China's "Great Migration": The impact of the reduction in trade policy uncertainty*

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April 16, 2019

Abstract

We analyze the effect of China's integration into the world economy on workers in the country and show that one important channel of impact has been internal migration. Specifically, we study the changes in internal migration rates triggered by the reduction in trade policy uncertainty faced by Chinese exporters in the U.S. This reduction is characterized by plausibly exogenous variation across products, which we use to construct a local measure of treatment, at the level of a Chinese prefecture, following Bartik (1991). This allows us to estimate a difference-in-difference empirical specification based on variation across Chinese prefectures before and after 2001. We find that prefectures facing the average decline in trade policy uncertainty experienced a 24 percent increase in their internal in-migration rate – this result is driven by migrants who are "non-*hukou*", skilled, and in their prime working age. Finally, in those prefectures, working hours of "native" unskilled workers significantly increased, and internal migrants found employment in the places they migrated to.

JEL classification: F22, F63, J61, O15. *Keywords*: hukou, immigration, internal migration, trade policy uncertainty.

*An earlier version of this paper was prepared within the "Value Added in Motion (VAM)" project funded by the Enel Foundation. The authors would like to thank Lorenzo Caliendo, Yuanyuan Chen, Fenglian Du, John Giles, Rufei Guo, Jack Hou, Mingming Jiang, Xin Meng, Chris Milner, Giammarco Ottaviano, Andrei Potlogea, Marlon Seror, Willem Thorbecke, Chuhong Wang, Shang-Jing Wei, Eden Yu, Zhihong Yu, Liqiu Zhao, Zhong Zhao, Yuan Zi and numerous seminar and conference participants for very helpful discussions and comments. We are also grateful to the editor and two referees of this journal, who helped us improve significantly the paper. This work was supported by the Economic and Social Research Council [grant number ES/L015684/1].

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" ...The last three decades have witnessed the world's 'Great Migration' – an estimated 200-250 million rural residents have moved to cities and towns within China (Chan 2012a). To put this in perspective, the volume of the Great Migration of Europeans to North America from 1800 to World War I was only a fraction of China's, 'on the order of fifty million persons' (Tilly 1976, p.58)." (Chan 2012b, page 187).

1 Introduction

China's accession to the World Trade Organization (WTO) in 2001 is one of the major economic changes of the new century. Much has been written about the impact of this event on the economies of China's trading partners, for example the United States.[1] In particular, the literature provides evidence on how U.S. workers have been affected by greater Chinese competition, for example through changes in employment rates.

In this paper we analyze the effect on workers in China.[2] Our main contribution is to show empirically that one important channel of impact on these workers has been internal migration. Our paper is the first to provide a comprehensive analysis of internal migration for all Chinese prefectures using individual-level Census data (to measure migration flows) and firm-level export data (to account for the local exposure to the international trade shock) together with an identification strategy based on plausibly exogenous variation. We investigate the implications of a specific consequence of WTO membership – namely the reduction in trade policy uncertainty faced by Chinese exporters to the U.S. – on internal migration in China. We study whether we can identify a link between reduction in trade policy uncertainty, changes in trade patterns and local labor demand, and the induced relocation of workers across Chinese prefectures.

Understanding China's "Great Migration" (Scheineson 2009) is important both because of the sheer size of the phenomenon, and because of the impact it has had on China's economy and society. As of 2014, China's National Bureau of Statistics estimated that 278 million individuals – or 20 percent of the country's total population – lived outside their

[1] See for example Autor, Dorn, and Hanson (2013), Handley and Limao (2017), Pierce and Schott (2016).

[2] Other papers focus on China as well, highlighting the important adjustments undergone by the Chinese economy as a result of WTO accession. See for example Brambilla, Khandelwal, and Schott (2010), Brandt and Morrow (2013), Cheng and Potlogea (2015), Erten and Leight (2017), Fan (2015), Kee and Tang (2016), Tombe and Zhu (2015), Yu (2015), Wang (2015) and Zi (2016).

home towns for at least 6 months each year. To gain perspective, if Chinese internal migrants were a separate country, they would make up the fourth largest one in the world. Several papers have highlighted the key role played by the geographic relocation of "surplus labor" (Lewis 1954) in explaining productivity – and more generally – economic growth in China (Tombe and Zhu 2015, Bond, Riezman, and Wang 2016, Li, Seok, and You 2015). Other contributions have emphasized instead the social challenges brought about by migration: unskilled migrant workers do not enjoy even basic labor rights, lack welfare coverage and are systematically exposed to discrimination in the urban areas where they move (Scheineson 2009). Less instead is known on the link between changes in the trade policy environment, and in particular trade policy uncertainty, and the relocation of workers across different regions within China. The goal of this paper is to shed light on this important question.[3]

To carry out our analysis, we combine data from several sources. We construct internal migration rates using individual-level information from, respectively, China's 2000 population Census and 2005 "mini" Census. Taking advantage of the detailed information in the data, we focus on individuals who have moved from their usual residence and identify those who have acquired the *hukou* (registration) in the locality where they currently reside, and those who instead have not.[4] We follow the literature and define the former as "*hukou* migrants" and the latter as "non-*hukou* migrants". We measure trade policy uncertainty – faced by Chinese exporters to the U.S. – using the product-specific normal-trade-relations (NTR) gap measure developed by Handley and Limao (2017) and Pierce and Schott (2016). This measure is built by calculating the gap between the Most Favorite Nation (MFN) tariffs applied by the United States to WTO members and the threat tariffs that would have been implemented if MFN status was not renewed to China by the U.S. Congress (the so called column 2 tariffs of the Smoot-Hawley Trade Act). To determine *local* exposure to uncertainty, at the level of a Chinese prefecture, we follow Bartik (1991). Specifically, we draw on export data at the firm level between 1997–1999 – i.e. before our period of investigation – which we use to construct a weighted average of the NTR gap across products for each Chinese prefecture. Additionally, we assess the robustness of our results using weights

[3] A few recent working papers have instead analyzed the broader question of how the Chinese economy has adjusted to globalization. See section 2 for more details.

[4] *Hukou* is a permit issued by the Chinese government. It determines the location of registration and work of each individual living in China, as well as access to local public services. Before the "Opening-up" reforms in 1978, people were required to reside in their *hukou* registration place. But as the *hukou* policy was relaxed, people were allowed to reside and work outside of their *hukou* registration place.

which are based on the employment distribution in 1990.[5]

Our analysis delivers several interesting findings. First, we show that Chinese prefectures facing a larger decline in trade policy uncertainty experienced larger inflows of migrant workers. When we look at different types of migrants – *hukou* vs. non-*hukou* migrants – we find that it is the latter who drive the changes in internal migration rates. This implies that the labor flows triggered by the reduction in trade policy uncertainty were characterized by a limited access of migrants to local public goods and services. Second, we investigate the role played by one natural mechanism that could explain our main finding, namely changes in trade flows. Taking advantage of firm-level data, we show that products and prefectures facing a larger decline in trade policy uncertainty experienced a larger increase in exports towards the United States.

Next, we exploit the richness of the individual-level Census data to explore heterogeneous effects across several dimensions. In particular, we separately estimate the impact of trade policy uncertainty reduction on skilled and unskilled migrants, migrants of different age groups, gender and *hukou* status at origin (rural vs. urban). This type of analysis enables us to examine the extent to which the trade policy shock affected different subgroups of the population. Our results indicate that the trade shock had a larger impact on male compared to female migrants; on migrants in prime working age, on the skilled and on those with urban *hukou* at origin. At the same time we find that the main adjustment in the case of unskilled labor has involved an increase in the number of hours worked by local ("native") unskilled workers. Finally, our data show that employment *levels* of migrants increased following the reduction in trade policy uncertainty.[6]

To summarize, the greater the reduction in trade policy uncertainty in a prefecture, the higher the increase in migration rate to that prefecture – of non-*hukou* migrants and of skilled migrants – and the higher the increase in the number of hours worked by unskilled native workers. Hence our analysis indicates that the adjustment has taken place through changes in migration, for skilled labor, and through changes in the number of hours worked for unskilled labor. In general, the main contribution of our paper is to provide new results on the labor-market adjustment of local economies to trade policy changes, in particular highlighting the importance of internal migration. Our results suggest that one way China

[5]The information is taken from China's 1990 population Census.

[6]There was though no significant effect on employment *rates* of neither migrants nor native workers (neither skilled nor unskilled).

has been able to reap the benefits of trade openness has been through a more efficient geographic allocation of (skilled) workers. Hence this is yet another example of how migration facilitates economic development and growth.

The remainder of the paper is organized as follows. Section 2 explains how our paper fits into the existing literature. In Section 3 we provide additional context for our analysis, focusing on internal labor mobility in China and the change in the trade policy environment after 2001. Section 4 describes our data, whereas Section 5 presents the empirical strategy and main findings. Section 6 presents additional results and robustness checks, and Section 7 examines the effect of the trade shock on alternative labor market adjustment mechanisms. Section 8 concludes.

2 Related literature

Our paper is related to three areas of research. First, it contributes to the growing literature on the regional economic impact of trade-induced shocks.[7] These studies typically quantify the size of the shock using a weighted average of changes in trade policy, with weights based on the industrial or factor endowments distribution in each region within a country, and explore the spatial consequences of the trade policy changes. Most of these papers focus on the relaxation of a country's own aggregate trade policy (such as a decrease in import tariff rates). Identification of the causal effect of trade liberalization on the outcome of interest relies on the assumption that changes in protection constructed at the local level are exogenous. This assumption might be satisfied in some specific circumstances but, as the literature on the political economy of trade policy has argued, domestic forces do play an important role in shaping the cross–sectional distribution of trade protection and these forces may have a geographical component. The recent analysis by McCaig (2011) of poverty and internal migration in Vietnam represents an exception, as the source of the shock is an exogenous trade policy change implemented by an important trading partner, the U.S. (the 2001 extension of MFN treatment to Vietnamese imports). McCaig (2011) finds that provinces more exposed to U.S. tariff cuts experienced a faster decline in poverty, but he

[7]For example, for poverty see Edmonds and Pavcnik 2005, Topalova 2007, Topalova 2010, Edmonds, Pavcnik, and Topalova 2010; for labor market outcomes see Goldberg and Pavcnik 2005, McCaig 2011, Hasan, Mitra, Ranjan, and Ahsan 2012, Kovak 2013, Autor, Dorn, and Hanson 2013, Monte 2016, etc.; for the persistency of the effects of the shocks see Dix–Carneiro and Kovak 2017 and Autor, Dorn, Hanson, and Song 2014; for a recent review of the literature see Pavcnik 2017.

documents only modest effects on internal migration flows, especially among low skilled individuals. Our analysis also exploits variation in the trade policy of a partner country and not of the country of interest – but in our paper the shock involves a reduction in the trade policy uncertainty in addition to a change in tariffs.

Our work is also closely related to two recent papers that focus on China's accession to the WTO as a source of reduction in trade policy uncertainty. Handley and Limao (2017) develop and calibrate a dynamic general equilibrium model in which policy uncertainty crucially affects the incentives to undertake a costly export investment decision. In a related paper, Pierce and Schott (2016) use a difference in difference empirical design to examine the link between the sharp drop in U.S. manufacturing employment beginning in 2001 and China's accession to the WTO. They find that products where the threat of tariff hikes declines the most experience larger increases in the value of imports from China and more severe employment losses. Note that another recent contribution to the literature, Autor, Dorn, and Hanson (2013) examine a related set of issues but uses a different source of exogenous variation.[8]

As in Handley and Limao (2017) and Pierce and Schott (2016), our analysis takes advantage of the reduction in trade policy uncertainty faced by Chinese exporters in the U.S., derived from the change in MFN status – from temporary to permanent – granted by the U.S. to China in 2001. Hence the variation across products exploited in the empirical analysis – which is driven by differences between non-MFN and MFN tariff rates – is most likely exogenous since non-MFN tariff rates were set by the United States in the 1930's. While Handley and Limao (2017), Pierce and Schott (2016) and Autor, Dorn, and Hanson (2013) consider impacts on the U.S. economy and specifically on U.S. workers, our analysis focuses on the effect that the reduction in trade policy uncertainty had on workers in China, mainly through the internal migration channel.

More directly related to our work are a few recent papers that investigate the link between trade liberalization and factor market adjustments in China. Our main innovation compared to these papers is to provide a comprehensive analysis of internal migration for all Chinese prefectures, based on individual-level data (to measure migration flows) – rather

[8]The authors analyze the impact of rising Chinese import competition (per worker) between 1990 and 2007 on U.S. local labor markets (defined at the commuting zone (CZ) level). The empirical analysis exploits variation across CZs and over time in exposure to Chinese import competition driven by, respectively, initial differences in industry specialization across CZs and changes in U.S. aggregate imports from China by industry, instrumented with changes in imports from China to other high-income countries.

than yearbook tabulations – and detailed firm-level export data (to construct trade weights that account for the local exposure to the international trade shock), together with an identification strategy based on plausibly exogenous variation. In addition, as discussed before, the micro detail of our data allows us to explore heterogeneous effects.

Using the same identification strategy as in this paper, Erten and Leight (2017) and Cheng and Potlogea (2015) investigate the local development impact, on multiple outcome variables, of the elimination of the threat of MFN non-renewal by the U.S. to China. One of the outcome variables in the two papers is changes in population stocks, interpreted as a proxy for internal migration. The first paper focuses on the impact on structural transformation; the second on the urbanization process. Erten and Leight (2017) find that localities more exposed to the reduction in trade policy uncertainty experience increased exports and foreign direct investment, an increase in overall GDP, a decline in agricultural employment and an increase in employment in the manufacturing (secondary) sector. They also find a modest increase in the total county population. Cheng and Potlogea (2015) uncover instead an increase in urbanization, output, employment, investment and FDI flows, and no impact on wages. Both papers use existing data compilations (yearbooks), rather than the individual-level data used in our analysis. The level of the analysis also differs from ours: while Erten and Leight (2017) focus on counties,[9] Cheng and Potlogea (2015) exploit instead variation at the level of the urban ward of a prefecture–level city. In the absence of an official definition of local labor markets by China's Statistical agency[10] both perspectives are informative but importantly the two papers do not cover all of China[11] and thus they cannot capture the full extent of internal migration in the country. Furthermore, the authors only provide indirect evidence on internal migration, based on population growth regressions. Using changes in population stocks as a proxy for migration is problematic as these changes are affected not only by migration, but also by other factors such as fertility and mortality, which are likely to differ across space due to a variety of reasons. Finally, the data available in the county level Census tabulations for this period refer only to the number of official residents, i.e. people with local *hukou*. Hence, the analyses based on these data cannot measure the movement of non-*hukou* migrants, which represents by far

[9] In 2005, there were a total of 2862 counties in China.

[10] For more on this issue see our discussion in section 4.1.

[11] For example, in Erten and Leight (2017) data on aggregate exports pattern are available only for less than half of the counties; see Table 2, column 1 in the paper; Cheng and Potlogea (2015) have instead data for at most 226 prefectures, out of a total of 344 prefecture level units.

the largest component of internal migration in this period. Thus, the strength of our paper is to use individual-level data taken from the Chinese population Census to construct direct measures of migration, and to match them with firm-level export data. This allows us to analyse all of China and to explore a rich set of heterogeneous effects, which cannot be studied with more aggregated data.

