 American Community Survey (Ruggles et al. (2019)). The sample is composed of all married couples in which the wife's age is between 25 and 55; husbands enter the sample between ages 16 and 75, though bandwidth restrictions and weights in the kink model imply that husbands younger than 20 or older than 60 play a negligible role in the analysis. We restrict attention to these age ranges for several reasons. First, the restrictions facilitate analysis of completed education and midlife labor market outcomes. Most individuals have completed schooling by age 25, and most workers are still employed in the labor market their mid 50s. Second, mortality should present a minimal bias at the older ages. Finally, for reasons discussed below, we want to reduce the role of search frictions associated with school and early careers. Our main conclusions are insensitive to these restrictions, but they simplify presentation and discussion.

Our first result and motivation for the rest of the paper appears in Figure 1, which reports the density of relative age of spouses in the United States. The figure exhibits a clear kink at the point that wives and husbands have the same quarter of birth. The black diamonds represent the share of all marriages that fall into the relative age bin, and the dashed red line represents the fit from the regression kink model. To the left of equality, the distribution is relatively flat for wives up to 4

quarters younger than their husband, then falls away in a smooth and concave manner. The slope away from the kink is not the primary subject of study in this paper; previous research suggests that spousal age homophily arises due to a variety of forces, including preferences and search costs (Mansour and McKinnish, 2014). To the right of equality in age, we find a steep drop off in the probability of a marriage partnership. Partnerships in which the wife is one year older than her husband are approximately half as likely to form as partnerships in which the wife is the same age, or up to two years younger than their husband. Put another way, over a third of marriages are between wives who are younger than their husband by less than two years, while less than 15 percent of marriages are between wives who are older than their husband by less than two years. The distribution to the right of the kink appears convex, which suggests an increasing penalty for these marriages.

The magnitude of the kink can be quantified using a regression kink model. Specifically, we define the difference in age, a, between wives w and husbands h as $\tilde{a}_{ij} = a_i^w - a_j^h$, and then compute the density d and run:

$$d(\tilde{a_{ij}}) = b_0 + b_1\tilde{a}_{ij}D[\tilde{a}_{ij} < 0] + b_2\tilde{a}_{ij}D[\tilde{a}_{ij} > 0] + f(\tilde{a}_{ij}) + e_{ij} \tag{1}$$

The controls for second-order terms on either side of the kink appear in $f(\cdot)$. The resulting regression kink estimate is then $b_2 - b_1$.[5] Based on the fitted lines in Figure 1, the regression kink model provides a good approximation to the distribution at the kink.[6]

In Table 2, we report the regression kink results for the change in the slope of the fraction of households which appear to the right of the kink. The estimate in first row is a 1.4 percentage point drop in the probability of a marriage partnership to the right of the kink. Although relative age is measured in quarters, we discuss results in years for ease of interpretation; also, a linear

[5]Estimation relies on the rdrobust package Calonico et al. (2017). We use the conventional regression kink estimator with a triangular weight. We use MSE-optimal bandwidth selector for our RD estimation, this bandwidth selection method is default in rdrobust package.

[6]The results are insensitive to how we treat the zero bin; all results assign it to the left side of the kink. Appendix tables demonstrate that we get nearly identical results when we assign it to the right side or use a dummy to control for its presence.

approximation to the curve fits well over the first 4 quarters on either side of the kink. Off of a base of 3.3 percent, this implies that marriages are about 60 percent as likely to form if the wife is a year older than the husband, as compared to when she is the same age as her prospective partner.

1.1 The Kink Over the Lifecycle and Across Generations

Next, we examine how the kink in marriage probability evolves over the lifecycle. There are several reasons to examine this dimension. For example, an important question is whether the kink in the relative age distribution reflects preferences or marriage market frictions. For example, matching based on cohort patterns in school have the potential to create a spike in the distribution of relative age in marriage that could induce a kink in the distribution of marriages. Asymmetry could result, specifically, from the greater probability that boys are held back in school. Similar cohort effects may occur on the job, for example, if newly employed elementary-school teachers meet and marry. We would expect, however, that these cohorting effects should dissipate over the lifecycle, meaning that the kink would appear in early marriages, but disappear later in the lifecycle. Alternatively, if the distribution in relative age reflects a gender identity norm, we might expect this to appear throughout the lifecycle. A related question is the degree to which the kink reflects fertility concerns which dissipate over the lifecycle.

The analysis we run follows the regression kink model and sample used above. We report results by age group for two samples: the entire population of marriages in which the wife is between ages 25 and 55 (the stock), and then a sample restricted to marriages formed in the last 3 years (a measure of the flow).[7] Table 2 contains the estimates of the kink for new marriages across the lifecycle. While the kink declines in importance over the lifecycle, we can detect the kink in every age group. Specifically, the kink appears in marriages of women in the upper age bins, where fertility rates are very low or near zero. We might expect marriages that form later in life to exhibit less adherence to social norms, since these marriages themselves would have been less common in an earlier era. Were we to extend the sample to older ages, we would find that the kink in relative

[7] Results are noisier but similar when restricting to marriages formed in the last 1 or 2 years.

age can be detected in new marriages even in the 60s and 70s. As a final check, we report the distribution of relative age in marriage for marriages that were formed after the wife turned 25, in Appendix Figure A.1. The kink is present and possibly more pronounced in this group. The fact that marriages throughout the lifecycle exhibit the kink gives us confidence that marriage market frictions do not explain our findings.

1.2 The Kink Across Subgroups: Education and Previously Married

Next, we examine the kink across different subgroups, focusing on educational subgroups, and dividing the population based on whether they are in their second or higher marriage.

First, we examine the kink by education level. On one hand, we might hypothesize that the kink will decline with education if gender-identity norms are most important for less educated individuals. This importance may reflect a reliance on family and social networks for a relatively large share of credit, information, job opportunities, and marriage partners. If this is the case, then marriage partners may be especially sensitive to their perception in the social network, and hence, be more likely to conform to norms. On the other hand, more educated individuals marry and have children later, suggesting their marriage market may give them more time to pair with someone who closely aligns with a range of considerations, including relative-age considerations. We have little evidence on whether adherence to norms is normal, in the price-theoretic sense.

The evidence suggests that kinks are uniformly increasing in education. Kinks are largest for the most educated group of wives, college graduates. Education homophily is quite strong, so the figure would look very similar for husbands' educations.[8] Similarly, the height of the distribution is highest for this group, suggesting a great preference for age homophily. Importantly, the kink appears in all groups.

Next, we examine the kink for first marriages and for marriages in which one or both of the partners is previously married. This is important both because it provides an additional check on

[8]We explored similar kinks in education, but the spike at equality in education is so dominant that it is hard to create the type of compelling visual evidence we have here. We plan to explore this at greater length in the future.

cohorting effects, and divorce is itself a violation of a social norm. We might expect couples who have been divorced to be less concerned about perceptions of adherence to gender-identity norms.

We find that the kink appears in both first and higher-order marriages, but is strongest in first marriages. The diminished kink in higher-order marriages is also consistent with the diminished density at equality in relative age, either due to additional frictions in this market, or a reduced preference for homophily. When we examine the kink by husbands' and wives' second marriages, the kink exhibits distinct patterns. The kink is slightly larger for wives, due to a steeper slope to the *left* of the kink. Our regression kink estimator does not distinguish between this type of distribution and one in which the slope changes due to a steeper fall off to the right of the distribution, as appears in the figure for husbands in their second marriage. It would be interesting to explore this issue further.

2 Theory

2.1 Gains to Marriage

We begin our model within the framework of Choo and Siow (2006). Although this model assumes frictionless matching with transferable utility, the formulas can also be derived from a broader class of models as the market grows large.[9]

Consider a woman who is choosing among potential husbands arranged by relative age, and the option of remaining unmarried. She values the age of her husband for any number of reasons, which we may or may not be able to enumerate. For example, she may prefer a husband who is as close to possible to her age, as they will then have similar tastes in friends, food, music, and similar timing of retirements and needs in old age; we refer to these as consumption preferences, in a loose sense. She may also prefer slightly older men, since the biological timing of her fecundity

[9]From Fox (2018): "Menzel (2015) studies marriage and shows that a class of semiparametric nontransferable utility matching models (not considered here) converge, as the market grows large, to a parametric matching model with matching formulas quite similar to the matching formulas in the logit transferable utility marriage matching model with a continuum of agents in Choo and Siow (2006))."

will occur before the desired fertility of men of her age. By marrying a slightly older man, he will have reached a higher level in the life-cycle earnings profile when their children are born. We call these fertility preferences.

In this model, women of type j marry men of type i, which generates utility from a ij systematic gain to marriage that can include an ij transfer and an individual-specific idiosyncratic gain to an ij marriage that follows the type I extreme value distribution. Remaining unmarried gives a similar systematic and idiosyncratic return without the possibility of a transfer. Following the discussion in Choo-Siow's paper, this gives rise to the marriage matching function: where μ_{ij} is the total number of marriages between women of age i and men of age j. As this is a discrete choice model, the value of the marriage is relative to a base state, which is remaining unmarried, reflected by i or j set to zero. The log of the matching function, $ln(\Pi_{ij}) = \pi_{ij}$ represents the total systematic gain to marriage per partner relative to remaining unmarried.

A convenient feature of this model is that we can run regressions of the form:

$$\pi_{ij} = X'_{ij}\beta + e_{ij}.$$

In particular, we can fit regression kink models (such as Equation 1) to describe the change in utility associated with violating the social norm. The model flexibly controls for other considerations in marriage, such as fertility, under the assumption that these other considerations are continuously differentiable (C_1) in the relative age in marriage.

2.2 The Price of Violating the Norm

To estimate the price of violating the norm and explore associated intrahousehold transfers we modify the framework of Chiappori, Oreffice and Quintana-Domeque (2012). We primarily focus on the estimation of the marginal rate of substitution between characteristics in the marriage market. We first review the model and relevant assumptions, before proceeding to the modifications in our setting.

Each woman j of age a_j^w is characterized by a vector $(a_j^w, X_j, \varepsilon_j)$, where X_j are her observable characteristics and ε_j are her unobservable attributes that affect her value on the marriage market. Each man i of age a_i^m is similarly characterized by a vector (a_i^m, Y_i, η_i). We do not restrict the matching technology or transferability of utility between the partners. To capture the social norm, we modify the traditional model to allow the value of marriage partners to depend on $\tilde{a} = a^w - a^h$, the relative age between the wife and husband.

