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MIGRATION, LABOR MARKET FLEXIBILITY, AND WAGE DETERMINATION IN CHINA: A REVIEW

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This paper reviews economic studies on rural-urban migration issues in China. The paper focuses on four issues: the household registration system in China, the profile of the migrants, explanations for rural-to-urban migration, and the interaction between migration and labor market evolution, with special reference to labor market segregation, labor market flexibility, and wage differentials. The paper concludes with suggestions for further research topics.

I. INTRODUCTION

EVER since China began its economic reforms in 1978, rural-to-urban migration has been a particularly important social phenomenon and has attracted much attention from both policy makers and academics. The growing literature includes: government-sponsored research reports, e.g., Zhang and Zhou (1999), as well as seminar proceedings, e.g., MOLSS (2000); book length treatments from sociologists, e.g., CASS (2000); contributions from demographers, such as Li, Chen, and Bao (1999), and of course research by economists, e.g., West and Zhao (2000).

The study of migration is not new in economics. The dominant approach in the 1970s was the Todaro (1969) model and its extension, the Harris-Todaro (1970) two-sector model, which recognized the persistent wage differential between the urban and rural sectors. In this model an individual will make his or her migration decision based on the expected urban-rural earning difference. The prediction from the Harris-Todaro model has been challenged by empirical evidence, and economists such as Nabi (1984) and Rosenzweig and Stark (1989) have realized the importance of the household in the migration decision process. For theories on migration and empirical results from a global perspective, reference should be made to the excellent survey by Williamson (1988). The unique household registration

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(*hukou*) system of China distinguishes Chinese migration from migration in other developing countries.

This paper will review major contributions by economists to the study of migration in China, with particular reference to rural-to-urban migration and related issues, a topic on which a substantial economic research literature has accumulated. I concentrate on rural-to-urban migration because it is the most important form of migration in China (followed by urban-to-urban and rural-to-rural migration) and because the empirical research on other forms of migration in China is still limited.[1] I should like to point out that because of space constraints, this paper cannot cover all the research that has been done in this area.

The paper is organized as follows. Section II will provide a brief history of the institutional arrangements relating to Chinese urban-rural segregation, and will discuss the household registration (*hukou*) system. This section will also illustrate the evolution of, and changes in rural-to-urban migration policy since 1978. Section III will document the trend of migration and will examine the profile of the migrants. Section IV will review the current literature on explanations for migration. Consensus and contention over the causes of migration will both be highlighted. Data issues and related econometric techniques will also be discussed. Section V will survey the research on the interaction between migration and labor market evolution. Empirical findings on labor market segregation and flexibility will be summarized. This section will also discuss the estimates of wage equations and wage differentials in the literature. Section VI will offer some comments and thoughts on further research issues and will conclude the paper.

II. THE ORIGIN AND EVOLUTION OF RURAL-URBAN SEGREGATION AND MIGRATION

A. *The Origin of the Hukou System*

The current *hukou* system in China originated in 1951, and it should be pointed out that at the time of its introduction, it was not intended to control the mobility of the people. It is often thought that the government started to intensify the *hukou* system and to strictly restrict the mobility of the population, including rural-to-urban migration, in the 1960s, following the collapse of the Great Leap Forward and the devastating famine of that decade. The main reason cited for this government action is food shortage (Wu 1994; Zhao 2000). But as argued in Lin, Cai, and Li (1996), the government needed to tie the farmers to the land so as to provide cheap agricultural products to the industrial sector. In this sense, the segregation of rural and urban population was caused by more profound factors than food shortage.

[1] The few exceptions include Cai, Du, and Wang (2001) on planned migration sponsored by the government, and Ma (2000) and Yao (2001b) on rural-to-rural migration.

B. *The Evolution of Hukou System*

The methods for controlling rural-to-urban migration were comprehensive. Through the People's Commune system, the earnings of farmers depended on their daily participation in collective farming, and the opportunity cost of migration was very high. Through the *hukou* system, the government allocated housing and jobs, and rationed food and other necessities, and these linkages made it almost impossible for people without local *hukou* to live in urban areas (Zhao 1999a; Cai 2001). It is worth noting that the *hukou* system deprived both rural and urban residents of their freedom of mobility.[2]

China began its economic reforms in 1978. The Household Responsibility System (HRS) emerged and eventually replaced the collective production team system. The HRS returned some degree of personal freedom to the rural people, increased their productivity, led to the availability of food in the urban free market, and eventually put an end to food rationing (Zhao 1999a); it also generated surplus labor in rural areas. All of these factors made rural-to-urban migration possible and necessary.

In the urban areas, the creation and development of the special economic zones, the expansion of the non-state sector and the loosening of urban employment policy created a demand for migrants (Meng and Zhang 2001; Cai 2001). The shift in China's development strategy from capital-intensive industries towards more labor-intensive industries has also created more jobs in the urban areas.

Despite all these changes, the basics of the *hukou* system have remained intact until recently. Some provinces and cities are starting to reform the *hukou* system, though official restrictions on migration still exist.

C. *The Evolution of Migration Policy from 1979 to 2000*

Huang and Pieke (2003) divide the evolution of migration policy into four periods, beginning in 1979. In the first period, 1979 to 1983, the government still prohibited migration. In the second period, 1984 to 1988, the government started to allow farmers to enter the urban areas on condition that food was provided by the farmers themselves. The third period was from 1989 to 1991. The term "rural migrant wave" was coined in 1989 to describe the enormous number of rural migrant travelers during the Chinese New Year period in that year. Following the "rural migrant wave" of 1989, migration was becoming a significant social phenomenon, and the government felt the need to interfere and restrict migration. During the fourth period, from 1992 to 2000, the central government to some extent encouraged rural-urban migration, but after 1995 many major cities tightened their con-

[2] The People's Commune system and the state ownership of the land made rural-to-rural migration almost impossible; the linkage of food rationing, housing allocation, job slot, and so on to the local *hukou* prevented the mobility from city to city.

