

Internal Migration and Rural Development in China: A Case Study Using the 2001 *Hukou* System Reform

Marc Gurgand*, Thomas Vendryes†, Yue Ximing‡

VERY PRELIMINARY - PLEASE DO NOT QUOTE - COMMENTS WELCOME

Abstract

Internal rural-to-urban migration flows are a crucial dimension of the process of structural change that accompanies the dynamics of development. From this point of view, the People's Republic of China stands today as a very special case, as it manages to achieve very high rates of growth while maintaining tight controls on mobility through what is known as the *hukou* system. This institutional legacy of the collectivist and planned economy era has been regularly criticized for generating discrimination and leading to a sub-optimal allocation of resources. However, two critical questions remain unanswered: to what extent does the *hukou* system actually hinder migration? And does it affect rural development? With a panel data set covering around 16 000 rural households in four Chinese provinces over the period 2000-2004, this study uses a significant reform of the *hukou* system which took place in the early 2000s to provide, for the first time, rigorous micro-level evidence on these two issues.

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*CNRS - Paris School of Economics (PSE), 54 Boulevard Jourdan, 75015 Paris, France. Email : gurgand@pse.ens.fr

†(corresponding author) Centre d'Économie de la Sorbonne, ENS Cachan, 61 Avenue du Président Wilson, 94235 Cachan cedex, France. Email: thomas.vendryes@ens-cachan.fr.

‡School of Finance, Renmin University, 59 Zhongguancun Street, Haidian District, Beijing 100872, P.R. China. Email: yue@ruc.edu.cn.

1 Introduction

Urbanization appears as an ubiquitous “pattern of development” (Chenery and Syrquin, 1975; Williamson, 1988), accompanying industrialization, growth and structural change in developing countries. As it is mainly fueled and driven by internal rural-to-urban migration flows, urbanization is also a key dimension of the shift in the allocation of resources and activities between rural and urban areas. However, even if this process of urbanization seems to be necessary, its potentially detrimental side consequences, and the possible sub-optimal decisions of rural migrants (e.g. Harris and Todaro, 1970), have led to important debates on the relevant and desirable policies on internal migrations (Lucas, 1997).

From this point of view, the People’s Republic of China stands today as a very special case. Indeed, despite the “reform and opening” era opened by Deng Xiaoping in 1978, China has maintained tight migration controls through what is known as the “*hukou*” system (Wang, 2005; Chan and Buckingham, 2008; Chan, 2009a). Its actual functioning does not completely prevent workers, and especially rural workers, from out-migrating, in particular to urban areas, but these migrants cannot transfer their official residence and thus their social rights to their destination areas. This has had several important consequences. It has hindered urbanization: even if the Chinese urbanization rate has been constantly increasing since 1978, it did not keep pace with overall economic development, and it was, in 2002, around 40%, that is to say 12 percentage points below the average urbanization rate of developing countries at the same level of development (Chang and Brada (2006)). Moreover, behind this constrained urbanization has appeared a huge population of migrant workers at the margins of legality, over 145 millions in 2009 (Chan (2013)) - a third of the rural labor force - with a secondary, often segregated and discriminated status at their destination (Cheng and Selden (1994)). Because of their status, these migrants are highly mobile, and do not, most of the time, try to settle down in urban areas (Zhang (2010); Chan (2013)).

The *hukou* system then deeply affects China’s development trajectory, and has consequently received a particular attention from policymakers and academics. From an economic point of view, two main *hukou*-related issues have been especially investigated.

First, as the *hukou* significantly constraints the mobility of workers and hinders the dynamic of urbanization, it has been shown that it is very likely to lead to a suboptimal allocation of resources and activities in China (Au and Henderson, 2006; Whalley and Zhang, 2007; Bosker, Brakman, Garretsen, and Schramm, 2012), and that it could also play a role in the very high savings rate which characterizes the Chinese pattern of development (Vendryes, 2011).

Second, as the *hukou* creates significant statutory differences between citizens and workers, it is naturally a key dimension of inequalities in China. Indeed, citizens can only have access to

public and social services (education, health, retirement pension, etc.) in the locality where their *hukou* is registered, and as localities naturally display different levels and qualities of such public services provision, citizens naturally reach different levels of human capital and welfare (Liu, 2005; Démurger, Gurgand, Li, and Yue, 2009; Fu and Ren, 2010). And discrimination and segregation are especially acute for the unofficial “floating population” of rural workers in urban areas, who do not have a local *hukou*. They have a relatively more difficult access to employment (Zhao and Howden-Chapman, 2010; Zhang, 2010), and especially to stable and high-qualification jobs in the formal sector (Guo and Iredale, 2004). And finally, once employed, these rural-to-urban migrants are also less paid (Démurger, Gurgand, Li, and Yue, 2009; Fu and Ren, 2010).

