

# Identity Loss and Rent-Seeking in Gender Categories

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## Abstract

This paper considers the effectiveness of Japanese gender equality policy in the context of the economics of identity and rent-seeking theory. Since the 1990s, the Japanese government has implemented countermeasures against falling birthrates as well as to promote active female participation. However, the effectiveness of both policies is in doubt, and gender asymmetry in the home remains as it was before the new policies were implemented. In order to explain this gender asymmetry, we have adapted a model with a utility function in which identity is associated with gender categories and their social norms. In addition, our model employs rent-seeking theory among gender categories and shows that the extent of dissipation depends on the degree of identity loss.

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## 1. Introduction

This paper addresses gender inequality both in household and in workplace from the total theoretical view point of identity economics and rent seeking. There has been two lines of empirical researches on gender inequality such that unequal time allocation for housework in household and gender pay gap and occupational segregation in workplace. In order to explain the empirical results of each line of research the theories have been developed respectively.

The division of labor in household have been analyzed in the household production model which originated in Mincer (1962) and Becker (1965) and developed as “new home economics.” In such models it is recognized that individuals and households allocate time among market work, non-market work and leisure subject to budget constraints, time constraints and a household technology constraint. (See [Stafford and Juster, 1985] for review of time use literature)

Although empirical studies in this field developed greatly in the 1980s, the most researches basically follow Becker's model which concluding that in an efficient household both spouses do not allocate time to both market labor and housework. In the 1991 edition of Becker's *Treatise on the Family* “specialization theorems” are presented concluding that efficiency requires specialization which contradicts recent empirical results. (see the results in [Glorieux, et.al. 2015]) In order to solve this theoretical problem, in 2000s the review of the household production function has been carried out. (Pollak, 2012)

A lot of international time-use research focuses on the gendered division of labor within the household [Bianchi and Milkie, 2010]. These recent studies suggest that the time men spend more on the labor market does not compensate for the time women spend more on domestic chores and childcare. Men have much more leisure time than women. It means that the time allocation of men and women keep up an outspoken gendered division of roles, even though there was a trend that the time allocation of men and women has converged and the gender gap is being closed. [Glorieux et.al. 2015]

On the other hand, many studies have intensively investigated on the gender wage gap and occupational segregation in workplace for several decades. The long-term trend has been a substantial reduction in the gender wage gap in economically advanced nations [Blau Kahn, 2008]. It has also been shown that human capital variables taken together explained little of the gender wage gap, while gender differences in occupation and industry continued to be important. [Blau Kahn, January 2016]

The theoretical foundation for gender pays gap and occupational segregation are surveyed by Grybaite. [Grybaite, 2006] The theories are grouped in two sets: human capital model, which emphasizing differences in qualifications and models of labor market discrimination different positions on the labor market.

In both types of the model's economists have analyzed the issue as results of rational choices of economic individuals. For example, it has been explained that the small labor supply for women is a rational choice because women have lower desire for labor force participation. [Mincer and Polachek, 1974] [Bulow and Summers, 1986] [Lazear and Rosen, 1990] However, these researches don't explain why women have lower desire for labor force participation. The models of labor discrimination suggest that practice of discrimination is costly to firms but it remains unclear how described models of discrimination can persist in a competitive market.

The researches of identity in social psychology suggests that economists should consider identity as an element which could explain the women's low preference for outside work and discrimination against women in workplaces. In the seminal work of identity economics Akerlof and Kranton introduces identity into economic models which can explain the reason for these preferences and discriminations. [Akerlof and Kranton, 2000] They present two stage non-cooperative game in which there are two types of players “woman” and “man”. Each type of players belongs to social gender categories that impose social norm and codes of conducts on their members. If the member of each social gender categories act against the social norms and codes of conducts it loses own welfare because it causes identity loss. This social identity model is applicable to the setting of households and workplace and it can account for the phenomena that previous economic theories cannot explain. It points out that gender identity hinders the market based rational behavior of everyone. Although their model is pathbreaking, it is so simplified that the behavior of the player in their model is a choice of whether or not to do something, for example, it is not possible to select a continuous variable as a behavior, such as a woman's market working hours. In addition to that their model is independent from market mechanism and the timing of the game played is unclear.

In this paper the framework for integrated handling of household production models and social identity models are provided. In the framework men who are currently dominated in market and home can take a short-term rent seeking behavior, and as a result, it also reveals that the long-run unequal environment for women has been reproduced by this rent seeking activity of men.

## 2. Gender Rent Seeking Model with Identity Loss

### 2.1 Preferences and Identity

Each person has a preference on leisure and consumption bundle as usual economic model. We denote leisure of individual  $j$  as  $l_j$  which increases individual's welfare. Each individual allocates its time among leisure, market labor and housework denoting as  $(l_j, m_j, h_j)$  with index  $j$  of individuals. Either market labor or housework decrease individual welfare. The consumption bundle of individual  $j$  is  $c_j \in R^n$  being sum of market commodity bundle  $x_j$  and household production commodity bundle  $z_j$ ;  $c_j = x_j + z_j$ . There can be market commodity which cannot be produced in households and household produced commodity which isn't marketed. The household produced commodity is only allowed to be consumed in the household. The individual  $j$ 's preferences on commodity and leisure is defined as a utility function  $U_j(c_j, l_j)$ ;  $U_j: R^n \times R_+ \rightarrow R$  which is continuous and concave function and increasing in all variables.