TABLE I

DISCRIMINATION POLICIES ON RURAL-URBAN MIGRATION: THE CASE OF BEIJING, CHINA

Period	Quantity Control	Registration and Fee Policy	Application and Approval Procedure	Restricted Sector
Formulating Regulation Policy period (1989–91)	Temporary worker must have the local *hukou*; aim to reduce the rural migrants by 200,000–250,000; tight control over the recruitment of rural migrants	The employer must apply for the temporary resident permit and working permit for their nonlocal employees		
Loosely controlled period (1992–94)		Stop to collect the management fee from the baby-sitters who are from outside Beijing	Formalize the labor contract for nonlocal workers; give more power to the lower level authority to approve the recruitment of rural migrants from local rural areas; give partial power to the employers to recruit nonlocal workers	
Strictly controlled period (1995–2000)	Tightly control the recruitment of nonlocal workers within the sectors with a large number of layoff workers; do not permit recruitment of nonlocal workers if the company has laid off 10 percent of its work force; set the ratio and formulate the rules on the recruitment of nonlocal workers and layoff workers; put a total quota on the nonlocal workers	Nonlocal workers must apply for temporary resident permit and working permit for nonlocal workers. The nonlocal worker must have employment certificate. Formalize the application procedure for the working permit. There are three different kinds of temporary resident permit	Formalize the control procedure for nonlocal workers; take three-no[a] migrants into custody and send them back to their home towns. Strictly control the recruitment of nonlocal workers for certain sectors	In 1996, there were recruitment restrictions on 16 sectors; in 1997, 32 sectors; in 1998, 34 sectors; in 1997, there was also a regulation forbidding the hiring of nonlocal workers in the service sector; in 1999, the restriction list included 8 sectors and 103 occupations

Sources: Reproduced from Cai, Du, and Wang (2001, Table 4).

[a] One explanation for the three-no is no legal identification card, no fixed resident place and no legal source of income; another explanation is no legal identification card, no temporary resident permit, and no employment certificate.

trols on migration because of the layoff and unemployment problem in urban areas.

Using Beijing as an example, Cai, Du, and Wang (2001) illustrate the existence and evolution of the institutional barriers restricting rural-to-urban migration. The changes in policy reflect the macro environment of Beijing at the time of the change, a situation that is summarized in Table I. Most cities experienced stages of migration policy changes similar to those that occurred in Beijing.

D. *The Reform of Hukou System since 2000*

Since 2000, the government has been reforming the *hukou* system and now allows greater mobility among the people.[3]

At a news conference held by the Ministry of Public Security (MPS) on February 25, 2002, Mr. Bao Shuixian, a deputy director of MPS, stated that China would not abolish the *hukou* system, but would reform it and loosen the controls on migration (Xinhua News Agency 2002). In fact, at the end of 2001, several provinces, including Jilin, Hunan, Fujian, Liaoning, and Guangdong, eliminated the distinction between rural *hukou* and urban *hukou*. China has begun to reform the *hukou* system at small town level with effect from 2001 (the pilot project started in 1997). The criteria for granting an urban *hukou* in small towns (county-level towns and below) are that inhabitants must (i) have a fixed place of residence, (ii) be employed, and (iii) have a legal source of income. It was reported that the majority of *hukou* applications that met the above-mentioned criteria were approved. The final goal of the reform is to extend the practice followed in the small towns to the whole of the country.

E. *Government Migration Policies*

There are few serious studies of the government polices that restrict or facilitate migration. That by Knight, Song, and Jia (1999) is an exception. Using a survey of four Chinese cities (Beijing, Shenzhen, Wuhan, and Suzhou), the authors study government policy on rural-urban migration.

They characterize government policy as one that exhibits a "lack of coherence and cohesion." The governments in poor and labor surplus areas are keen to promote migration, but governments in the cities worry about the job security of their residents, and have formulated various kinds of regulations aimed at shielding their residents from the competition of migrants.

Several restrictions are discussed by Knight, Song, and Jia (1999). The city governments usually put quotas on the number of migrants that each enterprise can employ. Some 77 percent of firms have had to pay fees to employ migrants with an average cost of 213 yuan, which equals 44 percent of the average monthly migrant wage. City governments have also set up a labyrinthine and costly system for con-

[3] The abolition of the Regulation on Taking the Urban Homeless and Beggars into Custody and Deportation in August 1, 2003 was a major event.

trolling migration. This system requires migrants to get an identification card, a migrant identity card, a temporary resident card, an employment registration card, and so on. It usually takes months and hundreds of yuan for a migrant to get a single piece of paper. This system has become a cash cow for governments at various levels.

Ironically, some branches of the government, including the Ministry of Labor (MOL) and its subsidiaries, also promote migration. But because of the high costs involved, only 18 percent of migrants are recruited through these government agencies. The migrants relying on these agencies spend 324 yuan on average, while the migrants finding a job through their relatives or friends need pay only about 50 yuan (Knight, Song, and Jia 1999).

III. TRENDS OF MIGRATION AND THE PROFILE OF MIGRANTS

A. *The Major Trends of Migration*

Before 1979, migration was a part of the planning system in China. The people migrated from relatively developed areas to underdeveloped areas following directions from the state. Since the introduction of reforms after 1979, the main driving force behind migration has been the income gap, both the rural-urban income gap and the regional income gap. Thus people tend to move from rural areas to urban areas and from poor regions to wealthy regions, that is from western and central China to the eastern coastal areas.

Using the 1990 census, Cai (1996) reports that there are 34.1 million migrants in China, of which 32.42 percent are inter-province migrants. By contrast, Wang, Wu, and Cai (2003), using the 2000 census, estimate that there are around 12.47 million migrants in China. Among these, 26.4 percent are inter-province migrants and 73.6 percent are intra-province migrants. Of the 12.47 million migrants, rural-to-urban and urban-to-urban migrants account for 78 percent, rural-to-rural migrants less than 20 percent, and the urban-to-rural migrants around 4 percent.

It is unclear why the number of the migrants decreased so sharply, from 34.1 millions in 1990 to 12.47 millions in 2000. The decline is counter-intuitive and is inconsistent with common wisdom. One plausible explanation is the poor quality of the data set and the unsatisfactory definition of what constitutes a migrant. Compared with other studies, for example, Huang and Pieke (2003), it seems that Wang, Wu, and Cai (2003) have underestimated the scale of migration.

