

Corneo, Giacomo

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Giacomo Corneo

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Giacomo Corneo

*University of Osnabrück, CEPR, CESifo
and IZA, Bonn*

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IZA

P.O. Box 7240
D-53072 Bonn
Germany

Tel.: +49-228-3894-0
Fax: +49-228-3894-210
Email: iza@iza.org

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ABSTRACT

Work and Television^{*}

Evidence from a sample of countries show that people roughly spend as much time watching television as earning their living. Moreover, television viewing and work hours are positively correlated across countries. A simple model based on complementarities in the organization of free time is developed that explains such a pattern as resulting from multiple equilibria. In this model the equilibria can be inversely Pareto-ranked by their amount of television viewing. Arguments are offered to explain why in some countries a Pareto-inferior equilibrium might have come into being.

JEL Classification: J2, H0, D1

Keywords: Television viewing, work hours, relational goods

Giacomo Corneo
Department of Economics
University of Osnabrück
Rolandstr. 8
49069 Osnabrück
Germany
Tel.: +49 541 969 2730
Fax: +49 541 969 2722
Email: gcorneo@oec.uni-osnabrueck.de

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1 Introduction

In analyzing agents' supply of work hours, economists are used to consider a model that only differentiates between time spent for work and time spent for leisure. The focus is on the determinants of labor supply, both because it is a major income source and occupies a very significant fraction of people's active time. No attempt is usually made to differentiate between the various uses of free time summarized by the word "leisure".¹ However, having a closer look at the ways in which people spend their free time seems worthwhile precisely because of its implications for labor supply analysis. Individual decisions about the allocation of their free time shape the possibilities of joint forms of leisure available to others and thereby affect the opportunity costs of working. Hence, there may be changes in labor supply behavior that merely result from a reorganization of free-time activities, and those changes will be unexplained unless one distinguishes between different uses of free time.

Empirical time researchers are unanimous in putting forward a single most time-consuming form of leisure in contemporary societies: television viewing. By way of an example, according to the evaluation of time diaries offered by Robinson and Godbey (1997), in 1985 US citizens reported on average 188 minutes of daily television viewing. As a primary activity alone, television absorbed almost 40 percent of the average American's free time. By comparison, the second most time-consuming activity, socializing within and outside the family, only took 56 minutes. Time-diary methods are actually likely to underestimate the actual amount of television viewing, as most studies estimate that the average American now watches roughly four hours per day.

In the first part of the current paper international evidence is reported that allows one to compare television viewing time in the period 1994-1997 across a sample of

¹A notable exception is Becker (1965), whose focus is rather different from the one in the current paper.

OECD countries. A first striking finding is about the sheer amount of hours devoted to viewing television: in each country watching TV absorbs on average about as much time as working. The evidence also reveals the following striking fact: hours of work and hours of television viewing are positively correlated across countries. The positive cross-country correlation between television viewing and working time is surprising since there is no apparent reason for them to be technologically complementary activities. And the longer one of those activities is, the shorter is the available time for the other one.

The second part of the paper tries to shed some light on the positive cross-country correlation between television and working time. A simple model of time allocation is developed, in which agents' time can be used for work, television viewing, and socially enjoyed leisure. The latter refers to activities performed together with others, like visiting friends or attending the meetings of one's club. During such activities, so-called relational goods are consumed by those who participate.² The distinctive trait of relational goods is that an agent's consumption increases with the amount of time the agent devotes to socializing as well as with the socializing effort expended by other agents. If these externalities are sufficiently strong, a concern for socially enjoyed leisure gives rise to multiple equilibria. Equilibria with little socializing but long hours of work and television viewing coexist with equilibria in which there is much socializing along with short hours of work and television viewing. This analytical framework thus rationalizes the empirically observed cross-country correlation between television viewing and working time as stemming from the selection of different equilibria in a situation in which several ones exist.³

²The terminology is due to Uhlaner (1989).

³There is a parallel between this interpretation of cross-country evidence and Putnam's (2000, ch.15) interpretation of the 1965-2000 decline of social connectedness and civic engagement in the US. He estimates that 25 percent of the decline is attributable to the rise of television viewing and

In the proposed model equilibria can be Pareto ranked by their amount of socializing, and the equilibria with long hours of work and television viewing can be seen as the result of a coordination failure. Given that everybody else is working long hours, it does not pay for an agent to invest time for creating and cultivating social ties. However, if socializing efforts generate sufficient complementarities, the agent would cut work hours if the others do the same.

