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Massimo D'Antoni
Ugo Pagano

The institutions of the work-leisure divide

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Massimo D'Antoni
Ugo Pagano

University of Siena

Abstract

Even in the most advanced societies, individuals seem to live in mutually exclusive social and economic spheres. During their leisure time, there is an increasing supply of all sorts of goods that should allow all sorts of happy activities. During their work time they feel used as increasingly flexible means of production. Institutions, which include consumption, are often excluding production. Institutions, which include production, are often excluding consumption. Standard economic theory has become a powerful ideology justifying this divide. The paper challenges this ideology and proposes a more general approach where in principle all human activities can contribute to final utility as well as to production. Our approach can give a rationale for policies favoring inclusive institutions that try to overcome the work-leisure divide and allow us to move towards a more satisfactory structure of human activities.

Keywords: work, leisure, economic ideology, institutions of capitalism

JEL classification: J18, I31, D13, L21

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1. Introduction

The institutions of our society suffer from a particular type of exclusivity. Some institutions are supposed to be places where we satisfy our needs. Other institutions are supposed to be the locus of production activities and be evaluated according to their capability to enhance production efficiency. Typically families, clubs and all sorts of associations are dedicated to the first type of activities while firms, business corporations and all sorts of service providers are dedicated to the second type of activities. In the first case the performance of the institutions is judged on the basis of their capability to generate utility for their members, in the second case the performance is related to the benefits that the institutions can provide for its owners or its users.

This common-sense divide between leisure and work is typical of capitalist societies. An asset becomes capital when it is able to provide an income stream for each owner and its value is given by this future income stream[1] . When this income stream is greater than the deterioration of capital, capital can generate other capital and a form of capital accumulation takes place. The institutions geared towards this process of capital accumulation are clearly distinguishable from those where the individuals satisfy their needs.

A clear-cut distinction is less evident in non-capitalist societies were the production of goods and their consumption does often happen within the same institution. In this case both the needs of the people and the production of the goods are included in the same institution. Within these institutions some individuals may be excluded from the most satisfactory activities and only be used to produce goods and services.

Orthodox economic theory has provided a well-known justification for this divide. It shows how so-called consumption decisions can be separated from production decisions and how these decisions can be independently taken by consumers and by profit-maximizing firms. In the next section we show how the standard neoclassical model, leading to this result, is based on a dichotic assumption about human activities which can a priori divided into leisure and work. In other words, in variables influencing only the objective function and variables affecting only the production function.

The third section of the paper assumes that work can affect (directly and not only as forgone leisure) both the utility and the production function. The separation between activities into different typologies of institutions becomes much more difficult. A firm managing the resources by simply equalizing their productivity in each task of the organization brings about an allocation of work which is inconsistent with the maximization of social welfare. Workers needs must be included in the decision-making processes of the organization.

The fourth section takes the analysis one step further and assumes that all human activities can potentially affect both the utility and the production function. We derive endogenous definitions of leisure and work and their implications for the organization of human activities. We will argue that a modern economy, friendly with the environment and with human nature, should rely on individuals considering always both the direct and indirect effects of all their activities on human welfare.

Finally, the last section concludes by considering some policy implications of our argument.

[1] Hodgson (2015) conceptualizes capitalism in way consistent with this view. Pistor (2019) argues that assets become capital when they acquire characteristics of priority, universality, durability and transferability which allow their owners to earn a stream of incomes.

2. Orthodox Theory and the standard division between work and leisure

We will start by considering a very simplified standard model of resource allocation. Following the neoclassical tradition it could be interpreted as the problem of Robinson Crusoe allocating his time on his island or as the problem faced by a society taken as a whole. We assume that utility depends only on two variables: leisure y_0 and consumption y. We have only one resource X that can be either be allocated in two productive uses, x_1 and x_2, to produce $y = f(x_1,x_2)$, or left idle as x_0 and transformed in an equal amount $y_0 = g(x_0) = x_0$ (g is an identical function). The problem can therefore be formulated as follows:

$$\max U(y_0,y) \text{ s.t. } \quad y_0 = x_0 \qquad (1)$$
$$y = f(x_1, x_2)$$
$$x_0 + x_1 + x_2 = X$$

We obtain the usual Lagrangian

$$L = U(y_0,y) - \lambda_0(y_0 - x_0) - \lambda(y - f(x_1, x_2)) - \lambda_r(x_0 + x_1 + x_2 - X) \qquad (2)$$

and the following first order conditions:

$$\partial U/\partial y_0 = \lambda_0 \quad \partial U/\partial y = \lambda \quad \lambda_0 = \lambda \quad \lambda(\partial y/\partial x_i) = \lambda_r \quad i = 1, 2 \qquad (3)$$

