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## Social Norms on Working Hours, Work-Life Balance, and

## Fertility Choice

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# Social Norms on Working Hours, Work-Life Balance, and Fertility Choice

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**Abstract**

This paper studies the role played by the social norms of working hours in a household labor-leisure and fertility decision model. We suppose that social norms enforce workers not to deviate from the ideal level of working hours, which depends on past and current observations of working hours in workplaces. We show that the social norms lead to multiple equilibria: one with long working hours and a low fertility rate and another with short working hours and a high fertility rate. Our results may help to explain the long working hours and low fertility rate that are observed in Japan.

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# 1   Introduction

Compared with other developed countries, Japan is famous both for its long working hours of market work and for its excessively low fertility rate. First, with respect to long working hours, Kuroda (2010a) shows, by utilizing time-use survey data, that Japanese males (resp. females) work 10 hours (resp. 7 hours) per week longer than Americans as a whole do. The OECD reports that, since the 1970s, market work has declined at least 15% in Japan. However, holding demographic changes constant, Kuroda (2010a) finds that, for both male and female full-time workers in Japan, working hours per week increased in the period from the 1970s to the mid-1980s and have been relatively stable for the past two decades. Moreover, an increase in overwork by full-time workers (especially males in their 20s and 30s) has recently become a serious problem in Japan. Genda (2005) uses the Employment Status Survey to note that the fraction of full-time male workers who work more than 60 hours per week increased from 20 % in 1992 to 27.6 % in 2002.[1] Such overwork by male workers hinders proper work-life balance in Japan. According to a study by Kuroda (2010b), male workers in Japan spend only 1.12 (resp. 0.81) hours per day on housework (resp. child care), whereas male workers in the U.S. spend 9.20 (resp. 1.29) hours per day on the same work.[2] Second, with respect to low fertility rate, the total fertility rate (TFR) in Japan hit its lowest value of 1.26 in 2005.[3] Although the TFR in Japan rebounded to 1.41 in 2012, it was still lower than corresponding TFRs in most developed countries.[4] Many researchers contend that deterioration of work-life balance is a major reason explaining the excessively low fertility rate in Japan. For example, Yamaguchi (2007) finds that how much time husbands and wives spend together at home strongly affects marital satisfaction, which is a major correlate of birth desire. Furthermore, Genda and Kawakami (2006) find that longer working hours reduce the frequency of sexual activity among young married couples. Therefore, a policy aimed at better work-life balance is considered to be one of the most effective methods of addressing the issue of low fertility rate in Japan.[5]

This paper proposes a simple model that explains the above-mentioned features of the Japanese economy by focusing on the effects of social norms on working hours. We suppose that the society (or

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[1] The survey was conducted by the Ministry of Internal Affairs and Communications.

[2] According to the OECD Employment Outlook in 2001 and Survey on Time Use and Leisure Activities in 2001 (Japan), the fraction of men's time contribution to total housework time and child care time among households with children aged less than 6 years is 40.4 % in Norway, 39.0 % in Australia, 37.7 % in Sweden, 37.0 % in the US, 35.7% in Germany, 34.3% in France, 29.9% in England, and 12.5 % in Japan.

[3] According to Suzuki (2006), among the G8 countries, only Italy, Japan and Russia have experienced "lowest-low fertility," defined as having a TFR of 1.3 or lower after 2000.

[4] According to the United Nations (2013), average TFR in Japan over the period 2005-2010 (resp. 1995-2000) was 1.34 (resp. 1.37), whereas the average TFR in more developed regions over the same period was 1.66 (resp. 1.56). "More developed regions" consists of Europe, Northern America, Australia/New Zealand and Japan.

[5] For example, see the White paper on gender equality in 2006 by the Gender Equity Bureau of the Cabinet Office in Japan.

workplace) in question has an ideal level of working hours as one of its social norms. In other words, people in the society (or workplace) share widely accepted beliefs about appropriate working hours in their workplaces (i.e., the ideal level of working hours as a social norm). This social norm enforces workers not to deviate from the ideal level of working hours. In this paper, we suppose that the ideal level of working hours as a social norm depends on past and current observations of working hours in workplaces. Social norms and workers' obedience to them affect each household's decisions regarding labor supply and fertility. We show that social norms lead to multiple equilibria: an equilibrium with long working hours and a low fertility rate ("long-working-norm equilibrium") and an equilibrium with short working hours and a high fertility rate ("short-working-norm equilibrium"). Our theoretical "long-working-norm equilibrium" result may help to explain the above-mentioned features of the Japanese economy.