The third part of the paper is concerned with the forces that might have led to the selection of a Pareto-dominated equilibrium in some countries. I speculate that the following factors might have been at work. First, the initial equilibrium selection might have led to such an equilibrium because hours of work were longer before the television technology was available and work hours were sticky due to labor institutions. Second, moving to an equilibrium with less television and less work might have failed since it required the coordination of a very large number of agents. Third, capital owners might have successfully opposed that coordination since they feared the distributional consequences of a reduction of aggregate labor supply.

The paper concludes by digressing on the implications of the model for labor market policy. Mandatory reductions of the workweek are discussed as a potential device to eliminate Pareto-dominated equilibria. Progressive taxation of labor income is argued to have positive welfare effects by indirectly raising the consumption of relational goods.

10 percent to increased time devoted to work, following the emergence of two-career families. He attributes most of the remaining decline to generational change.

2 Empirical evidence

Internationally comparable data on both television viewing and working hours can be collected for a sample of eleven countries: Finland, France, Germany, Italy, Japan, Norway, Spain, Sweden, Switzerland, UK, USA. The period covered by the data is 1994-1997, except for Italy and Japan, for both of which one year is missing.

Data about television viewing are obtained from European Key Facts (1998). This source provides average daily viewing time per individual in minutes for a number of years and countries. In each country the sample consists of several thousands adults. The device used to track the amount of viewing is the "people meter" which, by requiring viewers to actively report when they are viewing, considerably improved the accuracy of the viewing estimates as compared to the previously used "Nielsen audimeter": estimates by the "people meter" are more likely to reflect the time spent on television viewing as a primary activity.

The first column in Table 1 reports the data on television viewing time, converted into average annual hours for the period 1994-1997. The US are the country with the longest television viewing time, the average adult spending there 1,462 hours each year watching television. The country with the shortest time of television viewing is Norway with 878 annually hours of television per individual.

The statistical indicator of the time spent on work is average annual hours actually worked per person in employment. This variable is reported for various countries and years by OECD (2000). Averages for the period 1994-1997 appear in the second column of Table 1. The eleven countries mentioned before constitute the intersection between the set of countries in the European Key Facts (1998) source and the set of countries in the OECD (2000) source. All years available for this set of countries have been used.

Annual work hours are longer, but not much longer, than annual hours of television

viewing. On average over all countries, people work 1687 hours a year and watch 1155 hours a year television. This is only a difference of about 30%.

Table 1. Average annual hours spent for TV and work, 1994-1997.

| Country | TV-viewing hours per adult | Work hours per person in employment | Work hours per adult |
|-------------|----------------------------------|---|-------------------------|
| Finland | 929 | 1725 | 1043 |
| France | 1166 | 1616 | 878 |
| Germany | 1148 | 1563 | 903 |
| Italy | 1340 | 1637 | 761 |
| Japan | 1324 | 1885 | 1116 |
| Norway | 878 | 1413 | 850 |
| Spain | 1334 | 1813 | 903 |
| Sweden | 893 | 1600 | 981 |
| Switzerland | 882 | 1608 | 1036 |
| UK | 1387 | 1738 | 1065 |
| USA | 1462 | 1954 | 1264 |

Figure 1 exhibits a scatter plot of the data used to compute the first two columns of Table 1. Two remarkable features emerge. First, patterns of television viewing and working hours are quite different across different countries while they are rather stable in each country over the various years. Second, television viewing time seems to correlate positively with working time.

