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Marriage Networks, Nepotism, and Labor Market Outcomes in China[†]

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This paper considers the role of marriage in improving labor market outcomes through the expansion of an individual's networks. I focus on the impact of the relationship with the father-in-law on a young man's career using panel data from China. The identification strategy isolates the network effects related to a man's father-in-law by examining the post-marriage death of a father-in-law. The estimates suggest that the loss of the father-in-law translates into a decrease in a man's earnings of 7 percent. (*JEL* D85, J12, J31, O15, P23, P36, Z13)

In the past few decades, China has moved from a socialist system in which central planners assigned workers to state-owned enterprises toward a market system in which workers and firms are responsible for finding and creating matches. Until the 1980s, approximately 95 percent of wage jobs in urban areas were assigned by state bureaucrats (Bian 1994). The system began to change with the economic reforms and shift toward decentralization that began in the 1980s. This paper seeks to understand the role of social networks on labor market outcomes during this period of transition and rapid economic growth. Furthermore, I explore whether the use of social networks alleviates information problems between workers and firms that emerge with the shift away from government allocation of labor, or whether the role of networks facilitates decentralized favoritism and rent-seeking.

The type of social networks examined in this paper is based on marriage. Such networks are interesting because marriage allows for an immediate and substantial increase in an individual's networks. After marriage, people who care about the outcomes of the person's spouse have incentive to provide labor market assistance to the person directly. I examine one particular affine connection, the relationship between a young man and his father-in-law. This paper contributes to a relatively new trend in the literature on social networks toward estimating the effects of disaggregated social connections (Blanes i Vidal, Draca, and Fons-Rosen 2010; Magruder 2010).[1] The focus on one specific node-to-node connection allows the analysis to

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[1] Magruder (2010) examines the impact of a father on his son's labor market outcomes by using fluctuations in the employment status of parents to capture their ability to provide information and referrals to children. Blanes i Vidal, Draca, and Fons-Rosen (2010) find that lobbyists with past experience working with a US senator suffer a 24 percent drop in revenue when that particular senator leaves office.

move beyond providing evidence that networks matter for labor market outcomes and quantifying the impact. The paper also explores the mechanisms through which a personal relationship affects economic outcomes.

To estimate the impact of the connection between a man and his father-in-law on the young man's labor market outcomes, I use panel data from the China Health and Nutrition Survey and a pseudo panel constructed from retrospective information in the State and Life Chances in Urban China. The panel dimension of the datasets allows for a comparison of labor market outcomes of the same person before and after the post-marriage death of his father-in-law. By limiting the age of the sample to young men, the analysis exploits deaths of fathers-in-law that are likely to be unanticipated and orthogonal to labor market outcomes of their sons-in-law.

Certain features of the Chinese context facilitate the focus on the relationship between a man and his father-in-law. First, while households with multiple generations are common in China, tradition dictates that elderly parents live with their sons and that women live with their husbands' parents.[2] Thus, the death of an in-law does not have a direct, mechanical effect on the composition of the household and its income and consumption patterns. Furthermore, unlike an analysis of the relationship between men and their own parents or between women and their in-laws, I do not need to consider an endogenous decision regarding whether men reside with their parents-in-law.

While death plausibly terminates any labor market assistance between men and their fathers-in-law, it is also possible that death is associated with other changes that are not related to their labor market relationship. To consider the impact of other changes in behavior or outcomes surrounding the death of the father-in-law, I examine the death of the mother-in-law as a falsification test. The validity of this strategy relies on two key assumptions. First, it assumes a high degree of gender segregation in jobs such that men are more likely to receive information about job openings, referrals, or direct assistance from their fathers-in-law than from their mothers-in-law. A second assumption is that the time-varying unobservable changes in behavior or characteristics associated with an in-law's death, such as financial costs associated with a funeral or time expenditures on those who are sick, are similar for mothers-in-law and fathers-in-law.

This paper is closest to work on the labor market effects of marriage networks by Luke and Munshi (2006).[3] Their paper argues that marriage provides access to new affine networks in Kenya that help migrants to urban areas find jobs. The use of such networks has both costs and benefits; their results demonstrate that marriage leads to a greater probability of employment and higher wages but also increases remittances as a fraction of income. While the research question is similar to mine, the empirical strategy is quite different. They use traditional rules dictating exogamous marriages to instrument for marriage, and interpret the coefficient on marriage in these estimates as the impact of marriage networks. My identification strategy does

[2] In the CHNS data, about one-third of young adult men live with at least one of their parents, while less than 4 percent of young adult men live with at least one of their wives' parents.

[3] A related paper on marriage and labor market outcomes in the same context is Luke, Munshi, and Rosenzweig (2004).

not rely on the assumption that the only causal mechanism through which marriage matters for labor market outcomes is through networks.

While the connection between a man and his father-in-law can have several implications in the labor market, the identification strategy that relies on the death of the father-in-law limits the possible mechanisms to those that change at the time of death. For example, a personal referral may reduce an employer's uncertainty about an applicant's true productivity (Simon and Warner 1992, Rees 1966). If the father-in-law uses private information to reduce uncertainty in the signal of his son-in-law's productivity, this represents a type of network effect, but it would not be measured through the death of the father-in-law. Another example is offered by Lam and Schoeni (1993), who find that the educational attainment of a worker's father-in-law matters more for men's wages in Brazil than the worker's own father. They attribute this result to unobservable worker characteristics reflected in assortative matching rather than to nepotism. A correlation in characteristics of a man and his father-in-law will not be estimated in the strategy focusing on death. While most papers on social networks examine the labor market impacts of existing network relationships, this paper focuses on the effects of the dissolution of networks. This analysis contributes to our understanding of the ways in which the effects of networks can persist over time.