There is a considerable body of research attempting to explain differences in working hours across countries. The main question examined in these studies is why the working hours of Europeans have declined sharply over the last few decades relative to those of Americans.[6] Prescott (2004) argues that disparities in the length of working hours across countries can be explained by country differences in marginal tax rates through a substitution effect, while Blanchard (2004) attributes the disparities to country differences in preferences for leisure.[7] However, Alesina, Glaeser, and Sacerdote (2006) assert that neither tax distortions nor differences in preferences fully explain the divergences and instead emphasize the presence of positive complementarities in leisure. Once some type of coordination succeeds in achieving an environment where most people work shorter hours, positive complementarities in leisure may induce many people to decrease their working hours, and hence, a short-working equilibrium is achieved. Alesina, Glaeser, and Sacerdote (2006) suggest that both high taxes and direct pressure to work less, which were brought about by a combination of strong unions, generous welfare benefits, and social democratic governments during the 1970s and 1980s, served as a coordination device for working less in European countries. Our focus on work and/or social norms in workplaces and the resulting complementarities in working hours is in accord with the convincing arguments of Alesina, Glaeser, and Sacerdote (2006). However, this paper differs from theirs in at least the following two respects. First, we are specifically concerned with the interaction between choice of working hours and the fertility decision to explain the poor work-life balance and low fertility rate in Japan. Second, our formulation of social norms on working hours characterizes a typical workplace environment in Japan and naturally generates

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[6]In 2008, the average annual working hours per person in employment was 1,792 in the U.S., 1,653 in the U.K., 1,542 in France, and 1,432 in Germany (OECD, 2009).

[7]Simulation results of Prescott (2004) cannot predict Japanese data well.

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multiple equilibria regarding working hours.

This paper is also related to research by Manuelli and Seshadri (2009), who attempt to explain the differences in fertility rates across countries. The result of their numerical simulation reveals that the productivity differential alone can account for most of the fertility differences between the United States and poor nations. The authors also argue that a substantial proportion of US-Europe fertility differentials can be explained by income tax rate differences between the two regions.[8] Although Manuelli and Seshadri (2009) rely on differences in productivity and in tax rates to explain fertility differences, there is a large amount of literature that emphasizes other factors to explain the differences in fertility rates. For example, Kalemin-Ozcan (2002) studies the role of declining mortality rates, Doepke (2004) stresses the impact of the introduction of skill-intensive production technologies on fertility choice, and Greenwood and Seshadri (2005) emphasize the role played by technological progress in home production.

We emphasize the effects of social norms in the workplace and of the work-life balance resulting from those norms as a factor to explain the differences in fertility rate across countries.[9] We view our approach as complementing the existing explanations mentioned above. The relationship between work-life balance and fertility rate has attracted much attention from economists who have attempted to understand the fundamental causes of the low fertility rate in Japan. However, to our knowledge, there has been little theoretical research on this issue. We provide a tractable theoretical model that illustrates the observed long working hours and low fertility rate in Japan.

This paper is organized as follows. Section 2 presents the model. Section 3 demonstrates that there exist multiple equilibria of labor hours. Section 4 concludes.

## 2 The model

Consider an economy consisting of a continuum of identical households whose labor-leisure and fertility decisions are affected by the social norms of working hours.

### 2.1 Preferences

The utility of identical households is

$$U = \alpha u(c) + \beta v(n) + \gamma g(l) - \zeta \omega(d_m), \tag{1}$$

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[8] The simulation results of Manuelli and Seshadri (2009) also cannot predict Japanese data well.

