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Gender Patterns and Value of Unpaid Work

Findings from China's First Large-Scale Time Use Survey

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Acronyms

CHIP	China Household Income Project
GDP	Gross domestic product
NBS	National Bureau of Statistics
OLS	Ordinary least squares (statistical method)
SNA	System of National Accounts
SUR	Seemingly unrelated regression
TVE	Township and village enterprises
TUS	Time use survey
UNSD	United Nations Statistics Division

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Summary / Résumé / Resumen

Summary

Women throughout the world bear major responsibilities for unpaid work, which includes housework and taking care of people at home and in communities for no explicit monetary reward. Unpaid work is essential to the development of human capabilities and well-being. However, due to time constraints, unpaid work limits women's ability to participate equally with men in the labour market and reduces the time available to them for self-care, human capital investment, socializing with other people, political participation and relaxation. Despite its important implications for well-being and gender equality, unpaid work is not counted in conventional income and labour force statistics. The provision of household and care services, viewed as "the natural duty of women", is commonly taken for granted in policy making.

The authors take a close look at unpaid work using data from China's first large-scale time use survey (TUS) conducted in 2008. They document the gender patterns of time allocation over three activities: paid work, unpaid work and non-work activity (self-care and leisure). In China, as in many other countries, men spent more hours on paid work than women while women spent more hours on unpaid work than men. When the amount of time spent on paid and unpaid work was added together, women were found to have spent many more hours working than men did.

The authors next apply a seemingly unrelated regression (SUR) technique to estimate the trade-off between paid work, unpaid work and non-work activity. The estimates show consistently that almost all the changes associated with life events and economic situations that are considered in this study contribute to a widening of the female-male difference in total work time and a reduction in the time for self-care and leisure that is available to women relative to the time available to men. This finding suggests that women's propensity to trade off paid work for unpaid work is smaller than men's in Chinese society. Women are, however, not a homogeneous group; those who are more educated, come from families with higher income and receive higher wages have greater time autonomy.

Last, the authors apply five methods to assign a monetary value to unpaid work. Depending on the method used, the value assigned to unpaid work varies from 25 to 32 per cent of China's official GDP, from 52 to 66 per cent of final consumption and from 63 to 80 per cent of the gross products of the tertiary industry. These estimates show that unpaid work represents a huge contribution to national economic well-being.

The analysis reveals the tension between paid and unpaid work in China's new market economy. While both paid and unpaid work are essential to national well-being, as the analysis shows, the overriding concerns of the Chinese government in the post-reform period has been to improve the productivity of paid work and maximize growth of per capita GDP, assuming that the provision of domestic and care services will adjust itself accordingly. Consequently, market reforms have severely eroded the support and protection of both the government and employers for women's reproductive roles, exacerbating the work-family conflicts that Chinese women face. This development strategy is unfair to women and is also unsustainable in the long run. Hence, we call for greater policy attention to supporting the reproductive economy to ensure that the socially adequate supply of domestic and care services can be provided in a more gender-equitable manner.

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Résumé

Les femmes à travers le monde assument d'importantes responsabilités en effectuant des travaux non rémunérés—travaux ménagers et soins aux personnes à domicile et au niveau communautaire. Le travail non rémunéré est essentiel au développement des capacités et au bien-être des êtres humains. Cependant, faute de temps, il empêche les femmes de tenir une place égale à celle des hommes sur le marché du travail et réduit le temps qu'elles peuvent consacrer aux soins de leur personne, à leurs relations sociales, à la vie politique et aux loisirs. Bien qu'il ait des retombées importantes sur le bien-être et l'égalité entre hommes et femmes, le travail non rémunéré n'est pas compté dans les statistiques relatives au revenu et aux actifs. La prestation des services liés au ménage et aux soins, considérée comme "le devoir naturel des femmes", est généralement tenue pour acquise par les politiques.

Dans ce document, les auteures examinent de près le travail non rémunéré en utilisant les données provenant de la première vaste enquête menée en Chine sur les budgets-temps, qui date de 2008. Elles documentent le temps que consacrent hommes et femmes à trois activités: le travail rémunéré, le travail non rémunéré et les activités autres que le travail (les soins à leur personne et les loisirs). En Chine comme dans beaucoup d'autres pays, les hommes consacraient plus d'heures au travail rémunéré que les femmes, tandis que celles-ci passaient plus d'heures que les hommes à faire des travaux non rémunérés. Lorsqu'on a additionné le temps consacré au travail rémunéré et au travail non rémunéré, on s'est aperçu que les femmes passaient beaucoup plus d'heures à travailler que les hommes.

Les auteures appliquent ensuite une technique de régression apparemment indépendante (SUR) pour estimer le compromis fait entre le travail rémunéré, le travail non rémunéré et les activités autres que le travail. Les estimations montrent que presque tous les changements associés aux événements de la vie et aux conditions économiques qui sont considérés dans cette étude contribuent à creuser l'écart entre les hommes et femmes pour ce qui est du temps de travail total et du temps disponible pour les soins de leur personne et les loisirs, qui est plus réduit pour les femmes que pour les hommes. Cette constatation laisse à penser que les femmes trouvent moins facilement que les hommes un compromis entre travail rémunéré et travail non rémunéré dans la société chinoise. Cependant, elles ne constituent pas un groupe homogène; celles qui sont instruites, viennent de familles aisées et perçoivent des salaires relativement élevés sont plus libres de disposer de leur temps.

Enfin, les auteures appliquent cinq méthodes pour attribuer une valeur monétaire au travail non rémunéré. Selon la méthode utilisée, la valeur du travail non rémunéré varie de 25 à 32 pour cent du PIB chinois, de 52 à 66 pour cent de la consommation finale et de 63 à 80 pour cent du produit brut de l'industrie tertiaire. Ces estimations montrent dans quelle mesure le travail non rémunéré contribue à la prospérité de l'économie nationale.

L'analyse révèle la tension entre travail rémunéré et travail non rémunéré dans la nouvelle économie de marché chinoise. Si, comme le montre l'analyse, travail rémunéré et travail non rémunéré sont tous deux essentiels au bien-être de la nation, le gouvernement chinois s'est surtout préoccupé dans la période postérieure aux réformes d'améliorer la productivité du travail rémunéré et de maximiser la croissance du PIB par habitant, partant de l'idée que la prestation des services domestiques et des soins s'adapterait en conséquence. Aussi les réformes du marché ont-elles fortement érodé le soutien et la protection que les femmes chinoises assumant ce rôle de reproduction recevaient du gouvernement et de leurs employeurs et ainsi accentué le dilemme travail-famille devant lequel elles sont placées. Cette stratégie de développement, injuste pour les femmes, n'est pas tenable à la longue. Aussi demandent-elles que les décideurs politiques veillent davantage à soutenir l'économie de reproduction pour que la société ait suffisamment d'offres de services domestiques et de soins et que ces services soient plus équitablement répartis entre hommes et femmes.

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Resumen

Las mujeres del todo el mundo son las principales responsables del trabajo no remunerado, que incluye las labores del hogar y el cuidado de personas en la casa y la comunidad sin percibir ningún tipo de compensación monetaria explícita. El trabajo no remunerado es esencial para el desarrollo de las capacidades y el bienestar humanos. Sin embargo, por falta de tiempo el trabajo no remunerado limita la capacidad de la mujer para participar igual que el hombre en el mercado laboral y reduce el tiempo del que esta dispone para cuidar de sí misma, invertir en el desarrollo de su capital humano, socializar con otras personas, participar en la política y relajarse. A pesar de sus importantes implicaciones para el bienestar y la igualdad de género, el trabajo no remunerado no se toma en cuenta en las estadísticas convencionales relativas al ingreso y la fuerza laboral. La prestación de servicios domésticos y de cuidado, considerados "el deber natural de toda mujer", normalmente se da por sentada en la formulación de las políticas.

En este documento se analiza con mayor detalle el trabajo no remunerado a partir de datos de la primera encuesta a gran escala sobre el uso del tiempo en China que se realizó en 2008. Los autores comienzan por documentar los patrones de género en la asignación del tiempo en tres actividades: el trabajo remunerado, el trabajo no remunerado y la actividad no remunerada (autocuidado y recreación). En China, al igual que en muchos otros países, los hombres tuvieron muchas más horas de trabajo remunerado que las mujeres, mientras que estas tuvieron muchas más horas de trabajo no remunerado que los hombres. Al sumar la cantidad de trabajo remunerado y no remunerado, se obtuvo que las mujeres pasaron muchas más horas trabajando que los hombres.

