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Graduate School of Economics and
Osaka School of International Public Policy (OSIPP)
Osaka University, Toyonaka, Osaka 560-0043, JAPAN

Relative Income Positions and Labor Migration: A Panel Study Based on a Rural Household Survey in China[*]

Zheren WU[†]

Abstract

Migration may be used as a strategy to improve a household's comparative income position in residential areas. Previous studies have found empirical evidence that relative incomes affect emigration decisions. However, no effect is detected for internal migration. In this paper, we reexamine the effect of relative income positions on internal migration behavior. Based on data from a rural household panel survey of the Sichuan and Anhui provinces in China, we find that motives based on relative income play an important role in households' migration decisions. When all else is equal, a household that is poor relative to its home village reference group is more likely to increase migration than is a household in the upper end of the village income distribution. This effect is particularly apparent in households with pioneer migrants. The empirical results also indicate that pioneer migrants may confer a positive externality on potential future migrants. Workers belonging to households with pioneers might be less impeded by migration risks and costs and may be more likely to view migration (an increase in the number of migrants) as an effective strategy for improving their relative economic positions.

JEL classifications: J24; O15; R23

Keywords: Migration, Relative income position, Pioneer migrants

[†] Correspondence: Osaka School of International Public Policy, Osaka University; 1-31 Machikaneyama, Toyonaka, Osaka, 5600043, Japan
  E-mail: wzheren@osipp.osaka-u.ac.jp

1. Introduction

Relative position may be an important determinant of human behavior and well-being. The psychological theory of social comparison (Festinger, 1954) and the sociological theory of relative deprivation (Stouffer, 1949) have traditionally argued that people intentionally compare themselves with others; this has important consequences for both behavior and attitudes. Leading economists, such as Adam Smith and Karl Marx also argued that individuals are motivated, at least in part, by concerns about relative position.[1] Recent studies of happiness have found strong empirical evidence that people care about their relative economic position (e.g., Easterlin 1974, 1995, 2001; Clark and Oswald, 1996; Frey and Stutzer, 2002a, b; Luttmer, 2005; Ferrer-i-Carbonell, 2005).

Stark (1984) and Stark and Yitzhaki (1988) stress the importance of relative economic position in migration behavior. They hypothesize that individuals or households might undertake migration to improve their income positions relative to their original reference groups or to change reference groups. Contrary to the assumption made in many studies of labor migration, individuals and households are not motivated solely by absolute income considerations. The importance of relative position in explaining migration is supported by the empirical work of Stark and Taylor (1989). Based on a data set comprising information on 423 adults who come from 61 households in two villages in Mexico, they use a probit model to estimate the probability of household members' labor time being allocated to Mexico-to-U.S. migration work against the alternative of working exclusively in Mexico. They found that the initial relative income positions of households in their village reference groups play a significant role in emigration behavior. Stark and Taylor (1991) extended this work by using a multinomial logit model to analyze individual decisions to stay at home, to emigrate, or to relocate internally. They found that the relative income position significantly affects emigration from Mexico but does not affect internal migration. The authors suggest that this reflects the likelihood of shifting reference groups under internal migration but not in relation to foreigners in the emigrant's host country.

In this paper, we empirically test the importance of relative income position in internal migration. We use household panel data on rural Chinese communities for the period 2003–2006. We use two measures of relative income position to estimate the effect of the previous year's relative income position on the change in the number of migrants. Controlling for household-specific effects and the effect of absolute income, we find that, all else being equal, relative income motives play an important role in household migration decisions. A household that is poor relative to its home village reference group is more likely to increase

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1 Adam Smith (1759) wrote: "Nothing is so mortifying as to feel, that though our situation is open to the eyes of all mankind, no mortal conceives for us the half of what we suffer. Nay, it is chiefly from this regard to the sentiments of mankind, that we pursue riches and avoid poverty."
Karl Marx (1847) wrote: "A house may be large or small; as long as the neighboring houses are likewise small, it satisfies all social requirements for a residence. But let there arise next to the little house a palace, and the little house shrinks to a hut."

migration than is a household in upper end of the village income distribution. This effect is particularly apparent in households with pioneer migrants.

We contribute to the literature in four ways. First, instead of focusing on the decisions of individual household members, we consider the effects of households' relative income positions on aggregate household migration. When migration is used as a strategy to improve income positions relative to neighboring households, migration decisions are typically made by households rather than by individuals. Hence, it is reasonable to assume that household well-being is at the center of migration decision making.

Second, we consider seriously the concept that pioneer migrants may confer a positive externality on (potential) future migrants, and that decisions about whether to increase migration may differ between households that had at least one migrant in the previous year and those that had no pioneer migrant. From estimates based on the two subgroups, we find that the effect of relative income position is strong for a household that has a member in another location but not for those without a pioneer migrant. The presence of a pioneer migrant may lower the perceived risk and cost of moving and may make migration a more effective strategy for improving relative income position.

Third, the use of Chinese data mitigates the problem of reference group substitution in migration and facilitates the search for evidence that a low relative position promotes migration; this makes up for the lack of empirical evidence on internal migration. Under the unique Hukou system, few entire households in rural China relocate and migrants typically move temporarily and repetitively. Hence, the original reference group is likely to be maintained for individual migrants and households. If workers move permanently, over time, the reference group of migrants will shift to their host communities and even migrants who gain income may experience falls in their relative positions (Stark and Yitzhaki, 1988). The potentially high level of permanent migration might be another reason why Stark and Taylor (1991) failed to find any evidence of an effect on internal migration.

Fourth, the panel nature of our data enables us to control for household-specific effects. This allows us to reduce the potential for omitted variables bias by including factors such as geographical location, the productivity of land, fixed village effects, and to some extent, wage differences between regions, networks, and so on. It also enables us to utilize information that is available before decisions are made, such as information on the number of migrants in the previous year, lagged income, and lagged relative income. In this way, we avoid the problem encountered by previous cross-section studies that the predicted value of household income in the absence of migration (or migration by a household member) might be biased.

The paper is structured as follows. In Section 2, we present background information on rural migration in China, focusing primarily on the Hukou system. In Section 3, we describe our estimation procedure. In Section 4, we describe the data and define the variables used in the analysis. In Section 5, we analyze the determinants of migration and examine whether relative position affects migration numbers. Section 6 concludes the paper.

