Internal Migration Restrictions and Labor Allocation in Developing Countries

DOI:

[10.1142/S0217590817470051](https://doi.org/10.1142/S0217590817470051)

Document Version

Accepted author manuscript

[Link to publication record in Manchester Research Explorer](#)

Citation for published version (APA):

Rangazas, P., & Wang, X. (2017). Internal Migration Restrictions and Labor Allocation in Developing Countries. *The Singapore Economic Review*. <https://doi.org/10.1142/S0217590817470051>

Published in:

The Singapore Economic Review

Citing this paper

Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

General rights

Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Takedown policy

If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [<http://man.ac.uk/04Y6Bo>] or contact uml.scholarlycommunications@manchester.ac.uk providing relevant details, so we can investigate your claim.

Internal Migration Restrictions and Urbanization in Developing Countries

Peter Rangazas and Xiaobing Wang*

Abstract

This paper develops a simple model with endogenous rural-urban migration to analyze the implications of migration restrictions for economic welfare. The model reveals that a combination of an urban bias in public service provision and internal migration restrictions can raise social welfare. However, because even efficient migration restrictions increase urban households' welfare at the expense of rural households' welfare, there is an equity trade-off that policy makers should consider.

JEL Classification: J31, O18, O23, O53, R13

Keywords: Urban Bias, Migration Restrictions, Fiscal Policy, Efficiency, China

*Peter Rangazas: Economics Department, Indiana University-Purdue University, Indianapolis, 425 University Blvd, Indianapolis, IN, 46202, USA (Email: prangaza@iupui.edu); Xiaobing Wang: University of Manchester, Department of Economics, Arthur Lewis Building, Oxford Road, Manchester, M13 9PL (Email: xiaobing.wang@manchester.ac.uk).

1 Introduction

This paper creates a theoretical framework for thinking about internal migration in developing economies. Our purpose is to examine policies that directly and indirectly affect migration flows. Our analysis suggests that a certain level of restrictions on rural-to-urban migration may increase social welfare.

We focus on the question of the best pace of urbanization as it relates to the allocation of rural and urban government services. Our motivation comes from the fact that the vast majority of governments around the developing world are concerned about the adequacy of public goods provision and the crowding associated with rapid urbanization (Bloom and Khanna, 2007).

A second important issue we address is the role politics plays in exacerbating rural-urban inequalities. As first stressed by Lipton (1977), the disproportionate political power of urban interests (the “urban elite”) in some developing countries’ economic policies may distort the allocation of government services, exacerbate rural-urban inequalities, and intensify migration beyond efficient levels.

Concerns about rapid urbanization have generated a variety of policy responses in the attempt to control the pace of migration. Several countries have directly restricted population movements, at least at some point in their development. Countries with a history of restricting migration include Apartheid South Africa, Ethiopia, India, Russia, Viet Nam, and, perhaps most famously, China (Deshingkar and Grimm, 2005). Many have argued that China’s household registration (Hukou) system has contributed to higher income inequality and lowered aggregate production by creating an inefficient allocation of labor. Our model is designed to assess these types of claims.

The development of industry in cities and overall population growth, naturally lead to rural migration to urban areas due to both “pull” and “push” factors. As industrialization raises productivity and labor shortages, workers are pulled into the city by high wages. On the other hand, population growth and increasing scarcity of farm land lowers wage opportunities that push workers out of rural areas. In general, some reallocation of labor toward cities will raise worker productivity and aggregate output. However, if migration

to the city is too fast, it can lower urban public services per capita and also possibly raise unemployment.

With these tradeoffs in mind, countries attempt to manage migration flows in two principle ways. First, many countries have pursued a policy of “urban bias” in the provision of productive public services (e.g. transportation infrastructure, public utilities, water and sewage management, property protection, and public health). An urban bias in the provision of productive services tends to further raise the urban-rural wage gap and accelerates migration flows to the city. The second policy, much less frequently used, places direct controls on migration flows. For example, China’s Hukou system works as a de facto internal passport and visa mechanism that ties people to particular geographic locations. There has been a continuous loosening of controls and restrictions on rural labor moving to cities since the reforms began in 1978, but it is still difficult for rural migrants to settle in cities.