Substituting we obtain:

$$\partial U/\partial y_0 = (\partial U/\partial y)(\partial y/\partial x_i) = \lambda_r \quad i = 1, 2 \qquad (4)$$

and, in particular,

$$\partial y/\partial x_1 = \partial y/\partial x_2 \qquad (5)$$

Suppose now that λ, λ_0, and λ_r are the prices given to a consumer maximizing the difference between utility and costs:

$$\max U(y_0, y) - \lambda_r y_0 - \lambda y \qquad (6)$$

and to a profit maximizing producer

$$\max \lambda y - \lambda_r x_1 - \lambda_r x_2 \quad \text{s.t. } y = f(x_1, x_2) \qquad (7)$$

Maximization of (6)
implies

$$\partial U/\partial y_0 = \lambda_0 \quad \partial U/\partial y = \lambda \qquad (8)$$

while maximization of (7)
implies

$$\lambda \partial U/\partial x_i = \lambda_r \quad i = 1, 2 \qquad (9)$$

from which follow (4) and, once again,

$$\partial y/\partial x_1 = \partial y/\partial x_2 \quad (10)$$

The first order conditions of the decentralized solution are equal to (3)

.

This shows that a market where the individuals take their decisions at the shadow prices (that is the Lagrangean multipliers of the optimization problem) of the resources, can achieve the same conditions of the original optimization problem.

The maximization of profits implies an optimal allocation of the resource within the firm. The marginal productivity of the resource should be the same in each use. Preferences are not relevant to achieve this condition which appears to be driven only by technological efficiency.

On the basis of some prices, different individuals can coordinate optimally as if they were a unique Robinson Crusoe.

The model which we have just considered can be subject to many critical observations. One is that there is no mechanism for which these prices could emerge from market interactions. They are simply an outcome of an optimizing problem. We will however not consider these types of objections but we will rather concentrate on a different characteristic of the process of decentralization which makes Robinson, as well as a society of many Robinsons, behaving in a schizophrenic way.

Robinson does not consider his own preferences for his own productive activities. He derives his utility only from consumption and leisure. He can become some sort of capitalist employing himself and seeking the maximization of shareholder value. As a capitalist he maximizes profits. In this way he gets as a consumer the maximum amount of leisure and consumption. As the employee of himself he ignores his needs and allocates his energies as if he was steel or iron. We will examine the implications of the introduction of producers' preferences in the next section and we will endogenize the concept of work and leisure in the section 4.

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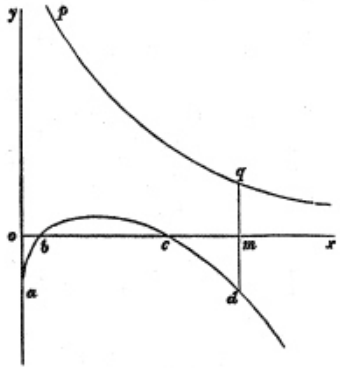
3. Introducing production preferences in the standard model

In a famous figure Jevons[2] considered a problem similar to that encountered by Robinson Crusoe. Also in this case a useful product was being produced and a decreasing curve was expressing the



[2] See Jevons (1965) figure 9 p. 173. Jevons was one of the makers, together with Menger and with Walras, of the 1870ties marginalist revolution. He was referring to the conditions which should hold for a single worker or for a cooperative of workers. Jevons also described the employment contract as a very imperfect arrangement and thought that the State should have an active role in the resolution of labor disputes. In Jevons (1968 p. 143, 145) he considered workers cooperatives to be a desirable arrangement.

decreasing pleasure gained by additional units of the product.

Labor was first painful and later pleasurable (from b to c) and then again painful. At point m the pleasure of additional production was matched by the pain of additional labor (qm = dm) and the an imaginary Robinson Crusoe would have stopped working.

From the Benthamian calculus of pleasure and pains, Jevons derived the standard conditions for the maximization of utility of an independent worker. This required that the marginal disutility of labour should be equalized with the marginal utility of its product.

Although in our simple model this condition is not immediately evident, we can show that a similar condition can be derived from it. However, in many respects, the two conditions are fundamentally different.

Remember that $x_0 = y_0$. Given the total resource constraint $x_0 + x_1 + x_2 = X$, if we keep x_2 constant, an increase of x_1 will imply a decrease of x_0 of the same amount. We have therefore that:

$$\partial U/\partial x_0 + \partial U/\partial y_0 = 0 \qquad (11)$$

and because of (4):

$$\partial U/\partial x_1 + (\partial U/\partial y)(\partial y/\partial x_1) = 0 \qquad (12)$$

Or:

$$(\partial U/\partial y)(\partial y/\partial x_1) = - \partial U/\partial x_1 \qquad (12')$$

This seems to imply the standard Jevons condition according to which the independent worker works until the marginal disutility of labor is equal to the marginal utility of its product.

However, in this case, the marginal disutility of labor must be interpreted as an opportunity cost due to an alternative use of the unit of the resource. It is not the real-life particular use of that unit that is causing, at the same time, disutility and productivity.

