Labor Shock Effects on Marriage Patterns

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Abstract

I study how a labor market shock affects who marries whom. I first study how a trade-induced local labor market shock affected workers differently by educational level and gender. I find that high school-educated men and women are disproportionately affected. However, while high school men's unemployment increases, women reallocate to less affected sectors and compensate for the job losses in the manufacturing sector. I then study how the labor market shock affects the marriage market. As the trade shock reduces the economic stature of men relative to women and the men's skill gap, the incentives to marry and to whom to marry are affected. I show that the decrease in marriage prevalence is driven by college-educated women marrying less with high school-educated men, as the increase in men's skill gap increases the costs of marrying down for women. On the other hand, high school women marry more with college-educated men. This can be explained as the result of two forces. First, the cost of marrying down for men remains unchanged. Second, college men become less attractive to college women as the shock reduces their relative economic stature.

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1 Introduction

Assortative mating has been steadily increasing in the US in the last decades (see e.g., Schwartz and Mare (2005)). Increased sorting can significantly increase the degree of income inequality (Fernández and Rogerson (2001)) and can curtail intergenerational mobility (Raskin (2022)). What determines who marries whom and why? In this paper, I study how an adverse labor market shock affects marriage prevalence and sorting patterns.

There is a long literature studying household formation. Becker's seminal paper (Becker (1973)) proposes that marriage's economic gains arise from household specialization. But as household technology improved (e.g., electric washing machines and microwaves) and the labor force participation of married women increased ("the quiet revolution" as coined by Goldin (2006)), the traditional gender specialization norm in which married women perform almost all household work and married men focus on market work weakens. Although traditional gender roles persist in the allocation of time within households, gender specialization in married couples has decreased dramatically since 1960 (Lundberg and Pollak (2007)). This convergence between men's and women's economic roles decreases the gains to marriage based on specialization and, therefore, marriage prevalence.

The economics of the family has identified different gains from marriage besides household specialization: joint consumption and production of public goods such as children's welfare (e.g., Lam (1988); Stevenson and Wolfers (2007); Chiappori et al. (2017)). In these models, spouses' income or human capital are complements. Changes in skill premium, rather than gender gaps, affect the incentives of whom to marry, rather than marriage prevalence, as higher human capital becomes more valuable on the marriage market.

Developing a model of household consumption, Fernández et al. (2005) examine how household formation and inequality interact in an economy. They argue that greater inequality may make matches between different classes of individuals less likely, as the cost of marrying down increases. In this paper, I test the main implication of their model exploiting the trade shock as an exogenous shock to inequality and evaluating how marriage sorting is affected.

I study how a large-scale labor demand shock caused by increased import manufacturing competition affected workers differently depending on gender and education level. In terms of employment and income, high school graduates, particularly men, were the most impacted. While both male and female employment were affected,

women were able to mitigate the effects by shifting to non-manufacturing jobs.

I then study how this differential adjustment affects marriage patterns. As shown by Autor et al. (2019), the share of married women decreased as men were differently affected by the increased international manufacturing competition. Nevertheless, the decrease in marriage prevalence is only observed for college-educated women. I argue that the relative decline in men's earnings is not enough to explain how marriage patterns are affected by the labor market shock. Changes in relative earnings across skill levels need to be taken into account. I show that the labor shock increased men's annual earnings skill gap and, consistent with Fernández et al. (2005) model, college-educated women marry less with high school men, as the cost of marrying down increases. For high school women, the prevalence of marriage is not affected. I show that this is partly a result of them increasingly marrying college-educated men, as the benefit of keep searching increases, and there is no increased cost of marrying down for men.

Related literature

My paper integrates two literatures. First, as described above, it is related to the economics of the family and the determinants of who marries whom. Second, it is related to a growing literature on the effects of increased import competition from China on local labor markets. Labor markets more exposed to import competition from China experienced larger declines in manufacturing employment, employment-population ratios, earnings for low-wage workers (Autor et al. (2013); Autor et al. (2014); Pierce and Schott (2016)); and larger increases in childhood and adult poverty, single-parenthood, and mortality related to drug and alcohol abuse, as well as greater uptake of government transfers (Autor et al. (2019))[1]. I add to this literature by examining how the negative labor market outcomes vary by education level.