[9] This paper is also related to the literature examining the effects of social norms on family size and demographic transition. Palivos (2001) and Bhattacharya and Chakraborty (2012) demonstrate how high fertility can result from a coordination failure when the interaction between agents takes the form of norms regarding family size. Munshi and Myaux (2006) propose a theory that fertility transition occurs through Bayesian updating as families learn about the social acceptability of contraceptive use. These authors also present evidence that reproductive social norms can explain the inertia of fertility behavior and contraceptive adoption in rural Bangladesh.

where $c$ is the level of consumption, $n$ is the number of children, $l$ is the amount of leisure, and $m$ is the number of working hours. We assume that $u()$, $v()$ and $g()$ are increasing and strictly concave in their arguments. To highlight the role of social norms in our analysis, we take the simplest functional forms:[10]

$$u(c) = \ln c,$$

$$v(n) = \ln n,$$

$$g(l) = \ln l.$$

The key element is the disutility represented by $\zeta \omega(d_m)$, which a worker has if her/his actual working hours deviate from the ideal level of working hours as a social norm. We suppose that $d_m \equiv |m - m^s|$ where $m^s$ is the ideal level of working hours as a social norm. In this paper, the ideal level of working hours represents workers' shared beliefs about appropriate working hours in their workplaces, and we suppose that this ideal level depends on past and current observations of working hours in workplaces. $\omega()$ is an increasing and (weakly) convex function. For analytical simplicity, we assume that $\omega(d_m) = |m - m^s|$. This formulation of social norms suggests that deviations of working hours from the ideal level in either direction (i.e., too long or too short) are equally evaluated.[11] $\alpha$, $\beta$, $\gamma$ and $\zeta$ are positive parameters, and $\zeta$ measures the extent to which households care about social norms on working hours relative to their private concerns.

There are some reasons workers care about social norms and try to maintain the ideal level of working hours. For example, Kandel and Lazear (1992) assert that guilt causes a worker to take the action believed to be ideal in her/his workplace. Workers feel guilty when their working hours are below the ideal level because their contribution level is considered to be low and colleagues may blame their choices.[12] In addition, workers sometimes feel guilty even when their working hours are above the ideal level because, for example, such overwork may lead to a future ideal level of longer working hours and other workers would not like this. Our formulation involves these features of deviation from social norms.

Conformity to work and/or social norms appears to be strong in Japan and is a distinguishing feature of the productivity of Japanese firms.[13] Aoki (1994) explains that, in Japanese firms, conformity to group

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[10] These specifications are inspired by Bhattacharya and Chakraborty (2012).

[11] This formulation follows the representation of social distance by Akerlof (1997). Akerlof and Kranton (2000 and 2005) study the effect of identity using a similar formulation. The peer pressure function by Kandel and Lazear (1992) also has a similar form.

[12] Such psychological feelings could also be explained by shame. Kandel and Lazear (1992) discuss a source of peer pressure from the perspective of guilt and shame.

[13] For example, Lincoln and Kalleberg (1985) argue that organizational commitment, which includes conformity to work norms, is stronger in Japanese firms than in U.S. firms.

norms creates a good reputation for the worker among her/his peer group, and such a reputation is important for her/his promotion. Okuno-Fujiwara (1989) also notes that work and/or social norms play an important role in the Japanese production system and theoretically demonstrates that cooperation is the prevailing work norm by assuming mutual monitoring among workers. In general, workers' frequent informal and formal communications as well as local information sharing are necessary to make mutual monitoring effective. Through such interactions, workers generate team spirit, which in turn are enforced to confirm the norm. These observations in Japanese firms imply that workers in Japan are more likely to conform to social norms of working hours, which leads to high productivities.

## 2.2 Constraints

Each household's total available time is normalized to unity and is allocated to child care, market work, and leisure. The time constraints of each household are given by

$$x + m + l = 1, \tag{2}$$

where $x$ is total parental attention (time input) to $n$ children, $m$ is working hours for market work, and $l$ is amount of leisure.

The household can substitute parental attention (time input) to $n$ children by purchasing market goods for childcare, $z$. The household's budget constraint is given by

$$c + qz = wm, \tag{3}$$

where $q$ is the price for childcare and $w$ is the wage rate. Households divide their labor income, $wm$, between consumption, $c$, and purchasing of child care goods, $qz$.