Let us consider the following example where leisure and the two tasks add up to 24 hours. That is $x_0 + x_1 + x_2 = X$ is satisfied by the following numbers: 16 + 2 + 6 = 24. A change of the values such as 15 + 3 + 6 = 24 will affect the utiliy level. By contrast the change 16 + 3 + 5 = 24 will have no direct effect on the disutility of labor. A decrease of the forgone leisure from 16 to 15 hours matters, whereas an increase of a task of one unit compensated by the decrease of a task of another unit does not matter.

The main difference between Jevons and the modern approach is that Jevons is referring to the pain or pleasure of a real-life activity. By contrast, the standard textbook model which we have considered is consistent with the Walrasian view[3] where utility is only derived from the resources that you keep

[3] Walras' (1977) formulation acted as an involuntary successful compromise between the Austrian and the British streams of the 1870s neoclassical revolution. By treating the disutility of work as the forgone utility leisure, Walras' formulation seemed to be consistent with Jevons' approach claiming that the disutility of work mattered. It seemed also to be consistent with the view of work, typical of the Austrian School, which regarded work as any other non-human resource. The possibility that also leisure could be produced by work did not alter much the Austrian approac. The interesting debates between the Austrian and the British Schools include Edgeworth (1894) and Bohm-Bawerk (1894a and 1894b). An account of the debate can be found in Pagano (1985). Koopmans (1951) regarded the inclusion of leisure and not work in the utility function as a semantic device. This device has become the standard approach for most microeconomic textbooks.

for yourself and not from the ones that you have sold. In the standard framework each resource that is sold and used in production involves disutility in the sense of forgone self-consumption and the disutility of forgoing this consumption must be obviously equal to the utility of keeping the resource. This approach fails to see the difference between resources such as human labor and other resources.

In the case of non-human resources the only thing that matter for utility are the units of the resource that you keep for yourself. What you rent or sell to others only matters insofar as it allows you to acquire other resources that you can consume. If you rent your house to somebody, you care about the income and the way in which it is maintained but you do not care or even know about the particular uses that they will make of your house (using for instance a room to sleep or to watch television).

The case of resources such as your own time is completely different. You cannot rent the resource, get utility from what you keep and otherwise be indifferent about the real use that others make of it. The worker cannot sell her own labor-power and walk away. Each use and each level of use of the resource that you have rented will in this case affect your utility. Thus, for the case of resources such as labor we have to assume that the levels of each use of the resource will affect welfare. The same activities which influence the production function will also appear as arguments of the utility function.

We have therefore to restate our model as follows:

$$\max U(y_0, y, x_1, x_2) \quad \text{s.t. } y_0 = x_0 \qquad (13)$$

$$y = f(x_1, x_2)$$

$$x_0 + x_1 + x_2 = X.$$

From this we obtain

$$\partial U/\partial y_0 = \lambda_0 \quad \partial U/\partial y = \lambda \quad \lambda_0 = \lambda \quad \partial U/\partial x_i + \lambda\,(\partial y/\partial x_i) = \lambda_r \quad i = 1,2 \qquad (14)$$

and:

$$\partial U/\partial y_0 = \lambda_0 \quad \partial U/\partial x_i + (\partial U/\partial y)(\partial y/\partial x_i) = \lambda_r \quad i = 1,2. \qquad (15)$$

Now we have:

$$\partial U/\partial x_1 + (\partial U/\partial y)(\partial y/\partial x_1) = \partial U/\partial x_2 + (\partial U/\partial y)(\partial y/\partial x_2) \qquad (16)$$

which means that the sum of direct and indirect utility must be the same in each use. Comparing condition (16) with (5) we can see how taking into account producers' preferences involves a radical change of the conditions necessary to have an optimal allocation of the resource among the two productive uses.

When we ignore the preferences of human beings for their own productive activities, the only thing that matters is the result of these activities but not the activities themselves. In this case it makes sense to organize and to allocate them according to their productivity, that is according to the effect that that the activity has indirectly on human welfare by increasing the amount of some useful product. This implies that the marginal productivity of the resource should be the same in each use.

Otherwise, the product could be increased by moving the resource from the less productive to the more productive uses.

By contrast when we take into account that all human activities, including those that allow the production of useful products, affect our welfare directly we cannot simply equalize the marginal productivity of the resource in each use (i.e. its indirect benefit via the production of a useful product) . We have to add to it the direct effect that performing that activity has on human welfare. This is clearly evident when we compare (16) and (5) which state that the sum of the direct and indirect utility of the resource should be the same in each use.

We have seen that a profit maximizing employer maximizing (7) will equalize the marginal productivity of the resource while ignoring the direct effect that the real activities performed by the people embodying it have on human welfare. In other words, he will choose technologies and allocate humans as if they were iron or a machine. A price system giving a scarcity price, implicit in the resource constraint of a resource, is not enough to decentralize decisions to profit maximizing producers. In order to achieve an efficient allocation, prices for each use of the resource should be taken into account. We need to set prices w_1 e w_2 for the two uses of the resource x_1 e x_2.