As a consequence, quite unsurprisingly, inequalities in China are high, rising, and are driven to a good extent by the income gap between urban and rural citizens (Sicular, Ximing, Gustafsson, and Shi, 2007). This phenomenon is not specific to China, but it is especially acute in the People’s Republic. This has naturally led to the emergence of a very lively debate, in political as well as academic circles, about the reform or eventual abolition of this system (Chan, 2009a). However, even if the actual functioning of the *hukou* has been deeply modified in several ways since the beginning of the reforms in 1978, and especially since the mid-1990s, it still creates very significant constraints for rural citizens and workers (Chan, 2009a).

However, two important points remain little investigated.

First, the extent to which the *hukou* system actually prevents rural workers from out-migrating remains unknown. Indeed, the *hukou* is not the only parameter in the individual’s or household’s decision to migrate: economic opportunities, risk, and mobility costs play a role as well (Zhu, 2007). As a matter of fact, temporary and circular migrations of rural workers are not specific to China, but are actually quite common in developing countries (Nelson, 1976; Day, Dasgupta, Datta, and Nugent, 1987; Lucas, 1997). However, the only existing study attempting to measure the impact of the *hukou* on migration decisions in China still finds that, in fact, migrants and would-be migrants are sensitive to and constrained by this system (Bao, Bodvarsson, Hou, and Zhao, 2011).

Second, in developing countries, migration flows out of rural areas can play a key role in their development, as out-migrants can send back remittances, or, if they eventually come back, they can make local communities benefit from their experience, brought-back capital, or new networks (Mendola, 2012). This phenomenon is also at play in China, where migrants’ remittances significantly increase rural households’ incomes (Du, Park, and Wang, 2005), and where returning migrants can play a leading role in local rural development (Ma, 1999, 2001; Murphy, 1999, 2002). As a consequence, the *hukou* system could also, eventually, be detrimental for China’s rural development, if it impedes out-migration and its potential beneficial consequences for origin areas.

The aim of this paper is to shed some light on these two *hukou*-related issues: to what extent does the *hukou* system actually hinder migration in China? And what are its consequences for rural development?

In order to bring elements of answer, we use an important reform of the *hukou* system which took place in the early 2000s, the “reform of the administration of the *hukou* system in small towns and cities”. This reform actually removed migration barriers for rural workers willing to settle down in nearby and medium-sized urban centers. Using a panel data-set covering almost 16 000 households in four provinces during the period 2000-2004, we then estimate the consequences of this reform on individuals’ and households’ migration behaviors, incomes and investment decisions.

Even if these issues are crucial for China’s economic and social development, their understanding, based on the Chinese specific experience, can provide insights on the processes and consequences of internal migration in developing countries in general.

The plan of the paper is as follows. The following second section will describe in details the *hukou* system, its functioning and in particular the “reform of the administration of the *hukou* system in small towns and cities”. The third section will present the data and the results. The last section offers some concluding remarks.

2 The *Hukou* System

2.1 A Historical Perspective

2.1.1 The Collectivist Era (1949-1978)

The “household registration system”, colloquially known as the *hukou*, was set up in the early 1950s, just after the foundation of the People’s Republic of China.¹ It was at first a purely administrative device, to register China’s population. However, with the progressive implementation of a collectivist and planned model of economic and social development at the end of the 1950s, the *hukou* became one the crucial institutional pillars of the People’s Republic. Indeed, since then, the *hukou* specifies for every single Chinese citizen an official locality of residence and an official sector of activity (agricultural or non-agricultural).

The sector of activity determined what kind of resources were available to a given citizen: land (collectively managed in the 1960s and 1970s) for “agricultural” *hukou* holders, and non-agricultural jobs as well as various social benefits for “non-agricultural” *hukou* beneficiaries.

The official locality of residence then determined where these resources were available, for example in which village a “agricultural” *hukou* worker was associated to collective farming, or

¹The description and analysis offered here rely heavily on the more detailed and comprehensive accounts proposed, in particular, by Chan and Zhang (1999); Wang (2005); Chan and Buckingham (2008); Chan (2009a).

where a “non-agricultural” *hukou* holder could be employed.

It should be noted here that the division between the “agricultural” and “non-agricultural” populations overlaps but does not coincide with the more common “urban” “rural” distinction (Chan, 2009b). “Non-agricultural” *hukou* holders can naturally live and work in the countryside, whereas very big cities can have some of their territory farmed, and thus include “agricultural” citizens.

Obviously, in the context of a collectivist and planned economy, the *hukou* system was then one of the main instruments to allocate labor across localities and sectors, and then to distribute production and public goods or social services to the population. It constituted one of the pillars of economic and social planning, sharing some similarities with the Soviet “*propiska*”. And, as usual in the Soviet-style socialist model of development (Knight, 1995), differences in statuses were designed to extract as much as possible from the agricultural sector - and thus at the expense of the “agricultural” *hukou* holders - to modern, urban and industrial activities - to the benefits of “non-agricultural” *hukou* citizens. The two different statuses were then clearly hierarchically ranked, consistently with the general economic organization.

Finally, *hukou* was inherited by the mother, and could be changed if deemed necessary by planning authorities. Little room was then left for individual mobility, whether geographical or sectoral.