The paper provides evidence that men's labor market outcomes decline by 7 percent to 13 percent following the death of their fathers-in-law. This paper contributes to the existing literature on labor market inefficiencies associated state control of enterprises (Wang 2012) and rent-seeking in the labor market (Gelb, Knight, and Sabot 1991; Goldberg 1982; Singell and Thornton 1997). The paper considers one mechanism through which the relationship with a father-in-law can have persistent labor market effects that are identified through the termination of the connection. An individual's wages may be augmented by nepotism based on his relationship with his father-in-law. This mechanism may be particularly important in the Chinese context, where personal networks of influence and obligations, called guanxi, have important economic implications (Bian 1994, Hwang 1987, Whyte 1996). I explore the hypothesis that the death of a father-in-law may remove the nepotistic component of wages based on the relationship with the father-in-law, and reduce the level of men's wages to the market value. I test theoretical predictions that nepotism should be stronger in state-owned enterprises than in private firms. I also exploit reforms that made state-owned enterprises behave more like private, profit-maximizing firms, and find these reforms correspond with a decline in the estimates of nepotism in state-owned enterprises.

I. Empirical Analysis

A. *Data*

The main dataset used in this paper is a panel dataset, the China Health and Nutrition Survey (CHNS). The CHNS covers nine provinces (Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, and Shandong), that vary considerably in their geography and levels of economic development. Counties

were stratified by income, and a weighted sampling technique randomly selected four counties in each province. In addition, the data include the provincial capital and one low-income city. The analysis in this paper uses waves 1991, 1993, 1997, 2000, 2004, and 2006. I exclude the first wave of the CHNS (1989) because it did not ask the set of questions about adult women's parents that are used to construct information about men's parents-in-law.[4] The information available on the nonresident parents of the married women in the sample includes whether each parent is living and the distance at which they each live.

I supplement the analysis with a dataset called State and Life Chances in Urban China (SLCC). Conducted in 1994, the survey covers 4,073 households across 6 provinces, plus Beijing and Shanghai. In addition to the capital city, one medium and one small city were randomly selected.[5] I construct a pseudo-panel using retrospective questions on past labor market experiences of the respondents. While respondents were asked about a full history of job transitions and characteristics at each job, wage information is collected only for specific years. It is asked annually from 1991 to 1994 and also for the years 1984 to 1987.[6] If respondents could not recall their wages in the specific year asked, they were allowed to provide wage information in an alternative year close to the specified year. The survey also included year of death and retrospective job characteristics of the parents of the primary respondents and their spouses. To minimize errors in recall, I limit the retrospective information to the past 12 years. Unlike the CHNS, this datasets offers very little information beyond labor market experiences.

The samples in this analysis are limited to adult, married men in the labor force between the ages of 22 and 45. The lower-bound age is set to 22 for 2 reasons: according to the marriage law of 1980, the legal age of marriage for men in China is 22 (for women it is 20 years old); and second, this age excludes the vast majority of individuals who are still in school. The upper-bound age is set to 45 because the focus of the analysis is on the career effects of marriage networks across generations. This upperbound removes the majority of cases where the father-in-law's death is likely to be anticipated as he is approaching or past the average age of life expectancy. The CHNS data include both rural and urban households, but the main analysis in this paper is limited to individuals living in urban areas, which are defined as neighborhoods where the majority of households have urban registrations. The SLCC dataset is limited to urban areas.

In Table 1, summary statistics for married men are presented in column 1. Panel A presents the CHNS data, and panel B presents the SLCC data. Column 2 presents information for the subset of married men for whom an in-law dies in the period covered by the survey, and refers to their information in the period prior to death. In comparison to all married men in the sample, the men for whom a father-in-law dies in the sample frame is slightly younger, with a higher fraction having completed

[4] This set of questions is called the "Ever Married Women" section of the survey instrument. There is no corresponding set of questions for married men, so I cannot construct information about nonresident parents-in-law for women.

[5] See Zhou (2004) for more details about the survey.

[6] Wage information for earlier time periods is also collected but not used in this analysis.

TABLE 1—SUMMARY STATISTICS

	All married men	Δ Father-in-law (Prior wave)
Panel A. CHNS data		
Age	36.57	34.77
	(5.45)	(4.35)
High school education	0.57	0.64
	(0.49)	(0.48)
Real hourly earnings	1.69	1.55
	(3.18)	(1.52)
Father-in-law distance (km)	60.74	48.55
	(225.0)	(168.2)
Mother-in-law distance (km)	57.34	53.78
	(203.5)	(195.9)
State sector job	0.67	0.70
Reside with father-in-law	0.03	0.01
Reside with mother-in-law	0.02	0.00
Father-in-law alive	0.68	1.00
Mother-in-law alive	0.82	0.91
Observations	2,015	145
Panel B. SLCC data		
Age	34.88	33.69
	(5.97)	(5.39)
High school education	0.53	0.47
	(0.50)	(0.50)
Real monthly earnings	403.6	358.92
	(638.5)	(292.5)
State sector job	0.78	0.84
Father-in-law alive	0.67	1.00
Mother-in-law alive	0.78	0.53
Observations	9,263	217

Notes: Standard deviations in brackets. The sample includes working men aged 22 to 45 living in urban areas. Column 1 refers to married men across all waves. Column 2 is a subset of married men. In the second column, ΔFather-in-law refers to information in the survey wave prior to the father-in-law passing away. The distance of in-laws is averaged over the time the in-law is alive.

high school.[7] The age and level of education of the sample for whom a father-in-law dies is quite similar to the full sample of married men in the SLCC. In both the SLCC and the CHNS, the earnings of those for whom the father-in-law passes away is lower than the full sample of married men.[8]

B. *Empirical Strategy*

The empirical strategy compares labor market outcomes of the same individual before and after the post-marriage death of his father-in-law. The strategy assumes

[7] There are seven categories of education in the CHNS and eight in the SLCC.