We require two assumptions. First, we require a form of separability: the marital attractiveness of each potential spouse within the neighborhood of a given $\tilde{a}$ can be summarized by a one-dimensional indices, $I_j = I(\tilde{a}_j, Y^1, Y^2, ..., Y^N)$ for women's value of a potential husband with observable characteristics Y_i. Similarly, we define $J_i = J(\tilde{a}_i, X^1, X^2, ..., X^N)$ for men's value of a potential wife's observable characteristics.[10] Effectively, this assumption implies that potential spouses of the same age (near the kink) share a similar set of preferences. We additionally assume separability allows us to decompose utility of a prospective partnership as the regular index and a gender identity norm, as $I(\tilde{a}, Y^h) + s^w(\tilde{a})$. Based on our descriptive findings, we model s as a kinked function,

$$s^w(\tilde{a}) = \begin{cases} f^w(\tilde{a}) & \text{if } \tilde{a} > 0 \\ 0 & \text{else} \end{cases}$$

which makes no contribution to utility below equality in age, but then turns on when the wife's age exceeds the husband's age. It is possible spouses values relative age in ways that are not captured by this function, but we assume these can be expressed by the traditional value component, and hence, can be separated from the social norm. Similarly,

$$s^h(\tilde{a}) = \begin{cases} f^h(\tilde{a}) & \text{if } \tilde{a} > 0 \\ 0 & \text{else} \end{cases}$$

[10] This is, of course, a strong assumption that is only somewhat mitigated by the fact that we have made no restrictions on the nature of the index. For example, the index could include non-monotonicities and non-linearities. Note, as well, that this index is identified up to some transform. Chiappori, Oreffice and Quintana-Domeque (2012) begin with the assumption where a single index governs all marriages, which would be the case if all women (men) shared the same preferences for men (women). The assumption of shared preferences may be more palatable in our setting, as we are only concerned with the neighborhood around equality in spouse age.

so husbands have a similar function which describes the change in marriage value of a wife who is older than them.

The second assumption we require is conditional independence between the indices and the unobservable vectors, which must be atomless. Effectively, this says that we permit unobservables in the model so long as they are well-proxied by the index. In the general case, this imposes that two individuals who have the same value of the index should have unobservables drawn from the same distribution. To illustrate the implications for our setting, consider a woman i who is indifferent between two potential spouses, one just older and one just younger than herself (precisely, as we take the limit as their age approaches equality). If there is some loss from violating the social norm, then the younger husband must have some characteristics that increase the value of the index and compensate her for the utility loss from the norm. We are assuming, in particular, that this compensation is not kinked in unobservable characteristics. This assumption may not be innocuous in our setting, and we return to it in the empirical work.

We can use these assumptions to define iso-attractiveness profiles (following the discussion in Chiappori, Oreffice and Quintana-Domeque (2012)) where the attractiveness for men is given by $I_j(Y_i^1,...,Y_i^K) = C$, and similarly for women, $J_i(X_j^1,...,X_j^K) = C'$. If the indexes are differentiable, then the marginal rate of substitution between characteristics for man i can be given by

$$MRS_i^{r,s} = \frac{\partial I/\partial Y_i^s}{\partial I/\partial Y_i^r}.$$

Given that our empirical work relies on the regression kink estimator, this interpretation is particularly attractive. We can estimate this MRS by regressing the characteristics of male i on i's wife's characteristics, and taking the ratio of the coefficients of interest. In our application, characteristic s is the social norm (given by the formulas, above), and r will be the other characteristics used to value it. Using the regression kink model, this will return the same coeffiecient as the kink in outcomes at equality in age. We show the empirical equivalence between the RK estimate and the Chiappori, Oreffice and Quintana-Domeque (2012) MRS in the Appendix.

3 Main Results

Intuitively, fewer marriages with a given characteristic implies that a marriage market assigns less systematic value to these matches. Following the discussion in the model section, we can infer the relative gains to marriage, π_{ij}, from the frequency of marriages between a husband of age i and a wife of age j, relative to the geometric average of unmarried men and women of those ages. Then, the penalty associated with the social norm can be estimated using:

$$\pi_{ij} = \beta_0 + \beta_1 \tilde{a}_{ij} D[\tilde{a}_{ij} < 0] + \beta_2 \tilde{a}_{ij} D[\tilde{a}_{ij} > 0] + g(\tilde{a}_{ij}) + \varepsilon_{ij},$$

where our regression kink estimate is now $\beta_2 - \beta_1$. As the Choo-Siow model describes the stock of marriages, we report the gain from marriage results for this sample.

Figure 2 reports the graphical results for the gains to marriage. Perhaps unsurprisingly, the distribution of gains to marriage closely resembles the fraction of marriages, as the normalization does not have a strong correlation with relative age. Table 3 reports the results for the pooled sample and broken apart by ages. In the first column, we report that gains to marriage fall by 2.5 percent of the 5.3 percent increase (relative to remaining unmarried) for couples with the wife one year younger than the husband. In the remaining columns of row 1, the kink in gains to marriage rises over the lifecycle from 1.4 percent in ages 25 to 29 to close to 3 percent in the late 30s, with small diminishment after that. Most of the movement over the lifecycle is due to changes in the average gain to marriage; we would not be able to reject that half of gains are lost to the norm. Put another way, the kink does not appear to be disappearing in younger cohorts, nor is it driven by a narrow set of cohorts.

3.1 The Distribution of Characteristics Between and Within Households

We next examine the relationship of the relative age kink with education and income. The figures present both the raw distributions of characteristics and on relative spousal characteristics. Relative characteristics may reflect transfers in the marriage market, and hence, are of considerable interest.

Figure 3 plots the distribution of education in relation to the relative age of spouses. In panel a, we can see that education increases as spouses' ages grow closer together. The age-homophily pattern is distinct from our interest in the norm, but it appears throughout the figures and demonstrates that there is strong sorting associated with relative age. In terms of the marriage market model, husbands and wives value spouses who are closer in age, and must have higher levels of education in order to marry someone who is closer in age to themselves. A regression kink model is fit to the data and provides a good prediction of the data around the kink. The different in education between husbands and wives is depicted in panel b, and the kink is striking. Wives are more educated than their husbands across all of the relative ages we depict. This relationship kinks upwards at equality in age. The regression kink model is again a good fit for the data.

The magnitude of these results is quantified in Table 4 by the regression kink model. Both husbands' and wives' educations kink downwards by almost half of a year of schooling at equality in age. This is consistent with what we found gains from marriage, namely, the value of a marriage falls when the wife is older than the husband. In other words, desirable spousal characteristics are associated with more desirable matches, while less desirable matches reflect idiosyncratic sources of returns. With the large sample sizes and sharp patterns, the null of no kink can be rejected with a high degree of confidence. The results are largely unchanged when we control for a cubic in age.

The difference in education is informative about the distribution of marital gains as a function of the norm. Wives who are a year older than their husband have 0.08 additional years of education in our model without controls, and the difference grows to 0.13 when we include the cubic in age. These results imply that wives must bring *relatively* more of a desirable characteristic in order to violate the norm. As education is largely a fixed characteristics in our sample, we view this as strong evidence of compensation which flows from the wife to the husband at the time of marriage. If we assume a 7 percent return to schooling, these results imply that wives must have 1 percent more labor market earning potential to compensate their husband for violating the norm by one year.

In panels c and d of Figure 3 we can see the analogous kink for total personal income. The

patterns are similar to the education pattern, with a large kink apparent at the equality in age. The differences between the two are also interesting. Although wives grow relatively more educated as they approach their husbands' age from below, household income gaps grow. Thus, household specialization appears to be increasing as the wife's age approaches the husbands. The kink in household income, which is implied by the sum of the husband and wife's incomes, is massive, at over $13,000.

Referring to Table 4, we again use the regression kink model to assess the size of the kinks. To distinguish the effects of education from income, we add a further column which includes the Mincer controls, education and a cubic in potential experience. We find that wives' income falls by just over $3000 at the kink; however, accounting for education and experience reduces this to $500. Husbands show larger effects, with their income falling by $10,000 at the kink, a value which is much less diminished by controls. In net, the gender gap in household income falls by over $7700 when the wife is a year older than her husband, relative to what would be predicted by a smooth distribution around equality in relative age. This is much larger than would be predicted by the differences in education, suggesting that labor market behavior explains an important share of the outcome in income. We return to this issue in the next subsection.

Together, these figures demonstrate that relative age—in particular, an aversion to pairing younger men with older women—plays an important role in determining who marries whom. Household matching patterns show a strong pattern of sorting that pairs more educated and higher-income spouses with one another. Wives who are older than their husbands must bring more to the table, in that they have higher levels of desirable characteristics in the marriage market. Crucially, these effects appear over a very narrow range of the data, greatly limiting the scope for explanations such as "men prefer younger women."

3.2 Labor Market Outcomes

In Figure 4 and Table 5, we depict how the kink affects three different labor market outcomes. First, in panels a and b, we show wage and salary income. The patterns follow the patterns in

total personal income, above. It appears that around 10 percent of the relative difference in total personal income comes from sources aside from labor market earnings.

In panels c and d, we show weekly working hours. The kink in hours of work is nearly as stark as the kink in income. On their own, both husbands and wives exhibit sharp changes in hours of work around the kink, with women working more and men working less. Together, the wife works around a half hour per week more relative to her husband if she is a year older than him. In panels e and f, we depict the same result for labor force participation. The result is much less pronounced, but the table reveals that the (visually) small kink is quite stronger, with a 0.5 percent decrease in the labor force participation gap. Along all the labor market dimensions, older wives work more and earn more money than would be predicted by smooth distributions.

3.3 Fertility Outcomes

In Figure 5, we depict fertility outcomes. We focus on households where the wife is age 38 to 42, to get close to completed fertility; this is before most kids leave the house, but near the age that fertility begins to fall to very low levels. In panels a and b we show that households who violate the norm have fewer children present at age 42. A household in which the wife is a year older has 0.06 fewer children present, on average. When we account for pre-determined observables, such as age, education and experience, these effects remain similar. In the final column we add a control for income, to check whether these results are a secondary consequence of labor market effects of the norm. They are not.

