When Opportunity Knocks: China's Open Door Policy and Declining Educational Attainment

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Abstract

At the end of 1978, China opened the door to trade with foreign businesses. This study investigates how the Open Door Policy's implementation affected the skill composition and skill premium for workers born 1960-1970. Using measures of local labor markets' export exposure, we find that for every $1000 increase in exports per worker, high school completion rates decreased by 4.5 p.p. for workers born in 1970, compared to those born in 1960. Linking this to mid-career outcomes in 2010, we show that highly export-exposed workers in China have a $124 greater return to an additional year of schooling than their less export-exposed brethren. This suggests China's growth was likely dampened and its income inequality widened during the early industrialization of the 1980s and 1990s, as the Open Door Policy simultaneously reduced the availability of skilled labor and increased the skill premium.

JEL Classification: I20

Keywords: Open Door Policy, educational attainment, high school completion, skill premium

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1 Introduction

There is a growing literature exploring the links between trade and educational choice. New job opportunities brought by growth in exports shift the relationship between education and earnings. However, the direction of this change is ambiguous ex ante. Initial export growth in developing countries typically is driven by low-skill, labor intensive goods (Amiti and Freund, 2010). This should suggest a decrease in the returns to education and a decline in educational attainment, as less educated workers face greater wages and job availability after exposure to export growth. Alternatively, exports to industrialized, high-income countries have been shown to increase the skill premium (Brambilla et al., 2012; Pissarides, 1997), suggesting that the returns to education and educational attainment should increase in response to export growth. In this study, we examine the initial period of export growth in China following the Open Door Policy in 1978, investigating how the educational choices of teenagers changed in response to export exposure. We then link these education decisions to the mid-career outcomes of these workers, examining whether the chosen educational attainment of these workers is consistent with the observed changes in the returns to education caused by export growth.

National trends in Chinese educational attainment suggest that the implementation of the Open Door Policy caused students to leave school and enter the workforce. Figure 1 shows that high school and middle school completion rates decline sharply for cohorts born in the early 1960s, only reversing in the late 1960s and 1970s. Compared to the cohort born in 1960, the cohort born in 1967 was 60 percent less likely to finish high school (16.7 percentage points), and was 16 percent less likely to finish middle school (10.2 percentage point). This is surprising, as the 1960s cohorts' primary and middle school education occurred during the Cul-

tural Revolution. During the Cultural Revolution (1966-1976), all universities in China were closed; the national college entrance exam was not resumed until October 1977. Cohorts born in the late 1960s were in primary school at the end of the Cultural Revolution, however. Given nationwide improvements in education quality and the renewed possibility of college attendance, we would typically expect educational attainment to be higher for these younger cohorts than for those born in the early 1960s, but the opposite is true. It took over a decade for the middle school completion rate to return to its 1960 level and over twenty years for the high school completion rate to return to its 1960 level. Although the sociology literature has briefly mentioned this education trend (Hannum, 1999), ours is the first in economics to explore the causes of this decline and its long-run implications on Chinese labor markets.

We find that exposure to export growth in the late 1970s causes a substantial decline in high school completion. A $1000 increase in exports per worker in a prefecture[1] causes a 4.49 percentage point decline in high school completion from 1960 to 1970. Overall, between-prefecture differences in exposure to export growth caused by the Open Door Policy decrease the high school completion rate by 1 percentage point at the median for cohorts born in the late 1960s. Though this only explains about 6% of the national decline in high school completion for 1960s birth cohorts, exposure to export growth induces substantial geographical variation in educational choice that we exploit for investigating mid-career outcomes.[2]

In this time period, high school graduates were the primary source of high-skilled labor in China, so our results demonstrate a decline in high-skilled labor and a corresponding increase in low-skilled labor occurred in the most highly trade-

[1]The mean export exposure per worker in Table 1 is $402.

[2]We also find no substantial impact on the middle school completion rate; i.e., our results suggest a rise in dropping out of school after middle school, but not a rise in dropouts before middle school completion.

exposed areas of China for those born in the 1960s. Using the 2010 Chinese Family Planel Studies (CFPS), we investigate how this pattern aligns with the relationship between the skill premium and export growth after the Open Door Policy. We find that, for workers born between 1960-1970 in provinces with the highest quintile of export exposure, the return to an additional year of schooling is CNY 839.7 larger than for workers born in the second highest quintile.[3] Additionally, one extra year of schooling increases the likelihood of employment by 2.6 p.p. in the upper quintile, relative to 0.6 p.p. in the second highest quintile. Despite demonstrating a negative relationship between educational attainment and export growth for this cohort, we find a positive relationship between the returns to education and export growth. This suggests that the decisions of these workers to drop out of school after the Open Door Policy in order to seek immediate employment were short-sighted, and likely resulted in substantial, permanent loss to the lifetime earnings of many workers.

This paper contributes to the literature studying how educational choices are affected by trade flow changes. Atkin (2016) studies the education choices of Mexican teenagers after Mexican trade liberalization from 1986 to 2000, finding that the expansion of job opportunities in the manufacturing sector leads to students dropping out at grade 9 instead of continuing through grade 12. The main mechanism we investigate and our findings are similar to Atkin's, although the methods we use differ. Atkin's main specification is an instrumental variables regression, with a large single-firm expansion (e.g. a plant opening) as an instrument for new export-related jobs, and his independent variable is local cohort-average schooling. Our specification is useful for studies of countries and periods where firm-level micro-data are not available and provides a measure for export-induced local job openings without relying on the counts of new openings.

[3]The return in the upper quintile is CNY 1374.5 (4.85% of median income), and the return in the second quintile is CNY 534.8 (1.89% of median income).

The closest study to our paper is Li (2018). She studies the effects of export growth on educational attainment in China from 1990 to 2005 and finds that high-skill export shocks increase high school and college enrollment while low-skill export shocks depress both. We look at an older generation than Li because we aim to explain the puzzling decline in educational attainment in the 1960s, while Li examines a period of greater trade growth in China.

Our clear advantage over the entire existing literature examining the relationship between trade and education, is that we are able to link trade-induced education decisions to mid-career outcomes. By studying older cohorts, we are able to investigate changes in the skill composition of workers and changes in the skill premium induced by export growth. As a result, we are able to determine whether teenagers are anticipating changes in the skill premium and adjusting their educational attainment correspondingly. Our findings suggest the opposite – teenagers appear to leave school to pursue new low-skilled job opportunities, potentially causing a widening of the skill premium and leading to more severe income inequality in developing economies.

The paper proceeds as follows. Section 2 provides a historical background of China's Open Door Policy reforms in 1978, as well as an overview of major educational policy changes in the 1970s. Section 3 describes the data, and Section 4 explains the estimation strategies used. Section 5 presents the empirical results of the Open Door Policy's effects on educational attainment and Section 6 presents the results of the Open Door Policy's effects on the returns to education. Finally, Section 7 provides concluding remarks.

2 Historical Background

2.1 The Open-Door Policy

Before 1978, China had a rigid centrally planned economy. Individuals and private corporations were not allowed to trade without intermediation with state-owned corporations. Domestic commodity prices were not linked to international prices, and foreign currency exchanges were highly restricted. These policy barrier resulted in almost no trade. From the data reported by all trade partners of China in the UN Commodity Trade database, the total value of all Chinese exports in 1962 was 616,785,000 USD, 1.3% of the national GDP.

In December 1978, China enacted a series of reforms to loosen its trade policy. The government decentralized decision making regarding exports and imports, granting local governments and foreign trade corporations decision-making power. Meanwhile, the government replaced the administrative restrictions on exports and imports with tariffs, quotas, and licensing. Controls on foreign exchange were loosened, particularly for foreign-invested or foreign-managed firms. The government first designated 4 special economic zones (SEZ) in 1980, where foreign and domestic investment decisions could be made without authorization from the central government in Beijing.[4] Later, 14 cities spread along the entire Pacific coast were designated "open coastal cities" for a similar purpose to the original 4 SEZ (Wei, 1995).[5]

During the same period, China restructured the administration of the agriculture sector. Under the new household responsibility system, local rural households were held responsible for the profits and losses of the land assigned to them. It was first

[4]The 4 SEZ were Shenzhen, Zhuhai, Shantou, and Xiamen.

[5]The "open coastal cities" differed from the SEZ by their well-established industry facilities and educated labor force.

adopted in 1979, and expanded nationwide in 1981. Unlike the former agricultural system, this household responsibility system stimulated farmers' enthusiasm and substantially increased agricultural productivity (Lin, 1987, 1988).