Focusing on trade in intermediate products, Zi (2016) studies the effect of the liberalization of Chinese trade policy on the location of economic activity across the country and how it leads to changes in the restrictiveness of the *hukou* system across provinces.[12] Using fixed effects models, she uncovers a series of interesting correlations which are then used to develop a quantitative framework and assess the welfare effects of the liberalization. Interestingly, she finds that the relatively small direct welfare gains induced by trade liberalization could be significantly magnified by the elimination of the *hukou* system. In a closely related paper, Wang (2015) develops a heterogeneous-firms trade model to study the effect of increased exports on patterns of employment and migration. The empirical analysis uses prefecture-level information from Census tabulations. The main result from the IV specification is that greater exports led to a significant decline in agricultural employment over the 2000-2010 period, as well as to increased internal migration. While her results are in line with ours, the identification is different and potentially more vulnerable to endogeneity concerns.

Tombe and Zhu (2015) develop and calibrate a two–sector, multiple–region general equilibrium model with interregional trade and labor mobility distortions to study the effect of changes in trade and internal migration costs on total factor productivity growth in China around its entry into the WTO. Based on a growth accounting exercise, the authors conclude that about half of the observed total labor productivity growth can be attributed to the decline in trade and migration costs observed in the period. Moreover, the observed more efficient allocation of labor across Chinese prefectures explains about twenty percent of total TFP growth. In a related paper, Fan (2015) develops and calibrates a multi-factor general equilibrium model to investigate the relationship between changes in trade and internal migration costs and income inequality both between and within regions in China. Lower trade costs increase inequality both across different regions and across different skill

[12]The measure is based on estimated fixed effects from a regression explaining the individual-level probability of obtaining local *hukou* in 2000. For a recent analysis of the effects of trade liberalization on local *hukou* regulations, see Tian 2018.

groups, with the former playing a role that is twice as big as the latter. At the same time, labor mobility plays an important role in shaping the geography of inequality within China. In particular, skill related differences in mobility costs make it easier for skilled workers compared to unskilled workers to relocate across prefectures, hence they tend to reduce inequality within coastal areas receiving large inflows of migrants, while making inequality more severe in the interior regions. Compared to Tombe and Zhu (2015) and Fan (2015), we focus on similar issues but use a different methodological approach – since we estimate an empirical model and provide evidence on a causal effect.

To conclude, while some papers offer evidence on the same topic, our comprehensive analysis of internal migration for all Chinese prefectures using individual-level Census data and firm-level export data, combined with an established identification strategy, sets our paper apart from existing work. In addition, our results provide evidence on many heterogeneous effects, for example by differentiating between *hukou* vs. *non-hukou* migrants, skilled vs. unskilled migrants, male vs. female migrants as well as old vs. young migrants.

3 Background and Context

3.1 *Hukou* and internal migration

For some time, China has carried out an active and restrictive internal migration policy. While in most countries citizens are free to move internally, the Chinese Household Registration System – known as the *hukou* system – imposes substantial limits to internal migration. *Hukou* is a permit issued by the Chinese government, which determines the location of registration (permanent residence) and work of each individual living in China. In addition, *hukou* entitles its holder to local social welfare programs, such as public education and healthcare, as well as pensions. Importantly, *hukou* is given on a family basis and in particular newborns inherit *hukou* location and type from their mother. Hence *hukou* is akin to *jus sanguinis* in Western countries' citizenship laws as it links the right to live, work and access public services in a given location to blood relationships.

Two attributes characterize the *hukou* system: the type (*leibie*) and the location (*suozaidi*). The *leibie* broadly categorizes individuals as "rural" or "urban" residents, identifying the two-tier welfare system available to them.[13] In our main results the dimension of the *hukou*

[13]In the early period of the system (1960s-1980s), the "urban" (non-agricultural) *hukou* entitled the holder

system we focus on is the location of registration (*suozaidi*).[14] When the system was strictly applied (until 1978), it prohibited Chinese individuals to move to and work in locations other than one's *hukou* registration place. In that period any change in *hukou* status required approval by the central government. Approval rates were very low and almost all Chinese citizens remained in their *de jure* location of registration. With the beginning of Deng Xiaoping's "Opening Up" reforms in 1978, demand for labor in the rapidly growing industries in the cities started to pick up. Since then policy makers have become increasingly aware that the system is an impediment to economic development, hence the extent to which the *hukou* system is enforced has significantly declined. First, individuals can now move to and work in locations which are different from their *hukou* registration place as long as they can support themselves, since they do not have access to local public services. In addition, State Council directives were issued in 1992 and 1998 which gave city authorities the power to grant local *hukou* to select groups of individuals – typically investors and highly educated workers.[15] In general, though, restrictions on long-term migration remain, limiting the ability of migrants to relocate and significantly affecting their behavior (Meng and Xue 2017).

3.2 Trade liberalization

After fifteen years of intense negotiations, China joined the WTO in December 2001, heralding a golden decade of rapid economic growth. China's entry in the WTO gave rise to significant trade policy changes and created a more predictable trade policy environment. In fact, while Japan and the EU had already granted China permanent MFN status in respectively 1974 and 1980, the 1980 U.S. decision to grant the country MFN status was subject to yearly renewal. The latter was far from certain, and was subject to a contentious political process which created substantial uncertainty in the tariff rates Chinese exporters

to a wide array of state-provided services (housing, employment, grain rations, education and medical care), while the "rural" (agricultural) *hukou* population was expected to be mainly self sufficient, receiving very limited, if any, state transfers. Afterwards, the population with rural *hukou* began receiving very limited welfare benefits in their *hukou* location.

[14] Our main results do not differentiate according to the type of *hukou* since both rural and urban non-*hukou* migrants have no access to local public services, while *hukou* migrants typically hold urban type. In additional results, we analyze migration by *hukou* at origin (rural vs. urban), see Table 9, Panel C.

[15] The directives also allowed the elimination of the distinction between rural and urban *hukou*. Still, the take up rate varied significantly and only a few provincial administrative units (e.g. Guangdong, Zhejiang, Shanghai, Hebei, Henan and Jiangsu) announced in the early 2000s that they would eliminate this distinction within some towns/county level cities.

would face in the US market.[16] In fact, in the 1990s, a bill was put before Congress every year to revoke MFN status to China. If enacted, these bills would have led to the application of the Smoot Hawley tariffs – i.e., they would have led to a significant increase in trade costs for Chinese exporters. In fact, by 2000 the average MFN tariff was only 4%, whereas if China had lost MFN status, it would have faced a 35% average tariff on its exports to the United States. While China's normal trade relation status with the U.S. has never been revoked, and Chinese exports have enjoyed MFN tariff rates in the U.S. between 1980 and 2000, the uncertainty induced by China's conditional MFN status was substantial, and the existing literature has shown that its elimination had a significant impact on the U.S. economy (Handley and Limao 2017, Pierce and Schott 2016). More specifically, there is evidence that China's entry into the WTO had an effect on subsequent employment growth in the U.S. manufacturing sector, and that this effect varied with the extent to which tariff uncertainty was affected. Pierce and Schott (2016) find that China's accession to the WTO led to a 3 – 4 percentage points decline in employment growth in U.S. manufacturing in the short run, and to a 12 –16 percentage points decline in the medium run.

4 Data and Descriptive Statistics

To carry out the empirical analysis, we combine data from a variety of different sources. In particular, we use 1) individual-level data from China's population Census to construct measures of internal migration, and 2) firm-level trade data to construct measures of exports at the product and prefecture levels. To capture the aggregate trade policy stance, we use tariff data from the World Integrated Trading System database and combine them with information on trade policy uncertainty vis a vis the United States, the pervasiveness of barriers to investment in China, the incidence of the U.S. Multi Fiber Agreement (MFA) quota, and the availability of production subsidies to Chinese firms. We aggregate these detailed micro–data to construct a prefecture–level panel dataset. The remainder of this section outlines the main steps we follow to construct the dependent variable and the key explanatory variables. The Data Appendix contains more detailed information on the data sources.

[16] For a more detailed description, see Handley and Limao (2017), and Pierce and Schott (2016).

4.1 Migration measures

Prior to defining the relevant migration measures used in this paper, we provide a brief description of the structure of local government in China. There are 31 provincial-level units, including 27 provinces and 4 provincial-level municipalities. The tree graph in Figure A.1 illustrates the administrative structure of a province. Each province can be additionally divided into prefectures.[17] Including the provincial municipalities mentioned above, there were 326 prefecture-level units in China in 1990.[18] Each prefecture consists of a prefecture-level city (PLC), i.e. a municipality with governing rights, and of a group of subordinate counties.

The *hukou* system mandates that all citizens of China are registered at a specific address detailed to the street number. For example, a person's *hukou* registration place can be "No. 100 City Rd., Apt 222, Old town District, Nanjing City, Jiangsu Province, China". When the *hukou* system was introduced, it was designed to keep track of population movements. Since *hukou* registrations are detailed to street numbers, even simple address changes within a county require altering one's registration record. Changing *hukou* location within a county is usually simple and is much easier than changing *hukou* location across counties and larger administrative units (such as prefectures and provinces), which is instead subject to the destination in-migration policies. Our measure of internal migration is based on individual-level information on *hukou* registrations, as reported in Census data.[19]

For the purpose of our analysis, we focus on prefectures as the unit of observation and use the 1990 delineation of prefectures, so that the sample of prefectures is the same in the main analysis, the pre-trend analysis and the falsification exercise – but results are robust if we use the 2000 delineation (see Appendix C: Supplementary Results). While the Chinese statistical office does not provide a geographic definition of a "local labor market", there are two reasons for our choice of the prefecture as a proxy for this concept. First,

[17]The 4 provincial-level municipalities include Beijing, Tianjin, Shanghai, and Chongqing. Even though they resemble expanded metropolitan areas, they correspond to the same administrative level as provinces, thus we treat them as collections of prefectures in our analysis. For example, Shanghai consists of 2 "prefectures": Shanghai Municipal District and Shanghai Counties.

[18]Our final sample includes 322 of them: 3 "prefectures" are dropped from the analysis because they are groups of non-contiguous counties under direct provincial administration (Xinjiang province, Hainan province, and Hubei province have such areas). Another prefecture – Yunnan, Yuxi – was dropped after running our test for outliers. Including these outliers in the analysis does not affect our results. Note that in 2000 the number of prefectures increased to 344.

[19]In the Census only people who stayed in a location longer than six months report their *hukou* status, thus temporary visitors are not included in our measure.

as pointed out by Xue and Zhang (2001) and Zi (2016), much of the planning of public transportation is carried out at the prefecture level and, for this reason, counties within the same prefecture are likely to have strong commuting ties and be economically integrated. As such counties cannot be considered distinct local labor markets. In general counties are quite small, that is why commuting is likely to take place across them.[20] Second, during the period we consider in our analysis, county boundaries have changed significantly, whereas prefectures have been much more stable.[21] In addition, data on aggregate export patterns are available only for less than half of China's counties. Using prefectures as the unit of analysis allows us to track the same geographic unit over time and to cover all of China in our analysis.

We focus on cross-prefecture migration and ignore within-prefecture moves. As a result, in our study (internal) migrants are individuals who move across prefectures. In addition, migrants are those who have arrived in their destination in the previous five years.[22] Depending on whether or not a migrant gains permanent residence in the destination prefecture, we will distinguish between "*hukou*" and "non-*hukou*" migrants.[23] In addition, we focus on working-age (16-65 years old) employed migrant workers. In the main analysis we look at the sample of male migrants, since they are less likely to exit the labor force for family reasons, but in the summary statistics (Table 1) and additional results (Section 6.3) we also consider the sample of female migrants. More precisely:

1. A "non-*hukou*" migrant is an individual who resides in a prefecture without the local *hukou*. They can be identified from the Census data using information under "Registration Status": anyone, in any location, whose registration status appears to be "registered elsewhere", is a non-*hukou* in-migrant in their current location. Note that we can further distinguish *within–province* non-*hukou* migration and *cross-province* non-*hukou* migration. Within-province non-*hukou* migration happens as individuals move to another prefecture within a province. Cross-province non-*hukou* migration occurs if the migrant crosses the provincial borders.

2. A "*hukou*" migrant is an individual who relocated to a different prefecture and trans-

[20] Note that the median Chinese county is only one fifth the size of a U.S. commuting zone, whereas the median Chinese prefecture is about 40 percent larger than the corresponding U.S. commuting zone.

[21] Between 2000 and 2005, the number of counties increased from 2411 to 2862, making county-level comparisons over time challenging.

[22] We use residence five years ago since it is a question consistently used across Census waves.

[23] A more detailed explanation of migrant definitions can be found in Appendix A.

ferred *hukou* registration to the destination residence. Since information on location of previous *hukou* is not available in the Census, the identification of *hukou* migrants requires a set of plausible assumptions. In particular, we can observe only individuals' current *hukou* registration place and where they lived previously, but not where their *hukou* was registered previously. As a result, we assume those locally registered residents who report a different residence 5 years ago to have transferred their *hukou* to the current locality; in other words, *hukou* migrants are currently registered residents who moved and changed their registration in the last 5 years. If the new residence is in the same province or in another province, respectively, then the corresponding migration is denoted as *within–province* or *cross–province hukou* migration. However, note that we only have data for *cross–province hukou* migration due to changes in the 2005 Census questionnaire.

Table 1 reports summary statistics on the national-level numbers and rates of total (*hukou* plus non-*hukou*) internal migration in 1990, 2000 and 2005,[24] where we focus on 16-65 year-old employed workers. Total migration includes cross-prefecture non-*hukou* migration plus cross-province *hukou* migration. The first three rows in each panel present the total counts of migrants, whereas the last three rows in each panel present the shares of migrants in the employed population.

Only about 17.8 million employed individuals migrated across prefectures between 1985 and 1990, representing 2.7 percent of the employed population aged 16-65. Migration in this period is gender biased, as about 57 percent of the migrants are males. Not surprisingly, as China relaxed its internal migration policy in the 1990's, internal migration nearly quadrupled in the next 15 years. Between 1995 and 2000, approximately 51.7 million employed individuals changed their prefecture of residence. Migration in this period is still gender-biased. Five-year mobility rates hover around 7.8 percent, a figure that is lower than in the United States (Molloy, Smith, and Wozniak 2011) in the same period. Interestingly, mobility increased even more over the following five years, when approximately 66.7 million employed individuals changed prefecture of residence. The gender-bias appears to be stable, while the five-year mobility rate increased to approximately 9.9 percent.

[24]The 1990, 2000 and 2005 population Census of China document detailed individual-level information on gender, age, education level, migration history, employment status, as well as other labor market attributes. We concord prefectures across 3 Census waves, and aggregate the individual level data to prefecture cells.

Using educational attainment from the population Census, we can also distinguish between skilled and unskilled migrants. Following the literature (Ge and Yang 2014), we divide the sample into two skill groups, and identify as skilled workers those who have at least a high school degree. Comparing across the three panels, unskilled migrants were always in greater numbers, in addition unskilled workers were increasingly more likely to move compared to skilled ones over time. More specifically, in 1985-1990, skilled workers were 2.16 times more likely to move across prefectures than unskilled ones, while in 1995-2000 and 2000-2005 respectively, skilled workers were only 1.22 times and 1.65 times more likely to move across prefectures than unskilled ones.

Figures 1a – 1b illustrate the geographic distribution of migration flows. The maps delineate China's prefectures and color code each of them using the share of recent total (non-*hukou* plus *hukou*) migrants among the employed population. Several interesting patterns emerge. First, the coastal prefectures of South–Eastern China are major destinations of migration flows. Among these destinations, two major economic zones (Yangtze River Delta region, and Pearl River Delta region) have the highest migration rates. In particular, very high internal migration rates are observed for instance in the prefectures surrounding Hangzhou Bay in the Yangtze River Delta region. In 2005, Shanghai had a total migration rate of 44.89%, Hangzhou and Ningbo had total migration rates of 24.34% and 41.70%, respectively. Prefectures in the Pearl River Delta region also have high migration rates. In 2000, Dongguan's total migration rate was 83.76%, Guangzhou's and Shenzhen's were 44.79% and 88.70%, respectively.[25] Second, migration flows are high also in several prefectures in the North East and in a few prefectures in the West.[26] Beijing and Tianjin are major migration destinations in the Bohai Bay Region and so are a few prefectures in the three Northeastern Provinces (Heilongjiang, Jilin and Liaoning), such as Dalian (in 2005 recent in-migrants represented 17.20% of the total population) and Daqing (10.10%). Third, central China does not appear to be a major migrant destination, with the exception of a few urban prefectures, such as Chengdu in Sichuan province (10.08% in 2005) and Xi'an in Shaanxi province (12.97% in 2005).