The reduction in fertility in completed fertility masks a more complicated story in the timing of fertility. Figure 6 depicts the fertility kink by the age of the wife. Households in their mid-20s which violate the norm actually have 0.15 more children present when the wife is one year older. It appears that households with slightly older wives tend to have children earlier, with an increased probability of births in the 20s eventually declining and becoming negative, such that completed fertility ends up lower. We know from studies of birth control access and other findings, that when women are given more control of their fertility, they tend to prefer later births with little or no

change in completed fertility Miller (2009); Ananat and Hungerman (2012). The findings on the norm thus agree with the labor market findings: women appear to give something up when they marry a slightly younger man.

4 Discussion

4.1 Interpreting the Results

How large are the transfers between wives and husbands? This is a difficult question to address, particularly without large-scale panel data. We would especially like to know if income differences reflect pre-determined differences or endogenous labor supply responses to the marriage partnership, shifts in household work, or changes in leisure-taking. In addition, we do not know whether differences in household incomes reflect equilibrium forces associated with homogenous marriage market values, or sorting based on these heterogeneous preferences especially regarding women's work. On one hand, the evidence on the gains to marriage shows that these households are less likely to form, implying that society-wide preferences dictate that these marriage are less valuable. On the other, we have found some evidence that these households are different in ways that would be consistent with sorting on preferences. One piece of evidence comes from kinks in height associated with the kink in relative age—households with slightly older wives are more equal in height. The height kink is robust to our main controls from above, suggesting that this non-economic, but potentially socially-relevant, characteristic responds. Other health-related outcomes, such as BMI, the likelihood of reporting good health, depression, and alcohol consumption show kinks, but the differences between husbands and wives disappear when we condition on age and education (see Appendix Table A.5.

We can calibrate the value of the compensation required to violate the norm under several scenarios. The evidence suggests the compensation flows from women to men. Wives have 0.13 years of additional education relative to their husbands; with a 7 percent return to education, this equates to an additional 1 percent in the households' full income. Assuming an equal sharing

rule, this implies that husbands receive 0.5 percent increase in resources for each year the norm is violated.[11] Given a mean income of $110,000, this implies a transfer of $550 per year.

While the education-based differences are not small, they dwarfed by the changes in total and labor market income. Women earn $7700 more in relative income in households where they are one year older than their husbands, even conditional on education. If we applied our equal sharing rule, men would receive $3850 of additional resources in households where their wife is one year older than them. This value is large, equating to 3.5 percent of household income. Even if changes in time use are purely on the non-labor income component, they are close to 0.5 percent of household income. It is also worth noting that the case in which changes in income are explained by changes in home production implies that households are organized in very different ways on either side of equality in age; this would be compelling evidence for the salience of the norm, even if it implied smaller intrahousehold transfers.

We conclude that the value of labor-market-related compensation husbands receive for marrying a wife who is one year older than them is likely between 1 and 3.5 percent of household income, or $1100 to $3850 in the average household. Transfers may be larger than these if they occur on other margins, such as time use in the household; previous research suggests that such transfers follows the labor market transfers Bertrand, Kamenica and Pan (2015). Of course, education may be valued in a spouse for reasons beyond its ability to generate labor market earnings. We also do not attempt to value the changes in fertility. In sum, we consider the labor market-based compensation to be likely lower bounds on total compensation.

5 Is the Norm Going Away?

We began by discussing the possibility that norms create hysteresis, constraining women's choices even after the original causes of gender roles have changed. One hypothesis is that social norms may be most important in "village economies," in which informal institutions provide insurance

[11] An equal sharing rule is likely a lower bound, as much of household consumption is shared.

and social support. In such settings, we expect other people's opinion of oneself to be quite important, since reputation is valuable for many reasons. Their is little evidence on the evolution of gender identity norms over time—economic and social forces have led to breakdowns in traditional roles, but it is less clear how to separate the supply (opportunity) and demand (costs) forces in these violations (Goldin, 2014).

To shed some light on this issue, we examine how the kink appears in other countries, and how it has evolved in the United States. Figure 7 reports the relative age distribution in four other countries. The kink appears, to some degree, in all of them. It also appears that the kink is larger in countries with more marriages concentrated around equality in age.

We can also look back in time, at the 1900 U.S. Census.[12] We find that the kink has existed for some time, but appears to be larger in the more recent Census.

Taken together, there is little evidence that the norm is dissipating over the course of development.

6 Preliminary Conclusions

We have several findings. First, the total marital surplus falls when the wife is older than her husband. Second, we document the adjustment of a number of observable characteristics of spouses. Since older wives are more educated and earn more money than just-younger wives, these transfers appear to flow from the wife to the husband. Depending on our assumptions, we value the labor market transfers at between 1 and 3.5 percent of household income. These figures do not include changes on other margins, particularly fertility.

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[12] In on-going work, we are extending this to examine the evolution across all available U.S. Censuses.

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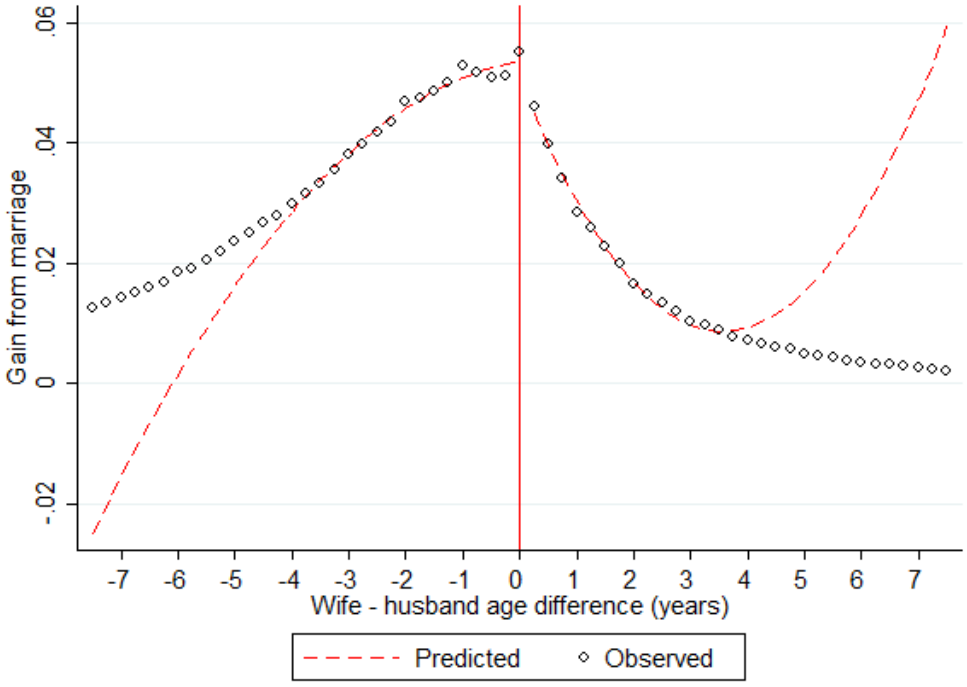
Figure 1: Fraction of Couples, 2012-2016 American Community Survey

Notes: The figure illustrates the fraction of couples in each age-difference bin. Age difference is defined as wife minus husband's age, measured in quarters. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples. The dashed line is a quadratic fit estimated in the regression kink model. We assign zero to left side of cut-off point.

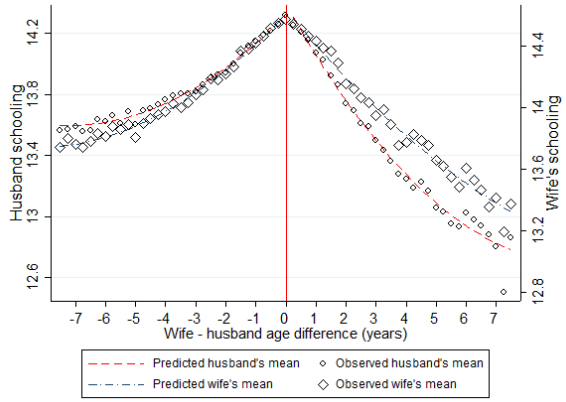
Figure 2: Gain from Marriage, 2012-2016 American Community Survey



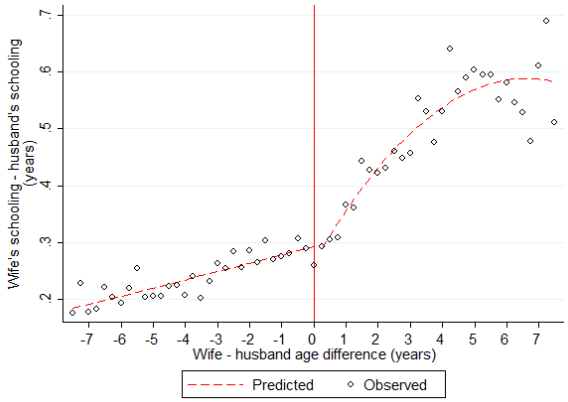
Notes: The figure illustrates the gain from marriage in each age-difference bin. Age difference is defined as wife minus husband's age, measured in quarters. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples. We calculate gain from marriage in each age cell, then estimate a regression kink model on age difference. The dashed line is a quadratic fit estimated in the regression kink model.