2.1.2 The “Reform and Opening” Era (1978-today)

In 1978, Deng Xiaoping initiated a series of radical transformations of the People’s Republic of China, starting the “reform and opening” era. Collectivist structures have been progressively and partially dismantled, while market processes have been gradually introduced, replacing the centrally planned allocation of resources. As a consequence, and as is well-known, China has experienced, over the last 30 years, one the most successful development trajectories in History. GDP growth has kept a very rapid pace of almost 10% per year (NBS, 2013), while the poverty rate decreased from 84% to 15.9% of the population (Chen and Ravallion, 2010).

However, despite this tremendous dynamics of liberalization, the *hukou* system has been maintained, and continues to play a key role in determining Chinese citizens’ opportunities, and, more generally, in shaping China’s development.

Naturally, as less and less resources have been allocated by the State or through collective structures, the difference between the two statuses, “agricultural” and “non-agricultural”, has tended to diminish. Since the mid-1990s, some localities have even suppressed this statutory distinction, a movement to some extent supported by the central State (Chan and Buckingham, 2008).

In a parallel way, as jobs are no more universally allocated by planning institutions, it has become possible for workers - especially the ones registered as “agricultural” - to work outside of their officially registered sector of employment. At the same time, direct controls on mobility have been progressively alleviated: it has been less and less common - and it is today exceptional - for the police or other administrative authorities to check that people actually live in the localities they are officially registered in and to send them back if it is not the case. As a consequence, huge migration flows have led rural “agricultural” workers to urban areas, to work in modern sectors. By the end of the 2000s, this migrant population amounted to an estimated 130-150 millions people, with maybe a third of the rural working population concerned by migration (Chan, 2013).

But this does not mean that the *hukou* system ceased to affect internal mobility and migrants’ opportunities. Indeed, the official locality of residence, registered through an individual’s *hukou*, still determines where public and social services (education, health, retirement pensions etc.) as well as some more qualified or protected employment opportunities are available. As a consequence, migrants who do not change their *hukou* remain second-class citizens and workers at their destination (Solinger, 1999; Chan and Buckingham, 2008).

And to change one’s *hukou*, to modify one’s official place of residence, remains extremely difficult, if it did not become even more so in the past two decades. Indeed, since the beginning of the 1990s, most the actual administration of *hukou*-related affairs has been decentralized at the provincial and local levels (Chan and Buckingham, 2008). Localities are thus now responsible for the management of their migrant inflows, and have got an extended autonomy, in particular, to set the conditions for a would-be migrant to get a local *hukou*. And the result of this decentralization of the *hukou* change process appears to be that official migration has become harder than in the past, with more restrictive entry conditions for candidates, especially in richer and more developed urban areas (Chan and Buckingham, 2008; Zhang and Tao, 2012).

Despite the deep movement of liberalization in China since the end of the 1970s, rural-to-urban migrants thus remain unofficial migrants, with only a limited access to urban jobs, a discriminated and segregated status, and a very limited access to public and social services at their destination. Highly mobile, they constitute a “floating population” - as they are frequently called - of secondary-rank citizens. The constraints created by the *hukou* are then still acute, and severely affect the migration opportunities of rural people.

2.2 Consequences

2.2.1 At the Micro Level: *Hukou* and Discrimination

At the micro level, the most investigated consequence of the *hukou* system is probably the one of the disadvantages, discrimination and segregation that migrants face when they work in a city

where they are not officially registered.

Indeed, existing studies tend to show that local *hukou* holders and migrants without a local *hukou* operate on segmented labor markets. For example, using a survey carried out in 1995 and covering 1900 migrants working in 118 enterprises located in four cities, Knight, Song, and Huaibin (1999) find that local workers and migrants are complements rather than substitutes (“migrants do job that non-migrants shun” (Knight, Song, and Huaibin, 1999, p. 102)), and thus face a segmented rather than unified labor market. This situation can also explain why migrants are on average less paid than local workers, and why their human capital is less rewarded. Their study also confirms that local authorities severely restrict permanent migration, and maintain very significant barriers ensuring that local citizens have a preferential access to employment.

This difference between the job opportunities and employment conditions of local urban *hukou* holders and of rural-to-urban migrants is also manifest through their job mobility, as shown by Knight and Yueh (2004) and ?. This phenomenon provides complementary evidence that the job search process is not similar for rural migrants and urban residents.

Existing studies also underscore that a good part of the disadvantages faced by migrants in urban labor markets are rooted in their educational opportunities. For example, based on a survey covering about 5000 urban *hukou*-holders workers and 3000 rural-to-urban migrants, Démurger, Gurgand, Li, and Yue (2009) decompose the earnings inequalities between these two populations, and show that most of the discrepancy can be explained by a composition effect. This is further confirmed by the work of Liu (2005) who uses a 1995 sample of more than 14 000 working individuals, all with a local urban *hukou*, but compare the employment situation of native local urban *hukou* holders to those of (definitive) migrants. Despite the fact that all surveyed individuals have the same status, and thus should not face segmented labor markets, migrants still have lower employment achievements, and this phenomenon is to a good extent due to a lower education level.