[25] As one of the major manufacturing hubs in Guangdong province, Dongguan is considered progressive in seeking foreign direct investment and is also known for migrant-labor-fueled factories. According to Dongguan city's estimate, at the end of 2008, there were 5.2 millions of migrants in its population of 6.9 million.

[26] The high migration prefectures in the Northwest are mainly oil-producing desert cities (Fan 2015) and prefecture-level jurisdictions in Xinjiang Production and Construction Corps.

Comparing migration patterns over time, we can see some interesting changes. Figure 2a color-codes the increase in in-migration rates from 2000 to 2005. The lighter regions experienced a decline in in-migration rates, whereas the darker regions experienced an increase in in-migrant rates over time. For instance, in-migration increased in the South Eastern part of the country, and in particular several additional prefectures became destinations of large new migrant arrivals. The total migration rate in Huainan (Anhui province) increased from 5.33% in 2000 to 17.82% in 2005, and that of Zhoushan (Zhejiang province) from 6.60% in 2000 to 18.07% in 2005. The same holds true for several prefectures in the North East of the country. For example, Tianjin's total migration rate increased from 9.53% in 2000 to 17.97% in 2005, and that of Shenyang (Liaoning province) from 7.37% in 2000 to 14.27% in 2005.

4.2 NTR gap

Our key explanatory variable captures the reduction in the trade policy uncertainty, faced by Chinese exporters vis a vis the United States, as a result of China's entry in the WTO. Following Pierce and Schott (2016), we measure it using the Normal Trade Relations (NTR) gap. The latter is defined as the difference between the Normal Trade Relations (NTR) tariffs, reserved to WTO members and applied to China's exports to the U.S. since the early eighties, and the non–NTR rates, which are instead the higher tariff rates applied to non-market economies and originally established under the Smoot-Hawley Tariff Act introduced in 1930. The latter would have been applied to China if Congress failed to extend MFN status to China in any year before China's entry in the WTO. More precisely, the NTR gap for product i is defined as:

$$\text{NTR gap}_i = \text{non NTR rate}_i - \text{NTR rate}_i$$

We construct the NTR gap using data on NTR rates for 1999, i.e. before China's WTO accession. Table 2 shows that the average NTR gap is substantial at over 31 percentage points. Furthermore, it is higher for unskilled-labor intensive goods (35 percentage points) than for skilled-labor intensive goods (27 percentage points).[27] Figure 3 illustrates the distribution of NTR gaps across product types and shows substantial variation. For example,

[27]Skilled labor intensive goods are those characterized by a higher than average skill intensity. See Appendix B.2 for more details on how this variable has been constructed.

"Binoculars" (product 900510) are characterized by an NTR gap of 60%, whereas "Other woven fabrics of silk" (product 500720) exhibit an NTR gap of 90%. At the same time, "Ginseng roots" (product 121120) is among the 448 products for which China's entry in the WTO did not have an impact, i.e. it is characterized by a zero NTR gap.

To carry out the empirical analysis, we aggregate the product-level NTR gap measure at the prefecture-level using as weights the product shares in the export basket of each Chinese prefecture, as observed over the period 1997-1999, i.e. before China's accession to the WTO. In other words we follow Bartik (1991) to construct a local measure, at the prefecture level, of the NTR gap.[28] To construct the weights, we use the firm-level export information available in China's Customs Data, which allows us to build a product/prefecture/destination dataset. In our baseline analysis we construct the weights using exports to the U.S., but in robustness checks in Table 6 we also consider alternative weighting schemes. Specifically, the NTR gap in prefecture j is defined as:

$$\text{NTR gap}_j = \sum_i \frac{Exp_{ij}}{Exp_j} * \text{NTR gap}_i$$

where Exp_{ij} are the exports of good i from prefecture j and Exp_j are total exports of the prefecture.

Figure 2b offers a snapshot of the NTR gap by prefecture, constructed using exports to the U.S. as weights. As can be immediately seen, NTR gaps are higher in the South-Eastern coastal region (Shaoxing in Zhejiang province has an NTR gap of 45.45%, whereas Chaozhou in Guangdong province has an NTR gap of 41.66%), but several prefectures in Central China do also exhibit very high NTR gaps (for example, Nanchong and Guangyuan located in Sichuan province have NTR gaps of 42.34% and 38.98%, respectively).

4.3 Other controls

Between 2000 and 2005 China experienced other changes in trade and other policies, both at home and abroad, which might have contributed to the increase in demand for labor and internal mobility. Since these other changes might be correlated with our main explanatory variable, we will investigate whether accounting for their impact affects the estimated effect

[28] Note that it is not possible to construct export baskets at the prefecture level for years before 1997 since data are not available before then at a disaggregate level. However we assess the robustness of our results using employment weights based on the 1990 Census.

of the reduction in trade policy uncertainty. Moreover, we also want to explore whether these other policy changes are additional important drivers of internal migration within China in this period. Following the literature, and in particular Pierce and Schott (2016), the additional policy controls include NTR rates, tariffs abroad, import tariffs, barriers to investment in China, MFA quota restrictions, production subsidies and export licenses. We aggregate these measures from product/industry/firm level to the prefecture level, as described below. Descriptive statistics for these variables are reported in Table 2.

The most direct way that trade policy affects the labor demand in a prefecture is through tariff rates. To account for the effect of tariff restrictions faced by Chinese exporters abroad, we construct two measures. The first, the *NTR rate* is the weighted average – across products – of the tariff rates applied by the United States to countries granted MFN status. The second, *Tariff Abroad*, is the weighted average of tariff rates across products and export destinations. For both measures, we use as weights the export shares in the *prefecture*'s export basket in 1997-1999, respectively, to the United States and to the other top destinations of Chinese exports at the national level (Hong Kong, Japan, European Union, South Korea, Singapore, Taiwan, Australia, Canada, and Russia).[29] We also want to control for changes in a prefecture's demand for labor due to China's own tariffs. We construct the variable *Import tariff*, which is the weighted average of tariff rates across products and imports' origin countries, where the weights are the import shares in the *prefecture*'s import basket, which we construct using the 1997 - 1999 transaction-level custom data.

China is a major destination of foreign direct investment (FDI) which, according to several studies, has played an important role in promoting local development (Chen, Chang, and Zhang 1995). To account for the increase in labor demand through this channel, we use a proxy for barriers to investment based on the *Contract Intensity* measure proposed by Nunn (2007). The latter describes the share of intermediate inputs used by a firm that requires relationship-specific investments by the supplier. The higher the contract intensity of firms, the more difficult it was for foreign firms to deal with imperfect contract enforcement in China before 2001. As China joined the WTO, some of these contract enforcement problems could be resolved within the GATT/WTO system (for example, through the dispute settlement mechanism). As a result, after 2001, prefectures characterized by exported products with higher contract intensity disproportionately benefited. Our measure of *Contract*

[29] Exports to these countries represents 77% of Chinese exports between 1997-1999.

Intensity at the prefecture level is equal to the weighted average across products exported by the prefecture.

From 2000 to 2005, an additional potential driver of increased labor demand was represented by the phasing out of quota restrictions on U.S. apparel and textile imports under the Multi-Fiber Agreement (MFA) and the Agreement on Textile and Clothing (ATC). Upon joining the WTO at the end of 2000, China became eligible for the elimination of these non-tariff barriers. Following Brambilla, Khandelwal, and Schott (2010), we calculate the share of China's clothing and textile exports which faced binding MFA quotas in the U.S. at the HS 6-digit level.[30] To measure the extent to which each Chinese prefecture was affected by the relaxation of MFA quotas, we aggregate the HS level MFA Quota Bound to the prefecture level using each prefecture's export basket. The resulting prefecture-level variable *MFA Quota Bound* measures the share of textile exports that would have faced binding MFA quotas after 2001, were not for China's WTO accession. Prefectures with a larger textile export sector, which faced more stringent MFA quotas before 2001, saw bigger non-tariff-barrier reductions through this channel as China joined the WTO.

Note that Chinese exporters benefit from a series of government subsidies which again are likely to affect the level of economic activity and demand for labor in a prefecture. For example, Defever and Riaño (2017) document that until 2008, foreign-owned firms in China that exported over 70% of their production enjoyed a 50% reduction in the corporate income tax rate. By locating in one of the numerous special economic zones, firms could benefit from an even lower tax rate.[31] China's Annual Survey of Industrial Firms (CASIF) reports the subsidy-per-sales ratio of each firm. We aggregate the geocoded firm-level data to calculate the average subsidy-per-sales ratio for each prefecture. Hence the prefecture-level time-varying *Production Subsidy* variable measures the share of prefecture-level production which is subsidized.

Finally, prior to China's accession to the WTO, there were significant restrictions on direct exporting, and firms which were not granted export licenses were required to export through intermediaries. As China joined the WTO, these restrictions were gradually phased

[30] Brambilla, Khandelwal, and Schott (2010) provide a crosswalk between 149 three-digit MFA product groups and HS codes.

[31] Additional benefits included VAT rebates and lower tariffs on imported machinery and intermediate inputs, direct cash subsidies, discounted utility and land rental rates and easier access to finance. Defever and Riaño (2017) find that, as a direct consequence of these subsidies, over a third of Chinese manufacturing exporters sell more than 90% of their products abroad.

out and all firms became eligible to export directly by 2004 (Bai, Krishna, and Ma 2017). The phasing out of the export licensing requirement likely contributed to increased demand for migrant labor in prefectures with high concentration of indirect exporters. To account for this important policy change, we have constructed a prefecture-level time-varying measure of *Export License*, capturing the share of manufacturing employment hired by firms with export licenses. To identify firms enjoying direct access to a foreign market, we have matched firms observed in the CASIF to those in the Chinese Customs Data. In particular, firms reporting positive export values in both data sets in a given year were classified as having an export license, whereas firms reporting positive export values only in CASIF were classified as indirect exporters – i.e. without access to an export license in that year.

5 Empirical Analysis

5.1 Empirical specification

We are interested in studying the effect of the reduction in trade policy uncertainty faced by a prefecture on that prefecture's migrant inflows. In particular, we ask whether prefectures with bigger NTR gaps (and thus bigger uncertainty reduction in tariff rates due to WTO accession) experienced larger migrant inflows after China's WTO accession, compared to prefectures with smaller NTR gaps. To answer this question, we implement a difference-in-difference estimation strategy. The first difference exploits variation over time, that is, pre- and post-WTO accession, as China's WTO accession provides variation (reduction) in tariff uncertainty over time. In addition, Chinese prefectures differ in their exposure to tariff uncertainty reduction according to the composition of their export baskets prior to China's WTO accession. Thus the second difference we exploit is cross-sectional, specifically between the high NTR-gap prefectures (more intensely treated) and the low-NTR gap prefectures (less intensely treated). Note that the treatment is a continuous variables. We model the impact of changes in other policies in a similar way within a difference-in-difference framework. The prefecture-level panel data set described in the previous section provides the variation used to identify the effects. Our baseline specification is given by:

$$M_{jt} = \alpha + \beta_1 \cdot \text{Post}_t \cdot \text{NTR Gap}_j + \beta_2 \cdot \text{Post}_t \cdot \mathbf{X}_j + \beta_3 \cdot \text{Post}_t + \delta_j + \epsilon_{jt} \qquad (1)$$

where M_{jt} is our measure of migrant inflows, specifically the share of (employed male) migrants in the total (employed male) population of prefecture j at year t ($t = \{2000, 2005\}$). [32] *NTR Gap*$_j$ measures the time-invariant uncertainty in trade barriers with the U.S. faced by each prefecture before WTO accession. $\mathbf{X}_j$ is a vector that contains reductions between 2000 and 2005 in tariff rates faced by Chinese exporters abroad (Δ*NTR rate* and Δ*Tariff Abroad*) and in Chinese import tariff rates (Δ*Import tariff*). We also include in $\mathbf{X}_j$ other time-invariant measures of barriers to trade and investment that were relaxed as China acceded to the WTO, namely *Contract Intensity* and the *MFA Quota Bound*. Note that $\mathbf{X}_j$ also includes the reduction between 2000 and 2005 of Chinese production subsidies, i.e. Δ*Production Subsidy*, and the increase over the same period of the share of manufacturing employment hired by firms with export licenses, i.e. Δ*Export License*.[33] The direct effect of the Post$_t$ dummy controls for changes in migrant inflows between 2000 and 2005, which are common across all prefectures. We also net out the (direct) effect of time-invariant prefecture characteristics with a set of prefecture fixed effects denoted as δ_j. β_1 is the main coefficient of interest. Standard errors are clustered at the prefecture level in all of our specifications.[34] Everything else equal, a positive value of β_1 in Equation (1) suggests that the reduction in uncertainty on U.S. tariff rates is associated with an increase in migrant inflows relative to the common time trend. Similarly for the other coefficients, a positive value suggests that – for example – a reduction in tariffs abroad or in Chinese tariffs is associated with higher migrant inflows.

Since the prefecture-level trade barriers are constructed using prefecture-specific trade baskets *prior to the WTO accession*, the estimating equation (1) allows us to answer the following question: how would migrant inflows to each prefecture change if export patterns of each prefecture remained constant and there was a reduction in trade policy uncertainty?

[32] The migration rate we use as dependent variable is defined as follows (for year t):

$$M_{jt} = \frac{M^j_{[(t-5),t]}}{Pop^j_t} = \frac{\text{inflow of employed immigrants into pref. } j \text{ between } (t-5) \text{ and } t}{\text{stock of employed population of pref. } j \text{ observed at } t}$$

which can be interpreted as the probability that a randomly chosen individual in the total observed employed population of prefecture j at year t is a recent migrant, i.e., somebody who migrated in the last five years, which is a common measure of recent migration flows used in the literature (see for example Card 2001).

[33] Note that interacting the time-invariant change in time-varying variables, with the $Post_t$ dummy, is equivalent to including the time-varying variables directly (see Pierce and Schott 2016).

[34] In an additional robustness check we have also clustered the standard errors at the provincial level (see column 2, Table 6, Panel B) and once again the results continue to hold. As we have only 31 clusters in this specification, following Bertrand, Duflo, and Mullainathan (2004), in our baseline results we use the prefecture level clusters.

In other words, the specification isolates the impact of the reduction in trade barriers, independent of changes in export baskets which might have occurred. The key identifying assumption is that, conditional on the common time trend and prefecture fixed effects, pre-WTO local export baskets did not change in anticipation of the trade liberalization to come – which we think is reasonable, given the high level of uncertainty.[35]

As explained in Section 4, NTR gaps are measured as the difference between Smoot-Hawley tariff rates and U.S. MFN tariff rates. As a consequence, since NTR gaps are a function of U.S. trade policy, in particular both past and present U.S. policy, they are not likely to be endogenous. In particular, it is reasonable to assume that current Chinese political-economy drivers could not have affected Smoot-Hawley tariff rates, which were set by the U.S. Congress in the 1930's. In addition, U.S. MFN tariff rates are the result of U.S. multilateral negotiations with all WTO countries, therefore they are unlikely to have been impacted by *local* conditions in China – especially given that China was not part of the WTO at the time the MFN rates were set by the U.S. (the end of the Uruguay Round). The same type of argument makes us confident that changes in tariffs abroad are not endogenous. Finally, stronger but plausible assumptions are required to justify the exogeneity of changes in Chinese import tariffs. In this case, one important concern is that unobserved time-varying shocks might at the same time affect migrant inflows and be correlated with changes in Chinese import tariffs over time. Note however that the latter are set at the *national* level while migrant inflows are measured at the *local* level, making this concern less severe.[36]

5.2 The impact on internal migration

We turn next to examine the impact of trade liberalization on internal male migration flows. Our results are presented in Table 3.[37]

Table 3 shows the baseline difference-in-difference (DID) results using, as dependent variable, the share of (male employed) migrants out of the local (male employed) population.