Taking the lead of Balestrino et al. (2003) and Hirazawa and Yakita (2009), the number of children $n$ is given by

$$n = az^{\mu}x^{1-\mu}, \tag{4}$$

where $a > 0$ and $\mu \in (0, 1)$. Although parents can substitute their time for childrearing with market goods, the latter is not a perfect substitute for the former because a child requires special parental time. In this paper, for simplicity, the household production function of childcare is specified to be of Cobb-Douglas form.

## 2.3 Household decision making

Each household chooses $c$, $l$, $m$, $x$ and $z$ to maximize (1) subject to (2), (3), and (4). This paper addresses how social norms of working hours affect the household's labor supply and fertility decisions. To focus on this issue, we first solve this issue under the assumption that the household's working hours, $m$, is held constant. Then, we explicitly consider the household's decisions of working hours.

Given the household's working hours, $m$, optimal consumption, $c^*$, leisure, $l^*$, and fertility rate, $n^*$, are presented as a function of $m$ as follows:

$$c^* = \frac{\alpha}{\alpha + \beta\mu} wm \equiv c(m), \tag{5}$$

$$l^* = \frac{\gamma}{\gamma + \beta(1 - \mu)} (1 - m) \equiv l(m), \tag{6}$$

$$n^* = a[\frac{1}{q}\frac{\beta\mu}{\alpha + \beta\mu} wm]^\mu [\frac{\beta(1 - \mu)}{\gamma + \beta(1 - \mu)} (1 - m)]^{1-\mu} \equiv n(m). \tag{7}$$

From (5) and (6), consumption $c$ increases with working hours, $m$, while leisure $l$ decreases with $m$. The increase in working hours positively affects consumption by raising household income, while it negatively affects leisure by tightening the time constraint defined in (2).

Moreover, by differentiating (7) with respect to $m$, we obtain

$$\frac{\partial n}{\partial m} = Am^{\mu-1}(1 - m)^{-\mu}(\mu - m) \begin{cases} \geq 0, & \text{when } m \leq \mu, \\ \leq 0, & \text{when } m \geq \mu, \end{cases} \tag{8}$$

where $A = a(\frac{1}{q}\frac{\beta\mu}{\alpha+\beta\mu}w)^\mu (\frac{\beta(1-\mu)}{\gamma+\beta(1-\mu)})^{1-\mu}$. Equation (8) indicates that when household working hours are sufficiently long (resp. short) to satisfy $m > \mu$ (resp. $m < \mu$), the additional increase in working hours negatively (resp. positively) affects fertility rate. Hence, as depicted in Figure 1, there exists an inverted U-shaped relationship between working hours, $m$, and fertility rate, $n$. When working hours are sufficiently short to satisfy $m < \mu$, the increase in working hours positively affects fertility rate by raising household income. However, when working hours are sufficiently long to satisfy $m > \mu$, the increase in working hours negatively affects fertility rate by decreasing parental attention (time input) to children.

Next, we consider the household's decisions of working hours, $m$, explicitly. By substituting (5), (6), and (7) into (1), the household utility function can be written as a function of $m$ as follows:

$$U(m) = \begin{cases} V(m) - \zeta(m - m^s) \equiv U_1(m), & \text{when } m \geq m^s, \\ V(m) - \zeta(m^s - m) \equiv U_2(m), & \text{when } m \leq m^s, \end{cases} \tag{9}$$

where

$$V(m) \equiv \alpha\ln c(m) + \beta\ln n(m) + \gamma\ln l(m).$$

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Note that $U_1(m^s) = U_2(m^s)$ and $U(m) = \min\{U_1(m), U_2(m)\}$ hold.

Let $m_1^* = \text{argmax } U_1(m)$, $m_2^* = \text{argmax } U_2(m)$, and $m^* = \text{argmax } V(m)$ where

$$m_1^* = \frac{\alpha + \beta + \gamma + \zeta - [(\alpha + \beta + \gamma + \zeta)^2 - 4\zeta(\alpha + \beta\mu)]^{1/2}}{2\zeta},$$

$$m_2^* = \frac{-(\alpha + \beta + \gamma + \zeta) + [(\alpha + \beta + \gamma + \zeta)^2 + 4\zeta(\alpha + \beta\mu)]^{1/2}}{2\zeta},$$

$$m^* = \frac{\alpha + \beta\mu}{\alpha + \beta + \gamma}.$$

Here, $m^*$ expresses optimal labor hours when the household does not care about social norms in deciding their working hours (i.e., $\zeta = 0$). Henceforth, we refer to $m^*$ as optimal working hours under the no-norm equilibrium.

