The Evolution of the Intrahousehold Division of Labor in a Market Development Context– A Longitudinal Study of Rural China

He, Yong

Universite Clermont-Auvergne

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Yong HE[*]

Abstract

With a panel sample of more than 3000 rural Chinese households surveyed over 21 years, this study estimates the evolution of relative roles of social status and human capital in the intrahousehold division of labor under the context of a rapid market development. With the guidance of a theoretical framework, it is found that: 1) market development enhanced the status of women, and changed the traditional rule of "women indoors and men outdoors"; 2) market development allocated more young labor to outward wage-earning jobs and left a higher share of the elderly and juvenile in land-based semi-market activities and chores, indicating an increasing importance of human capital over family status; 3) market enlargement relaxed the entrance requirements for labor market in terms of education level, age and height.

JEL Classification: D13, J22, O12

Key words: intrahousehold division of labor, human capital, rural China, family status, market development, chores.

I.   Introduction

Since long, the intrahousehold division of labor (IHDL) has been considered as governed by members' social as well as economic functions in the family's productive and reproductive activities. Xenophon (1923) was probably the first to adopt this approach 2300 years ago. He inferred that as the family plays a double role: having sons and daughters to support their parents in old age on the one hand, and having new treasures being most amply added on the other hand, God suits woman's nature for indoors and man's nature for outdoors.

Economists explain IHDL by the search of increasing returns of specialization and division of labor on the basis of human capital, and their analyses open to incorporate social factors mainly through integrating altruism in the household utility function, and the bargaining process among household members. On their side, sociologists focus on the social role of household members in function of their gender and family status shaped by social norms. The joint determination of social and economic factors in IHDL can be generally observed in the real world.

This study aims at empirically estimating how market development could shape the evolution of the roles of gender and family status on the one side, and of human capital on the other side, in IHDL. The theoretical framework that underlies empirical tests is supported by two pillars: 1) market development changes demand and supply-side conditions in the labor market. On the demand side, it reduces wage gap between men and women because most discriminating considerations gradually give way to efficiency criterion. On the supply side, along with income growth, it reduces human capital gap among family members through universal education, better nutrition, and improving medical care; 2) following new-institutional economics, economic development gives rise to changes in social norms. How quick these changes occur, however, are subject to empirical tests.

The originality of the work lies in its assessment of this evolution in a direct way. Two indirect ways of estimation are to compare the differences between urban and rural areas, and between the countries with different development levels. Indirect ways are facilitated by data availability, but present some serious limits. The direct way consists of observing the changes in IHDL on the basis of the same population over a rather long time in which there is striking market development.

As China has experienced extraordinary long-run economic growth and market development since more than 40 years, on the basis of the CHNS database, we construct a longitudinal sample of more than 3000 households surveyed in the same villages of 9

provinces with a length of 21 years (1989-2009). An econometric model by Fafchamps and Quisumbing (2003) is adopted, and panel random-effects Tobit regressions are used to evaluate the evolution of IHDL in five marketable and four chore tasks.

Strong evidence is found that rapid market development in rural China has meaningfully changed rural IHDL. Human capital consideration has become more prevalent. Market development enhanced the status of women. Women participated in more outdoor market activities and involved less in agricultural activities and domestic no-market works. Social role that was important in the past have lost ground to economic efficiency in IHDL. Market development allocated more young labor force to farther wage-earning jobs and left a higher share of the elderly and juvenile in land-based semi-market activities and household chores. Traditional rule of "women indoors and men outdoors" has been replaced by that of "the old indoors and the young outdoors" due to their differences in human capital.

This paper is organized as follows. Section II reviews the literature on how social and economic determinants affect IHDL and constructs a conceptual framework for econometric tests. Section III presents the data, and econometric model for measuring the impacts of social and economic variables on IHDL. Section IV analyzes the results. Finally section V concludes.

II. Factors determining IHDL and theoretical framework for tests

In a traditional society, as by economic criteria, men have higher level of human capital in terms of education and physical force, and by social functional criteria, women reproduce, both social and economic considerations drive the division of labor towards a same direction: women specialize in indoor and men in outdoor works. With the modernization of the society, especially the equalization of educational opportunities, economic and social criteria diverge in their impacts on IHDL.

Sociological theories explain IHDL with reference to relative resources, time availability, or ideology (Shelton and Daphne 1996). Relative resource theory suggests that household members with the most power do the least housework since people with the most resources negotiate their way out of it (Hersch and Stratton, 1994). The time availability approach assumes that individuals are time constrained and that housework will be performed by the members with fewest time constraints. The ideology approach argues that those living in more egalitarian cultures tend to allocate time more equally to housework (Fuwa 2004). Bonke et al. (2008) find evidence that Danish households specialized less than American

households, and postulate that this cross-national difference is a result of Scandinavia's more egalitarian family culture.

Much evidence in the favor of the determination by social factors in IHDL has been found in developing countries where traditional family mode prevails and the market has only a weak effect on intrahousehold production and consumption. Seebens (2010) shows that in developing countries, women are embedded in a system of institutions that define rules of action and impose incentives, and are generally more constrained than men with regard to access to productive resources such as land, credit or information. Women also face inequalities in the labor market. Using data from Burkina Faso, Kevane and Wydick (1999) find that social norms significantly explained differences in patterns of time allocation between two ethnic groups and regulated women's economic activities. The literature on time allocation in South Asia shows that to different extents, social norms, particularly patriarchy and the norm of female seclusion, affected time allocation (Khandker, 1988; Alderman and Chishti, 1991; Sultana et al. 1994, and Sathar and Desai 1996). Using data from rural Pakistan, Fafchamps and Quisumbing (2003) find that while IHDL was influenced by comparative advantage based on human capital and by long-lasting returns to learning by doing. There was also evidence of a separate effect of gender and family status. Households seemed to operate as hierarchies with sexually segregated spheres of activity.

Above findings are in accordance with traditional rural China where the three-generation stem family was the norm (Levy 1971). In such a family structure, the younger generation deferred to the elder, and women deferred to men. Parents chose a daughter-in-law to continue the family line and to help out with household chores (Baker 1979). Sons were cherished, followed by daughters. No matter how hard she worked for her husband's family, a daughter-in-law was considered an outsider and was kept powerless (Leslie and Korman 1989). Since 1949, with the communist government in power and later under the effect of industrialization and of One-Child Policy, the large family structure has broken down in urban area. In rural China, traditional family structure remained dominant during Mao's epoch.

Economists focus on economic efficiency aspects of IHDL. As Becker (1981) put it, husband and wife benefit from a division of labor between market and household activities. The gain comes from increasing returns to investments in sector-specific human capital that raise productivity in either market or nonmarket sectors. Becker (1965) also states that biological differences are very important in explaining why women have traditionally done most of the child rearing.