[35]The time line of China's entry into the WTO shows that there was a very significant amount of uncertainty up to the end of negotiations, suggesting that anticipation effects are unlikely to have played a key role.

[36]Note that Chinese import tariffs are not the main focus of our analysis, as they are simply a control variable. Also, they are not always included in the specification – in which case the results on our main variable are unaffected.

[37]Note that the majority of our analysis focuses on male migrant workers, and we explore gender heterogeneity in Table 9.

We focus on employed migrants and local population because we want to isolate the labor-demand channel. Columns (1)–(3) consider all migrants (both "non-*hukou*" and "*hukou*" migrants, and both across and within provinces), whereas columns (4)–(7) consider specific subgroups. Regression (1) only includes the impact of uncertainty reduction while regression (2) adds the reduction in tariff rates abroad and in China. Finally, regression (3) presents the full specification where reductions of investment barriers, the elimination of the MFA quota, production subsidies and export licenses are also accounted for. All specifications include prefecture and time fixed effects, and standard errors (in parentheses) are clustered at the prefecture level. All estimates suggest that a larger reduction in uncertainty is associated with an increase in the share of in-migrants in the population (relative to the common time trend). Focusing on our benchmark specification in column (3), everything else equal, a ten percentage points reduction in tariff uncertainty with the U.S., as measured by the NTR gap, is associated with a 0.59 percentage point increase in the total migration rate. With the prefecture-level NTR gap averaging at 32%, prefectures facing the average decline in trade policy uncertainty experience a 1.89 percentage point increase in the migration rate, which represents a 24 percent increase. These effects are not driven by changes in the denominator of the migration rate, as we show later in the paper in Panel B – Column (1), Table 11.

It is worth noting that, in column (3) which is our preferred specification, also the tariff variables have the expected signs, although they are insignificant (probably because of little variation in those variables in this period).[38] Reductions in the NTR rate and in tariffs abroad have a positive (insignificant) impact on migration rates. That is, the larger the reduction in NTR rates and tariff rates faced by exporters of a Chinese prefecture abroad, the higher the increase in migrant shares to this prefecture. This is consistent with the fact that international prices of exported goods are likely to increase when NTR rates and tariff rates abroad decrease (terms-of-trade effect of tariff reductions); moreover, prefectures demand more migrant labor as international prices of exported goods increase, since production also increases. Moreover, the negative (insignificant) sign on import tariffs suggests that, the larger the reductions in a prefecture's import tariff rates, the smaller

[38]On the other hand, Zi (2016) finds that a reduction in import tariffs is correlated with an increase in internal migration, which is what we find if we don't account for the reduction in trade policy uncertainty (see Table C2 in the Supplementary Appendix). Note though that once we account for the decline in trade policy uncertainty the coefficient on the tariff change is no longer statistically significant.

the increase in in-migrant shares to that prefecture. This suggests that prefectures might replace migrant labor with cheaper imported inputs.

In columns (4)-(7) of Table 3 we study whether the reduction in trade policy uncertainty had a differential effect, depending on the type of migrants considered. This type of analysis will shed light on whether the changes in internal migration we observe were driven in part by internal migration policy changes, and if so, of which type. If we found significant effects when we only consider *hukou* migrants, then we could conclude that the reduction in uncertainty triggered major *hukou* policy changes, of the type involving access of migrants to the welfare state of the prefecture of destination (through the acquisition of the *hukou* of the new residence). The reason is that this aspect of *hukou* policy was definitely binding before the period of our analysis, i.e. any change in the number of *hukou* migrants could only take place if policy was relaxed. If on the other hand we found that our results are completely driven by non-*hukou* migrants, then we would not be able to separately identify changes in policy. The reason is that non-*hukou* migration had already been partially liberalized before our period of analysis, and so the results could be consistent with either a policy-unconstrained world or with policy changes.[39]

In column (4) we start by restricting our attention to non-*hukou* migrants, considering both relocations across prefectures within the same province and across provinces. In columns (5)-(7) we restrict our attention to migration across provinces – as data for *hukou* migration are only available at this level. As a benchmark, column (5) presents the estimated impact of uncertainty reduction on total cross-province migrants (non-*hukou* plus *hukou* migrants); column (6) focuses instead on non-*hukou* cross-province migrants, and column (7) on *hukou* cross-province migrants. Our results for non-*hukou* migration (column 4), total cross-province migration (column (5)) and for non-*hukou* cross-province migration are broadly comparable to the findings in column (3). At the same time, we do not find evidence of a significant impact of the reduction in trade policy uncertainty on "*hukou*" migration (column (7)). These results suggest that there was no liberalization of migration policy of the type involving full access of migrants to the public goods and services associated with the acquisition of the local *hukou* status. At the same time, as mentioned

[39] In other words, an increase in the share of non-*hukou* migrants could be driven by a greater number of individuals who want to move to a prefecture – if the prefecture already allows inflows of non-*hukou* migrants – or by the liberalization of policy vis a vis non-*hukou* migrants – if the prefecture initially has a binding quota.

above, the significant results in the regressions for non-*hukou* migrants do not allow us to identify an independent role played by changes in policy for non-*hukou* migrants. Those results could be driven by pure economic factors in prefectures where non-*hukou* migrants were already allowed to move in.

There are two caveats in the last set of results. First, data limitations imply that *hukou* migrants can only be observed across provinces and not within provinces. It might be that some major *hukou* policy changes did in fact take place as a consequence of China's WTO accession – of the type involving acquisition of the local *hukou* in the prefecture of destination – but only within each province. Second, it is possible that, among *hukou* migrants, we include return migrants who go back to the prefecture where they were born, and for which they enjoy local *hukou*, after having lived and worked in another location. Since the latter type of move is not driven by economic factors but most likely by life-cycle considerations (for example the desire to live close to family during retirement), it may bias the estimates in the *hukou* regressions towards zero and in part explain why we do not find significant results in these models. To investigate this issue, we carry out robustness checks where we break down the sample by age groups and we find no evidence of return migration of old *hukou* migrants (the results are available upon request).

Our basic identification strategy relies on a difference in difference methodology. For our estimates to be plausible, we need to rule out the presence of any difference in time trends in the pre-treatment period between the treatment and control groups (note that, by treatment and control groups, we mean prefectures which were, respectively, highly treated and lightly treated, since our treatment variable is not dichotomous but continuous). To this end, we re-estimate the difference-in-differences model over the pre-treatment period. For the pre-treatment parallel trend assumption to be satisfied, we should find that the difference-in-difference estimate for the earlier period is statistically insignificant and close to zero.

The analysis of the trends in the pre-treatment period is based on using migrant inflows that took place between 1990 and 2000 and determines whether they were affected differentially for prefectures in the treatment vs. control groups. The results are reported in Table 4. Since it is the 2000-2005 values of the NTR gap that determine whether a prefecture is treated or not, the treatment and control groups are defined according to these

values. We measure tariffs that appear as explanatory variables in two different ways.[40] In one set of regressions (see panel A, Table 4), we measure them in 2000-2005, which implies that the treatment and control groups are defined exactly as in our main specification. At the same time, we realize that changes in tariffs during the 90's might be an omitted variable affecting the pattern of change in migration rates in the 90's. Therefore, in another set of regressions (see panel B, Table 4), we measure the tariffs which appear as explanatory variables using data for the 90's. Note that both these exercises are variants of the "pre-treatment parallel trends exercise". Importantly they both show that our treatment and control groups follow parallel trends before China's WTO accession. In Table 5 we carry out a related exercise, which we label the "falsification exercise". In this case we consider a period – the 90's – during which there was no reduction in trade policy uncertainty faced abroad by Chinese exporters. Yet we can construct pseudo-treatment and pseudo-control groups, based on data on the NTR gap for that period. In particular, in the falsification exercise we measure the NTR gap as the difference between the non-NTR U.S. tariff rates and the 90's NTR tariff rates. Moreover, we measure tariffs which appear as explanatory variables using data for the 90's. Since there was no treatment in the 90's, we expect to estimate zero effects, which is exactly what we find.

6 Additional Results

In this section, we provide several additional results that show: 1) the robustness of our main findings; 2) the main channel through which the reduction in trade policy uncertainty affects internal migration, i.e. changes in exports to the U.S.; and 3) how the findings vary across different migrant groups.

6.1 Robustness

In our benchmark estimates we used a measure of the weighted NTR gap, where the weights were calculated using the prefecture's basket of exports to the United States in 1997-1999. There are two types of concerns with this measure. First, using exports as weights understates the policy uncertainty prefectures face since, as we will show, exports tend to be lower when uncertainty is higher and to increase when this uncertainty is reduced (see

[40] Note that the other control variables are available only for the main sample period (2000 and 2005).

Table 7). In other words, products exposed to high trade policy uncertainty are given a smaller weight. Second, although we think it is highly unlikely that firms could have predicted the exact timing and magnitude of changes to come, exactly because of all the uncertainty surrounding China's entry in the WTO,[41] we worry that export baskets to the United States in 1997-1999 might be affected by firms adjusting beforehand how much they export. We address these concerns in several ways. First, we start by using an unweighted measure of the NTR gap based only on whether a given product was exported to the United States (see column (1), Panel A, Table 6). Second, we construct an alternative weighted NTR gap using the basket of exports *to the entire world*, rather than only to the United States (see column (2)). Third, we use an unweighted measure based only on whether a given product was exported to the entire world (see column (3)). Finally, we replace our export-based weights with sectoral employment shares in 1990 (see column (4)). The sign and significance of our results are unaffected, indicating that the possible endogeneity of export shares to the United States is not a major concern.

While it is important to assess the robustness of our results to the use of alternative weighting schemes, it is worth noting that the 1990 employment weights correspond to local production which is directed to both the domestic and international markets. As the recent literature on international trade in the presence of heterogeneous firms shows, we cannot assume though that domestic and international sales are perfectly correlated, since only the most productive firms will serve both markets.[42] Hence our preferred specification is the one based on the weighted NTR gap using as weights export shares (to the U.S.) which allow us to capture precisely the exposure to trade policy uncertainty in U.S. markets. While endogeneity of the export weights might be a concern, note that the time line of China's entry into the WTO shows that there was great uncertainty up to the end of negotiations, suggesting that anticipation effects are unlikely to have played a key role.[43]

A second concern that needs to be addressed is the potential omitted variable bias that can arise if tariff uncertainty with the U.S. is correlated with local economic growth and the latter also contributes to increased local labor demand. For example, coastal prefectures have enjoyed faster economic growth and absorbed more migrant labor during our sample

[41] For details, see https://www.wto.org/english/thewto_e/acc_e/a1_chine_e.htm.

[42] This might explain the large size of the effect based on employment weights – as they might capture the impact through the domestic market as well as the "pure" trade effect.

[43] If the estimates based on employment weights are still thought to be valid, then our baseline results are – if anything – biased towards zero compared to those.

period. To address this potential concern, in Table 6, Panel B, column (1), we control for the GDP per capita of each prefecture in 2000 and 2005. The estimated effect of the NTR gap on the total migration rate is unaffected compared to our benchmark result (Table 3, column (3)). In addition, we also account for the fact that prefectures with larger NTR gaps are likely to export a smaller volume of trade (as a share of GDP) at the beginning of the period. Therefore these prefectures will likely experience a smaller reduction in trade policy uncertainty and a smaller increase in migration rate. If this is the case, our estimates would be biased towards zero, which is consistent with what we find in Table 6, Panel B, column (2): When we control for the volume of trade (as a share of GDP) of each prefecture in 2000 and 2005, the estimated impact of $Post_t \cdot NTR\ Gap_j$ is larger in absolute value (even though the difference is not statistically significant).

Finally, unobservables or latent drivers might be shared by prefectures that are geographically close to each other and/or lie within the same province. If spatial spillovers exist – in other words, if "close" prefectures influence each other – then we can no longer assume the independence of observations and the OLS estimates will be biased (Anselin 2013, LeSage and Pace 2009). We address this concern following three alternative approaches. First, to account for potential correlation between the error terms across prefectures within the same province, we cluster the standard errors at the province level in column (3) and the results are once again qualitatively unaffected.[44] Second, in column (4) we implement a spatial error model (SEM) and allow the error terms to be spatially autocorrelated. In particular, we assume $\epsilon = \lambda W\epsilon + u$, where ϵ is the error term, and W is an NxN spatial weights matrix specifying whether a pair of prefectures affect each other based on geographic proximity. Finally, in column (5) we implement a spatial Durbin error model (SDEM), which includes spatial lags in both the explanatory variables and the errors. The results in columns (4)-(5) show that our estimates are robust when we account for unobserved spatial spillovers.[45]

[44] We have estimated all the specifications in the paper with errors clustered at the provincial level and our findings are overall robust (results available upon request).

[45] Note that the coefficients in columns (4) and (5) are smaller than the benchmark estimates because they capture only the "direct effect" – the impact of a prefecture's tariff uncertainty reduction on its *own* migration rate. Meanwhile, the spatial regressions allow for an "indirect effect" whereby a prefecture's migration rate could be affected by neighboring prefectures' tariff uncertainty, where the latter is likely relevant because of input/output linkages at the regional level. Accounting for both the direct and indirect effects, the *total* effect of tariff uncertainty reduction is 0.11 (SE = 0.049).

6.2 Channel: the impact on exports to the U.S.

The focus of this paper is on the impact – on internal migration within China – of the reduction in trade policy uncertainty faced by Chinese exporters in U.S. markets. The main channel through which this effect is likely to operate is exports from China to the United States. The intuition is that, as a consequence of the elimination of the threat of MFN non-renewal by the U.S. government, both Chinese firms and U.S. and multinational firms producing in China should be more willing to invest in large projects in China to produce and export to the U.S.. If Chinese exports indeed increase, this is likely to impact the demand for labor at the local level, which in turn will affect internal labor mobility.

Using data on the stock of fixed assets at the city level, Cheng and Potlogea (2015) provide evidence that a reduction in trade policy uncertainty is associated with an increase both in the local stock of fixed capital and in foreign direct investment. To directly investigate the role of trade flows, we estimate instead a specification which is very similar to the one presented in Equation (1), the main difference being that we focus on Chinese exports to the U.S. market as the dependent variable (see Table 7).

We consider variation both across 6-digit HS product codes (columns (1)-(2)) and across both products and prefectures (columns (3)-(4)). Moreover, we group annual exports for 1997-2000 and 2002-2006 to define respectively the pre– and post–treatment periods. In columns (1) and (3) we focus only on exports to the U.S. whereas in column (2) and (4), to address the possibility that exports might transit through Hong Kong (Fisman and Wei (2004)), we consider both Chinese exports to the U.S. and to Hong Kong.[46] The results in columns (1) and (2) show that higher policy uncertainty reduction for a certain product is associated with an increase in exports to the US. In columns (3)-(4) we find the same result at the prefecture by product level. Based on the specification with product-level exports in column (1), everything else equal, a ten percentage points reduction in tariff uncertainty with the U.S., as measured by the NTR gap, is associated with a 19 percent increase in the exports of that product to the U.S. Similarly, based on the specification at the prefecture by product level in column (3), everything else equal, a ten percentage points reduction in tariff uncertainty with the U.S. is associated with a 20 percent increase in the exports to the U.S.. Therefore prefectures facing the average decline in trade policy uncertainty –

[46]Note that the NTR gap in columns (1)-(2) varies at the product level while in columns (3)-(4) it varies at the product by prefecture level.

which is around 31 percentage points – experienced a 62% increase in exports.