Seguidamente los autores aplican una técnica de regresión aparentemente no relacionada para calcular el equilibrio entre el trabajo no remunerado, el trabajo remunerado y la actividad no remunerada. Los resultados muestran de forma sostenida que casi todos los cambios relacionados con los eventos de la vida y las situaciones económicas que se consideran en este estudio contribuyen a ampliar la diferencia entre hombres y mujeres en cuanto al tiempo total de trabajo y a la reducción del tiempo para el autocuidado y la recreación que la mujer tendría disponible en comparación con el tiempo disponible para el hombre. Este resultado indica que la propensión de la mujer a cambiar el trabajo no remunerado por el trabajo remunerado es menor que en el caso del hombre en la sociedad china. Sin embargo, las mujeres no conforman un grupo homogéneo; aquellas que tienen un nivel más alto de educación, aquellas que provienen de familias de mayor ingreso y aquellas que reciben salarios más altos tienen una mayor autonomía en el manejo de su tiempo.

Como última etapa del estudio, los autores aplican cinco métodos para asignar un valor monetario al trabajo no remunerado. Según el método utilizado, el valor asignado al trabajo no remunerado varía entre 25 por ciento y 32 por ciento del PIB oficial de China, entre 52 por ciento y 66 por ciento del consumo final y entre 63 por ciento y 80 por ciento de los productos brutos de la industria terciaria. Estos cálculos muestran que el trabajo no remunerado representa una enorme contribución al bienestar económico nacional.

Nuestro análisis revelan la tensión entre el trabajo remunerado y el no remunerado en la nueva economía de mercado de China. Si bien tanto el trabajo remunerado como el trabajo no remunerado son esenciales para el bienestar nacional, como se observa en nuestro estudio, el interés principal del gobierno chino durante el período posreforma ha sido mejorar la productividad del trabajo remunerado y maximizar el crecimiento del PIB per cápita, partiendo del supuesto de que la provisión de los servicios domésticos y de cuidado se ajustarán por sí solos. En consecuencia, las reformas de mercado han erosionado gravemente el apoyo y la

protección tanto del gobierno como de los empleadores del papel reproductivo de la mujer, lo cual ha exacerbado los conflictos entre familia y trabajo que enfrentan las mujeres chinas. Esta estrategia de desarrollo es injusta para la mujer y es además insostenible a largo plazo. Es por ello que los autores proponen que en la formulación de las políticas se preste una mayor atención al apoyo a la economía reproductiva para asegurarse de que se pueda obtener una provisión socialmente adecuada de servicios domésticos y de cuidado de una manera más equitativa desde el punto de vista del género.

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1. Introduction

Women throughout the world bear major responsibilities for unpaid work, which includes housework and taking care of people at home and in communities for no explicit monetary reward.[1] Unpaid work is essential to the development of human capabilities and well-being. Through its contribution to human and social capital formation, unpaid work also plays a pivotal role in generating and sustaining economic growth (Folbre and Nelson 2000). However, due to time constraints, unpaid work limits women's ability to participate equally with men in the labour market and reduces the time available to them for self-care, human capital investment, socializing with other people, political participation and relaxation (Cagatay et al. 1995). Despite its important implications for well-being and gender equality, unpaid work is not counted in conventional income and labour force statistics. The provision of household and care services, viewed as "the natural duty of women," is commonly taken for granted in policy making (Beneria 2003).

Feminist scholars have challenged conventional concepts of work and economic welfare, calling for unpaid work to be "counted" in economic statistics, "accounted for" in representations of the economy and "taken into account" in policy making (Elson 2000). The Beijing Platform for Action, adopted at the 1995 United Nations Fourth World Conference on Women, urged countries to develop "suitable statistical means to recognize and make visible the full content of the work of women and all their contributions to the national economy, including their contribution in the unremunerated and domestic sector" (United Nations 1996:25). Time use surveys (TUS) provide a unique statistical tool for analyzing unpaid work and its interaction with other human activities. Until the mid-1990s, however, most of the large-scale TUS were conducted in developed countries. TUS began to flourish in developing countries after the World Conference on Women in 1995. The National Bureau of Statistics (NBS) of China launched its first large-scale TUS in 2008.

This paper examines unpaid work using data from China's first national TUS. We first describe the gender patterns of time spent on three types of activity: paid work, unpaid work and non-work activity (personal care, training, leisure, and so on). Next, we apply a seemingly unrelated regression (SUR) technique to estimate the trade-off between the three types of activity. Finally, we evaluate the monetary value of unpaid work and compare the results with a range of macroeconomic indicators. Before presenting the statistical results, we briefly describe the 2008 China Time Use Survey (TUS) and the classification of time use activities adopted by this paper.

2. The 2008 China Time Use Survey and Activity Classification

The 2008 China TUS covers 37,142 individuals aged between 15 and 74 years from 16,661 households in 10 provinces, including Beijing, Hebei, Zhenjiang, Anhui, Henan, Guangdong, Sichuan, Yunnan and Gansu. The sample consists of 19,621 urban residents and 17,521 rural residents, and it includes 18,215 males and 18,927 females. The survey used a time diary approach in which respondents were asked to report what they did in each 10-minute interval over a 24-hour span on a weekday and a weekend day. The time diary gathered information on the primary activities and the secondary activities that were conducted simultaneously, the location where the primary activity took place, who the person was with when the primary activity started and modes of transportation if travel was involved. The information was subsequently post-coded according to a standard list of activities. Using a questionnaire instrument, the survey also obtained complementary information on respondents' age, sex, ethnicity, marital status, relationship to head of household, educational attainment, occupation,

[1] In this paper, the term "unpaid work" refers to the unpaid services excluded from the calculations of GDP based on the System of National Accounts (SNA) and the term "paid work" refers to all the activities included in the SNA production boundary. The definition of "unpaid work" in this paper is narrower than the one commonly used in the literature, which also refers to the unpaid activities included in the SNA production boundary, such as unpaid work in the family business or collection of fuel and water for family consumption.

income of the previous month (by a categorical measure) and the distance from home to the workplace or school. The summary statistics of respondents' characteristics are presented in table A1 in appendix 1.

Guided by the International Standard Activity Classifications introduced by the United Nations Statistics Division (UNSD) and EUROSTAT, the 2008 China TUS divides human activities into nine one-digit, 61 two-digit and 113 three-digit categories. The nine one-digit categories include:

- personal care and self-maintenance (0);
- wage employment (1);
- household production in primary industry (2);
- household-based production in manufacturing and construction industries (3);
- household-based services to generate income (4);
- housework for households' own consumption (5);
- care for household members (children and the elderly, sick or disabled), help to other households and community volunteer services (6);
- education and training (7); and
- recreation, leisure and social contact (8).

Following the approach taken by Budlender (2010), we focus on the activities reported as primary activities and aggregate the nine categories of activity into three broader groups. We first distinguish productive (work) and non-productive (non-work) activity by defining productive activity as an activity that, conceptually speaking, one could pay someone else to do in accordance with Reid's (1934) third party principle. Based on this principle, the activities of categories 0, 7 and 8 are non-productive activities (termed as non-work activity)[2] and the rest are productive activities. We next divide productive activities into those that would or would not be included in the System of National Accounts (SNA) production boundary. The SNA includes in its calculation of GDP all production of goods,[3] regardless of whether the goods are sold on the market or not, but it includes only the services that are conducted for the purpose of generating income. For the sake of expositional clarity, we use the term of "paid work" to describe the activities in categories 1 to 4 that are included in the SNA production boundary and the term of "unpaid work" to the activities in categories 5 and 6 (housework, care of persons and voluntary community services), which are excluded from the SNA boundary.[4]

3. Gender Patterns of Time Use

This section presents basic patterns of time use for Chinese women and men. Table 1 reports the data on labour force participation, unemployment and types of employment in terms of part-time (working less than 35 hours per week), standard full-time (working between 35 and 48 hours per week) and over-time (working more than 48 hours per week). As in many other countries, gender differences in these areas are observed in China: men aged between 15 to 74 years have higher labour force participation rates than women in the same age group (81.6 versus 70.7 per cent), their unemployment rates are lower than women's (2.8 versus 4.3 per

[2] It is noteworthy that education and training in category 7 resembles work more than non-work activity in categories 0 and 8 in that the time invested in education and training can lead to higher income in the future.