Most of the literature criticizes both an urban bias in the provision of public services and any direct controls on migration flows as being both inefficient and unfair. However, there is a lack of theoretical analysis in explicit general equilibrium models of migration where both these policy features appear together. We study the optimal allocation of public services and the optimal level of migration restrictions in a general equilibrium model with endogenous rural to urban migration, allowing for a comprehensive assessment of both policies. Our analysis suggests an urban bias is generally efficient and that, under a wide-range of reasonable assumptions, positive migration restrictions will raise social welfare (even when urban and rural household welfare is weighted equally).

The rest of the paper is structured as follows. Section 2 provides background on what is currently the most significant attempt to control migration flows—China’s Hukou system. Section 3 develops a model with endogenous migration choices that also incorporates the government’s allocation of productive public services and restriction on migration flows. Section 4 uses a calibration of the model to identify the situations where both an urban bias and migration restrictions are welfare maximizing. Section 5 provides a conclusion.

2 China's Migration Restrictions and Labour Market

In China, explicit migration restrictions have existed in some form for about two thousand years. The current system, the Hukou Registration Act of the People's Republic of China, started in 1958. The Act granted state agencies much greater powers in controlling citizens' geographical mobility through a system of migration permits and enrollment certificates.¹

Despite Hukou, China has experienced the world history's largest flow of rural to urban migration (Zhang and Song, 2003). The number of people living in urban areas has grown from less than 18 percent of the population in 1978 to 54 percent in 2013, with about 560 million more people now living in urban areas (NBS, 2014). The scale and speed of urbanization raises questions about the effects of Chinese policies that attempt to control migration in a way that reflects a clear urban bias.

Under the 1958 Hukou system, every Chinese citizen was registered as resident in a specific place with a category of either agricultural (rural) or non-agriculture (urban). Residents with rural Hukou were assigned rights to land for farming, while those with urban Hukou were provided with various benefits, including state-subsidized food and housing and, for many, access to permanent jobs.

The Hukou system functions as a *de-facto* internal passport and visa mechanism that confined the population to their place of birth and created two separate entities, a rural and an urban China, where migration between the two is under strict state control. Under this system, employment restrictions and state distribution policies created a highly segmented system, which still remains in many areas of the economy. This led many to argue that China had separate rural and urban labor markets for about 40 years until the late 1980's when the restrictions on rural-urban migration were gradually eased (Meng and Zhang 2001).

The reforms over the past decades have seen many explicit benefit in many cities reduced, and controls over rural urban migration being loosened. However, it still re-

¹See Chan and Zhang (1999), Knight and Song (1999) and Wang and Piesse (2010) for detailed description of the Hukou system.

mains extremely difficult for an individual or a household with rural Hukou to establish a household in an urban area and obtain urban Hukou. Although temporary migration is now permitted, city governments impose restrictions on the employment of migrants in enterprises under their jurisdiction in order to minimize unemployment and maintain social order (Knight and Song, 2005, p184). When in cities, migrants have little access to the benefits available to urban Hukou holders – these include unemployment support, health care, retirement pensions, or the Minimum Living Allowance scheme. It is even the case that migrants’ children are often denied access to urban public schools (Meng, 2012). Due to the Hukou system, rural migrant workers are discriminated against in the urban labour market and are regarded socially as “second class” in urban society (Démurger *et al* 2009).

Governments used the Hukou system as an explicit tool of control of migration flow: allowing more migration when it thought more was needed and reducing it when it thought it was not. These tools include direct quotas, job and wage discrimination (Knight and Song 2005), temporary Hukou registration of origin and place of work, increased application fees for required documents, adjusting the level of implementation of measure and intensity of temporary Hukou inspection or level of enforcement, all of which affect the “cost” of migration to migrants (Zhao 1999, Wang *et al* 2016).

This situation was exacerbated by huge discrimination in terms of occupational attainment and wages for migrant workers. In fact, the political and institutional arrangements gave urban residents privileged access to secure employment at above market-clearing wages and controlled the flow of peasants to cities, allowing rural migrants to fill only the jobs that urban-dwellers did not want (Knight and Song, 1999; Meng, 2012).

In addition to migration restrictions, large amounts of government revenue are invested in urban development projects, while there is far less per capita in rural areas (Wang *et al*, 2013). What is defined as a public service in a city may not be considered so in the countryside as much of the public sector infrastructure that does exist in rural areas is provided by the rural population themselves. In cities, local governments typically build schools and roads whereas in some villages, the villagers themselves are responsible

for financing and constructing these.