In integrating these two literatures my paper is close to Autor et al. (2019). They show how shifts in the relative economic stature of young men versus young women affected marriage prevalence. In this paper, I show that the effects on marriage vary by education. I argue that this is a result of the trade shock not only affecting marriage prevalence but also marriage patterns, this is, who marries whom. While changes in relative earnings between men and women affect marriage prevalence, changes in skill gap earnings further affect marriage patterns.

The rest of the paper is organized as follows. Section 2 presents the empirical

[1]See Autor et al. (2016) and Redding (2020) for a literature review

strategy. Section 3 describe the data sources and selection. Section 4 shows the trade shock effects on labor market outcomes, and Section 5 the effects on the marriage market. Section 6 concludes.

2 Empirical Strategy

My empirical strategy builds on Autor et al. (2013) and Acemoglu et al. (2016). I exploit regional variation in exposure to rising manufacturing competition from China, stemming from initial differences in industry specialization across US Commuting Zones (CZs), to understand how shocks to the labor market affect employment and marriage patterns.

The measure of the local labor market shock is the average change in Chinese import penetration in a CZ's industries, weighted by each industry's share in initial CZ employment:

$$\Delta IP_{i\tau} = \sum_j \frac{L_{ij90}}{L_{i90}} \Delta IP_{j\tau}. \tag{1}$$

Where $\Delta IP_j = \frac{\Delta M_{j\tau}}{Y_{j91} + M_{j91} - X_{j91}}$ is the growth of Chinese import penetration in the US for industry j over period τ, computed as the growth in US imports from China divided by initial absorption in 1991 (pre-shock). The change in import penetration for industry j is apportioned to each CZ according to the share of industry j in CZ i's total employment, as measured in County Business Patterns data in 1990.

I study the causal effects of trade shocks on employment and marital status of the young-adult population ages 25-34 by fitting models of the form

$$\Delta Y_{si\tau} = \alpha_\tau + \beta_1 \Delta IP_{i\tau} + \mathbf{X}'_{i\tau}\beta_2 + e_{si\tau}. \tag{2}$$

Here, $\Delta Y_{si\tau}$ is the decadal-equivalent change in outcome Y over period τ in CZ i among group s. I estimate equation (2) stacking differences across two periods, 1990 to 2000 and 2000 to 2014, including a dummy for the second period, α_τ The control vector $\mathbf{X}'_{i\tau}$ contains start-of-period CZ-level covariates to control for labor force and demographic composition.

A concern estimating equation (2) is that increased imports from China might be the result of a demand shock as the US experiences a structural change in its manufacturing employment. To identify the exogenous supply-driven component of

increased Chinese import penetration in the US I instrument ΔIP_j with realized industry-level growth of Chinese imports in other eight developed countries [2]:

$$\Delta IP^O_{i\tau} = \sum_j \frac{L_{ij80}}{L_{i80}} \Delta IP^O_{j\tau}. \tag{3}$$

Additionally, the start-of-period employment shares are replaced with lagged values to mitigate simultaneity bias. The identifying assumption is that the common within-industry component of rising Chinese imports in the US and other high-income countries are a result of China's increased productivity and trade costs [3].

3 Data

For measures of local labor market shock by CZ I use the publicly available data set from Autor et al. (2019).

All outcome variables are constructed from IPUMS US Census 1990 and 2000, and pooled American Community Survey samples from 2013 through 2015 (Ruggles et al. (2020)). I allocate the Census geographic units, Public Use Microdata Areas (PUMAs), to CZs using the crosswalks in Dorn (2009)[4].

I keep all men and women aged 25 to 34. I define high school graduates as those whose educational attainment is 12th grade, I do not include those with some college. College graduates are all individuals with at least 4 years of college. For marital status, I define as married those individuals married with spouse present.

4 Labor market outcomes

I first study how increased trade competition affects employment by gender and education level. To do so, I estimate equation (2) where $\Delta Y_{si\tau}$ is the change in employment share of the population aged 25-34 in CZ i among group s during period τ.