[3] Not all goods produced within the household are included in calculation of GDP. For instance, as Smith (2004) pointed out, breast milk is not included, even though it is a good and can be bought and sold in the market.

[4] Productive activities outside the SNA boundary are termed "unpaid care work" by Budlender (2010). We choose the term of "unpaid work" instead of "unpaid care work" due to the consideration that activities such as volunteer services are not all related to care provision. Household-based production and services for sales, that is, the activities in categories 2, 3 and 4 are often called "unpaid work" in the literature. We consider these activities as "paid work" in that their monetary values at the household level are recognized by the SNA, even though individual members do not receive financial compensation directly.

cent) and the proportion of part-time workers is lower for men than for women (19.6 versus 32.4 per cent). Dividing the sample in terms of rural versus urban sectors, we note that labour force participation rates for both sexes are higher in the rural sector than in the urban sector, while the opposite pattern is observed for unemployment rates. Noticeably, the between-sector difference in labour force participation for women (22.2 percentage points) is greater than the gender difference within each sector (13.7 percentage points lower for women than for men in the urban sector and 7.8 percentage points lower for women than for men in the rural sector). Much of the between-sector difference in labour force participation for women occurred among the youngest group (15 to 24 years old) and the older groups of 45 years old and above, reflecting the fact that young urban women are more likely than their rural counterparts to study in school instead of entering the labour force and that urban women tend to withdraw from the labour force at a much younger age.

Table 1: Labour force participation, unemployment and distribution of paid working hours for Chinese men and women aged 15 to 74 years

	All		Urban Sector		Rural Sector	
	Male	Female	Male	Female	Male	Female
Labour force participation rate (%)	81.6	70.7	73.4	60.4	90.4	82.6
By age (%)						
Age 15–24	43.2	46.1	29.1	35.2	55.7	56.2
Age 25–34	95.2	89.4	94.1	88.4	96.7	91.1
Age 35–44	95.8	89.2	94.6	86.3	97.2	92.4
Age 45–54	93.8	72.9	90.5	58.5	97.3	88.3
Age 55–64	71.9	45.2	44.4	13.7	92.9	74.0
Age 65–74	36.8	23.8	6.9	5.6	78.8	56.4
Unemployment rate (%)	2.8	4.3	5.3	8.5	0.6	0.7
Distribution over paid working hours (%)						
Part-time 1 to 34 hours/week	19.6	32.4	22.3	29.9	17.3	34.6
Full-time 35 to 48 hours/week	27.6	29.8	42.7	43.4	14.4	18.3
Over-time 49 and above hours/week	52.8	37.7	35.0	26.7	68.3	47.1

The between-sector difference for women in the older age group is indicative of the gendered impacts of China's ongoing institutional and economic transformations. As a result of the transition from a centrally planned to a market economy, China's public sector underwent a dramatic restructuring in the late 1990s. During the restructuring, a large number of urban women in their late 40s and 50s were laid off or forced to take earlier retirement, and many have experienced difficulty re-entering the labour market since then (Appleton et al. 2002; Ding et al. 2009). The economic transition has also been marked by reduced state control over labour mobility, resulting in a sharp increase in internal migration from rural to urban areas. However, rural-urban migration flows are dominated by young people and male workers, which has contributed to the feminization of agricultural production, pushing up the labour force participation of women in the older age group in rural areas (Chang et al. 2011).

Table 2 presents the mean time that men and women spend in paid work, unpaid work and non-work activity. In this table, the number of hours for the three types of activity adds up to 168, which is the total number of hours in a week. In China, as in other countries, men spend more time than women on paid work whereas women spend more time than men on unpaid

work. The female-male time gap for paid work is 11.3 hours per week, while the gap for unpaid work is 16.7 hours per week. The gender gap in each type of work is more pronounced for the rural sector than for the urban sector. Overall, women spend 5.4 fewer hours per week on non-work activity than do men. Dividing unpaid work into four components (housework, childcare, adult care and volunteer work), we note that women spend markedly more time than men on housework and childcare, while the mean number of hours spent on adult care and volunteer work is similar between women and men.

Table 2: Mean time spent on activities by Chinese men and women aged 15 to 74 years (hours/week)

	All		Urban		Rural	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
Paid work	42.0	30.7	33.0	25.0	51.7	37.3
Unpaid work	10.6	27.3	12.9	27.6	8.1	26.9
Non-work activities	115.2	109.8	121.8	115.2	108.0	103.6
Unpaid work						
Housework	8.1	22.3	10.0	22.5	6.1	21.9
Child care	1.3	3.6	1.5	3.2	1.0	4.0
Adult care	0.2	0.2	0.2	0.3	0.1	0.1
Volunteer	0.4	0.4	0.3	0.4	0.5	0.4
Proportion of time spent on unpaid work in total working time (%)						
	20.2	47.1	28.1	52.4	13.5	41.9

Source: 2008 China TUS.

4. The Determination of Time Allocation

In this section, we examine the determination of time allocation between activities. The analysis intends to address the following questions: How do women and men adjust the time spent on paid work, unpaid work and non-work activity in response to changes in life events and in economic standing? Are women and men equally capable of trading off one type of activity for another? The gender pattern of the relationships among the three types of activity sheds light on the work-family conflicts facing women and men in China.

Becker's (1965) theory of time allocation provides a neoclassical economic framework for analyzing how women and men allocate time between market work and home production. According to this theory, men specialize in market work and women in home production because men receive a higher market wage than women and women are more productive than men in home production (Becker 1985; Gronau 1986). Assuming that family members are altruistic toward each other and that they all dislike work and enjoy leisure, one would expect that while women and men may play different roles in market work and home production, the total work time (or its obverse, the non-work time) should be evenly distributed between women and men (Bittman and Wajcman 2000). To achieve gender equality in total work, women and men should be equally capable of substituting one type of work for another. Feminists have contested the neoclassical interpretation, arguing that the gender division of labour results from deep-rooted social norms regarding the distribution of responsibility for housework and care (Folbre 2004). According to this view, the choice available to women in time allocation is more limited than the choice available to men; women who allocate more time to paid work may do so at the expense of their leisure instead of their unpaid work, and only men have the option to substitute market work for domestic labour.

Empirical evidence of the trade-off between work and non-work activities is mixed. Some studies show that women's massive entry into the labour force in recent decades has not been followed by a more even distribution of the responsibility for domestic chores and care between women and men (Hochschild 1989). As a result, women's participation in paid work has been associated with an increased double burden, decreased leisure and lower well-being.[5] Other studies indicate that while there remain marked gender gaps in paid and unpaid work in almost all countries, gender differences in the total amount of work have declined with the rise in per capita income, and an equal distribution of total work between women and men has actually been achieved in a number of high income countries (Burda et al. 2007).

Much of the research on these issues has focused on developed countries, and empirical studies on the trade-off between different activities for developing countries are sparse. Using survey data on workers in township and village enterprises (TVEs) in China, MacPhail and Dong (2007) examined how the paid work of women and men affects their hours of domestic labour. The estimates in that study show that the number of hours spent in paid work is associated with a reduction in the hours spent in domestic work for men, but not for women. On the other hand, the market wages for paid work reduce domestic working time for both women and men. In that paper, the effects of paid work on domestic work time were estimated by regressing domestic work on paid work and a host of covariates. Instrumental-variable estimation techniques were applied to control for potential simultaneous bias in that study, but when that approach is used, there is always a concern about the quality of the instrumental variables that are available.

In this paper, we examine the interdependence of paid work, unpaid work and non-work activity using the seemingly unrelated regression (SUR) technique.[6] With the SUR technique, we estimate the three types of activity simultaneously. To capture the fact that under the time constraint, variations in the amount of time in one activity must be compensated by changes in the other activities, the SUR equation system is estimated under two restrictions: first, the sum of intercepts of the system is equal to the total number of hours per week, that is, 168 hours; and second, the sum of coefficients of each explanatory variable over all activities is equal to zero. Thus, within the restricted SUR system, the concern about simultaneous bias is minimized.