A flow of capital from the agriculture sector to the industrial sector, through the application of the well known “price scissors” and agricultural taxes (Wang and Piesse, 2010), and the urban bias policy in terms of larger share of public investment in urban areas make urban areas enjoying a faster capital accumulation and industrialization. The migration restriction imposed by cities government under the Hukou system made it possible for urban workers to have a higher capital per capita and higher productivity.

To summarize, there are clearly some benefits to controlling migration flows. China has not only avoided the massive urban slums often seen in many developing countries but has also allowed for fast growth in capital intensity and productivity. At the same time, large-scale movements of workers from the low-productivity agricultural areas to the high-productivity cities has been an important force in China’s unprecedented economic growth (Meng, 2012; Combes *et al* 2015). It is not unreasonable to imagine that there is an optimal amount of rural-to-urban migration that could be determined by a combination of government policy instruments. The next section develops a model that incorporates both costs and benefits of internal migration and explores when migration restrictions may be optimal.

3 The Model

The set-up of the model in this section follows Mourmouras and Rangazas (2013). This model describes a closed economy with two sectors producing different products: the urban sector produces industrial goods and the rural sector produces agricultural goods (food). Production in each sector is carried out by perfectly competitive firms using different technology. Firms in the urban sector engage in final goods production with modern technology which uses capital and labor. Urban households own and derive income from “capital” which includes both physical and human capital. The rural sector produces food with the traditional technology that combines land and labor. Rural households provide unskilled labour. Government investment and government services affect the productivity of each sector.

There are three types of households who can only work in the sector in which they reside. The urban households live and work in the urban sector. Rural households must make a decision to remain in the rural sector and produce food or migrate to the city, subject to natural and policy-based migration costs, to work in industry. In equilibrium, there will always be a urban-rural wage gap that motivates some, but not complete, migration out of the rural area and toward the city.

3.1 Production

3.1.1 Urban Sector

Firms in the urban sector produce industrial goods using capital and labor according to the following technology,

$$Y = DK^\alpha M^{1-\alpha}$$

where Y is output, K is the capital stock, M is the number of workers employed, D is a labor productivity index and α is the constant capital share parameter with $0 < \alpha < 1$. The productivity index, D , is a function of effective productive government services per household, g , and an exogenous technology index, E .

$$D = g^\mu E^{1-\mu}$$

where μ is a constant parameter with $0 < \mu < 1$. The technology index, E , grows at a constant rate q .

The unskilled workers employed in the urban sector are households that have migrated from rural areas. Let N^o be the number of rural households.

$$M = mN^o$$

where m is the fraction of rural households that leave to work in the city.

There is a competitive labor market for unskilled labor in the urban sector causing the wage to equal the marginal product of labor,

$$W = (1 - \alpha) DK^\alpha M^{-\alpha} = (1 - \alpha) g^\mu E^{1-\mu} \left(\frac{K}{N^o} \right)^\alpha m^{-\alpha}$$

The N urban households own the capital K (the aggregation of physical and human capital) and split the total income from capital equally.

$$\frac{rK}{N} = \alpha D \left(\frac{K}{N^o} \right)^\alpha \frac{N^o}{N} m^{1-\alpha}$$

where r denotes the return on capital.

3.1.2 Rural Sector

The rural sector produces food with a technology that uses unskilled labor, F and land, L , instead of physical capital,

$$O = AL^\rho F^{1-\rho}$$

where O is the output of food, A is the productivity index in the rural sector, and ρ is the constant labor share parameter. Similar to the urban sector, the labor productivity index in the traditional sector is determined by

$$A = (g^o)^\varepsilon E^{1-\mu}$$

where $g^O = G^O/F$ denotes the effective productive government services per household, where $\varepsilon \leq 1$ captures the idea that government services, such as roads, public utilities, or property protection, may have higher productivity in the urban nonagricultural sector than in agriculture. This possibility is important in establishing an urban bias in the provisions of government services across sectors. As will become clear, an urban bias, in turn, is important in making a case for migration restrictions.

The labor employed in the production in the rural sector, F , is

$$F = (1 - m) N^o$$

The unskilled farm laborers split the farm output equally and the output per rural

household is

$$\frac{O}{F} = (g^o)^\mu E^{1-\mu} \left(\frac{L}{N^o} \right)^\rho (1-m)^{-\rho}$$

3.2 Preferences

All households have the same preferences.