Table 1 estimates the effect of increased trade exposure on employment shares for men and women. Increased import competition reduces employment for men but not among women (Panel A and B, column I). A one unit trade shock (almost equivalent

[2]The eight comparison countries are Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland.

[3]See Autor et al. (2013) for a test against correlated demand shocks and an alternative estimation strategy using a gravity model of trade which yields similar results

[4]Crosswalks files are publicly available at `https://www.ddorn.net/data.htm`.

to the average decade-level rise over this period) reduces the share of employed men by 1.3 percentage points, while the decrease in women's employment share is not statistically significant. Table 1 also studies how the effects on employment vary by educational level. Men's employment share decline is driven by employment loss for high school graduates. An increase in one unit trade shock decreases the share of high school graduates' employment by almost 1.6 percentage points (Panel A, column II). In contrast, men's college graduates' employment remains unaffected (Panel A, column III). The same pattern is observed for women, although the employment loss for high school graduates is not statistically significant (Panel B, columns II-III).

Table 1: Impact of trade shock on employment by sex and education

Panel A: Men			
	All	High School Educated	College Educated
	(I)	(II)	(III)
Δ Import Penetration	-1.272***	-1.571***	-0.336
	(0.284)	(0.331)	(0.246)
Panel B: Women			
	All	High School	College
	(I)	(II)	(III)
Δ Import Penetration	-0.440	-0.831	-0.0934
	(0.357)	(0.512)	(0.296)
Observations	1,444	1,444	1,444

Notes: Dependant variable is the change in percentage population age 25-34 that is employed. Regressions include a dummy for the 2000-2014 period; star-of-period shares of CZs that is Hispanic, black, Asian, and other race; time trends for US census divisions; lagged share of CZ employment in manufacturing; start-of-period indices of employment in routine occupations and of employment in off-shorable occupations. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

China's export boom disproportionately affected manufacturing workers. Table 2 shows how high school educated men and women adjusted differently to the trade

shock. Rising import competition reduces manufacturing employment for both. The decrease in employment for highs school graduated men is driven by the loss of manufacturing jobs. A unit rise in trade exposure reduces manufacturing employment by 1.5 percentage points for high school graduated men, and total employment by 1.6. In contrast, women were able to re-allocate into the non-manufacturing sector. Roughly two thirds of the women's job losses in the manufacturing sector are absorbed by the non-manufacturing sector. This is consistent with Brussevich (2018), who finds that men face higher exit costs from manufacturing than women.

Table 2: Impact of trade shock on manufacturing and non-manufacturing employment by sex and education

Panel A: High school educated men			
	Employment	Manufacturing Employment	Non-Manufacturing Employment
	(I)	(II)	(III)
Δ Import Penetration	-1.571***	-1.499***	0.0518
	(0.331)	(0.374)	(0.405)
Panel B: High school educated women			
	Employment	Manufacturing Employment	Non-Manufacturing Employment
	(I)	(II)	(III)
Δ Import Penetration	-0.831	-1.921***	1.316***
	(0.512)	(0.393)	(0.481)
Observations	1,444	1,444	1,444

Notes: Dependent variables: change in percentage of population age 25-34 that is employed (I), employed in manufacturing (II), employed in non-manufacturing sector (III). All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

Next, I study how the trade shock impacted annual labor earnings for high school men and women. I keep workers who worked at least 48 weeks during the last calendar year, and who usually worked at least 19 hours per week. Both men's and women's annual labor earnings are negatively affected by the trade shock. A one unit of trade shock decreases men's annual earnings by 1.7 percentage points and 1.3 points that of women's. The decrease in labor earnings is explained by losses for those working in the non-manufacturing sector. I additionally study the impact on the unconditional

distribution of annual earnings. This is, the impact on annual earnings for all high school educated men and women, irrespective of weeks or hours worked. Figure 1 shows the results for the change in earnings levels. The trade induced earning losses are greater for men than women for almost all ventiles.