In this case, a consumer who maximizes

$$U(y_0, y, x_1, x_2) - \lambda_r (y_0 - x_0) - \lambda y + w_1 x_1 + w_2 x_2 \quad \text{s.t. } x_0 + x_1 + x_2 = X. \tag{17}$$

and a producer who maximizes:

$$\lambda y - w_1 x_1 + w_2 x_2 \tag{18}$$

obtain the following conditions:

$$\partial U/\partial y_0 = \lambda_r \quad \partial U/\partial y = \lambda \quad \partial U/\partial x_i + w_i = \lambda_r \quad i = 1,2 \tag{19}$$

and from (18) we have:

$$\lambda (\partial U/\partial x_i) = w_i \quad i = 1,2 \tag{20}$$

Replacing the values of w_1 e w_2, which we obtain from (19), we have:

$$\partial U/\partial x_i + \lambda (\partial U/\partial x_i) = \lambda_r \quad i = 1,2 \tag{21}$$

The optimal allocation — as expressed by conditions (14) — can therefore again be obtained by decentralized producers.

In this case, prices of resources necessarily change when their use changes. Each price is appropriate for a certain level of each use.

However, a market for each use of labor would imply a continuous bargaining between the suppliers and utilizers of productive services. As pointed out by Coase (1937), such bargaining, implying a price for each level of each use, would deny the very existence of a firm, intended as an institution alternative to the market whose existence is justified by the possibility to save on transaction costs.[4]

But what kind of firm would be best equipped to solve the optimization problem? According to

[4] This is equivalent to the idea expressed in Coase (1960) that the firm is an institution by which some externalities, including those arising from economies of scale and scope, can be internalized. On this point see Pagano and Vatiero (2015).

standard economic theory, firms should maximize profits and be managed in the exclusive interests of shareholders. A natural corollary of this view has been that productivity should be maximized and that employees should be allocated among different uses as if they were iron or coal. The firm conceived as a profit-maximizing institution, working in the interest of the shareholders, is an institution excluding from its decision-making process the persons who spend their life working in the organization. Workers preferences for a decent, interesting and creative work were seen at most as a way to increase workers' productivity and were not considered an independent goal that an organization should try to fulfil. Only a culture and/or an ideology, which assumes that people have no preferences for their own working life (and are only interested in leisure), can justify these institutions excluding these needs in their decision-making processes. Unfortunately this ideology coincides with standard textbook economics.

However even if we assume that labor is painful, it is not homogeneously so. Its pain could be greatly reduced by choosing tasks, and in general an organization of work, which would best fit the preferences of the workers. Labor could not be bought according to a price corresponding to the scarcity of a particular skill and then allocated to achieve productivity.

An alternative solution is to change the objective function of the organization in such a way that its revenue and the welfare of its workers are both taken into account. In other words, we should look for organization that are such that both the direct (dis)utility of a task and its indirect utility are taken into account.

Assume that the function $U(y_0, y, x_1, x_2)$ is additively separable, that is:

$$U_c(y_0, y) + U_p(x_1, x_2) \tag{22}$$

so that in principle the "consumer choice" about the consumption and leisure is independent of the "producer choice" arising from the fact that different task levels involve different (dis)utility.

In terms of the simple model which we have considered before this involves decentralizing the decisions to a consumer maximizing:

$$U_c(y_0, y) - \lambda_r y_0 - \lambda y \tag{23}$$

and to a firm maximizing:

$$U_p(x_1, x_2) + \lambda y - \lambda_r (x_1 + x_2) \tag{24}$$

we would again achieve the conditions (14), which implies (16).

An inclusive organization is one that includes in its objective function both the direct and the indirect effects of work or, in other words, does not exclude the preferences of the workers for their own working activities from the decision making process of the organization. This organization should equalize the sum of the marginal (dis)utility of work and of the marginal utility of the product of work in each use. It should not simply equalize the latter as maximizing shareholder. It should take into account its overall effect on human welfare which involve that the sum of the direct and indirect utility is equalized in each use.

4. An endogenous definition of work and leisure

In economics, leisure is an empty space that is not filled with any activity and work is an activity that

is only done with the purpose of allowing us to obtain useful things. We have discussed how analysis should be modified when we take into account that individuals directly obtain utility from specific work activities.