From (9), it is evident that $m_1^* < m^* < m_2^*$ holds. Additionally, because of our formulation of the social norm (i.e., $\zeta|m - m^s|$), neither $m_1^*$ nor $m_2^*$ directly depends on $m^s$. For $m_1^*$ to be a valid optimal choice, $m_1^* \geq m^s$ must hold. Similarly, $m_2^* \leq m^s$ is necessary for $m_2^*$ to be a valid optimum.

The household's objective function is simply $U(m) = \min\{U_1(m), U_2(m)\}$ which is non-differentiable at $m^s$. Hence, as depicted in Figures 2 to 4, there are three cases classified by the size of the ideal level of working hours, $m^s$. In each figure, the household's objective function is identified in bold and a kink occurs at $m^s$. In Figure 2, when $m^s \leq m_1^* < m_2^*$, $U(m)$ reaches the maximum at $m_1^*$, which is the only valid optimal choice. In fact, this is the optimal choice for all $m^s \leq m_1^*$. In Figure 3, when $m^s \in [m_1^*, m_2^*]$, household utility is maximized at the kink, $m^s$. In fact, this choice is optimal for all $m^s \in [m_1^*, m_2^*]$. In Figure 4, the household chooses working hours of $m_2^*$ for all $m^s \geq m_2^*$. As a result, a typical household's choice of working hours responds to the social norm according to the following map:

$$m_i = f(m^s) = \begin{cases} m_1^*, & \text{for } m^s \leq m_1^*, \\ m^s, & \text{for } m^s \in [m_1^*, m_2^*], \\ m_2^*, & \text{for } m^s \geq m_2^*. \end{cases} \quad (10)$$

Note that the ideal level of working hours, $m^s$, partially dictates the household's decision of working hours and produces the household's choice to deviate from the ideal level under the no-norm equilibrium (i.e., $m^*$), except in the knife-edge case of $m^s = m^*$.

Our result that the optimal number of working hours depends on the ideal level of working hours as a social norm is partly consistent with the empirical result by Kuroda and Yamamoto (2011). They find a significant decline in the working hours of Japanese workers after they were transferred from offices in Japan to those in European countries. Kuroda and Yamamoto (2011) note that workplace environments in Europe, which are influenced by local stuff working behavior, are different from those in Japan and

that those differences result in such decline. These authors argue that the working hours of Japanese workers are influenced by and would converge to those of their peers and/or neighborhood.

## 3 General Equilibrium

### 3.1 Social norms by cross sectional average of working hours

We first assume that the ideal level of working hours as a social norm depends on the mean level of working hours in the society (i.e., $m^s = \bar{m}$). Under this specification, equation (10) is rewritten as

$$m_i = f(\bar{m}) = \begin{cases} m_1^*, & \text{for } \bar{m} \leq m_1^*, \\ \bar{m}, & \text{for } \bar{m} \in [m_1^*, m_2^*], \\ m_2^*, & \text{for } \bar{m} \geq m_2^*. \end{cases} \tag{11}$$

We seek a symmetric Nash equilibrium assuming identical households. Such an equilibrium occurs only when $m_i = \bar{m}$ for all $i$. Thus, equilibrium working hours are described as the fixed point to $\bar{m} = f(\bar{m})$ where $f(\bar{m})$ is defined in (11). It is apparent from (11) that equilibrium working hours are indeterminate. A continuum of equilibrium levels of working hours is possible in the interval $[m_1^*, m_2^*]$.

Which of these equilibria is realized depends on households' expectations of other households' working hours. For example, supposing that all households rationally anticipate that all other households choose long working hours of $m_2^*$, it would indeed be optimal for households to choose $m_2^*$ as a direct consequence of conformist behavior. In this case, the equilibrium corresponding to $m_2^*$ (i.e., long-working-norm equilibrium) would be realized as a self-fulfilling equilibrium. Analogously, supposing that all households rationally anticipate that all other households choose short working hours of $m_1^*$, the equilibrium corresponding to $m_1^*$ (i.e., short-working-norm equilibrium) would be realized as a self-fulfilling equilibrium. Almost the same arguments hold for other levels of working hours in the interval $[m_1^*, m_2^*]$.