Figure 3: Schooling and Personal Total Income Around Age Kink

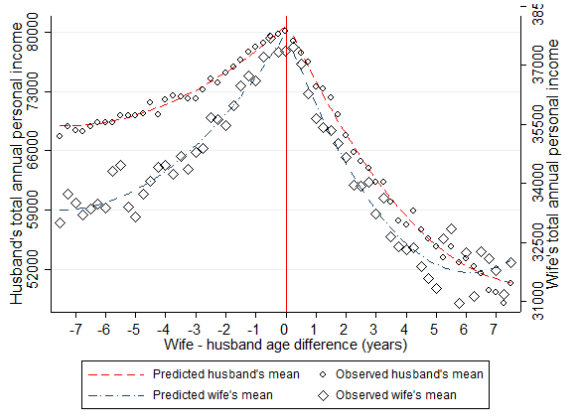
(a) Wife and husband schooling



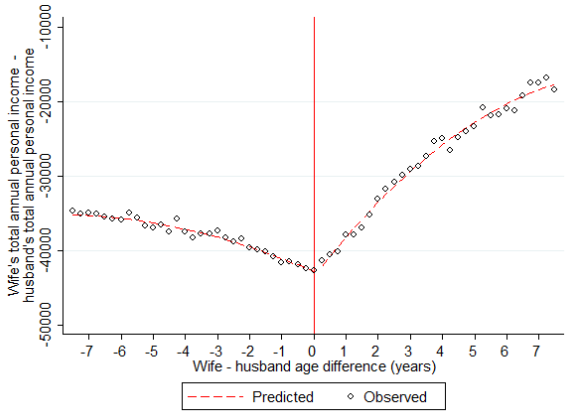
(b) Wife's schooling - husband's schooling



(c) Wife and husband total personal annual income



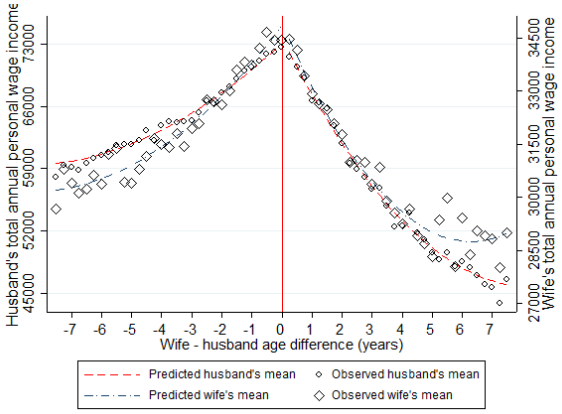
(d) Wife's total annual income - husband's total annual income



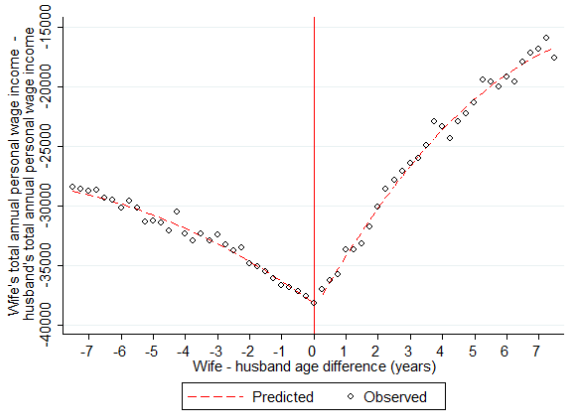
Notes: The figure illustrates schooling and total personal annual income for wife, husband and the difference between wife and husband. The total annual income is adjusted to 2016 value. The dashed line is a quadratic fit estimated in the regression kink model.

Figure 4: Labor Market Outcomes Around Age Kink

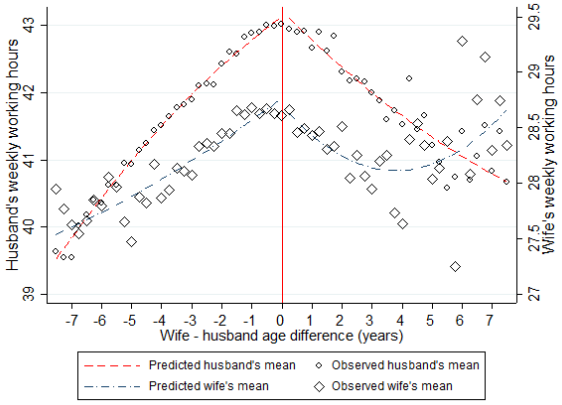
(a) Wife and husband annual wage income



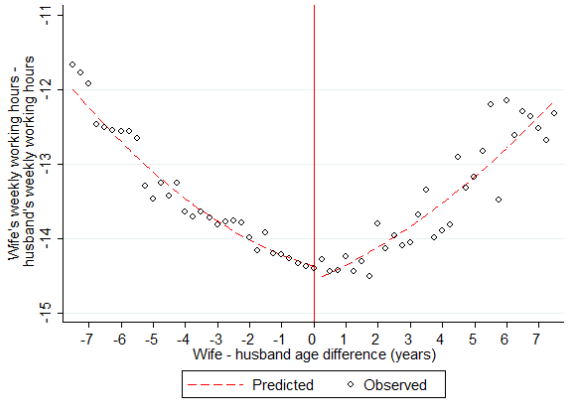
(b) Wife's annual wage income - husband's annual wage income



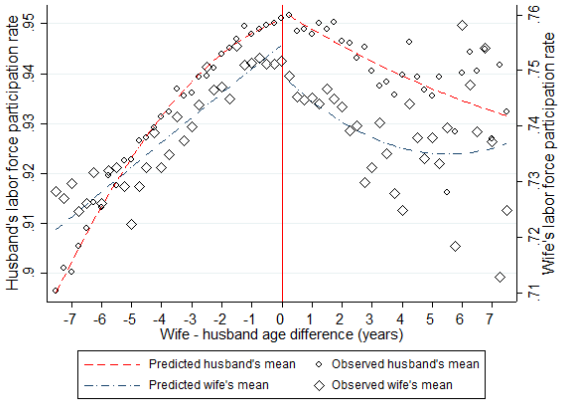
(c) Wife and husband weekly working hours



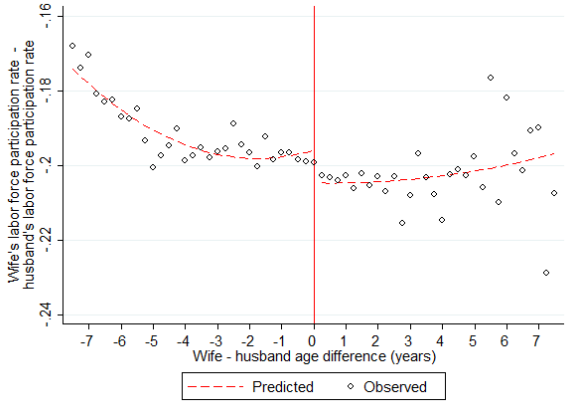
(d) Wife's weekly working hours - husband's weekly working hours



(e) Labor force participation rate for wife and husband



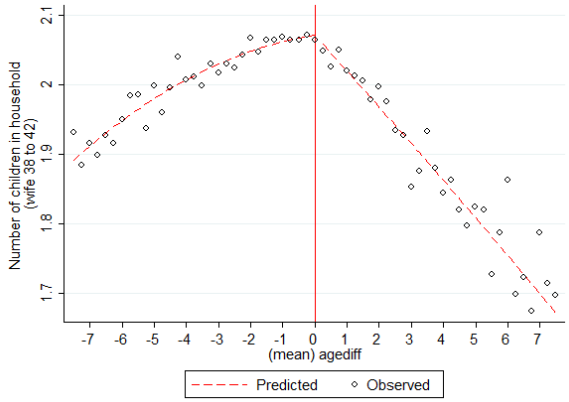
(f) Wife's labor force participation - husband's labor force participation



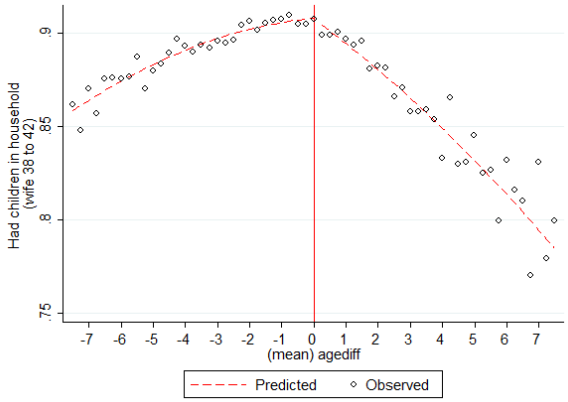
Notes: The figure illustrates annual wage income, weekly working hours and labor force participation rate for wife, husband and the difference between wife and husband. The total annual wage income is adjusted to 2016 value. The dashed line is a quadratic fit estimated in the regression kink model.

Figure 5: Fertility Outcomes Around Age Kink

(a) Average number of children (wife from 38 to 42)

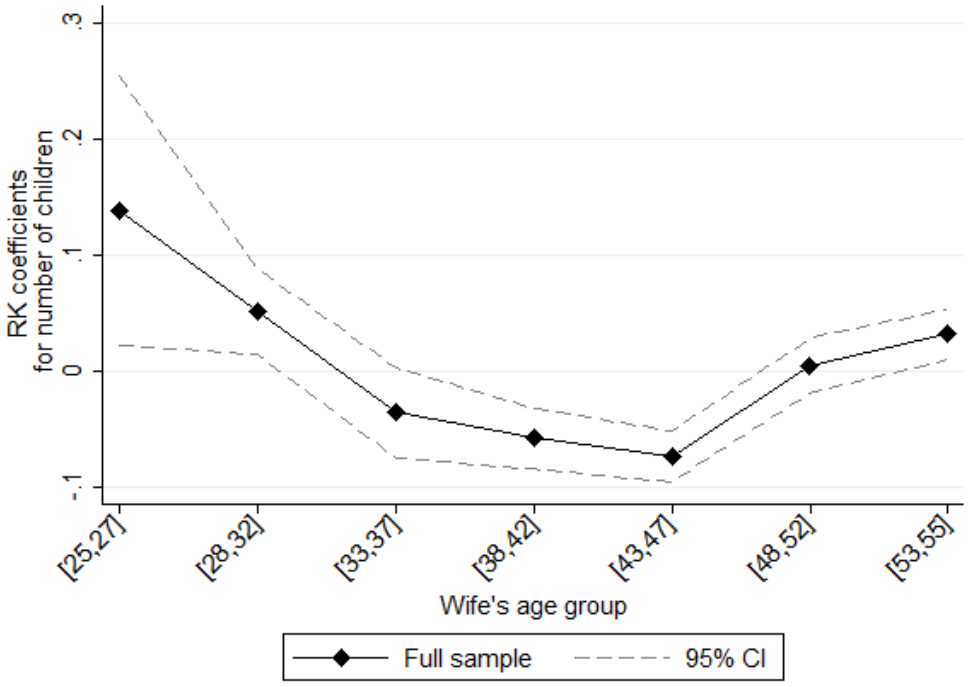


(b) Had child in household (wife from 38 to 42)



Notes: The figure reports households fertility decisions for couples with wives age from 38 to 42. The red dashed line is quadratic fit estimated using regression kink model.