[8] In the CHNS, I construct real hourly earnings by using total individual annual earnings and scaling up the average number of hours the person worked in the past week. The SLCC does not ask about hours worked so the earnings measure is at the monthly level. Variables in units of RMB (including earnings and assets) are converted into real 2006 RMB using a United Nations GDP deflator for mainland China.

that the death of the father-in-law is orthogonal to the current labor market situation of the young man. This may be particularly plausible for the sample of young men in my analysis where their fathers-in-law are not near or past the average age of death. Unfortunately, the data do not allow me to separate deaths that follow long-term illnesses from deaths that result from accidents or short-term illnesses.

This strategy addresses several common concerns in estimating the impact of social networks on labor market outcomes. One possible concern is the endogenous formation of networks.[9] In this case, the concern is that unobservable factors that influence the formation of the marriage match and the marriage network also directly affect the labor market outcomes. The identification strategy avoids this problem by focusing on the termination of connections. Furthermore, any time-invariant unobservable characteristics will be removed with the individual fixed effects.

While the timing of a person's death may be somewhat unpredictable, it may not be completely exogenous to the decisions made by a family. For example, death can be preceded by illness, and anticipation of this event may alter outcomes leading up to the event. As a falsification test, I also examine the outcomes of individuals whose mothers-in-law die in the sample period. The validity of the falsification test depends on two key assumptions. First, any time-varying unobservable characteristics associated with an in-law's death are similar for mothers-in-law and fathers-in-law. Second, this strategy also assumes that there is a high degree of gender segregation in jobs, such that men are more likely to receive information about job openings or direct assistance from their fathers-in-law than from their mothers-in-law.

C. *Labor Market Effects of Marriage Networks*

The main identification strategy employed to estimate the network effects associated with the relationship between a man and his father-in-law is given by

$$y_{it} = \alpha_0 + \alpha PostFIL_{it} + \beta X_{it} + \gamma_i + \varepsilon_{it}, \tag{1}$$

where y is the logarithm of earnings for individual i in year t. *PostFIL* equals one for each wave following the death of the father-in-law. Individual fixed effects, γ_i, are also included. In the most parsimonious specification, X includes indicators for categories of education, a cubic in age, and a constant term. The coefficient α provides the within-person effect of the death of a father-in-law and is identified from individuals for whom their father-in-law dies during the sample period.

The results corresponding to equation (1) for young men living in urban areas are displayed in Table 2. The dependent variable is the logarithm of earnings. The parsimonious specification is shown for the CHNS in column 1 and for the SLCC in column 3. In order to address concerns that the timing of the death of the in-laws is correlated with the man's own health status or his marriage tenure, columns 2 and 4

[9] It is not common for parents to arrange marriages in urban areas of China. According to the 1991 Study for the Status of Contemporary Chinese Women, only 19 percent of urban couples found their spouse through involvement by relatives (Huang, Jin, and Xu 2012). Thus, it is not the case that fathers-in-law are selecting husbands for their daughters based on their ability to assist the young men's careers.

Table 2—Impact of the Death of a Father-in-Law on log Earnings

	CHNS data		SLCC data	
	(1)	(2)	(3)	(4)
PostFILdeath	–0.128*	–0.132**	–0.069**	–0.070**
	(0.067)	(0.067)	(0.034)	(0.034)
Observations	2,583	2,583	13,292	13,292
Additional controls	No	Yes	No	Yes
Adjusted R^2	0.372	0.373	0.663	0.663

Notes: The dependent variables are constructed with real hourly earnings in the CHNS data and real annual earnings in the SLCC data. All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

add the number of years married and his current health status.[10] Retrospective questions on health are not asked in the SLCC, so the additional control in column 4 is years married.

In column 1, the results indicate that the impact of the loss of a father-in-law is a 13 percent fall in wages relative to other men. This estimate is significant at the 10 percent level. The magnitude of the impact on wages remains similar with the inclusion of the additional controls in column 2 and the significance rises to the 5 percent level. In the SLCC, the corresponding estimates of the impact of the death of the father-in-law is a decline in wages of 7 percent. The SLCC estimates are smaller in magnitude than the CHNS estimates, though this difference is not statistically significant. There are several possible reasons for the difference. First, the SLCC results are based on retrospective questions. Attenuation in the estimates may result from errors in recall. Second, the SLCC covers a slightly earlier time period. Overall, the results suggest that the labor market outcomes of young men decline following the loss of their fathers-in-law.

D. *Estimates Conditional on the Status of the Mother-in-Law*

The baseline specification described above does not distinguish between the impact of the death of the father-in-law when the mother-in-law is still alive from the impact of his death when the mother-in-law has already died. The results in Table A1 include indicators for the passing of the father-in-law conditional on the mother-in-law being deceased or living at that time. The estimates in both the CHNS and the SLCC suggest that the negative effect of losing a father-in-law is mainly driven by those for whom the mother-in-law is still alive at the time of his death rather than those for whom the mother-in-law is already deceased. The differences in the magnitude of the estimates may reflect the fact that deceased mothers-in-law

[10] Health status is self-reported with four categories ranging from poor to excellent.