2.2 Educational History

Figure 1 shows that educational attainment declined for cohorts born in the 1960s. We aim to link this decline to the implementation of the Open Door Policy, but this was a tumultuous time period in China with many reforms and shocks that affected education. Perhaps the most well known of these is the Cultural Revolution. However, the Cultural Revolution is unlikely to be the cause of declining education among the 1960s birth cohorts because it occurred from 1966-1976, long before the younger cohorts with the lowest educational attainment entered middle school. The most well-known impact of the Cultural Revolution on education is the closure of all colleges from 1966 to the early 1970s. The national university entrance exam was reinstated in 1977. Middle school education and high school education were affected to a lesser degree as well. The Down to the Countryside Movement started in 1968, by sending urban middle school and high school graduates to rural areas. The main group of "sent-down youth" were birth cohorts 1948-1953 (aged 13-18 in 1966). During the same time period, the government expanded primary schools and middle schools, especially in rural areas. As a result, according to the Chinese National Statistics Yearbook 1980, enrollment in primary and middle school increased throughout the 1970s nationwide.

3 Data

3.1 Trade and Educational

Our primary data source is the 1990 Chinese Population Census 1% subsample, providing educational attainment, prefecture and province of residence, migration status and other individual characteristics. We then link the Census with a prefecture-level export exposure factor. The export exposure factor is a measure for how changes in exports influence a prefecture. Export flows are measured as the changes in China's total export value for commodities from 1975 to 1982. The commodity export values come from the United Nations Commodity Trade (UN ComTrade) database, measured in US dollars. We aggregate the import flows from China reported by all countries and use that as China's total value of exports. China did not begin reporting its export flows to the United Nations until 1984, despite China exporting goods for decades before that. We need trade flows from the 1970s to observe changes in exports from the late 1970s to the 1980s, thus it is not feasible to use export flows reported by China. Additionally, import flows are generally more reliable than export flows because countries have incentives to track import shipments carefully for tariff purposes (Hummels and Lugovskyy, 2006).

It is commonly believed that export growth in China primarily occurred during the 1990s and 2000s, especially after China joined the World Trade Organization in 2001. The 1990s and 2000s are when China's exports became substantial relative to the rest of the world. However, if we focus on export growth within the country, as industrialization spread and China's productivity increased after a series of political reforms, exports grew exponentially starting in the mid-1970s. According to the World Bank, the total value of Chinese exports grew five-fold from 1970 to 1980,

quintupling again from 1980 to 1990. Figure 2 shows the changes in export value for the four highest value industries before 1990 in China. We can see that for the manufacturing of small goods, clothing, and textiles, export value increased rapidly.

In addition to export changes, we need information on the local labor market conditions Chinese teens faced in the 1970s, yet poor employment statistics in China at that time make direct measurement of local labor market conditions impossible. We instead use the 1982 Chinese Population Census to infer employment by industry by prefecture in the mid-1970s. We cannot use the whole labor force in 1982 to calculate this directly, as we expect some of the changes in job opportunities brought by exports have started to appear in the labor market, particularly for younger workers. We instead used older cohorts, aged 40-50 in the 1982 census (born 1922-1942), to estimate the employment shares in 1975.

There are concerns that some of these workers may have switched industries between 1975 and 1982. However, given that most workers worked in state-owned enterprises at that time, the labor market was rigid and moving occupations was not common. In addition, we choose a cohort that is in a stable stage in their career; they are less likely to move than their younger, less experienced counterparts. Another potential concern is workers migrating across regions, so we restrict our sample to only individuals who have not migrated between prefectures in the last five years. We lose less than 5% of the sample from this restriction.

As shown in table 1, prefecutre-leve export exposure per worker from 1975 to 1982 increases in the median prefecture by about $123. The bottom 10% of the prefectures saw a negative impact. Those are exclusively inland prefectures, mostly in Tibet. The province-evel export exposure per worker is less disperse. Table 2 presents the province-level export exposure per worker by quintiles. The top quintile includes three municipalities, Beijing, Shanghai and Tianjin, and two oil producing

provinces, Xinjiang and Liaoning.

3.2 Mid-career Outcomes

Our second data source is China Family Panel Studies (CFPS), which provides labor outcomes for the cohorts of interest (born 1960-1970). We analyze the return to schooling for individuals who experienced different levels of trade shocks in their teenage years. CFPS is a nationally representative, annual longitudinal survey of Chinese communities, families, and individuals. We use the 2010 baseline survey for our analysis.

The variables we use from CFPS 2010 are years of schooling, number of siblings, marital status, mother's education, father's educaton, mother's party membership, father's party membership, gender, province of residence, and prefecture of birth. The second panel in Table 7 shows summary statistics of the main variables we use in the mid-career outcome analysis. The mean annual income is 12173 yuan, and the median is about half of the mean. The employment rate of 1960s cohorts in 2010 is 67.4%. The descriptive statistics of other categorical control variables are in Appendix A2. We use province-level export exposure to assign individuals to quintiles in the mid-career outcome analysis instead of prefecture-level export exposure, because the CFPS only includes deidentified, unlinkable prefecture codes.

4 Methods

We aim to estimate the effect of trade on the educational choices of Chinese students in the 1970s and 1980s, around the implementation of China's Open Door Policy in late 1978. To begin, we modify the local labor market exposure measure used by Autor et al. (2013) to be applicable to the rise in exports in China, rather than in

import competition from a single trading partner:

$$\Delta XPW_{ck} = \sum_{j} \frac{L_{jk}}{L_{ck}} \frac{\Delta X_{wcj}}{L_k} \tag{1}$$

In equation (1), L_{jk} is the total employment in prefecture k and industry j in China in 1975, ΔX_{wcj} is the change in Chinese exports to the world (w) in industry j from 1975 to 1982 (in \$1000s). The term ΔXPW_{ck}, then, is the average export change per worker in prefecture k, weighted by the prefecture's pre-Open Door Policy share of total employment nationwide in industry j.

Ideally, we would observe employment by industry and by prefecture in China in 1975, and use this to construct our local export exposure variable. However, these data are not available, likely due to the political turmoil in China in the mid-1970s. Instead, we observe employment using China's 1982 National Population Census, and restrict our sample to older workers who are unlikely to change industries between 1975 and 1982. Our sample for constructing these labor share variables includes only workers ages 40 to 50 in 1982 (33 to 43 in 1975), and requires the assumption that any movement of these older workers between industries or between prefectures from 1975 to 1982 is not endogenous with the education decisions of teenagers in this time period. Constructing ΔXPW_{ck} provides us with a single export exposure measure per prefecture, used as the primary variable of interest in our regressions.

We wish to observe the final education decisions of teens who are in school when China implements its Open Door Policy in 1978; to do this, we use China's 1990 National Population Census. Treatment is assigned based on prefecture of residence in 1990, restricting our sample to only individuals who have not moved across prefectures in the past 5 years ($> 95\%$ of the sample). Additionally, we exploit heterogeneity across different age groups, as older teens when the Open

Door Policy begins are likely to respond to the trade shock differently than younger teens. Our primary regression model is:

$$Ed_i = \alpha + \sum_y \beta_y \Delta XPW_{ck} \times \delta_y + \gamma X_i + \varepsilon_i \tag{2}$$

In (2), our coefficients of interest are β_y – the different effects of the export exposure ΔXPW_{ckt} on each birth cohort y born between 1960 and 1970, aged 8 to 18 when the Open Door policy begins in 1978. Importantly, the export exposure does not change between cohorts, it only varies across prefectures. We also include fixed effects for birth cohort, province, sex, and ethnicity in X. The coefficients β_y identify between-prefecture, within-province, within-birth cohort differences in the educational response to a prefecture's export exposure change. Our outcome variable, Ed_i, is a middle school completion dummy variable or a high school completion dummy variable. In our regressions in Section 5, we set birth cohort 1960 as our baseline, as 18 year olds in 1978 would have already completed middle school and high school by the time China implemented its' Open Door policy. This allows us to make direct comparisons between an unaffected cohort (1960), partially affected cohorts (1961-66)[6], and fully affected cohorts (1967-70).

Our paper is closely related to the literature using trade flow changes in the form of a Bartik instrument (Bartik, 1991) to study labor market responses. Autor, Dorn and Hanson's influential paper used Chinese import flow changes to study the impact of import competition on labor market outcomes in the United States (Autor et al., 2013). Our methodology is similar, with one key difference: ΔXPW is constructed using changes in aggregate export flows from China to the rest of the world. This sidesteps the simultaneity issue that Autor, Dorn, and Hanson use IV estimation to circumvent, as we are interested in Chinese trade with all partners,

[6]The cohort born in 1966 would be in middle school when the Open Door policy began

not with one particular trading partner. As a result, we estimate equation 2 as is, without implementing a 2SLS framework.

5 Results

5.1 High School Completion

To begin, we estimate the average effect of prefecture-level export exposure changes on treated cohorts' likelihood of completing high school.

Table 3 presents the OLS point estimates of the effect of export exposure changes on high school completion. Column (1) shows the estimate from a naïve regression including only export exposure, and gender and ethnicity dummies. The estimate indicates that a $1000 increase in exports per worker increases the likelihood of completing high school by 10.4 percentage points. Adding province fixed effects and birth year fixed effects, column (2) shows that a $1000 increase in exports per worker increases high school completion by 4.76 percentage points. Both regressions in column (1) and (2) show a positive correlation between export growth and high school completion in this era in China. However, a more interesting question is how this effect differs between younger and older students. In other words, does export growth explain that high school completion rates of those born in the late 1960s are significantly lower than those of ones born in 1960.