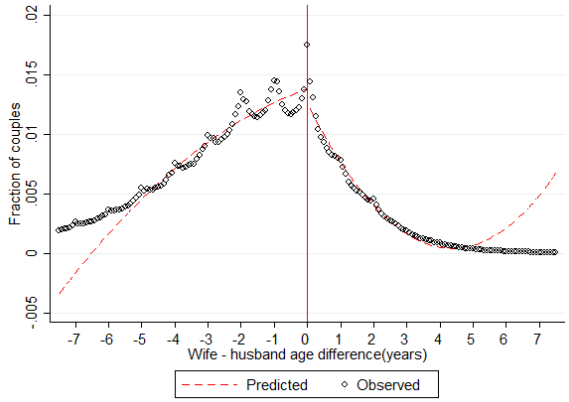
Figure 6: RK Estimates for Number of Children, by Wife's Age Group



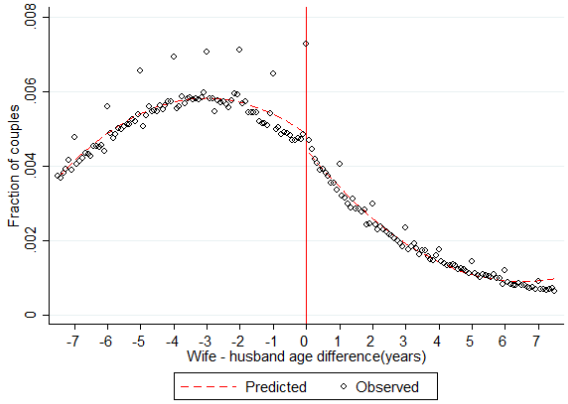
Notes: The figure illustrates regression kink estimates of number of children in household by wife's age group. The dashed line is 95% CI.

Figure 7: Fraction of Couples, International Comparisons

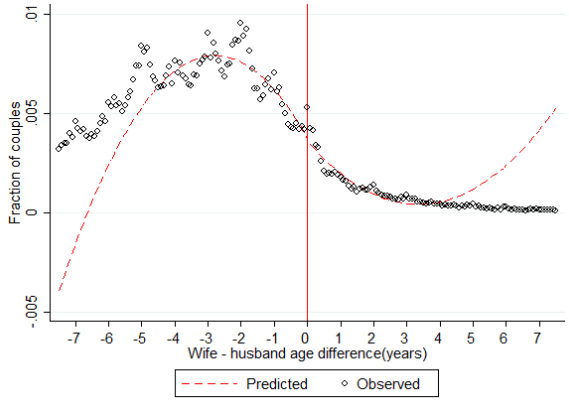
(a) China, 2000



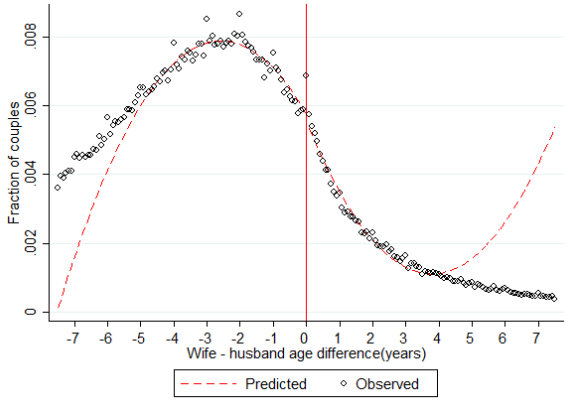
(b) Colombia, 2005



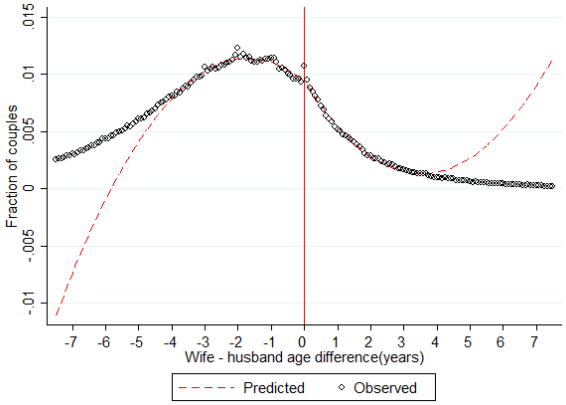
(c) Indonesia, 2005



(d) South Africa, 2011

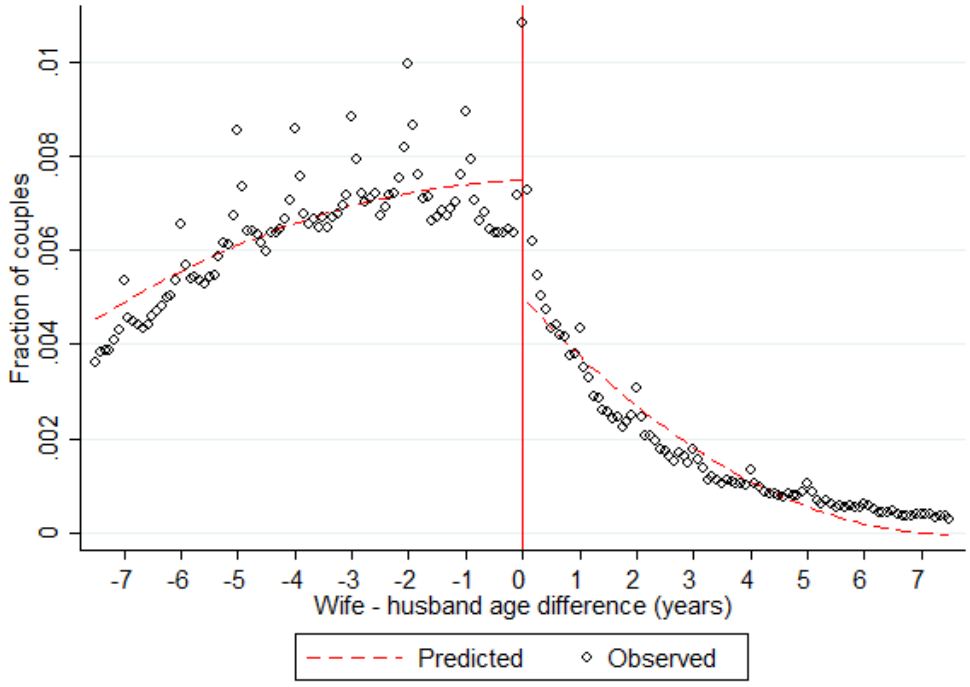


(e) Spain, 2011



Notes: The figure reports fraction of couples by age difference bin across countries. Age difference is defined as wife minus husband's age, measured in months. Our sample consists of 2,667,373 couples from China, 613,063 couples from Colombia, 218,677 couples from Indonesia, 464,596 couples from South Africa and 768,850 couples from Spain. The dashed line is a quadratic fit estimated in the regression kink model.

Figure 8: Fraction of Couples, U.S 1900



Notes: The figure reports fraction of couples by age difference bin for U.S in 1900. Our sample consists of 637,534 couples. The age difference is defined to be wife's age minus husband's age, measured in months. The dashed line is a quadratic fit estimated in the regression kink model.

Table 1: Summary Statistics

	Wife		Husband	
	Mean	SD	Mean	SD
Age	42.12	8.51	44.78	9.65
Schooling	14.07	3.055	13.83	3.18
Labor force participation	0.74	0.44	0.92	0.28
Weekly working hours	37.12	11.75	44.52	10.92
Total personal annual income	36014.74	48198.22	74538.52	82945.11
Total personal annual wage income	32800.79	45299.75	65427.55	76191.31
Sample size	1,735,066		1,735,066	

Notes: The table report average and standard deviation of demographic characteristics for wife and husband. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples.

Table 2: RK Estimates for Fraction of Couples by Wife's Age

	Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
				Panel A: All Marriages			
RK estimates	-1.4***	-2.2***	-2.0***	-1.6***	-1.4***	-1.2***	-1.2***
	(.20)	(.39)	(.49)	(.28)	(.20)	(.16)	(.20)
Avg. for wife 1 year younger	3.3	4.1	3.6	3.3	3.1	3.1	3.1
				Panel B: New Marriages			
RK estimates	-1.7***	-2.7***	-1.9***	-0.96***	-0.68***	-0.60***	-0.62***
	(.24)	(.49)	(.34)	(.17)	(.090)	(.087)	(.088)
Avg. for wife 1 year younger	3.0	4.0	3.1	1.9	2.1	2.0	2.1
Marriage hazard for women	0.051	0.093	0.071	0.049	0.039	0.032	0.023
Marriage hazard for men	0.060	0.087	0.092	0.068	0.048	0.036	0.030
Share married: women (%)	58.9	38.0	56.2	62.8	64.5	64.3	63.5
Share married: men (%)	58.0	29.5	51.5	62.2	65.9	66.4	66.5

$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Notes: This table reports regression kink estimates for fraction of couples on age difference between wife and husband. The sample consists of 1,735,066 couples in United States from 2012 to 2016. We define newly marriages to be couples married within last 3 years before survey. The share of the married men and women rows report share of married men and women in ACS 2012 to 2016 population which consists of individual's age between 25 and 55 and in each age group. The marriage hazards are calculated using couples newly married in the last year between 26 to 55 (so last year age from 25 to 54). We take husband and wife in each age divided by the number of unmarried men and women respectively of each age, then we calculate the average hazard in the age group. All coefficients are multiplied by 100. Standard errors are reported in parentheses.

Table 3: RK Estimates for Gain from Marriage by Wife's Age

	Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
RK estimates	-2.5***	-1.4***	-2.6***	-3.0***	-2.9***	-2.7***	-2.4***
	(.15)	(.30)	(.30)	(.24)	(.19)	(.16)	(.15)
Avg. for wife 1 year younger	5.3	2.5	4.8	6.0	6.2	6.0	6.1
Share married: women (%)	58.9	38.0	56.2	62.8	64.5	64.3	63.5
Share married: men (%)	58.0	29.5	51.5	62.2	65.9	66.4	66.5

$*p < 0.10, **p < 0.05, ***p < 0.01$

Notes: This table reports conventional regression kink estimates for gain from marriage on age difference between wife and husband.The sample consists of 1,735,066 couples in United States from 2012 to 2016. The share of married men and women rows report share of married men and women in ACS 2012 to 2016 population which consists of individual's age between 25 and 55 and in each age group. Standard errors are reported in parentheses.