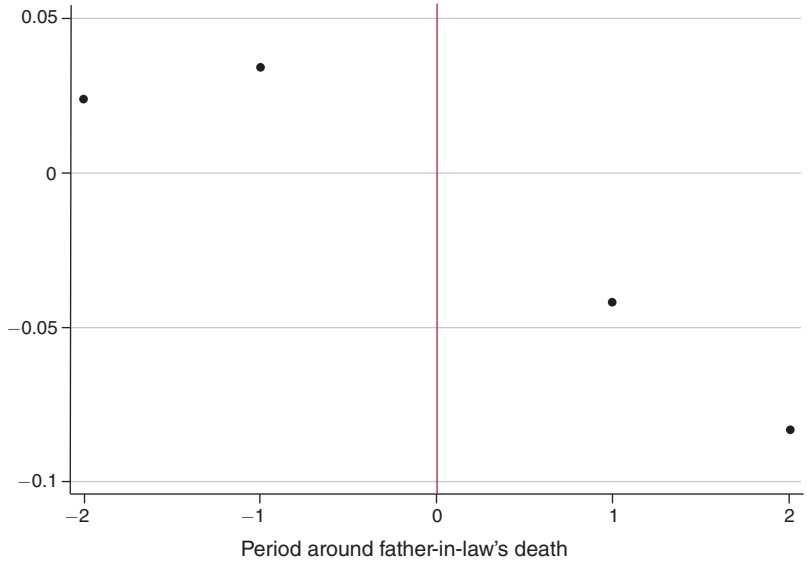

Figure 1. Mean log Earnings Residuals around Death of Father-in-Law

correspond with substantially older fathers-in-law, and these men were too old to help the career outcomes of their sons-in-law. It is important to note that given that the sample is limited to young men, the mother-in-law is still living at the time of the father-in-law's death in the vast majority cases. Given the low power in the estimates when the mother-in-law is deceased, we cannot reject the hypothesis that the net impact of the loss of the father-in-law on wages is the same regardless of whether the mother-in-law is alive or not.

E. *Flexible Estimates*

I take advantage of the multiple waves available in the CHNS panel dataset and allow the effects of each death to vary over the periods before and after the death.[11] Figure 1 displays the average residuals of the logarithm of earnings of young men after controlling for a cubic in age and province-year indicators. The sample is restricted to two waves prior to death and two waves following death of the father-in-law in the CHNS.

The vertical line denotes the period of the father-in-law's death. The mean log earnings after removing age and province-year effects was positive in the two periods prior to the death of the father-in-law. Relative to the pre-death periods, the earnings outcomes of the young men decline one period after the death by about 7 percent. The losses appear to accumulate 2 waves after the death where the young men's earnings are about 11 percent lower. The time pattern of the earnings surrounding the death of a father-in-law suggests that the loss of the network relationship

[11] These estimates are not implemented in the SLCC because the gaps between retrospective periods can be large as well as different across individuals.

with the father-in-law caused a large drop in earnings of men that is persistent for several years.

II. Falsification Test with Mothers-in-Law

While the empirical results show a strong drop in the earnings of young men following the death of their fathers-in-law, there may be other possible explanations for the estimated impact in addition to labor market network effects. In particular, we might be concerned that there are other changes occurring around the time of death that are unrelated to the labor market relationship between a father-in-law and son-in-law. To consider the impact of other changes in behavior or outcomes surrounding the death of the parent-in-law, I examine the death of the mother-in-law as a falsification test.

A. *Assumptions of the Falsification Test*

The validity of this strategy relies on two key assumptions. First, it assumes a high degree of gender segregation in jobs such that men are more likely to receive information about job openings, referrals, or direct assistance from their fathers-in-law than from their mothers-in-law. A high degree of gender segregation in labor market networks has been demonstrated in numerous settings including China (Kuhn and Shen 2010), the United States (Loury 2006), and India (Munshi and Rosenzweig 2006). The CHNS and SLCC provide 10 and 32 categories of occupations, respectively. Even at this coarse level, the differences by gender are quite pronounced.[12] For more precise evidence on gender segregation in the urban Chinese labor market, I use 1999 data from the Study of Family Life Survey in Urban China to calculate the female share of workers in 249 two-digit occupation categories. Figure A1 plots the density of the fraction of female workers faced by male and female workers.[13] The skewness in the distributions indicates that men are much more likely to be in male-dominated occupations and women in female-dominated occupations. The median male and female works in an occupation where about three-quarters of the workers are their same gender. Overall, the descriptive evidence supports the assumption that fathers-in-law are more likely to have information about openings and to be able to provide other assistance for positions staffed by men than are mothers-in-law.

A second assumption is that many time-varying unobservable changes in behavior or characteristics associated with an in-law's death, such as financial costs associated with a funeral or time expenditures on those who are sick, are similar for mothers-in-law and fathers-in-law. I compare time and financial expenditures associated with the death of men's mothers-in-law with the death of men's fathers-in-law in Table 3. The summary statistics in panel A make use of survey questions in the CHNS about the time that the household head and spouse spend caring for elderly parents.[14] This question is only asked in the CHNS in 1989, so I examine care for

[12] The gender differences are statistically significant at the 5 percent level or higher for all occupations in the CHNS and for 28 of the 32 occupations in the SLCC. These results are available on request.

[13] This method of measuring gender segregation is used in Magruder (2010).

[14] This question does not separate elderly parents of the husband and the wife.

Table 3—Time and Financial Expenditures by Death of Mother-in-Law and Father-in-Law

Sample	Mother-in-law passes away (1)	Father-in-law passes away (2)
Panel A. I(*parents need care*)		
Prior to passing	0.129	0.116
	(0.337)	(0.322)
Observations	108	95
Panel B. I(*parents cared for by couple*)		
Prior to passing	0.047	0.032
	(0.213)	(0.176)
Observations	106	95
Panel C. I(*funeral expenses in last year*)		
After passing	0.276	0.294
	(0.449)	(0.458)
Observations	105	85
Panel D. I(*child care by maternal grandparents*)		
Prior to passing	0.102	0.109
	(0.304)	(0.313)
After passing	0.022	0.025
	(0.150)	(0.154)
Observations	171	182
Panel E. Buying food (*time by household*)		
Prior to passing	0.524	0.597
	(0.534)	(0.597)
After passing	0.606	0.631
	(0.615)	(0.684)
Observations	497	576
Panel F. Cooking food (*time by household*)		
Prior to passing	2.033	2.055
	(1.945)	(2.622)
After passing	2.707	2.436
	(5.368)	(3.495)
Observations	497	576
Panel G. Washing clothes (*time by household*)		
Prior to passing	0.666	0.706
	(0.750)	(0.745)
After passing	0.868	0.885
	(0.938)	(0.999)
Observations	497	576

Notes: Standard deviations in brackets. The first column refers to households where the mother-in-law passes away, and the second column refers to the households where the father-in-law passes away.