Since the middle and late 1980s, rural-to-urban migration has become a continuing social phenomenon. The exact number of migrants is open to dispute (Rozelle et al. 1999), but numbers cited in Sicular and Zhao (2002) show that the volume of rural-to-urban migration more than doubled, from 8.9 million in 1989 to 23.0 million in 1994 (Table II). Wang's research (2000) on interregional migration confirms

TABLE II

RURAL POPULATION, LABOR FORCE, AND RURAL-URBAN MIGRATION IN CHINA

(1,000)

Year	Rural Population	Percentage of Rural Population	Rural Labor Force	Employed by TVEs	Rural Migrants
1978	790,140	82.08	306,380	28,270	
1980	795,650	80.61	318,357	30,000	
1985	807,570	76.29	370,651	69,790	
1989					8,875
1990	841,380	73.59	420,095	92,650	
1991	846,200	73.06	430,925	96,090	
1992	849,960	72.54	438,016	106,250	13,785
1993	853,440	72.01	442,557	123,450	
1994	856,810	71.49	446,541	120,170	22,961
1995	859,470	70.96	450,418	128,620	24,488
1996	850,850	69.52	452,880	135,080	25,190
1997	841,770	68.09	459,617	130,500	24,763
1998	831,530	66.65	464,323	125,370	26,666
1999	820,380	65.22	468,965	127,040	
2000	808,370	63.78	479,621	128,200	
2001	795,630	62.34	482,289	130,860	

Sources: For rural population, percentage of rural population, rural labor force, and employed by TVEs, National Bureau of Statistics of China (2002, Table 4-1, Table 5-4, Table 12-3); for rural migrants, Sicular and Zhao (2002, Table 2.3).

TABLE III

INTER-REGION MIGRATION IN CHINA, 1982–2000

(1,000)

	1982–87			1985–90			1995–2000		
	Eastern Region	Middle Region	Western Region	Eastern Region	Middle Region	Western Region	Eastern Region	Middle Region	Western Region
Eastern region	—	—	—	—	—	—	—	—	
Middle region	735	—	—	1,089.4	—	—	2,499.3	33.8	—
Western region	379.2	60.5	—	843.7	222.6	—	1,194.8	—	—

Source: Wang (2000, Table 1).
Note: The figure, e.g., 735, means the number of migrants from Middle Region to Eastern Region is 735,000.

the same trend (Table III). Li (1994) estimates that rural migrants amount to between 50 and 100 million, among whom 70–80 percent migrate to urban areas. Huang and Pieke (2003) report that the number of rural-to-urban migrants amounted to 45 million in 1997, 55 million in 1998, and 67 million in 1999.

The migrants are mainly from the central and western regions, and the popular destinations are big cities and the eastern coastal areas. Wang, Wu, and Cai (2003) estimate that of the inter-province migrants, 75 percent migrate to eastern areas, and only 9.8 percent and 15.3 percent to central and western areas respectively.

B. *The Profile of Migrants*

In general terms, rural migrants are more educated and usually younger than nonmigrants. The majority of them have junior high school or primary school education. There are few female migrants. Minority nationalities are less likely to migrate (Huang and Pieke 2003).

According to the 1990 census, male migrants outnumber females, and account for 55 percent of the total (Cai 1996). Huang and Pieke (2003) claim that only one-third of rural migrants are female. There are several reasons for there being fewer female migrants. Traditionally, women have been considered to be housewives and their duties have been thought to lie in the home. From an economic point of view, the labor demand for male migrants, for example, in the construction industry, is also stronger than the demand for female migrants.

Migrants tend to be young people. According to the 2000 census, rural migrants from the 15–19, 20–24, and 25–29 age groups account for 24.6, 23.2, and 20.1 percent of the total respectively, the equivalent numbers for urban migrants being 21.1, 24.1, and 16.1 percent (Wang, Wu, and Cai 2003).

Some 48.5 percent of rural migrants have junior high school education, and 16.7 percent and 14.2 percent of rural migrants have elementary school education and senior high school education, respectively. By contrast, 35 percent of urban migrants have college-level education, another 35 percent have senior high school or technical school education, and 23 percent have junior high school education (Wang, Wu, and Cai 2003).

Li (1990) reports that in Beijing, 60 percent of migrants have a migration duration spell of more than six months, and 44 percent have a spell of more than one year. In Shanghai, the percentage numbers are 64 and 48 percent, respectively. Knight, Song, and Jia (1999) report an average migration spell of 6.8 months in 1993. Migrants also often move back and forth between home and work place (Hare 1999).

Rural migrants often hold jobs in the informal sector, for it is difficult for them to find a job in the formal sector (Wang, Maruyama, and Kikuchi 2000). According to Cai (1996), 36 percent of migrants have jobs in the manufacturing and service sectors, 20 percent go into the construction sector, and 8 percent are self-employed. In the sample given by Hare (1999), 70 percent of migrants are engaged in the construction sector. The *hukou* system in China makes it very difficult for the migrants to get a job in the formal sector. China differs from many developing countries in that the *hukou* system obliges many able migrants to work in the informal sector.

IV. THE CAUSES OF RURAL-TO-URBAN MIGRATION

A. *Empirical Evidence from China*

The driving forces of rural-to-urban migration are commonly described in terms of *push* and *pull* factors. A surplus of rural labor is often viewed as the main push factor. Todaro (1969) and Harris and Todaro (1970) point to the existence of chronic unemployment in urban areas and instead suggest that the expected wage gap between rural and urban areas operates as the pull factor.

The significance of the rural-urban income gap in China is obvious from Table IV. In 1980, per capita income in the urban areas was 3.09 times that in the rural areas according to NBSRG (1994), or 2.50 times that of the rural areas according to Johnson (2002). It should be noted that NBSRG (1994) includes noncash income as part of the income of urban people. The gap was narrowed through the early 1980s and reached its minimum extent in 1985. In that year, according to NBSRG (1994), the ratio of urban income to rural income was 2.26, while according to Johnson (2002) it was 1.86. The gap has widened again since then. Yang and Zhou (1999) study the V-shaped income gap. They conclude that the earlier start of the rural reforms narrowed the gap during the 1978–85 period. The widening of the gap since 1985 has been primarily caused by the government's financial transfer program in favor of the urban sector. Migration is not only driven by the huge rural-urban income gap, but also by the regional income gap. As shown in Table III,

TABLE IV

RATIO OF URBAN INCOME TO RURAL INCOME

	National Bureau of Statistics Research Group (1994)	Johnson (2002)		National Bureau of Statistics Research Group (1994)	Johnson (2002)
1978		2.57	1990	2.84	2.20
1979		2.42	1991	2.92	2.40
1980	3.09	2.50	1992	3.05	2.58
1981	3.02	2.24	1993	3.27	2.80
1982	2.74	1.98	1994		2.86
1983	2.44	1.85	1995		2.71
1984	2.39	1.86	1996		2.51
1985	2.26	1.86	1997		2.47
1986	2.60	2.12	1998		2.51
1987	2.64	2.17	1999		2.65
1988	2.49	2.17	2000		2.79
1989	2.73	2.29			

Sources: NBSRG (1994, Table 2); Johnson (2002, Table 2).