Table 4: RK Estimates for Schooling and Total Annual Wage Income

	Sample	Raw	Age cubic	Mincer
Schooling	Wife	-0.45***	-0.43***	
		(.020)	(.021)	
	Husband	-0.55***	-0.46***	
		(.034)	(.029)	
Difference	Household	0.082***	0.13***	
		(.0098)	(.022)	
Total personal annual income	Wife	-3174.73***	-2853.15***	-558.77**
		(293.34)	(308.93)	(278.46)
	Husband	-10857.1***	-9793.7***	-7396.51***
		(877.45)	(556.65)	(512.51)
Difference	Household	7435.61***	7548.84***	7702.85***
		(447.34)	(468.93)	(434.59)

$*p < 0.10, **p < 0.05, ***p < 0.01$

Notes: The table reports conventional regression kink estimates of schooling and total personal annual income for wife, husband and difference between wife and husband. The age cubic column reports estimates controlling a cubic in age for husband and wife separately. For difference outcomes, we control for a cubic in wife's age. The Mincer column reports estimates controlling a quadratic in potential experience and schooling for wife and husband separately. For the Mincerian difference outcomes, we control a quadratic in potential experience for both wife and husband, and wife's schooling.

Table 5: RK Estimates for Labor Market Outcomes

	Sample	Raw	Age cubic	Mincer
Total personal annual wage income	Wife	-3092.4***	-2773.64***	-493.94**
		(255.12)	(272.09)	(222.30)
	Husband	-9928.25***	-9060.91***	-6727.66***
		(845.38)	(515.21)	(478.97)
Difference	Household	6645.58***	6784.89***	6964.13***
		(440.43)	(439.73)	(404.50)
Weekly working hours	Wife	-.51***	-.36***	.28**
		(.081)	(.13)	(.12)
	Husband	-.77***	-.51***	-.35***
		(.061)	(.11)	(.10)
Difference	Household	.31***	0.19	.50***
		(.11)	(.14)	(.16)
Labor force participation	Wife	-0.0095***	0.00084	0.0058
		(.0019)	(.0039)	(.0040)
	Husband	-0.0057***	-0.0012	-0.0029*
		(.0011)	(.0019)	(.0017)
Difference	Household	-0.0028	0.0015	0.0045
		(.0019)	(.0038)	(.0039)

$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Notes: The table reports conventional regression kink estimates of labor force participation, total annual wage income and weekly working hours for wife, husband and difference between wife and husband. The age cubic column reports estimates controlling a cubic in age for husband and wife separately. For difference outcomes, we control for a cubic in wife's age. The Mincer column reports estimates controlling a quadratic in potential experience and schooling for wife and husband separately. For the Mincerian difference outcomes, we control a quadratic in potential experience for both wife and husband, and wife's schooling.

Table 6: RK Estimates for Fertility Outcomes (Wife Age 38 to 42)

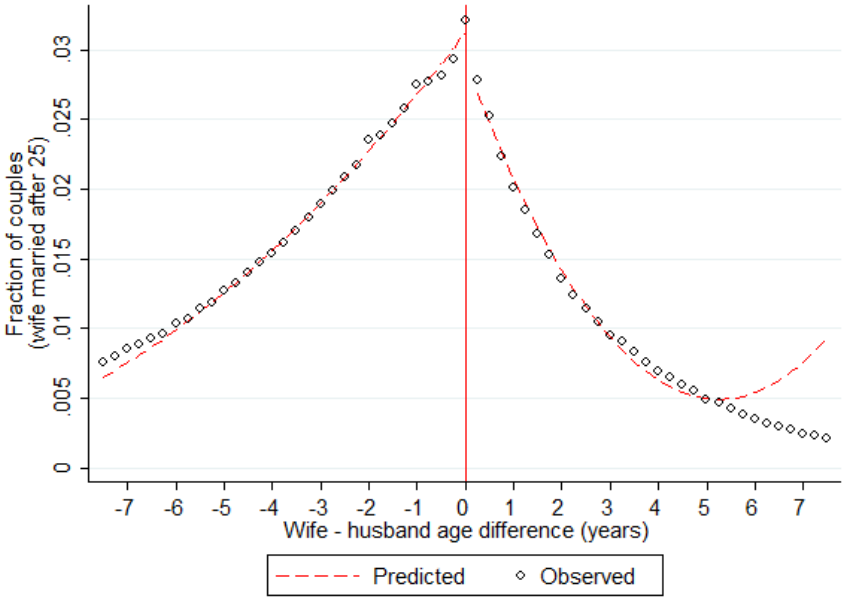
	Sample	Raw	Age cubic	Mincer	Mincer + income
Number of children in household	Household	-0.058***	-0.038**	-0.062***	-0.040**
		(.013)	(.019)	(.018)	(.017)
Had child in household	Household	-0.014***	-0.00098	-0.0048	-0.000050
		(.0026)	(.0062)	(.0053)	(.0052)

$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Note: The table reports conventional regression kink estimates of number of children and had child in household for households. The age cubic column reports estimates controlling a cubic in age for husband and wife separately. For difference outcomes, we control for a cubic in wife's age. The Mincer column reports estimates controlling a quadratic in potential experience and schooling for wife and husband separately. For Mincerian difference outcomes, we control a quadratic in potential experience for both wife and husband, and wife's schooling. The Mincer + income column reports estimates with for both the Mincerian control and total earning separately for wife and husband. For the Mincer + income difference, we use Mincerian difference control and wife's total earning as controls.

A Appendix

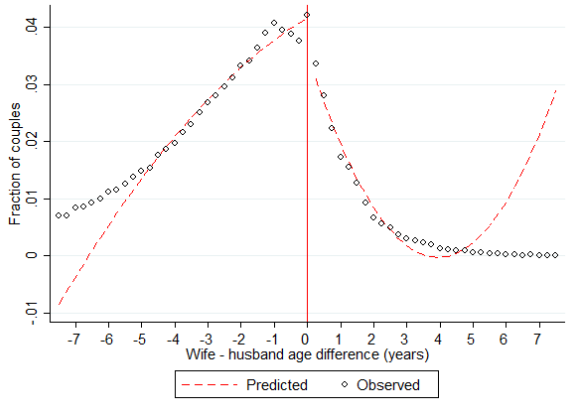
Figure A.1: Fraction of Couples, Wife Married After 25



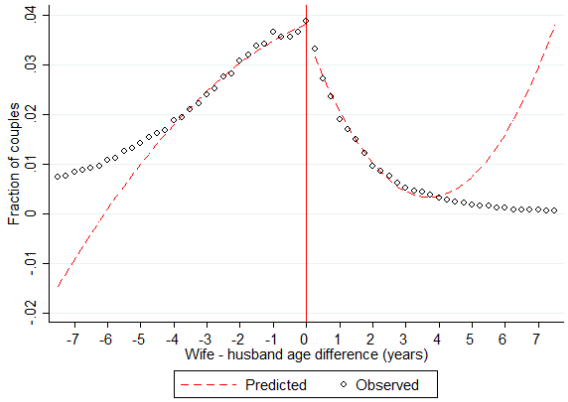
Notes: The figure illustrates fraction of couples by age difference bin. Our sample consists of couples with husband's age between 16 to 75, wife's age between 25 to 55 and married after age 25. The dashed line is quadratic fit estimated using regression kink model.