2. The Hukou system and rural migration in China

Migration in China differs from that in most other countries because of China's unique Hukou system. During the prereform era, China severely restricted rural-to-urban migration and the Hukou system represented the most important legal barrier to migration. It was difficult for rural individuals to move to urban areas because of tight controls on urban Hukou, on which employment and the allocation of housing, food, and other necessities were contingent. In the mid-1980s, the government relaxed the Hukou system and rural workers were allowed to work in cities and could apply for temporary registration at their destination. In the 1990s, the Hukou system underwent further relaxation to cater for huge labor demand in urban areas and rural residents were allowed to buy temporary urban residency permits. However, permanent Hukou changes remain difficult, especially for low-skilled and poor people. In 2001, the central government began to reform the Hukou system. This made urban Hukou easier to obtain and generated fairer treatment for rural migrants.

The effect of the reforms on rural emigration has been surprising. According to official statistics from the National Statistical Bureau (NSB)[2] , the number of rural-to-urban migrants increased from merely two million in the mid-1980s to 70 million in the mid-1990s. Moreover, despite the massive layoffs in urban areas caused by the reform of state-owned enterprises, the number of rural migrant laborers increased to 118 million in 2004, which represents 23.8% of rural laborers.

Migration in rural China is typically temporary. Although the current Hukou system makes it possible to obtain permanent residence in another region, it still restricts migrant access to most state provisions such as public health care, the pension system, education, legal aid and social services. According to an NSB survey of rural migrants in 2006[3], of the 29,426 migrant laborers interviewed, only 26.63%, 27.23%, 15.35%, and 32.54% participated in basic pension insurance, medical insurance, unemployment insurance, and industrial injury insurance, respectively. This survey also shows that 2,493 of the 5,065 migrant workers who moved along with their school-age children paid higher fees for tuition than those paid by local residents. The average fee was in excess of 1,226 yuan per year, which exceeds the migrant worker's average monthly salary of 966 yuan. These potential barriers raise migrants' living costs in urban areas and cause them to worry about an uncertain future, which makes it difficult for them and their families to stay. In addition, land is owned by the state and peasants make contracts with villages to cultivate their land. Those who have rural permanent Hukou have land-use rights in their villages. Cultivation of the land guarantees a minimum level of subsistence for rural people even if everything else fails. As a result, most migrant workers maintain their dual residential status and move temporarily. They separate from some of their family members in their home villages, circulate between their places of origin and destination, and share much of their incomes with other family members. According to a 2005 survey by the Research

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2 Department of Rural Surveys National Statistical Bureau (2005).
3 From the website homepage of the Central Government of China (2006).

Table 1. Income levels and the distribution of rural migrants in China (2004 survey)

Outflow	*Per capita net income (yuan)		Migrants/local laborers	Inflow				
	Rural	Urban		National (million persons)	Urban	Eastern	Central	Western
National	2,936	9,422	23.8%	118.23	94.3%	70.0%	14.2%	15.6%
Eastern	3,970	11,340	19.8%	39.34	--	96.6%	2.1%	0.8%
Central	2,706	7,844	27.2%	47.28	--	65.2%	32.8%	1.8%
Western	2,134	7,875	25.4%	31.61	--	41.0%	2.9%	55.8%

Source: Department of Rural Surveys, National Bureau of Statistics (2005).

* Calculated from China Statistical Yearbook (2005), NSB.

Office of the State Council[4], only 8.13% of the surveyed migrants planned to work permanently in their current destinations; most migrants expressed a desire to return to their homes in the future.

Note that a temporary pattern of migration does not necessarily imply short-term moving. According to the survey conducted by China's Ministry of Agriculture[5] , of all 31 provinces in 2003, 90.3% of the 10,480 interviewed migrant workers worked away from their home counties for at least three months and 60.2% engaged in migratory work for over 10 months in the survey year. The average period of migratory work was 286 days in the year.

Table 1 reports the number and distribution of rural migrant laborers by region and destination based on NSB statistics for 2004. Peasants are attracted by large regional income gaps and by the urban–rural income gap. Most migrant laborers come from China's underdeveloped western and central provinces and mainly head to urban areas, eastern coastal locations, and metropolises. In 2004, 94.3% of the 118.23 million rural migrants moved to urban areas. The eastern region absorbed 70% of national rural migrants and only 3.4% of its migrants went to the central and western regions. It is worth noting that although average rural per capita net income in the central region (at 2,706 yuan) is much higher than that in the western region (at 2,134 yuan), more migrants come from the central region than from the relatively poor western region. Similarly to many other countries, it is not necessarily the case that the poorest of the poor are the first to migrate.

3. Methodology

Migration decisions represent complex judgments in which economic incentives play an important role. According to Stark and Taylor (1991), when people care about their relative economic position and when the reference group is stable, migration decisions depend on the level of initial absolute income, the initial relative income position, and the expected income gain from migration. We focus on household migration decisions. To determine whether migration is promoted by relative positions, one might investigate household decisions about whether to increase the number of migrants and in what numbers based on

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4 State Council Research Center (2006).
5 Ministry of Agriculture of China (2004).

lagged absolute income, lagged relative income positions, and other factors thought to affect migration gain. The estimated equation is the form:

$$\Delta M_{it} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 RP_{i,t-1} + X_{it}\gamma + u_{it} , \qquad \Delta M \geq 0 \qquad (1)$$

where the subscript i denotes the household and t denotes the year; the dependent variable, ΔM, is the change in the number of migrants from the previous year; α is the constant term; Y represents absolute income by household size (per capita net income); RP is the relative income position; and the vector X represents a set of specific controls relevant to the household's migration decision such as household structure and factors expected to influence the income gain from migration. The error term, u, is assumed to be of the form $u_{it} = \mu_i + \lambda_t + v_{it}$, where μ_i and λ_t, respectively, denote unobservable fixed household effects and fixed time effects, and v_{it} is the stochastic component such that $v_{it} \sim IID(0, \sigma_v^2)$.

We limit the sample to those households that have nonnegative changes in the number of migrant laborers. Decreases in the number of migrants may occur when migrants return to their villages of origin. The reasons for returning are complicated: migrants may return because they fail to find jobs in their host communities; returns may also be the result of marriage, childbearing, family care, health considerations, and so on. Determinants of the decision to return differ from those of the migration decision and are therefore not discussed in this paper.