TABLE V

RESEARCH ON THE DETERMINATION OF RURAL-URBAN MIGRATION IN CHINA

Study	Dependent Variable(s)	Key Independent Variables	Results on Key Variables	Data Description	Data Source and Econometric Method
Cai (1996)	The ratios of migrants to nonmigrants in rural areas	Ratio of local rural income to the average national rural income; ratio of local rural population percentage to the national rural population percentage; ratio of local per capita land to national per capital land; ratio of percentage of farmers employed by TVEs at local to the national percentage	Increase of income reduces migration; the ratio of rural population has a positive effect on migration; per capita land allocation has a positive effect; percentage of farmers employed by TVEs also has a positive effect	1990 National Census	1990 Census OLS
Zhao (1997b)	Discrete variable: local agricultural job, local nonagricultural job, migration	Gender, marital status, age, number of preelementary school children, per capita land allocation, education level	Female gender reduces probability of migration by 7%; marriage reduces migration probability by 2.8%; education increases migration, but has even bigger positive effect on taking nonagricultural employment; per capita land allocation has negative impact on migration	Sampling methods: Randomly selected from a rural household survey network, the network followed a stratified random sampling scheme Sampling areas: Sichuan Province in western China Sample size: 418 migrants, 452 local nonfarm workers, 4,072 farm workers	Data was collected jointly by Rural Development Research Center, Ministry of Agriculture, and Statistical Bureau of Sichuan Province in 1995 and 1996 Multinomial logit

Hare (1999)	Out migration status	Age, gender, marital status, education level, per capita production assets, per capita land allocation, household of female worker ratio, household of male worker ratio	Male gender increases the probability of migration by 30%; younger individuals are more likely to migrate; marriage lowers the probability by 10%; the effect of education is not significant, nor the per capita production assets and land allocation	Sampling methods: Random sample from three townships Sampling areas: Xiayi County of Henan, a poor county in central China Sample size: 309 households, 128 migrants, and 611 nonmigrants	Data was collected by the author and Zhao Shukai in 1995 Probit
Hare (1999)	Spell of migration	Gender, per capita production assets, per capita land allocation, household female worker ratio, household male worker ratio	Each additional *mu* of land allocation reduces the migration spell by 27%; per capita production assets have a negative effect; both household female worker ratio and male worker ratio have a positive effect	Sampling methods: Random sample from three townships Sampling areas: Xiayi County of Henan, a poor county in central China Sample size: 309 households, 128 migrants, and 611 nonmigrants	Data was collected by the author and Zhao Shukai in 1995 Duration analysis
Zhao (1999a)	Migration status	Gender, marital status, age, age squared, per capita land allocation, and education level	Females are 55.3%, and married people 37.6% less likely to migrate compared to the average; migrants tend to be younger, male and unmarried; land size has a negative effect; education has a positive effect on male migrants	Sampling methods: Randomly selected from a rural household survey network, the network followed a stratified random sampling scheme Sampling areas: Sichuan Province Sample size: 418 migrants, 452 local nonfarm workers, 4,072 farm workers	Data was collected jointly by Rural Development Research Center, Ministry of Agriculture and Statistical Bureau of Sichuan Province in 1995 and 1996 Logit

TABLE V (Continued)

Study	Dependent Variable(s)	Key Independent Variables	Results on Key Variables	Data Description	Data Source and Econometric Method
Zhao (1999b)	Migration status	Household mean age, mean schooling, number of laborers, household land size	Mean age has a negative effect, so does mean schooling and land size; number of laborers has a positive effect	Sampling methods: Randomly selected from a rural household survey network, the network followed a stratified random sampling scheme Sampling areas: Sichuan Province in western China Sample size: 1,820 households, 7,410 individuals	Data was collected jointly by Rural Development Research Center, Ministry of Agriculture and Statistical Bureau of Sichuan Province in 1995 and 1996 Logit
Jalan and Ravallion (2001)	Proportion of adult household members working out of the township	Income risk, yield risk, medical risk	Significant negative effect of income risk on migration, no effect of farm yield risk and small positive effect of medical risk	Sampling methods: Panel data Sampling areas: Four provinces: Guangdong (coastal province), Guangxi, Guizhou, and Yunnan (western and poor provinces) Sample size: 6,108 households over a six-year period (1985–90)	Panel data, Rural Household Survey by National Bureau of Statistics Quantile regression
Yao (2001b)	Length of migration	Land endowment, household savings and productive equipment, number of instances of land reallocation, land holding below or above average	Land endowment has no significant effect, household savings and productive equipment are statistically significant but not economically significant, number of instances of land reallocation has significant negative effect, and egalitarian land distribution promotes migration	Sampling methods: Two counties in each province, one township in each county, one administrative village and three natural villages in each township, 7 to 8 households in each village randomly interviewed Sampling areas: Six provinces: Zhejiang, Anhui, Hunan, Hebei, Shannxi, and Sichuan Sample size: 824 households	Survey conducted by Rural Development Research Center, Ministry of Agriculture in 1999 Tobit