Column (3) includes export exposure per worker interacted with birth cohort fixed effects, in addition to the covariates in column (2). This specification identifies how the effects of export growth differ across birth cohorts. With the 1960 birth cohort set as the baseline, cohorts born in 1961, 1962, and 1963 experienced increased high school completion, while the cohorts born after 1964 decreased their high school completion, relative to the 1960 cohort. Column (4) adds interaction

terms of province fixed effects and birth cohort fixed effects, capturing any potential province-year specific effects on education, and is our preferred specification. The estimates in column (4) show that the rise in exports has a significant, negative effect on cohorts born in and after 1965. Specifically, compared to the cohort born in 1960, a $1000 increase in exports per worker leads to a 3.32 percentage point decrease in the high school completion rate for one born in 1965. Moreover, this negative effect is greater for younger cohorts. On average, those born in 1970 have a 4.49 percentage point lower probability of completing high school compared to the 1960 cohort, when experiencing the same trade shock.

It is hard to interpret the effects shown in Table 3, since there is substantial between-prefecture heterogeneity in export growth from 1975 to 1982. The mean export exposure per worker is $320, but the 25th percentile experienced only $35 of export exposure, while the 90th percentile experienced over $650. Figure 3 plots the point estimates from Table 3, evaluated at the mean export exposure per worker for each birth cohort, with the 1960 birth cohort as the baseline. One born in 1966 with a mean export exposure has a 1 percentage point lower probability of finishing high school compared to one born in 1960 with the same exposure. Overall, our relatively coarse export exposure measure explains 6.1% of the high school completion decline among cohorts born in the 1960s.[7]

Figure 4 includes three curves showing the estimated effects at the 10th, 50th, and 90th percentile of export exposure per worker. The high school completion rate for cohorts born between 1964-1970 with the 90th percentile export exposure[8] is

[7]The high school completion rate decreased from 30.02% in the 1960 birth cohort to 13.67% in the 1966 birth cohort.

[8]Jinzhou city, Chaoyang city, Huludao city, Taiyuan city, Anshan city, Dandong city, Tongling city, Shanghai municipality, Beijing municipality, Tianjin municipality, Dalian city, Huainan city, Qiqihar city, Suihua city, Daqing city, Liaoyang city, Urumuqi city, Baicheng city, Songyuan city, Yingkou city, Panjin city, Lanzhou city, Benxi city, Wuhai city, Jiuquan prefecture, Fushun city and Karamay city.

reduced by 1 to 2.8 percentage points compared to the 1960 birth cohort.

Overall, the results shown above indicate that China's Open Door Policy had a negative and significant effect on the high school completion rates of the 1964-1970 birth cohorts, compared to the cohort born in 1960.

5.2 Middle School Completion

The previous results suggest that high schoolers dropped out of school due to job opportunities brought by the Open Door Policy. It is important to also investigate if this trade shock had a similar effect on middle school completion. In Figure 1, both middle school and high school completion rates declined for the 1960s birth cohorts, although the reduction in high school completion rate was greater and affected older cohorts compared to the decrease in middle school completion. We run the same regressions as in Table 3, with the dependent variable as middle school completion.

Table 4 presents OLS point estimates of the effect of export exposure on middle school completion. Surprisingly, the trade shock has a positive effect on the middle school completion rate of all the 1960s birth cohorts compared to the baseline cohort in 1960. The estimates are statistically significant for cohorts from 1963 to 1970, and the effects are stronger for younger cohorts. These education variables are cumulative – a high school graduate counts as both a high school and a middle school completer. Thus these findings are not explained by teens dropping out of high school and only completing middle school. This presents a puzzle – why would export growth increase middle school completion, yet decrease high school completion for cohorts born in the 1960s?

Farmer Heterogeneity

During the same period as the Open-Door Policy, China experienced a series of fundamental changes to the agricultural sector, where rural households gained responsibility for the profits and losses of the land assigned to them. These policies were first adopted in 1979, and expanded nationwide in 1981 by Deng Xiaoping. Unlike the previous agricultural system under Mao Zedong, this more privatized system stimulated farmers' enthusiasm and increased agricultural productivity. As a result, labor demand in the agricultural sector increased under this new system. Our export exposure measure is larger in highly industrialized, non-agrarian prefectures. Given that export exposure is positively associated with the middle school completion rate in Table 4, it is likely that this effect can be explained by a reduction in middle school completion in rural provinces, rather than by a positive causal effect of export growth on middle school completion. To investigate this, we construct a farmer dummy variable and a series of interaction terms of this variable and birth cohort and include them in the primary regression model.[9]

Column 1 in Table 5 shows the estimates of export exposure's effect on middle school completion, accounting for farmer heterogeneity. The coefficients shown are only for non-farmers; coefficients for farmers are shown in Table A1 in the appendix. We can see that after accounting for farmer differences, the coefficients of interest for non-farmers become small and insignificant. Figure 5 also plots the point estimates with confidence intervals from this regression, and Figure 6 shows the effects at different percentiles of export exposure per worker on middle school completion. These results show that the Open Door Policy had no effect on the middle school completion rates of the 1960s cohorts, and suggest that agricultural reform is the

[9]We use the occupation reported in the 1990 Census to identify farmers, as we do not have their *hukou* information for their official urban/rural designation. Occupation codes we consider farmers are detailed in the data appendix.

cause of the decline in primary and middle school completion among these cohorts.

As a robustness check, we add the same set of farmer dummies to the high school completion regression and show the results in Column 2 of Table 5. The effect on high school completion becomes smaller after controlling for farmer heterogeneity, but the effects are still significant and comparable in magnitude to those in Table 3. In Figure 7 we can still see obvious negative effects, although the effects are not statistically significant for several birth cohorts. Compared to Figure 4, Figure 8 shows that the trade shock's effect on high school completion is weaker at all levels of export exposure per worker after accounting for farmer heterogeneity.

5.3 Falsification Tests

One potential concern with our identification is that the local export exposure per worker could change in conjunction with human capital accumulation so that this trade shock is not exogenous to education. We test this concern by running the same regression on older cohorts, born from 1940-1960, who had already finished their education when the Open Door Policy started. Figure 9 presents the coefficients of interest of the regression on birth cohorts 1940-1970. Although noisy, the trade shock's effect on earlier cohorts (1940-1960) are not significantly different from zero, and are generally smaller than the primary effects shown from 1964-1970.

6 Mid-Career Outcomes

The analysis in the previous section shows that the Open Door Policy had a negative and statistically significant effect on the education decisions of birth cohorts 1964-1970. This explains part of the high school education decline for people born in the mid-1960s compared to the ones born in 1960. In this section, we investigate the

Open Door Policy's effects on adult outcomes and link these effects to the changes in education shown in Section 5.

The channels through which the trade shock impacts mid-career outcomes for the generation born between 1960-1970 is complicated, but this paper only focuses on education. We use the 2010 Chinese Family Panel Studies (henceforth CFPS) to examine the mid-career outcomes of hte 1960s birth cohorts. The individuals born in the 1960-1970 cohorts are 40 to 50 years old in 2010, reaching their peak earnings potential in our data. To see if there are differential impacts on the returns to education in provinces with high and low trade exposure, we perform analysis by quintiles of trade exposure. Each quintile has five to six provincial level administration regions, listed in Table 2. Note that not all provinces in the high exposure quintiles are high-income provinces today. For individuals *born* in a quintile of provinces, we regress labor market outcomes on highest level of education, number of siblings, parental education, parental party membership, birth prefecture fixed effects, year of birth fixed effects and current province of residence fixed effects.

Table 6 presents the returns to education in the 2010 CFPS by quintile of exposure to export growth after the Open Door Policy[10]. The trade shock is assigned by the province of birth in the CFPS, as the educational attainment decisions were made due to the job opportunities available to the teenagers when they were attending middle school and high school.[11] Trade shocks assigned by province of birth should reflect the labor market environment the individuals were exposed to while in school.[12]

[10]Full results shown in Table A3 and Table A4.

[11]We have prefecture level exposure, but the prefecture code is hidden in the public CFPS data.

[12]CFPS 2010 has the question "Where did you live when you were 12?", which is a more direct proxy for location of school. The response rate to that question is too low, however, for it to be useful to our analysis. Given how hard it was to migrate back in the 1970s, it is reasonable to believe that for most people the province they are born in will be the province they went to school in.