According to Akerlof and Kranton (2000) we define the social categories and identity of individuals. There are two social categories of gender, "women" and "men" denoted  $F$  and  $M$  respectively. Each individual  $j$  belongs to either of these social categories;  $j \in F$  or  $j \in M$ . They have their own identity by belonging to that social category. Each social category has a social norm and code of conduct imposed on its members, and if each individual does not act in accordance with its social norm and codes of conduct, they feel a sense of loss of identity. If a person acts in accordance with such social codes, the person will not lose its identity.

In our model the behavior which causes the identity losses are market and housework labor of women  $(m_F, h_F)$ . The society has social norm and codes of conducts impose identity losses on members of both social category "women" and "men". In other words, there is a social consensus that the longer woman's housework hours are, and the shorter the market labor hours are, the more feminine she is. If a "woman" is married, her choice of time allocation between market labor and housework labor affects her husband's identity. A married "man" feels more identity loss with longer market labor and shorter housework labor of his wife.  $I_M(m_F, h_F)$  denotes male identity loss and  $I_F(m_F, h_F)$  denotes female identity loss where  $I_j: [0, K] \times [0, K] \rightarrow R_+$  is continuous, decreasing in  $h_F$  and increasing in  $m_F$ .

### 2.2 The Household's Constraints

All individuals engage in consumption and production activities in the market, and in households at the same time. In other words, individuals could exchange commodities and services, including their own labor, in a competitive market.

In our model we focus on the household which consists of a "man" and "woman". They have each individual preference, consumption vector and household production technology. There is at least one market commodity which cannot be produced in households and necessary input for household production. We denote the household production technology of individual  $j$  as a function  $f_j(h_j, e_j)$ ;  $f_j: R_+ \times R^n \rightarrow R^n$ . We assume that the additivity of the household production function and concavity.

A price vector of commodity bundle and labor is  $(p, w) \in V \subset R^n$ ;  $V$  is a compact, convex and bounded set of relative price vector. With this price vector of each individual we can define as follows.

$$\sum_{j=M,F} \{wm_j - p(x_j + e_j - \omega_j)\} \geq 0 \quad (1)$$

As a unity the household budget is common for the member of the household. The household production constraint is also common in the household member. The commodity produced in a household is only consumed in the household which produced it. The *household production constraint* is as follows.

$$\sum_{j=F,M} \{f_j(h_j, e_j) - Z_j\} \geq 0 \quad (2)$$

Although each individual maximizes their utility function respectively, the market constraint and household production constraints are common in household members. It is important to note that the allocation of time and household production commodities is determined by the governance of the household, not through market mechanism. Thus, it is necessary to introduce governance of households which rule

decision making process of the households, e.g. family bargaining games.

Moreover, the market price vector of commodities and wages also affects the allocation of household commodities and time allocation. If wage rates are low and the household production technology is efficient enough, then the market labor might decrease and the household work might increase instead. Because the commodities which can substitute consumption with each other in market and household could shift to household production form the purchase in market.

In other words, the decision-making of individuals belonging to households depends on both the market and the governance of households.

### 2.3 The Structure of Gender Rent-seeking Game

In this section the structure of the model is explained in two stages; 1) gender rent seeking by currently social superior category “men”, 2) non-cooperative market-household game played by members of households.

In the first stage, a “man” decides how much effort he makes to keep his gender identity as it should be. Before a person comes to make responsible decisions in the market or in the households, it develops the social identities and acquires the social norms and cods of conducts of which it belongs. Although the process seems to be independent of economic activity, it is deeply dependent of economic interest terms as the member of currently social superior category. In the process a “man” learns the way how he restores his gender identity when it is infringed and how much it costs. A “man” decides the defense level of its identity  $y \in [0,1]$  prior to his market and household decision making. The identity defense costs him  $C(y)$ ;  $C: [0,1] \rightarrow R_+$  and  $C$  is convex increasing function in  $y$ . By the male identity defense, his partner in his household suffer welfare damage  $L(y, m_f, h_f)$ ;  $L: [0,1] \times [0, K] \times [0, K] \rightarrow R_+$  depending on her level of “against social norms and codes of conducts” behavior. We call the welfare damage of a “women” as backlash loss. The example of male identity defense action is showing anxiety and irritation to his spouse when his housework share is larger than he expects or when his income share in the household is less than his spouse.

In the second stage, given price vector  $(p, w)$  and the spouse’s allocation  $(x_{-j}, z_j, m_{-j}, h_{-j}, e_{-j})$  each individual  $j$  decides its own allocation of commodities and time, maximizing each payoff function subject to market and household production constraint.