Zhao (2001)	Migration status	Number of experienced migrants, number of return migrants, gender, marital status, age, and education level	Number of experienced migrants and number of return migrants who capture the migrant network have positive effect on the probability of migration	Sampling methods: Two counties in each province, one township in each county, one administrative village and three natural villages in each township, 7 to 8 households in each village randomly interviewed Sampling areas: Six provinces: Zhejiang, Anhui, Hunan, Hebei, Shannxi, and Sichuan Sample size: 824 households	Survey by Rural Development Research Center, Ministry of Agriculture in 1999 Logit
de Brauw et al. (2002)	Employment type	Age, gender, education, training, household land size, the value of durable goods, number of labor force in household, time trend	For the probability to migrate to urban areas or to be employed in the local area, education, number of labor force in the household training and being male all have positive effects, and age has a negative effect	Sampling methods: Stratified random sample of 60 villages in 6 provinces Sampling areas: Six provinces: Hebei, Liaoning, Shaanxi, Zhejiang, Hubei, and Sichuan Sample size: 1,199 households	China National Rural Survey plus additional data collected by the authors Fixed effect logit model
Zhu (2002)	Migration status	Age, age squared, education level, per household land allocation, marital status, urban-rural income gap	Age has a positive but age squared a negative effect; education only plays a positive role for males, but not for females; marriage reduces the probability of migration significantly; income gap is important; per capita household land has negative effect	Sampling methods: 81 cities or counties divided into three groups, then resident's committee and village chosen randomly from given cities and counties Sampling areas: Hubei Province, a relatively rich province in central China Sample size: 2,796 households	Survey by the author in Hubei Province in 1993 Switching regression Structural Probit

almost all migrants move from lower-income western and central regions to the high-income eastern region.

Besides examining push and pull factors, economists have also analyzed the effects of other personal and household characteristics, such as age, gender, education level, and family size, all of which are carefully examined in the literature. Table V summarizes selected papers on the determinants of rural-to-urban migration. The key explanatory variables analyzed here include age, gender, education, marital status, per capita land allocation, per capita production assets, and the urban-rural income gap. Most of the studies have been done at the level of the individual, with only a few at the household level. In addition to well known issues, the effects of risk (Jalan and Ravallion 2001) and migrant network (Zhao 2001) have also been examined.

Except for Cai (1996), the data sets used are not national level data, but are samples taken from one or several provinces (counties). It is difficult to quantify the effect of features of the data sets on the estimation results, but when the results are based on estimates, but when comparing the different studies, it is worth noting that Zhao (1997b, 1999a, 1999b) use the same data set, Yao (2001a) and Zhao (2001) use the same data set, and Jalan and Ravallion (2001) and de Brauw et al. (2002) use data on different provinces from the same survey.

Binary choice and multinomial choice models are commonly used in the research, though economists also apply other econometric techniques, such as duration analysis (Hare 1999), quantile regression (Jalan and Ravallion 2001), and the tobit model (Yao 2001a).

Different scholars use different methods to investigate the effect of surplus labor on rural-to-urban migration. Using the 1990 census, Cai (1996) finds that the ratio of the local rural population percentage to the national rural population percentage, the ratio of local per capita land area to national per capita land area, and the ratio of the local percentage of farmers employed by township and village enterprises (TVEs) to the national percentage all have positive effects on migration. Per capita (or per household) land allocation is often used as a proxy for surplus labor. Zhao (1997b, 1999a, 1999b) and Zhu (2002) find that land size has a significant negative effect on migration decisions. An additional *mu* (a unit of area measurement in China) of land reduces the probability of migration by 4.4 percent if the decision model is individual-based (Zhao 1999a) and by 2.8 percent if the decision model is household-based (Zhao 1999b). Though Hare (1999) finds that land size has no significant effect on the migration decision at the household level, he finds that an additional *mu* of land reduces the migration spell by 27 percent.

Zhu (2002) models the impact of the income gap on migration and finds it to be the most important positive factor. Cai (1996) studies the ratio of local rural income to the average national rural income, and finds that an increase in the ratio will reduce migration. At household level, Hare (1999) finds there is no significant ef-

fect of per capita production assets on the migration decision, but an additional 100 yuan of per capita assets increases the migration spell by 2 percent. These findings are consistent with the Harris-Todaro two-sector model. Nonetheless, the question of the impact of the V-shaped rural-urban income gap on the trend of migration remains unanswered. There is too little empirical research on the relationship between the income gap and the migration decision to allow us to draw a reliable conclusion.

The relationship between age and the probability of migration is an inverted-U shape (Zhu 2002). Hare (1999) finds that the 16–25 and 26–35 age groups are the most likely to migrate. Zhao (1999a) finds that the probability of migration decreases with age. She believes that this may be due to the higher psychological cost for migration among older people (Zhao 1997b). In the literature, the explanation for the negative effect of age mainly relates to the fact that the benefit period for older migrants is shorter than for younger migrants (Zhao 1999a). However most Chinese rural migrants are temporary migrants and it is hard to see the relevance of this explanation to China. Zhao (1997a) finds a positive effect of age on the migration decision, and attributes this to the existence of severe restrictions on the migration choices of young people. She conjectures that young people have little chance to migrate despite their willingness to do so.

As regards the role of education, the research findings are mixed. Zhao finds that formal education has a surprisingly small effect on migration but a significantly positive effect on the shift from farm work to nonfarm work (Zhao 1999a), and most educated rural people prefer local nonfarm work to migratory work (Zhao 1997b). Hare (1999) finds no significant effect of formal education on the probability of migration. In a household level model, Zhao (1999b) finds that the mean education level of a laborers' household has a significantly negative effect on the migration decision. Zhu (2002) finds that education plays a positive role only for males, and not for females. There are two possible explanations for these mixed findings. One is that the estimates from the binary choice model (with migration and nonmigration being the two choices) and the trinomial choice model (with farm work, nonfarm work, and migratory work being the three choices) are difficult to compare. The multinomial Logit approach in Zhao (1997b, 1999a) is more realistic since farm work and nonfarm work are very different. Amalgamating these two choices will blur the true effect of certain variables. Another explanation is that education has a different effect for males than for females (Zhu 2002). It will be useful to do separate estimations for each gender group.

Gender is one of the most important of the variables that determine the migration decision. Females are much less likely to migrate than males. Zhao (1997b) finds that being female reduces the probability of migration by 7 percent, while Hare (1999) finds that being male increases the probability of migration by 30 percent, and Zhao (1999a) finds that females are 55.3 percent less likely to migrate. These

results perhaps reflect the labor demand in urban areas, a demand that is mainly for manual labor.

Marital status is another important factor that influences the decision to migrate. Marital status reduces the probability of migration in the range from 2.8 percent (Zhao 1997b) to 10 percent (Hare 1999). Zhao (1999a) states that compared to the average, married people are 37.6 percent less likely to migrate. Zhu (2002) also finds a significant negative effect. The leading explanation for this finding is the high migration cost (both cash cost and physical cost) that accrues when married people migrate.