6.3 Heterogeneous Effects

We turn now to carry out a series of exercises to investigate whether the migration response to trade policy uncertainty reduction is heterogeneous across prefectures and demographic groups. In Table 8 we allow for non-linear effects of the reduction in trade policy uncertainty. In particular we assign prefectures to 5 quintiles based on the size of their trade policy uncertainty reduction and estimate a different impact of the NTR gap after China's WTO accession for each quintile. We find that the positive effect of the NTR gap is driven by prefectures in the fourth and fifth quintiles. Hence our results are robust to accounting for non-linear effects.

Next we explore whether our results differ by gender, age and hukou status at origin – see Table 9 where we run the same specification as in column (3) of Table 3 for separate subgroups. In panel A we focus on gender; for comparison purposes, in column (1) we replicate the results for males from our baseline model (column (3) in Table 3), whereas in columns (2) and (3) we consider respectively females and total (males plus females). While the impact of the reduction in trade policy point uncertainty is significant for both groups, the point estimates are larger for males than for females, even if the two are not statistically different. In panel B we explore the role of age by considering four separate subgroups: 16-25 years old, 26-40 years old, 41-55 years-old, 56-65 years old. Consistent with our expectations, we find that the strongest and more significant results hold in the sample of the 16-25 and 26-40 year old migrant workers. For the older age groups, none of the effects are instead significant. Finally, in panel C we focus only on non-*hukou* migrants and study the role of *hukou* status at origin. Column (3) reports as a benchmark the findings of column (4) Table (3). Interestingly our results indicate that the reduction in trade policy uncertainty had a larger effect on the mobility of urban rather than rural residents.[47] One possible explanation for these findings is that land rights are highly uncertain in rural China, and permanently leaving a rural village might result in the confiscation and redistribution of the land initially assigned to a household. This adds to the migration costs faced by rural households and indeed, as shown by Mullan, Grosjean, and Kontoleon (2011) land tenure insecurity reduces rural-urban migration. In a related study, de la Rupelle, Quheng, Shi,

[47] Note that in both Panels B and C we focus on the male sample.

and Vendryes (2009) find also that rural migrants keep going back and forth between origin villages and urban destinations in order to protect the rights to their land. As a result, migration from rural areas tends to be more temporary and circular than migration from urban areas – which implies that rural–urban migration might not be fully accounted for in official statistics.

Third, we explore heterogeneous effects based on skill. As explained in section 4, for the purpose of our analysis a skilled worker is an individual who has completed at least a high school degree, whereas someone with less than a high school education is unskilled. The results are reported in Table 10 where we separately estimate the impact of a reduction in trade policy uncertainty on the migration rates of unskilled and skilled workers, respectively. In columns (1)-(2) we use the same measure of uncertainty reduction for both skill groups (NTR gap) while in columns (3)-(4) we construct a skill-specific measure of the NTR gap (by dividing products in each prefecture's trade basket into two groups, skilled-labor-intensive products and an unskilled-labor-intensive products).[48] Our results indicate that a reduction in trade policy uncertainty has a strong and significant positive impact on skilled migration rates, but no effect on unskilled migration rates. We can think of three possible explanations for this finding. First, the reduction in trade policy uncertainty increased the demand for skilled labor but not for unskilled labor. Second, given the same increase in labor demand for the two skill groups, skilled labor is more mobile. Third, given the same increase in labor demand for the two skill groups, the higher demand for unskilled labor was satisfied through an increase in supply by native workers in the prefecture. We further explore the role played by these mechanisms in Section 7.

7 The impact on other labor market outcomes

To better understand how Chinese local labor markets adjust to the trade shock, we carry out a series of additional exercises, which are reported in Tables 11 and 12. Our point of departure is that, in addition to hiring migrants, local labor markets can accommodate an increase in demand in other ways, such as by employing more local workers, or by extending the number of working hours of the employed workers.[49]

[48] Skilled-labor-intensive products are those that use skilled workers (i.e. those who have at least completed high school) more intensively. For more details on the definition of skill intensity, see Appendix B.2.

[49] Note that our Census data do not provide information on the other potential margin of labor market adjustment, namely wages.

We start by exploring the impact of the trade shocks on the employment of both natives and migrants (see Table 11). In panel A we focus on the effect on employment rates[50], whereas in panel B we investigate the impact on employment levels. In columns (1)-(3), panel A, we consider the effect on all workers, without distinguishing by skill level. In column (1) the dependent variable is the total employment rate of both natives and migrants, whereas in column (2) and (3) we focus, respectively, on migrants and natives. We find that the decline in trade policy uncertainty did not have any effect on employment rates, both in the aggregate and for each subgroup of the population. In columns (4)–(6) we repeat the same exercise focusing on unskilled workers, i.e. workers who did not complete a high–school degree, whereas in columns (7)–(9) we consider skilled workers. Also in these cases we do not estimate a significant effect of the reduction in trade policy uncertainty. One possible explanation for these results is that, with average employment rates at around 97%, the Chinese labor market was quite saturated during this period, thus there was little room to adjust to the increased demand for labor through changes in the rates of employment. Even though employment rates did not adjust, the analysis in panel B indicates that as a result of the shock the employment *level* of migrants did increase, and this is true for both skilled and unskilled individuals.

What happened at the intensive margin? In other words, did the number of hours worked by different groups of individuals adjust as a result of the shock? To explore this question, in Table 12 we turn to consider the impact of the reduction in trade policy uncertainty on the number of weekly working hours, following the same structure as in Table 11. Several interesting results emerge. First, as can be seen in column (1), the reduction in trade policy uncertainty increased the overall number of hours worked in more intensively treated prefectures. Interestingly though, this result is driven by natives spending more time at work, whereas hours of work by migrants did not change. Looking at different effects by skill group, the findings in columns (4)–(6) indicate that the adjustment in hours of work affected unskilled workers, rather than skilled ones, and once again the effect applied only to natives and not to migrant workers.

From Table 10, Table 11 and Table 12, we can see that a reduction in trade policy

[50]The employment rate of natives (migrants) equals the number of employed native (migrant) workers divided by the total number of natives (migrants) in the labor force. An individual is defined as employed if 1) they have worked more than one hour for pay in the reference week, or 2) they have not worked for pay in the reference week due to business off-seasons, training, or vacation.

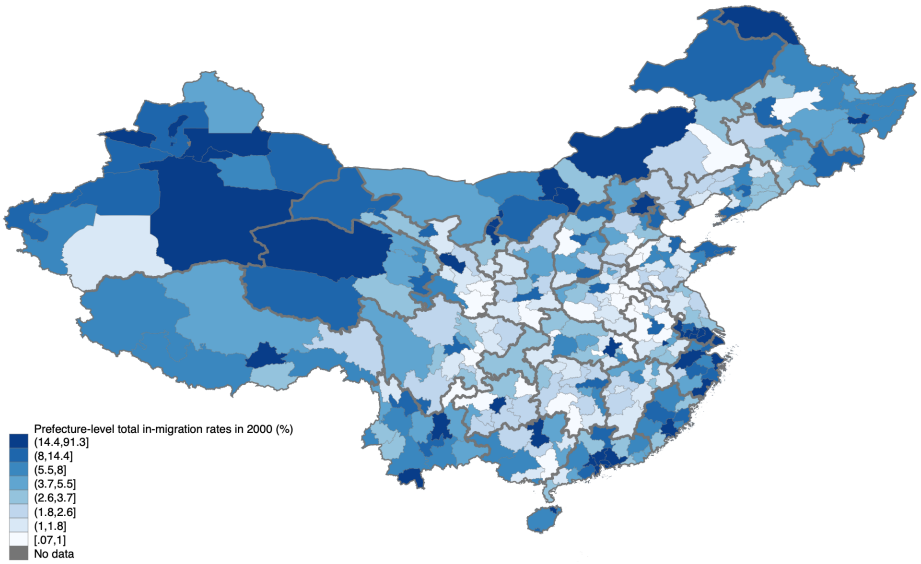
uncertainty led to an increase in demand for *both* skilled and unskilled labor. While the adjustment to increased demand for unskilled labor took place through longer working hours of unskilled native workers, the adjustment to increased demand for skilled labor was accommodated by admitting and employing more skilled migrant workers.

8 Conclusion

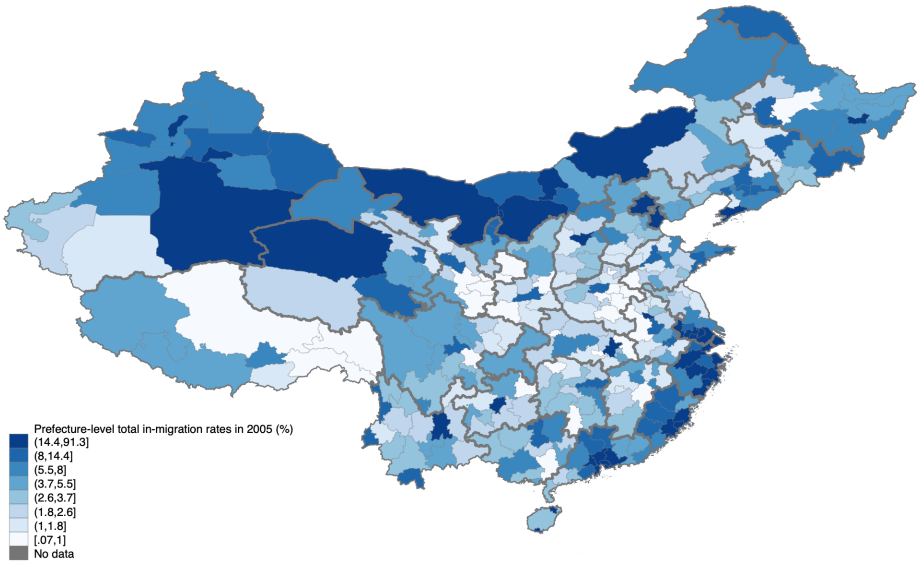
In this paper we carried out a systematic analysis of the effects of China's entry in the WTO on the internal mobility of Chinese workers. Building on the recent work by Pierce and Schott (2016) and Handley and Limao (2017), we focused on the role played by the reduction in trade policy uncertainty in U.S. markets due to permanent MFN status granted by the U.S. to China. Our analysis delivered several interesting results. First, we have shown that Chinese prefectures facing a larger decline in trade policy uncertainty experienced larger inflows of migrant workers. When we looked at different types of migrants – *hukou* vs. non-*hukou* migrants – we found that it is the latter who drove the changes in internal migration rates. In other words, we found that the labor flows triggered by the reduction in trade policy uncertainty have been characterized by a limited access of migrants to local public goods and services. Second, we have investigated one natural mechanism that could explain this finding, namely changes in labor demand brought about by changes in trade flows. Our results show that this mechanism was in fact at work: products and prefectures facing a larger decline in trade policy uncertainty vis a vis the United States experienced a larger increase in exports towards that country. Third, we have explored how the decline in trade policy uncertainty affected different subgroups of the population. Our results indicate that the effect of the trade shock was driven by skilled rather than unskilled migrant workers and by prime working age migrant workers. Interestingly, while the bulk of the results are for the sample of male migrant workers, we also find significant results for the sample of female migrant workers. Finally, we have explored the role played by other potential labor market adjustment mechanisms. Our results indicate that the main adjustment – in prefectures facing a larger decline in trade policy uncertainty – in the case of unskilled labor has involved an increase in the number of hours worked by local ("native") unskilled workers. We found instead no effect on the employment rate of neither migrants nor native workers (neither skilled nor unskilled).

One of the main contributions of our paper is to have considered the institutional details of the internal migration framework within China, by distinguishing *hukou* vs. *non-hukou* migration. Our results show no evidence that the trade shock we have examined in our paper led to a liberalization of the *hukou* system associated with changes in the registration location and access to local public services. This might explain why we find significant results only for skilled migrants, since the latter are better able to overcome the lack of access to public services. Hence, we can derive important policy implications from our analysis. Our results suggest that one way China has been able to reap the benefits of trade openness, and further its economic development, has been through increased skilled migration. To achieve an even more efficient geographic allocation of workers – and facilitate unskilled migration – in response to the growing opportunities brought up by trade, a liberalization of the *hukou* system of the type mentioned above should be further pursued.

Figure 1: Heat maps of in-migration rates among employed population aged 16-65, in 2000 and 2005



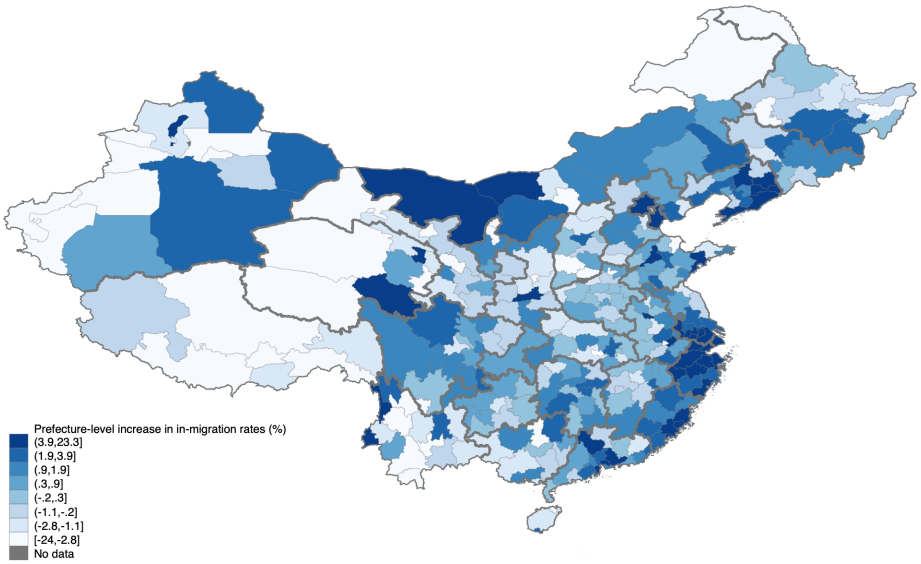
(a) Prefecture level *"non-hukou" plus "hukou"* migration rates in 2000 (%)



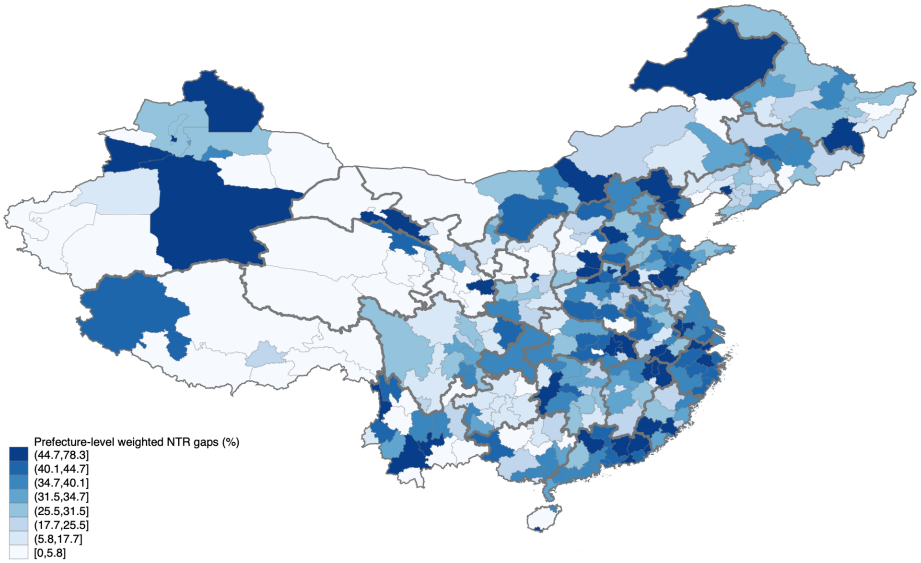
(b) Prefecture level *"non-hukou" plus "hukou"* migration rates in 2005 (%)

Notes: Figures (a) and (b) plot each prefecture's share of cross-prefecture migrants among working age (16 – 65 years old) employed male workers, in 2000 and 2005, respectively. The unit of observation is prefecture, and province borders are outlined in thick lines. Prefectures are color-coded into 8 intervals based on their in-migrant shares.