Results in the previous sections suggest that in high trade exposure regions, people left school earlier. If high trade exposure regions have lower returns to education compared to low exposure regions, then that may justify their dropout decisions. However, if the returns to education are flat or even increasing over all quintiles, then early dropout decisions decrease mid-career income, and teenagers likely should not have dropped out if they understood the long run impacts of education. In the first four columns of table 6, the coefficients are of similar magnitude in both panels; the returns to education are similar in most provinces. The income return to education in the top quintile, however, is substantially larger. If an average student born in the highest quintile provinces finished high school, he would earn CNY 1375 more than his less educated peers of a similar background. He is also 2.6% more likely to be employed between the ages of 40 and 50.

Why is the highest quintile so different from the rest of the country? There are five provincial-level administrative regions in the highest quintile: Beijing, Shanghai, Tianjin, Liaoning and Xinjiang. Liaoning and Xinjiang are largely rural, oil-producing provinces. Their high trade exposure is driven by a large increase in oil exports and the dominance of oil extraction in the provincial economy. Beijing, Shanghai and Tianjin are the only three municipalities at the time to designated at the provincial administration level. Since trade may affect the returns to schooling differently between municipalities and oil-producing provinces, we evaluate the return to education separately for the cities and non-cities in the top quintile.

Table 7[13] reveals that the higher returns to education in the upper quintile are driven completely by the cities. People born in Liaoning and Xinjiang have similar returns to education as the rest of the country. People born in the large cities, however, earn CNY 3388.4 more per additional year of schooling, which is equivalent

[13]See full set of results in Table A5 and Table A6.

to 500 U.S. dollars.[14] This is 4.49% of average urban household income according to the China Household Finance Survey in 2011. This result is not surprising, as skill-intensive jobs concentrate in big cities. A teenager who quit high school to work in the factory will likely be unqualified for managerial jobs in his forties, while his peer with a high school diploma can have a much higher-paying job.

Interestingly, the employment gap between the upper quintile and other parts of China is the same in cities and non-cities. Given that most people have not moved out of the province they were born in, trade shocks opened jobs that remained in the long run, but those jobs don't necessarily pay more.

Given that the long-run return of education is higher for those born in a city between 1960-1970, did they decrease their education in response to export growth in a similar manner to the rest of the country? We create an indicator for the 9 most populated cities in 1990. We divide birth cohorts into young (born in or after 1965) and old (born before 1965) and interact this large city indicator with cohort and trade exposure. Table 8 shows that the younger cohort more responsive to export growth if they were born in a big city than in other regions with similar trade exposure. This is an intuitive result; when China was opening up for trade, the earliest expansion of production was concentrated in big cities where the infrastructure was already well-suited for industry. Young people born in the cities will learn about new job openings earlier and get the job with lower transportation and moving costs, so the expansion of production attracts local labor before any migration occurs.

The mid-career outcomes indicate that education has a high, long run return throughout the country, which is much more prominent for individuals born in big cities. However, when making drop-out decisions, it seems that teenagers chose

[14]Converted using 2010 exchange rate. 1 USD=6.77 CNY in July 12 2010.

to forego many positive long run career outcome to earn immediate income. This decision was especially costly for teenagers born in Beijing, Shanghai and Tianjin, as the returns to education at mid-career are much higher than in the rest of country. Because they are more likely to drop out before completing high school compared to other regions with high trade exposure, it is safe to say that in the long run, they made a costly decision leaving school early.

7 Conclusion

We investigate how China's Open-Door Policy can explain the decline in educational attainment among China's 1960s birth cohorts. There are clear drops in both high school and middle school completion for nearly a decade, and we are the first to examine the underlying causes of these nationwide trends. We find that export growth driven by the Open Door Policy decreased high school completion by 4.5 p.p. for the cohorts born between 1965-1970, compared to the baseline cohort born in 1960. This suggests that the wave of new, unskilled jobs created by the Open Door Policy were filled by teenagers choosing lower educational attainment than they otherwise would.

At mid-career for the 1960s cohorts, we find that the returns to schooling are the same for individuals who faced low to moderate export exposure in their teenage years. However, the returns to schooling are substantially greater for individuals who were exposed to the largest export growth. Although the mid-career skill premium is higher for these individuals, the high school completion rate was significantly lower for the younger cohorts in highly export-exposed cities. This implies that any temporary gains in income and employment from an early dropout decision were eventually surpassed by the widening of the skill premium over the following

decades. Likely, these individuals should have attained more education in response to export shocks in their teenage years, not less.

This paper is the first to link educational attainment and mid-career outcomes with local labor market trade exposure. Our findings contribute to the literature on tradeoffs between labor force participation and human capital accumulation. Furthermore, we are the first to provide empirical evidence that positive export shocks can decrease the availability of skilled labor and as a result, can impede the long-term growth of developing economies.

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Table 1: Summary Statistics of Export Exposure per prefecture, in 1000 USD

Percentile	Export Exposure	Statistics	
10%	-0.0754	Mean	0.402
25%	0.0353	Std Dev	2.527
75%	0.303	Minimum	-1.467
90%	0.664	Maximum	34.898
N	198	Median	0.123

Table 2: Summary Statistics of Export Exposure per province, in 1000 USD

Quintiles	Provinces	Mean	SD	Min	Max
20%	Zhejiang, Hunan, Guangxi, Guizhou, Yunnan, Tibet	-0.023	0.026	-0.065	0.001
40%	Inner Mongolia, Anhui, Fujian, Jiangxi, Henan, Sichuan	0.015	0.006	0.005	0.022
60%	Hebei, Jiangsu, Hubei, Guangdong, Shaanxi, Qinghai	0.039	0.0131	0.023	0.053
80%	Shanxi, Jilin, Heilongjiang, Shandong, Gansu, Ningxia	0.140	0.068	0.073	0.255
100%	Beijing, Shanghai, Tianjin, Liaoning, Xinjiang	0.395	0.083	0.258	0.465

	1960		1970	
1990 Census	**Mean**	**SD**	**Mean**	**SD**
Education				
Complete primary school	0.847	0.36	0.863	0.344
Complete middle school	0.631	0.483	0.524	0.499
Complete high school	0.281	0.449	0.096	0.294
Some high school	0.289	0.454	0.142	0.349
Some College	0.024	0.154	0.028	0.164
Demographic Characteristics				
Female	0.486	0.5	0.489	0.5
Ethnic Minority	0.078	0.268	0.08	0.272
Agriculture	0.574	0.494	0.627	0.484
N	142270		277357	

CFPS 2010	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Annual Income	12173.313	6000	23282.61	0	800000
Years of Schooling	7.689	9	4.087	0	22
Employment Status	0.674	-	0.469	0	1
# Siblings	3.507	3	1.703	0	11
Female	48.26%				
N	5781				

Source: IPUMS 1990 China Population Census and CFPS 2010. See other controls summary statistics in Appendix A2.

Table 6: Impact of educational attainment on labor market outcomes, by quintiles of birth province exposure to trade shocks

	Lowest	Second	Third	Fourth	Highest
	Panel One: Income				
Highest level of education	865.0***	475.0***	812.0**	534.8***	1374.5**
	(158.5)	(100.6)	(282.3)	(67.66)	(485.7)
	Panel Two: Current Employment Status				
Highest level of Education	0.00592	0.00745*	0.00539	0.00598**	0.0260***
	(0.00493)	(0.00391)	(0.00422)	(0.00302)	(0.00569)
Observations	800	1345	1168	1759	896

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$. All regressions include individual controls, current province of residence fixed effects, year of birth fixed effects and birth prefecture fixed effects. Individual controls include gender, number of siblings, mother's highest level of education, father's highest level of education, mother's party membership and father's party membership. All individual controls are categorical dummies.

Table 3: High School Completion

	(1)	(2)	(3)	(4)
	1	2	3	4
ΔXPW	0.104**	0.0476**	0.0595*	0.0710**
	(0.0363)	(0.0175)	(0.0299)	(0.0257)
1961.birthyr×ΔXPW			0.0217*	0.00183
			(0.0119)	(0.00893)
1962.birthyr×ΔXPW			0.0107	-0.00274
			(0.00855)	(0.00680)
1963.birthyr×ΔXPW			0.0103	0.00302
			(0.00886)	(0.00916)
1964.birthyr×ΔXPW			-0.00222	-0.0176
			(0.0123)	(0.0123)
1965.birthyr×ΔXPW			-0.0212	-0.0332**
			(0.0185)	(0.0143)
1966.birthyr×ΔXPW			-0.0265	-0.0392**
			(0.0223)	(0.0145)
1967.birthyr×ΔXPW			-0.0305	-0.0389*
			(0.0252)	(0.0192)
1968.birthyr×ΔXPW			-0.0194	-0.0365**
			(0.0267)	(0.0176)
1969.birthyr×ΔXPW			-0.0265	-0.0385*
			(0.0262)	(0.0198)
1970.birthyr×ΔXPW			-0.0407	-0.0449**
			(0.0293)	(0.0181)
Province FE		Y	Y	Y
Birth FE		Y	Y	Y
Province × Birth FE				Y
N	2450185	2450185	2450185	2450185