The effect of absolute income on migration is complex. In general, poor households have an incentive to send migrants to earn far more than household members could earn at home. They are keener than the rich to make potential income gains from migration because they face lower opportunity costs of moving and they derive greater satisfaction from income gains. In addition, natural disasters and world price fluctuations may well render earning village income risky. Because poor households cannot adequately endure potential rural risks, they are more likely to spread their labor assets to insure against uncertain income flows from specific markets (see, e.g., Stark and Levhari, 1982; Ghatak et al., 1996; Lucas, 1997). However, when migration is costly and risky, the rich are better able to migrate. Compared to low-income households, rich households are less impeded by migration costs. Furthermore, the rich usually have better human capital endowments, which raise the efficiency of their job search, lower their risk aversion, and contribute to insuring them against risks at their destinations (see, e.g., Schwartz, 1976; Ghatak et al. 1996). Therefore, the expected sign of the coefficient on lagged absolute income (β_1) in equation (1) is indeterminate.

For our study, the key variable is relative income position (RP). Assuming that the household, including its migrants, view the village as its relevant reference group, we use two standard indices of the

relative income position to examine its effect on migration. Following Akerlof (1997), Corneo and Jeanne (1997), Knell (1999), and Ljungqvist and Uhlig (2000), among others, the first index we use is a *group-wide comparison*. This is defined as the difference between the household's per capita income (y_i) and the village's average per capita income ($\bar{y}$): i.e.,

$$RP_i' = y_i - \bar{y} \ . \qquad\qquad (2)$$

For a household with a given income of y_i, any increase in the incomes of other households in the village will lower the relative position of the household; if all the other household incomes are constant, any increase in the household's income will raise its relative position.

Following Yitzhaki (1979, 1982), Hey and Lambert (1980), Stark (1984), Stark and Yitzhaki (1988), and Stark and Taylor (1989, 1991), the second index we use is an *upward comparison*, which is based on the additive inverse of relative deprivation. In this context, a person's feelings of deprivation in a society arise from comparing his or her situation with those of better-off persons.[6] Relative deprivation is measured as the percentage of households in the reference group who are richer than the household multiplied by their mean excess income. Assuming that the income distribution is upwardly ranked in a village with a household size of *n*, i.e., $y_1 \leq y_2 \leq \cdots \leq y_n$, our second index of relative income positions is

$$RP_i'' = (-1) \times (relative\ deprivation)$$
$$= -\frac{n-i}{n} \sum_{j=i+1}^{n} \frac{y_j - y_i}{n-i}$$
$$= -\frac{1}{n} \sum_{j=i+1}^{n} (y_j - y_i) \qquad if\ y_i < y_n,$$

$$and \quad RP_i'' = 0 \qquad\qquad if\ y_i = y_n\ . \qquad\qquad (3)$$

If all rankings are fixed, any increase in the income of household *j*, which is richer than household i, will lower the relative position of household i; if all the other household incomes remain constant, any income gain by household i will lower the income difference between it and richer households, and may improve household *i*'s income ranking (which would reduce the proportion of households richer than i) and thereby raise the household's relative position. When household *i* is the richest one in its village community, RP'' is at its maximum of zero.

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6 See also Runciman (1966). As one of the first formal definitions of relative deprivation in sociological theory, Runciman defined four preconditions for it: 1) A does not have X; 2) A knows of other persons that have X; 3) A wants to have X; 4) A believes obtaining X is realistic.

According to the existing literature, households that are poor relative to their home village reference groups are expected to increase the number of migrants; they do so in an attempt to improve their income position in the home village. Therefore, if a low relative income position creates a strong incentive to migrate, one would expect β_2 to be negative and significant.

A potential problem may arise in the estimation of equation (1). This is that the behavior of households without a pioneer migrant might differ from that of households that already have members in other locations. According to Carrington et al. (1996), migration begins with pioneers who have low migration costs, for example, educated and capable young men, and these migrants are expected to achieve substantial gains from migration. In addition, these pioneer migrants confer a positive externality on other household members (potential future migrants). For example, they increase the information available to other household members and reduce the risks of moving. This is because pioneer migrants send home information about how to migrate, where to look for work, what wages to expect, and information on migration costs and risks, and how to reduce them. Furthermore, if future migrants move to the same region, pioneer migrants can support these subsequent migrants at their destinations by, for example, providing them with job search assistance, helping them to find housing, and even by extending credit and providing lodgings, and lowering the psychological costs of leaving home. Hence, the presence of pioneer migrants may lower moving costs and enhance job prospects. Because households with pioneers are more likely to increase their incomes and improve their relative income positions through migration, the effects of relative income on migration may be more apparent in these households.

Another issue is that the relative income position of a household might affect whether or not it decides to increase the number of migrants rather than affect the number of additional migrants. To address this, we use a binary choice model to examine the effects of relative and absolute income on the likelihood of a household increasing its number of migrants.

4. Data and variables

We use panel data from the rural household survey conducted by the Ministry of Agriculture of China at the end of December of each year. We use data on the Sichuan and Anhui provinces that cover the period from 2003 to 2006. The Sichuan and Anhui provinces are in western and central China, respectively. Both are predominantly rural and are the two largest exporters of rural labor. Thus, the experiences of rural households in these two provinces may shed light on those of rural households elsewhere in China. The survey covers about 2000 households, which are randomly sampled from 33 villages.

Data on both individuals and households were obtained from household interviews. Data on individuals include information on household members' characteristics, such as age, gender, and education; there is also information on days worked in the survey year in three types of activity: local farm work, local nonfarm work, and migratory work. Household-level data include information on incomes and landholdings and other aspects of household economic activity. Under the Hukou system in China, entire rural households rarely relocate; migrants usually move temporarily and repetitively. Hence, the omission

from the survey of households that have left the original community entirely, which is a problem that typically arises in surveys on migration, does not arise. Another virtue of our data set is that, while virtually all previous empirical studies of migration in China have been based on survey evidence from the 1980s and 1990s, our more recent data enable us to shed light on what has happened to rural labor mobility since Hukou reform has accelerated.