Figure 2: Heat maps of migration and trade policy uncertainty



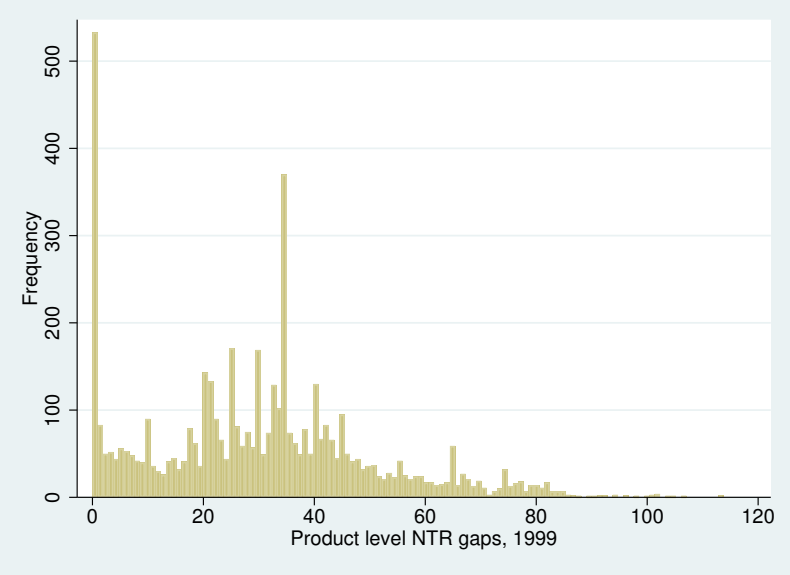
(a) Increase from 2000 to 2005 in in-migration rates



(b) Weighted NTR gaps, 1999

Notes: Figure (a) plots the increase in cross-prefecture in-migrant shares from 2000 to 2005, in percentage points. The sample is working age (16 – 65 years old) employed male workers. The unit of observation is a prefecture, and province borders are outlined in thick lines. Prefectures are color-coded into 8 (roughly) equal-sized intervals based on their in-migrant shares. Figure (b) plots the size of Normal-Trade-Relations (NTR) gaps for each prefecture in 1999 – before China was granted permanent normal trade relations status. See text for details of the construction of NTR gaps.

Figure 3: HS 6-digit product level NTR gaps, 1999



Notes: This figure shows the scatterplot and histogram of NTR gaps at the HS 6-digit (1996) product level. See text for details on the construction of NTR gaps.

Table 1: National-level internal migration of employed population

1990	Male	Female	Total
Total number of migrants (million)	10.04	7.71	17.75
Number of skilled migrants (million)	3.07	1.50	4.57
Number of unskilled migrants (million)	6.97	6.21	13.18
Rate of total migration (%)	2.78	2.61	2.70
Rate of skilled migration (%)	5.44	4.65	5.04
Rate of unskilled migration (%)	2.29	2.36	2.33
2000	**Male**	**Female**	**Total**
Total number of migrants (million)	29.38	22.35	51.73
Number of skilled migrants (million)	6.82	3.91	10.73
Number of unskilled migrants (million)	22.56	18.44	41.00
Rate of total migration (%)	8.13	7.41	7.77
Rate of skilled migration (%)	9.52	8.70	9.11
Rate of unskilled migration (%)	7.78	7.18	7.48
2005	**Male**	**Female**	**Total**
Total number of migrants (million)	37.36	29.36	66.72
Number of skilled migrants (million)	11.31	7.47	18.78
Number of unskilled migrants (million)	26.05	21.89	47.94
Rate of total migration (%)	10.27	9.45	9.86
Rate of skilled migration (%)	14.33	14.65	14.49
Rate of unskilled migration (%)	9.15	8.43	8.79

Notes: This table describes the national-level stocks and rates of recent internal migrants (arrived in the previous five years) in 1990, 2000, and 2005. Samples are drawn from the Censuses. We focus on 16-65 employed workers. Total migration includes cross-prefecture non-*hukou* and cross-province *hukou* migrants. Skilled workers are those who have completed at least high school education.

Table 2: Summary statistics of prefecture level panel data

	2000	2005
Total migration rate	8.14	10.37
	(13.21)	(15.80)
Total non-*hukou* migration rate	7.77	9.91
	(13.13)	(15.83)
Total provincial migration rate (Prov NHM + HM)	4.94	6.41
	(10.34)	(12.70)
Provincial non-*hukou* migration rate (Prov NHM)	4.57	5.95
	(10.26)	(12.72)
Provincial *hukou* migration rate (Prov HM)	0.46	0.55
	(0.66)	(0.70)
NTR gap (weighted)	31.96	31.96
	(13.13)	(13.13)
NTR rate	3.87	3.68
	(2.48)	(2.44)
Tariff abroad	4.51	4.11
	(3.53)	(3.28)
Import tariff	13.70	7.25
	(6.45)	(2.84)
Contract intensity	43.24	43.24
	(7.78)	(7.78)
MFA quota bound	12.75	12.75
	(12.59)	(12.59)
Production subsidy	0.86	0.54
	(2.09)	(1.75)
Export license	0.34	0.49
	(0.23)	(0.25)
N	322	322

Notes: This table summarizes migration measures and trade barriers at the *prefecture* level. The sample includes 322 prefectures with consistent boundaries from 1990 to 2005. The first five rows list migration rates calculated as the shares of migrants in a prefecture's working-age employed population. Rows 6-13 list measures of trade barriers and other policies considered in the main regression specification. *NTR gap (weighted)* measures the reduction in uncertainty of U.S. tariff rates. *NTR Rate* measures the weighted average MFN tariffs in the U.S. market. *Tariff Abroad* is the weighted average tariff rate a prefecture faced in China's top export markets, including Hong Kong, Japan, European Union, South Korea, Singapore, Taiwan, Australia, Canada, and Russia. *Import tariff* is the weighted average import tariff a prefecture imposes on imported goods, given its import basket. *Contract Intensity* measures the share of intermediate inputs that require relationship-specific investments. *MFA Quota Bound* measures the share of textile exports that would have faced binding MFA quotas were not for China's WTO-accession. *Production subsidy* measures the share of local production which is subsidized. *Export license* measures the share of workers employed by firms with export licenses. All measures of trade barriers are aggregated from the product/industry/firm level to prefecture level. See text for more details.

Table 3: Migration Rates (different migrant definitions)

Migration rate	All migrants (*hukou* PLUS non-*hukou*)			NHM	Prov NHM+HM	Prov NHM	Prov HM
Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post x NTR gap	0.063	0.063	0.059	0.055	0.041	0.037	0.004
	(0.025)**	(0.026)**	(0.028)**	(0.027)**	(0.022)*	(0.021)*	(0.005)
Post x Δ NTR Rate		-0.013	0.088	0.061	0.207	0.179	0.030
		(0.658)	(0.632)	(0.593)	(0.442)	(0.393)	(0.132)
Post x Δ Tariff Abroad		-0.006	0.007	0.016	-0.032	-0.023	-0.010
		(0.086)	(0.078)	(0.075)	(0.070)	(0.057)	(0.036)
Post x Δ Import Tariff		0.007	-0.000	0.011	-0.011	-0.000	-0.012
		(0.043)	(0.045)	(0.043)	(0.036)	(0.033)	(0.010)
Post x Contract Intensity			0.036	0.041	0.030	0.036	-0.006
			(0.040)	(0.039)	(0.029)	(0.028)	(0.008)
Post x MFA Quota Bound			-0.010	-0.009	-0.009	-0.007	-0.001
			(0.024)	(0.022)	(0.022)	(0.020)	(0.006)
Post x Δ Production Subsidy			0.060	0.051	0.088	0.079	0.013
			(0.225)	(0.223)	(0.187)	(0.183)	(0.024)
Post x Δ Export License			-0.011	-0.011	-0.003	-0.004	0.000
			(0.015)	(0.015)	(0.009)	(0.009)	(0.002)
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.91	0.91	0.91	0.91	0.91	0.34
N	644	644	644	644	644	644	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. The dependent variables are: the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-province and cross-prefecture) migrants (columns (1)-(3)); migration rate of all (cross-province and cross-prefecture) non-*hukou* migrants (NHM in column (4)); migration rate of cross-province *hukou* PLUS non-*hukou* migrants (Prov NHM + HM in column (5)); cross-province non-*hukou* migrants (Prov NHM in column (6)); and cross-province *hukou* migrants (Prov HM in column (7)). The "pre-treatment" period is 2000 and the "post-treatment" is 2005. The sample includes 322 prefectures with consistent boundaries from 1990 to 2005. The DID terms are constructed using a time dummy "Post" interacted with changes in trade/production policies. Refer to Table 2 and text for the definition and construction of the explanatory variables.

Table 4: Pre-treatment trends: migration rates of all migrants; 2000-2005 NTR gaps

Panel A: 2000 and 2005 tariffs as controls

Dependent variable:	2000-2005	1990 - 2000				
Migration rate	NHM+HM	NHM+HM	NHM	Prov NHM+HM	Prov NHM	Prov HM
	(1)	(2)	(3)	(4)	(5)	(6)
Post x NTR gap	0.059	0.034	0.035	0.027	0.028	-0.001
	(0.028)**	(0.034)	(0.035)	(0.027)	(0.028)	(0.007)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.65	0.63	0.42	0.39	0.10
N	644	644	644	644	644	644

Panel B: 1990 and 2000 tariffs as controls

Dependent variable:	2000-2005	1990 - 2000				
Migration rate	NHM+HM	NHM+HM	NHM	Prov NHM+HM	Prov NHM	Prov HM
	(1)	(2)	(3)	(4)	(5)	(6)
Post x NTR gap	0.059	0.050	0.054	0.012	0.016	-0.003
	(0.028)**	(0.042)	(0.042)	(0.030)	(0.030)	(0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.65	0.63	0.42	0.39	0.09
N	644	644	644	644	644	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table shows the pre-treatment trend using internal migration measures between 1990 and 2000 to test whether internal migration changed in anticipation to elimination of trade policy uncertainty after 2001. The sample includes 322 prefectures, observed at 1990 and 2000. As a comparison, we reproduce column (3) in Table 3 for the same 322-prefecture delineation in 2000-2005 in the first column. Columns (2) - (6) report pre-trend of 1990 to 2000 migration. Both panels use the reduction in trade policy uncertainty between 2000 and 2005 – the 1999 NTR gaps used in the main specification (Table 3) – as the main explanatory variable. Panel A uses tariff rates from 2000 and 2005 as controls, and Panel B uses tariff rates from 1990 and 2000 as controls. Both panels include other control variables including contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level. See text for more details.

Table 5: Falsification test: migration rates of all migrants; 1990-2000 NTR gaps

Dependent variable:	2000-2005	1990 - 2000				
Migration rate	NHM+HM	NHM+HM	NHM	Prov NHM+HM	Prov NHM	Prov HM
	(1)	(2)	(3)	(4)	(5)	(6)
Post x NTR gap	0.059	0.019	0.026	-0.021	-0.014	-0.008
	(0.028)**	(0.043)	(0.042)	(0.033)	(0.032)	(0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.65	0.63	0.42	0.39	0.09
N	644	644	644	644	644	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table shows the falsification test using internal migration rates between 1990 and 2000 and test whether they respond to the contemporary U.S. trade policy uncertainty – the 1990 NTR gap – which was yet to be eliminated. The sample includes 322 prefectures, observed at 1990 and 2000. As a comparison, we reproduce column (3) in Table 3 for the same 322-prefecture delineation in 2000-2005 in the first column. Columns (2) - (6) report the results of falsification tests on 1990 to 2000 migration, with the 1990 NTR gaps as the main explanatory variable and tariff rates from 1990 and 2000 as controls. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level. See text for more details.

Table 6: Robustness Check: migration rate of all migrants (*hukou* PLUS non-*hukou*), using alternative NTR gaps

Panel A: Alternative measures of NTR gaps

	Trade US Unweighted (1)	Trade World Weighted (2)	Trade World Unweighted (3)	Employment Weighted (4)
Post x NTR gap	0.081	0.062	0.102	0.178
	(0.041)*	(0.031)**	(0.051)**	(0.077)**
Controls	Yes	Yes	Yes	Yes
Control for p.c. GDP	No	No	No	No
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE Cluster	Prefecture	Prefecture	Prefecture	Prefecture
Adjusted R-squared	0.91	0.91	0.91	0.91
N	644	644	644	644

Panel B: Different specifications

	Control for per capita GDP (1)	Control for Post*Exp (2)	SE clustered at province level (3)	Spatial Error Model (4)	Spatial Durbin Error Model (5)
Post x NTR gap	0.063	0.063	0.059	0.035	0.039
	(0.029)**	(0.028)**	(0.030)*	(0.018)*	(0.019)**
Controls	Yes	Yes	Yes	Yes	Yes
Control for p.c. GDP	Yes	No	No	No	No
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes
SE Cluster	Prefecture	Prefecture	Province	Spatial Error	Spatial Error
Adjusted R-squared	0.91	0.91	0.91	0.04	0.08
N	628	628	644	636	636

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table shows robustness checks of the baseline specification. The dependent variable is the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* migrants. In Panel A, alternative measures of NTR gaps are used. In the first column, prefecture-level NTR gaps are simple averages of NTR gaps of products exported to the US, and the prefecture-level import and export tariff rates are simple averages of tariff rates of products imported and exported by each prefecture. In the second column, prefecture-level NTR gaps are weighted averages of NTR gaps of products exported to the world, and the prefecture-level import and export tariff rates are weighted averages of tariff rates of products imported and exported by each prefecture. In the third column, prefecture-level NTR gaps are simple averages of NTR gaps of products exported to the world, and the prefecture-level import and export tariff rates are simple averages of tariff rates of products imported and exported by each prefecture. Panel B presents 5 alternative specifications: control for GDP per capita in (1), controlling for share of exports in (2), clustering standard errors at the province level in (3), including spatially correlated errors in (4) and (5). Note that results columns (4) and (5) in panel B come from spatial regressions on the first difference specification. The sample size in columns (1) and (2) is smaller due to missing GDP measures in 8 prefectures, while the sample size in (4) and (5) is smaller due to concordance issues with the underlying geographic map. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level except in B(3). See text for more details.