Under the current set up, it is difficult to examine rigorously what factors really determine households' expectations of other households' working hours. However, society's historical experiences of working hours will be one of the crucial factors affecting households' expectations. Therefore, the society with historically long (resp. short) working hours is more likely to reach the long-working-norm (resp. short-working-norm) equilibrium. In the next subsection, we briefly reconsider this role of history using a different formulation of social norms.

### 3.2 Social norms by weighted average of past working hours

The ideal level of working hours as a social norm might be influenced not only by the working hours of current members of the society but also by the society's historical experiences. To incorporate this facet

in a simple way, we assume that social norms on working hours depend on the historical path of working hours in the society. Let $\delta$ denote the time discount rate by which these observations are depreciated in mind. Then, the ideal level of working hours in period $t+1$ is given by $m_{t+1}^s = (1-\delta)\sum_{j=0}^{\infty}\delta^j m_{t-j}$ where $m_{t-j}$ is realized working hours in period $t-j$.[14] Alternatively, this can be written in period by period notation as $m_{t+1}^s = \delta m_t^s + (1-\delta)m_t$.

Under this specification, equation (10) is rewritten as

$$m_{i,t} = f(m_t^s) = \begin{cases} m_1^*, & \text{for } m_t^s \leq m_1^*, \\ m_t^s, & \text{for } m_t^s \in [m_1^*, m_2^*], \\ m_2^*, & \text{for } m_t^s \geq m_2^*. \end{cases} \tag{12}$$

Hence, assuming identical households, the ideal level of working hours in period $t+1$ can be expressed as

$$\begin{aligned} m_{t+1}^s &= \delta m_t^s + (1-\delta)f(m_t^s), \\ &= \begin{cases} \delta m_t^s + (1-\delta)m_1^*, & \text{for } m_t^s \leq m_1^*, \\ m_t^s, & \text{for } m_t^s \in [m_1^*, m_2^*], \\ \delta m_t^s + (1-\delta)m_2^*, & \text{for } m_t^s \geq m_2^*. \end{cases} \end{aligned} \tag{13}$$

Figure 5 shows the dynamic properties of the ideal level of working hours, $m_t^s$, determined in (13). As shown in Figure 5, there exists a continuum of steady state equilibrium levels of working hours in the interval $[m_1^*, m_2^*]$. In these steady state equilibria, household working hours coincide with the ideal level.

Which of these steady state equilibria is realized depends on the initial value of working hours, $m_0^s$. Supposing that the initial value is sufficiently large to satisfy $m_0^s \geq m_2^*$, the economy would converge to the steady state equilibrium corresponding to $m_2^*$ (i.e., long-working-norm equilibrium). In contrast, supposing that the initial value is sufficiently small to satisfy $m_0^s \leq m_1^*$, the economy would converge to the steady state equilibrium corresponding to $m_1^*$ (i.e., short-working-norm equilibrium). Finally, supposing that the initial value lies in the region where $m_0^s \in [m_1^*, m_2^*]$, working hours would not change over time and would remain constant at its initial value, $m_0^s$.

The larger (resp. smaller) initial value indicates historically longer (resp. shorter) working hours. Hence, the society with historically longer (resp. shorter) working hours is more likely to reach the long-working-norm (resp. short-working-norm) equilibrium.

## 3.3 Characteristics of long-working-norm equilibrium

The analyses in subsections 3.1 and 3.2 suggest that when the effects of social norms on workers' behavior are critical, the society with historically longer working hours is more likely to reach the long-working-

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[14]This specification is inspired by Strulik (2013), though Strulik (2013) considers the issue of the anti- (or pro-) schooling norm.

norm equilibrium. Households allocate more time to market work but less time to both leisure and child care under the long-working-norm equilibrium than under the no-norm equilibrium (i.e., $m_2^* > m^*$, $l(m_2^*) < l(m^*)$, and $x(m_2^*) < x(m^*)$). In particular, when the intensity of parental attention (time input) in household production $1 - \mu$ is sufficiently large to satisfy

$$1 - \mu > \frac{\gamma}{\alpha + \gamma}, \tag{14}$$

we can easily confirm that the relations $m_2^* > m^* > \mu$ hold from (7) to (9). Hence, as depicted in Figure 1, the fertility rate under the long-working-norm equilibrium $n_2^*$ is lower than that under the no-norm equilibrium, $n^*$. As a result, the long-working-norm equilibrium is characterized by long working hours, short leisure hours, and a low fertility rate.