Source: CHNS

elderly parents for households in which the wife's mother dies between 1991 and 1993, and households where the wife's father dies between 1991 and 1993.[15] The share of households that report having elderly parents that need care a few years prior to death is similar at around 12 percent. Among households that report elderly parents needing care, about 30 percent of household heads and spouses provide some care themselves prior to both types of deaths (panel B).

Panel C presents summary statistics for previous-year funeral expenses by the household asked in the period following the passing of a mother-in-law or a father-in-law.[16] Regardless of the gender of the in-law that died, about 30 percent of households report having spent money on funeral expenses in the last year. In panel D, I examine how the care of young children by maternal grandparents varies by the gender of the death of the maternal grandparent.[17] The first row refers to the periods prior to death, and for both samples about 10 percent of households received child care assistance from the wife's parents. It falls to 2.3 percent after the passing of the mother-in-law and to 2.4 percent after the passing of the father-in-law. While the death of one of the wife's parents has effects on time demands of the household, the results suggest that the effects do not vary substantially by whether the father-in-law or the mother-in-law passes away.

Finally, panels E, F, and G present the average hours per day that households spend on purchasing food, cooking food, and washing clothes, respectively. Calculated from the CHNS, these statistics are broken down by before and after the death of the woman's mother and her father. For all three types of chores, the passing of a parent-in-law corresponds to an increase in the amount of time that household members spend on these tasks. This suggests that parents-in-law were assisting in household chores. However, the increases that follow a death are quite similar regardless of the gender of the in-law that passes away.

B. *Estimates for the Death of the Mother-in-Law*

Table 4 presents the results corresponding to the falsification tests. Panel A shows estimates of the impact of the death of the mother-in-law.[18] Unlike the estimates for the death of the father-in-law, the mother-in-law's death leads to an increase in earnings. However, this is not statistically significant. Panel B includes both the death of the father-in-law and the mother-in-law in the same specifications. Holding constant the wage effects of losing the mother-in-law, the impact of the father-in-law's death is still large and negative. Overall, the falsification test suggests that the estimated effects of losing the father-in-law are unlikely to be driven by general changes that

[15] Because the question is only asked in the first wave of the survey, I cannot examine the statistics for care for a surviving parent-in-law following the death of the other parent-in-law.

[16] This question was included only in the 1993 and 1997 waves.

[17] This is asked in all waves of the CHNS but only to households that have at least one child under six.

[18] The corresponding results for the impact of the death of a woman's parents on her own outcomes are shown in Table A2. The net impact of the death of the father is a small, insignificant increase in the level of her wages in the CHNS and an insignificant decline in the SLCC. The difference in the results for women and men provide support for the hypothesis that the impact of the death of the father-in-law on men's outcomes is working through male labor market networks rather than a mechanism that directly affects the entire household.

Table 4—Impact of the Death of a Mother-in-Law on log Earnings

	CHNS data		SLCC data	
	(1)	(2)	(3)	(4)
Panel A. Death of a mother-in-law				
postMILdeath	0.130	0.124	0.0628	0.0618
	(0.102)	(0.102)	(0.0432)	(0.0431)
Additional controls	No	Yes	No	Yes
Observations	2,588	2,588	13,292	13,292
Adjusted R^2	0.338	0.338	0.663	0.663
Panel B. Death of either a mother- or father-in-law				
postMILdeath	0.159	0.153	0.0648	0.0639
	(0.100)	(0.0999)	(0.0432)	(0.0432)
postFILdeath	–0.147**	–0.151**	–0.0704**	–0.0716**
	(0.0701)	(0.0703)	(0.0341)	(0.0340)
Additional controls	No	Yes	No	Yes
Observations	2,575	2,575	13,292	13,292
Adjusted R^2	0.338	0.338	0.663	0.663

Notes: The dependent variables are constructed with real hourly earnings in the CHNS data and real annual earnings in the SLCC data. All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

occur around the time of the death of a parent-in-law, such as funeral expenditures or changes in household time allocation regarding chores and caring for a sick parent.

It is also interesting and surprising that the death of the mother-in-law has a large positive (though insignificant) effect on young men's wages. This may suggest that caring for parents-in-law prior to their deaths required effort that these men could channel into their careers after the death. It is also possible that households transfer financial resources to their wives' parents. If the amount transferred while the parent-in-law was living was a percentage of earnings rather than a fixed amount, then young men may have more incentive to work harder and earn higher wages after the passing of a parent-in-law. The positive impact of the death of the mother-in-law suggests that the estimated net labor market impact of losing the father-in-law may be underestimated given that we do not remove the impact of other changes that are not related to the labor market relationship occurring around the time of death.

III. Additional Evidence on the Network Effect

A. *Sector of Employment*

Nepotism is one possible explanation for the large declines in the level of men's wages following the death of the father-in-law. I consider the type of nepotism that is a type of favoritism that boosts individuals' wages above what they would earn

in the absence of the family connection.[19] An additional prediction of this type of nepotism is that firms that are not profit-maximizing can sustain higher levels of nepotism than profit-maximizing firms. To examine this prediction, I exploit the structure of the urban economy, which is split into three main sectors in China. The assumption is that state-owned enterprises are less constrained by profit maximization than private firms. This is plausible given that state-owned enterprises had goals other than profits, including maintaining stability and employment (Bai et al. 2000; Bai, Lu and Tao 2006). In addition to the private and state sector, there are collective enterprises that have features of both private and state firms. Urban collective enterprises, owned by local governments or employees, are responsible for their own profits and losses, and are not subject to central planning targets. There is considerable variation across collectives in their relationships with state banks and with private companies.