The regression model is written below:

$$H_{ji} = \beta_{j0} + \beta_{j\gamma} X_i + u_{ji} \qquad (1)$$

$$\sum_{j=1}^{3} \beta_{j0} = 168 \text{ and } \sum_{j=1}^{3} \beta_{j\gamma} = 0 \text{ for all } \gamma = 1, 2, \ldots K$$

where j = 1, 2 and 3 represents paid work, unpaid work and non-work activity, respectively; i is the index for individuals; γ is the index for explanatory variables; H is number of hours per week; X is a vector of covariates; β_0 is the intercept; β_γ is the slope coefficient; and u is the error term.

The covariates in X include gender, marital status, presence of children aged six years or younger, household size, age and its squared term, years of schooling, unearned income in log form, predicted wage rates in log form, employment status and province dummy variables. Given that there is no information on household members younger than 15 years or older than 74 years in the dataset, the variable for having young children in the household is derived from the information on whom the individual was with at the beginning of an activity recorded by the survey; this variable is defined as equal to one if any household member reports being with

[5] Elson 1995; Floro 1995; Koggel 2003.

[6] The empirical analysis presented in this section follows the procedure first introduced by Neuwirth (2007). Kimmel and Connelly (2007) applied a SUR Tobit-type model to analyze the determinants of time allocation. Following Neuwirth (2007), we adopted a SUR ordinary least squares (OLS) type approach because time use specialists have suggested that OLS is statistically more appropriate than Tobit for analyzing time diary data (Stewart 2009).

a child aged six years or younger, and zero otherwise.[7] Household size is defined as the number of household members aged between 15 and 74 years plus the dummy variable for children present. We acknowledge that the variable of household size may understate the actual size of a household if the household has more than one child younger than 15 years of age or if it has adults older than 74 years of age. Unearned income, measured in yuan per month, is the sum of income earned by other household members, calculated as the middle point of each income class. Predicted wage rates, measured in yuan per hour, are derived from the estimates of wage equations presented in table A2 in appendix 2.[8]

Table 3 presents the SUR estimates of equation (1) by sector. The main purpose of the regressions presented in this table is to estimate *ceteris-paribus* gender differences in time allocation and explore the differences between the urban and rural sectors. The intercepts measure the mean weekly hours spent on each type of activity by a male in a given sector who is not married, has no young children, is aged between 15 and 24 years, is employed and resides in Beijing, with the continuous covariates equal to zero. Comparing the intercept estimates for the rural and urban sectors, we note that urban males with the aforementioned characteristics spent 5.1 fewer hours on paid work each week and 8.3 more hours on non-work activity than their rural counterparts did. We next examine the estimates for gender, which is the variable of primary interest. The estimates indicate that, other things being equal, urban women spent three fewer hours on paid work each week, 13.5 more hours on unpaid work and 10.5 fewer hours on non-work activities than urban men. A similar pattern of gender differences is observed for the rural sector, with the female-male gaps of -11.3 hours for paid work, 18.3 hours for unpaid work and -7 hours for non-work activity. These estimates are in line with the proposition that women's ability or propensity to substitute one type of work for another is more limited than men's – most likely due to socially prescribed gender roles. As a result, women have to cope with the dual demands of market work and domestic responsibility by having less time for self-care and leisure than is available to men. While the gender patterns are qualitatively the same for the urban and rural sectors, there are noticeable differences in the size of the gap between the two sectors. Compared with the urban sector, the gender gaps in both paid and unpaid work are larger for the rural sector while the gap in non-work activity is smaller. The between-sector differences may partly reflect the fact that the nature of paid work is more flexible in terms of time schedules in the rural sector than in the urban sector. It may also be the case that due to biological needs and social norms, there is a lower limit to the amount of time for self-care and leisure, which prevents rural women from cutting their non-work time any further to offset the extra time that they have to spend on domestic labour. Indeed, summing up the between-sector differences in both the intercepts and gender effects, we note that rural workers of both sexes spent more time working than did urban workers and the amount of time in non-work activity is the smallest for rural women relative to other groups.

[7] Note that, according to this definition, a person is considered "living in the household with children aged six years or younger present" as long as one household member reports being with a young child at some time either on a workday or a weekend day, even if that person themselves is not with a young child at any time.

[8] Wage rates were obtained by dividing the mid-point of each income class by the number of hours spent in paid work per month. Wage equations were estimated by OLS, separately, for women and men with positive incomes. We did not correct for potential selection bias because we did not have adequate information on excludable variables.

Table 3: SUR estimates of the determinants of time allocation by sector

	Urban Sector			Rural Sector		
	Paid work	Unpaid work	Non-work	Paid work	Unpaid work	Non-work
Constant	36.127***	–1.735*	133.608***	41.317***	1.381	125.302***
	1.155	0.876	1.128	1.636	1.049	1.363
Female	–3.022***	13.554***	–10.532***	–11.254***	18.334***	–7.080***
	0.340	0.257	0.332	0.483	0.310	0.403
Married	0.812	4.429***	–5.241***	2.045**	4.547***	–6.591***
	0.494	0.375	0.482	0.745	0.478	0.621
Child 0–6	–1.290***	5.405***	–4.115***	–5.383***	7.009***	–1.626***
	0.332	0.251	0.324	0.411	0.264	0.342
Household Size	1.132***	–1.633***	0.501*	0.247	–1.173***	0.926***
	0.218	0.165	0.213	0.220	0.141	0.183
Age 25–34	6.821***	11.078***	–17.899***	4.080***	3.527***	–7.607***
	0.757	0.574	0.739	1.000	0.641	0.833
Age 35–44	5.450***	13.180***	–18.630***	4.939***	2.383***	–7.322***
	0.860	0.652	0.840	1.073	0.688	0.894
Age 45–54	1.273	13.556***	–14.828***	3.781***	3.367***	–7.148***
	0.857	0.650	0.837	1.055	0.677	0.879
Age 55–64	–5.982***	16.491***	–10.509***	1.046	5.613***	–6.659***
	0.829	0.628	0.809	0.951	0.610	0.793
Age 65–74	–8.674***	14.509***	–5.835***	–4.821***	6.104***	–1.284
	0.802	0.608	0.782	1.131	0.726	0.943
Schooling	–0.858***	–0.302***	1.161***	–0.723***	–0.194***	0.918***
	0.115	0.087	0.112	0.085	0.055	0.071
Log unearned income	–0.340***	0.140***	0.199***	0.189**	0.005	–0.194***
	0.051	0.038	0.049	0.066	0.042	0.055
Log wage rate	6.133***	0.820	–6.954***	8.494***	1.348	–9.844***
	0.823	0.624	0.803	1.235	0.792	1.029
Unemployed	–27.901***	12.227***	15.674***	–29.237***	4.182**	25.054***
	0.637	0.483	0.621	2.345	1.504	1.955
Inactive	–24.899***	8.090***	16.809***	–26.496***	4.215***	22.280***
	0.370	0.280	0.361	0.577	0.370	0.481
Hebei	2.066***	0.456	–2.522***	4.528***	1.528*	–6.057***
	0.623	0.472	0.608	0.978	0.627	0.815
Heilongjiang	3.822***	0.662	–4.485***	8.345***	0.778	–9.123***
	0.731	0.554	0.714	1.223	0.785	1.020
Zhejiang	–0.567	–1.637***	2.204***	5.699***	–2.043***	–3.656***
	0.609	0.462	0.595	0.872	0.560	0.727
Anhui	2.863***	1.691***	–4.554***	4.032***	2.574***	–6.607***
	0.646	0.490	0.630	0.916	0.587	0.763
Henan	2.103***	–0.737	–1.365*	3.062**	2.464***	–5.527***
	0.593	0.449	0.579	0.995	0.639	0.830
Guangdong	–0.123	–2.270***	2.392***	2.527**	0.396	–2.922***
	0.556	0.421	0.543	0.932	0.598	0.777
Sichuan	2.534*	–0.134	–2.400*	13.641***	–1.376	–12.269***
	1.045	0.792	1.020	1.177	0.755	0.981

Yunnan	3.675***	–0.786	–2.889***	16.555***	–2.138**	–14.419***
	0.757	0.573	0.738	1.233	0.791	1.028
Gansu	2.114**	0.771	–2.885***	7.636***	1.797*	–9.433***
	0.815	0.618	0.796	1.182	0.758	0.985
R^2	0.453	0.368	0.400	0.284	0.340	0.306
χ^2	16278.8	11426.6	13221.7	6964.1	9015.8	7822.7
p value	0.0	0.0	0.0	0.0	0.0	0.0
N	19,621			17,521		

Notes: Figures presented below the coefficient estimates are standard errors. ***, ** and * denote significance levels of 1 per cent, 5 per cent and 10 per cent, respectively. The omitted groups include those who are unmarried, male, aged between 15 to 24 years, employed, have no children aged under seven years present and reside in Beijing.