An empirical study by Gronau and Hamermesh (2006) indicates that child care is a relatively time-intensive activity, especially when parents have small children.[15] Moreover, many theoretical studies employ the restrictive assumption of $\mu = 0$ because the parental time (opportunity) costs of child care are considered to be more relevant than the physical costs.[16] Therefore, the parameter assumption of (14) might not be so restrictive.

As emphasized in subsection 2.1, the effects of social norms are generally not negligible in Japanese workplaces. Furthermore, the average working hours in Japan have been higher than those in other developed countries over the past 40 years. Historians argue that long working hours in Japan are deeply rooted in the Japanese work style developed in the eighteenth century (Saito, 1996). In addition, chronic overwork in Japan hinders young couples from achieving proper work-life balance and induces an excessively low fertility rate in Japan relative to other developed countries. Our theoretical "long-working-norm equilibrium" result may help to explain these relevant features of the Japanese economy in a systematic way.

# 4 Concluding Remarks

This paper incorporated the social norms of working hours into a household labor-leisure and fertility decision model and examined how inclusion of social norms affects equilibrium outcomes. We showed that the inclusion of social norms leads to multiple equilibria: one equilibrium with long working hours and a low fertility rate, and another equilibrium with short working hours and a high fertility rate. Our

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[15]According to Gronau and Hamermesh (2006), among couples with a husband aged 20-35 years, the ratio of relative goods/time intensity in the U.S. is 0.43.

[16]See, for example, Galor and Weil (1996).

model may help to explain the observed long working hours and low fertility rate in Japan. Although we stress the importance of social norms on working hours as a factor to explain the excessively low fertility rate in Japan, there may be other factors that can be attributed to that observation. Our approach should be seen as complementary to the other factors that have already been proposed in the existing literature.

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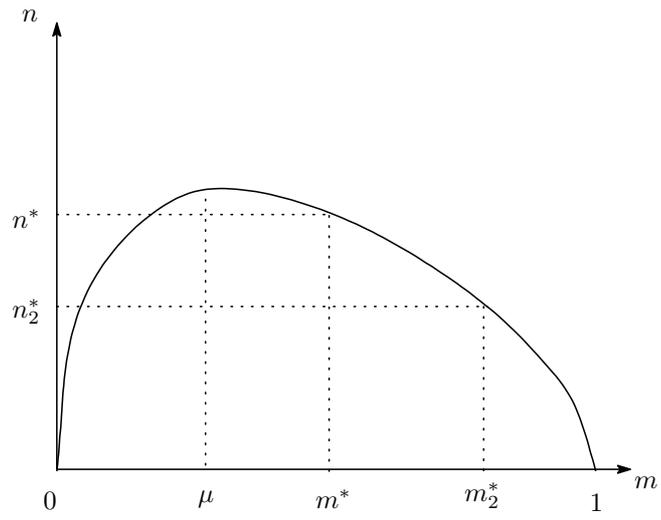
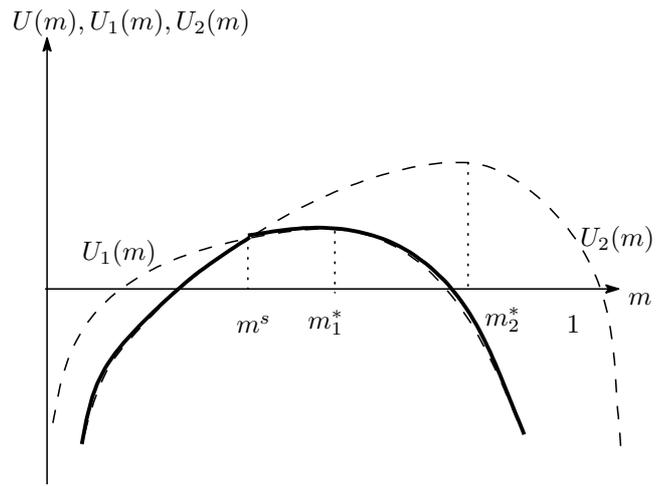Figure 1: The relationship between labor supply $m$ and fertility rate $n$