What about leisure? We associate leisure with pleasant activities, that we undertake for their own sake. Indeed, our immediate experience is that leisure is more pleasant than work, that we choose even when nobody rewards us for doing so). Leisure is associated to consumption rather than production, and yet leisure and work are competing use of the same resource, time. Moreover, a satisfying definition of leisure should account for the fact that the same activity may be leisure for some individuals and work for others, or it can be generally considered work in same ages and leisure in other times. As Adam Smith[5] had pointed out:

> *hunting and fishing, the most important employments of mankind in the rude state of society, become in its advanced state their most agreeable amusements, and they pursue for pleasure what they once followed from necessity*

Observe how in the Smithian approach leisure, is not a black hole where all activities, reduced to absolute idleness, have no productive benefits. Moreover, Smith's claim suggests that we cannot define leisure independently of the economic organization of a society. Following this intuition, in this part of the paper we want to sketch an endogenous definition of leisure, where the same activity can be leisure or work depending on the circumstances.

A way to introduce this idea is by noting that, in Robinson's world, to a close look there is no clear distinction between work and leisure. Consider again his problem of allocating time between two activities, for example hunting and gathering[6]. We assume that each activities produces a output and generates utility, at least up to a certain level; namely, we assume that the marginal utility is decreasing and it can become negative as the time spend in the activity increases. Hence, we represent the problem as:

$$\max U(y_1, y_2, x_1, x_2) \quad \text{s.t.} \quad y_1 = f_1(x_1) \qquad (25)$$
$$y_2 = f_2(x_2)$$
$$x_1 + x_2 = X.$$

By defining the activity symmetrically, we do not predetermine whether one activity is leisure or work. The first order conditions are:

$$\lambda_r - \partial U/\partial x_i = (\partial f_i/\partial x_i)(\partial U/\partial y_i) \qquad i = 1,2 \qquad (26)$$

Since λ_r is the marginal utility (opportunity cost) of time, on the left hand of each equation we have the marginal cost of time spent in each activity (the opportunity cost of time net of the direct utility from activity), while on the right hand side we have the "indirect" utility derived from its output.

The first order conditions shows that activities which produce a lower value (because of their low productivity or the low utility of their output) have to be more enjoyable. Vice versa, those activities

[5] Smith (1776) Book I, Chapter X . Unlike Ricardo Smith held a subjective a theory where humans held preferences for all their activities. Marx held an intermediate view arguing that under capitalism is reduced to simple tasks and becomes an homogeneous pain but it can become interesting and an end in itself in a future communist society (Pagano 1985 and 2007).

[6] Also eating and hunting may be a good example. By eating Robinson reproduces his body and gets the energies to go hunting. In the peculiar situation of the Island, if the taste of the venison is bad, he may also dislike eating and love hunting. Instead of hunting for eating, he may eat for hunting.

whose output is more valuable, even if they may be pleasant when they occupy a small amount of time, will be carried out up to the point that their direct utility will be so low to compensate for the high marginal indirect utility. In general, because our employment choice will be at least in part instrumental to buying goods with the income it produces, and because we tend to choose as our employment the activity where our productivity is higher, the equilibrium direct marginal utility of work will be low.

Indeed, for high enough productivity and/or value of the output produced, the direct marginal utility $\partial U/\partial x_i$ will be negative, as it is usually assumed in standard textbooks when referring to work. When instead $\partial U/\partial x_i > 0$, we can say that the activity includes a leisure component; typically, this will be the case when the indirect utility Robinson derives from the output produced is low. Of course, a low utility or low productivity may imply that Robinson prefers to spend no time at all in the activity (the time spent in each activity cannot be negative), but if the direct utility is large enough, the level of activity will have a positive amount even in this case.

Although both activities maybe at least in part pleasant, we can talk of a leisure component, but we might hesitate to define Robinson's activities as leisure in a strict sense. After all, both activities produce some output, so they can be associated more naturally to the notion of work, albeit possibly a pleasant work.

However, we can go a step further and complicate our simple model by assuming that carrying out an activity x_1 requires that some of the output of the other activity is consumed. One example is related to what some scholars think of our hunting and gathering stage. According to them gathering, mainly performed by man was subsiding, the hunting of big animals performed by men[7]. The net calories intake of the hunting activity was negative and this activity was possible by consuming some of the calories produced thanks to gathering. Assume that Robinson, as a typical male, prefers hunting to gathering.

Let $z_i=z_i(x_j)$, for $i \neq j$, represent the quantity of output i necessary to carry out activity x_j. We consider that consumption of i for the production of i is already taken into account in the production function f_i. The fact that it is a function of x_j amounts to assuming the two inputs x_j and z_i are complementary in the production of j.