The current literature then points to the fact that rural-to-urban migrants remain secondary rank workers, that they do not operate on the same labor market as urban officially registered residents, but also that these differences are, to a good extent, shaped by the different educational opportunities that a Chinese citizen faces when young, whether he is registered as urban or rural.

2.2.2 At the Macro Level: *Hukou* and the Misallocation of Resources

Besides its effect on the opportunities of rural migrants and on their performance on urban labor markets, the *hukou* system also bears consequence for the allocation of resources throughout the Chinese economy. Indeed, as it prevents workers to move freely across sectors and localities, it may lead to a sub-optimal allocation of resources, and especially of labour.

For example, Au and Henderson (2006) estimate production functions at the city-level in China for the 1990s, and show that a majority of Chinese urban areas were undersized, a phenomenon associated with a very significant loss in production and welfare. Indeed, if China's labor was optimally allocated, output per worker could be 35% higher.

As for Whalley and Zhang (2007), they carry out the same kind of estimation, at the regional level. Removing the *hukou* constraints would thus allow workers to move to places where their labor would be better paid, that is to say more productive. According to their estimations and simulations, a complete abolition of the *hukou* system and the consecutive freedom of internal migration could lead to a 13 to 25% gain in GDP.

But the removal of barriers to migration could also, naturally, lead to a momentous shift in China's economic geography, as shown by Bosker, Brakman, Garretsen, and Schramm (2012), who use a New Economic Geography approach. It would strengthen the core-periphery structure, and lead, in particular, to the reinforcement of the demographic and economic importance of the main four cities of China (Beijing, Shanghai, Guangzhou, Chongqing).

The *hukou* system can also have consequences on the dynamics of China's development. For example, Vendryes (2011) has shown that, because the *hukou* constrains the life-cycles of rural workers, and especially of rural-to-urban migrants, it could lead to an increase in savings and investment, and thus the *hukou* system could be one of the factors behind the historically high level of national savings that characterize China's development.

Finally, and probably more importantly, the constraints generated by the *hukou* system for rural citizens education opportunities could jeopardize the sustainability of China's growth, and eventually lead to a middle-income trap, rooted in human capital issues (Zhang, Yi, Luo, Liu, and Rozelle, 2012). At least partly because of *hukou* system, the rural-urban gap is also especially important in China, and contributes to the very high overall level of inequalities, a source of social discontent and unrest (Sicular, Ximing, Gustafsson, and Shi, 2007).

The *hukou* system thus does not only concern the situation and achievements of rural-to-urban migrants, but it also affects the trajectory and eventual attainment of China's development.

2.2.3 The Impact of the *Hukou* on Migration Decisions and Rural Development

However, despite the importance of the *hukou* system for China's development, little remains known about the exact impact of the constraints it creates on migration behaviors: to what extent do the *hukou* system actually affects the migration decisions of rural workers? So far, the only study trying to investigate this issue is the work by Bao, Bodvarsson, Hou, and Zhao (2011) on interprovincial migration over the period 1985-2005. They measure the degree of difficulty for in-migrants to secure a local *hukou* by the "historical relative frequency of persons with local

hukou”, the idea being that a higher share of the population officially registered would indicate that the local *hukou* would be easier to get. And they find that, actually, migration flows are highly dependent on their measure of the relative difficulty to get a local *hukou*. However, this measure remains quite imperfect, as it does not come from direct information on *hukou* regulations, and as it can be affected by other factors.

The other aspect of the *hukou* system which has remained little investigated is the one of the consequences of the *hukou* system for rural development. Indeed, in developing countries, out-migrants are often major agents of development for their households and home villages (Mendola, 2012). This is also the case in China, where a very important proportion of rural workers migrate to urban areas but remain economically linked with households and families in their origin villages.

For example, using two data sets on China’s rural areas over the period from 1997 to 2000-2001, Du, Park, and Wang (2005) show that migration can help rural households to get out of poverty: remittances sent back by migrant members can increase a household’s income by 8.5-13.1%, and these remittances respond to the needs of household members. These remittances allow rural households to more than compensate the direct loss due to workers leaving the village and especially agricultural work, as shown for example by Rozelle, Taylor, and de Brauw (1999) and Taylor, Rozelle, and de Brauw (2003) in their careful examination of data gathered on almost 800 households in 31 different villages of the Hebei province in 1995.

Finally, returnee migrants can also play a key role in local development, through the capital they bring back, but also through their new skills, experience and networks. As a matter of fact, returnee migrants often invest and become entrepreneurs once back home (Ma, 1999, 2001; Murphy, 1999, 2002). A relaxation of the *hukou*, by rendering migration easier for rural workers, could thus indirectly be favorable for rural development, by permitting more remittances to be sent back, more urban experience to be brought back, and more networks to be established.