To incorporate social factors, in unitary economic models, the household acts as one with a single preference function, and household members are either assumed to have homogenous preferences, or to have an altruistic household head that holds all the power within the household (Alderman et al. 1995). Traditional benevolent and solitary aspects of the family are often supported by evolutionary biologists who have developed a body of formal theory of the amount of altruism that can be expected to emerge among relatives in sexually reproducing species (Bergstrom, 1997).

Since the late 1970s, intrahousehold collective models have appeared. They allow different decision makers to have different preferences, and do not require a single household welfare index to be interpreted as a utility function (Chiappori 1992). Those models are rooted in cooperative and non-cooperative game theory and pay special attention to the interaction among the heterogeneous preferences of household members and power distribution among them. The family is a place of conflict and cooperation. Collective approaches represent household allocations as the outcome of some specific bargaining process and apply the tools of cooperative game theory to this framework (Manser and Brown 1980; McElroy 1990). The second subclass of collective models relies on non-cooperative game theory. Men and women negotiate an enforceable conjugal contract before marriage. The conditionality of action implies that not all noncooperative models are Pareto optimal (Carter and Katz 1997).

To summarize, whereas non-economic explanations emphasize the role of customs, social norms and socially defined responsibility and argue that individuals perform the tasks assigned to them by society according to gender and family status, economic explanations of IHDL focus on an effort to capture increasing returns of specialization on the ground of differences in human capital, while open to incorporate the social roles in their models.

In connection with the existing literature and admitting that IHDL is shaped by both economic and social determinants, we set up a conceptual framework showing how market development may lead IHDL to be affected more by human capital consideration and less by gender and family status. The framework is then subject to empirical tests.

Consider in a traditional society, a household comprises a group of men and a group of women, with the first more favored by social norms. If the first group has higher level of human capital, time allocation according to human capital or to social norms will lead to the same outcome. If the group of women has higher level of human capital, time allocation by social norms will lead to neither efficient nor equal results. This inference also applies to the case of the household divided into groups of the elderly and of the young.

Market development changes the traditional way of IHDL through affecting its social and economic determinants. It affects economic determinants on both demand and supply sides. On the demand side, first, with geographically enlarging market size, it requires greater mobility through asking for labor force to be able to work in far and changing places. This favors the young that have higher level of physical and intellectual abilities than the elderly; second, while in a backward economy, in accordance with low and segmented demand for female labor, women's factor price is under-evaluated, with market development, wage gap between men and women decreases. On the supply side, along with economic development, growing income allows women to improve their education, nutrition and medical care, and thus increase their human capital relative to men. Consequently, market development reinforces the role of economic determinants via increasing relative prices of household members with lower family status. Maintaining old IHDL would be at the cost of giving up some potential gains for the household.

Market development also affects social determinants. The theories of new-institutional economics show how changes in social-economic conditions induce institutional changes (Coase 1937, North 1981). In the face of increasing market demand for female labor, extra-household environmental parameters change in the favor of women, and discrimination is reduced by law and by government policies. The social norm that women must stay home may lose ground if women are able to gain at least as much as men. How long institutional change is required is an open question and is subject of empirical investigation. Williamson (2000) has expected 100 to 1000 years for social norms to change. Our empirical tests allow us to have an idea not only on whether these changes occur, but also on their pace.

There are two indirect ways of empirical estimation on the impact of market development on the evolution of IHDL. The first is to compare the difference between urban and rural areas. In urban regions, IHDL is to larger extent determined by household members' endowments of human capital, while in rural area, gender and family status remain the key factors in IHDL. The second way is to compare the difference between countries with different development levels: in the less developed countries, IHDL is to larger extent determined by gender and by family status, whereas in more developed countries, economic determinants play a much more important role.

The indirect ways are easier because data are more available, but present some serious limits. The difference between urban and rural areas risks being overestimated because the kinds of tasks assumed by urban and rural households are quite different. Unlike in countryside, many chores, such as cooking, washing and childcare can be satisfied by markets

in cities. Thus their kinds and quantities of works subject to time allocation are different. For the comparisons between countries with different development levels, one of the notable concerns is the cultural differences between them. With similar development level, differences in cultural context and social norm may lead to different IHDL.

This study proposes a direct way of estimation. It consists of observing changes in IHDL on the basis of the same population over a rather long time. It avoids the inconveniences of the indirect ways. The same rural population of different periods roughly remained in the similar cultural context, kinds as well as quantities of works subject to time allocation. The real difficulty, however, is how to find the adequate data that satisfy at once three conditions: 1) with the same population; 2) over a rather long period; 3) with meaningful market development.

III. Data and econometric modeling

III.1. The sample

The CHNS database comes from longitudinal surveys with eight waves (1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009). The surveys cover more than 10000 individuals from 2000 to 3000 rural households in the same villages of nine representative provinces in each wave.

We collected information on 23111 observations (by household and wave) that reported their allocations of time. In order to get a better evaluation of the role of family statuses other than husband and wife, were removed the households with less than three members (3891 observations), those of which all members have left home (75 observations), and finally those merely composed of aging people and the juvenile (566 observations). A sample of 18579 observations from 3669 households is obtained. It is, as Table 1 shows, an unbalanced panel, with only one-fourth present in all eight waves.

Table 1 The Percentage of Household according to Their Surveyed Frequencies

Total number of households surveyed	1 wave	2 waves	3 waves	4 waves	5 waves	6 waves	7 waves	8 waves
3669	10.33%	9.05%	12.26%	10.49%	12.02%	7.44%	12.51%	25.89%

Note: Calculated on the basis of the sample.

III.2. Market development

We first describe market development as an environmental change, and then with this change as given, we are able to adopt a direct way of estimation: assessing how the explanatory variables reflecting social status and human capital affect IHDL over time. In other words, in this study, market development is not dealt with as an explanatory variable to estimate its effect over IHDL.

Table 2 shows that income growth of these surveyed households was rapid in this period.

Table 2 Per Capita Income (at constant price) and Annual Growth

	1989	1991	1993	1997	2000	2004	2006	2009
Household sample	2550	2452	2377	2561	2896	2905	2947	2998
Per capita annual income in Yuan	2372	2389	2660	3521	4382	5561	6742	10072
Annual growth rate		0.36%	5.52%	7.26%	7.56%	6.14%	10.11%	14.32%

Notes: Calculated on the basis of the sample.

Behind the constant income growth there was a profound change in income structure over time. The share of farming was reduced drastically, while small business (e.g., craft industry, commerce, restaurants, repairing, and other services) progressed steadily. Sideline (e.g., livestock, garden, and fishing) and salaried activities generated more than half of income.