The impression of a positive correlation is confirmed by computing regression lines. The first column in Table 2 reports the results from estimating a television viewing time equation by OLS. The coefficient on the working time variable exhibits

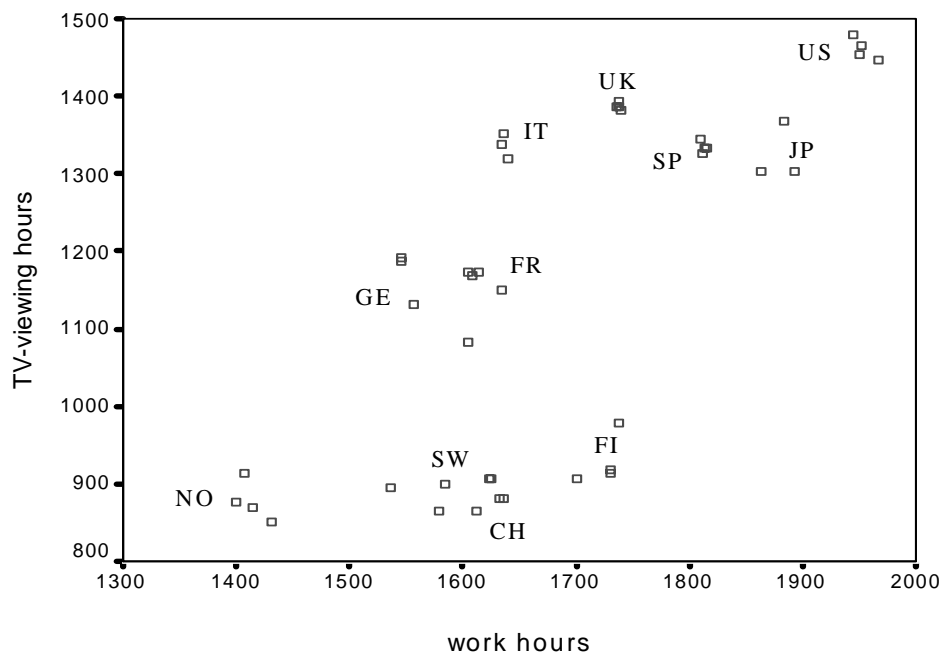


Figure 1: Annual hours spent for TV and work, 1994-1997

a positive sign and is strongly statistically significant. In column (2) a trend term has been added to the equation. The coefficient on the working time variable keeps being positive and significant.

Table 2. OLS estimates for TV viewing time. Standard errors in parentheses

| | Coefficient (1) | Coefficient (2) | Coefficient (3) | Coefficient (4) |
|-------------------|-----------------------|-------------------------|----------------------|------------------------|
| Work per employed | 1.049 (0.162) | 1.047 (0.164) | | |
| Work per adult | | | 0.457 (0.249) | 0.458 (0.252) |
| Year | | 12.395 (22.294) | | 14.999 (30.636) |
| Constant | -614.152 (273.998) | -1796.018 (2143.625) | 700.088 (247.411) | -733.571 (2938.863) |
| R ² | 0.511 | 0.515 | 0.078 | 0.083 |
| N. Obs. | 42 | 42 | 42 | 42 |

The utilized working time variable refers to hours spent on work by those who are employed, whereas the television viewing variable refers to the viewing behavior of the overall adult population. Since countries differ by the portion of their adult population that works, it is interesting to see whether the positive correlation between television and working time still manifests itself when working hours are averaged on the overall adult population. A meaningful approach to measure the average number of hours the adult population of a country desires to work is:

$$workhours \times part \times age,$$

where *workhours* is the formerly reported variable portraying the average annual hours per person in employment, *part* is the labor force participation ratio for persons aged 15-64 years and *age* is the fraction of the population aged 15-64 in the population aged 15 or more.⁴

Average working time desired by the adult population of the various countries is reported in the third column of Table 1. The average over all countries is 987 working hours per adult, which is 168 hours less than the average time devoted to viewing television. Only in three countries, viz. Finland, Sweden and Switzerland, people desire on average to spend more time on work than watching television.

The third and fourth columns of Table 2 report the results from OLS estimations that employ the new working time variable, with and without a time trend. In both cases the coefficient on the working time variable exhibits a positive sign and is statistically significant at conventional levels, which indicates a positive correlation between work hours and television viewing time.

How can the above evidence be rationalized? A possible route is to invoke a correlation in preferences: countries in which preferences for money are strong might also happen to be countries in which preferences for television are strong, and countries with weak preferences for money might also happen to display weak preferences for television. While a curious international pattern of preferences may explain the empirical evidence to some extent, other factors seem to be at work as well. Preferences should enormously differ in order to justify, by them alone, such large cross-country differences as the one between the US and Norway. An opposite route is actually followed in the subsequent Section: preferences are assumed to be uniform across countries and differences in behavior are shown to result from multiple equilibria.