Household welfare is determined by the consumption of the industrial good produced in the rural sector, y and food produced in the rural sector, o .

Let u be the utility function of an household and χ be the weight of the consumption of final good in the utility function.

$$u = \chi \ln y + (1 - \chi) \ln o$$

The budget constraint for an household is

$$y + po = I$$

where p is the relative price of food and I is the net income of the household. At optimal,

$$y = \chi I$$

$$po = (1 - \chi) I$$

The indirect utility function of an household is thus

$$\ln I + \chi \ln \chi + (1 - \chi) \ln(1 - \chi) - (1 - \chi) \ln p$$

Each household pays a net income tax τ (net of transfers and subsidies paid to the households) that is used to finance the budget for productive public services, as well as other government expenditures such as military services. We know that in China, for a

prolonged period of time, rural residents paid higher tax than rural residents (Wang and Piesse 2010), but for simplicity, we assume that rural households face the same tax rate as the urban sector.

3.2.1 Migrants

Upon reaching the city, each migrant receives the urban after-tax wage, $(1 - \tau)W$, paid to unskilled labor. However, migration is costly. There are two types of migration costs. The first type is set by a policy that requires each migrant to pay a fraction of their wage to urban residents $\hat{\omega}$, in the form of fees, extra rent on urban housing, and perhaps even bribes. For a prolonged period from the late 1980s, Chinese rural migrants needed temporary Hukou when searching for and taking jobs in the city. The temporary Hukou application process is controlled by the government though the adjustment of application time-lags, fees, and the strictness of implementation.

The second type of migration costs are not paid to urban households but rather are the natural costs of migration that include transportation costs and lost wages associated with unimpeded job search, which we also model as a fraction of the urban wage $\bar{\omega}$. Thus, after taxes and moving expenses, the disposable income the migrant worker has for consumption is $(1 - \omega)(1 - \tau)W$, where $\omega = \bar{\omega} + \hat{\omega}$.

The net income of a migrant can be written as

$$(1 - \omega)(1 - \tau)W = (1 - \omega) \left\{ (1 - \tau)(1 - \alpha)E^{1-\mu} \left(\frac{K}{N^o} \right)^\alpha \right\}^* g^\mu m^{-\alpha}$$

The associated indirect utility function for a migrant is thus

$$\begin{aligned} v^* = & \left[\chi \ln \chi + (1 - \chi) \ln (1 - \chi) + \ln \left\{ (1 - \tau)(1 - \alpha)E^{1-\mu} \left(\frac{K}{N^o} \right)^\alpha \right\}^* \right] \\ & + \ln (1 - \omega) + \mu \ln g - \alpha \ln m - (1 - \chi) \ln p \end{aligned}$$

3.2.2 Urban Households

The after-tax income of an urban household is

$$(1 - \tau) \left[\frac{rK}{N} + \hat{\omega}W \frac{mN^o}{N} \right] = [\alpha + \hat{\omega}(1 - \alpha)] \left\{ (1 - \tau) \left(\frac{K}{N^o} \right)^\alpha \frac{N^o}{N} E^{1-\mu} \right\} g^\mu m^{1-\alpha}$$

Substituting the net income of an urban household to the indirect utility function, the indirect utility function for an urban household is

$$v = \left[\chi \ln \chi + (1 - \chi) \ln (1 - \chi) + \ln \left\{ (1 - \tau) \left(\frac{K}{N^o} \right)^\alpha \frac{N^o}{N} E^{1-\mu} \right\} \right] \\ + \ln [\alpha + \hat{\omega}(1 - \alpha)] + \mu \ln g + (1 - \alpha) \ln m - (1 - \chi) \ln p$$

3.2.3 Rural Households

The after-tax income of a rural household is

$$(1 - \tau) \frac{pO}{F} = p \left\{ (1 - \tau) E^{1-\mu} \left(\frac{L}{N^o} \right)^\rho \right\}^o (g^o)^{\varepsilon\mu} (1 - m)^{-\rho}$$

The indirect utility function for a rural household that remains in the rural sector is

$$v^o = \left[\chi \ln \chi + (1 - \chi) \ln (1 - \chi) + \ln \left\{ (1 - \tau) E^{1-\mu} \left(\frac{L}{N^o} \right)^\rho \right\}^o \right] + \varepsilon \mu \ln g^o - \rho \ln (1 - m) + \chi \ln p$$

3.3 Equilibrium

We primarily consider equilibria where both sectors operate and some movement to the city occurs each period. For these equilibria, the food market is in equilibrium and the rural households must be indifferent about staying in the rural sector or migrating to the urban sector.