This structural change was accompanied by a profound market transition featured by the decrease of state and collective sectors and the increase of private enterprises. First phase (1978-1996) was the establishment of the household-responsibility system (HRS). Collective land ownership kept unchanged, peasants were contracted to explore a certain size of land during 30 years renewable, and the yields beyond the quota was sold in free markets at unregulated prices. Thrusted by this change, there was a large expansion of the township and village enterprises (TVEs). Between 1982 and 1988, the industrial output of TVEs grew at an average annual rate of 38.2% (Putterman 1997). By 1995, industrial TVEs had overtaken the state-owned enterprises, becoming the biggest contributor to China's industrial production.

The second phase (between 1997 and 2000, extendable to 2003) was marked by the privatization of TVES. The TVEs expansion appeared to have reached a turning point in 1997 when the total number of firms and employment declined for the first time (Li and Rozelle 2003). This decline was caused by the East Asia crisis (Sun 2002). In response to this decline, many small TVEs were transformed from collective to private ownership.

The third phase started from 2000, and was featured by the acceleration of rural-urban migration. Since 2000, as major providers of a large number of manufacturing goods, Chinese

coastal regions had been enjoying the reputation of the "world factory". The increase in demand and in wage incited more peasants to leave their villages and to work in cities. Rural-urban migration was then tightly restrained by the Hukou system with discriminating conditions for rural workers on food quota, housing, medical care, child schooling, and employment (*Young 2013*). To satisfy the demand for manpower in cities, the loosening of restrictions on migration started in few provinces in need of migrant workers. It was until 2014 that the difference between agricultural and nonagricultural Hukou statuses was definitively suppressed at the national level.

To summarize, three phases constituted a whole process of market formation. The first phase partially formed land and products markets. Since then peasants were allowed to rent their contracted lands to the others, and to sell their products. The second phase marked the nascent form of capital market following the privatization of TVEs. Finally the third phase formed the labor market. According to the migrant worker surveys by the Chinese Statistic Bureau, and the Statistic Annual Yearbooks, the share of migrant workers in total rural labor increased from 7.14% in 1990 to 19.47% in 2000. This share reached to 30.91% in 2005 and to 56.17% in 2010.

III.3. Econometric modeling

After showing that during this period there has been a profound market development, this section provides an econometric model to estimate the evolution of the effects of human capital and social roles on IHDL over time.

This is an adaptation of the model of Fafchamps and Quisumbing (2003). Their model is based on the pioneering work of Becker (1965) and Gronau (1976) that permit individuals to trade off domestic work, market work and leisure. A step further is taken by Kooreman and Kapteyn (1987) who disaggregate domestic work into many non-market activities.

Household welfare is written:

$$\sum_{i=1}^{N} \omega^i V^i(C_m^i, C_z^i, T^i - L^i) \tag{1}$$

V^i is the utility of household member i. C_m^i and C_z^i are vectors of market and home produced goods. T^i and L^i are the total time endowment and total labor of household member i. The welfare weights ω^i are treated as exogenous to the task allocation process.

The household has a series of partially intertwined production activities, some of which yield marketable output X_m, others yield home goods C_z. Production technology of the household allowing for the possibility of economies of scope is:

$$G(X_m, C_z, L_a^*, K_l) \geq 0 \tag{2}$$

where L_a^* is a vectors of effective labor allocated to various task a, and K_l is a vector of semi-fixed inputs.

Effective labor is given by:

$$L_a^* = \sum_{i=1}^{N} e_a(H_i) L_a^i \tag{3}$$

where H_i denotes a vector of human capital characteristics of i, and $e_a(.)$ is a function determining labor effectiveness in task a.

The household faces a cash budget constraint:

$$\sum_m p_m (C_m - X_m) = U \tag{4}$$

where U is unearned income.

Maximize (1) subject to (2) and (4), plus a series of non-negativity constraint $L_a^i > 0$ yields a series of reduced-form labor allocation functions:

$$L_a^i = f_a(K_l, U, H_1, \dots, H_N, \omega_1, \dots \omega_N) \tag{5}$$

As households differ dramatically in their composition and structure, equation (5) cannot be directly estimated. It is possible to estimate the determinants of total household labor by task, L_a. Summing equations (5) over all members, total labor used in task α can be written:

$$L_a = \sum_{i=1}^{N} L_a^i = F_a(K_l, U, H_1, \dots, H_N, \omega_1, \dots \omega_N) \tag{6}$$

Equation (6) implies a family composition and structure effect expressed in labor shares of different family statuses in task a. To deal with this effect, Fafchamps and Quisumbing (2003) employ a convenient parameterization for household composition:

$$N_1 + \sum_{j=2}^{J}(1 + \alpha_j) N_j \approx N e^{\sum_{j=2}^{J} \alpha_j (N_j/N)} \tag{7}$$

J is the number of categories of family status, N_j is the number of household members in category j (for instance son or daughter), N is total household size, and α_j is a parameter that expresses how different category j is from the omitted category: category 1.

If household members are equivalent in terms of labor supply, all α_j are 0. $-1 < \alpha_j < 0$ means that category j counts for less than the omitted category, and vice versa if $\alpha_j > 0$. If $\alpha_j = -1$, adding a member of category j does not raise household total labor. Household composition effects can thus be tested through α_j estimates.

Equation (6), together with family composition effect explicitly expressed in equation (7) can be econometrically estimated across households of different sizes and compositions by replacing individual-specific variables H_i and ω_i with household summary statistics, such as household size, average human capital of household members, and variables reflecting family background that potentially affect time allocation.

With the above considerations and some adaptations, we get following econometrically testable equation:

$$L_{at} = A + \alpha_1 ln N_{it} + \sum_{j=2}^{J} \alpha_j (N_j/N)_{it} + \sum_{j=2}^{J} \beta_j \, Trend_j +$$

$$\sum_{k=1}^{K} \alpha_k (H_k/N)_{it} + \sum_{k=1}^{K} \beta_k \, Trend_k + \sum_{l=1}^{L} \alpha_l (K_l)_{it} + \sum_{m=1}^{M} \alpha_m (O_m)_{it} + \delta_t + \delta_p +$$

$$\varepsilon_{it} \qquad (8)$$

A is a constant. The second and third terms on the right hand are just the terms from Equation (7) in logarithm form. $ln N_{it}$ is the number of family members of household i in log form. $\sum_{j=2}^{J} \alpha_j (N_j/N)_{it}$ estimate the mean effects of the member share of each family status category (N_j/N). Seven categories are distinguished: husband, wife, son, daughter, daughter-in-law, grandparent and grandchild. The member shares of two categories: aging people and child are taken as omitted category. This category includes all members belonging to seven family statuses but legally out of working age (>65 years or <16 years).[1]