Other aspects of the migration decision are also examined by economists. Jalan and Ravallion (2001) find a significant negative effect of income risk on the migration decision, but no significant effect from the yield risk and the medical risk. Zhao (2001) finds that a migration network has a positive effect on the probability of migration. Hare (2002) studies the choice of job location, and finds that the value of the household's capital is an important factor.

Most of the research on the determination of migration has been done by modeling discrete choice. Hare (1999) and Yao (2001a) are two exceptions. Using duration analysis, Hare (1999) studies the length of the migration period. Her main findings are that each additional *mu* of land reduces the migration spell by 27 percent, that per capita production assets have a negative effect, and that both the household female worker ratio and the household male worker ratio have a positive effect. An interesting finding of her study is that individual characteristics are more important in influencing the decision to migrate, but household variables are more important in determining the length of the migration period. The relationship between the characteristics of the person and of the household and exit probability is also an interesting topic. Unfortunately the author has not investigated this aspect.

Yao (2001a) also studies the length of the migration period, his main concern being with the relationship between land distribution and migration. Instead of using duration analysis, he applies a tobit model in his research. This means that the economic explanations of estimates in Yao differ from those of Hare (1999) and the two are not comparable. The main result of Yao's analysis is that egalitarian land distribution promotes labor migration. The author has not provided a McDonald-Moffitt (1980) decomposition for his tobit result, and hence it is impossible to evaluate the intensive contribution (participation in migration) and extensive contribution (duration of the migration) of land distribution to migration, these usually being relevant to policy analysis.

B. *Consensus and Remaining Issues*

Overall, the economists agree that surplus labor in rural areas and the rural-urban income gap are the driving forces behind rural-to-urban migration in China. Age, gender, and marital status are important variables in the migration decision. The

findings on education are mixed. Other issues, such as the effects of risk and of migration networks have also been investigated.

Nonetheless, direct studies on the role of rural surplus labor and the rural-urban income gap as determinants of migration are still few and far between. We do not even know the size of the rural surplus of labor. The data on migration are still spotty (Sicular and Zhao 2002). Almost all data used in the above-mentioned research contributions are regional data, and this might well limit the external validity of the estimates that have been made.

V. LABOR MARKET SEGREGATION AND WAGE DIFFERENTIALS

This section examines links between migration and the evolution of the labor market, with special reference to labor market segregation, labor market flexibility, wage determination, and wage differentials. Table VI summarizes the main features of the selected studies.

A. *Segregation*

Despite more than 20 years of economic reform, the labor market in China is still segregated. One of the most important forms of segregation is rural-urban labor market segregation. Though the number of rural-to-urban migrants is increasing every year, considerable institutional barriers still exist (Cai 2001).

Furthermore, segregation also exists not just in the rural labor market but also within the urban labor market. An example is the segregation between formal and informal sectors. The degree of labor market segregation differs from region to region. A series of field studies by the China Center for Economic Research (CCER 1998a, 1998b, 1998c) find that the labor market in Sichuan Province is relatively integrated compared with that of Guangdong Province. The CCER investigators claim that within the urban area of Shanghai, the old rural-area urban-area dualism is being replaced by a new rural-migratory-worker urban-resident-worker dualism.

Yang and Zhou (1999) find that labor productivity in urban areas is substantially higher than in rural areas, and suggest that there are barriers to labor mobility across sectors. In 1992, the sectoral marginal productivities of labor were 9,346, 1,211, and 601 yuan per person for state industrial, rural industrial, and agriculture, respectively. The authors identify urban welfare systems and rural land arrangements as the main institutional barriers. High costs of child care and schooling also hinder the migration of rural families to the urban areas. Zhao (1999a) regards housing costs in urban areas as another important barrier.[4] These existing barriers increase migration costs, and reduce the number of permanent migrants. In fact, the majority of migrants are temporary migrants.

[4] The monthly rent of a one-bedroom apartment in Beijing is around 1,000 yuan, and the average monthly wage for a migrant is 553 yuan (Zhao 1999a, pp. 781–82).

TABLE VI

SELECTED STUDIES ON LABOR MARKET SEGREGATION, EARNING DETERMINATION, AND WAGE DIFFERENTIALS

Study	Issue(s)	Main Results	Data Description	Data Source and Econometric Method
Yang and Zhou (1999)	Rural-urban income disparity	Labor productivity in urban area is substantially higher than in rural areas, and there are barriers to labor mobility across sectors. The urban welfare systems and rural land arrangements are the main institutional barriers	Data sets used: National data on income; Provincial data on productivity; Rural Household Survey; Urban Household Survey	Different data released by the State Statistical Bureau of China OLS
Zhao (1999a)	Household earning in rural area	Shifting one worker from farm to migratory work increases family income by 49.1%; shifting one worker from farm to local nonfarm work increases family income by 13.0%; adding one farm worker increases the family income by 9.0%; schooling has very small effect on earnings	Sampling methods: Randomly selected from a rural household survey network, the network followed a stratified random sampling scheme Sampling areas: Sichuan Province Sample size: 418 migrants, 452 local nonfarm workers, 4,072 farm workers	Data was collected jointly by Rural Development Research Center, Ministry of Agriculture and Statistical Bureau of Sichuan Province in 1995 and 1996 OLS
Yao (2001b)	Wage determination of migrants and locals	Observed variables can explain most of the 135% wage gap between locals and migrants,, but for a local worker, the most important wage attributes are marital status and political affiliation, and for a migrant they are age, education, and years in current job	Sampling methods: Four villages chosen nonrandomly from four provinces from north to south China Sampling areas: Xiliu of Hebei (North), Wanli of Jiangshu, Yiyi of Zhejiang, and Jinju of Guangdong Sample size: 239 local residents and 277 migrants	Surveys on four villages in four different provinces in China OLS