⁴Variable *part* is reported by OECD (2000). Variable *age* is recovered from Eurostat (1998/99).

3 A model with relational goods

3.1 Assumptions

On first approximation, the activities in which agents engage during their free time may be subdivided into two categories. The first one consists of activities which yield privately enjoyed leisure. The most prominent example of such activities is television viewing;⁵ further examples are surfing in the internet, reading a newspaper, writing poetry. Activities in the second category yield instead socially enjoyed leisure. Personalized interactions with friends and neighbors constitute an outstanding example of such activities; participation in the activities of clubs and community associations, religious bodies, political parties, unions and various civic organizations are further examples.

Socially enjoyed leisure can be seen as the consumption of relational goods, i.e. goods produced by agents connected through a personal relationship. Thus, an agent's consumption of relational goods increases with the amount of time and effort the agent devotes to socializing as well as with the socializing effort expended by other agents. Two types of external effects may be distinguished. First, there is an externality in the formation of an agent's social network, i.e. the group of persons with whom actual socializing takes place. Building a social network gives rise to positive externalities in quite the same fashion as job search does in labor markets with mobility costs (e.g. Diamond [1981]). All networks are subject to a risk of termination, e.g. because an agent moves to a different location. With imperfect information flows, building a network requires that an agent spends some time in collecting the necessary information. The agent has to spend some time in order to meet potential interactants,

⁵Putnam (2000, ch.13) dismisses the early idea of television as an "electronic hearth" that fosters family togetherness. With multiple TV sets per household, even mere physical closeness due to watching together has become relatively rare.

screen them, and being screened by them. The probability of a successful match clearly increases with the time the agent devotes to searching for partners. However, the quality of the match will also be higher, the more time the remaining agents devote to search.⁶

A second type of externality concerns the individually exerted efforts by members of a given social network to improve their skills as interactants. Such skills are in part relation-specific, i.e. not valuable outside a given social network. The involved external effects are similar to those generated by individual effort decisions in a work team. An agent's benefit from being in a social network increases with the time the agent invests in preparing for high-quality interactions⁷, and at the same time, the agent benefits from the investment in interaction skills made by the other members of the network.

In order to study the implications of private and social leisure in a manageable framework, a model is developed in which the externalities affecting relational goods appear in a reduced form. The model economy is populated by a continuum of agents $i \in [0, 1]$ with logarithmic preferences,

$$U(i) = \alpha(i) \ln c(i) + \beta(i) \ln z(i) + \gamma(i) \ln x(i) \quad (1)$$

where $c(i)$, $z(i)$, and $x(i)$ are the amounts of the three goods that agent i consumes. Good c , used as the numeraire, does not require time in order to be consumed. Good z has unit price of zero but requires one hour of the agent's time for each unity of the good the agent consumes. For concreteness, z is referred to as television, although it may capture any form of individually spent free time. Good x represents

⁶Spending an entire evening in a bar will not improve one's social contacts if nobody else turns up.

⁷Examples may range from contributing a dish to a neighborhood dinner to empathizing by imaging yourself in a friend's shoes.

socially enjoyed leisure, has unit price of zero, and is referred to as the relational good consumed by the agent. The taste parameters $\alpha(i)$, $\beta(i)$, and $\gamma(i)$ are all strictly positive.

The consumption of the numeraire good is uniquely determined by an agent's income:

$$c(i) = w(i)l(i), \quad (2)$$

where $w(i)$ is the exogenous hourly wage and $l(i)$ is the endogenous labor supply of individual i .

The relational good is produced by the socializing efforts exerted by the agent, $s(i)$, and by the average socializing effort in the population, S according to:

$$x(i) = s(i)^{g(S)}, \quad (3)$$

where the continuous and strictly increasing function g satisfies $g > 1$.

Socializing, viewing television, and working are linked together by an agent's time budget, i.e.:

$$l(i) + z(i) + s(i) = T, \quad (4)$$

where T is total time available. Without loss of generality I normalize total available time to unity.