One important issue is how to estimate trend effects. To do this, a time trend variable is made, with wave89=0, wave91=1, …, wave09=8. Then the trend variable, $Trend_j$ for

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[1] This way of defining the omitted category has several advantages. As Table 3 will show, they were quantitatively important. In addition, they were observed to be active in farming, sideline and chores. A number of people in this category even maintained their salaried activities. Lastly, they are more stable in mean age, because by definition, children reaching 16 years and the passed aging people are at once taken off from this category. Therefore, their labor supply remained more stable over time than all others categories, and constitutes a good reference for comparison.

category j is to cross its member share with time trend.[2] With the coexistence of the mean effect (α_j) and trend effect (β_j), it will be able to differentiate four cases: 1) if both effects are insignificant, the contribution of j is insignificant all the time; 2) if only mean effect is significant, it reflects the contribution of j at the starting wave; 3) if only trend effect is positively (negatively) significant, it indicates that the contribution of j is insignificant at the starting wave, and then in increase (decrease) all the time; 4) if both effects are significant, we judge that the contribution of j is significant in the starting wave and then changed all the time.

$\sum_{k=1}^{K} \alpha_k (H_k/N)_{it}$ measure the effects of several human capital variables: average education level, age (and squared age), and heights of male and female at legal working age by household and wave. They are the proxy of household's intellectual and physical capabilities. $\sum_{k=1}^{K} \beta_k Trend_k$ are the trend effects of them.

$\sum_{l=1}^{L} \alpha_l (K_l)_{it}$ measure semi-fixed factors. Four groups of assets are identified: livestock, business tools, farm tools and land.

$\sum_{m=1}^{M} \alpha_m (O_m)_{it}$ measure the effects of other factors to control for: share of members outside; unearned income is the sum of pension and rental; shares of pension and of rental in unearned income are also used as control variables.

Finally wave and province dummies, δ_t and δ_p, are for controlling time effect and regional inequality effect. At last, ε_{it} is the error term.

To summarize, total household labor per task (five market activities and four chores) is regressed on household size, seven shares of the members with same family status in total number of the household, variables reflecting human capital, and other control variables. The trend effects of the explanatory variables are also assessed.

Following Fafchamps and Quisumbing (2003), he tests are performed using a longitudinal random-effects two-limit Tobit regression. As shown in the following results, the Rho values being fairly low suggests the appropriateness of the random- over fixed-effects two-limit Tobit regressions.

IV. Results and analysis

IV.1. Descriptive statistics

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[2] The method of using a dummy variable to interact with time trend variable to capture the evolution of its impact over time has been generally employed in econometric studies (Cf. Wooldridge, 2016, chapter 14).

Descriptive statistics retain valuable information. In Table 3, the average household size was around 4.5, indicating the breakdown of traditional large and complex family structure even in rural area. In general, the household composition is conditional on the evolution in age of different categories of family status. For instance, the increasing share of *daughter-in-law* over time was due to age increase of *son*.

Table 3 Household Composition by Family Status and Age

	1989	1991	1993	1997	2000	2004	2006	2009
Sample	2299	2277	2195	2259	2507	2189	2434	2429
Household size	4.47	4.56	4.54	4.36	4.21	4.08	4.56	4.73
By family status								
Husband	0.96	0.95	0.94	0.93	0.93	0.92	0.90	0.90
Wife	0.97	0.96	0.96	0.96	0.95	0.95	0.95	0.95
Son	1.13	1.16	1.15	1.11	1.03	0.96	1.07	1.11
Daughter	0.97	1.00	0.97	0.85	0.74	0.63	0.91	0.93
Daughter-in-law	0.10	0.15	0.16	0.19	0.22	0.26	0.34	0.38
Grandparent	0.19	0.17	0.15	0.12	0.10	0.08	0.07	0.07
Grandchild	0.14	0.17	0.20	0.20	0.24	0.28	0.31	0.38
By age								
Adult_male	1.43	1.51	1.53	1.57	1.55	1.60	1.75	1.78
Adult_female	1.47	1.59	1.60	1.61	1.59	1.61	2.00	2.08
Aging people	0.17	0.17	0.19	0.18	0.17	0.21	0.29	0.35
Child	1.40	1.29	1.22	0.99	0.90	0.67	0.52	0.51

Notes: 1) calculated on the basis of the sample; 2) the family status is defined as the relationship between household members and the head of household (the husband or the wife if she is widowed); 3) since some categories are limited in number and their independent presence is not essential, they are regrouped with other categories by similarity. In general, relative to the household head, brothers and sisters, as well as their spouses, are younger. Brothers, sisters' husbands, and genders are grouped with sons, sisters with daughters, brothers' wives with daughters-in-law, the parents of brothers' wives and of sisters' husbands with grandparents, and finally brothers' and sisters' children are classified as sons or daughters if they are over 16 years, and as grandchildren if they are under 16 years; 4) The aging people are defined as those over 65 years, and child as younger than 16 years. They form the omitted category for the regressions.

In Table 4, average land exploited by households had a slight trend of concentration. As agricultural activities need physical strength, age and height can be two proxies of physical human capital. Age increased overtime for all categories of family status. Education levels by family status were in progress. The young was more educated than the old, and women had nearly the same education level as men.

Table 4 Assets by Household and Human Capital by Family Status

	1989	1991	1993	1997	2000	2004	2006	2009
Assets								
Land (in mu)	4.77	4.77	4.77	6.43	6.56	6.41	6.16	6.22
Farming tools (in yuan)	240.94	479.66	540.90	1000.48	1057.20	1288.27	1284.07	1154.98
Business tools (in yuan)	506.83	340.26	998.42	2890.63	3384.50	3507.00	3994.94	5011.74