We define migration on a place-of-work basis. A migrant worker is defined as a person who works outside his or her home village on at least 30 days during the survey year.[7] A migrant household is one that has at least one migrant worker. Under these definitions, migrant workers account for about 40% of the sample labor force and over 60% of the sampled households participated in migration. More than 90% of migrant workers worked outside their villages on at least 90 days, and the mean migration period is 252 days in a year.

Restricting the sample to households in which the change in the number of migrants is nonnegative, the usable estimation samples comprise 1,491 households in 2004, 1,605 households in 2005, and 1,663 households in 2006. Table 2 presents definitions and reports descriptive statistics for the variables used for analysis. Absolute income is measured as per capita net income and can be negative. Two indices of the relative income position are constructed from the survey data. Because households were sampled from over 30 villages, similar absolute household incomes in different villages do not necessarily imply similar relative income positions. When relative income is measured as the difference from the village's average per capita income (RP'), the correlation between absolute income and relative income is 0.88; when the index of the additive inverse of relative deprivation (RP'') is used, the correlation is 0.40. The latter measure of relative income suggests sharp differences between the income distributions of the sampled villages.

In addition to measures of absolute and relative income, the regression includes control variables that are hypothesized to influence the returns from migration activities and to affect the motivation and ability of households to increase their numbers of migrants. Measures of household size, numbers of students and preschool children, the labor force, and the lagged number of migrants are used to control for household structure and constraints on increasing the number of migrants. Although households with children are generally less eager to move, the need for a large house or the prospective schooling of children might prompt a move when children are at preschool age. When children are at school, location ties are stronger, and migration is less likely to occur (see, e.g., Sandell, 1977; Mincer, 1978; Nivalainen, 2002). Therefore, we expect the number of students to have a negative effect, while the expected effect of preschool children is indeterminate. Households with more laborers can send more migrants, but the effect of household size is

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7 Migration is usually defined as out-of-county work in China. The 'out-village' definition used in this paper follows that of Stark and Taylor (1991). The out-of-village-work definition of migration covers those who work elsewhere but live in the home village. To test whether this definition drives our results, the same methods of analysis were repeated by using out-of-county and out-of-province definitions of migration. The results were similar to those presented in Section 5. When we set the left constraint on the days of out-village work as 1 or 90, our results were similar.

Table 2. Definitions of, and descriptive statistics on, variables and the expected effects of the independent variables (Observations = 4,759)

Variable	Expected effect	Definition	Mean	Standard deviation	Minimum	Maximum
Dependent variable						
ΔM		Change in the number of migrant laborers (people). Migrant is a laborer who works away from the home village on at least 30 days during the year	0.261	0.551	0	4
Independent variable						
Lagged income	?	Per capita household net income in previous year (1,000 yuan)	3.106	1.939	−0.083	36.739
Lagged RP'	−	Difference from the village average income in previous year, derived from the original survey data	−0.021	1.713	−3.879	31.251
Lagged RP''	−	Additive inverse of relative deprivation in previous year, derived from the original survey data	−0.828	0.663	−4.065	0
Correlation between lagged income and lagged RP' = 0.88 Correlation between lagged income and lagged RP'' = 0.40						
Household size	?	Household size (people)	3.997	1.434	1	9
Student	−	Number of students (people)	0.636	0.808	0	5
Preschool	?	Number of preschool children (people)	0.186	0.419	0	2
Labor	+	Labor force (people). A laborer is defined as a female aged between 16 and 55 or a male aged between 16 and 60. Anyone who works on 90 days or more during the year but fails to meet the age constraints also belongs to the labor force. Full-time students and individuals unable to work are excluded from the labor force.	2.875	1.142	1	8
Lagged number of migrants	−	Number of migrants in previous year (people)	1.000	0.951	0	5
Labor_Edu	+	Laborers' mean years of schooling	6.527	2.108	0	16
Labor_Age	−	Laborers' mean age (years)	41.885	9.593	16	81.5
Labor_Male	+	Number of male laborers (people)	1.534	0.711	0	7
Land	−	Per capita landholding (mu)	1.189	0.983	0	13
Migrant share in village labor	+	Village migrants/village labor force, derived from the original survey data	0.433	0.137	0.043	0.774

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Table 3. Group comparisons: sample means of the independent variables (2006 data)

Variable	Households without change in number of migrants versus households increasing migrant numbers		Nonmigrant households versus migrant households	
	Without change	Positive change	Nonmigrant	Migrant
(Obs:)	1,310	353	409	1,254
Lagged income	3.46	3.51	--	--
Lagged RP'	0.04	−0.15	--	--
Lagged RP"	−0.85	−1.02	--	--
Household size	3.95	4.37	3.53	4.20
Student	0.67	0.50	0.66	0.62
Preschool	0.17	0.24	0.12	0.21
Labor	2.78	3.38	2.42	3.07
Lagged number of migrants	1.14	0.96	0.00	1.46
Labor_Edu	6.57	7.14	5.94	6.94
Labor_Age	42.66	39.25	48.37	39.84
Labor_Male	1.49	1.80	1.28	1.65
Land	1.23	1.18	1.39	1.16
Migrant share in village labor	45.64%	49.19%	37.12%	49.42%

unpredictable. Given the numbers of laborers and children, household size is affected by the number of adult dependents (such as the elderly), who may need care and thus may limit migration. On the other hand, as argued by Shi et al. (forthcoming), these individuals may promote migration by helping with childcare and housework (including farming). The lagged number of migrants is predicted to have a negative effect on the increase in migration. This is because households that sent migrants in the previous year have fewer to send in the current year. Moreover, as many migration studies (e.g., Greenwood, 1997) have shown, because educated young male adults are the keenest migrants, one would expect household labor endowments to follow the same trend as average education levels, average ages, and the number of male workers. A measure of per capita landholdings is included because rural migration may be caused by land scarcity (see, e.g., Rozelle et al., 1999). In addition, we include the proportion of migrants in the total village labor force to control for village characteristics that are expected to influence migration, such as economic shocks due to natural disasters, migration networks with neighbors, village infrastructure, and wage differences between regions. We expect the coefficient on this variable to be positive.