Table 3: Impact of trade shock on annual labor earnings by sex and education

Panel A: High school educated men			
	All	Manufacturing Sector	Non-Manufacturing Sector
	(I)	(II)	(II)
Δ Import Penetration	-1.661**	-0.766	-2.023***
	(0.746)	(1.122)	(0.738)
Panel B: High school educated women			
	All	Manufacturing Sector	Non-Manufacturing Sector
	(I)	(II)	(II)
Δ Import Penetration	-1.327*	0.950	-1.757**
	(0.679)	(2.181)	(0.536)
Observations	1,444	1,444	1,444

Notes: Dependent variable is the change in percentage of annual and salary earnings for high school educated men and women who worked at least 48 weeks and usually at least 19 hours per week. All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

Figure 1: Impact of trade shock on high-school educated men and women annual labor earnings by percentile

Notes: The figure measures the impact of a unit trade shock on the unconditional distribution of annual wage and salary earnings for high-school educated men and women. Each dot is the coefficient from a separate IV quantile regression that includes the full set of control variables from Table 1. Shaded areas represent the 95 percent confidence interval.

5 Marriage market outcomes

Autor et al. (2019) study how increased international manufacturing competition affected marriage. They find that, consistent with Becker's model, as trade shocks reduce men's earnings relative to women's, they deter marriage formation for women aged 18 to 39: an increase in trade competition decreases the fraction of young women who are currently married while increasing the fraction of women who were never married. I also find that the increased import competition deters marriage formation for women aged 25 to 34. Panel A of Table 4 shows that a one-unit trade shock reduces the share of currently married women by 0.5 percentage points and increases the share of women who never married by 0.75 percentage points [5].

But not all women are equally affected by the trade shock; as seen in the previous

[5]See Table A3 for impact on men's marital status.

section, unskilled workers are disproportionately affected by it. Panel B and C of Table 4 shows that the trade-induced decrease in women currently married is driven by college educated women. A one-unit shock predicts a 0.9 percentage points reduction in the fraction of college women currently married.

Table 4: Impact of trade shock on women's marital status by education

Panel A: All women			
	Married (I)	Never Married (II)	Divorce Rate (III)
Δ Import Penetration	-0.536*	0.753**	-0.129
	(0.283)	(0.307)	(0.199)
Panel B: High school educated women			
	Married (I)	Never Married (II)	Divorce Rate (III)
Δ Import Penetration	-0.317	0.741*	-0.343
	(0.392)	(0.423)	(0.342)
Panel C: College educated women			
	Married (I)	Never Married (II)	Divorce Rate (III)
Δ Import Penetration	-0.829**	1.077***	-0.187
	(0.405)	(0.371)	(0.215)
Observations	1,444	1,444	1,444

Notes: Dependent variables are the change in percentage in the share of women who are currently married (I), who never married (II), and in divorce rate (III). The divorce rate is the ratio of women who are divorced over the sum of women who are currently married or divorced. All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

Surprisingly, the increased trade exposure does not affect the share of married high school women. While they adapt and shift to the non-manufacturing sector, the proportion of unemployed high school men rises. Why does the proportion of currently married high school women remain unchanged if high school men are less marriageable? The main argument of my paper is that changes in relative economic stature between men and women are not enough to understand how marriage formation changes. While changes in relative earnings between men and women affect marriage prevalence, changes in skill gap earnings further affect marriage patterns,

or who marries whom. As Fernández et al. (2005) argue, inequality changes affect sorting. I show how the trade shock affect skill premium for men and not for women, and use Fernández et al. (2005) predictions to help rationalize how marriage patterns are affected by the trade shock.

The fall in the relative economic status of men diminishes the gains from household specialization and thus the gains from marriage. However, household specialization is not the only source of gains to marriage. As Lundberg and Pollak (2014) emphasize, as women's involvement in the economy grew (the "quiet revolution" as coined by Goldin (2006)), the traditional pattern of gender specialization and division of labor within the household weakened. The primary source of the gains to marriage shifted from the production of household services and commodities to joint production (e.g., investment in children) or consumption.

Developing a model of household consumption, Fernández et al. (2005) examine how household formation and inequality interact in an economy. They argue that greater inequality may tend to make matches between different classes of individuals less likely, as the cost of marrying down increases. In this paper, I test the main implication of their model exploiting the trade shock as an exogenous shock to inequality and evaluating how marriage sorting is affected. First, I review their main implications, and next, I test it.