Meng and Zhang (2001)	Occupation attainment for rural migrant and urban residents Four categories: white-collar workers, wholesale & retail trade workers, service workers, and production & other workers	Educated urban residents are more likely to have a white-collar job or work in wholesale or retail trade occupation; for rural migrants, education increases their probability of getting a white-collar job but reduces their chances of becoming a wholesale or retail trade worker; family structure is not important for the occupation attainment of urban residents, but important for the rural migrant	Sampling methods: Two surveys Sampling areas: Shanghai Sample size: Shanghai Floating Population Survey: 6,609 observations; Shanghai Residents and Floating Population Survey: 3,000 observations	Shanghai Floating Population Survey and Shanghai Residents and Floating Population Survey conducted by Institute of Population Studies at Shanghai Academy of Social Sciences in 1995 and 1996 Multinomial logit
Meng and Zhang (2001)	Earning differentials between urban residents and rural migrants	Return from education is higher for rural migrants than for urban residents; job training is important for urban residents but not for rural migrants; marital status is positively related to rural migrants earnings but not to the urban residents' A large portion of the earnings gap is due to within-occupational factors that are unexplained, and is likely to be due to discrimination	Sampling methods: Two surveys Sampling areas: Shanghai Sample size: Shanghai Floating Population Survey: 6,609 observations; Shanghai Residents and Floating Population Survey: 3,000 observations	Shanghai Floating Population Survey and Shanghai Residents and Floating Population Survey conducted by Institute of Population Studies at Shanghai Academy of Social Sciences in 1995 and 1996 OLS
Meng (2001)	Job attainment for migrants Three categories: formal sector, wage-earning in informal sector, and self-employed in the formal sector	Individuals with higher labor market quality, such as more educated, more trainedand having more city work experience, are more likely to be self-employed in the informal sector. Formal sector and wage-earning in the informal sector attract different people but it is hard to identify which group has the higher quality	Sampling methods: Survey Sampling areas: Jinan City of Shangdong Province (coastal area) Sample size: 1,500 migrants	Survey conducted in Jinan, Shangdong Province in 1995, Multinomial logit

TABLE VI (Continued)

Study	Issue(s)	Main Results	Data Description	Data Source and Econometric Method
Meng (2001)	Wage differentials among the formal sector, wage-earning in the informal sector, and self-employed in the formal sector	Education is not important for formal sector, but is important for other two sectors; rural work experience has significant positive effect on wages of formal sector and wage-earning in informal sector, but only city experience matters to self-employed informal sector; training is important for all three; in self-employed informal sector, neither gender nor marital status is an important factor Observed endowment can only explain a small portion of the differentials	Sampling methods: Survey Sampling areas: Jinan City of Shangdong Province (coastal area) Sample size: 1,500 migrants	Survey conducted in Jinan, Shangdong Province in 1995 by the Institute of Population, Chinese Academy of Social Sciences Heckman two-step model
Zhu (2002)	Migrant and rural nonmigrant income functions	Age has an inverted-U effect on income; education has a positive effect for male migrants but not for female migrants, and has greater effect for nonmigrants than for migrants	Sampling methods: 81 cities or counties divided into three groups, then resident's committee and village chosen randomly from given cities and counties Sampling areas: Hubei Province, a relatively rich province in central China Sample size: 2,796 households	Survey by the author in Hubei Province in 1993 Switching regression with selection-bias correction

Rural people who successfully overcome the migratory barriers immediately face discriminatory treatment and even types of social exclusion (Yao 2001b) which are far more difficult to conquer. The exclusion is comprehensive and striking. The migrants are geographically segregated, politically ignored, and financially discriminated against (Yao 2001b). The well-known "Zhejiang Village" formed by migrants in a suburb of Beijing provides an example of this kind of exclusion.

Meng and Zhang (2001) find that educated urban residents are more likely to have a white-collar job or to work in wholesale or retail trade occupations. For rural migrants, education increases their probability of getting a white-collar job but reduces their chances of becoming a wholesale or retail trade worker. Only 1 percent of migrants hold managerial and technical positions, compared with 19 percent of nonmigrants (Knight, Song, and Jia 1999). Controlling for personal characteristics, a migrant is 17.6 percent less likely to have a white-collar job than a local resident (Yao 2001b).

Knight, Song,and Jia (1999) find that urban and rural migrant workers are not close substitutes in the production function of urban firms. Being able to bear hardships and being easily manageable are two main assets possessed by migrants.

Meng (2001) studies the migration population alone, and finds that among migrants, individuals with higher labor market quality, such as those who are more educated, more trained, and have more city work experience, are more likely to be self-employed in the informal sector. The formal sector and the wage-earning informal sector attract different people but it is hard to identify which group has the higher quality.

B. *Wage Differentials*

For wage functions, Meng and Zhang (2001) find that the rate of return to education is around 1 percent higher for rural migrants than for urban residents. They also conclude that job training is important for urban residents but not for rural migrants, and marital status is positively related to the earnings of rural migrants but not to those of the urban residents. The migrant-nonmigrant earning differential is 50 percent, and a large portion of which is likely to be due to discrimination. But Yao (2001b) finds that most of the 135 percent wage gap between locals and migrants can be explained by observed variables (types of firms, villages, and characteristics of the worker). For a local worker, the most important wage attributes are marital status and political affiliation, while for a migrant, they are age, education, and years spent in the current job. The different explanations of income gap given by Meng and Zhang (2001) and Yao (2001b) can perhaps be reconciled under the Hedonic Model of Rosen (1974), which considers earnings to reflect the characteristics of both workers and jobs. Meng and Zhang control only personal characteristics while Yao controls both.

Though both inter-occupational and intra-occupational types of discrimination

exist, Meng and Zhang (2001) find that discrimination within the occupation is more serious in the case of China. They find that 82 percent of the hourly wage differential between urban and rural migrant workers is due to unequal payment within the occupation concerned.

Besides migrant/nonmigrant wage differentials, there also exist sectoral wage differentials in China. Gordon and Li (1999) provide a theoretical analysis of the sector wage differentials. Sectoral wage differentials are also found within the migrant population. Education is not important for migrants in the formal sector, but it is important for the other two sectors; rural work experience has a significant positive effect on migrants' wages in the formal sector and wage-earning informal sector, but only city experience matters to self-employed migrants in the informal sector; pre-migration training is important for all three; in self-employed informal sector, neither gender nor marital status is an important factor (Meng 2001).

Yao (1999) studies the labor market in rural areas and concludes that the rural labor market is not competitive and is segregated. His evidence is the the limited role of human capital in wage determination. Zhao (1999a) finds that marginal productivity is quite different among farm work, nonfarm work, and migratory work. According to Zhao (1999a), shifting one worker from farm work to migratory work increases the family income by 49.1 percent, shifting one worker from farm work to local nonfarm work increases family income by 13.0 percent, and adding one farm worker increases the family income by 9.0 percent. With Yao (1999), Zhao (1999a) also finds that schooling has a very small effect on earnings.