Standard errors in parentheses

*$p < 0.10$, **$p < 0.05$, ***$p < 0.001$

Table 4: Middle School Completion

	(1)	(2)	(3)	(4)
	1	2	3	4
ΔXPW	0.173***	0.0803**	0.0578	0.0588
	(0.0418)	(0.0339)	(0.0345)	(0.0350)
1961.birthyr×ΔXPW			0.00984	0.0125
			(0.00652)	(0.00744)
1962.birthyr×ΔXPW			0.00228	0.0132
			(0.00885)	(0.00817)
1963.birthyr×ΔXPW			-0.000103	0.0225**
			(0.00988)	(0.00986)
1964.birthyr×ΔXPW			0.0107	0.0211**
			(0.0105)	(0.00965)
1965.birthyr×ΔXPW			0.0186	0.0230**
			(0.0124)	(0.0112)
1966.birthyr×ΔXPW			0.0279**	0.0245**
			(0.0130)	(0.0115)
1967.birthyr×ΔXPW			0.0321**	0.0209
			(0.0148)	(0.0136)
1968.birthyr×ΔXPW			0.0463**	0.0280*
			(0.0170)	(0.0147)
1969.birthyr×ΔXPW			0.0450**	0.0261*
			(0.0180)	(0.0139)
1970.birthyr×ΔXPW			0.0545**	0.0380**
			(0.0184)	(0.0142)
Province FE		Y	Y	Y
Birth FE		Y	Y	Y
Province × Birth FE				Y
N	2450185	2450185	2450185	2450185

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table 5: Trade Effects on Non-Farmers

	(1) Middle School Completion	(2) High School Completion
ΔXPW	0.00824	0.0292
	(0.0138)	(0.0197)
1961.birthyr×ΔXPW	-0.00287	-0.00967
	(0.00618)	(0.00847)
1962.birthyr×ΔXPW	0.00136	-0.00173
	(0.00775)	(0.0102)
1963.birthyr×ΔXPW	0.00611	0.000824
	(0.00710)	(0.0101)
1964.birthyr×ΔXPW	-0.00155	-0.0171
	(0.00870)	(0.0138)
1965.birthyr×ΔXPW	0.00435	-0.0279**
	(0.0101)	(0.0130)
1966.birthyr×ΔXPW	0.00175	-0.0295**
	(0.0107)	(0.0141)
1967.birthyr×ΔXPW	-0.000919	-0.0295
	(0.0123)	(0.0197)
1968.birthyr×ΔXPW	0.00123	-0.0188
	(0.0122)	(0.0187)
1969.birthyr×ΔXPW	-0.00486	-0.0191
	(0.0120)	(0.0217)
1970.birthyr×ΔXPW	0.0182	-0.0132
	(0.0139)	(0.0191)
N	2286998	2286998

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table 7: Impact of educational attainment on labor market outcomes in the highest trade exposure quintile, by cities and non-cities

	Cities	Non-cities
	Panel One: Income	
Highest level of education	3388.4** (1085.4)	496.9** (229.0)
	Panel Two: Current Employment Status	
Highest level of Education	0.0232** (0.00892)	0.0292*** (0.00772)
Observations	337	559

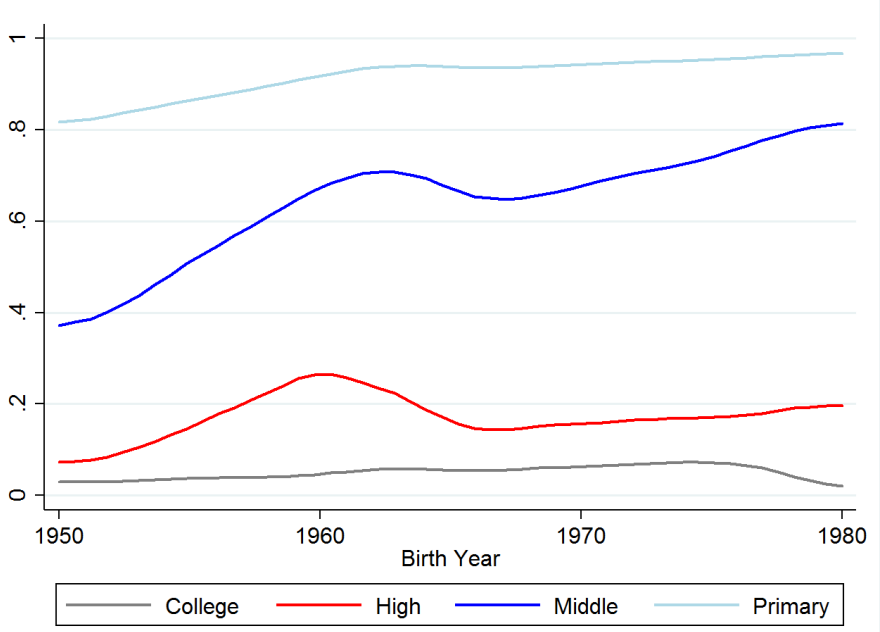
Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$.
Cities include Beijing, Shanghai and Tianjin. Non-cities include Liaoning and Xinjiang.

Table 8: High School Completion by Generation by birth location

	High school completion rate
Young cohort×Big city×ΔXPW	-0.0772** (0.0305)
Young Cohort	-0.162*** (0.0286)
Young cohort×ΔXPW	-0.0360** (0.0110)
Big city	0.0187 (0.0130)
Big city×ΔXPW	0.149*** (0.0281)
ΔXPW	0.0667*** (0.0180)
Observations	2450185

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$. Young cohort is 1 if the individual is born after 1965, and 0 otherwise. Big city is 1 if the individual is born in one of these 9 cities: Shanghai, Beijing, Tianjin, Wuhan, Shenyang, Guangzhou, Chongqing, Xi'an, Nanjing and 0 otherwise. ΔXPW is the province level trade exposure. Each of these cities is a prefecture. Harbin was one of the top 10 cities, but it is not a prefecture on its own so we leave it out.