Table 7: Log Exports to US

Dependent variable:	by product		by product and prefecture	
log export	US	US & HK	US	US & HK
	(1)	(2)	(3)	(4)
Post x NTR gap	0.019	0.023	0.020	0.017
	(0.005)***	(0.004)***	(0.002)***	(0.002)***
Controls	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
(number of FE)	(2)	(2)	(2)	(2)
Product fixed effect	Yes	Yes	Yes	Yes
(number of FE)	(4,835)	(4,835)	(4,835)	(4,835)
Prefecture FE	No	No	Yes	Yes
(number of FE)	–	–	(318)	(318)
SE Cluster	Product	Product	Prefecture	Prefecture
Adjusted R-squared	0.77	0.73	0.34	0.36
N	9,670	9,670	743,554	743,554

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The dependent variable in columns (1)-(2) is 6-digit HS product-level average log export values to the U.S. during 1997-2000 and 2002-2006. In columns (3)-(4), the dependent variable is the prefecture-by-product-level average annual log export values to the U.S. during 1997-2000 and 2002-2006. Huber-White SEs are reported in parentheses, and they are clustered at the product level in columns (1)-(2), and at the prefecture level in columns (3)-(4). "Controls" include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export license. Note that in all columns, we use the DID interaction of "Post" and *changes* in policies as in the main specification.

Table 8: Heterogeneous effects: migration rate of all migrants (*hukou* PLUS non-*hukou*) by NTR gap quintiles

Dependent variable:	Migration rate of NHM+HM
1st Quintile: Post x NTR gap	0.305
	(0.190)
2nd Quintile: Post x NTR gap	0.069
	(0.071)
3rd Quintile: Post x NTR gap	0.082
	(0.051)
4th Quintile: Post x NTR gap	0.073
	(0.043)*
5th Quintile: Post x NTR gap	0.065
	(0.033)**
Controls	Yes
Prefecture and year dummies	Yes
SE	Clustered
Adjusted R-squared	0.91
N	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table presents the non-linear effects of trade policy changes on migration rates. 322 prefectures are grouped into quintiles of treatment groups. All specifications include prefecture and time fixed effects. The dependent variable is the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-prefecture) migrants. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level. See text for more details.

Table 9: Heterogeneous effects by gender, age and hukou type at origin

Panel A: By gender

Dependent variable:	Male	Female	Total
NHM+HM	(1)	(2)	(3)
Post x NTR gap	0.059	0.044	0.053
	(0.028)**	(0.021)**	(0.024)**
Controls	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.93	0.92
N	644	644	644

Panel B: Males by age group

Dependent variable:	16-25	26-40	41-55	56-65
NHM+HM	(1)	(2)	(3)	(4)
Post x NTR gap	0.080	0.085	0.035	-0.014
	(0.047)*	(0.037)**	(0.024)	(0.042)
Controls	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.87	0.88	0.83	0.72
N	644	644	644	644

Panel C: Males by type of hukou at origin

Dependent variable:	Urban	Rural	Total
NHM	(1)	(2)	(3)
Post x NTR gap	0.089	0.043	0.055
	(0.034)***	(0.036)	(0.027)**
Controls	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered
Adjusted R-squared	0.70	0.91	0.91
N	644	644	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. Sample includes 322 prefectures observed in 2000 and 2005. The dependent variables are migration rates of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-prefecture) migrants (NHM+HM) by gender in panel A, by age groups in panel B, and migration rates of non-*hukou* (cross-prefecture) migrants (NHM) by type of *hukou* at origin in panel C. We use the NTR gaps and other trade policy changes in the main specification (Table 3) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table 10: Migration rate of all migrants (*hukou* PLUS non-*hukou*); skill-specific

Dependent variable:	Same NTR gaps		Specific NTR gaps	
NHM+HM	Unskilled	Skilled	Unskilled	Skilled
	(1)	(2)	(3)	(4)
Post x NTR gap	0.042	0.098	0.030	0.067
	(0.031)	(0.047)**	(0.030)	(0.032)**
Controls	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.76	0.91	0.77
N	644	644	644	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The dependent variable is the migration rate of *hukou* (cross-province) migrants and non-*hukou* (cross-prefecture) migrants by skill types. Skilled workers are those who completed at least high school education, and skilled sectors are ones that uses skilled workers intensively. The sample includes unskilled sectors (Columns (1) and (3)) and skilled sectors (Columns (2) and (4)) in 322 prefectures, observed at 2000 and 2005. In Columns (1)-(2), we use the same NTR gaps for both skill groups, ie, not skill-specific, while in Columns (3)-(4), we use skill-specific NTR gaps and other trade measures for each skill group. The other explanatory variables are constructed similarly; they include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table 11: Labor Market Outcomes: Employment Rates of Migrants (M) and Natives (N)

Panel A: Employment rates

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	-0.001	-0.019	0.003	0.000	-0.031	0.007	0.009	0.054	0.009
	(0.011)	(0.043)	(0.011)	(0.011)	(0.044)	(0.011)	(0.016)	(0.055)	(0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.66	0.14	0.68	0.63	0.19	0.63	0.53	0.01	0.54
N	644	644	644	644	642	644	644	614	644

Panel B: Employment levels

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	0.415	0.912	-0.497	-0.167	0.514	-0.676	0.582	0.373	0.179
	(1.029)	(0.354)**	(0.966)	(0.877)	(0.253)**	(0.842)	(0.263)**	(0.145)**	(0.195)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.96	0.94	0.96	0.96	0.95	0.96	0.95	0.84	0.96
N	644	644	644	644	642	644	644	614	644

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The sample includes 322 prefectures, observed at 2000 and 2005. In panel A, the dependent variables are the employment *rates* of migrants (M) and natives (N) by skill types. In panel B, the dependent variables are the employment *levels* of migrants (M) and natives (N) by skill types. Skilled workers are those who have completed at least high school education. For both panels. columns (1)-(3) include migrants and natives of all skill types, and results for unskilled labor (columns 4-6) and skilled labor (columns 7-9) are reported separately. We use the NTR gaps and other trade policy changes in the main specification (Table 3) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table 12: Labor Market Outcomes: Weekly Working Hours of Migrants and Natives

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	0.049	-0.022	0.048	0.056	-0.042	0.056	-0.001	-0.001	-0.006
	(0.022)**	(0.038)	(0.021)**	(0.024)**	(0.051)	(0.023)**	(0.017)	(0.060)	(0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.42	0.23	0.42	0.45	0.21	0.44	0.39	0.05	0.45
N	644	644	644	644	642	644	644	608	644

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The sample includes 322 prefectures, observed at 2000 and 2005. The dependent variables are the weekly working hours of migrants (M) and natives (N) by skill types. Skilled workers are those who completed at least high school education. Columns (1)-(3) include migrants and natives of all skill types, and results for unskilled labor (columns 4-6) and skilled labor (columns 7-9) are reported separately. We use the NTR gaps and other trade policy changes in the main specification (Table 3) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

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A Definition of Migrants

To better illustrate the two definitions of migration, graph A.2 and graph A.3 show the composition of individuals surveyed at a certain prefecture R, which is located in province P.

Take 2000 as an example, there are three groups of individuals associated with a prefecture: 1) those who are registered and currently residing in R (local residents) 2) those who are residing but not registered in R (immigrants), and 3) those who are registered in but away from R (emigrants). Only 1) and 2) are observed in prefecture R, and emigrants from R fill out their census questionnaire in their destination prefectures. The "Unregistered and residing" (immigrants) are what we define as "non-*hukou* migrants", whose location of origin prefectures determine whether they are *within–province* or *cross–province* non-*hukou* migrants. Among the "Registered and residing" (local residents), we identify "*hukou* migrants" as those who, within the previous 5 years, moved to R and acquired residentship. Their origin prefecture determined whether they are *within–province* or *cross–province hukou* migrants. The classification of residents in 2005 are exactly the same, with one regrettable exception from the data restriction, that is, among the local residents who are "registered and residing" in a prefecture, we cannot separate natives and *within-province hukou* migrants apart. This limitation is the reason why we can only study *cross–province* non-*hukou* migrants in our empirical analysis.

Figure A.1: Administrative organization of a Chinese province

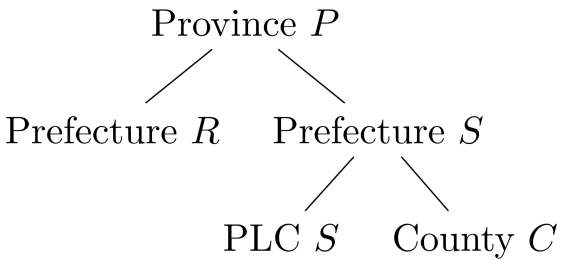


Figure A.2: Composition of survey subjects in 2000 Census

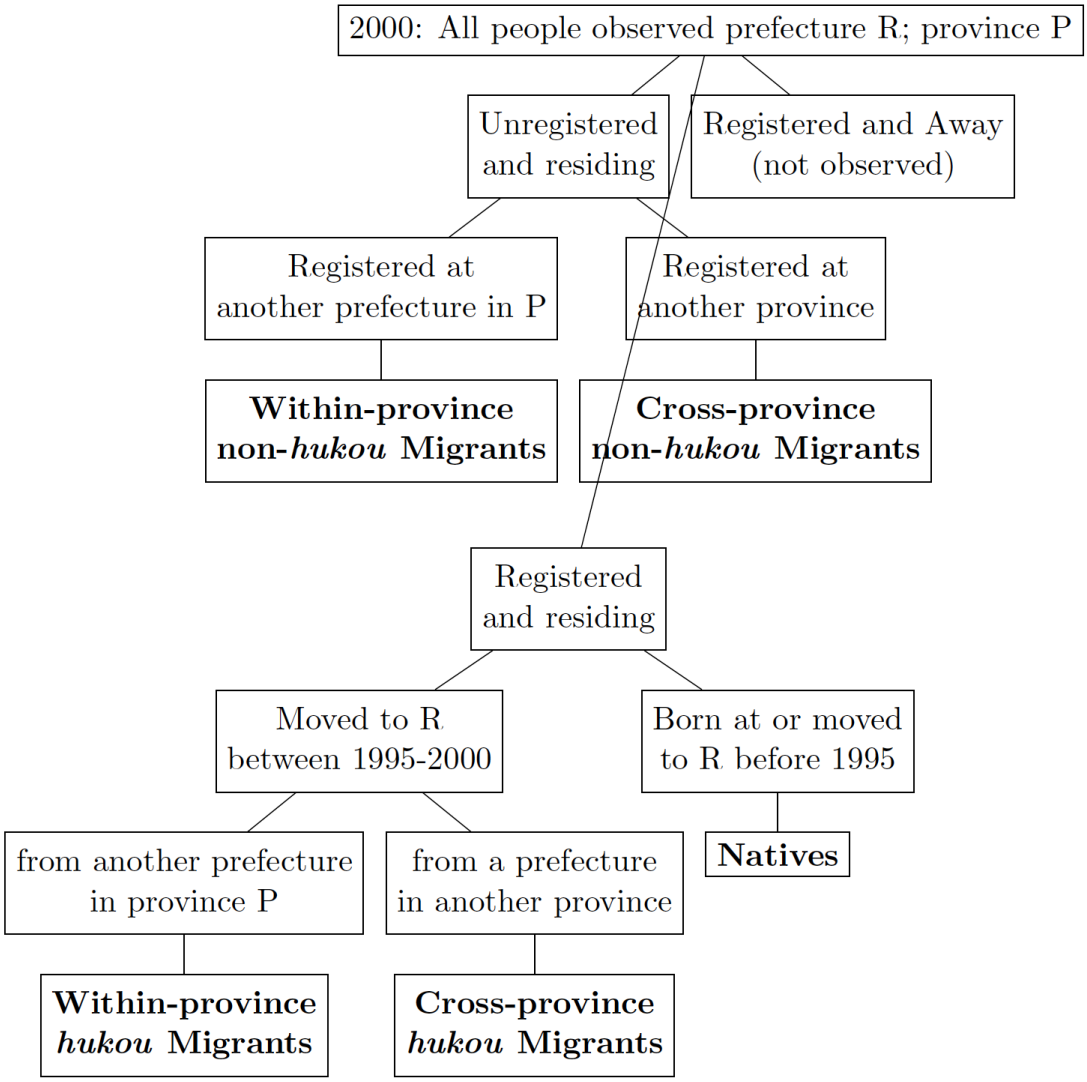
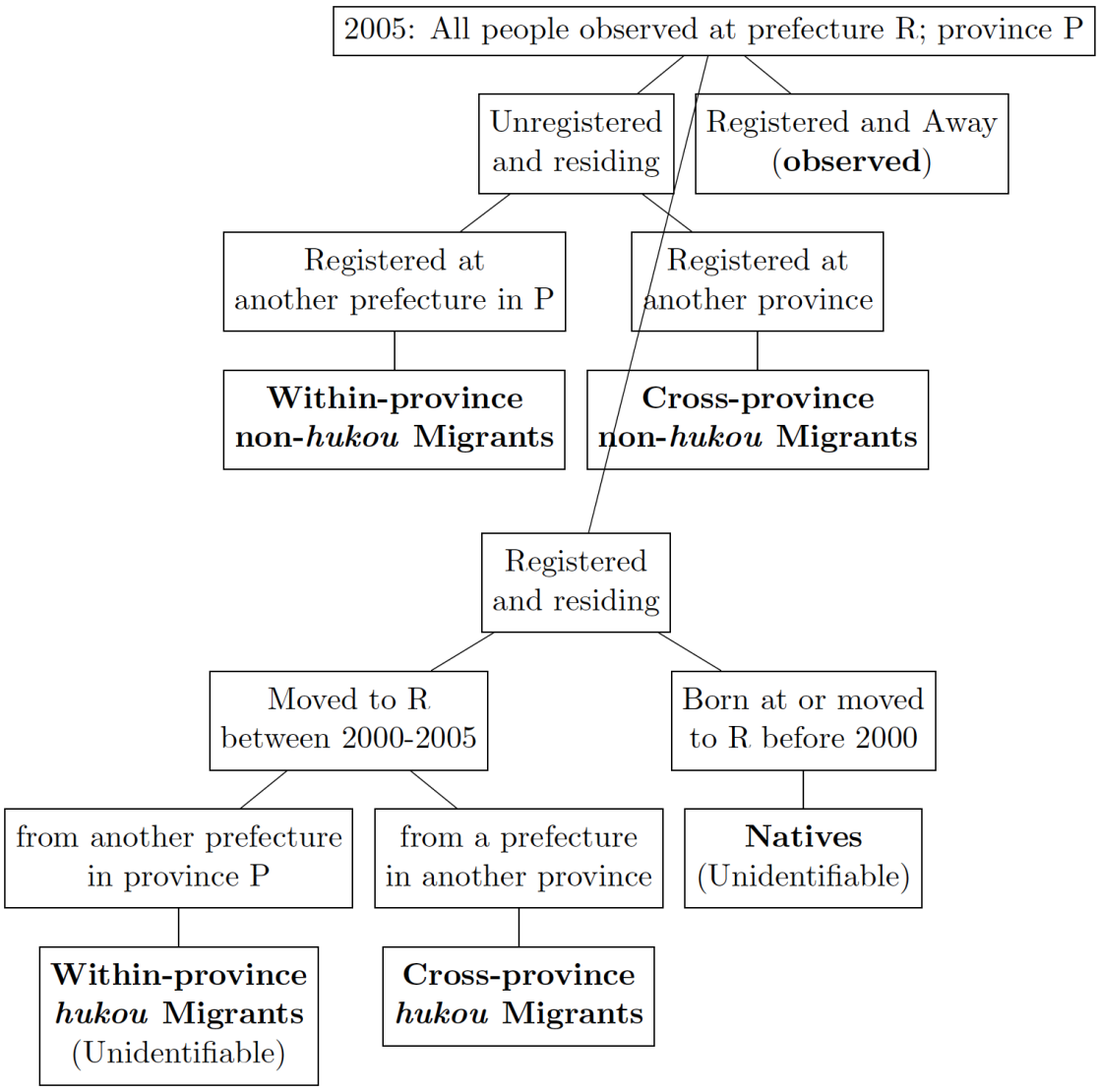


Figure A.3: Composition of survey subjects in 2005 Census



B Data Sources

This section provides information on the data used in this paper, as well as on the key variables employed in the empirical analysis. There are three main sources of data: China's Population Census for 1990, 2000 and 2005; China Custom Data (CCD) covering the period 1997-1999, and tariff rates for 1990 - 2006, obtained from the World Integrated Trade Solution (WITS) dataset . In addition, the industry skill intensity data has been constructed using China's Annual Survey of Industrial Firms (CASIF).