Human capital								
Age_husband	41.59	43.38	44.48	45.51	46.38	48.68	51.50	53.32
Age_wife	39.96	41.83	43.13	44.26	45.17	47.80	50.86	52.58
Age_son	13.88	15.63	16.81	18.75	19.89	22.86	26.50	28.59
Age_daughter	12.55	14.11	15.12	16.84	17.55	19.07	25.63	28.07
Age_daughter-in-law	26.27	26.70	27.36	28.67	29.08	30.89	32.57	33.75
Age_grandparent	69.56	70.04	71.17	72.18	72.31	72.49	73.67	74.60
Age_grandchild	4.81	5.32	5.48	6.76	6.94	7.46	9.06	9.91
Edu_husband (in year)	6.14	6.40	6.68	7.05	7.65	7.95	7.72	7.66
Edu_wife	3.89	4.01	4.19	4.70	5.52	5.84	5.40	5.50
Edu_son	6.02	6.48	6.93	7.12	8.07	8.33	8.66	8.73
Edu_daughter	5.76	6.33	6.81	6.93	8.14	8.22	8.51	8.62
Edu_daughter-in-law	7.75	8.00	8.18	8.13	8.56	8.58	8.84	8.69
Edu_grandparent	1.10	1.20	1.39	1.50	1.91	2.52	2.52	2.32
Edu_grandchild	3.63	3.59	5.31	3.77	5.10	4.93	5.51	6.10
Height_husband (in meter)	1.65	1.65	1.65	1.65	1.66	1.66	1.66	1.66
Height_wife	1.54	1.54	1.54	1.54	1.55	1.55	1.54	1.54
Height_son	1.40	1.43	1.47	1.52	1.55	1.59	1.61	1.65
Height_daughter	1.31	1.37	1.40	1.46	1.48	1.49	1.52	1.55
Height_daughter-in-law	1.56	1.56	1.56	1.56	1.57	1.57	1.57	1.56

Notes: 1) calculated on the basis of the sample; 2) mu is a Chinese measure unit of land and equals 1/15 hectare; 3) *edu_* by family status are measured their education years.

Table 5 presents the statistics on time allocation among the categories of family status in farming, sideline, off-farm activities and chores. *Husband* and *wife* performed more than 80% of the work in farming and sideline. They were also in charge of more than 70% of chores, and this share decreased slightly over time.

Whereas *husband* and *wife* reduced their off-farm activities by half, the younger generation (including *son*, *daughter*, and *daughter-in-law*) doubled their shares over the period. Unlike the parents, *son* reduced the work in farming, and increased in salaried activities, while kept unchanged in sideline and chores. *Daughter* followed the same trend of *son*, but her reduction in farming, sideline and chores were drastic, and her progress in off-farm activities was impressive.

Traditionally *Daughter-in-law* was the least favored.[3] In all four types of work, her share, even in increase, could not lead to conclusive remarks. This is because, from Table 3, unlike the four categories, *husband*, *wife*, *son*, and *daughter*, which are relatively stable in number, *daughter-in-law* increased significantly, as the natural consequence of increasing number of *son* reaching the age of marriage. With the increase in share of *daughter-in-law* in the household, logically her amount of working time would also increase.

Table 5 Household Allocation of Time

	1989	1991	1993	1997	2000	2004	2006	2009
Farming								
Number of households declared	1433	1638	1564	1501	1481	1044	1006	959

[3] Fafchamps and Quisumbing (2003) also conclude that in Pakistan, daughters-in-law worked harder than the daughters.

Household average (days per week)	9.40	11.80	10.98	10.50	9.04	7.78	7.53	7.56
Share of Husband	0.35	0.35	0.35	0.37	0.37	0.40	0.41	0.40
Share of Wife	0.37	0.37	0.37	0.38	0.39	0.39	0.43	0.42
Share of Son	0.12	0.13	0.14	0.13	0.12	0.11	0.08	0.09
Share of Daughter	0.11	0.10	0.08	0.06	0.04	0.03	0.01	0.01
Share of Daughter-in-law	0.02	0.03	0.04	0.04	0.06	0.06	0.06	0.07
Share of Grandparent	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Share of Grandchild	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Sideline								
Number of households declared	1501	1561	1444	1347	1398	1228	1275	1216
Household average (days per week)	2.18	7.13	6.71	6.88	6.37	7.65	7.09	7.18
Share of Husband	0.27	0.22	0.22	0.24	0.24	0.30	0.31	0.31
Share of Wife	0.56	0.63	0.63	0.61	0.62	0.54	0.56	0.53
Share of Son	0.05	0.04	0.04	0.05	0.04	0.06	0.04	0.06
Share of Daughter	0.06	0.05	0.04	0.03	0.02	0.03	0.02	0.01
Share of Daughter-in-law	0.02	0.02	0.03	0.04	0.05	0.05	0.05	0.05
Share of Grandparent	0.05	0.03	0.03	0.03	0.03	0.02	0.01	0.02
Share of Grandchild	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Off-farm								
Number of households declared	1190	1257	1240	1313	1549	2052	2397	2401
Household average (days per week)	10.93	9.96	9.76	9.98	9.52	11.80	14.91	15.42
Share of Husband	0.43	0.36	0.34	0.31	0.32	0.29	0.23	0.21
Share of Wife	0.21	0.17	0.17	0.17	0.18	0.21	0.18	0.17
Share of Son	0.19	0.22	0.23	0.24	0.24	0.25	0.26	0.26
Share of Daughter	0.12	0.17	0.18	0.20	0.18	0.15	0.22	0.23
Share of Daughter-in-law	0.05	0.07	0.06	0.07	0.07	0.08	0.09	0.09
Share of Grandparent	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.00
Share of Grandchild	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.03
Chores								
Number of households declared	2268	2251	2187	2251	2493	2117	2382	2420
Household average (hours per week)	43.04	53.71	42.75	32.83	30.44	33.85	29.50	35.64
Share of Husband	0.12	0.12	0.09	0.09	0.11	0.13	0.15	0.15
Share of Wife	0.63	0.65	0.65	0.66	0.63	0.56	0.56	0.52
Share of Son	0.05	0.03	0.04	0.03	0.04	0.07	0.07	0.07
Share of Daughter	0.12	0.08	0.07	0.06	0.06	0.06	0.05	0.05
Share of Daughter-in-law	0.03	0.07	0.10	0.12	0.14	0.15	0.14	0.16
Share of Grandparent	0.06	0.05	0.04	0.03	0.03	0.02	0.02	0.02
Share of Grandchild	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02

Notes: 1) the sample is derived from CHNS surveyed rural households; 2) sideline includes livestock, fishing and garden. Off-farm activities include salaried activities and small business. Chores include cooking, washing clothes, house clearing and childcare; 3) the members declared having left home and worked outside are just assumed to have worked 48 hours per week in salaried activities, and did not participate in any other activities. They are also assumed to have spent no time on household chores; 4) data are missing on small business in 1989, on house clearing in 1989, 1991, 1993 and on childcare in 1989.

From these descriptive statistics, we make three observations. First, behind the fact that the elderly progressively reduced their activities outside household and reoriented to the works near or inside their households, and that the younger moved in opposite direction, human capital played a key role. The younger generation with higher education levels and with stronger physical force was more favored by labor market. Therefore, this is a rational supply response to rapid increase in demand by the market in cities.