I estimate equation (1) separately by the employment sector of the young men. For individuals for whom their father-in-law died during the survey period, the sector of employment is defined in the wave immediately prior to the death. For other individuals, the sector of employment is defined in the first wave. Assuming that state-owned enterprises are less constrained by profit maximization, we would expect the death of the father-in-law to have stronger effects among individuals in the state sector than in the private sector. The magnitude of the effect for individuals in collective enterprises ultimately depends on whether they are more like state or private firms.

Panel A of Table 5 displays the results.[20] As predicted, the impact of the death of the father-in-law has a large negative effect for men who were working in the state sector in the CHNS. The state sector estimates are –13 percent and significant at the 10 percent level in the CHNS. The estimates for collective sector employees in column 3 are estimated with less precision. This is not surprising given that the sample size is much smaller. In the private sector, the impact of the death of the father-in-law is positive in the CHNS, but this estimate is not statistically different from zero. Overall, the results for the CHNS provide suggestive evidence that favoritism played a role in men's wages in the state sector, and provide additional support for nepotism as the mechanism through which the father-in-law's death affects a young man's outcomes. In contrast, the results for the SLCC are not precisely estimated, and the magnitudes of the estimates are not consistent with the predictions of nepotism.

Gradual reform of the socialist system toward a mixed economy began following the death of Chairman Mao Zedong in 1976. The sample period in the CHNS analysis covers the years 1991, 1993, 1997, 2000, 2004, and 2006. Major reforms of the state sector occurred in the mid- to late-1990s, including privatization of the total stock of state-owned housing, privatization of some state-owned enterprises, and lay-offs of employees of state-owned enterprises. During this period of reform, there was new pressure on remaining state-owned enterprises to become more

[19] This is a specific form of nepotism that builds on Becker's (1971) standard model of taste-based discrimination.

[20] Because of space constraints, the table does not include the specifications with the additional controls, but the results look similar with and without the additional controls.

TABLE 5—NET IMPACT OF FATHER-IN-LAW'S DEATH ON WAGES BY EMPLOYMENT SECTOR

	State sector		Collective sector		Private sector	
	CHNS (1)	SLCC (2)	CHNS (3)	SLCC (4)	CHNS (5)	SLCC (6)
Panel A. Standard specification						
PostFILdeath	–0.13*	–0.03	–0.26	0.06	0.19	–0.12
	(0.07)	(0.03)	(0.16)	(0.08)	(0.33)	(0.16)
Observations	1,551	9,739	493	1,801	325	700
Adjusted R^2	0.50	0.68	0.32	0.63	0.15	0.78
Panel B. Allowing for different effects after 1997						
Post97FILdeath	0.22**		0.40		–0.43	
	(0.09)		(0.28)		(0.42)	
PostFILdeath	–0.29***		–0.43**		0.56	
	(0.09)		(0.18)		(0.38)	
Observations	1,551		493		325	
Adjusted R^2	0.47		0.29		0.15	

Notes: All regressions include a cubic in age, education, province-year indicators, sector of employment, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

competitive. I exploit this change to provide an additional test of the idea that competition reduces nepotism. I estimate the following equation:

$$(2) \qquad y_{it} = \alpha_0 + \alpha PostFIL_{it} + \alpha_{97} PostFIL97_{it} + \beta X_{it} + \gamma_i + \varepsilon_{it},$$

where *PostFIL*97 equals one if the father-in-law passed away in the 1997 wave or later. In other words, the total impact of losing a father-in-law after 1997 is $\alpha + \alpha_{97}$. Assuming that state-owned enterprises became more concerned with profit maximization in the mid-1990s, a model of nepotism implies that $\alpha < 0$ and $\alpha_{97} > 0$ in the sample of state-sector employees. In other words, the estimated impact of the death of the father-in-law is negative during the pre-reform period, when state-owned enterprises were less concerned with profit-maximization, but this impact is diminished for deaths that occur in or after 1997 because the ability of state-owned enterprises to maintain rent-seeking wages was reduced.

The corresponding results are shown in panel B of Table 5. For the sample employed in the state sector in column 1, the estimate of α is negative and α_{97} positive. These estimates are significant at the 1 and 5 percent levels, respectively. Furthermore, the magnitude of the estimates indicate that the loss of the nepotistic component of wages associated with the father-in-law's death was completely eliminated in the post-reform period. The patterns in the collective sector are similar to the state sector. Finally, the results for the private sector show a reversed pattern of effects though this is not statistically significant. Overall, the results in panel B confirm the idea that nepotism played a larger role in the determination of wages in the state sector prior to the economic reforms of the mid- to late-1990s in China.

Table 6—Impact of Father-in-Law's Death on Job Changes

	CHNS data		SLCC data	
	(1)	(2)	(3)	(4)
PostFILdeath	0.060*	0.061*	0.044***	0.043***
	(0.036)	(0.037)	(0.016)	(0.016)
Additional controls	No	Yes	No	Yes
Observations	2,424	2,424	13,292	13,292
Adjusted R^2	0.028	0.027	0.177	0.177

Notes: The dependent variable is an indicator for job changes and is only available in the CHNS for the 1997–2006 waves. All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

B. *Job Changes*

Given that wages are likely to display some nominal downward rigidity, the loss of a nepotistic component of wages is likely to be associated with individuals losing jobs that are based on their relationships with their fathers-in-law. I examine the impact of the death of in-laws on the probability that the individual changes his job. In Table 6, the dependent variable is an indicator for whether the individual has changed his job since the last wave. In the CHNS, this question was only added to the survey in 1997, so the size of the sample is smaller than the estimates of wages. The CHNS estimates show that the rate of job changes increases following the death of a father-in-law by about 6 percentage points. This is significant at the 10 percent level. The magnitude of the impact is quite large relative to the average rate of job changes for the CHNS sample, which is 13 percent. However, this is not necessarily an immediate change as the waves of the CHNS occur in two to four year intervals. In the SLCC results in the last two columns, the estimated net impact of the father-in-law's death is a 4.4 percentage point increase in the rate of job switches. The average rate of job changes in the SLCC sample is 10 percent. Unlike in the CHNS, the estimates of the impact in the SLCC are statistically significant at the 1 percent level or higher.