Fernández et al. (2005) develop a model of household formation which allows for search and it is embedded in an economy with two factors of production, skilled or unskilled workers, and further distinguish between men and women. Agents derive utility from joint consumption and a match-specific quality, love. Matching takes place over two periods: they meet at random and draw a match quality and decide whether to match or not, if they don't, they enter a second round of matching which is equal to the first. When a skilled individual meets an unskilled one and draws a high quality match faces a trade-off between forming a lower-income household with a high quality match, or going to the next round where the expected quality of the matches is lower, but there is also a positive probability of meeting a skilled agent and enjoy a higher household income. As they put it, agents face a trade-off between love and money. The main insight comes from deriving the cutoff level of love required for a skilled agent to not to continue her search after meeting an unskilled agent. The cutoff increases with inequality: as skilled agents earnings increase relative to unskilled, the cost of marrying down increases. I test their prediction exploiting the increased inequality across skill levels generated by the trade shock to evaluate how

the costs for marrying down changed for men and women, and later check if the patterns of whom marries whom changed.

The trade shock not only affects women's relative to men's income, but also earnings gaps across skill levels for men. Figures 2a and 2b shows the impact of increased trade competition on women's skilled-unskilled annual earnings gap by percentile. For women, earnings inequality across skill levels remains unchanged at every quantile. For men then, the costs of marrying down remain unchanged. Figure 2c shows the results for men's earnings skill gap. The trade shock differently affects unskilled men's earnings. A one-unit trade shock increases skilled men relative to unskilled men's earnings, significantly so for those in the middle percentiles. For college women, marrying a high school man becomes more costly, decreasing the likelihood of marrying them. For unskilled women, the cost of marrying an unskilled man also increases, so the incentives to keep searching increase.

Finally, to test Fernández et al. (2005) prediction, I study how the trade-induced labor market shock affects who marries whom. For each education group, I divide the share of married individuals according to their spouse's education and study how these shares evolve. I divide the share of married women into those who married up or down. For a given level of education E I do the following decomposition:

$$\frac{\text{Married Women(E)}}{\text{Total Women(E)}} = \frac{\text{Women(E) Married Down}}{\text{Total Women(E)}} + \frac{\text{Women(E) Married Up}}{\text{Total Women(E)}}, \quad (4)$$

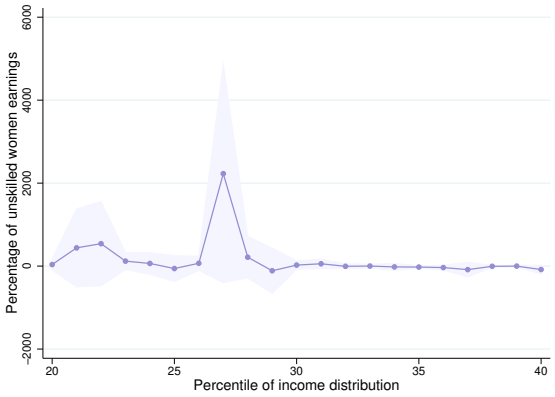
where Women(E) refers to women of education level E.

For high school educated women, I divide them into those married with a spouse with at most the same level of education as themselves ("married down") and those married with a spouse with higher education than themselves ("married up"). For college graduates, I divide them into those married with a spouse with lower education than themselves ("married down") and those married with a spouse with same level of education as themselves ("married up").

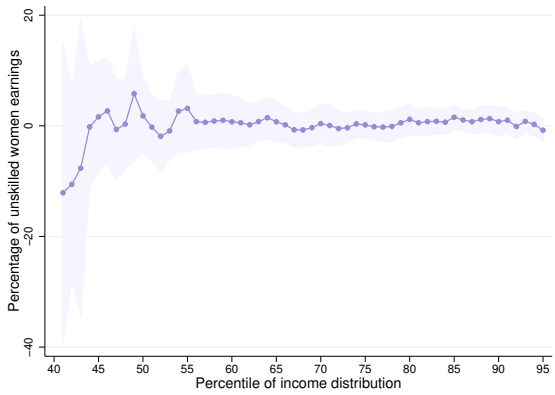
To evaluate how marriage patterns change, I estimate equation (2) for the decadal change of each term of equation (4)[6]. Table 5 shows how marriage patterns change