Figure 1: School Completion Rates across Cohorts



Notes: Data is from China's 2000 Census. Sample includes birth cohorts 1950-1980

Figure 2: Highest Export Value Industries, 1960-1990

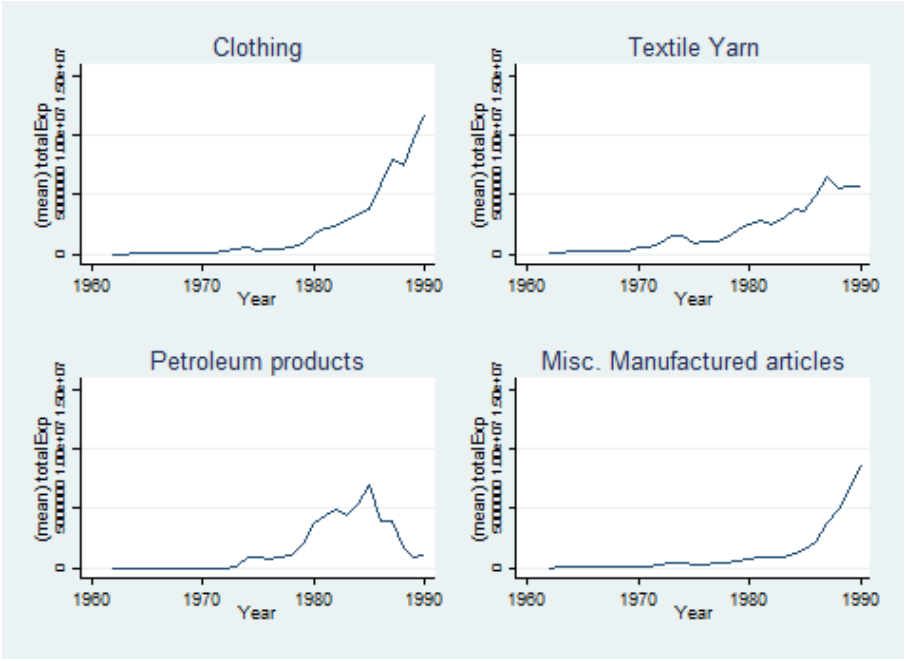
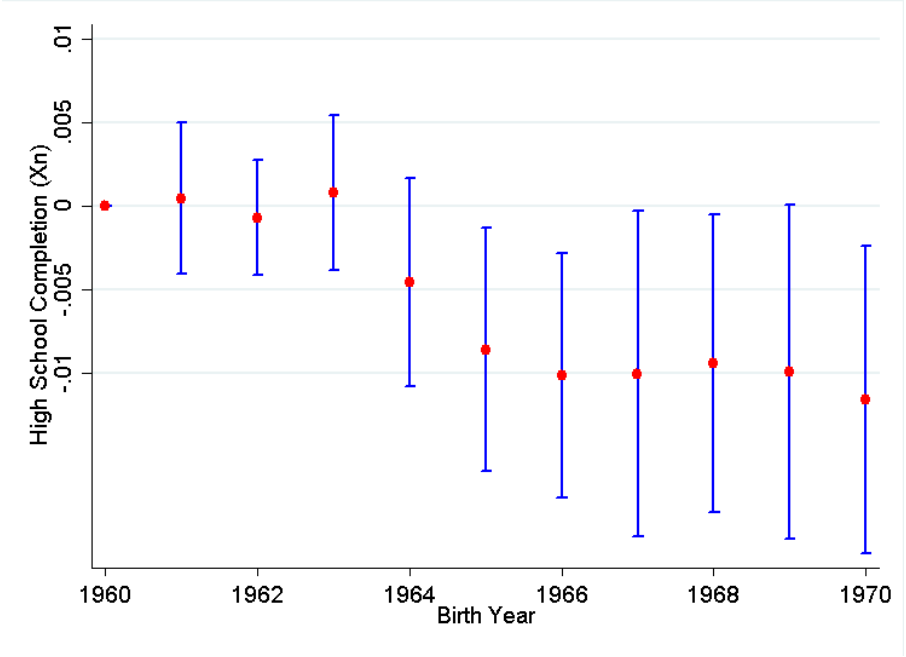
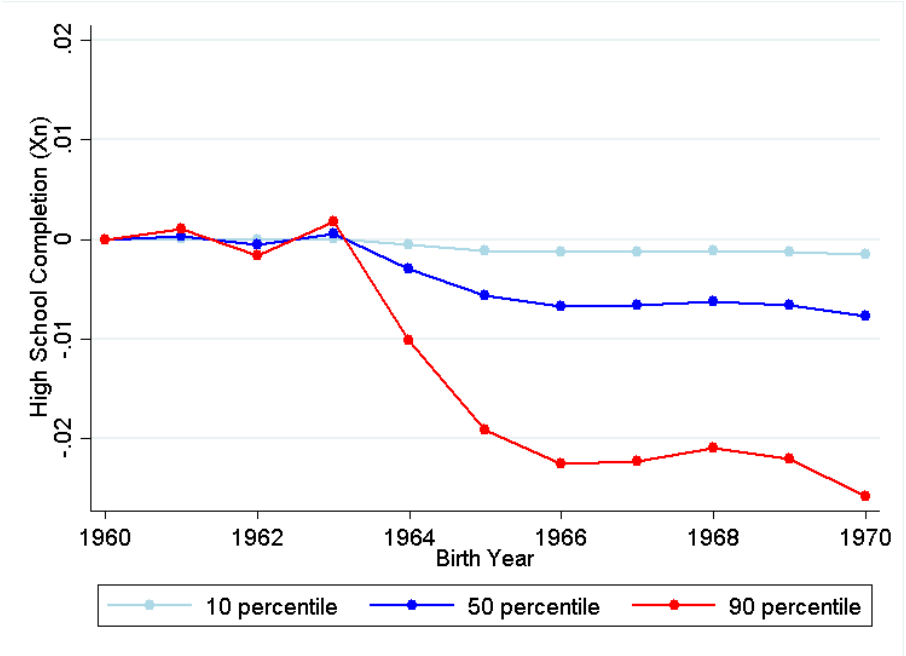


Figure 3: Export Exposure Mean Effects on High School Completion



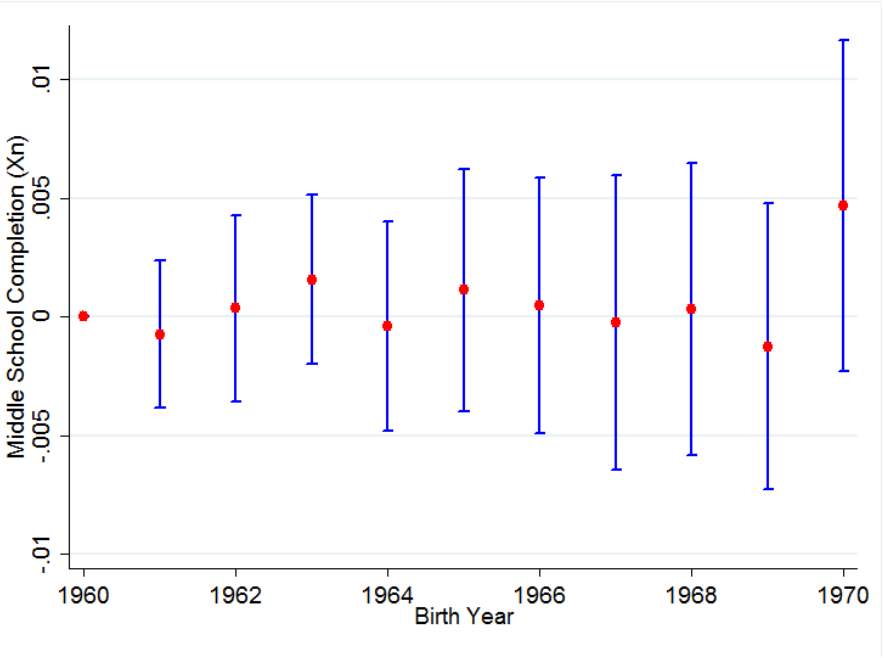
Notes: Sample includes birth cohorts 1960-1970

Figure 4: Percentile Effects on High School Completion



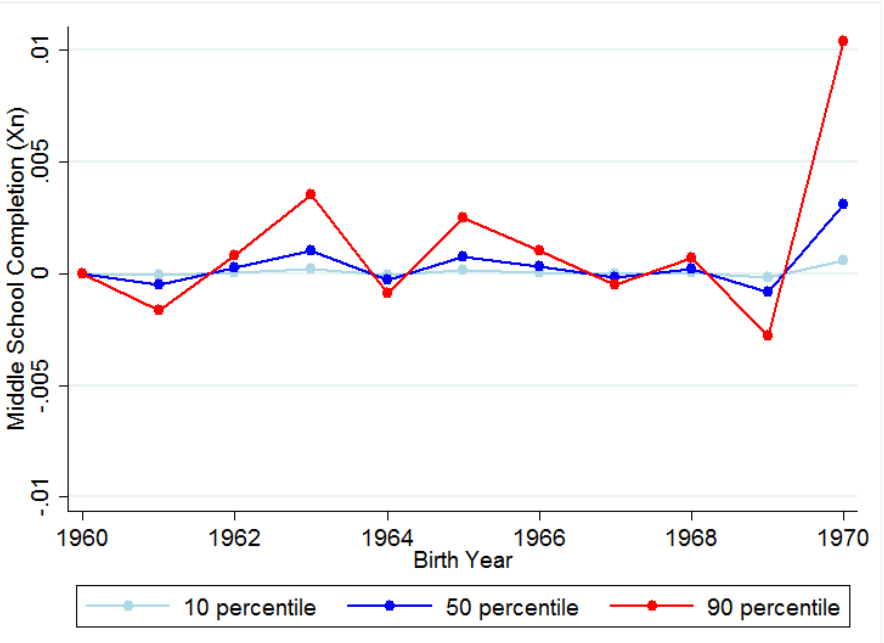
Notes: Sample includes birth cohorts 1960-1970

Figure 5: Export Exposure Mean Effects on Middle School Completion (Non-Farmers)



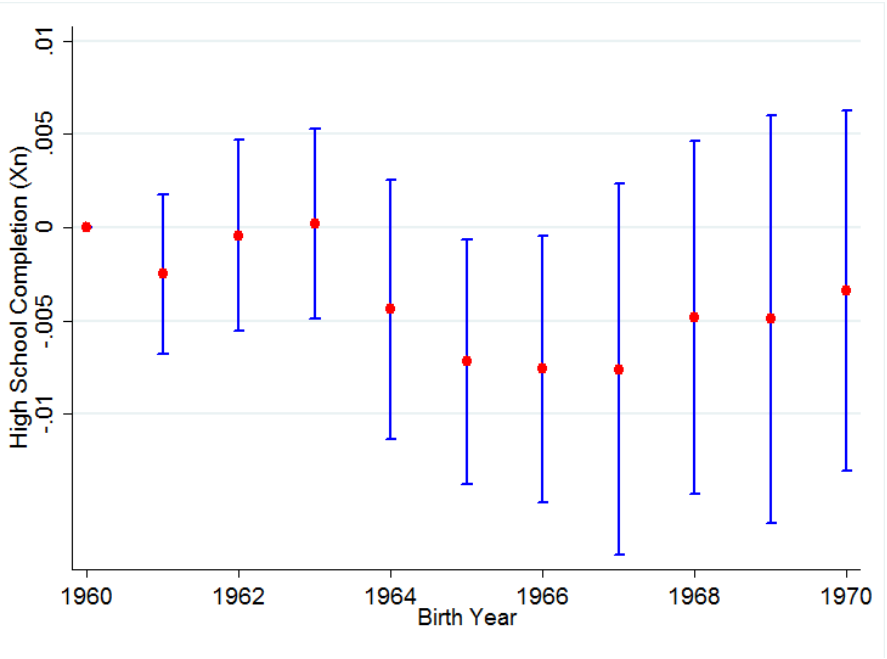
Notes: Sample includes birth cohorts 1950-1980