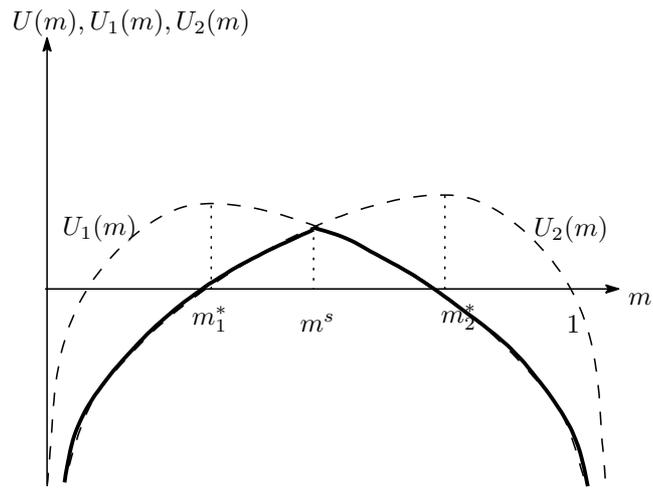Figure 2: $U(m)$ when $m^s \le m_1^* < m_2^*$
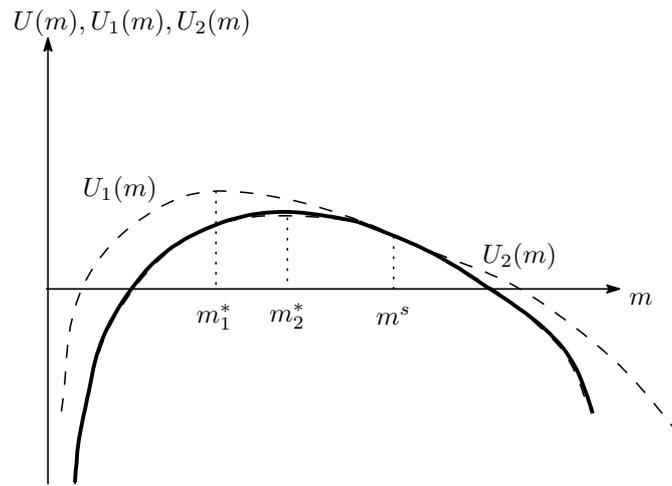
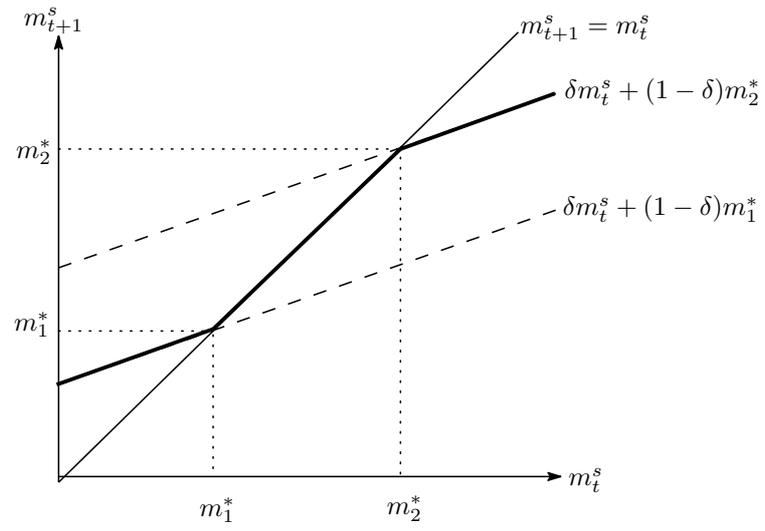Figure 3: $U(m)$ when $m^s \in [m_1^*, m_2^*]$

Figure 4: $U(m)$ when $m^s \geq m_2^*$

Figure 5: The dynamic properties of social norms $m_t^s$