Our objective in this paper is to evaluate these consequences of the *hukou* system, taking as a quasi-natural experiment an important reform of the *hukou* system which took place in the early 2000s: the “reform of the administration of the *hukou* system in small towns and cities”.

2.3 The 2001 Reform

As noted above, since the mid-1990s, an important debate took place in political and academic circles about possible reforms of the *hukou* system. As made clear in the preceding sections, evolutions such as the decentralization of the management of migrations and of the *hukou* system, or the tendency toward the suppression of the statutory differences between “agricultural” and “non-agricultural” *hukou*, did not end up actually softening the constraints on migration generated by this system. These evolutions may even have, especially in more developed localities, reinforced

the *hukou* barriers (Chan and Buckingham, 2008; Zhang and Tao, 2012).

However, one important policy of actual relaxation of the *hukou* system was designed and implemented by central authorities in the 1990s and early 2000s: the “reform of the administration of the *hukou* system in small towns and cities”.² The objective was to abolish all migration restrictions for rural workers to the lowest tier of the urban hierarchy (namely to urban areas with an administrative status of county-level city, county seat and established towns). The aim was to divert rural migrants from big and already well populated and developed cities, to small, local towns, and then to promote a “urbanization from below”, against the emergence of a few mega-cities and the depopulation of China’s inner territories. It should be noted that such a policy could be welfare-enhancing, as recent evidence points to the fact that a process of structural transformation through the development of rural non-farm activities and migration to secondary-rank towns can lead to more inclusive growth patterns and accelerate poverty reduction (Christiaensen and Todo, Forthcoming).

The policy was first experimented in around 450 towns and small cities (that is to say between 10 and 20 by province) in 1997.³ Despite constituting already a significant loosening of existing constraints to access a urban *hukou*, conditions remained quite restrictive: in the framework of the experimentation, an applicant for a local urban *hukou* had to prove that he has already got for two years stable work and residence in the urban area he wanted to settle in, he could have to pay some local registration fees, and finally, if applicable, he had to give up the land rights attached to his previous “agricultural” *hukou*. As a consequence, this experiment seems to have had a very limited impact on the mobility decisions of Chinese rural households.

In 2001,⁴ the experiment was extended nationwide, opening to migration more than 20 000 towns and small cities, up to the level of county-level cities. Following the reform, were thus concerned and opened all urban areas that were not part of a prefectural-level city (there were more or less 270 of them in 2000) or of one of the four municipalities (Beijing, Tianjin, Shanghai, Chongqing). Opened towns typically had a population ranging from a few thousands to 100 000 people, and their levels of development can be very diverse, without, generally speaking, matching that of urban areas of a higher rank.

Not only did the central government generalize the experiment in 2001, but it also considerably loosened the conditions to get a urban *hukou*. Following the 2001 final reform, it is then sufficient to have a stable job and a stable residence (without a tow years duration condition) in an urban area to apply for a local *hukou*, and citizens with a “agricultural” *hukou* can keep their land rights

²The following description relies to a great extent on the accounts given by Wang (2004), Fan (2008) and Chan (2009a).

³1997 State Council Document no. 20 (Guofa [1997] 20 hao), published June 10th, 1997.

⁴2001 State Council Document no. 6 (Guofa [2001] 6 hao), published March 30th, 2001.

in their origin village, while, finally, no administrative fees should be demanded for this process of *hukou* change. However, as was the case in the framework of the 1997 experiment, the scope of the reform remains local: would-be rural migrants can ask and get a urban *hukou* in a opened city within their origin county of residence.

To the best of our knowledge, no estimate exists of the consequences of this reform on migration decisions and mobility flows in China, however it is clear that it did not alter radically the geography and dynamics of migration flows in China. But there is some evidence (see for ex. Wang, 2004, p. 121) that the effect was not nil either.

A last important point to be noted is that, as is usually the case most of the time with regulations published through State Council Documents, the reform had to be, under the central government's impetus, implemented locally by each province. Actual conditions of implementation were very similar - at least in the four provinces covered by the survey we use in this paper - from a province to another, whereas the exact implementation date varied a little, around 2001, time of the issuance of the 2001 State Council Document no. 6 launching the reform.

This reform and the temporal and geographical variation in its implementation will then be used here to identify the consequences of the *hukou* system on migration decisions and rural development.

3 Empirical Investigation

3.1 Data

The primary set of data we use here are information collected by teams of the National Bureau of Statistics in four provinces (Henan, Jiangsu, Sichuan, Yunnan), over the period 2000-2004. This provides us with an unbalanced panel of about 15 600 households, for a total of roughly 88 000 individuals. All in all, these households and individuals were covered in 1281 different villages, distributed in 151 counties.

The questionnaire provides us with detailed information at the individual level (age, education, employment situation etc.) as well as at the household level (land holdings, assets, incomes and expenditures etc.). Of particular interest for us are, at the individual level, the data available on migration decisions (whether an individual migrate for work a given year or not), which is detailed (except for 2000) by type of migration destinations: municipalities (Beijing, Tianjin, Shanghai, Chongqing), province capital cities, prefecture-level cities, county-level cities, towns and others.