3.3.1 Market for Food

On the supply side, the total output of food is

$$N^o E^{1-\mu} \left(\frac{L}{N^o} \right)^\rho (g^o)^{\varepsilon\mu} (1-m)^{1-\rho}$$

Summing the demand for food across all three types of households gives the demand for food as the following

$$\frac{(1-\tau)(1-\chi)}{p} N^o E^{1-\mu} \left[\left(\frac{K}{N^o} \right)^\alpha g^\mu m^{1-\alpha} (1-\bar{\omega}(1-\alpha)) + p \left(\frac{L}{N^o} \right)^\rho (g^o)^{\varepsilon\mu} (1-m)^{1-\rho} \right]$$

Equating demand and supply of food and solving for p gives the following equation,

$$p = \frac{(1-\tau)(1-\chi) \left(\frac{K}{N^o} \right)^\alpha g^\mu m^{1-\alpha} (1-\bar{\omega}(1-\alpha))}{[1 - (1-\tau)(1-\chi)] \left(\frac{L}{N^o} \right)^\rho (g^o)^{\varepsilon\mu} (1-m)^{1-\rho}}$$

3.3.2 Migration Equilibrium

For there to be some but not complete migration, the migrant's welfare must be the same as the rural household's welfare in equilibrium, $v^* = v^o$. This yields,

$$\ln(1-\alpha) + \alpha \ln \left(\frac{K}{N^o} \right) + \ln(1-\omega) + \mu \ln g - \alpha \ln m = \rho \ln \left(\frac{L}{N^o} \right) + \varepsilon \mu \ln g^o - \rho \ln(1-m) + \ln p$$

Taking the log of the equilibrium price, substituting into the expression above, and rearranging gives

$$\begin{aligned} & \ln m - \ln(1-m) + \ln(1-\bar{\omega}(1-\alpha)) \\ &= \ln(1-\omega) + \ln(1-\alpha) + \ln[1 - (1-\chi)(1-\tau)] - \ln[(1-\chi)(1-\tau)] \end{aligned}$$

Solving the equation for m we get,

(1)

$$m = \frac{\kappa(1 - \omega - h)}{1 + \kappa(1 - \omega - h)}, \quad \kappa \equiv \left[(1 - \alpha) \frac{1 - (1 - \chi)(1 - \tau)}{(1 - \bar{\omega}(1 - \alpha))(1 - \chi)(1 - \tau)} \right]$$

The migration rate m is independent of g and g^o . From equation (1), $\frac{dm}{d\omega} < 0$ which indicates that the migration is decreasing in migration costs. More rural households would choose to remain in the rural sector when there is an increase in the migration costs. The migration is increasing in $1 - \alpha$ because this fraction raises the urban sector wage for unskilled labor. It is also decreasing in $(1 - \bar{\omega}(1 - \alpha))(1 - \chi)(1 - \tau)$ as this expression raises the demand for food which would raise food prices and thus income of rural households.

Using the log form of the migration equilibrium condition and substituting it back into the log form of the equilibrium food price gives

(2)

$$\ln p = \mu \ln g - \mu \ln g^o + \ln(1 - \omega) - \alpha \ln m + \rho \ln(1 - m) + \ln \left\{ (1 - \alpha) \frac{(K/N^o)^\alpha}{(L/N^o)^\rho} \right\}$$

4 Policy Analysis

4.1 Welfare Analysis

The government chooses ω (through its control of $\hat{\omega}$), g , and g^o to maximize a social welfare function comprised of the utility functions of urban and rural households (represented by migrants, whose utility equals that of rural households in all equilibria we consider). For convenience, we will think of the initial allocation of households as being evenly split across the sectors. In this case, maximizing social welfare defined over types is equivalent to maximizing social welfare defined over all households because there are equal numbers of the two types.

The social welfare function is

$$V = v + \gamma v^*$$

where γ is the relative weight placed on the migrant's (rural household's) welfare. In choosing policy the government accounts for all effects, including those on food prices and migration to the city.