B.1 China Custom Data: 1997-2006

We use China Custom Data (CCD, also called China Import and Export Data) between 1997 – 1999 to construct the the export basket of each prefecture. China Custom Data is an annual HS-based transaction-level dataset compiled by the General Administration of Customs of China. It records information on each import/export transaction, and the variables relevant for our analysis include commodity code (HS 6-digit), partner country, firm type, firm location at the prefecture level, import/export type, transaction value (in USD), and transaction types.

B.2 Skill Intensity

We use HS 6-digit level factor intensity data aggregated from the 2004 China's Annual Survey of Industrial Firms (CASIF), which is also known as "Chinese Industrial Enterprises Database". It is a firm-level dataset, collected yearly by China's National Bureau of Statistics. The survey includes all industrial firms that are either state-owned, or are non-state firms with sales above 5 million RMB. It also contains data on the overall composition of the labor force employed by more than 300,000 industrial enterprises. The data reports information on industry, output value, export delivery value, number of employers, wage payments, profit and tax etc. A skilled worker is an individual who has at least completed high school. Using information on the number of skilled and unskilled workers employed in the production of each HS-6 digit product, we construct the skill intensity measure as the share of skilled workers in total employment. Skill intensive products are those characterized by a value of this indicator above the national median.

B.3 Census of China: 1990, 2000, 2005

The migration data has been obtained comes form the population Census of China, conducted by the National Bureau of Statistics (NBS). We use samples from the 1990, 2000 and 2005 waves. The population Census of China documents detailed information on individual's location, *hukou* status and migration history, among other individual characteristics.

C Supplementary Results

Table C.1: Migration Rates of all migrants (*hukou* PLUS non-*hukou*) in *first difference*

	(1)	(2)	(3)
Δ Import Tariff	0.112	0.109	0.073
	(0.048)**	(0.048)**	(0.045)
Δ NTR Rate		0.911	0.531
		(0.449)**	(0.425)
Δ Tariff Abroad		0.001	0.006
		(0.020)	(0.019)
NTR gap			0.043
			(0.016)***
First Difference	Yes	Yes	Yes
SE	Robust	Robust	Robust
Adjusted R-squared	0.02	0.02	0.05
N	340	340	340

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Similar to Zi (2017), this specification is in first differences and the dependent variables measures the change in migration rates from 2000 to 2005. Note that the point estimates are different because initial employment level is used as weights. Robust SEs are reported in parentheses.

Table C.2: Comparison of local labor markets

	N	Median Area (km^2)	Mean Area (km^2)	Std. Dev.
U.S. commuting zones	709	9,023	12,625	23,661
Chinese prefectures	344	12,858	27,059	51,407
Chinese counties	2,411	1,941	3,896	9,639

Notes: Authors' calculation based on the 2000 map of China.

Table C.3: Migration Rates (different migrant definitions)

	All migrants (*hukou* PLUS non-*hukou*)			NHM	Prov NHM+HM	Prov NHM	Prov HM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post x NTR gap	0.057	0.052	0.052	0.049	0.037	0.033	0.004
	(0.023)**	(0.023)**	(0.026)**	(0.025)*	(0.021)*	(0.020)*	(0.005)
Post x Δ NTR Rate		0.673	0.694	0.667	0.581	0.554	0.032
		(0.712)	(0.710)	(0.703)	(0.492)	(0.468)	(0.102)
Post x Δ Tariff Abroad		-0.001	0.001	0.001	0.002	0.003	-0.001
		(0.020)	(0.021)	(0.021)	(0.010)	(0.010)	(0.004)
Post x Δ Import Tariff		0.034	0.032	0.037	0.020	0.026	-0.006
		(0.044)	(0.047)	(0.047)	(0.035)	(0.034)	(0.009)
Post x Contract Intensity			0.013	0.021	0.010	0.018	-0.009
			(0.031)	(0.031)	(0.023)	(0.022)	(0.006)
Post x MFA Quota Bound			-0.012	-0.010	-0.010	-0.008	-0.002
			(0.023)	(0.020)	(0.021)	(0.019)	(0.006)
Post x Δ Production Subsidy			0.041	0.036	0.067	0.061	0.009
			(0.226)	(0.224)	(0.190)	(0.186)	(0.023)
Post x Δ Export License			-0.014	-0.014	-0.005	-0.005	0.000
			(0.015)	(0.015)	(0.009)	(0.009)	(0.002)
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.91	0.91	0.90	0.91	0.91	0.91	0.35
N	680	680	680	680	680	680	680

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. The dependent variables are: the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-province and cross-prefecture) migrants (columns (1)-(3)); migration rate of all (cross-province and cross-prefecture) non-*hukou* migrants (NHM in column (4)); migration rate of cross-province *hukou* PLUS non-*hukou* migrants (Prov NHM + HM in column (5)); cross-province non-*hukou* migrants (Prov NHM in column (6)); and cross-province *hukou* migrants (Prov HM in column (7)). The "pre-treatment" period is 2000 and the "post-treatment" is 2005. The sample includes 340 prefectures with consistent boundaries from 1990 to 2005. Refer to main text for the definition and construction of the explanatory variables.

Table C.4: Robustness Check: migration rate of all migrants (*hukou* PLUS non-*hukou*), using alternative NTR gaps

Panel A: Alternative measures of NTR gaps

	Trade US Unweighted (1)	Trade World Weighted (2)	Trade World Unweighted (3)	Employment Weighted (4)
Post x NTR gap	0.070	0.057	0.087	0.178
	(0.039)*	(0.030)*	(0.050)*	(0.077)**
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes
Control for p.c. GDP	No	No	No	No
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE Cluster	Prefecture	Prefecture	Prefecture	Prefecture
Adjusted R-squared	0.91	0.90	0.90	0.91
N	680	680	680	644

Panel B: Different specifications

	Control for per capita GDP (1)	Control for Post*Exp (2)	SE clustered at province level (3)	Spatial Error Model (4)	Spatial Durbin Error Model (5)
Post x NTR gap	0.055	0.056	0.052	0.035	0.034
	(0.027)**	(0.027)**	(0.029)*	(0.018)*	(0.018)*
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes	Yes
Control for p.c. GDP	Yes	No	No	No	No
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes
SE Cluster	Prefecture	Prefecture	Province	Spatial Error	Spatial Error
Adjusted R-squared	0.90	0.90	0.90	0.04	0.10
N	664	664	680	668	668

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table shows robustness checks of the baseline specification. The dependent variable is the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* migrants. In Panel A, alternative measures of NTR gaps are used. In the first column, prefecture-level NTR gaps are simple averages of NTR gaps of products exported to the US, and the prefecture-level import and export tariff rates are simple averages of tariff rates of products imported and exported by each prefecture. In the second column, prefecture-level NTR gaps are weighted averages of NTR gaps of products exported to the world, and the prefecture-level import and export tariff rates are weighted averages of tariff rates of products imported and exported by each prefecture. In the third column, prefecture-level NTR gaps are simple averages of NTR gaps of products exported to the world, and the prefecture-level import and export tariff rates are simple averages of tariff rates of products imported and exported by each prefecture. Panel B presents 5 alternative specifications: controlling for GDP per capita in (1), controlling for share of exports in (2), clustering standard errors at the province level in (3), including spatially correlated errors in (4) and (5). Note that results columns (4) and (5) in panel B come from spatial regressions on the first difference specification. The sample size in columns (1) and (2) is smaller due to missing GDP measures in 8 prefectures, while the sample size in (4) and (5) is smaller due to concordance issues with the underlying geographic map. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level except in B(3).

Table C.5: Log Export to US

	by product		by product and prefecture	
Export destination	US	US & HK	US	US & HK
	(1)	(2)	(3)	(4)
Post x NTR gap	0.019	0.023	0.020	0.016
	(0.005)***	(0.004)***	(0.001)***	(0.002)***
Controls	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes
(number of FE)	(2)	(2)	(2)	(2)
Product fixed effect	Yes	Yes	Yes	Yes
(number of FE)	(4,835)	(4,835)	(4,835)	(4,835)
Prefecture FE	No	No	Yes	Yes
(number of FE)	–	–	(330)	(330)
SE Cluster	Product	Product	Prefecture	Prefecture
Adjusted R-squared	0.77	0.73	0.33	0.36
N	9,670	9,670	761,436	761,436

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: The dependent variable in columns (1)-(2) is the 6-digit HS product-level average annual log export values to the U.S. during 1997-2000 and 2002-2006. In columns (3)-(4), the dependent variable is the prefecture-by-product-level average annual log export values to the U.S. during 1997-2000 and 2002-2006. Huber-White SEs are reported in parentheses, and they are clustered at the product level in columns (1)-(2), and at the prefecture level in columns (3)-(4). "Controls" include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Note that in all columns, we use the DID interaction of "Post" and *changes* in policies as in the main specification (Table 3 in main text).

Table C.6: Heterogeneous effects: migration rate of all migrants (*hukou* PLUS non-*hukou*) by NTR gap quintiles

Dependent variable:	Migration rate of NHM+HM
1st Quintile: Post x NTR gap	0.173
	(0.217)
2nd Quintile: Post x NTR gap	0.023
	(0.082)
3rd Quintile: Post x NTR gap	0.054
	(0.050)
4th Quintile: Post x NTR gap	0.052
	(0.042)
5th Quintile: Post x NTR gap	0.051
	(0.031)*
Controls	Yes
Prefecture and year dummies	Yes
SE	Clustered
Adjusted R-squared	0.90
N	680

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: This table presents the non-linear effects of trade policy changes on migration rates. 340 prefectures are grouped into quintiles of treatment groups. All specifications include prefecture and time fixed effects. The dependent variable is the migration rate of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-prefecture) migrants. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing. Huber-White SEs (in parentheses) are clustered at the prefecture level.

Table C.7: Heterogeneous effects: migration rates by gender, age, and urban status

Panel A: By gender

Dependent variable:	Male	Female	Total
NHM+HM	(1)	(2)	(3)
Post x NTR gap	0.051	0.038	0.046
	(0.026)**	(0.020)*	(0.022)**
Controls for tariffs and NTBs	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered
Adjusted R-squared	0.90	0.92	0.92
N	680	680	680

Panel C: Males by age group

Dependent variable:	16-25	26-40	41-55	56-65
NHM+HM	(1)	(2)	(3)	(4)
Post x NTR gap	0.071	0.074	0.031	-0.013
	(0.043)	(0.034)**	(0.021)	(0.038)
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.87	0.87	0.83	0.72
N	680	680	680	680

Panel B: Males by type of hukou at origin

Dependent variable:	Urban	Rural	Total
NHM	(1)	(2)	(3)
Post x NTR gap	0.080	0.035	0.049
	(0.034)**	(0.032)	(0.025)*
Controls for tariffs and NTBs	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered
Adjusted R-squared	0.69	0.90	0.91
N	680	680	680

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. Sample includes 340 prefectures observed in 2000 and 2005. The dependent variables are migration rates of *hukou* (cross-province) migrants PLUS non-*hukou* (cross-prefecture) migrants (NHM+HM) by gender in panel A, by age groups in panel B, and migration rates of non-*hukou* (cross-prefecture) migrants (NHM) by type of *hukou* at origin in panel C. We use the NTR gaps and other trade policy changes from the main specification (Table 3 in main text) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table C.8: Migration rate of all migrants (*hukou* PLUS non-*hukou*) by skill

Dependent variable:	Same NTR gaps		Specific NTR gaps	
NHM+HM	Unskilled	Skilled	Unskilled	Skilled
	(1)	(2)	(3)	(4)
Post x NTR gap	0.034	0.092	0.026	0.059
	(0.028)	(0.050)*	(0.029)	(0.031)*
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.90	0.76	0.90	0.76
N	680	680	680	680

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The dependent variable is the migration rate of *hukou* (cross-province) migrants and non-*hukou* (cross-prefecture) migrants by skill types. Skilled workers are those who completed at least high school education, and skilled sectors are ones that uses skilled workers intensively. The sample includes unskilled sectors (Columns (1) and (3)) and skilled sectors (Columns (2) and (4)) in 340 prefectures, observed at 2000 and 2005. In Columns (1)-(2), we use the same NTR gaps for both skill groups, ie, not skill-specific, while in Columns (3)-(4), we use skill-specific NTR gaps and other trade measures for each skill group. The other explanatory variables are constructed similarly; they include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table C.9: Labor Market Outcomes: Employment of Migrants (M) and Natives (N)

Panel A: Employment rates

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	0.001	-0.024	0.005	0.003	-0.035	0.009	0.009	0.049	0.008
	(0.010)	(0.042)	(0.010)	(0.010)	(0.043)	(0.011)	(0.015)	(0.052)	(0.015)
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.65	0.14	0.67	0.63	0.20	0.63	0.52	0.01	0.53
N	680	680	680	680	678	680	680	646	680

Panel B: Employment levels

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	0.309	0.772	-0.463	-0.268	0.421	-0.686	0.578	0.331	0.223
	(1.079)	(0.313)**	(1.031)	(0.930)	(0.226)*	(0.905)	(0.250)**	(0.135)**	(0.192)
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.95	0.94	0.95	0.94	0.95	0.94	0.94	0.84	0.96
N	680	680	680	680	678	680	680	646	680

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The sample includes 340 prefectures, observed at 2000 and 2005. In panel A, the dependent variables are the employment rates of migrants (M) and natives (N) by skill types. In panel B, the dependent variables are the employment levels of migrants (M) and natives (N) by skill types. Skilled workers are those who completed at least high school education. For both panels. Columns (1)-(3) include migrants and natives of all skill types, and results for unskilled labor (columns 4-6) and skilled labor (columns 7-9) are reported separately. We use the NTR gaps and other trade policy changes from the main specification (Table 3 in main text) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.

Table C.10: Labor Market Outcomes: Weekly Working Hours of Migrants and Natives

	All			Unskilled			Skilled		
	M+N	M	N	M+N	M	N	M+N	M	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post x NTR gap	0.048	-0.022	0.047	0.054	-0.044	0.055	-0.001	-0.004	-0.006
	(0.021)**	(0.038)	(0.020)**	(0.023)**	(0.050)	(0.022)**	(0.017)	(0.056)	(0.017)
Controls for tariffs and NTBs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SE	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered	Clustered
Adjusted R-squared	0.40	0.26	0.40	0.44	0.22	0.42	0.38	0.08	0.43
N	680	680	680	680	678	680	680	638	680

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Notes: Huber-White SEs (in parentheses) are clustered at the prefecture level. All specifications include prefecture and time fixed effects. The sample includes 336 prefectures, observed at 2000 and 2005. The dependent variables are the weekly working hours of migrants (M) and natives (N) by skill types. Skilled workers are those who completed at least high school education. Columns (1)-(3) include migrants and natives of all skill types, and results for unskilled labor (columns 4-6) and skilled labor (columns 7-9) are reported separately. We use the NTR gaps and other trade policy changes from the main specification (Table 3 in main text) for all columns, ie, trade policy changes are not specific to demographic groups. Control variables include NTR rate, tariff abroad, import tariff, contract intensity, MFA quota bound, production subsidy, and export licensing.