Given  $(p, w, \omega; y) \forall (x_F, z_F, m_F, h_F, e_F; y)$  “man” maximizes the following problem by choosing  $(x_M, z_M, m_M, h_M, e_M)$  :

$$\text{Max} \quad U_M(c_M, l_M) - C(y) \quad (1)$$

$$\text{st.} \quad \sum_{j=M,F} \{wm_j - p(x_j - \omega_j)\} \geq 0 \quad (2)$$

$$\sum_{j=F,M} \{f_j(h_j, e_j) - Z_j\} \geq 0 \quad (3)$$

$$K - m_M - h_M - l_M = 0 \quad (4)$$

$$C_M = x_M + Z_M - e_M \quad (5)$$

Since the market and household production constraints are the same for a “woman” in the same household, her optimization problem is as follows.

Given  $(p, w, \omega; y), \forall (x_M, z_M, m_M, h_M, e_M; y)$ , a “woman” solves the following problem by choosing  $(x_F, z_F, m_F, h_F, e_F)$ :

$$\text{Max} \quad U_F(c_F, l_F) - I_M(m_F, h_F) - L(y, m_F, h_F) \quad (6)$$

$$\text{st.} \quad \sum_{j=M,F} \{wm_j - p(x_j - \omega_j)\} \geq 0 \quad (1)$$

$$\sum \{f_j(h_j, e_j) - Z_j\} \geq 0$$

$$j=F,M$$

$$K - m_F - h_F - l_F = 0 \quad (7)$$

$$C_F = x_F + Z_F - e_F \quad (8)$$

If we assume the strict concavity of utility functions  $U_F, U_M$ , strict convexity of identity loss functions  $I_F, I_M$ , backlash loss function  $L$  and defense cost function  $C$ , then we have upper-semi continuous best response correspondences of each optimization problem from Kuhn-Tucker Theorem and Maximum Theorem

Since for given  $(p, w, \omega; y)$  and  $(x_{-j}, z_{-j}, m_{-j}, h_{-j}, e_{-j})$  the feasible sets satisfying market and household constraints of each individual  $j \in F, M$  are compact, convex and bounded sets (see proof in Appendix I), with the upper-semi continuity of each individual's best response correspondences, the Kakutani's Fixed Point Theorem implies the existence of Nash-equilibria of the second stage non-cooperative market-household game.

### 3. Equilibrium and Comparative Analysis

#### 3.1 The Comparative Analysis of Market-Household Game

Since the market-household game has equilibria which satisfies the first order conditions of Kuhn-Tucker Theorem, we can show the results of comparative statistics.

The Kuhn-Tucker conditions for a "man" is as follows. There exists  $\mu_1, \mu_2 \geq 0$  such that:

$$1) \quad \mu_1 \geq 0 \text{ and } \mu_1 \text{ such that} \\ \sum_{j=F,M} \{ w m_j - p(x_j + e_j - \omega_j) \} + \mu_2 \{ f_M(h_M, e_M) + f_F(h_F, e_F) - \sum_{j=F,M} z_j \} = 0 \quad (9)$$

The following five first order conditions hold.

$$- \frac{DU_F}{DC_F} - \mu p = 0 \quad (15)$$

$$\frac{DU_F}{DC_F} - \mu_2 = 0 \quad (16)$$

$$\mu_2 \frac{Df_F}{De_F} - \mu_1 p = 0 \quad (17)$$

$$- \frac{\partial U_F}{\partial l_F} - \frac{\partial I_F}{\partial m_F} - \frac{\partial L}{\partial m_F} + \mu w = 0 \quad (18)$$

$$- \frac{\partial U_F}{\partial l_F} - \frac{\partial I_F}{\partial m_F} - \frac{\partial L}{\partial m_F} + \mu \frac{\partial f_F}{\partial h_F} = 0 \quad (19)$$

First, as for "men", the marginal utility ratio between leisure and each consumer commodities are equal to the ratios between wages and the commodity price from (10) and (13) In other words, a "man", efficiently maximizes economic welfare by adjusting his consumption and labor, whether which is market labor or domestic labor, by market price mechanism. On the other hand, as for "women", the marginal utility ratio between leisure and a consumption commodity is not equal to the ratios of wages and the commodity price from (15) and (18). The market mechanism works so that the marginal utility ratio of leisure and each commodity

for a woman is smaller than the wage and the consumer goods price ratio by the sum of the marginal values of identity loss and the backlash loss at the equilibrium.

Hence even when the wage rates of the husband and the wife are equal, and they have the same utility functions, the supply of market labor of the wife is smaller than that of her husband. The reason for this is the identity loss of the wife and the backlash of the husband.

Second, relative wage rate of “men” and “women” is larger than the marginal utility of leisure of a “man” valued by the marginal utility of a “woman” from (13) and (18). It means that even when the husband and the wife are equal, and they have the same utility functions, the leisure of the wife at the equilibrium is smaller than that of the husband.

Third, the female marginal productivity of housework valued by that of a “man” is larger than the marginal female utility of leisure valued by that of a “man” from (14) and (19). Even when the wife and the husband have the same household production functions and the same utility functions, at the equilibrium the housework time is larger than that of her husband.

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