The 2006 data reported in Table 3 enable comparisons between households with no change in the number of migrants and those that increased the number of migrants, as well as comparisons between migrant households and nonmigrant households. Over one-fifth of households in the sample increased migrants and over three-quarters of all households in the sample participated in migrant work in 2006. Lagged average absolute income among households that increased the number of migrants was 3.51 thousand yuan, slightly above the average of 3.46 thousand yuan among households that did not increase the number of migrants. On the other hand, the mean values of both indices of the relative income position are smaller for households that increased the number of migrants; an inferior relative income position

Table 4. The effect of the relative income position on the change in the number of migrants

Dependent variable: Change in the number of migrant laborers (≥ 0)
Number of observations = 4,759
Number of groups = 2,056

	(1)		(2)	
Lagged income	0.082	***	0.021	**
	(0.030)		(0.008)	
Lagged RP'	−0.083	***		
	(0.030)			
Lagged RP''			−0.085	***
			(0.023)	
Household size	0.14	***	0.138	***
	(0.038)		(0.038)	
Student	−0.217	***	−0.224	***
	(0.042)		(0.042)	
Preschool	−0.218	***	−0.22	***
	(0.050)		(0.050)	
Labor	0.138	***	0.14	***
	(0.033)		(0.033)	
Lagged number of migrants	−0.811	***	−0.804	***
	(0.018)		(0.018)	
Labor_Edu	0.033	***	0.031	***
	(0.011)		(0.011)	
Labor_Age	−0.008	***	−0.009	***
	(0.003)		(0.003)	
Labor_Male	0.12	***	0.115	***
	(0.039)		(0.039)	
Land	0.04		0.036	
	(0.031)		(0.031)	
Migrant share in village labor	2.109	***	2.143	***
	(0.245)		(0.245)	
Year = 2004	0.017		−0.019	
	(0.033)		(0.023)	
Year = 2005	−0.009		−0.017	
	(0.018)		(0.017)	
Constant	−0.968	***	−0.816	***
	(0.274)		(0.254)	
R-squared	0.47		0.48	
F-test of all $\mu i = 0$	2.63 [2005,2689]***		2.63 [2005,2689]***	
Hausman test	1050.88[14]***		1052.76[14]***	

Notes: Standard errors in brackets; degrees of freedom in square brackets; ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

seems to motivate households to engage in migration. Comparisons based on other variables are consistent with our expectations.

5. Empirical results

5.1 *How does the relative income position affect the change in the number of migrants?*

Table 4 reports the estimation results for equation (1) in which the change in the number of migrant laborers is the dependent variable. Estimation is based on the full sample. Column (1) presents the results based on the use of the group-wide position measure; i.e., the difference between household per capita

income and the village's average income (RP'). Column (2) reports the results based on the use of the upward position measure; i.e., the additive inverse of relative deprivation (RP'').

First, we test the fixed-effects specification. All F-tests reject the null hypothesis that there are no household-specific effects at the 1% significance level. In addition, the Hausman test suggests that the household effects are correlated with the other regressors. Hence, the fixed-effects specification is preferred to the OLS and random-effects models. The fixed-effects specification also allows for the inclusion of time-invariant factors such as geographical location, the productivity of land, village fixed effects and, to some extent, wage differences between regions, migration networks, and so on. Including these variables reduces the potential for omitted variable bias.

In column (1), which reports results based on the use of the difference between household per capita income and village average income (RP') to measure the relative income position, the coefficient on lagged absolute income is 0.082, and the coefficient on lagged RP' is –0.083. Both coefficients are significant at the 1% level even after controlling for household structure, labor force characteristics, land, the village migration rate, time dummies, and household-specific effects.

Column (2) reports estimated results based on the use of the additive inverse of relative deprivation to proxy the relative income position (RP''). Because the correlation between RP'' and absolute income is much lower than that between RP' and absolute income, this specification is preferred. However, the results are similar to those in column (1). The coefficient on lagged absolute income is 0.021, and is significant at the 5% level. The coefficient on lagged RP'' is –0.085, which is similar to the estimate of –0.083 reported in column (1). This coefficient is significant at the 1% level.

These findings indicate that households who earned more experienced a larger increase in the number of household members migrating. However, if absolute income acts as a proxy for unobservable factors such as ability and productivity, our results may indicate that households with more skilled and able (and therefore rich) workers provide more migrants. Another possibility is that rich households are less restricted by moving costs and thus their members have more opportunities to migrate.

When the effect of absolute income on migration is controlled for, holding all other factors constant, the relative income position has a significantly negative impact on household migration. A household that is poor relative to its home village reference group increases migration by more than do those are more favorably situated in the village's income distribution. This finding is robust to the choice of relative income index.

The coefficients of all other independent variables, except for that on landholding, are statistically significant and have the expected signs, and are thus consistent with the theory and with existing empirical findings. The coefficient on per capita landholding in each column is not significant at the 10% level. Land scarcity may no longer be an important determinant of migration. In recent years, expanding rural households have chosen to subcontract the cultivation of their lands to others or to leave arable land uncultivated, and have migrated to cities to look for work. According to the Anhui Provincial Commission

Table 5. Households with pioneer migrants versus households without pioneer migrants

Dependent variable: Change in the number of migrant laborers (≥ 0)							
	(A) Households with pioneer migrants (No. of observations = 3042, No. of groups = 1425)				(B) Households without pioneer migrants (No. of observations = 1,717, No. of groups = 879)		
	(1)		(2)		(3)		(4)
Lagged income	0.094	***	0.024	*	0.036		−0.001
	(0.034)		(0.012)		(0.059)		(0.012)
Lagged RP'	−0.101	***			−0.04		
	(0.035)				(0.060)		
Lagged RP"			−0.086	***			−0.013
			(0.030)				(0.042)
Household size	0.142	***	0.133	***	0.09		0.091
	(0.047)		(0.047)		(0.071)		(0.072)
Student	−0.245	***	−0.242	***	−0.063		−0.07
	(0.053)		(0.053)		(0.074)		(0.074)
Preschool	−0.264	***	−0.257	***	−0.05		−0.057
	(0.058)		(0.058)		(0.107)		(0.107)
Labor	0.192	***	0.2	***	0.085		0.084
	(0.040)		(0.039)		(0.060)		(0.061)
Lagged number of migrants	−0.816	***	−0.811	***			
	(0.024)		(0.024)				
Labor_Edu	0.018		0.017		0.066 ***		0.066 ***
	(0.014)		(0.014)		(0.019)		(0.019)
Labor_Age	−0.019	***	−0.019	***	0.002		0.001
	(0.004)		(0.004)		(0.005)		(0.005)
Labor_Male	0.138	***	0.132	***	0.024		0.024
	(0.044)		(0.044)		(0.077)		(0.077)
Land	0.054		0.046		0.077		0.077
	(0.045)		(0.045)		(0.058)		(0.058)
Migrant share in village labor	1.871	***	1.936	***	2.394 ***		2.347 ***
	(0.273)		(0.276)		(0.528)		(0.523)
Year = 2004	0.002		−0.047	*	−0.093		−0.123 ***
	(0.038)		(0.028)		(0.067)		(0.046)
Year = 2005	−0.019		−0.031		−0.037		−0.046
	(0.021)		(0.020)		(0.035)		(0.031)
Constant	−0.331		−0.143		−1.711 ***		−1.568 ***
	(0.339)		(0.323)		(0.511)		(0.450)
R-squared	0.50		0.50		0.15		0.15
F-test of all μi = 0	2.47[1424,1603]***		2.47[1424,1603]***		2.96[878,825]***		2.95[878,825]***
Hausman test	723.76[14]***		717.50[14]***		283.40[13]***		273.39[13]***