It should be noted that the panel is, at the individual level, very unbalanced, with a very important proportion of individuals moving in or out the panel sample over the 2000-2005. Also, as for migrants, the National Bureau of Statistics treats rural individuals out-migrating as still

being part of their origin household if they are “economically linked” with remaining members, that is to say if they share most of their income with them.

As for households, the information we are especially interested in are the ones concerning their incomes and their investment. In particular, we have data on the overall level of income, as well as the amounts remitted or brought back by migrants, and on the structure and value of productive assets owned.

Concerning the exact timing of the reform, as noted above, because instructions given by the central government have to be implemented by provincial authorities, the exact date of the reform can differ from a province from another. According to publicly available official material, the Yunnan province authorities published a document launching the reform on October 22nd, 1999, Jiangsu on March 20th, 2000, Henan on September 18th, 2001 and Sichuan on November 30th, 2001. As our panel data are on a yearly basis, we will consider that the reform will be effectively in place the 1st of January following the issuance of a province-level document implementing the reform. Thus, the *hukou* restrictions for the access for small cities and towns are considered to be suppressed starting in 2000 for Yunnan, 2001 for Jiangsu, and then 2002 for both Henan and Sichuan.

3.2 Empirical Strategy

Our econometric estimations will then be of the following form (for individual i , in province p , at time t):

$$Y_{ipt} = \alpha_p + \beta_t + \gamma D_R + \delta X_{ipt} \epsilon_{ipt}$$

Where Y_{ipt} is the outcome of interest, α_p is the province-level constant (or fixed-effect), present to ensure that we account for systematic differences between provinces, β_t is a constant by year (or fixed-effect) to take into account a possible time-trend, and where, finally, D_R is a dummy indicating whether the reform has been implemented or not at the province-level. The main parameter we want to estimate is then γ , which gives the effect of the reform on the various outcomes we are interested in. And ϵ_{ipt} is naturally the residual error term.

When possible, fixed-effect estimation will be preferred, to fully benefit from the panel structure of the data. When it will not be possible, we will include a set X_{ipt} of relevant individual, household and county-level characteristics.

3.3 Dependent Variables

As made clear before, our objective is to estimate the impact of the *hukou* reform on migration behaviors and then on rural development, that is to say especially investment decisions by rural

households. Our four main variables of interest will then be the following.

3.3.1 Work Migration

Our first dependent variable is simply a dummy indicating whether a given individual has migrated for work during the year. Used estimators include fixed-effect OLS and fixed-effect logit, to account for the dichotomous nature of the dependent variable.

3.3.2 Migration Destination Types

The panel data set provides us, after 2000, with information about the precise type of migration destinations, with six possible destinations: 1.municipalities (Beijing, Tianjin, Shanghai, Chongqing), 2.province capital cities, 3.prefecture-level cities, 4.county-level cities, 5.towns and 6.others. If we find an impact of the reform on work migration, it should be particularly noticeable for migrations to types 4 and 5 (county-level cities and towns), which are the two kinds of urban areas opened following the reform. And the effect should be especially strong for the 4th type of migration destination, as county-level cities were the highest-rank, biggest and most developed urban areas opened by the reform. We will then run a series of fixed-effect OLS and fixed-effect logit estimations, for every possible destination of migration. We will also estimate all of these possibilities together, through a multinomial logit. As, in this last case, we cannot use a fixed-effect methodology, we will include a set of controls, at the individual level (gender, dummy for household head, age and age squared), household level (household structure, household head age, household maximum level of education), and county level (administrative status, population, surface, administrative structure - all information for 1999).

3.3.3 Household Income from Outside

At the household level, we will investigate the consequences of the reform on rural households income, and more specifically on the income sent back or brought back by migrants. The questionnaire investigated precisely two kinds of incomes coming from migrants: income remitted by out-migrants, and income brought back if the migrant spent some time in his origin village during the year. For the purpose of this study, both of them are added, so as to measure the overall level of income coming from migration.

3.3.4 Household Assets

Finally, this panel data set provides with detailed information about the structure of productive assets of surveyed rural households. We will use both the overall level of productive assets, and, as subcategories, the amounts of agricultural and of non-agricultural fixed assets.

3.4 Attrition and Samples

One of the main issues with the panel data set we use here is the important amount of individuals - and, to a lesser extent, of households - disappearing during the period 2000-2004. Two opposite solutions will be used here to try to face this issue, by restricting or expanding the panel data set. In the first case, we will restrict our estimation to individuals (or, depending on the case, households) present the whole time period, from 2000 to 2004: we will then use a “balanced sample”. In the second case, we will expand the sample to include missing individuals, and treat their disappearance from the panel as a choice - for example, definitive migration, with no links with remaining households’ members: this will constitute our “extended sample”.

Moreover, as the information we have on migration is specifically on migration for work, we will restrict the sample used to estimate the impact of the reform on migration behaviors to individuals between 20 and 60 years old.