[6]It is important to note that the results are not driven by changes in educational attainment for men or women. The trade shock does not affect their educational attainment nor the ratios across gender-education pairs. See Tables A2 and A1

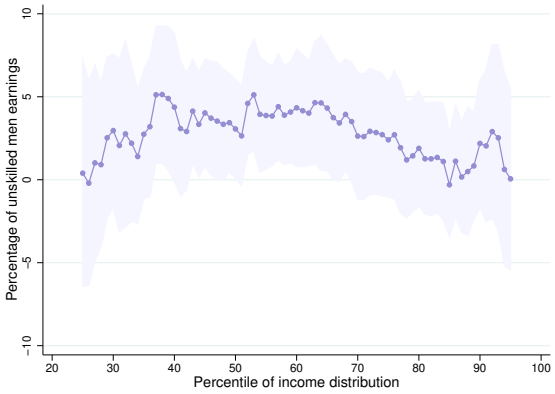
Figure 2: Change in skilled-unskilled annual earning gaps by gender



(a) Women: bottom percentiles



(b) Women: top percentiles



(c) Men

Notes: The figures present the impact of a unit trade shock on the difference in the skilled-unskilled earnings gap by gender as a percentage of the unskilled earnings in 1990 for each percentile. Each dot is a coefficient from a separate IV quantile regression that controls for the set of control variables from Table 1. Shaded areas represent a 95 percentila confidence interval.

with the trade-induced labor market shock[7][8]. Consistent with Fernández et al. (2005) predictions, as the costs of marrying down increase for college women, they marry less with high school educated men. For high school women, the costs of marrying high school men also increases. Although the decrease in these types of marriages is not significant, they do marry more with college men. This can be the result of different

[7]The change in the fraction of currently married women slightly changes in value, but not significance, for both education groups in comparison to Table 4. This is due to a slight change on the sample, as for this exercise I only considered married women those with valid information on their spouse's education.

[8]See Table A4 for men's results.

forces. As high school men do relatively worse than college men, high school women are more likely to search more in order to marry a college men, consistent with an increase in the share of those who never married (Table 4, Panel B, column (II)). For college men, the cost of marrying down has not increased, and their income relative to college women's diminish (see Figure A1). Then, as some marriages between college women and men are deterred, the likelihood of college men marrying down might increase.

Table 5: Impact of trade shock on marriage patterns by women's education

Panel A: High school educated women			
	Married (I)	Married Down (II)	Married Up (III)
Δ Import Penetration	-0.260	-0.559	0.335*
	(0.409)	(0.411)	(0.179)
Panel B: College educated women			
	Married (I)	Married Down (II)	Married Up (III)
Δ Import Penetration	-0.748**	-0.607**	-0.127
	(0.381)	(0.371)	(0.254)

Notes: The dependent variables are the decadal change of each term of equation (4). All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

6 Conclusion

In this paper, I studied how the labor market shock induced by increased import competition affected men and women differently by education group. High school-educated men and women are disproportionately affected by it. While high school men's unemployment increases, women reallocate and compensate for the job losses in the manufacturing sector. I then showed how these differential effects by education affect the marriage market. While the relative decrease in men's earnings decreases marriage prevalence, the inequality shock induced by the increased import competition also changes the incentives of whom to marry. As the earnings skill premium increases for men, women's cost of marrying unskilled men increases. As their costs

of marrying down increase, college women marry less with high school-educated men. Additionally, high school-educated women search more and marry more with college-educated men, for whom the costs of marrying down remain unchanged while also becoming less attractive to college women.

References

Acemoglu, Daron, David H Autor, David Dorn, Gordon H Hanson, and Brendan Price, "Import competition and the great US employment sag of the 2000s," *Journal of Labor Economics*, 2016, *34* (S1), S141–S198.

Autor, David H, David Dorn, and Gordon H Hanson, "The China syndrome: Local labor market effects of import competition in the United States," *American Economic Review*, 2013, *103* (6), 2121–68.

_ , _ , and _ , "The China shock: Learning from labor-market adjustment to large changes in trade," *Annual review of economics*, 2016, *8*, 205–240.