Second, even though from descriptive statistics, we have observed meaningful changes in shares of working time across different family statuses among different activities, for some categories of family status, we cannot know whether these changes were due to time reallocation, or to the changes in share of them in the compositions of households. As noted,

daughter-in-law was the case. What we are interested is merely the time reallocation. We do not know whether women benefited more from the evolution of IHDL either. Their time evolution in chores was still less conclusive.

Third, the change in "hardness" of work for each family status can be estimated only in econometric estimations. The descriptive statistics of the sample may give rise to biased conclusions because the effects of other variables are not controlled for. Therefore, more convincing results rely on the subsequent regressions.

IV.2. Regression results

These results on market activities and chores are presented respectively in Tables 6 and 7. To begin with, we analyze the results on labor allocation according to family status. They also contain useful information on gender and human capital effects, because firstly, seven family statuses can be mostly regrouped according gender, and secondly, human capital levels are closely associated with age. Family statuses can be regrouped as the elderly (over a certain age, says, 50, mostly classified into *grandparent*, *husband* and *wife*), the young (between 18 to 50, and mostly classified into *son*, *daughter* and *daughter-in-law*), and the juvenile (under 18, mostly classified into *grandchild*). The young group has the highest level of human capital in terms of education and physical force, followed by the elderly, and the juvenile have the lowest level of human capital.

Table 6 Random-effects Tobit Regressions on Market Activities

	(1) Farming	(2) Livestock	(3) Garden	(4) Business	(5) Salaried activities
Lnhousehold_size	4.978	2.545	2.017	3.612	12.862
	(0.338)***	(0.233)***	(0.261)***	(0.463)***	(0.269)***
Husband	0.343	0.269	0.107	-0.156	0.517
	(0.200)*	(0.133)**	(0.151)	(0.355)	(0.184)***
Wife	0.107	0.408	0.438	0.110	2.534
	(0.215)	(0.148)***	(0.164)***	(0.411)	(0.214)***
Son	1.085	0.028	0.250	-0.043	1.145
	(0.093)***	(0.062)	(0.072)***	(0.181)	(0.099)***
Daughter	0.886	-0.037	0.003	0.001	-0.177
	(0.088)***	(0.060)	(0.068)	(0.171)	(0.090)**
Daughter-in-law	2.098	-0.097	0.078	0.528	-0.151
	(0.278)***	(0.197)	(0.227)	(0.436)	(0.253)
Grandparent	0.844	-0.016	0.295	-0.292	1.050
	(0.193)***	(0.130)	(0.151)*	(0.469)	(0.223)***
Grandchild	0.114	0.599	0.146	0.752	1.001
	(0.644)	(0.437)	(0.491)	(0.982)	(0.370)***
Trend_husband	-0.026	-0.051	-0.019	0.045	0.028
	(0.046)	(0.031)	(0.032)	(0.076)	(0.037)
Trend_wife	0.133	-0.043	-0.030	0.024	-0.320

	(0.050)***	(0.034)	(0.035)	(0.085)	(0.042)***
Trend_son	-0.065	0.047	0.011	0.078	-0.009
	(0.024)***	(0.016)***	(0.017)	(0.040)*	(0.021)
Trend_daughter	-0.095	0.044	0.045	0.047	0.172
	(0.021)***	(0.015)***	(0.015)***	(0.037)	(0.018)***
Trend_daughter-in-law	-0.358	-0.003	0.008	-0.046	0.250
	(0.056)***	(0.040)	(0.042)	(0.083)	(0.046)***
Trend_grandparent	-0.039	0.014	0.019	0.044	-0.093
	(0.069)	(0.048)	(0.050)	(0.112)	(0.056)*
Trend_grandchild	0.047	-0.020	-0.004	-0.050	0.055
	(0.115)	(0.081)	(0.086)	(0.163)	(0.065)
Members_outside	-11.120	0.389	-0.365	1.572	6.526
	(1.060)***	(0.774)	(0.822)	(1.871)	(0.893)***
Trend_member_outside	0.660	-0.617	-0.559	-1.029	0.586
	(0.183)***	(0.135)***	(0.137)***	(0.305)***	(0.144)***
Edu_male	-0.241	0.016	-0.071	-0.016	0.347
	(0.044)***	(0.029)	(0.034)**	(0.086)	(0.045)***
Age_male	0.034	-0.032	0.031	-0.062	0.305
	(0.055)	(0.038)	(0.041)	(0.098)	(0.052)***
Height_male	-0.039	-0.023	-0.006	0.016	0.127
	(0.022)*	(0.015)	(0.017)	(0.042)	(0.024)***
Edu_female	-0.175	-0.019	0.001	0.008	0.524
	(0.039)***	(0.026)	(0.030)	(0.079)	(0.042)***
Age_female	0.032	-0.052	-0.061	-0.012	0.056
	(0.054)	(0.038)	(0.041)	(0.091)	(0.052)
Height_female	-0.069	-0.011	0.000	0.050	0.045
	(0.024)***	(0.016)	(0.019)	(0.047)	(0.027)*
Age_sq_male	-0.076	0.029	-0.038	0.042	-0.271
	(0.065)	(0.044)	(0.049)	(0.115)	(0.059)***
Age_sq_female	-0.093	0.095	0.018	0.083	-0.089
	(0.064)	(0.044)**	(0.049)	(0.100)	(0.058)
Trend_edu_male	0.021	-0.018	-0.003	-0.006	-0.057
	(0.010)**	(0.007)***	(0.007)	(0.016)	(0.008)***
Trend_edu_female	0.014	0.001	-0.015	0.020	-0.074
	(0.008)	(0.006)	(0.006)**	(0.015)	(0.007)***
Trend_age_male	0.010	0.005	0.003	0.004	-0.016
	(0.005)**	(0.003)*	(0.003)	(0.008)	(0.004)***
Trend_age_female	0.000	-0.003	0.009	-0.007	-0.008
	(0.005)	(0.003)	(0.004)**	(0.009)	(0.004)*
Trend_height_male	0.003	0.002	-0.002	-0.002	-0.023
	(0.004)	(0.003)	(0.003)	(0.007)	(0.004)***
Trend_height_female	0.012	0.006	0.004	0.003	-0.009
	(0.005)**	(0.003)	(0.004)	(0.009)	(0.005)*
Lnlivestock	0.065	0.146	-0.032	-0.131	-0.547
	(0.033)**	(0.028)***	(0.027)	(0.055)**	(0.032)***
Lnbusines_tools	-0.021	-0.010	-0.031	0.102	0.065
	(0.016)	(0.012)	(0.012)**	(0.021)***	(0.014)***
Lnfarm_tools	0.055	0.022	0.045	-0.099	0.037
	(0.017)***	(0.012)*	(0.013)***	(0.027)***	(0.017)**
Lnland	1.849	0.333	0.068	-0.147	-0.228
	(0.117)***	(0.077)***	(0.089)	(0.160)	(0.092)**
Lnunearned	0.033	0.049	0.057	0.190	-0.103
	(0.076)	(0.060)	(0.057)	(0.076)**	(0.060)*
Share_pension	-1.203	-0.247	-0.366	-2.253	0.251
	(0.736)	(0.529)	(0.542)	(0.714)***	(0.517)
Share_rental	-0.391	-0.534	-0.815	-1.147	0.421
	(0.670)	(0.510)	(0.494)*	(0.665)*	(0.527)
Wave dummies	yes	yes	yes	yes	yes
Province dummies	yes	yes	yes	yes	yes
Constant	5.018	4.151	1.888	-8.329	-30.996