There is a predetermined portion of tax revenue designated for the provision of productive government services per capita, b . The budget constraint of the government is

$$g[\pi + m(1 - \pi)] + g^o(1 - \pi)(1 - m) = b$$

where π is the fraction of the total population that are urban households, which we take to be 1/2 throughout as mentioned above. The first order conditions for the three choices are

(3a)

$$\frac{(1 + \gamma)\chi\mu}{g} = \psi[\pi + m(1 - \pi)]$$

(3b)

$$\frac{(1 + \gamma)(1 - \chi)\varepsilon\mu}{g^o} = \psi[(1 - m)(1 - \pi)]$$

(3c)

$$\begin{aligned} & \frac{1 - \alpha}{\alpha + (\hat{\omega})(1 - \alpha)} + \psi \left[(g - g^o)(1 - \pi) \left(\frac{-dm}{d\omega} \right) \right] \\ & \leq \frac{\chi(1 + \gamma) - 1}{1 - \omega} + \frac{1 - \chi\alpha(1 + \gamma)}{m} \left(\frac{-dm}{d\omega} \right) + \frac{(1 + \gamma)(1 - \chi)\rho}{1 - m} \left(\frac{-dm}{d\omega} \right) \end{aligned}$$

Begin by focusing on (3c), the first order condition for the migration restriction. The left-hand-side is interpreted as the marginal benefit and the right-hand-side as the marginal cost of restrictions. If at $\hat{\omega} = 0$, the marginal cost of migration restrictions is greater than the marginal benefit, then restrictions on labor mobility are not optimal.

The first term on the left-hand side is the marginal benefit to urban households of the extra income directly generated by the migration costs imposed on the rural households (application fees, housing payments, bribes etc.), which is decreasing in ω due

the diminishing marginal utility of consumption. The second term is the benefit of restricted migration on freeing government revenue because of reduced crowding of urban productive services (assuming there is an urban bias in the provision of public services).

The first term on the right-hand-side is the loss in income to the migrant due to the government imposed migration costs, net of a positive effect of migration costs resulting from increased food supply and lower food prices. This marginal effect on social welfare could in fact be positive because the lower food prices benefit all households while the migration cost is borne only by migrants. The higher is χ , the more likely that this effect is a true net cost because the weight placed on food in the household's budget is lower. The second term on the right-hand-side is the loss in total urban income from a reduced return to capital, net of the effect of lower urban income lowering food prices, resulting from reduced migration. The third term is the reduction in per capita farm income due to the reduced migration to the city and the crowding of farm land.

Combining (3a) and (3b) allows us to examine possible sources of an urban bias,

(4)

$$g^o = \varepsilon \left[\frac{1 - \chi}{\chi} \right] \left[\frac{\pi + m(1 - \pi)}{(1 - m)(1 - \pi)} \right] g$$

An urban bias is not necessarily optimal in this setting.² An urban bias is more likely (1) the greater is the relative productivity of public services in the urban area (i.e. the smaller is ϵ), (2) the lower is the relative preference weight placed on agricultural goods (the first term in squared brackets) and (3) the lower is the relative urban population—raising the relative cost of public service provision in rural areas (the second term in squared brackets). Fundamentals leading to a large urban bias, increase the likelihood that some restriction on labor migration to the city may raise social welfare by preventing crowding of government inputs that are productive in generating nonagricultural products.

Substituting (4) into the government budget constraint, allows us to solve for the level of government service provision in terms of migration costs and the total budget,

²See Mourmouras and Rangazas (2013) for a set of assumptions where an efficient urban bias is unambiguously present.

(5)

$$g = \left[\frac{\chi}{\chi + \varepsilon(1 - \chi)} \right] \frac{b}{\pi + m(1 - \pi)}$$

4.2 Optimal Internal Migration Restrictions

Now we examine whether there are conditions where migration restrictions are positive. First, set $\gamma = 1$, so that rural and urban households are equally weighted. In this case, maximizing V is equivalent to maximizing the sum of all households' utility, as in the utilitarian social welfare function, with no bias toward urban residents. We use numerical calibrations of the model because, depending on the particular values of the parameters, migration restrictions may or may not be optimal—i.e. migration restrictions are neither generally optimal nor sub-optimal.

Labor shares are typically set to $1/3$ in each sector (see Gollin, 2002). To be consistent with this observation we set $\rho = 1/3$. In the modern or manufacturing production function, we include skilled labor or human capital in K . An unskilled labor share in modern production has been estimated to about $1/3$ (Mankiw *et al*, 1992), so we set $\alpha = 2/3$.