C. *Labor Market Flexibility*

Due to the unique *hukou* system, the labor market in the formal sector is shielded from the competition of migrants. The majority of migrants are employed in the informal sector. Meng (2001) finds that the labor market in the formal sector is more regulated, and the labor market in the informal sector is more developed, which means that the market evaluation of an individual's endowments are far lower in the formal sector.

Nonetheless, the theoretical model of Gordon and Li (1999) predicts that the government will be forced to reduce wage distortions (and wage inflexibility) in the state sector because of inter-sector labor migration. Dong and Bowles (2002) provide some empirical evidence to support this argument, and they also find that the rate of return to education among four ownership categories (state-owned enterprises, township and village enterprises, joint ventures, and foreign-invested firms) has converged. This is not surprising since the mobility of any factor between different sectors will equalize the prices of the factor.

The reform of state-owned enterprises (SOEs) has also put pressure on labor market arrangements in the formal sector. The influx of the migrants, the mass layoff of SOE workers, and competition from the private sector as well as from

foreign and joint ventures will definitely improve the flexibility of the labor market in China. But from current studies, it is hard to quantify the contribution of the rural-urban migration to labor market flexibility.

D. *Consensus and Remaining Issues*

The main consensus of economists is that the labor market in China is still segregated. There are different kinds of segregation, including segregation of the urban-rural labor market, segregation within the urban and within the rural labor market, segregation between the migrant and nonmigrant population and segregation within the migration population. The labor market in the formal sector is more regulated, and the labor market in the informal sector is more developed.

Migration (rural-to-urban and inter-sector migration) improves the flexibility of the labor market, but its effect is hard to quantify. There is virtually no study of the dynamic interaction between migration and labor market evolution. As regards labor market flexibility, labor market segregation, and wage determination, it is also difficult to separate the effects of migration from the effects of other reforms and institutional changes. Except for de Brauw et al. (2002), the current literature focuses only on the urban labor market.

The data sets that have been used in the existing research are quite varied. As is shown by the six studies summarized in Table VI, each research contribution uses a different data set, a feature that makes comparison among them very difficult. The data sets range from national data (Yang and Zhou 1999) to data that cover only four villages (Yao 2001b) or only one city (Meng 2001). One study uses data on China's richest area, Shanghai (Meng and Zhang 2001), while another employs data on the single western province of Sichuan (Zhao 1999a). Due to the vast regional differences within China, this variety creates two issues: one is external validity and the other is the comparability of the studies.

VI. CONCLUSION REMARKS AND FURTHER RESEARCH TOPICS

Zhu (2002) has made three criticisms concerning research on Chinese migration. The first is that most research remains qualitative, the second is that available data sets are not suitable for migration research, and the third is that studies focus on the migrant and nonmigrant income gap and ignore the dynamic interaction between income and labor mobility.

With regard to the first point, it should be clear from the research work reviewed in this article that a fair number of the studies have employed advanced econometric techniques. For the literature in Chinese, Zhu's (2002) point still holds, but for the literature in English, it is no longer the case.

I share Zhu's concern with the quality of the data sets. There are two issues. One is that most of the surveys, and especially the national surveys, are not suitable for

migration research, and this is also true for the most recent Chinese census of 2000, which does not even include income information. The other is that most of the research has been done using regional data. This creates two problems that reflect the vast regional differences within China: one is external validity and the other is comparability among the studies. The data problem is not only due to the poor design of questionnaires, but also reflects the difficulties of drawing up a national representative migrant sample and comparing it with a nonmigrant sample, let alone the hazards of tracing observations over time.

With regard to the third point raised by Zhu, I agree with the importance of taking into account the dynamic interaction between income and labor mobility. From a macro-level perspective, I think it would be interesting to investigate the impact of the V-shaped urban-rural income gap on migration. But given the limitations of the data available at present, it is difficult to conduct empirical studies on these dynamics. Several studies in Table V explore the static relationship between income and migration.

In addition to the interaction between income and migration, I think that the following issues are also important and interesting.

First, the dynamics between migration and labor market evolution is an important topic. One example of this kind of dynamic is the interaction among migration, urban unemployment, job creation and wage structure. It is well known that the tightening of controls over migration after 1995 in the large cities has been due to the mass lay-offs of urban workers. But the rationale of this policy change is mainly based on anecdotal evidence and lacks strong empirical support. Empirical evidence on the dynamics would provide valuable guidance for similar policy formulation in the future.

Second are the effects of migration on the family structures of the migrants, and on the well being of the children of the migrants. It has been almost twenty years since the first wave of rural migration got under way, and the time span is long enough for studies to be made of long-term effects such as these. Understanding these effects will be crucial for the government in formulating policies to address the social issues related to the migrant population.

Third are comparative studies on the economic and social behavior of permanent migrants and temporary migrants. On the one hand, the press often ascribes social problems to the temporary or *floating* nature of the rural migrant population; on the other hand, the government and the urban public do little to help the migrants to settle down permanently. The results of such a study would have very strong policy implications, especially on policies for both facilitating and restricting migration.

Fourth are the impacts of migration on the source communities. There have been several studies on this topic. Taylor, Rozelle, and de Brauw (2002) study the effects of migration on income in source communities, Zhao (2002) examines the behavior of return migrants, and Bai (2000) considers the effects of migration on agriculture.

However, there are still too few studies on these issues. The San Nong Wenti (the three rural problems: rural production, rural community, and rural people) are major policy issues in China. Research on the impacts of migration on the source communities would be very helpful in identifying and proposing solutions for the three rural problems.

Studying the impact of migration restrictions on the Chinese economy, such as has been done by Au and Henderson (2002), and the relationship between migration restrictions and agglomeration and productivity, is also a fruitful field in which there are too few studies. In the long run, since the segregation of the labor market will be harmful to the Chinese economy, studies in this field are important in order to obtain insights into the possibilities for sustainable development in China.

Through the studies that have been accomplished so far, we have come to understand many issues surrounding rural-to-urban migration in China, but there are even more issues that we need to know about and that require further study.

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