Figure A.2: Fraction of Couples, by Wife's Age Group

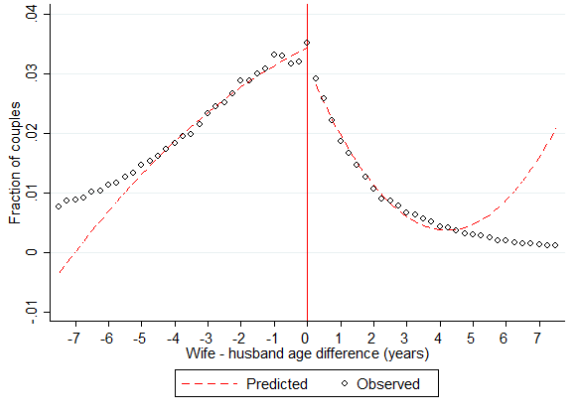
(a) Wife 25 to 29



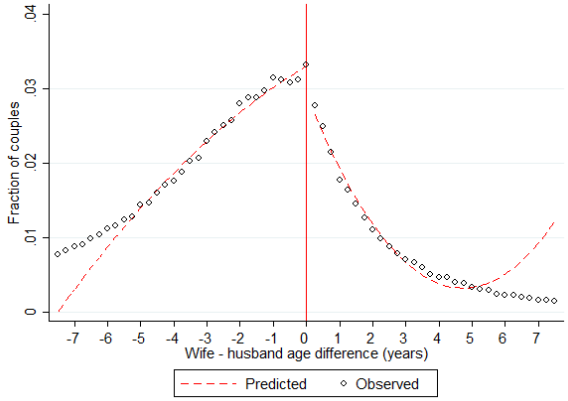
(b) Wife 30 to 34



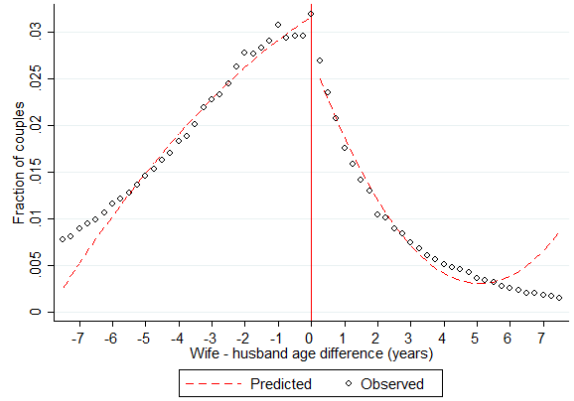
(c) Wife 35 to 39



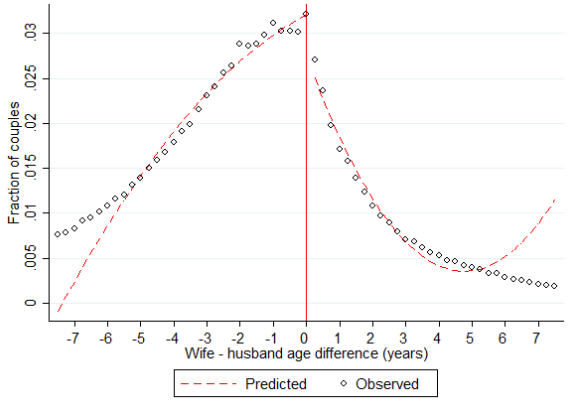
(d) Wife 40 to 44



(e) Wife 45 to 49



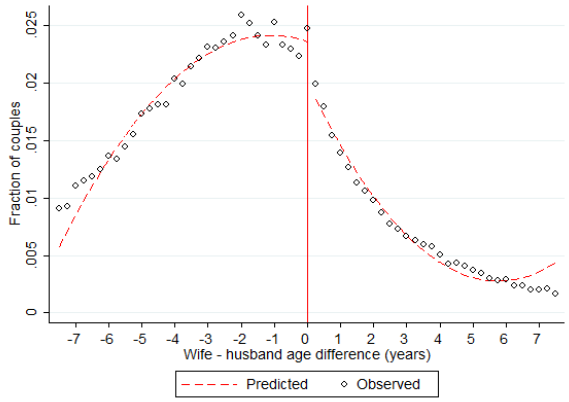
(f) Wife 50 to 55



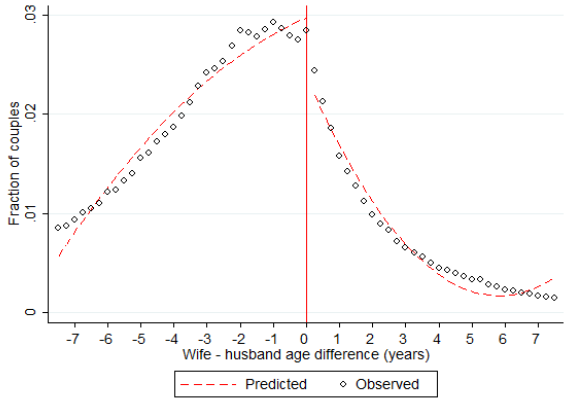
Notes: The figures report the fraction of couples in each age-difference bin by wife's age group. Age difference is defined as wife minus husband's age, measured in quarters. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples. The dashed line is a quadratic fit estimated in the regression kink model.

Figure A.3: Fraction of Couples, by Wife's Schooling

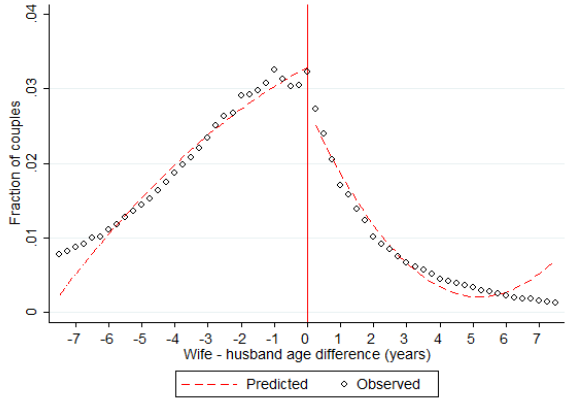
(a) Wife is high school drop-out



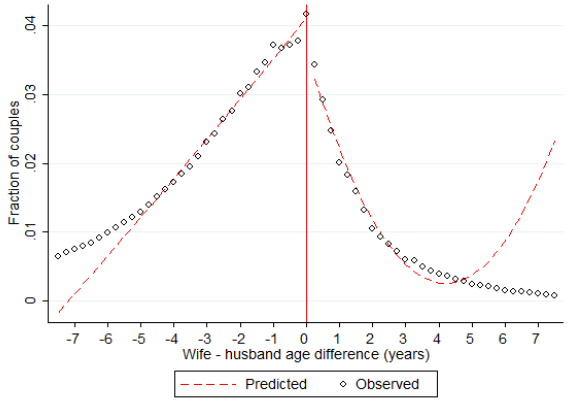
(b) Wife is high school graduate



(c) Wife has some college



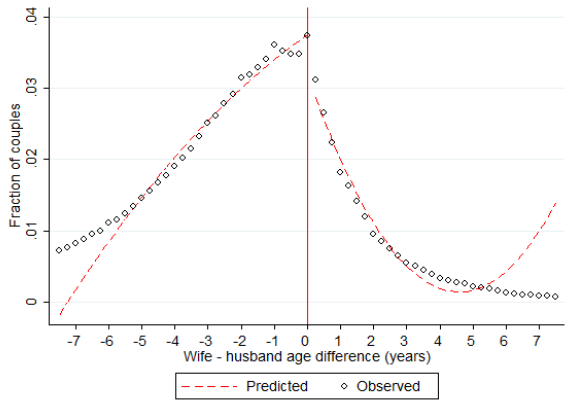
(d) Wife has college and above



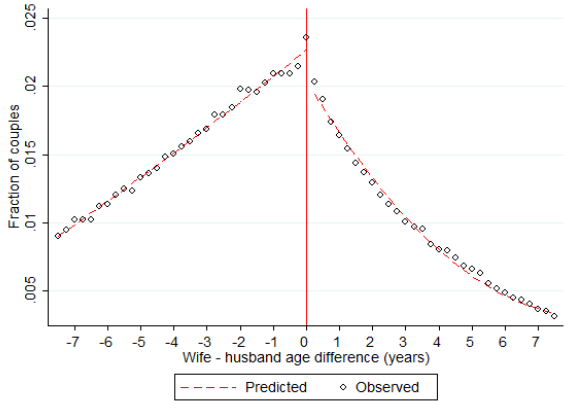
Notes: The figures report the fraction of couples in each age-difference bin by wife's schooling. Age difference is defined as wife minus husband's age, measured in quarters. We define high school wife is drop-out if her schooling is less than 12 years, high school graduate if schooling is 12 years, some college is her schooling is higher than 12 and lower than 16, and college and above if schooling is higher or equal to 16 years. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples. The dashed line is a quadratic fit estimated in the regression kink model.

Figure A.4: Fraction of Couples, by Wife's Number of Marriages

(a) Wife has one marriage

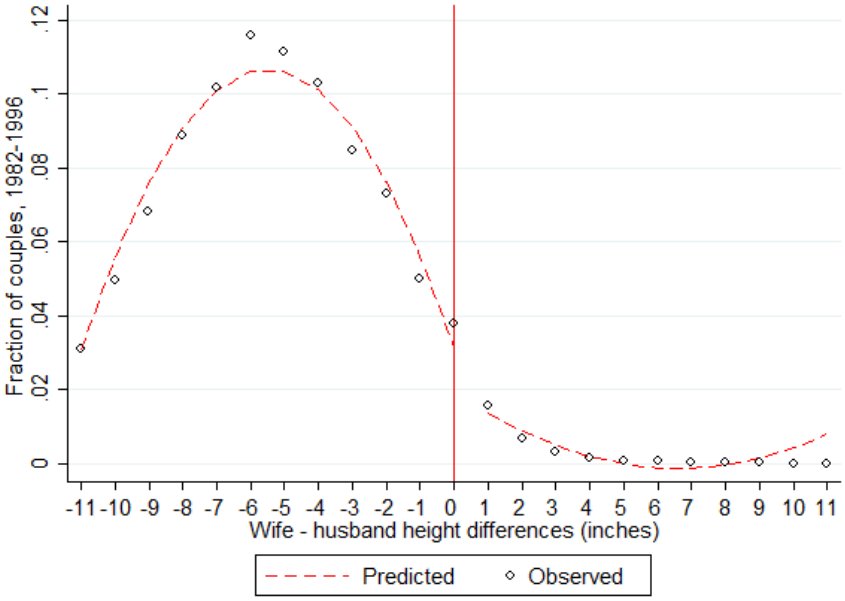


(b) Wife has at least two marriages



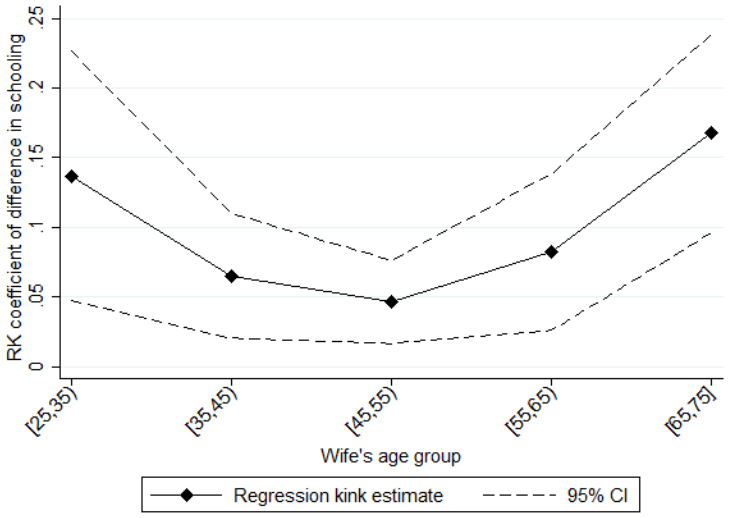
Notes: The figures report the fraction of couples in each age-difference bin by wife's marriage times. Age difference is defined as wife minus husband's age, measured in quarters. The data is taken from the 2012-2016 American Community Survey and includes 1,735,066 currently married couples. The dashed line is a quadratic fit estimated in the regression kink model.

Figure A.5: Fraction of Couples, by Height Difference



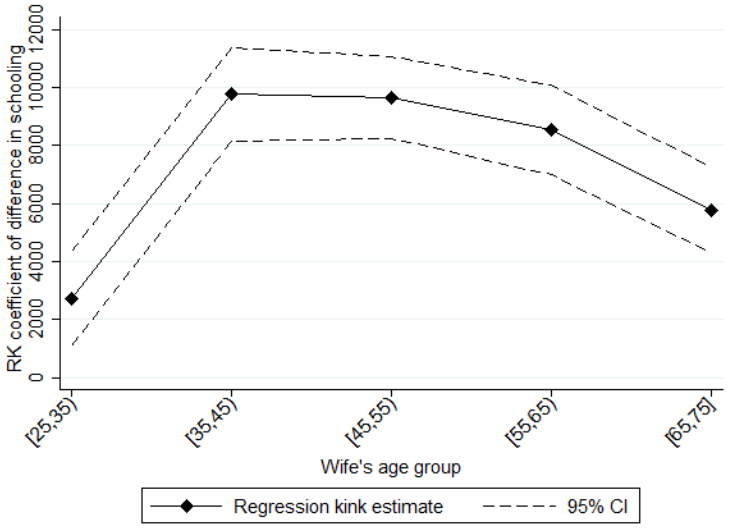
Notes: The figure illustrates fraction of couples by height difference between wife and husband. Our sample consists of 237,265 couples with husband's age between 16 to 75 and wife's age between 25 to 55. The dashed line is quadratic fit estimated using regression kink model.