The maximization problem is modified as follows:

$$\max U(y_1, y_2, x_1, x_2) \quad \text{s.t.} \quad \begin{aligned} y_1 &= f_1(x_1) - z_1(x_2) \\ y_2 &= f_2(x_2) - z_2(x_1) \\ x_1 + x_2 &= X. \end{aligned} \tag{27}$$

We obtain the first order conditions:

$$\partial U/\partial y_1 = \lambda_1 \quad \partial U/\partial y_2 = \lambda_2 \tag{28}$$

$$\partial U/\partial x_1 + \lambda_1(df_1/dx_1) - \lambda_2(dz_2/dx_1) = \lambda_r \quad \partial U/\partial x_2 + \lambda_2(df_2/dx_2) - \lambda_1(dz_1/dx_2) = \lambda_r \tag{29}$$

[7] Some evidence for this hypothesis is given by Hawkes (1996) but it is criticized by Gurven and Hill (2009). The idea is that men went hunting big preys to impress women and upgrade their status. However, big preys were rarely caught and the activity had to be subsided by women who gathering and hunting small preys provided a regular supply of calories.

giving, after some substitution:

$$\lambda_r - \partial U/\partial x_1 = (df_1/dx_1)(dU/dy_1) - dz_2/dx_1(\partial U/\partial y_2) \quad (30)$$

$$\lambda_r - \partial U/\partial x_2 = (df_2/dx_2)(dU/dy_2) - dz_1/dx_2(\partial U/\partial y_1) \quad (31)$$

The new terms on the right hand side of the two conditions imply that it is now possible, when df_i/dx_i is low and dz_j/dx_i is high, that carrying out an activities implies a loss in terms of output. This will be the case when the activities consumes more resources than it produces.

Going back to our example of hunting and gathering this is the case when for the activity 1 the production in terms of calories of the hunting activity is less than the calories subtracted from the production of the gathering activity.

$$(\partial f/\partial x_1)(\partial U/\partial y_1) \quad < \quad (dz_2/dx_1)(\partial U/\partial y_2) \quad (32)$$

and

$$\lambda_r < \partial U/\partial x_1 \quad (33)$$

In this case the hunting activity x_1 has not simply a leisure component in the sense that it has a higher utility and lover productivity than the gathering activity x_2. It is also "costly" leisure in the strong sense that it is an activity that is characterized by a deficit in terms of the output (here a deficit of calories) and needs to be subsided by another activity (here the gathering activity producing a surplus of calories).

The allocation problem can be decentralized to a consumer and to two profit-maximizing firms using the shadow prices. Provided that, as discussed in section 3, w_1 and w_2 can be differentiated for the two activities x_1 and x_2, the optimization problem for the consumer is:

$$\max U(y_1, y_2, x_1, x_2) \quad \text{s.t.} \quad \lambda_1 y_1 + \lambda_1 y_2 = w_1 x_1 + w_2 x_2 \quad (34)$$
$$x_1 + x_2 = X$$

with the conditions

$$\partial U/\partial y_1 = \lambda_1 \quad \partial U/\partial y_2 = \lambda_2 \quad \partial U/\partial x_1 = \lambda_r - w_1 \quad \partial U/\partial x_2 = \lambda_r - w_2 \quad (35)$$

while for the firm producing commodity i it is:

$$\max \lambda_i y_i - w_i x_i - \lambda_j z_j(x_i) \quad \text{s.t.} \quad y_i = f_i(x_i) \quad (36)$$

which gives

$$\lambda_i(df_i/dx_i) - w_i x_i - \lambda_j(dz_j/dx_i) = 0 \quad (37)$$

and by substituting from (35) into (37) we see that the optimal allocation is reached.

Note that, because of inequality (33), w_1 is negative. Indeed, while in the case of gathering the entrepreneur is running a standard firm and the wage w_2 is positive, in the case of hunting he is

running a hunting club were the leisure hunting activity takes place. He charges a fee w_1 for the "safari" that he organizes because, even if he keeps the dead animals, this is not enough to compensate for the cost of the cost of the hunting activity.

We have considered the case that hunting and gathering are decentralized to two different organizations. However, in section 3, we have shown that a single firm could organize the two activities; in this case, the internal allocation of resources will not rely on the price mechanism but on command and control within a hierarchical relation. We also claimed that, in order to reach an efficient allocation, productivity cannot be the only relevant dimension, and employees' preferences for different tasks must be taken into account.

It is well known that neoclassical economics does not provide an explanation of the nature of the firm and its borders. To explain why some activities are bundled into a single organization, and more in general why not all allocative decisions take place in markets, we must invoke the presence of transaction costs. There is no convincing reason why the borders between organizations must separate activities that we defined "work" from activities we call "leisure". Indeed, we expect that in many cases transaction costs will make it advantageous to bundle together work and leisure into the same organization. Again, this implies that the allocation of activities among different tasks is not decided by the price mechanism, but by conscious maximization within the organization (Coase, 1937).