3.5 Results

Results for the impact of the reform on the four different dependent variables of interest described above are displayed in tables 1 to 4, presented at the end of the paper.

3.5.1 Work migration

According to the results displayed in Table 1, whatever the estimation model used or the exact specification, we always find a strong and significant (at the 1% level) effect of the reform on migration: after the reform has been implemented in a province, rural workers did indeed migrate more. However, as we do not find a significant effect on attrition, it seems to indicate that migrants still maintain links with their household’s members remaining in their origin villages. This is consistent with the scope and the aim of the reform. Indeed, as explained above, the reform scope was very local, as access to an urban *hukou* was possible in a town within a rural citizen’s origin county, and central authorities also stated that rural workers getting an urban *hukou* could keep their land rights in their home villages, thus creating a strong incentive to remain involved in the economic and social life of one’s origin village.

3.5.2 Migration Destination

Results displayed in table 2 further confirm that the correlation we find between the implementation of the reform and increased out-migration is very likely to manifest a causality. Indeed, despite the slight variations in the results on the types of migration destinations chosen by out-migrants, one destination is always very positively and significantly associated with the reform: county-

level cities. And this kind of urban areas was the highest level of the urban hierarchy opened to migration by the reform. The only other destination of migration which seems to have been affected by the reform is prefecture-level cities: following the reform, rural workers migrate less to prefecture cities. And these urban areas are just above county-level cities. This could indicate that some substitution took place, migrants previously migrating to prefecture cities preferring to move to county-level cities, which, despite a lower level of population and development, could offer, following the reform, more stable opportunities and an access to social services.

3.5.3 Households incomes and investments

As indicated by the results of table 3, following increased possibilities of migration, rural households also receive more income sent back or brought back by migrants. But this did not lead them to invest more, as indicated by table 4. If their income from outside increased, on average, by 260-280 *yuan* per year, households did not increase their productive fixed assets. This is consistent with the results found theoretically and empirically, at the macro level, by (Vendryes, 2011). However, rural households did significantly reduce their investments in agricultural fixed assets, whereas the level of their non-agricultural fixed assets slightly increased, even if this result is not statistically significant. The intuition would be the following: after the reform, rural workers and households can expect better opportunities in urban areas, and an eventual long-term mobility out of their home village. They should thus have less incentives to invest in local agricultural production, but may have more incentives to acquire non-agricultural assets, that could be transferred, later, to urban areas, with their attached activity.

4 Conclusion

Based on a panel data set covering China's rural areas in four provinces over the period 2000-2004, this study offers the first micro-level and rigorous evidence that the *hukou* system does actually affect the migration decisions of rural workers in China. Indeed, following the reform of the *hukou* system which took place in the early 2000s, rural workers did indeed migrate more, to the most important, populated and developed urban areas that have been rendered accessible. The *hukou* then does actually act on a constraint on workers mobility.

As a result of this increased migration flows, rural households got more income, remitted or brought back by migrants, but they did not invest more. As a matter of fact, they even decreased their agricultural investment, as could be expected as a consequence of a reform designed to offer them more numerous and more stable opportunities in urban areas.

Thus, a loosening of the *hukou* system does lead to better migration opportunities, and con-

secutively to higher incomes for rural households. However, it does not lead to a faster rural development, as beneficiaries do not increase productive investments, and even decrease agricultural ones. This would indicate that rural households that expect better opportunities to settle down in urban areas begin to decrease their involvement in local activities. A further relaxation of the *hukou* constraints, for example through a similar opening of higher rank cities, may then lead to a rural depopulation, and to a relative decline of rural activities.

Table 1: Effect of the reform on migration

Dpdt var	Work Migration				Attrition	
	FE OLS	FE OLS	FE Logit	FE Logit	FE OLS	FE Logit
D Reform	.0.0189*** (.00366)	.0193*** (.0222)	.286*** (.0703)	.290*** (.0699)	-0.000657 (.00412)	-0.127 (.0222)
Year Dummies	X	X	X	X	X	X
Individual FE	X	X	X	X	X	X
Balanced sample	X		X			
Extended sample		X		X	X	X
Nb. of Obs.	73983	100023	17542	20963	250753	174481
Nb. of Groups	15177	29707	3529	4657	50642	35225
	F(5,15176)= 12.69 Prob > F = 0.0	F(5,29706) = 19.03 Prob > F = 0.0	LR $\chi^2(5) = 86.59$ Prob > $\chi^2 = 0.0$	LR $\chi^2(5) = 128.74$ Prob > $\chi^2 = 0.0$	F(5,50641)=15.63 Prob > F = 0.0	LR $\chi^2(5) = 144.84$ Prob > $\chi^2 = 0.0$

Notes:

- 2000 is omitted of year dummies,
- Standard errors in parenthesis,
- Marginal effects reported for Logit estimations,
- Significance levels: ***: 1%; **: 5%; *: 10%.