_ , _ , and _ , "When Work Disappears: Manufacturing Decline and the Falling Marriage Market Value of Young Men," *American Economic Review: Insights*, September 2019, *1* (2), 161–78.

_ , _ , _ , and Jae Song, "Trade adjustment: Worker-level evidence," *The Quarterly Journal of Economics*, 2014, *129* (4), 1799–1860.

Becker, Gary S, "A theory of marriage: Part I," *Journal of Political economy*, 1973, *81* (4), 813–846.

Brussevich, Masha, "Does trade liberalization narrow the gender wage gap? The role of sectoral mobility," *European Economic Review*, 2018, *109*, 305–333.

Chiappori, Pierre-André, Bernard Salanié, and Yoram Weiss, "Partner choice, investment in children, and the marital college premium," *American Economic Review*, 2017, *107* (8), 2109–67.

Dorn, David, "Essays on Inequality, Spatial Interaction, and the Demand for Skills," 2009. Dissertation University of St. Gallen no. 3613.

Fernández, Raquel and Richard Rogerson, "Sorting and long-run inequality," *The Quarterly Journal of Economics*, 2001, *116* (4), 1305–1341.

Fernández, Raquel, Nezih Guner, and John Knowles, "Love and money: A theoretical and empirical analysis of household sorting and inequality," *The Quarterly Journal of Economics*, 2005, *120* (1), 273–344.

Goldin, Claudia, "The quiet revolution that transformed women's employment, education, and family," *American Economic Review*, 2006, *96* (2), 1–21.

Lam, David, "Marriage markets and assortative mating with household public goods: Theoretical results and empirical implications," *Journal of Human resources*, 1988, pp. 462–487.

Lundberg, Shelly and Robert A Pollak, "The American family and family economics," *Journal of Economic Perspectives*, 2007, *21* (2), 3–26.

_ **and** _ , "Cohabitation and the uneven retreat from marriage in the United States, 1950–2010," in "Human capital in history: The American record," University of Chicago Press, 2014, pp. 241–272.

Pierce, Justin R and Peter K Schott, "The surprisingly swift decline of US manufacturing employment," *American Economic Review*, 2016, *106* (7), 1632–62.

Raskin, Victoria, "Essays on Intergenerational Mobility and the Labor Market," 2022. Doctoral Dissertation.

Redding, Stephen J, "Trade and Geography," Working Paper 27821, National Bureau of Economic Research September 2020.

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Gover, Erin Meyer, Jose Pacas, and Matthew Sobek, "IPUMS USA: Version 10.0. Minneapolis, MN: IPUMS.," 2020.

Schwartz, Christine R and Robert D Mare, "Trends in educational assortative marriage from 1940 to 2003," *Demography*, 2005, *42* (4), 621–646.

Stevenson, Betsey and Justin Wolfers, "Marriage and divorce: Changes and their driving forces," *Journal of Economic perspectives*, 2007, *21* (2), 27–52.

A Appendix Tables and Figures

Table A1: Impact of trade shock on education attainment by sex

	Men		**Women**	
	High School Educated	College Educated	High School Educated	College Educated
Δ Import Penetration	0.214	-0.0262	-0.0488	0.111
	(0.361)	(0.265)	(0.381)	(0.258)
Observations	1,444	1,444		

Notes: Dependant variable is the change in percentage men or women age 25-34 whose highest educational attainment is 12th grade (I) or at least 4 years of college (II). All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state..

Table A2: Impact of trade shock on education attainment by sex

	$\frac{\text{Women}}{\text{Men}}$	$\frac{\text{HS Women}}{\text{HS Men}}$	$\frac{\text{HS Women}}{\text{Coll Men}}$	$\frac{\text{Coll Women}}{\text{HS Men}}$	$\frac{\text{Coll Women}}{\text{Coll Men}}$
Δ Import Penetration	0.140	-0.123	-0.140	0.0849	0.0433
	(0.128)	(0.181)	(0.435)	(0.327)	(0.225)
Observations	1,444	1,444	1,444	1,444	1,444

Notes: Dependent variables are the change in gender ratio and change in gender ratio by education pairs combinations. All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state..