Figure 6: Percentile Effects on Middle School Completion (Non-Farmers)



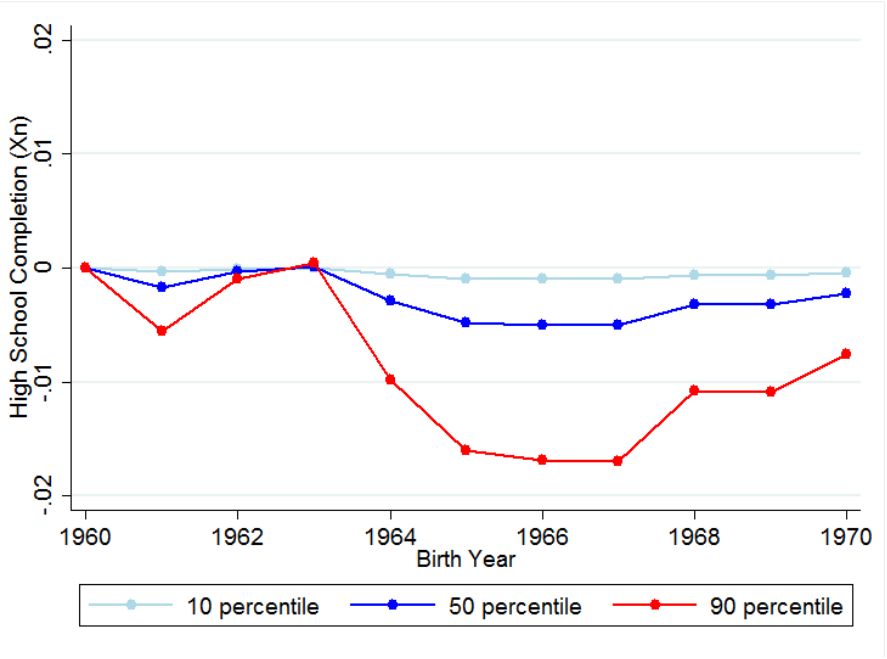
Notes: Sample includes birth cohorts 1950-1980

Figure 7: Export Exposure Mean Effects on High School Completion (Non-Farmers)



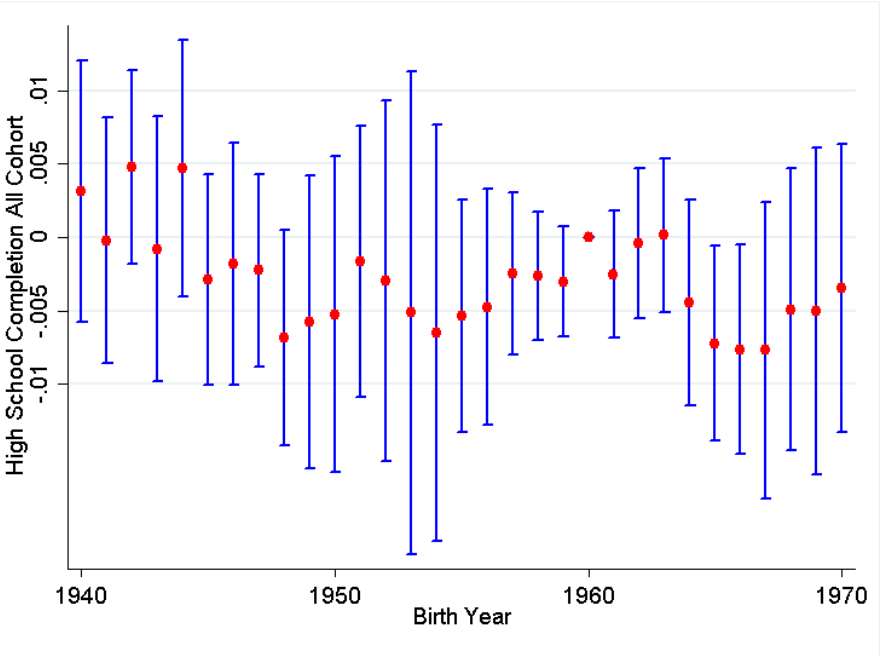
Notes: Sample includes birth cohorts 1960-1970

Figure 8: Percentile Effects on High School Completion (Non-Farmers)



Notes: The gender-cohort averaged years of schooling is weighted by individual weight.

Figure 9: Export Exposure Effects on High School Completion, 1940-1970



Notes: Sample includes birth cohorts 1950-1980

Appendix: Additional Tables and Figures

Table A1: Export Exposure Effects on Farmers' Education

	(1) High School	(2) Middle School
Farmer	-0.388***	-0.339***
	(0.0186)	(0.0164)
Farmer×ΔXPW	0.00628	-0.00176
	(0.0279)	(0.0290)
Farmer×1961.birthyr×ΔXPW	0.00921	-0.0110
	(0.0115)	(0.00949)
Farmer×1962.birthyr×ΔXPW	0.0149	-0.0132
	(0.00935)	(0.0130)
Farmer×1963.birthyr×ΔXPW	0.0161	-0.0147
	(0.0158)	(0.0152)
Farmer×1964.birthyr×ΔXPW	0.0261*	-0.00763
	(0.0141)	(0.0146)
Farmer×1965.birthyr×ΔXPW	0.0165	-0.00173
	(0.0131)	(0.0160)
Farmer×1966.birthyr×ΔXPW	0.0222	-0.00349
	(0.0160)	(0.0166)
Farmer×1967.birthyr×ΔXPW	0.0181	0.000158
	(0.0176)	(0.0230)
Farmer×1968.birthyr×ΔXPW	0.0257	-0.00852
	(0.0218)	(0.0261)
Farmer×1969.birthyr×ΔXPW	0.0301	-0.0124
	(0.0187)	(0.0279)
Farmer×1970.birthyr×ΔXPW	0.0172	-0.0178
	(0.0220)	(0.0294)
N	2286998	2286998

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table A2: Summary Statistics of Other Controls, CFPS 2010

Variables	Percent	Variables	Percent
Marriage Status			
Never Married	1.03		
Married	95.21		
Cohabitation	0.27		
Divorced	1.94		
Widowed	1.55		
Father's Edu		**Mother's Edu**	
Illiterate/Semi-illiterate	51.49		74.42
Primary School	30.55		18.24
Junior High School	10.72		4.47
Senior High School	5.36		2.11
2- or 3-year College	0.84		0.28
4-year College/Bachelor's Degree	1.01		0.35
Master's Degree	0.00		0.03
Doctoral Degree	0.03		0.09
Father's Part		**Mother's Party**	
Member of Communist	18.79		2.42
Member of Democratic	0.15		0.01
Member of Communist Youth League	1.06		0.95
General Public	80.00		96.63

Table A3: Mid-career Income

	(1)	(2)	(3)	(4)	(5)
	income	income	income	income	income
cfps2010eduy_best	865.0***	475.0***	812.0**	534.8***	1374.5**
	(158.5)	(100.6)	(282.3)	(67.66)	(485.7)
1.gender	4471.7***	4461.7***	8807.3***	5726.3***	9749.7***
	(1140.4)	(731.1)	(1760.5)	(545.1)	(1593.8)
1.qb1	-6800.8	-5139.6**	2939.6	2502.5*	-9841.0
	(6007.4)	(2197.6)	(1819.2)	(1327.7)	(7079.9)
2.qb1	-4241.5	-1887.5	5093.1**	1768.1*	-7834.2
	(4559.9)	(2305.3)	(1747.9)	(1050.0)	(4934.1)
3.qb1	-4677.4	-2515.9	4602.3**	3770.2***	-2779.4
	(4613.4)	(2177.7)	(1735.9)	(1078.8)	(5704.3)
4.qb1	-3559.8	-3734.3*	3855.8**	2213.1**	-4622.8
	(4538.1)	(2108.2)	(1716.9)	(1029.4)	(4547.0)
5.qb1	-4173.1	-2801.0	9341.8	2674.2**	-2927.5
	(4597.1)	(2196.9)	(6385.7)	(1087.4)	(5138.1)
6.qb1	-3098.0	-3358.2	4565.6**	2253.7*	-2369.0
	(4676.6)	(2878.2)	(2031.6)	(1183.1)	(4831.6)
7.qb1	-4537.1	-601.5	5571.1**	4078.3**	3053.3
	(4868.6)	(3123.7)	(2479.6)	(1794.1)	(7839.5)
8.qb1	-1281.9	1566.4	7484.7*	2941.2	-5908.4
	(5152.3)	(4830.1)	(4314.6)	(2061.5)	(6450.4)
9.qb1	-12489.0**	-7009.7	33361.6	3998.9	
	(4908.4)	(6549.6)	(23384.0)	(5294.8)	
10.qb1	-2842.7			1240.8	1878.9
	(6146.8)			(4105.0)	(5813.4)
2.feduc	-822.4	-433.6	-138.5	-165.2	351.4
	(1200.5)	(957.2)	(1230.4)	(589.0)	(1829.5)
3.feduc	-220.7	-1897.2*	949.3	2763.2**	-2313.3
	(2317.0)	(1131.9)	(1998.0)	(1152.2)	(3064.5)
4.feduc	-817.9	989.3	517.4	226.4	5296.4
	(5720.2)	(2394.7)	(1851.7)	(1267.5)	(4019.2)
5.feduc	-7689.0	2526.7	9982.7*	-1269.8	2406.4
	(6465.6)	(4621.7)	(5354.8)	(2117.0)	(5833.6)
6.feduc	1753.0	1088.8	-2942.2	3375.9	-2372.6
	(9217.1)	(2579.6)	(7834.7)	(3812.4)	(8035.0)
2.meduc	-342.5	1696.2	-514.6	2842.5**	1906.9
	(1550.0)	(1429.8)	(1199.0)	(887.7)	(2099.3)
3.meduc	-3477.4	-867.5	2530.9	1409.3	7022.3
	(6411.2)	(1825.8)	(2461.4)	(1734.8)	(4371.9)
4.meduc	1046.3	3495.4	-4228.1	-820.6	7308.7
	(11553.0)	(2585.5)	(4152.7)	(1896.7)	(4790.2)
5.meduc	2564.7		1695.7	11443.7**	7411.0
	(9054.5)		(17834.5)	(4445.9)	(14318.8)
6.meduc	-21552.0**	19558.6	-1293.6	17246.4**	20381.7
	(9846.7)	(14092.6)	(3116.9)	(8353.7)	(15017.9)
11.qb1			13443.0**	11666.4**	
			(4908.3)	(5837.9)	
N	800	1345	1168	1759	896