Informally, an equilibrium is defined as a set of individual decisions about l , c , z , s , and a social characteristic S , such that the two following requirements are met. First, the choices of work hours, numeraire consumption, television viewing and socializing efforts by any agent maximize his utility function (1) subject to the constraints (2), (3) and (4), taking S as given. Second, S equals the average of the individually chosen socializing efforts.

3.2 Results

I first establish the following fact:

Proposition 1 *An equilibrium always exists.*

Proof. Using (1), (2), (3) and (4), the individual optimization problem can be written as:

$$\max \alpha(i) \ln c(i) + \beta(i) \ln z(i) + \gamma(i)g(S) \ln s(i) \quad (5)$$

subject to:

$$c(i) = w(i)(1 - z(i) - s(i)) \quad (6)$$

For given S , an individual's optimal choices are:

$$c^*(i) = \frac{\alpha(i)w(i)}{\alpha(i) + \beta(i) + \gamma(i)g(S)} \quad (7)$$

$$z^*(i) = \frac{\beta(i)}{\alpha(i) + \beta(i) + \gamma(i)g(S)} \quad (8)$$

$$s^*(i) = \frac{\gamma(i)g(S)}{\alpha(i) + \beta(i) + \gamma(i)g(S)} \quad (9)$$

Define $S^* \in [0, 1]$ as the average socializing effort in equilibrium. From (9) an equilibrium exists if and only if S^* satisfies:

$$S^* = \int_0^1 \frac{\gamma(i)g(S^*)}{\alpha(i) + \beta(i) + \gamma(i)g(S^*)} di \equiv G(S^*). \quad (10)$$

Since $G : [0, 1] \rightarrow [0, 1]$ is continuous, the existence of S^* follows from Brouwer's fixed-point theorem. Q.E.D.

The set of the equilibrium points is therefore determined by equation (10). Given S^* , individual behavior is uniquely determined by (7), (8), (9), and

$$l^*(i) = 1 - z^*(i) - s^*(i). \quad (11)$$

Proposition 2 *Multiple equilibria are possible. Equilibria with longer working time also display longer television viewing.*

Proof. Since function $G(\cdot)$ is strictly increasing, multiple equilibria may arise, as shown by way of an example. Suppose that agents have identical tastes $\alpha(i) = 15$, $\beta(i) = 15$, $\gamma(i) = 1$, $\forall i$, and that $g(\cdot)$ is the quadratic function

$$g(S) = 150S^2 + S + 1. \quad (12)$$

Finding the equilibria of the models boils down to determining the roots of a cubic equation ensuing from (10):

$$150S^3 - 149S^2 + 30S - 1 = 0. \quad (13)$$

There are three equilibria: $S_1^* \approx 0.04$, $S_2^* \approx 0.22$ and $S_3^* \approx 0.73$. It can be shown that the equilibria S_1^* and S_3^* are stable, whereas S_2^* is an unstable equilibrium.

Substituting (8) and (9) into (11) one can compute equilibrium work hours as:

$$l^*(i) = \frac{\alpha(i)}{\alpha(i) + \beta(i) + \gamma(i)g(S)}. \quad (14)$$

Since $g(\cdot)$ is strictly increasing, equilibria with more socializing have less time spent on work. By (8), equilibria with more socializing also have less television viewing. Hence, equilibria with longer work hours also display longer television viewing. Q.E.D.

The reason for multiplicity is straightforward: the individual incentive to look for social contacts is strong when socializing efforts by others are intense and it is weak when socializing efforts by others are modest. Multiple equilibria are possible if these complementarities are strong enough. Equilibria with more socializing display less of both television viewing and working. Therefore television and work are positively correlated across equilibria.

Proposition 3 *Whenever there are two equilibria with different average working time, the one with shorter average working time Pareto-dominates the other one.*

Proof. Take two different equilibria S_1^* and S_2^* , with $S_2^* > S_1^*$. Since the utility function of each agent (5) increases with S , the value of the maximized utility function is larger under S_2^* than under S_1^* . By this fact and the previous Proposition, the equilibrium yielding the higher utility is the one with the shorter working time. Q.E.D.