Turning to the other estimates, we find that most results are relatively similar between the two sectors. With respect to age effects, the estimates show that in both urban and rural sectors, the amount of time spent in paid work varies with age in an inverted U-shaped pattern; the amount of time in non-work activity varies with age in a U-shaped pattern; and the amount of time spent in unpaid work increases more or less monotonically with age. Moreover, an increase in years of schooling reduces the amount of time spent on work of either type and increases the amount of time spent on non-work activity. Additionally, as expected, a change in wage rates is positively related to the amount of time spent on paid work and is negatively related to the amount of time spent on non-work activity.

Table 4 presents the SUR estimates of equation (1) for women and men separately.[9] The purpose of the regressions presented in this table is to explore the differences between women's and men's response to exogenous changes. The intercepts presented here measure the mean weekly hours spent in each type of activity by a rural resident of a given sex who is not married, has no young children, is aged between 15 and 24 years, is employed and resides in Beijing,[10] with the continuous covariates equal to zero. The estimates indicate that rural women with the characteristics described above spent 36.7 hours each week on paid work, 10.0 hours on unpaid work and 121.7 hours on non-work activity. For rural men, these estimates are 50.2 hours, 1.8 hours and 115.9 hours, respectively. The estimates for the urban dummy variables suggest that gender differences in paid work and unpaid work are smaller in the urban sector than in the rural sector and the difference in non-work activity is greater in the former than in the latter, other things being equal. Regarding marriage effects, we find that marriage decreases paid work time for women and increases paid work time for men. However, marriage increases unpaid work time for both women and men, but the increase is greater for women than for men by a wide margin. Overall, marriage increases women's total work time more than men's, thereby resulting in a greater reduction in women's non-work time. Having young children reduces paid work time and increases unpaid work time for both women and men, but once again, it results in a greater reduction in non-work time for women than for men. Living in a larger household decreases unpaid work hours and increases non-work hours for both sexes, but the effects are stronger for men than for women. With respect to age effects, the estimates show that both women and men spend more time on non-work activity at the two ends of their life course and more time on paid work in the middle phase, while their time in unpaid work increases monotonically with age. Despite the similarities, women in every age group from 25 years onward appear to spend three to four fewer hours per week on non-work activities than their male counterparts.

[9] We also estimate gender-specific SUR equations by sector and find the gender patterns between the rural and urban sectors are similar. To streamline the presentation, we only report the gender-specific estimates for the sample of rural and urban combined.

[10] There are many rural counties under the jurisdiction of Beijing.

Table 4: SUR estimates of the determinants of time allocation by gender

	Female			Male			Female–male difference in change in non-work time
	Paid work	Unpaid work	Non-work	Paid work	Unpaid work	Non-work	
Constant	36.743***	9.986***	121.270***	50.244***	1.830**	115.925***	5.345
	1.177	0.915	1.034	1.222	0.697	1.116	
Urban	–9.447***	0.995*	8.453***	–14.143***	3.092***	11.052***	–2.599
	0.582	0.452	0.511	0.593	0.338	0.542	
Married	–1.902***	9.050***	-7.148***	3.886***	1.066**	–4.952***	–2.195
	0.575	0.447	0.505	0.645	0.368	0.589	
Child 0–6	–5.382***	9.252***	-3.870***	–1.057**	3.308***	–2.251***	–1.619
	0.365	0.284	0.321	0.377	0.215	0.344	
House-hold size	0.300	–0.778***	0.477**	0.390	–1.353***	0.964***	–0.487
	0.206	0.160	0.181	0.211	0.120	0.193	
Age 25–34	5.203***	9.057***	–14.260***	6.575***	4.500***	–11.075***	–3.185
	0.822	0.638	0.722	0.890	0.508	0.813	
Age 35–44	4.923***	10.411***	–15.333***	5.139***	5.777***	–10.916***	–4.417
	0.868	0.675	0.763	0.991	0.565	0.906	
Age 45–54	1.506	11.883***	–13.389***	3.172**	5.765***	–8.937***	–4.452
	0.860	0.669	0.756	0.982	0.560	0.897	
Age 55–64	–3.208***	14.276***	–11.067***	–2.015*	8.966***	–6.951***	–4.116
	0.836	0.650	0.735	0.926	0.528	0.846	
Age 65–74	–4.885***	11.256***	–6.371***	–9.118***	10.708***	–1.590	–4.781
	0.928	0.721	0.816	0.955	0.544	0.872	
Schooling	–0.733***	–0.129*	0.862***	–1.071***	0.038	1.033***	–0.171
	0.079	0.061	0.069	0.112	0.064	0.102	
Log unearned income	0.088	–0.137**	0.049	–0.074	0.058	0.017	–0.032
	0.061	0.048	0.054	0.055	0.031	0.050	
Log wage rate	8.331***	-1.218*	–7.113***	5.330***	0.691	–6.022***	–1.091
	0.790	0.614	0.694	0.894	0.510	0.817	
Unemployed	–27.859***	13.474***	14.385***	–28.240***	7.405***	20.835***	–6.450
	0.901	0.700	0.792	1.042	0.594	0.952	
Inactive	–25.006***	7.692***	17.315***	–27.117***	4.013***	23.104***	–5.789
	0.404	0.314	0.355	0.496	0.283	0.453	
Hebei	3.163***	0.583	–3.746***	2.938***	0.573	–3.511***	—
	0.735	0.571	0.646	0.743	0.424	0.679	
Heilongjiang	5.589***	1.068	–6.657***	5.650***	–0.484	-5.166***	—
	0.857	0.666	0.753	0.883	0.503	0.807	
Zhejiang	3.718***	–2.123***	–1.595*	1.357	–1.331**	–0.026	—
	0.717	0.557	0.630	0.722	0.412	0.660	
Anhui	2.111**	2.403***	-4.514***	3.569***	0.961*	-4.530***	—
	0.720	0.560	0.633	0.730	0.416	0.667	
Henan	2.928***	-0.083	-2.846***	2.431***	0.379	-2.811***	—
	0.719	0.559	0.632	0.731	0.416	0.667	
Guangdong	3.316***	–1.327*	-1.989**	-0.932	-0.994*	1.926**	—
	0.708	0.550	0.622	0.710	0.405	0.648	

Sichuan	12.837***	-3.582***	-9.256***	6.022***	-0.578	-5.447***	—
	0.966	0.751	0.849	0.992	0.565	0.906	
Yunnan	11.262***	-4.297***	-6.966***	6.116***	1.020*	-7.138***	—
	0.871	0.677	0.766	0.884	0.504	0.807	
Gansu	5.934***	-0.491	-5.443***	2.136*	2.423***	-4.559***	—
	0.876	0.681	0.770	0.904	0.515	0.825	
R^2	0.368	0.220	0.382	0.409	0.133	0.394	
chi2	11,043.4	5,335.9	11,780.5	12,622.9	2,792.8	11,999.5	
p value	0.0	0.0	0.0	0.0	0.0	0.0	
N	18,927			18,215			

Notes: Figures presented below the coefficient estimates are standard errors. ***, ** and * denote significance levels of 1 per cent, 5 per cent and 10 per cent, respectively. The omitted groups include those who are unmarried rural residents, aged between 15 to 24 years, employed, have no children aged under seven years present and reside in Beijing. The female-male differences in non-work time associated with regional effects are omitted in the last column.