IV. Alternative Explanations

A. *Inheritance Effects*

The estimated effects on the level of men's wages may reflect an inheritance effect following the death of the father-in-law. More specifically, the wealth effect could induce young men to switch into jobs that are less demanding. In this case, the death of the father-in-law could plausibly lead to a drop in men's earnings.

The legal institutions and common practices surrounding inheritance in China make this an unlikely explanation for the results. First, the Law of Succession of 1985 specifies an order of inheritance that does not favor female children. The law

specifies that successors who have made predominant contributions to caring for the deceased may be given larger shares of the assets. Given that elderly parents are far more likely to reside with their sons than their daughters, the households of daughters are unlikely to receive substantial inheritances.[21] Second, at least half of the assets accumulated during marriage must go to the surviving spouse.[22] If surviving spouses receive the majority of assets following death, then the inheritance hypothesis would suggest the impact on wages to be stronger when there is no surviving spouse. This is not consistent with the results of Table A1, where the wage effects are larger when the other spouse was alive.

While neither survey asks directly about inheritance transfers or receipts, I examine CHNS questions on consumption, assets, and hours worked to further consider the alternative hypothesis. The inheritance hypothesis is predicated on the idea that the wealth transfer was large enough to reduce men's effort in the labor market such that wages fell by over 7 percent. Under the inheritance story, we would expect consumption and assets to increase following the death of the father-in-law or for the labor supply of men to decrease (or both). In contrast, if the death of the father-in-law leads to a loss of job networks or other labor market assistance, we would expect consumption and assets to fall.

Table 7 presents the results where the dependent variables are measures of consumption, assets, and the number of hours worked per week. In columns 1 and 2, the dependent variable is total household food consumption in kilograms over three days.[23] The estimates indicate that the death of the father-in-law corresponds with a fall of 8.6 kilograms of food consumption, or approximately 12 percent. I also construct another measure of consumption that is the logarithm of the total value of purchases of household electronic goods, such as televisions and sewing machines, over the past year. The net impact of the father-in-law's death on consumption of these types of household goods is negative and significant from 0 at the 10 percent level.

The next two columns of Table 7 are housing assets, measured as the logarithm of the self-reported value of a person's privately owned home. The impact of the death of the father-in-law on housing assets is negative, but not significant at the standard levels. Finally, in the last two columns, I examine the impact of the in-law's death on the average number of hours that the man worked per week in the previous year. The results show that individuals increased the number of hours worked following the death of his wife's father, but this is not significant at the standard levels.

Overall, the results of Table 7 do not support the idea that there was a large wealth effect associated with a father-in-law's death. The results are consistent with the hypothesis that a living father-in-law provides valuable labor market assistance, and

[21] Individuals in the adult sample were born before the implementation of the one-child policy and very few of the adult women in the sample are only children. Over 97 percent of the men in the sample have a sibling-in-law (and 87 percent have a brother-in-law).

[22] Data collected in four cities by the Study of Popular Habits of Succession in 2005 confirm that popular beliefs about inheritance are consistent with the law. About three-quarters of respondents reported that the spouse should be the first to inherit. Furthermore, most respondents thought that sons should have the next rights of inheritance before daughters.

[23] This is taken from a detailed food diary that the CHNS household filled out for three consecutive days and includes food consumed in the home as well as away from home.

Table 7—Impact of Father-in-Law's Death on Consumption, Assets, and Hours Worked

	HH food consumption		Log HH purchases		Log housing assets		Hours worked per week	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PostFILdeath	–8.68***	–8.57**	–0.14*	–0.15*	–0.07	–0.08	1.61	1.61
	(3.35)	(3.36)	(0.08)	(0.08)	(0.13)	(0.13)	(1.37)	(1.38)
Add'l controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,571	2,571	2,500	2,500	1,935	1,935	2,552	2,552
Adjusted R^2	0.05	0.05	0.06	0.06	0.11	0.11	0.03	0.03
Mean dep. var.	69.87	69.87	7.77	7.77	4.60	4.60	45.92	45.92

Notes: All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. In column 1, the dependent variable is household food consumption (measured in kilograms) over three days. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Source: CHNS

that negative repercussions associated with the death of a father-in-law make the household worse off in terms of consumption and leisure.

B. *Information about Job Openings*

It is possible that the father-in-law provided a flow of information about job openings. This mechanism can be framed within the landmark argument of Granovetter (1983), who argued that acquaintances provide more new and useful information about job openings than close friends and family; the father-in-law provides a link to a set of acquaintances with whom the son-in-law does not directly associate, and when the father-in-law passes away, the son-in-law loses access to a flow of information. The existing empirical evidence provides strong support for the importance of networks for labor market outcomes (Beaman 2012; Munshi 2003; Bayer, Ross, and Topa 2008; and Conley and Topa 2002). While losing the flow of information about new job openings is likely to reduce the growth rate of earnings, it is less likely to be consistent with the findings in this paper of a large drop in the level of a young man's earnings.

C. *Residential Mobility and Care for Parents-in-Law*

We cannot observe all relevant changes surrounding the death of a father-in-law to ensure that the effects are driven by a labor market relationship between a young man and his father-in-law. For an alternative explanation to be valid, it will need to be consistent with a fall in men's wages as well as a decrease in consumption. One possibility is that the death of a woman's father may lead the household to move closer to her surviving mother, and the change in residence requires the man to change to a job with lower wages and longer hours. This alternative explanation for the results is also consistent with the results in Table A1 that showed stronger effects of the father-in-law's death when the mother-in-law was still alive.