4 Selecting a television and work equilibrium

The above model portrays equilibria with long work hours and television viewing as a coordination failure based on complementarities in socializing efforts. As any other model of coordination failure, the current one may be criticized on the following ground: with gains from coordination, people should eventually manage to find a way of coordinating complementary activities. In what follows three interrelated reasons for the selection of a Pareto-dominated equilibrium are offered.

First, the initial equilibrium selection might have led to an inferior equilibrium. At the early stages of television diffusion (roughly, in the 1950s in the US and in the 1960s in the other countries), people worked longer hours than nowadays. The introduction of the television technology increased the marginal utility that could be derived from leisure time and made a reduction of working time desirable. Institutional constraints on the length of the workday might have substantially slowed down the adjustment of work hours. The economy was moving towards the new equilibria "from above", and it is natural to think that it got stuck in the first one it encountered, i.e. the one with the longest hours of work.

Second, a decentralized move towards a Pareto-superior equilibrium might have failed because it required the coordination of a very large number of agents. In modern societies, the environment to which people are exposed is enormously large. Coordination to an equilibrium with a larger consumption of relational goods is thus

severely limited by the transaction costs and free-riding incentives that are associated with large groups.

Third, the selection of a "television and work equilibrium" might be seen as a social situation orchestrated by the capitalists. The equilibrium preferred by the capitalists is the one with the largest labor supply, because this is the one which induces the highest remuneration of capital.⁸ Hence capitalists might have successfully opposed trade unions and labor parties whenever they tried to promote a reduction of working time.⁹ This might explain the observed differences between a country like the US, in which the balance of power is in favor of capital, and countries in which the balance of power is more in favor of labor, like the Scandinavian ones (see Table 1).

⁸Suppose, without loss of generality, that agents are identical. Immerse the model of Section 3 in a competitive model economy with a constant-returns-to-scale technology: $Y = F(K, L) \equiv Lf(k)$, where $f(k)$ is a strictly increasing and concave function of capital intensity. Capital K is exclusively owned by capitalists. Labor L is offered by workers alone.

If the consumption of relational goods is segregated by ownership class, workers' choices of time allocation are as computed in the model of Section 3. Since the mass of workers is normalized to unity, aggregate labor supply is given by:

$$L = \frac{\alpha}{\alpha + \beta + \gamma g(S)}$$

With competitive factor markets, capital earns its marginal product:

$$r = F_K(K, L) = f'(k)$$

An increase in labor supply benefits capitalists because it intensifies the relative scarcity of capital:

$$F_{KL}(K, L) = -\frac{kf''(k)}{L} > 0.$$

⁹Schor (1991) discusses at some length the strategies adopted by business in the US to oppose reductions of the workweek.

5 Concluding remarks

Television viewing and work hours are positively correlated across a sample of OECD countries. This empirical finding can be explained by the presence of strong complementarities in the consumption of various forms of socially enjoyed leisure. Accordingly, equilibria with lots of work and television can be seen as the outcome of a coordination failure. Some arguments have been offered as to why in some countries agents' time might be allocated according to a "television and work equilibrium".

Acknowledging the presence of complementarities in various forms of leisure can profoundly alter the normative analysis of policies directed at the labor market. The case of a mandatory reduction of work hours has already been mentioned. It can be viewed as a device to prevent agents from being trapped in a Pareto-dominated equilibrium. Such a measure is difficult to enforce for a number of work activities, the duration of which is hard to monitor, like those of managers and the self-employed. However, if social ties are not fully compartmentalized across professional groups, those who are not actually forced to reduce their working time by legislation may find an interest in reducing their own work hours, since a larger pool of potential social contacts is available. A mandatory reduction of work hours for a subgroup of the population may thus entail a bandwagon effect leading the whole population to reduce their working time.

Progressive taxation of labor income is another case in point. Because of the externalities associated with socializing efforts, even in the preferred equilibrium there is too little socializing and underconsumption of relational goods. While a subsidy for socializing efforts may restore efficiency, such a measure is not viable on practical grounds. Alternatively, a feasible approach is to tax competing uses of time, in particular working time. Under realistic conditions, a larger degree of progressivity in the taxation of labor income leads to a reduction of labor supply. As a consequence,

time for socializing can expand. The incentive costs of a progressive tax schedule may be substantially lower than in conventional welfare analyses if one takes its beneficial impact on the consumption of relational goods into account.

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