Table A3: Impact of trade shock on men's marital status by education

	Married (I)	Never Married (II)	Divorce Rate (III)
Panel A: All men			
Δ Import Penetration	-0.0515	0.173	-0.253
	(0.317)	(0.272)	(0.262)
Panel B: High school educated men			
Δ Import Penetration	-0.187	0.511	-0.340
	(0.433)	(0.362)	(0.542)
Panel C: College educated men			
Δ Import Penetration	-0.324	0.419	-0.141
	(0.442)	(0.427)	(0.220)
Observations	1,444	1,444	1,444

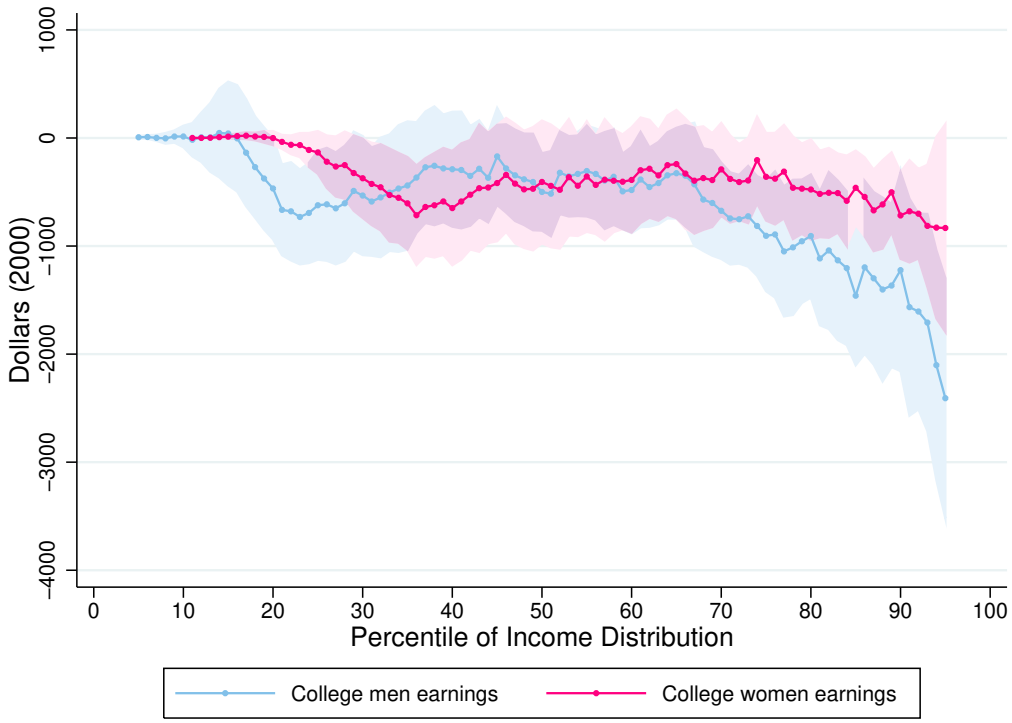
Notes: Dependent variables are the change in percentage in the share of men who are currently married (I), who never married (II), and in divorce rate (III). The divorce rate is the ratio of women who are divorced over the sum of women who are currently married or divorced. All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

Table A4: Impact of trade shock on marriage patterns by men's education

Panel A: High school educated men			
	Married (I)	Married Down (II)	Married Up (III)
Δ Import Penetration	-0.292	0.424	-0.342**
	(0.370)	(0.399)	(0.148)
Panel B: College educated men			
	Married (I)	Married Down (II)	Married Up (III)
Δ Import Penetration	-0.318	0.358*	-0.250
	(0.381)	(0.185)	(0.430)

Notes: The dependent variables are the decadal change of each term of equation (4). All regressions include the full set of control variables from Table 1. Regressions are weighted by the product of period length and commuting zone share of start-of-period US mainland population. Robust standard errors in parentheses are clustered on state.

Figure A1: Impact of trade shock on college educated men and women annual labor earnings by percentile



Notes: The figure measures the impact of a unit trade shock on the unconditional distribution of annual wage and salary earnings for college educated men and women. Each dot is the coefficient from a separate IV quantile regression that includes the full set of control variables from Table 1. Shaded areas represent the 95 percent confidence interval.