Notes: Standard errors in brackets; degrees of freedom in square brackets; ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

of Agriculture, 9,000 hectares of farm land (1.2%) in the province were left abandoned at the end of 2001, and its value is increasing annually.

To test whether there is serial correlation in v_{it}, we estimation our equation by using a fixed-effects model with a first-order autoregressive disturbance term. In the specification that incorporates the group-wide position measure (RP'), the coefficients on relative and absolute income are not significant at the 10% level; this may be because they are highly correlated. However when using the upward comparison index to measure the relative income position ($RP"$), the results are essentially unchanged; the coefficient on lagged $RP"$ is negative and the coefficient on lagged absolute income being positive, and both are significant at the 5% level. The Durbin–Watson statistic is 1.54 in both models.

5.2   Households with pioneer migrants versus households without pioneer migrants

Migration may differ between households that had at least one migrant in the previous year and households with no pioneer migrant. Table 5 compares results for two subgroups (with and without pioneer migrants) in panel (A) and panel (B), respectively. In each case, an F-test rejects the null hypothesis that all the

household-specific effects are zero, and the Hausman test rejects the random-effects model. The fixed-effects model is preferred.

Table 5(A) reports results that are similar to those for the full sample in Table 4. In both specifications, the coefficients on lagged absolute income are positive at at least the 10% significance level. The coefficients on lagged relative income position are negative and significant at the 1% level. Given absolute income, household structure and the other factors expected to influence income gains from migration, relative income motives continue to play an important role in migration decisions. Compared to better-off households in the village, poorer households tend to add more migrants.

Households without pioneer migrants behave differently. For both specifications in Table 5(B), the estimated coefficients on lagged absolute income are insignificant at the 10% level. The coefficients on the lagged relative income position are negative but not significant at the 10% level. Unlike the situation in households with pioneer migrants, there is no clear evidence that relative income positions affect migration decisions.

Table 5 also reveals striking differences between the two groups in the coefficients of other explanatory variables. Education is not an important determinant of the migration decisions of households with pioneer migrants but has a significantly positive effect on households without pioneers. Moreover, for households with pioneer migrants, household structure and all the demographic labor-force variables except for education have significant effects on migration decisions. By contrast, for households without pioneer migrants, these controls are not significant at the 10% level.

These results are consistent with the hypothesis advanced in Section 2 that, in the absence of a pioneer migrant, potentially high moving costs and uncertainty about migration prospects discourage households from using migration to enhance income and improve their relative income positions. When migration is no longer attractive, it is not surprising that the estimated coefficients on other variables, such as household structure and most of the demographic controls, are not highly significant. However, in this case, education plays an important role in reducing migration risks and promoting migration in various ways (see, e.g., Schwartz, 1976; Root and De Jong, 1991; Greenwood, 1997; Lucas, 1997). First, households with more educated persons have more information about particular localities. They face lower risks and have less uncertainty about migrating before they move. Second, education may also reduce the importance of tradition and family ties and increase individual awareness of other localities, which weakens the forces that bind people to their home villages. Third, education increases the efficiency of job search at destination. Moreover, because formal education provides general skills that are transferable, education increases learning potential over time through on-the-job experience and thereby enhances the prospects of success at destination. These factors are expected to stimulate highly educated households to supply more migrants and thus counteract the effect of an absence of pioneer migrants.

These findings suggest that pioneer migrants confer a positive externality on household members who have not yet migrated. The presence of pioneer migrants may reduce the moving costs and risks of future

Table 6. The likelihood of a household increasing the number of migrants

Dependent variable = 1 for positive change in the number of migrant laborers
= 0 for no change in the number of migrants

	(A) Households with pioneer migrants				(B) Households without pioneer migrants			
	(1)		(2)		(3)		(4)	
Lagged income	0.756	*	0.221		0.625		−0.225	**
	(0.450)		(0.155)		(0.664)		(0.104)	
Lagged RP'	−0.864	*			−0.813			
	(0.479)				(0.673)			
Lagged RP"			−1.015	**			0.437	
			(0.445)				(0.426)	
Household size	0.632		0.504		−0.128		−0.546	
	(0.721)		(0.727)		(0.837)		(0.852)	
Student	−1.626	*	−1.505	*	0.924		1.225	
	(0.874)		(0.868)		(0.924)		(0.960)	
Preschool	−1.243		−0.939		1.226		1.285	
	(0.818)		(0.818)		(1.130)		(1.119)	
Labor	0.73		0.82		0.601		0.836	
	(0.512)		(0.515)		(0.828)		(0.876)	
Lagged number of migrants	−5.462	***	−5.461	***				
	(0.468)		(0.471)					
Labor_Edu	0.239		0.235		0.953	***	0.96	***
	(0.211)		(0.206)		(0.298)		(0.299)	
Labor_Age	−0.054		−0.058		0.054		0.039	
	(0.068)		(0.066)		(0.069)		(0.071)	
Labor_Male	1.211	**	1.157	**	0.185		0.254	
	(0.541)		(0.530)		(0.874)		(0.863)	
Land	1.04		0.993		0.192		0.136	
	(0.789)		(0.807)		(0.644)		(0.631)	
Migrant share in village labor	19.888	***	21.12	***	10.545	*	6.718	
	(3.942)		(4.041)		(6.367)		(5.998)	
Year = 2004	−0.9	*	−1.207	***	−2.227	***	−3.36	***
	(0.521)		(0.382)		(0.858)		(0.711)	
Year = 2005	−0.673	**	−0.683	**	−1.207	***	−1.567	***
	(0.293)		(0.281)		(0.428)		(0.422)	
Log likelihood	−133.38		−132.41		−56.21		−56.45	
Number of observations	1094		1094		347		347	
Number of groups	431		431		149		149	

Notes: Standard errors in brackets; ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

migrants. Hence, for households with pioneer migrants, human capital is less important and they are more likely to view increasing migration as an effective strategy for increasing absolute income and for improving their relative economic positions.