We next look at human capital and economic variables. The estimates show that education has a negative effect on the amount of time women spend on both paid and unpaid work and a positive effect on their non-work hours. For men, education has a negative effect on the time spent in paid work and a positive effect on non-work time, but it has no effect on men's unpaid work. Additionally, unearned income has a negative effect on women's unpaid work hours but it has no effect on men's. Furthermore, as one would expect, wage rates are positively correlated with paid work hours and negatively correlated with non-work hours for both sexes. Although higher wage rates are associated with a decline in women's unpaid work hours, they have no effect on men's unpaid work. These estimates suggest that women who are more educated, come from families with a higher income or are better paid have a greater ability to reduce their domestic work burdens and enjoy more time autonomy. Finally, life events such as unemployment and economic inactivity increase the amount of time spent on unpaid work and non-work activity for both men and women. However, while these life events reduce paid work by almost the same amount for both sexes, unemployed or economically inactive women take on more unpaid work and consequently have 5 to 6 fewer hours per week for non-work activities than their male counterparts.

A strikingly consistent gender pattern emerging from the estimates discussed above is that almost all the changes associated with life events and economic situations that are considered in this study contribute to a widening of the female-male difference in total work time and a reduction in the time for self-care and leisure that is available to women relative to the time available to men (see the last column of table 4). This finding suggests that women's propensity to trade-off paid work for unpaid work is smaller than men's in Chinese society.

5. The Monetary Value of Unpaid Work

The objective of this section is to assign a monetary value to unpaid work and to compare the values that result with a range of macroeconomic indicators. There are two main reasons for undertaking this exercise. First, unpaid work generates wealth and contributes substantially to a country's welfare; however, this contribution to welfare goes unnoticed in the conventional GDP calculation. Failure to account for the value of unpaid work results in an undervaluation of a country's welfare. When domestic services that have traditionally been performed as unpaid work are commercialized, on the other hand, the result may be an overestimation of economic growth. Second, given that women perform the largest share of unpaid work, the omission of unpaid work from the measure of GDP results in an undervaluation of women's contribution to the economy. As a consequence, women's entitlements to a fair share of the income generated by the market sector are often inadequately recognized, and the needs that they face in performing their unpaid family responsibilities are commonly overlooked by policy makers. Hence, an explicit monetary valuation of unpaid work should help to raise public

awareness of women's contribution and should lead to greater recognition of their need for support from society at large (Budlender 2010).

While the valuation of unpaid work has become a regular statistical undertaking in developed countries, this type of endeavor has just started to emerge in developing countries. The remainder of this paper provides the first estimation of the monetary value of unpaid work for China.

Methods of valuating unpaid work

The value of unpaid work can be determined using either an output or an input approach. The idea behind the output approach is to assign a value to the output produced by unpaid work by multiplying the quantity of the output by the price of a corresponding good produced in the market. This method requires that a market price be found for each of the services provided as unpaid work and that data on the quantity of the services provided and consumed be made available. The data requirements associated with the output-based method represent a severe constraint for the adoption of this method, particularly in the case of developing countries (Charmes and Unni 2004).

The input approach calculates the value of the output produced by unpaid work by focusing solely on the value of labour inputs. The value of unpaid work as calculated by this method is equal to the time spent in various activities multiplied by the corresponding wage rates. The input approach may involve either an opportunity cost method or a replacement cost method. The opportunity cost method sets the value of unpaid work as equal to the income that the person who performs the unpaid work could have earned in the labour market if s/he had performed paid work rather than unpaid work. For individuals who are employed, the opportunity cost of unpaid work is equal to the market wage rate that they earn. For non-employed individuals, the opportunity cost is estimated by either their "potential wages" (that is, the average wage of an employed person with the same observed market characteristics) or by their "reservation wage" (that is, the wage rate at which a typical individual with the same market characteristics would be indifferent between a unit of time assigned to paid work and a unit of time assigned to unpaid work) (Sousa-Poza et al. 2001). One drawback of the opportunity cost method is that it places a higher value on the domestic work of individuals whose market productivity is higher. One way to minimize this discrepancy is to use the average wage for all people (or all people of a particular sex) in the economy instead of the actual or predicted wage of the person who performed the unpaid work (Sousa-Poza et al. 1999; Budlender 2010).

The replacement cost method calculates the value of unpaid work by computing what it would cost to hire someone to do it. This method can be divided further by distinguishing between the generalist and the specialist approaches. While the generalist method sets the value of unpaid work at the wage of a housekeeper, the specialist method estimates market costs by first determining how much time is spent on each specific activity and then using the wage rates that apply to specialists (such as a cook, a gardener or an accountant) to calculate the value of the time spent on these non-market activities. One concern about the replacement cost method is that the quality and productivity of the substitute hired from the market may differ from the quality and productivity of the person doing unpaid work. On the one hand, the substitute from the market might be more productive as a result of having received special training. On the other hand, the market replacement method may fail to capture the value of "personal and emotional care" in unpaid domestic work (for example, the care one provides to one's own children), thus yielding values of unpaid work that are too low (Folbre and Nelson 2000). Another concern about the generalist method is that it may generate a downward bias because the average earnings of domestic workers tend to be lower than the wages of most other occupations. Despite the shortcomings of this approach, however, the replacement cost method using the wages of generalist workers as the standard is generally preferred to other input-

based methods because it has lower data requirements and its results are more consistent (Varjonen et al.1999).

The valuation of unpaid work has proven to be more challenging in developing countries because of economic dualism and market limitations. It is difficult to estimate the opportunity costs for rural workers who typically work on family farms and do not earn wages. It is also unclear what would be the replacement cost of unpaid work in rural areas where the markets for domestic services are either rudimentary or nonexistent.

The approaches used in this paper

We applied an input-based approach instead of an output-based approach because we did not have the data that would have been required for the latter approach. In light of the limitations of each input-based method discussed above, we adopted five methods to compute the monetary value of unpaid work and compared the results. We also computed the value of unpaid direct care of persons (children, the elderly, sick or disabled), separately. The first method applied is the opportunity cost method. The calculation procedure is illustrated in tables A3 and A4 in appendix 3.[11] Using information from the 2008 China TUS, we first calculated hourly earnings by dividing the mid-point of each income class by the number of hours spent on paid work per month. The mean earnings for each sex-disaggregated education class were then calculated using actual earnings for those who reported both positive earnings and positive paid work hours, and predicted earnings were calculated for those who reported zero earnings or zero hours spent on paid work. The predicted earnings were computed using the estimates of the sex-specific earnings regression which control for educational attainment, potential experience and its squared term, and dummy variables for urban residents and provinces. The earnings regressions are presented in table A2 in appendix 2. We next calculated sex-specific average opportunity costs and mean hours on unpaid work per day, using the distribution of individuals in the sample over five education classes for each sex as the weights. The total value of unpaid work was obtained by multiplying the value of unpaid work hours per day per person by 365 days and the total population of each sex aged between 15 and 74 years of age[12] and then summing up the two sex-specific aggregates obtained. The opportunity cost method described above yields a value of 9,028 billion yuan for total unpaid work and 1,799 yuan for unpaid direct care of persons.

We next adopted two economy-wide mean earnings methods to evaluate unpaid work. The calculation procedures are presented in tables A5 and A6 of appendix 3. We first assessed the value of unpaid work using sex-specific mean earnings derived from the actual earnings of respondents in the sample who reported both positive earnings and positive paid work hours. Given that the opportunity cost method takes into account not only employed individuals but also non-employed individuals, the economy-wide mean earnings method is expected to generate a higher unit price than the opportunity cost method because the expected market wages tend to be higher for the employed than the non-employed who are typically less educated and have less market experience. The second economy-wide mean earnings method complements the first one by obtaining earnings information from an alternative source, that is, the *China Labor Statistical Yearbook 2009* (National Bureau of Statistics of China 2009b). Sector-disaggregated mean earnings were calculated to capture the rural-urban economic disparity.[13] The two economy-wide mean earnings methods generate fairly similar estimates of the value of unpaid work and care work (9,894 and 1,966 billion yuan versus 9,870 and 1,956 billion yuan). As expected, these values are higher than the estimates of the opportunity cost method (9,028 and 1,799 billion yuan).