To illustrate, assume for simplicity that the preferences for the activities are separable from the preferences for their products, or

$$U(y_1, y_2, x_1, x_2) = U_c(y_1, y_2) + U_p(x_1, x_2) \tag{38}$$

The allocation problem can be decentralized to a consumer, who will choose y_1 and y_2 to solve:[8]

$$\max U_c(y_1, y_2) - \lambda_1 y_1 - \lambda_1 y_2 \tag{39}$$

and to a single firm, which is required to solve:

$$\max \quad \lambda_1 y_1 + \lambda_1 y_2 + U_p(x_1, x_2) - \lambda_r (x_1 + x_2) - \lambda_1 z_1(x_2) - \lambda_2 z_2(x_1) \tag{40}$$

$$\text{s.t.} \quad y_1 = f_1(x_1) \quad y_2 = f_2(x_2)$$

observe that now, as in Section 3, the same wage is paid for both activities, but the firm internalizes the worker's utility in its objective function. It is easy to check that the two optimization problems yield the first order conditions

$$\partial U_c/\partial y_1 = \lambda_1 \qquad \partial U_c/\partial y_2 = \lambda_2 \tag{41}$$

$$\lambda_1(df_1/dx_1) + \partial U_p/\partial x_1 - \lambda_2(dz_2/dx_1) = \lambda_r \quad \lambda_2(df_2/dx_2) + \partial U_p/\partial x_2 - \lambda_1(dz_1/dx_2) = \lambda_r \tag{42}$$

which correspond to the optimality conditions (28) and (29).

As in the preceding section, if an organization emerges to save on transaction costs, it will not rely on prices to decide the levels of the different activities, but it will directly maximize the utilities of the individuals carrying out these activities (i.e. it will not stick to outright profit maximization).

[8] We consider that the consumer doesn't control the allocation of his/her time in the activities, which is chosen by the firm where her preferences are taken into account.

However, unlike the organization considered in the preceding section, now some of the activities are not only less productive (and more pleasant) than others, they may produce a net negative output. Nonetheless, if their high direct utility offsets their lower productivity, it is still efficient to carry them out. The firm is now a mixed leisure-work organization: to stick to our previous example, it may be at the same time a leisure hunting club and a productive gathering working unit.

Our Robinson has no family. He is only later joined by Friday, that he will treat as his slave. Thus, the internal division of labor of the Robinson-Friday organization is likely to see the first enjoying hunting and the second concentrating on gathering. This may still be efficient, although the distribution of benefits is not necessarily equitable. A similar inequality may emerge in the hunting and gathering families which have characterized such a large share of the history of our species. We have seen, that according to some anthropological literature, men hunt big preys at expenses of the more productive gathering performed by woman. In this non-market organization, in which hunting and gathering are jointly organized, hunting is a leisure male activity whose deficit of calories is subsided by female gathering.

A sharp distinction between work and leisure, both in term of times and places, can be considered an historical outcome of the industrial revolution. At that stage, the institutional divide between the factory and the family became also a clear divide between different activities. Some activities were performed under the direction of an employer, others stayed in the family. Influenced by what they observed in real-life, most economic textbook assumed such division as something unquestionable, and provided an ideology to justify it as a natural fact.

Human activities were naturally and exogenously divided into work and leisure or in activities influencing only the production or only the utility function (and Robinson's personality was split accordingly). The family was conceptualized as a place were no costly work was performed and individuals were simply engaged in the fulfillment of their preferences. The firm was seen as a place devoted only to production where the tasks being performed were only indirectly influencing utility, as they subtracted time from leisure. Workers were supposed to be indifferent among different tasks and work treated as generic time spent in (whatever) productive activity. This picture was far from reality, since some production is carried (sometimes painfully) within the family and the (often low) quality of working life affects human welfare. The formal division of leisure and work served to justify, or at least to hide, the worst aspects of both institutions.

Excluding from the analysis the production processes carried out within the family obscured the costs and the unequal division of labor in what may be considered as the most important production process: giving birth to and raising human beings. For economics, human beings come to life without pregnancy, without a difficult education process, and immediately endowed with preferences restricted to consumption of goods and leisure. All the costly activities carried out within the family, along with the unequal distribution of such costs, are absent from many economic textbooks.

On the other hand, ignoring workers' preferences and their humanity favored an authoritarian view of the firm where labor power could be allocated among different productive uses as any other non-human power. Technological efficiency, defined independently of the well-being of the individuals engaged in production, became the criterion by which working activities should be organized. The struggles about the distribution of painful labor were ignored and the emphasis on profit maximization and shareholder value supported corporate irresponsibility towards the workers employed in production.

A clear-cut division between leisure and work cannot be grounded in a permanent human psychology and even less on their sloppy exogenous definitions. A sharp divide emerged with the

industrial revolution and the physical separation of human activities associated with factory production and office work. Now, the covid pandemic is accelerating a movement in the opposite direction[9]. Both movements were grounded on new technologies: centralized steam power in one case and the ITT technologies in the other. They were favored by an increased difficulty to carry out the traditional forms of production: enclosures made the synergy between agriculture and industrial work more difficult and the pandemics transformed the spatial centralization of work into a health hazard. The investments in new forms of organizations are favored not only by new innovations but also by the fact that the existing alternatives have become less appealing. This could bring about irreversible transformations of the organization of work.