	(2.848)*	(1.834)**	(2.288)	(4.431)*	(2.716)***
Number of household	2459	2455	2455	1743	3494
Log likelihood	-31364.70	-24609.56	-24609.56	-10794.09	-39598.84
Wald chi2	3872.67	5355.90	5355.90	412.77	20812.28
Prob > chi2	0.000	0.000	0.000	0.000	0.000
Rho	0.154	.029	.029	.183	.106
Left-censored observations	7	32	32	77	86
Uncensored observations	10355	9256	9256	3640	12886

Notes: 1) the sample is derived from CHNS surveyed rural households; 2) regressions are on the basis of Equation (8); 3) dependent variables are measured in days per week; 4) standard errors are in parentheses; 5) * significant at 10%; ** significant at 5%; *** significant at 1%; 6) data on small business are missing in 1989.

Consider at first two major time allocations: farming and salaried activities in Table 6. In regression (1) on farming, at the starting wave, the mean coefficients were decreasingly ordered with *daughter-in-law*, *son* and *daughter*. The extents of decrease of these coefficients over time were also by the same order, with *daughter-in-law* enjoying the largest decrease. *Grandparent* and *husband* took a significant effort on farming, and *wife* increased time in farming over time.

In regression (5) on salaried activities, the results are roughly the inverse of that of farming: While *wife* took the first place in term of working time at the starting wave, she reduced it over time. *Daughter-in-law* and *daughter* increased their time over time, whereas their efforts at the starting wave were not significant. *Son* and *husband* were always significantly present in these activities. The evolution of allocation of time in salaried activities was linked with the disappearance of a large number of TVEs and the emergency of a lot of private enterprises. The former was mostly near or within villages where the households lived, while the latter was mostly located near or within cities. Doubtlessly the young people had higher capability of mobility to satisfy this change.

In regressions (2) and (3) on livestock and garden, *wife* played the first role, with *husband* and *son* the second role respectively. Over time, the younger generation (*son* and *daughter*) increased their time for recompensing the reduction of working time of their parents due to aging.

In regression (4) on small business, no significant differences in level and in trend were observed (excepting a slight increase with *son*). This seems to indicate a joint participation by all household members.

Turning to Table 7 on chores, in regression (1) on cooking, *grandparent* and *wife* were the most important participants at the starting wave, and reduced their participations over time.

Daughter was significant contributor and *grandchild* increased his contribution over time. On washing, *daughter-in-law*, *daughter* and *son* were by order the greatest contributors at the starting wave, whereas over time, by the same order, their contributions reduced. *Wife* increased her contribution over time. On house clearing, there was not significant division of labor among family statuses. At last, surprisingly, while childcare could be expected as a major activity of women, the absence of any family status effect indicates an equal contribution among family members in function of their free time.

Table 7 Random-effects Tobit Regressions on Chores

	(1) Cooking	(2) Washing	(3) House clearing	(4) Childcare
Lnhousehold_size	8.670	4.297	2.533	18.203
	(0.735)***	(0.223)***	(0.171)***	(2.029)***
Husband	-0.234	-0.063	0.303	1.531
	(0.456)	(0.139)	(0.209)	(1.832)
Wife	1.742	-0.098	0.014	2.356
	(0.522)***	(0.159)	(0.242)	(1.949)
Son	0.262	0.479	0.097	1.190
	(0.232)	(0.071)***	(0.114)	(0.945)
Daughter	0.571	0.575	0.123	-1.241
	(0.223)**	(0.068)***	(0.102)	(1.126)
Daughter-in-law	0.273	1.069	-0.032	2.694
	(0.693)	(0.211)***	(0.267)	(1.836)
Grandparent	2.156	-0.151	-0.176	1.764
	(0.492)***	(0.150)	(0.350)	(1.586)
Grandchild	-2.051	-0.034	0.057	6.294
	(1.022)**	(0.311)	(0.342)	(8.659)
Trend_husband	0.084	0.011	-0.076	-0.490
	(0.100)	(0.031)	(0.039)**	(0.417)
Trend_wife	-0.229	0.076	0.026	0.014
	(0.112)**	(0.034)**	(0.044)	(0.433)
Trend_son	-0.051	-0.070	-0.007	-0.016
	(0.055)	(0.017)***	(0.022)	(0.225)
Trend_daughter	-0.058	-0.089	-0.009	0.172
	(0.049)	(0.015)***	(0.019)	(0.237)
Trend_daughter-in-law	-0.090	-0.187	0.001	-0.069
	(0.132)	(0.040)***	(0.046)	(0.368)
Trend_grandparent	-0.438	0.056	0.080	-0.032
	(0.149)***	(0.046)	(0.072)	(0.498)
Trend_grandchild	0.374	0.021	0.005	-1.290
	(0.184)**	(0.056)	(0.058)	(1.433)
Members_outside	-6.493	-7.811	1.111	-9.577
	(2.667)**	(0.816)***	(0.902)	(10.478)
Trend_member_outside	-0.342	0.448	-0.700	-3.121
	(0.434)	(0.133)***	(0.138)***	(1.681)*
Edu_male	0.067	0.082	0.121	0.421
	(0.106)	(0.032)**	(0.055)**	(0.338)
Age_male	0.028	-0.024	0.049	0.126
	(0.132)	(0.040)	(0.040)	(0.479)
Height_male	0.003	-0.001	0.008	0.168
	(0.054)	(0.017)	(0.025)	(0.164)
Edu_female	0.348	0.088	0.001	-0.128
	(0.096)***	(0.029)***	(0.049)	(0.294)