[11] The calculation procedure is explained in Budlender and Brathaug (2002).

[12] Information on the total population was obtained from the *China Statistical Yearbook 2009*.

[13] Information on sex-specific earnings is not available in the *China Labor Statistical Yearbook 2009*.

Last, we applied two variants of the replacement cost approach. The calculation procedures are presented in tables A7 and A8 of appendix 3. We first assigned a value to unpaid work using the mean earnings of the urban household services sector from the *China Labor Statistical Yearbook 2009*. This method yields a value of 9,599 billion yuan for unpaid work and of 1,898 billion yuan for unpaid care work. In studies involving developed countries, the value of unpaid work obtained by the opportunity cost method is typically higher than the value obtained by the replacement cost method using generalists' wages, because the opportunity cost method takes into account all occupations and the replacement cost method considers only domestic workers whose pay is typically low. Contrary to this stylized pattern, our replacement cost method yields a higher estimate than the opportunity cost method, possibly because the mean earnings of urban domestic workers overstate the replacement costs for rural workers whose earnings are much lower. To take into account the rural-urban earnings disparity, we calculated the sector-disaggregated mean earnings of the household services sector using information from the 2008 China Household Income Project (CHIP). The mean hourly earnings of urban workers in the household services sector was used to measure the replacement cost for urban residents, while the mean earnings of migrant workers in this sector were used for rural residents. The mean earnings of 9.3 yuan per hour for urban workers calculated from the 2008 CHIP are almost the same as those from the *China Statistical Yearbook 2009*, while the mean earnings for migrant workers are much lower (only 5.6 yuan per hour).[14] As expected, the second replacement cost method results in lower estimated values (7,705 billion yuan for unpaid work and 1,522 billion yuan for care work). These estimates can reasonably be considered the lower bounds of the value of unpaid work and care work.

Comparisons with macroeconomic indicators

Table 5 presents the monetary values of unpaid work and care work by five evaluation methods and provides comparisons with several macroeconomic indicators. In particular, we compare the value of unpaid work to China's GDP, to its final consumption expenditure and to the gross products of tertiary industries in 2008 to discern the contribution of unpaid work and the size of the care economy broadly defined.[15] We begin with the comparison to GDP. The value of unpaid work is estimated to be between 25.1 per cent (using sector-disaggregated generalist mean earnings) and 32.2 per cent (using two economy-wide mean earnings) of GDP. For unpaid care work, the value is estimated to be between 5.0 and 6.4 per cent of GDP. Intuitively, an estimate at 25 per cent (or 32 per cent) means that the 2008 official GDP would have to be multiplied by a factor of 1.25 (or 1.32) if the production that took place in both market and domestic sectors were taken into account. For unpaid care work, the value is estimated to be between 5.0 and 6.4 per cent of the GDP.

[14] The strikingly large earning differential between urban and migrant workers in the urban domestic service sector is indicative of the pervasive labour market segregation and discrimination against migrant works.

[15] China's GDP in 2008 is 30,686 billion yuan; final consumption expenditure is 14,911 billion yuan; and gross products of tertiary industry are 12,305 billion yuan. These statistics are obtained from the *China Statistical Yearbook 2009*.

Table 5: Value of unpaid work and care work and macroeconomic indicators

	Opportunity cost method	Economy-wide earnings I	Economy-wide earnings II	Replacement cost method I	Replacement cost method II
Unpaid work					
Billion yuan	9,028.0	9,894.1	9,868.6	9,599.5	7,705.5
% of GDP	29.4	32.2	32.2	31.3	25.1
% of final consumption	60.5	66.3	66.1	64.4	51.7
% of tertiary industry	73.4	80.4	80.2	78.0	62.6
% of paid work	51.59	56.5	56.3	54.8	44.0
Unpaid care work					
Billion yuan	1,799.5	1,966.6	1,948.9	1,898.7	1,521.9
% of GDP	5.9	6.4	6.4	6.2	5.0

Notes: Opportunity cost method computes the value of unpaid work and care work using sex-disaggregated mean earnings for each education class based on the information from the 2008 China TUS; the economy-wide mean earnings method I uses sex-disaggregated mean earnings using information from the 2008 China TUS; the economy-wide employment earnings method II uses sector-disaggregated mean earnings from the *China Labor Statistical Yearbook 2009*; replacement cost method I uses mean earnings of the urban household services sector from the *China Labor Statistical Yearbook 2009*; and replacement cost method II uses sector-disaggregated mean earnings of the household services sector obtained from the 2008 CHIP.

From a comparative perspective, the estimates of the relative size of unpaid work to GDP for China are lower than those for developed countries in the west (for instance, 32 to 62 per cent for the United States, 44 per cent for France and 31 to 46 per cent for Canada) but similar to the estimates for Japan (20 to 31 per cent) and South Korea (19 to 29 per cent) – two developed countries in East Asia.[16] The valuation of unpaid work for developing countries typically displays large variation over the alternative methods. For instance, the value of unpaid work is estimated to be between 27 to 63 per cent for India and 11 to 30 per cent for South Africa (Budlender 2010). Compared to these estimates, our estimates appear more consistent.

We next compare the value of unpaid work with final consumption expenditure and the size of the tertiary industry.[17] The value of unpaid work is estimated to be between 51.7 and 66.3 per cent of consumption expenditure and between 62.6 and 80.4 per cent of GDP of the tertiary industry. Last, we compare the value of unpaid work with the value of paid work. The value of paid work is calculated on the assumption that the population aged between 15 and 74 years in the urban and rural sectors, on average, spent 4.13 and 6.36 hours, respectively, on paid work each day and earned 13.0 and 6.1 yuan, respectively, per hour. The calculation yields a value of 17,515 billion yuan. Compared to this estimate, the value of unpaid work is approximately 44 to 56 per cent of the value of paid work. All the comparisons above suggest that unpaid work represents a relatively large portion of work and value and that it therefore should not be neglected in policy making.

6. Conclusion

This paper has documented the gender patterns of time use in paid work, unpaid work and non-work activity; it has examined the interaction among the three activities; and it has evaluated the monetary value of unpaid work and its contribution to the national economy

[16] The estimates are from Sousa-Poza et al. (1999) for the United States and Canada, Fouquet and Chadeau (1981) for France, and Budlender (2010) for Japan and South Korea.

[17] In line with the international SNA, the tertiary industry in the Chinese statistical system includes all services sectors ranging from transport, communication, wholesale and retail, catering services, banking and insurance, real estate, social services, health care, education and research to government agencies. The gross products of tertiary industry accounted for 40.1 per cent of China's GDP in 2008.

using data from the 2008 China TUS. As expected, men spent more hours on paid work than women, while women spent more hours on unpaid work than men. When the amount of time spent on paid and unpaid work was added together, women were found to have spent many more hours working than men did. Using a SUR methodology, the analysis found that women do not have the same propensity as men to substitute one type of work for the other; as a result, almost all the changes in life events and economic situations that have a significant impact on time allocation ultimately lead to a larger gap between men and women in the amount of time spent on non-work activity (self-care and leisure). Women are, however, not a homogeneous group; those who are more educated, come from families with higher income and receive higher wages have greater time autonomy. While the responsibility for housework and the provision of personal care limits women's choices about their use of time, the macro-economic comparisons in the final sections of the paper show that unpaid work represents a huge contribution to national economic well-being.

Our analysis reveals the tension between paid and unpaid work in China's new market economy. While both paid and unpaid work are essential to national well-being, the overriding concerns of the Chinese government in the post-reform period has been to improve the productivity of paid work and maximize growth of per capita GDP, assuming that the provision of domestic and care services will adjust itself accordingly (Cook and Dong 2011). As a result, the market reforms have severely eroded the support and protection of the government and the employer for women's reproductive roles, exacerbating the work-family conflicts Chinese women face. This development strategy is unfair to women and is also unsustainable in the long run. Hence, we call for greater policy attention to supporting the reproductive economy to ensure that a socially adequate supply of domestic and care services can be provided in a more gender equitable manner.