5.3   Effects on the likelihood of households increasing the number of migrants

Although we have focused on the increased number of migrants in a household, absolute income and relative income incentives may have different effects on whether a household increases its number of migrants. That is, the effects on whether the number of migrants is increased may differ from those on the increase in the number of migrants. Table 6 reports logit estimation results, in which the dependent variable is a dummy variable that is unity if the household increases its migrant laborers and is zero otherwise. The results in panel (A) relate to the case in which there are pioneer migrants, and those in panel (B) relate to the case in which there are no pioneers.

Because the estimates discussed in Sections 5.1 and 5.2 suggest that there are household-specific effects and that these effects are correlated with the other regressors, we only report results from the fixed-effect model. In the fixed-effects logit model, households that did not change their choice between 2004 and 2006

are excluded. This is because these households contribute nothing to the log likelihood. Thus, the numbers of households in the samples falls to 431 and 149 in panels (A) and (B), respectively. Given that lagged RP' might be collinear with lagged absolute income, we focus on the results that are based on the use of the second index of relative income (RP'') in columns (2) and (4).

According to the results in panel (A), for households with pioneer migrants, the coefficient on lagged absolute income is insignificant at the 10% level, but is positive; whereas the coefficient on the lagged relative income position is negative and significant at the 5% level. The estimated coefficients on education are not statistically significant at the 10% level. Although there is no strong evidence that absolute income affects the likelihood of a household increasing the number of migrants, the results are generally similar to those in Table 5(A). The effect of relative income position is robust and this variable has a negative effect on migration. Households in the lower part of the village income distribution have an incentive to increase the number of migrants to improve their relative income position. Given the presence of pioneer migrants, education is not an important determinant of migration.

The behavior of households without pioneer migrants seems different from that of households that have already participated in migration. As reported in Table 6(B), for households without pioneer migrants, the relative position has no clear effect on migration decisions. However, the effect of education on migration is positive and significant at the 1% level. Because the absence of pioneer migrants might raise moving costs and increase migration risks, migration may be seen as an inefficient way of improving the income position. In this case, by generating household knowledge and skills, education might lower the risk of moving and raise the efficiency of job search, and thus promote migration.

In contrast to the insignificant effect of absolute income reported in Table 6(A) and Table 5(B), the coefficient on lagged absolute income is negative and significant at the 5% level when the upward comparison index of relative position (RP') is used, as in column (4) of Table 6. It is possible that households aim to reduce income risks by diversifying their income portfolios by placing members in other labor markets. In Section 3, we argued that poor households are more likely to send migrants than are rich households because they are less able to insure themselves against potential risks in village income. This effect is small for households with pioneer migrants because they have already spread their risks; thus, we do not find the same effect in Table 6(A). Because the incentive to diversify income risk is related to the decision about whether to undertake migration rather than to the decision about how many migrants to send, for households without pioneers, the linear specification in Table 5(B) shows no evidence of a significant negative effect of absolute income on household migration decisions.

To summarize, our results suggest that households care about their relative income positions and that these concerns significantly affect migration decisions. A household that is poor relative to other village households is more likely to increase the number of migrants as it aims to improve its relative position. However, the motivation to migrate is affected by the presence of pioneer migrants. The negative effect of relative income is only significant in households with pioneer migrants. Moreover, education is only an important determining factor for migration in households without pioneer migrants. These findings support

the hypothesis that migration begins with pioneers that have low migration costs and high expected migration gains, such as educated workers. More importantly, pioneer migrants might confer a positive externality on future migrants. Moving costs and risks are lower in households with pioneers and these households are more likely to view migration as an effective strategy for enhancing their income and improving their relative income position within the reference group.

6. Conclusion

In this paper, we aimed to test the importance of the relative income position in internal migration decisions. Our main concern was whether relatively poor households in a village community are more likely to increase their numbers of migrants, and whether the presence of pioneer migrants influences this effect. We used a unique household panel data set on rural Chinese communities covering the period 2003–2006. We also used two measures of the relative income position. We estimated the effect of the previous year's relative income position on the change of the number of migrants. Having controlled for the effect of absolute income, we found evidence that relative income positions affect migration decisions. However, the motivation to migrate differs between households with and without pioneer migrants. For households with pioneer migrants, those that are relatively poor in their villages are more likely to increase the number of migrants than are better-off households. For households without pioneer migrants, the relative income position does not significantly affect migration decisions. We also found that for households without pioneer migrants, education has a major effect on migration decisions, whereas there is no such effect for households already participating in migration.

These findings yield some implications. Economists have long recognized that it is not necessarily the case that the poorest regions have the highest migration rates, and greater income inequality usually increases the incentive to migrate. This occurs because individuals and households compare themselves with others; those in inferior relative income positions and that feel deprived are more likely to undertake migration.[10] According to our estimation results, pioneer migrants confer a positive externality on household members who have not yet migrated; for households without pioneer migrants, by generating household knowledge and skills, education might lower the risk of moving and raise the efficiency of job search, and thus counteract the effect of an absence of pioneer migrants and promote migration. Hence, we would expect government subsidies for rural labor training to aggressively promote migration, particularly among households without pioneer migrants.[11] Moreover, a cost effective and efficient way of promoting migration would be to provide rural workers with information about jobs and living conditions at their destinations; i.e., build a public network to reduce moving costs and risks.