To explore this possible explanation, I first examine the probability of moving or attriting from the CHNS survey. Table A3 presents the impact of the death of in-laws conditional on whether the other in-law is living or deceased on the probability of either moving (within the sample area) or attriting from the survey. The estimates that are conditional on the other in-law being alive suggest a decline in mobility following the death of a father-in-law of 7 percent for the group for whom the mother-in-law is still alive. The mean rate of moving or attriting in the sample of analysis is 20 percent. A possible explanation is that the household chooses to remain near the woman's mother following the death of the woman's father. While the reduction in mobility could lead to a lower growth rate of earnings, it is difficult to think of a plausible story in which remaining in the same location leads to a sizable drop in the level of wages observed for young men. Overall, the results do not support the idea that the differences in the reduction of mobility following the death of a father-in-law can explain the large, negative impact of the death of the father-in-law on men's wages.

D. *Direct Labor Market Assistance*

Many of the results are also consistent with the hypothesis that the father-in-law was providing direct and steady assistance to the job of the son-in-law. The father-in-law and the son-in-law may work together in the same firm and complementarities in the tasks done by the father-in-law and the son-in-law result in lower productivity of the son-in-law following the death of the father-in-law. If the true mechanism is complementarities in production by the young man and his father-in-law, we would expect the productivity effect to be strongest for men that share the same occupation as their fathers-in-law, but the results (which are available from the author upon request) do not support this. Furthermore, there is no reason to expect that worker complementarities should be stronger in the state sector than in the private sector, or that it should decline in the state sector following the reforms.

Alternatively, the son-in-law and father-in-law may work separately in the same firm, but the family relationship solves a moral hazard problem. Under this type of mechanism, family members provide worker monitoring as firms can punish workers both directly and indirectly by punishing their family members (Heath 2011, Kugler 2003). However, Table 7 suggests that the death of the father-in-law has a positive, though insignificant, effect on hours worked. Assuming that variation in hours worked captures worker effort, a model of moral hazard would predict a drop in the number of hours worked.

E. *Insurance Effects*

Another explanation for the fall in the level of wages and an increase in the probability of job changes is if the father-in-law provided insurance while living. Assuming this is true, we may see individuals switching into jobs that have lower wages but less volatility of wages and less unemployment risk. However, this explanation is not consistent with the results in Section IIIA, where the loss

associated with the father-in-law's death was strongest in the state sector and weaker after the reforms of state-owned enterprises. Given that state jobs provided more security than private sector jobs before 1997, the insurance hypothesis would predict that the results would be strongest for those working in the private sector. Furthermore, it would predict an increase in the impact of the father-in-law's death after 1997, when the security associated with state jobs declined and the rate of lay-offs increased.

V. Conclusion

The results of the paper indicate that men's labor market outcomes in China decline substantially following the death of their fathers-in-law. The impact of the passing of the father-in-law is a decline in the level of wages of 7 to 13 percent. The estimates suggest that the death of the father-in-law makes them worse off; not only do their wages decline but the total consumption of the household falls. This paper emphasizes the importance of marriage networks on the labor market outcomes of young men. An interesting area of future research would examine the extent to which these labor market effects influence decisions in the marriage market.

The ways in which individuals use marriage networks can have important implications for labor market efficiency. The paper presents suggestive evidence that use of marriage networks decreases efficiency in the labor market in this particular context. Individuals use marital connections to distort wages of family members above the market value. This type of nepotism may be facilitated by the structure of the Chinese economy, where state-owned enterprises are relatively less focused on profit maximization than are private firms. One of the policy implications is that privatization of state-owned enterprises leads to the reduction of this type of rent-seeking behavior in the state sector.

The results of this paper highlight the role that marriage-driven favoritism play in creating inefficiencies in the labor market in China. Further research is needed to understand whether the full transition from a socialist economy to a market-driven economy is either necessary or sufficient for eliminating the inefficiencies associated with nepotism. Other possible policy solutions that would be interesting to explore in future research include the implementation and enforcement of anti-nepotism laws.

Appendix

Table A1—Wage Impact of Father-in-Law's Death Conditional on the Mother-in-Law's Status

	CHNS data		SLCC data	
	(1)	(2)	(3)	(4)
PostFILdeath$_{MILalive}$	–0.182**	–0.191**	–0.094**	–0.096**
	(0.073)	(0.074)	(0.039)	(0.039)
PostFILdeath$_{MILdead}$	–0.047	–0.036	0.024	0.024
	(0.111)	(0.112)	(0.059)	(0.059)
Additional controls	No	Yes	No	Yes
Observations	2,405	2,405	13,236	13,236
Adjusted R^2	0.369	0.371	0.663	0.663

Notes: All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A2—Impact of the Fathers' Death for Urban Women

	CHNS data		SLCC data	
	(1)	(2)	(3)	(4)
post*F*death	0.087	0.090	–0.067	–0.063
	(0.060)	(0.061)	(0.052)	(0.052)
Additional controls	No	Yes	No	Yes
Observations	2,322	2,322	12,108	12,108
Adjusted R^2	0.444	0.443	0.627	0.627

Notes: The dependent variables are constructed with real hourly earnings in the CHNS data and real annual earnings in the SLCC data. All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to rural men and urban women aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table A3—Impact of Father-in-Law's Death on Residential Mobility

	(1)	(2)
PostFIL$_{MILlive}$	–0.069*	–0.064
	(0.040)	(0.040)
PostFIL$_{MILdead}$	0.085	0.085
	(0.057)	(0.057)
Observations	3,018	3,018
Adjusted R^2	0.138	0.139

Notes: CHNS data. The dependent variable is an indicator for a residential move or attrition from the survey. All regressions include a cubic in age, education, province-year indicators, individual fixed effects, and a constant term. Additional controls are years married and health status. The sample is limited to urban men aged 22 to 45. Robust standard errors clustered by individual in brackets.

*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

FIGURE A1. OCCUPATIONAL SEGREGATION BY GENDER

Source: Study of Family Life in Urban China, 1999

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