Appendix 1: Summary Statistics of the Sample

Table A1: Individual characteristics by sector and by gender

	Urban	Rural	Female	Male
Female	0.516	0.502		
Urban			0.535	0.521
Married	0.835	0.863	0.850	0.847
Child 0–6	0.217	0.273	0.249	0.238
Household size	2.360	2.666	2.481	2.528
Age (year)	43.170	43.801	43.035	43.918
Education (year)	11.775	7.930	9.455	10.488
Log unearned income	8.114	7.202	7.919	7.438
Unemployed	0.046	0.006	0.030	0.023
Inactive	0.333	0.135	0.293	0.184
Beijing	0.121	0.077	0.099	0.101
Hebei	0.125	0.132	0.127	0.130
Helongjiang	0.128	0.068	0.100	0.100
Zhejiang	0.083	0.095	0.086	0.091
Anhui	0.085	0.166	0.125	0.121
Henan	0.155	0.112	0.137	0.133
Guangdong	0.107	0.068	0.088	0.089
Sichuan	0.022	0.080	0.050	0.048
Yunnan	0.101	0.081	0.092	0.092
Gansu	0.072	0.120	0.094	0.095
Observations	1,9621	17,521	18,927	18,215

Source: 2008 China TUS.

Appendix 2: Wage Regressions

Table A2: OLS estimates of wage equation by gender

	Female	Male
Constant	0.901***	1.091***
	0.155	0.119
Primary	0.283***	0.178*
	0.072	0.085
Junior high	0.534***	0.378***
	0.097	0.093
Senior high	0.735***	0.552***
	0.108	0.101
College	1.116***	0.943***
	0.111	0.105
Experience	-0.004	0.007*
	0.003	0.003
Experience^2	0.000***	-0.000
	0.000	0.000
Urban	0.647***	0.803***
	0.069	0.058
Regional dummy	Yes	Yes
R^2	0.309	0.385
F test for zero slop	128.29	143.14
P value	0.0	0.0
N	12,309	14,456

Notes: Figures presented below the coefficient estimates are heteroscadesticity-robust standard errors. ***, ** and * denote significance levels of 1 per cent, 5 per cent and 10 per cent, respectively. **Source:** 2008 China TUS.

Appendix 3: Valuation of Unpaid Work and Unpaid Care Work

Opportunity cost approach

Table A3: Mean earnings and hours on unpaid work and care work by education

	Male				Female			
	Earnings per hour (yuan)	Unpaid work (hours per day)	Unpaid care (hours per day)	Percent	Earnings per hour (yuan)	Unpaid work (hours per day)	Unpaid care (hours per day)	Percent
No schooling	3.64	1.36	0.24	2	5.12	4.20	0.76	7
Primary	4.91	1.39	0.31	14	5.53	4.31	0.70	20
Junior high	6.82	1.42	0.32	37	7.15	4.08	0.74	32
Senior high	10.29	1.56	0.34	27	9.83	3.74	0.65	24
College and above	16.44	1.70	0.47	21	14.00	3.14	0.76	17
Average	9.43	1.51	0.35		8.47	3.90	0.72	

Source: Both mean earnings and hours are derived from the 2008 China TUS.

Table A4: Valuation using opportunity cost sex-disaggregated earnings from the 2008 China Time Use Survey

	Male		Female		Combined	
	Unpaid work	Unpaid care	Unpaid work	Unpaid care	Unpaid work	Unpaid care
Hours per day (weighted)	1.51	0.35	3.90	0.72	n.a.	n.a.
Hours per year	551	128	1,424	263	n.a.	n.a.
Population aged 15–74 (million)	534.62	534.62	518.40	518.40	n.a.	n.a.
Total hours per year (billion)	294.6	68.4	737.9	136.3	1,032.5	204.7
Earnings per hour (yuan)	9.43	9.43	8.47	8.47	n.a.	n.a.
Total value (billion yuan)	2,778.0	645.0	6,250.0	1,154.5	9,028.0	1,799.5
% of GDP	9.0	2.1	20.4	3.8	29.4	5.9

Notes: n.a. = not applicable. **Source:** The information on total population is from the *China Labor Statistical Yearbook 2009*.

Economy-wide mean earnings approach

Table A5: Valuation using economy-wide sex-disaggregated mean earnings

	Male		Female		Combined	
	Unpaid work	Unpaid care	Unpaid work	Unpaid care	Unpaid work	Unpaid care
Hours per day	1.51	0.35	3.90	0.72	n.a.	n.a.
Hours per year	551	128	1,424	263	n.a.	n.a.
Population aged 15–74 (million)	534.62	n.a.	518.40	n.a.	1,053.02	n.a.
Total hours per year (billion)	294.6	68.4	737.9	136.3	1,032.5	204.7
Earnings per hour (yuan)	9.94	n.a.	9.44	n.a.	n.a.	n.a.
Total value (billion yuan)	2,928.3	679.9	6,965.8	1,286.7	9,894.1	1,966.6
% of GDP	9.5	2.2	22.7	4.2	32.2	6.4

Notes: n.a. = not applicable. Mean earnings are calculated based on the actual earnings of those respondents who report both positive earnings and time spent on paid work in a given week. **Source:** 2008 China TUS.

Table A6: Valuation using economy-wide sector-disaggregated mean earnings

	Urban		Rural		Combined	
	Unpaid work	Unpaid care	Unpaid work	Unpaid care	Unpaid work	Unpaid care
Hours per day	2.93	0.58	2.50	0.49	n.a.	n.a.
Hours per year	1069	212	913	179	n.a.	n.a.
Population aged 15–74 (million)	481.04	n.a.	571.98	n.a.	1,053.02	n.a.
Total hours per year (billion)	514.2	102.0	737.9	136.3	1,032.5	204.7
Earnings per hour (yuan)	13.0	n.a.	6.1	n.a.	n.a.	n.a.
Total value (billion yuan)	6684.6	1326.0	3186.1	629.9	9870.7	1955.9
% of GDP	21.8	4.3	10.4	2.1	32.2	6.4

Notes: n.a. = not applicable. Mean urban hourly earnings are derived by dividing annual average earnings (28,898 yuan) of all urban employees by 44.5 hours multiplied by 50 weeks; mean rural hourly earnings are calculated by dividing annual earnings (12,560 yuan) of all employees in agriculture, forestry, animal husbandry and fishery by 41 hours multiplied by 50 weeks. The information on annual earnings and weekly hours is obtained from the *China Labor Statistic Yearbook 2009*.

Replacement cost approach

Table A7: Valuation using mean earnings of the urban household services sector

	Unpaid work	Unpaid care
Hours per day	2.73	0.54
Hours per year	996.5	197.1
Population aged 15–74 (million)	1,032.5	n.a.
Earnings per hour (yuan)	9.33	n.a.
Total value per year (billion yuan)	9,599.5	1,898.7
% of GDP	31.3	6.2

Notes: n.a. = not applicable. Mean hourly earnings are derived by dividing average annual earnings (22,858 yuan) of workers in the urban household services sector by 49.0 hours multiplied by 50 weeks. The information on annual earnings and weekly hours is obtained from *China Labor Statistic Yearbook 2009*.

Table A8: Valuation using sector-disaggregated mean earnings of the household service sector

	Urban		Rural		Combined	
	Unpaid work	Unpaid care	Unpaid work	Unpaid care	Unpaid work	Unpaid care
Hours per day	2.93	0.58	2.50	0.49	n.a.	n.a.
Hours per year	1069	212	913	179	n.a.	n.a.
Population aged 15–74 (million)	481.04	n.a.	571.98	n.a.	n.a.	n.a.
Total hours per year (billion)	514.2	102.0	737.9	136.3	1,032.5	204.7
Earnings per hour (yuan)	9.3	n.a.	5.6	n.a.	n.a.	n.a.
Total value (billion yuan)	4,780.6	943.6	2,924.9	578.3	7,705.5	1,521.9
% of GDP	15.6	3.1	9.5	1.9	25.1	5.0

Notes: n.a. = not applicable. Mean hourly earnings for the urban sector are calculated by dividing mean monthly earnings (1,785 yuan) of urban workers in the sales and household services sector by 48.4 hours multiplied by four weeks and mean hourly earnings for the rural sector are by dividing mean monthly earnings (1,440 yuan) of migrant workers in the same sector by 66 hours multiplied by four weeks. The information on monthly earnings and weekly hours is obtained from the 2008 CHIP.

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