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8 See also the explanations of Stark (2006) and Yitzhaki (1979).
9 For instance, in March 2004, the central government launched the 'Sunshine Project' to train new rural migrants in their home areas, with a concentration on the poorest of these areas. Millions of rural laborers receive benefit from this program each year.

References

Akerlof, G.A. (1997). "Social distance and social decisions", Econometrica, 65, 1005–1027.

Carrington W. J., Detragiache E., and Vishwanath T. (1996). "Migration with endogenous moving costs", American Economic Review 86(4), 909–930.

Clark, A.E. and Oswald, A.J. (1996). "Satisfaction and comparison income", Journal of Public Economics 61, 359–381.

Corneo, G. and Jeanne, O. (1997). "Conspicuous consumption, snobbism and conformism", Journal of Public Economics 66, 55–71.

Department of Rural Surveys National Bureau of Statistics (2005). Research on rural labor of China, China Statistics Press, Beijing.

Easterlin, R.A. (1974). "Does economic growth improve the human lot? Some empirical evidence", In: David, P.A. and Reder, M.W. (Eds.), Nations and Households in Economic Growth, Essays in Honor of Moses Abramowitz. Academic Press, NY, 89–125.

Easterlin, R.A. (1995). "Will raising the incomes of all increase the happiness of all?", Journal of Economic Behavior and Organization 27 (1), 35–47.

Easterlin, R.A. (2001). "Income and happiness: towards a unified theory", The Economic Journal 111, 465–484.

Ferrer-i-Carbonell, A. (2005), Income and well-being: an empirical analysis of the comparison income effect", Journal of Public Economics, 89(5–6), 997–1019.

Festinger, L.(1954). "A theory of social comparison processes", Human Relations, 7(2) 117–140.

Frey, B. and Stutzer, A. (2002a). "Happiness and Economics", Princeton: Princeton University Press.

Frey, B. and Stutzer, A. (2002b). "What can economists learn from happiness research?", Journal of Economic Literature, XL (2), 402–435.

Ghatak, S., Levine, P. and Price, S. (1996). "Migration theories and evidence: an assessment", Journal of Economic Surveys, 10(2), 159–198.

Greenwood, M.J. (1997). "Internal migration in developed countries", In Handbook of Population and Family Economics, edited by M. Rosenzweig and O. Stark. Vol. 1B. Amsterdam: North Holland.

Hey, J.D. and Lambert P.J. (1980). "Relative deprivation and the Gini coefficient: comment", Quarterly Journal of Economics 95(3), 567–573.

Knell, M. (1999). "Social comparisons, inequality, and growth", Journal of Institutional and Theoretical Economics 155, 664–695.

Ljungqvist, L. and Uhlig, H. (2000). "Tax policy and aggregate demand management under catching up with the Joneses", American Economic Review 90 (3), 356–366.

Lucas, R.E.B. (1997). "Internal migration in developing countries", In Handbook of Population and Family Economics, edited by M. Rosenzweig and O. Stark. Vol. 1B. Amsterdam: North Holland.

Luttmer, E. (2005). "Neighbors as negatives: relative earnings and well-being", The Quarterly Journal of Economics, 120(3), 963–1002.

Marx, K. (1847). Wage Labour and Capital, Ch. 6. Quoted from the edition: New York: International Publishers, 1933, p. 30.

Mincer, J. (1978). "Family migration decisions", Journal of Political Economy 86, 749–773.

Ministry of Agriculture of China (2004), http://www.nmpx.gov.cn/gongzuoyanjiu/t20040309_14804.htm

National Bureau of Statistics of China (2005). China Statistical Yearbook, China Statistics Press, Beijing.

Nivalainen, S. (2004). "Determinants of family migration: short moves vs. long moves", Journal of Population Economics 17, 157–175.

Runciman, W. G. (1966). "Relative deprivation and social justice: A study of attitudes to social inequality in twentieth century England", Berkeley, CA: University of California Press.

Root, B.D. and De Jong G.F. (1991). "Family migration in a developing country." Population Studies 45(2), 221–233.

Rozelle, S., Taylor, E. and De Brauw, A. (1999). "Migration, remittance, and agricultural productivity in China", American Economic Review, 89(2), 287–291.

Sandell, S.H. (1977). "Women and the economics of family migration", The Review of Economics and Statistics 59, 768–782.

Schwartz, A. (1976). "Migration, age and education", Journal of Political Economy, 84 (4), 701–720.

Shi, X., Heerink, N., and Qu, F. "Choices between different off-farm employment sub-categories: an empirical analysis for Jiangxi province, China", China Economic Review, forthcoming.

Smith, A. (1759). The Theory of Moral Sentiments, London: Printed for A Millar, in the Strand; and A. Kincaid and J. Bell, in Edinburgh.

Stark, O. (1984). "Rural-to-urban migration in LDCs: a relative deprivation approach", Economic Development and Cultural Change, 32 (3), 475–486.

Stark, O. (2006). "Inequality and migration: A behavioral link", Economics Letters, 91, 146–152.

Stark, O. and Bloom, D.E. (1985). "The new economics of labor migration", American Economic Review, 75(2), 173–178.

Stark, O. and Levhari D. (1982). "On migration and risk in LDCs", Economic Development and Cultural Change, 31, 191–196.

Stark, O. and Taylor, J. E. (1989). "Relative deprivation and international migration", Demography, 26(1), 1–14.

Stark, O. and Taylor, J. E. (1991). "Migration incentives, migration types: the role of relative deprivation", The Economic Journal, 101, 1631–1178.

Stark, O. and Yitzhaki, S. (1988). "Labour migration as a response to relative deprivation", Journal of Population Economics 1(1), 57–70.

State Council Research Center (2006). "Investigation Report of the Rural Migrant Workers in China", China Truth Press, Beijing.

Stouffer, S. A., Edward A. S., Leland C. D., Shirley A. S., and Robin M. W., Jr. (1949). "The American soldier: adjustment during army life" (Vol.1.), Princeton: NJ: Princeton University Press.

The Central Government of China (2006), http://www.gov.cn/jrzg/2006-10/24/content_421221.htm

Yitzhaki, S. (1979). "Relative deprivation and the Gini coefficient", Quarterly Journal of Economics 93(2), 321–324.

Yitzhaki, S. (1982). "Relative deprivation and economic welfare", European Economic Review, 17, 99–113.