The work-leisure divide is not an intrinsic characteristic of human nature. It may be rather due to an institutional and physical separation between the realm of production, dominated by the profit maximizing firm, and the realm of leisure taking place in our households. The reorganization of work that is taking place may offer an opportunity to overcome that dichotomy also from an analytical point of view and help us to reach, to use Jevons' language, a better mix of the pleasure and pains which characterize our activities.

5. Conclusion

In the first decades of the last century a group of German intellectuals criticized the rigid separation between private life and working life which characterized capitalist societies. If the expressions of individual personalities were confined to the family and to private life, production could be organized in an authoritarian manner on the basis of some efficiency principles. With an analogy inspired to the places where they used to meet, they complained that the different roles of the individuals were closed in different caves separated by thick limestone rocks[10]. Very little communication was allowed among their separated selves.

The Robinson Crusoe described by economic theory is also divided in two selves living in two separate caves. In one cave he lives with his preferences but without his activities. In the other cave he lives with his activities but without his preferences. In the first cave preferences are restricted to consumption goods and leisure (defined as an absence of activity). In the second cave, the activities exist but they are performed on the basis of the limited preferences expressed in the first cave.

Much of what Robinson does in the second cave is independent of human preferences. For many decisions, no human preference is required. Independently of preferences, Robinson can label as inefficient and disregard all the combinations of leisure and consumption goods that are not such that to increase one he must decrease the others. The preferences of the first cave provide indifference curves which, under appropriate convexity assumptions, indicate a unique point on the frontier defined by the efficient combinations of leisure and consumption goods. The same unique point would be defined by the tangency of the curves with a line whose steepness expresses the price ratio between leisure and any other consumption good. Thus, the Robinsons, confined in the

[9] Juhász R. Squicciarini M. P. and Voigtländer N. (2020) point out how it was not simply the availability of a new technology but also the fading of alternatives which caused major changes in the organization of work during the first industrial revolution. Institutional complementarities can also inhibit the transition to new technologies (Pagano 2011).
[10] The group included Theodor Adorno, Walter Benjamin and Alfred Sohn-Rethel. They met in Capri and the Costiera Amalfitana, sometimes in the Clavel Tower near Positano which was expanded to include some of dynamite-made caves in the nearby limestone rocks. See Mittelmeier 2019.

two caves, can simply communicate via relative prices.

The half-Robinsons cannot be enclosed in the two caves without missing what makes Robinson a human-being: an active individual with subjective preferences.

In this paper we have tried to reconstruct Robinson's personality assuming that he is a real human being. We made the assumption that he has preferences for all goods and all activities. Many (not all enjoyable) activities are carried in his (and more often Mrs. Robinson's) so-called leisure time. We have also assumed that when the Robinsons go to work they do not leave their personality and their preferences at home.

When Friday appears Robinson may delegate to him some activities that he does not like. He will keep some activities for himself because he likes performing them. He may have Friday going hunting and giving him the venison but since he enjoys hunting he keeps at least part of that activity for himself.

In a market economy the hierarchical relation existing between Robinson and Friday is less evident. However, we can make a similar distinction between leisure and work. Some activities, like hunting may be done for leisure even if the market value of venison is less than Robinson's cost of hunting. Unlocking the separate selves of the individuals can have important policy implications which are otherwise obscured by an a-priori leisure-work divide.

In the first place it shows how the inequality of wealth can translate into an unequal distribution of leisure and work activities which may be socially unsustainable. A high inequality of wealth may imply that many productive activities with a high leisure content are performed by few individuals.

Secondly so-called leisure time is not the absence of activities. It includes activities that we cannot afford to buy or that can be bought but we wish to perform ourselves. Care may fit both cases. We cannot buy care activities for our relatives without altering its nature and its meaning. At the same time, even when we could buy the care on the market we may want to provide at least part of it. The unequal distribution of (paid and unpaid) care and the limits to the commodification of care activities are some of the most important problems of our society.

Thirdly if we abandon the leisure-work exogenous divide we can reframe the nature of the employment relationship. If we rent buildings or machines we can walk away with our preferences. By contrast when we are renting our time we cannot leave our preferences in some artificial leisure-consumption cave. All real-life organizations have to cope with workers' preferences. When in the name of efficiency workers' preferences are ignored, humans are treated as a machines run in the interests of employers and not as humans with subjective needs[11]. The legislation concerning firms and other organizations should take into account this point.

Finally, an economy, compatible with a sustainable environment, cannot be reconciled with individual personalities imprisoned in separated consumption-leisure or efficient-production caves. If the only purpose of the activities done in the production cave is to fill the first cave, the latter may collapse under the pressure of material products. We need to leave all sorts of limiting caves, get more happiness from our production activities and become be less dependent on their material products.

[11] A firm, treating humans as things, will choose a technology such that employees perform activities that do not satisfy their needs as producers. Moreover, this technology will cause a deterioration of the social relations at the workplace which are a very important factor for the well-being of the workers (Diener and Seligman, 2004 and Warr, 1999).

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