Figure A.6: RK Estimates for Schooling Difference, by Wife's Age Group



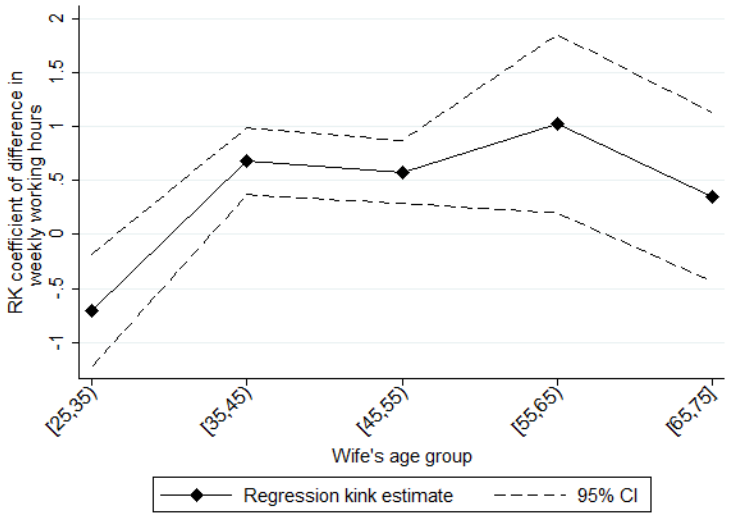
Notes: The figure illustrates regression kink estimates of schooling difference between wife and husband by wife's age group. Our sample consists of couples wife's age between 25 to 75 and husband's age between 16 to 75. The dashed line is 95% confidence interval.

Figure A.7: RK Estimates for Total Annual Income Difference, by Wife's Age Group



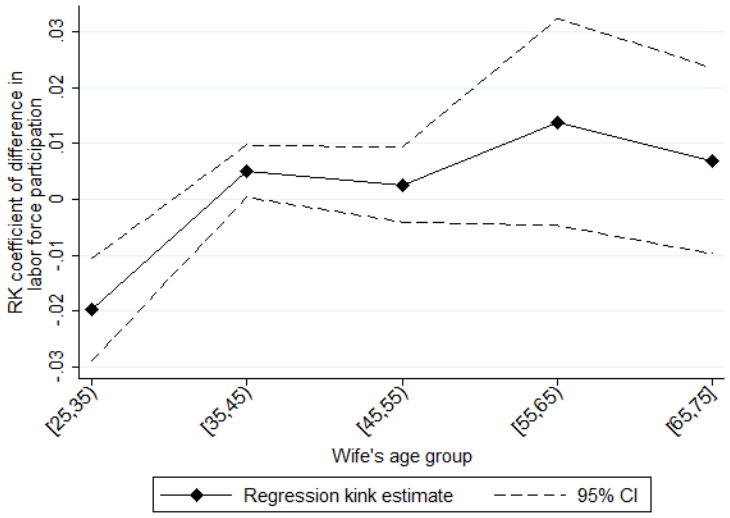
Notes: The figure illustrates regression kink estimates of total annual income difference difference between wife and husband by wife's age group. Our sample consists of couples wife's age between 25 to 75 and husband's age between 16 to 75. The dashed line is 95% confidence interval.

Figure A.8: RK Estimates for Weekly Working Hours Difference, by Wife's Age Group



Notes: The figure illustrates regression kink estimates of weekly working hours difference difference between wife and husband by wife's age group. Our sample consists of couples wife's age between 25 to 75 and husband's age between 16 to 75. The dashed line is 95% confidence interval.

Figure A.9: RK Estimates for Labor Force Participation Difference, by Wife's Age Group



Notes: The figure illustrates regression kink estimates of labor force participation difference difference between wife and husband by wife's age group. Our sample consists of couples wife's age between 25 to 75 and husband's age between 16 to 75. The dashed line is 95% confidence interval.

Table A.1: RK Estimates for Fraction of Couples, by Wife's Age and With Same Age Indicator

Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
Panel A: All couples						
-1.4***	-1.6***	-1.6***	-1.6***	-1.5***	-1.5***	-1.5***
(.10)	(.10)	(.13)	(.10)	(.087)	(.078)	(.083)
Panel B: New couples						
-1.6***	-1.2***	-1.2***	-1.2***	-1.1***	-1.1***	-1.1***
(.070)	(.26)	(.27)	(.19)	(.16)	(.12)	(.11)

$*p < 0.10, **p < 0.05, ***p < 0.01$

Note: This table reports conventional regression kink estimates for fraction of couples on age difference between wife and husband.The sample consists of 1,735,066 couples in United States from 2012 to 2016. We estimate regression kink model with control for an indicator of 0 age difference. We define new marriages to be couples married within last 3 years before the survey. All coefficients are multiplied by for interpretation purpose. Standard errors are reported in parentheses.

Table A.2: RK Estimates for Gain from Marriage, by Wife's Age and With Same Age Indicator

Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
-2.3***	-2.3***	-2.3***	-2.3***	-2.3***	-2.3***	-2.3***
(.17)	(.24)	(.22)	(.20)	(.15)	(.15)	(.14)

$*p < 0.10, **p < 0.05, ***p < 0.01$

Note: This table reports conventional regression kink estimates for gain from marriage on age difference between wife and husband.The sample consists of 1,735,066 couples in United States from 2012 to 2016. We estimate regression kink model with control for an indicator of 0 age difference. All coefficients are multiplied by 100 for interpretation purpose. Standard errors are reported in parentheses.

Table A.3: RK Estimates for Fraction of Couples, by Wife's Age and 0 Assigned to Right Side of Cut-off Point

Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
Panel A: All Marriages						
-1.6***	-2.3***	-2.1***	-1.7***	-1.5***	-1.3***	-1.3***
(.22)	(.39)	(.43)	(.29)	(.21)	(.18)	(.20)
Panel B: New Marriages						
-1.8***	-2.8***	-2.0***	-0.97***	-0.72***	-0.60***	-0.69***
(.26)	(.49)	(.33)	(.20)	(.10)	(.075)	(.13)

$*p < 0.10, **p < 0.05, ***p < 0.01$

Note: This table reports conventional regression kink estimates for fraction of couples on age difference between wife and husband.The sample consists of 1,735,066 couples in United States from 2012 to 2016. We define new marriages to be couples married within last 3 years before the survey. All coefficients are multiplied by 100 for interpretation purpose. Standard errors are reported in parentheses.

Table A.4: RK Estimates for Gain from Marriage, by Wife's Age and 0 Assigned to Right Side of Cut-off Point

Pooled	25 to 29	30 to 34	35 to 39	40 to 44	45 to 49	50 to 55
-2.6***	-1.4***	-2.6***	-3.0***	-3.1***	-2.8***	-2.6***
(.12)	(.27)	(.19)	(.14)	(.13)	(.12)	(0.098)

$*p < 0.10, **p < 0.05, ***p < 0.01$

Note: This table reports conventional regression kink estimates for gain from marriage on age difference between wife and husband.The sample consists of 1,735,066 couples in United States from 2012 to 2016. All coefficients are multiplied by 100 for interpretation purpose. Standard errors are reported in parentheses.

Table A.5: RK Estimates for Health Outcomes

	Sample	Raw	Age cubic	Mincer	Mincer + income
Height	Wife	-0.039	-0.052	-0.021	-0.019
		(.033)	(.041)	(.050)	(.047)
	Husband	-0.18***	-0.17***	-0.19***	-0.22***
		(.038)	(.040)	(.055)	(.065)
Difference	Household	0.16***	0.14**	0.13**	0.20**
		(.033)	(.056)	(.058)	(.086)
BMI	Wife	0.29***	0.25***	0.28**	0.29**
		(.062)	(.073)	(.12)	(.12)
	Husband	-0.021	0.094	0.10	0.11
		(.043)	(.079)	(.085)	(.086)
Difference	Household	0.30***	0.19	0.11	0.14
		(.056)	(.11)	(.14)	(.14)
Probability of reporting good health	Wife	-0.015***	-0.017***	-0.014***	-0.014***
		(.0019)	(.0033)	(.0037)	(.0031)
	Husband	-0.0010***	-0.015***	-0.012***	-0.012***
		(.0022)	(.0034)	(.0045)	(.0043)
Difference	Household	-0.0053**	0.0017	0.0012	0.0022
		(.0024)	(.0045)	(.0049)	(.0052)
Std. depression index	Wife	0.062***	0.060	0.047	0.042
		(.023)	(.051)	(.052)	(.047)
	Husband	0.036	-0.0047	-0.011	-0.014
		(.028)	(.041)	(.041)	(.044)
Difference	Household	0.056	0.075	0.052	0.081
		(.058)	(.056)	(.067)	(.083)
Average number of drinks per week	Wife	-0.14	-0.31	-0.33	-0.32
		(.18)	(.39)	(.38)	(.37)
	Husband	.40**	0.33	0.14	0.18
		(.17)	(.35)	(.35)	(.34)
Difference	Household	-0.65	-0.70	-0.53	-0.50
		(.44)	(.53)	(.53)	(.44)

$*p < 0.10$, $**p < 0.05$, $***p < 0.01$

Notes: The table reports conventional regression kink estimates of health outcomes for husband and difference between wife and husband. Our sample consists of sample of currently married female age between 25 to 55 and male age between 16 to 75. The age cubic column reports estimates controlling a cubic in age for husband and wife separately. For difference outcomes, we control for a cubic in wife's age. The Mincer column reports estimates controlling a quadratic in potential experience and schooling for wife and husband separately. For Mincerian difference outcomes, we control a quadratic in potential experience for both wife and husband, and wife's schooling. The Mincer + income column reports estimates with for both the Mincerian control and total earning separately for wife and husband. For Mincer + income difference, we use difference Mincerian control and wife's total earning as controls.