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table A4: Mid-career Employment

	(1) Emp	(2) Emp	(3) Emp	(4) Emp	(5) Emp
cfps2010eduy_best	0.00592	0.00745*	0.00539	0.00598**	0.0260***
	(0.00493)	(0.00391)	(0.00422)	(0.00302)	(0.00569)
1.gender	0.0242	0.0511*	0.116***	0.0948***	0.185***
	(0.0353)	(0.0281)	(0.0290)	(0.0231)	(0.0331)
1.qb1	-0.0529	-0.0327	-0.135	0.0694	0.00947
	(0.162)	(0.0912)	(0.0973)	(0.0723)	(0.109)
2.qb1	-0.00146	0.0848	-0.161*	0.0530	0.110
	(0.137)	(0.0848)	(0.0832)	(0.0673)	(0.106)
3.qb1	0.0319	0.0875	-0.102	0.0591	0.0930
	(0.134)	(0.0832)	(0.0830)	(0.0658)	(0.107)
4.qb1	-0.0471	0.117	-0.117	0.117*	0.101
	(0.135)	(0.0836)	(0.0832)	(0.0653)	(0.110)
5.qb1	-0.0974	0.0625	-0.142	0.170**	0.129
	(0.136)	(0.0854)	(0.0863)	(0.0682)	(0.117)
6.qb1	0.142	0.111	-0.114	0.0282	0.0680
	(0.140)	(0.0948)	(0.0957)	(0.0696)	(0.120)
7.qb1	0.0478	0.0782	-0.161	0.0414	0.0465
	(0.155)	(0.103)	(0.104)	(0.0821)	(0.152)
8.qb1	0.0421	0.224	0.0381	0.0843	0.0917
	(0.183)	(0.196)	(0.112)	(0.0971)	(0.184)
9.qb1	-0.532**	0.264**	-0.0458	0.154	
	(0.168)	(0.102)	(0.101)	(0.261)	
10.qb1	-0.298			-0.599***	0.491***
	(0.326)			(0.109)	(0.141)
2.feduc	-0.0147	0.0384	0.0559*	-0.0460*	0.00805
	(0.0402)	(0.0336)	(0.0340)	(0.0275)	(0.0426)
3.feduc	-0.00749	-0.0238	0.140**	-0.00232	0.00549
	(0.0696)	(0.0483)	(0.0513)	(0.0430)	(0.0614)
4.feduc	-0.0886	0.157**	-0.0754	0.00391	0.0678
	(0.0972)	(0.0665)	(0.0626)	(0.0528)	(0.0691)
5.feduc	-0.415*	-0.0877	-0.196	0.212	-0.236
	(0.234)	(0.142)	(0.251)	(0.160)	(0.159)
6.feduc	-0.193	0.385**	-0.633***	0.359***	-0.180
	(0.183)	(0.136)	(0.149)	(0.0876)	(0.123)
2.meduc	-0.107**	0.0411	-0.0194	0.0295	0.0363
	(0.0521)	(0.0407)	(0.0407)	(0.0364)	(0.0451)
3.meduc	-0.169	0.0527	-0.0715	-0.0509	0.0734
	(0.116)	(0.0711)	(0.0874)	(0.0678)	(0.0683)
4.meduc	0.000232	0.113	-0.0799	-0.0715	0.0575
	(0.0993)	(0.138)	(0.141)	(0.113)	(0.0940)
5.meduc	0.261		0.317	0.0602	0.317**
	(0.185)		(0.262)	(0.259)	(0.151)
6.meduc	-0.0372	0.183	-0.633***	-0.0159	0.262
	(0.133)	(0.237)	(0.0868)	(0.120)	(0.165)
11.qb1			-0.0410	-0.349	
			(0.0987)	(0.287)	
N	750	1231	1156	1758	886

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table A5: Mid-career Income and Employment in Beijing, Shanghai and Tianjin

	(1) income	(2) Emp
cfps2010eduy_best	3388.4**	0.0232**
	(1085.4)	(0.00892)
1.gender	12683.0***	0.198***
	(3226.0)	(0.0506)
1.qb1	-23294.8**	-0.127
	(11447.2)	(0.117)
2.qb1	-18039.1*	-0.0667
	(9945.9)	(0.114)
3.qb1	-6596.2	-0.0358
	(10307.3)	(0.117)
4.qb1	-16036.9*	-0.173
	(9674.7)	(0.130)
5.qb1	-19081.4**	-0.00813
	(9614.1)	(0.150)
6.qb1	-37827.5	-0.140
	(24029.7)	(0.187)
7.qb1	117282.9***	0.118
	(17617.8)	(0.149)
8.qb1	-21446.7	0.284
	(13150.0)	(0.185)
2.feduc	1933.8	-0.00231
	(4271.1)	(0.0670)
3.feduc	-3542.7	-0.0964
	(5678.1)	(0.0961)
4.feduc	15132.7	-0.0340
	(11881.9)	(0.130)
5.feduc	10982.5	0.122
	(15006.6)	(0.161)
6.feduc	-26171.1	-0.319**
	(26988.2)	(0.162)
2.meduc	8103.7	0.0824
	(5405.5)	(0.0728)
3.meduc	20109.1*	0.130
	(10561.4)	(0.112)
4.meduc	22215.8**	0.134
	(10472.6)	(0.130)
5.meduc	2212.8	0.245
	(32669.2)	(0.175)
6.meduc	72117.8*	0.354*
	(42209.9)	(0.212)
N	337	327

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table A6: Mid-career Income and Employment in Xinjiang and Liaoning

	(1) income	(2) Emp
cfps2010eduy_best	496.9**	0.0292***
	(229.0)	(0.00772)
1.gender	5827.0***	0.152**
	(1048.1)	(0.0464)
1.qb1	-2427.2	0.113
	(3880.2)	(0.208)
2.qb1	-1953.1	0.342*
	(3101.9)	(0.194)
3.qb1	-2627.3	0.270
	(3111.9)	(0.193)
4.qb1	-106.3	0.338*
	(3150.0)	(0.194)
5.qb1	778.0	0.337*
	(3821.7)	(0.199)
6.qb1	2.001	0.280
	(3200.3)	(0.201)
7.qb1	-1237.4	0.243
	(3496.8)	(0.223)
8.qb1	-2906.2	0.262
	(3247.1)	(0.280)
2.feduc	1371.9	0.0241
	(1324.6)	(0.0572)
3.feduc	2825.3*	0.0622
	(1704.0)	(0.0787)
4.feduc	1738.8	0.104
	(1533.2)	(0.0898)
5.feduc	-470.9	-0.402*
	(2880.1)	(0.224)
6.feduc	480.2	-0.0580
	(5572.2)	(0.205)
2.meduc	-397.3	0.0112
	(1206.7)	(0.0589)
3.meduc	2049.0	0.0898
	(2479.1)	(0.0874)
4.meduc	2237.1	0.0329
	(2809.9)	(0.120)
5.meduc	5583.1	0.387**
	(7616.0)	(0.170)
6.meduc	-5149.6	0.173
	(3855.7)	(0.262)
N	559	559

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$