A survey of empirical estimates places the output elasticity of public capital services between 0.20 and 0.40 (see Mourmouras and Rangazas, 2007). These are based on economy-wide estimates. We set parameters so that the average output elasticity of public services is 0.30, so $\pi\mu + (1 - \pi)\varepsilon\mu = 0.30$. We consider settings where $\varepsilon = 0.5$ and $\varepsilon = 0.75$, a relatively strong and a relatively weak productivity advantage for public services in the urban sector.

Three different settings for χ are considered: $1/2$, $2/3$, and $3/4$. The net tax rate, τ , is set to 0.30, but results are not sensitive to its exact value.

Finally, we determine $\bar{\omega}$ as the smallest value that ensures an urban bias in the provision for government services ($g^o/g \leq 1$) in the absence of government restrictions. The value for $\bar{\omega}$ varies with the other fundamentals that drive the urban bias. The stronger are the other fundamentals, the lower migration costs have to be to maintain a relatively low cost for urban service provision per urban worker that allows for an urban bias.

Table 1 Equilibria with Mobility Restrictions

χ	ε	$\bar{\omega}$	$\hat{\omega}$	m	g^o/g	Δv	Δv^*
1/2	1/2	0.23	0.08	0.309	0.947	0.573	-0.036
1/2	3/4	0.80	0.00	0.143	1.00	0.000	-0.000
2/3	1/2	0.00	0.17	0.469	0.692	0.365	-0.091
2/3	3/4	0.30	0.00	0.455	1.00	0.000	-0.000
3/4	1/2	0.00	0.15	0.567	0.603	0.239	-0.090
3/4	3/4	0.03	0.07	0.581	0.942	0.207	-0.047

Table 1 reports the equilibria results under our different parameter settings. For each setting, the table gives the minimum value for $\bar{\omega}$, as described above, the optimal migration restriction ($\hat{\omega}$), the equilibrium fraction of rural households that migrate (m), a measure of the equilibrium urban bias (g^o/g), and the changes in the welfare of urban and rural households relative to the equilibrium with no government restrictions (Δv and Δv^*). Under all parameter settings, the marginal benefit in (3c) is downward sloping and the marginal cost is upward sloping, generating a unique value for the optimal migration restriction (including the possibility of a corner solution at zero, where the marginal cost exceeds the marginal benefit).

When there is a sufficiently large productivity advantage to urban public services, with $\varepsilon = 0.5$, optimal mobility restrictions are strictly positive. If the productivity advantage is weaker, $\varepsilon = 0.75$, migration restrictions are only optimal if there is a large preference for urban manufacturing goods, $\chi = 3/4$. Thus, when there is sufficient reason to generate an urban bias based on the relative value of the productivity of urban public services, some restriction of labor migration to the city is warranted to prevent crowding that undermines the provision of these services. One indicator of strength of the fundamentals generating an urban bias is whether the bias would be present even if migration flows to the city were costless or minimal. These can be seen in the table when $\bar{\omega}$ is zero or small.

The general conclusion from Table 1 is that *some* restriction on labor mobility is optimal when an urban bias is present on efficiency grounds. However, the size of the

restriction is not large, far less that what is needed to completely restrict labor flows. Furthermore, while mobility restrictions maximize social welfare, they are not themselves efficient because in all cases the welfare of rural households and migrants fall when restrictions are present. While labor restrictions create a *potential* Pareto improvement in some cases, in no case is there a strict Pareto improvement.

5 Conclusion

This paper uses a simple model of rural to urban migration to show that both (1) an urban bias in the provision of productive public services and (2) some internal migration restrictions can be welfare maximizing. An implication of our results is that China's urban bias in the provision of public services and its Hukou system could raise aggregate welfare. However, we find that the optimal migration restrictions are not large and they do not lead to strict Pareto improvements. The restrictions increase aggregate welfare by raising the welfare of urban households more than they lower the welfare of rural households.

Our model does not consider the possibility of unemployment, which can create an additional justification for the migration controls. When there is surplus labor in both rural and urban sectors, transferring excess labor to urban areas is not likely to increase efficiency. Without sufficient employment creation in the urban sector, the surplus labor migration to the city will simply raise urban unemployment rather than urban output.

Now that China has experienced both considerable economic growth and widening income inequality, its policy priorities may shift. For China to become a fairer society, the effects of migration restrictions on rural households' welfare must be recognized. In addition, if migration restrictions are lessened, it may be time to shift more public services to rural areas. As indicated by our theory, public services become more costly to provide to a larger urban population, causing the optimal urban bias to shrink.