Table 2: Effect of the reform on migration destination

Dpdt var	D Reform							
	Series of FE OLS		Series of FE Logit		Multinomial Logit			
0. No Migration	-0.00704* (.00418)	-0.000220 (.00431)	.00265 (.0734)	.238 (.0300)	-0.00810* (.00444)	.00178 (.00445)	-.00284 (.00436)	.000870 (.00388)
1. Municipalities	.00106 (.00151)	.000699 (.000806)	.219 (.194)	.152 (.145)	.00377** (.00162)	.000279 (.00191)	.00204** (.000197)	.000109 (.000926)
2. Province Capital City	.00265 (.00232)	.00134 (.00126)	.203 (.133)	.188* (.0981)	.00363 (.00246)	.00306 (.00244)	.00264* (.00139)	.00222 (.00135)
3. Prefecture-level City	-0.000387 (.00242)	-.00262** (.132)	-.252** (.128)	-.328*** (.0921)	-0.00342 (.00329)	-.00764** (.00342)	-.00440** (.00186)	-.00688*** (.00188)
4. County-level City	.0.0114*** (.00234)	.00365*** (.00117)	.503*** (.122)	.262*** (.0954)	.00966*** (.00217)	.00781*** (.0226)	.00339*** (.00115)	.00220* (.00119)
5. Town	-.00219 (.00186)	-.000263 (.000881)	-.213 (.153)	-.0603 (.126)	-0.00323 (.00236)	-.00378 (.0239)	-.000422 (.00101)	-.000894 (.00104)
6. Others	-.00320* (.00172)	-.00169** (.000832)	-.225 (.169)	-.131 (.140)	-.00231 (.00184)	-.00151 (.00178)	-.000863 (.000868)	-.000538 (.000845)
7. Attrition		.00135 (.00437)		-.00891 (.0307)			.000456 (.00448)	.00292 (.00343)
Year Dummies	X	X	X	X	X	X	X	X
Province Dummies					X	X	X	X
Individual FE	X	X	X	X				
Individual Controls						X		X
Household Controls						X		X
County Controls						X		X
Balanced sample	X		X		X	X		
Extended sample		X		X			X	X
Nb. of Obs.	75173	200111	varies	varies	73684	72107	197453	193073
Nb. of Groups	18999	50642	varies	varies				
	Prob > F = 0.0	Prob > F = 0.0	Prob > $\chi^2 = 0.0$	Prob > $\chi^2 = 0.0$	Prob > $\chi^2 = 0.0$	Prob > $\chi^2 = 0.0$	Prob > $\chi^2 = 0.0$	Prob > $\chi^2 = 0.0$

Notes:

- 2002 is omitted of year dummies,
- Standard errors in parenthesis,
- Marginal effects reported for Logit estimations,
- Significance levels: ***: 1%; **: 5%; *: 10%.

Table 3: Effect of the reform on households' income from outside

Dpdt var Indpdt vars	Households' Incomes from Outside					
	FE OLS		Tobit			
D Reform	264*** (46.7)	.288*** (49.9)	816*** (114)	821*** (115)	941*** (128)	947*** (129)
Extended sample	X		X	X		
Balanced sample		X			X	X
Year Dummies	X	X	X	X	X	X
Province Dummies			X	X	X	X
Household FE	X	X				
Hh Head Controls			X		X	
Household Controls			X		X	
County Controls			X		X	
Nb. of Obs.	45377	34633	45377	44913	34633	34325
Nb. of Groups	15328	9421				
	F(5,15327)= 94.98 Prob > F = 0	F(5,9420) = 75.59 Prob > F = 0	F(8,45369) = 187.84 Prob > F = 0	F(27,4486) =77.01 Prob > F = 0	F(8,34625)=144.05 Prob > F = 0	F(27,34298)=58.7 Prob > F = 0

Notes:

- 2000 is omitted of year dummies,
- Standard errors in parenthesis,
- Significance levels: ***: 1%; **: 5%; *: 10%.

Table 4: Effect of the reform on households' investment

Dpdt var Indpdt vars	Hh Fixed Assets		Hh Agrik. Fixed Assets		Hh Non-Agrik. Fixed Assets	
	FE OLS					
D Reform	-152 (175)	-179 (194)	-365*** (130)	-431*** (144)	213 (170)	252 (189)
Extended sample	X		X		X	
Balanced sample		X		X		X
Year Dummies	X	X	X	X	X	X
Household FE	X	X	X	X	X	X
Nb. of Obs.	45377	34633	45377	34633	45377	34633
Nb. of Groups	15328	9421	15328	9421	15328	9421
	F(5,15327)= 85.04 Prob > F = 0	F(5,9420) = 70.27 Prob > F = 0	F(5,15327) = 71.48 Prob > F = 0	F(5,9420) =59.93 Prob > F = 0	F(5,15327)=31.67 Prob > F = 0	F(5,9420)=58.7 Prob > F = 0

Notes:

- 2000 is omitted of year dummies,
- Standard errors in parenthesis,
- Significance levels: ***: 1%; **: 5%; *: 10%.

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