Age_female	0.156	0.078	0.035	-0.840
	(0.133)	(0.041)*	(0.043)	(0.520)
Height_female	0.101	-0.026	0.022	-0.181
	(0.060)*	(0.018)	(0.030)	(0.184)
Age_sq_male	0.058	0.063	-0.059	-0.391
	(0.153)	(0.047)	(0.039)	(0.620)
Age_sq_female	-0.139	-0.025	-0.017	0.856
	(0.152)	(0.046)	(0.038)	(0.697)
Trend_edu_male	-0.007	-0.011	-0.011	-0.087
	(0.021)	(0.007)	(0.009)	(0.072)
Trend_edu_female	-0.065	-0.018	0.005	0.082
	(0.020)***	(0.006)***	(0.008)	(0.067)
Trend_age_male	-0.008	-0.001	0.004	0.018
	(0.010)	(0.003)	(0.004)	(0.040)
Trend_age_female	0.001	-0.010	-0.003	0.027
	(0.011)	(0.003)***	(0.005)	(0.044)
Trend_height_male	0.002	0.001	-0.002	-0.042
	(0.010)	(0.003)	(0.004)	(0.033)
Trend_height_female	-0.013	0.008	-0.004	0.034
	(0.012)	(0.004)**	(0.005)	(0.039)
Lnlivestock	0.279	-0.033	0.019	0.184
	(0.076)***	(0.023)	(0.008)**	(0.214)
Lnbusines_tools	-0.036	-0.009	-0.018	0.011
	(0.038)	(0.012)	(0.010)*	(0.103)
Lnfarm_tools	0.147	-0.001	-0.002	0.094
	(0.043)***	(0.013)	(0.059)	(0.116)
Lnland	0.486	0.061	-0.051	-0.173
	(0.244)**	(0.074)	(0.036)	(0.676)
Lnunearned	-0.084	-0.093	1.292	0.665
	(0.163)	(0.050)*	(0.345)***	(0.515)
Share_pension	1.336	1.121	0.747	-2.030
	(1.412)	(0.433)***	(0.319)**	(4.392)
Share_rental	0.701	0.864	2.533	-5.329
	(1.439)	(0.442)*	(0.171)***	(4.508)
Wave dummies	yes	yes	yes	yes
Province dummies	yes	yes	yes	yes
Constant	-18.696	-4.670	-4.962	45.244
	(6.253)***	(1.896)**	(2.254)**	(17.686)**
Number of household	3621	3621	3310	1995
Log likelihood	-74117.69	-52949.85	-28273.38	-14964.32
Wald chi2	4927.34	3727.42	1328.22	690.82
Prob > chi2	0.000	0.000	0.000	0.000
Rho	.009	.003	.022	.043
Left-censored observations	353	604	575	148
Uncensored observations	17461	17211	10693	3336

Notes: 1) the sample is derived from CHNS surveyed rural households; 2) regressions are on the basis of Equation (8); 3) dependent variables are measured in hours per week; 4) standard errors are in parentheses; 5) * significant at 10%; ** significant at 5%; *** significant at 1%; 6) Data are missing on house clearing in 1989, 1991, 1993, and on childcare in 1989.

On the base of the results of time allocation according to family statuses, we are able to retain some noteworthy features on this allocation by gender and human capital.

Firstly, on gender, Chinese IHDL has been far out of traditional mode of "women indoors and men outdoors". If also considering farming and sideline as outdoor activities, *wife* was the first contributor in livestock and garden, and performed more farm and sideline work than *husband*. *Daughter-in-law* and *daughter* were also the main labor contributors in farming during the early period. Among indoor activities, *wife* and *daughter* were main contributors only in cooking, and *daughter-in-law* and *daughter* in washing in early period. Even in house clearing and in childcare, women were not significantly main labor providers.

The most remarkable is that over time, the market development has oriented women into outdoor market activities, and freed them from indoor household chores. In salaried activities, *wife* was the first contributor at the starting wave. VTEs being near or inside villages, they could return home after work. Within young generation, gender difference was significantly lessened. While at the starting wave, the supply of labor in salaried activities by *daughter* and *daughter-in-law* was lower than that of *son*, over time, this difference disappeared. Their withdrawal from farming was more rapid than that of *son*. In traditional Chinese society, *daughter-in-law* was the least favored. This feature, still observed at the starting wave, changed considerably, indicating that *daughter-in-law* was no longer significantly disadvantaged by social norms. Their decrease in farming exceeded the increase of *wife* in farming, and their increase topped the decrease of *wife* in salaried activities, indicating an improvement in gender equality. The emancipation of women by market development was also manifested in allocation of labor in chores. In cooking, the decreasing role of *wife* was replaced by the increase of *grandchild*. In washing, the decrease of *daughter-in-law* and *daughter* exceeded the increase of *wife*.

In parallel with women emancipation, it can be observed also that over time, market development allocated the young, toward the outward and more profitable market activities, while *grandparent* (and to some extent, *grandchild*) towards less profitable semi-market activities (farming and sideline). Labor contribution of *wife* and *grandparent* were in decrease in salaried activities. *Son*, *daughter* and *daughter-in-law* were in increase in salaried activities, and in decrease in farming. *Grandparent* and *wife* were in increase in farming. In cooking, the decrease of *grandparent* and *wife* was compensated by the increase of *grandchild*. The labor contributions of *son*, *daughter* and *daughter-in-law* were in decrease in washing.

Lastly, the variables reflecting human capital, especially education levels, produced significant effects. In general, labors with lower level of human capital were allocated in farming and sideline activities, and those with higher level of human capital in salaried activities. The effects of average education levels of male and female were both significantly

positive in salaried activities while they were significantly negative in farming. Contrary to our expectation that these effects would last and strengthen, their trends, however, were significantly in decrease. The same trends were observed in terms of age and height. This seems to indicate a relaxing entrance requirement for the labor market, as the consequence of the enlargement of market demand asking for a larger-number, but less qualified labor.

V. Concluding remarks

In this study, a sample of Chinese rural households surveyed over 21 years was constructed to estimate whether market development led the intrahousehold allocation of time to be influenced more by human capital consideration and less by gender and family status.

Strong evidence has been found that rapid market development in rural China has meaningfully changed rural IHDL. Human capital consideration has become more prevalent. Social roles that were important in the past have lost ground to efficiency. On the basis of education level and physical force, household members with less favored family statuses improved their positions. Gender discrimination was widely reduced. Over time, more female labors were allocated into outside household and profitable market activities, and less in farming and sideline works, and in chores. Market development also allocated more young labor into outward-oriented market activities, and the elderly into land-linked works and chores. Juvenile labors were also observed to be charged more inward household works. The traditional rule of "women indoors and men outdoors" has been replaced by that of "the old indoors and the young outdoors". Lastly, a gradual relaxation of entrance requirements for the labor market in terms of education level, age and height was observed as the consequence of market development.

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