Acknowledgments

We would like to thank seminar and conference participants at Manchester University, Renmin University of China, Beijing Normal University, the 26 CEA conference at Nottingham University for their valuable comments and suggestions. We thank Ning Xue for her research assistance.

References

- Bloom, David. and Khanna, Tarun., 2007, “The Urban Revolution,” *Finance and Development*, 44(3): 8-14.
- Chan, Kam Wing., and Li Zhang, 1999, “The Hukou System and Rural Urban Migration in China: Processes and Changes”, *The China Quarterly*, 160: 818-855.
- Combes, Pierre-Philippe., Sylvie. Démurger and Shi. Li, “Migration externalities in Chinese cities”. *European Economic Review*, 2015. 76: 152-167.
- Démurger, Sylvie., Marc Gurgand, Shi Li, Ximing Yue, 2009, “Migrants as Second-class Workers in Urban China? A Decomposition Analysis” *Journal of Comparative Economics*, 37(4):610-628
- Deshingkar, Priya., and Grimm, Sven., 2005, “Internal Migration and Development: A Global Perspective,” *Migration Research Series No.19*, International Organization of Migration.
- Gollin, Douglas., 2002, “Getting Income Shares Right”, *Journal of Political Economy*, 110(2): 458-474.
- Knight, John., and Lina Song, 1999, *The Rural-Urban Divide: Economic Disparities and Interactions in China*. Oxford: Oxford University Press.
- Knight, John., and Lina Song, 2005, *Towards a Labour Market in China*. New York, Oxford University Press.
- Mankiw, N. Gregory., David Romer, and David N. Weil, 1992, “A Contribution to the Empirics of Economic Growth”, *The Quarterly Journal of Economics*, 107(2): 407-437.
- Meng, Xin., 2012, “Labor Market Outcomes and Reforms in China”, *Journal of Economic Perspectives*, 26 (4): 75-102.

Meng, Xin, and Junsen Zhang, 2001, “The Two-tier Labor Market in Urban China: Occupational Segregation and Wage Differentials Between Urban Residents and Rural Migrants in Shanghai”, *Journal of Comparative Economics*, 29 (3): 485-504

Mourmouras, Alexandros., and Peter Rangazas, 2007, “Foreign Aid Failures and Sources of Poverty: A Quantitative Framework”, *IMF Staff Papers*, 54: 59-90.

Mourmouras, Alexandros., and Peter Rangazas, 2013, “Efficient Urban Bias”, *Journal of Economic Geography*, 13(3): 451-471.

National Bureau of Statistics of China (NBS), (eds.), 2014, China Statistic Yearbook, various years, Beijing: China Statistics Press.

Wang, Xiaobing., and Jenifer Piesse, 2010, “Inequality and the Urban-rural Divide in China: Effects of Regressive Taxation”, *China and World Economy*, 18(6): 36-55.

Wang, Xiaobing., and Jenifer Piesse, 2013, “The Micro-foundations of Dual Economy Models”, *The Manchester School*, 81(1): 80-101.

Wang, Xiaobing., Jenifer Piesse, and Zhengmao Ye, 2016 “Labour Markets in China: A Study of Structure and Evolution of Wages”. *Frontier of Economics in China*. 11(2): 265–301.

Wang, Xiaobing., Jenifer Piesse and Nick Weaver, 2013, “Mind the Gaps: A Political Economy of the Multiple Dimensions of China’s Rural-Urban Divide”. *Asian Pacific Economic Literature*. 27(2):52-67.

Wang, Xiaobing., and Nick Weaver, 2013a, “Surplus Labour and Urbanization in China”, *Eurasian Economic Review*, 3(1): 84-97.

Wang, Xiaobing., and Nick Weaver, 2013b, “Surplus Labour and Lewis Turning Points in China”, *Journal of Chinese Economic and Business Studies*, 11(1): 1-12.

Zhang, Kevin Honglin, and Shunfeng Song, 2003, “Rural–urban migration and urbanization in China: Evidence from time-series and cross-section analyses”, *China Economic Review*, 14 (4): 386–400

Zhao, Yaohui, 1999, “Leaving the Countryside: Rural-To-Urban Migration Decisions in China”, *American Economic Review*, 89 (2): 281-286