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No. 291, 1991

JOB AMENITY AND THE INCIDENCE OF DOUBLE WORK

by

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January 1991

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ABSTRACT

The basic purpose is to explain why some workers have two jobs. The hypothesis is that workers in jobs associated with an amenity are more prone to accept double work. If earnings fall for such jobs, it is rational to have two jobs while for jobs with no amenity a fall in earnings causes a rational worker to leave the sector altogether. An amenity can be expected for instance for workers in primary sectors and evidence that farmers at an increasing rate have double occupations are provided. The comparative statics on the models yield some unexpected results. The models are tested on data on farmers and the regressions yield some support for the theoretical models.

I am grateful to Frank Stafford and Stefan Fölster for comments.

1. Introduction.

Amenities or disamenities connected with different jobs are, in the labor economics literature, a source of compensating wage differentials. For an employer in a competitive labor market to attract labor for jobs with health risks, exposure to pollution or crowding etc., it is necessary to offer the worker a wage premium.[1/] Similarly, one can argue that workers may have emotional links to certain jobs which may force employers in other sectors to offer higher wages. For instance, workers are likely to have a preference for jobs offered at the place of birth and a wage premium above the one that covers the costs of moving is then necessary. Some workers might also have emotional links to specific jobs and therefore turn down offers of higher earnings from employers in other sectors. A case in point is handicraft workers who find a value in keeping up a tradition from previous generations.

If the emotional link to the home region or a specific job is strong workers are unlikely to give up their job even if earnings fall. A reaction might be to share the total work time between the lower paid job having the amenity and another better paid but less prefered job. For instance, an artist who finds that earnings fall need not give up painting all together but instead accept a second, better paid, part time job. A plumber, on the other hand, who lacks emotional links to his trade might give up plumbing altogether if earnings fall and continue to have only one job in another business.

If some amenity generates double work it is not surprising that it is found more often in certain jobs than in others. Except for the most succesful ones, workers in the cultural sector, like musicians, painters and poets, and handicraft workers often have a second job to raise total earnings. Double work has also become increasingly popular in the primary sector like agriculture and fishery. In the next section, evidence on the increasing importance of part time agriculture in several countries are provided.

Since double work is increasing in several countries, it is justified to study the issue to contribute to our understanding of this phenomenon. I present first a number of theoretical explanations for double work. A common denominator for workers having two jobs is that one of the jobs has an inherent amenity. This amenity is a necessary condition for wage differentials and the connection to the theory of compensating wage differentials should therefore be obvious. Second, the paper presents an empirical test of the theoretical models presented. Here, data from the Swedish Level of Living Survey (LNU) are used and the models are applied to explain why Swedish agriculture has increasingly become a part time activity.

The paper is organized in the following manner. Section 2 gives evidence on double work from the agricultural sector in some developed countries. In Section 3.a I present a general model of a utility maximizing worker who perceives an amenity to his job. In Section 3.b I present a "target income" model where workers have a preference for the sector with an amenity and in Section 3.c the target income model is expanded to allow for leisure. Section 4 contains an empirical application and Section 5 concludes the paper.

2. Evidence on Double Work from Agriculture.

Agriculture is a good example of a sector to which workers may have emotional links. The transformation of the agricultural sector in developed Western economies has led not only to a fall in the number of agricultural workers but also to a tendency for agriculture to become a part time activity. The rising share of part time agricultural production implies that the number of farmers falls considerably less than the total amount of hours of labor inputs in agriculture.

Table 1.1, for instance, shows the share of the agricultural work force that also participated in non–agricultural activities in the US for the selected years 1960, 1970, 1980 and 1987.

Table 1.1. The share of the Agricultural Population Participating in Nonagricultural Activities. In percent. Selected Years.

1960	19.3
1970	26.2
1980	31.7
1987	38.1

Source: Statistical Abstracts of the United States.

The share of the agricultural population that obtains income from non–agricultural activities increased substantially during the period, from 19.3 % in 1960 to 38.1 % in 1987. The table also indicates that the shift towards double work did not decelerate during the 1980s.

Similar tendencies prevail in other developed countries. In Sweden, for instance, of farmers' total incomes agriculture contributed 66 % in 1965 but only 28 % in 1986. In Table 1.2 are shown net revenues emanating from agriculture as a share of farmers' total income in Sweden 1980 to 1987. It is clear from the table that the trend has continued during the 1980s.

The share of the workforce having other employments is the highest in the primary sectors. In 1988, 15.1 % of the workforce in agriculture, forestry, hunting and fishing claimed that they had another employment while among the total workforce the average was 8.5 %.

Table 1.2. Net Revenues from Agricultural Activity as a Share of Total Net Revenues. In percent. Sweden 1980–1987.

1980	42
1981	42
1982	41
1983	39
1984	40
1985	38
1986	34
1987	33

Source: Statistics Sweden.

It might seem as if higher average earnings outside agriculture and lower agricultural earnings would be of crucial importance in explaining the increase in part time agriculture. While such variables may explain the fall in total agricultural employment it can hardly explain the increase in part time agriculture. Higher earnings in other sectors would give incentives to leave agriculture altogether as is true for other sectors when profitability falls.

Considering that the rise of part time work is widely spread and is of a long run nature, it appears as if national tax systems, though they may affect the deviations between countries, are not a major determinant of double work. Instead one would have to look for more fundamental explanations.

3.a A General Model of Amenity Connected Work.

I shall present three different models that all have the feature that workers prefer a certain work. The emotional linkage is represented by the inclusion in the utility function of the share of time spent in the sector where an amenity exists.

The chosen approach has connections with the migration literature, where choice of location enters the utility function, like Berg (1961) or, more recently, Hill (1986). These studies, which had the purpose of explaining the share of work time spent in a foreign country, can, like the present paper, be looked upon as special cases of the more general literature of compensating wage differentials. In those studies, an amenity is derived from working at home.

Assume two sectors, one with jobs having some amenity and one traditional manufacturing sector with no amenity. These are called the a–sector and the m–sector. Assume that an individual has a utility function $U=U(X, a)$ where X is his commodity consumption and a is the share of his total available work time spent in the "amenity" sector. U rises in both arguments. Consumption, X depends on the individual's earnings such that $X=w^m(1-a)+wSa$. Here w^m is the manufacturing earnings, w is earnings in the amenity sector and $S\equiv(1+s)$ where s is a subsidy rate provided by the government.

The individual agent takes w^m and w to be fixed and the restriction $w^m>Sw$ holds.[2/] The maximization problem is formulated as:

(3.1) $$\max_{a, X} \quad U = U(X, a)$$

(3.2) subject to $$w^m = X + (w^m - Sw)a$$

(3.3) $$0 \leq a \leq 1.$$

There are then two goods, X and a, with two prices 1 and $(w^m - Sw)$. Let Ω be the Lagrange function and λ the corresponding multiplier, the first order conditions are obtained as:

(3.4) $$\frac{\partial\Omega}{\partial X} = U_x - \lambda = 0$$

(3.5) $$\frac{\partial\Omega}{\partial a} = U_a - \lambda(w^m - wS) = 0$$

(3.6) $$\frac{\partial\Omega}{\partial\lambda} = -X + w^m(1-a) + wSa = 0.$$

The first order conditions yield the matrix system:

(3.7) $$\begin{bmatrix} U_{xx} & U_{xa} & -1 \\ U_{ax} & U_{aa} & -(w^m - ws) \\ -1 & -(w^m - wS) & 0 \end{bmatrix} \begin{bmatrix} dX \\ da \\ d\lambda \end{bmatrix} = \begin{bmatrix} 0 \\ \lambda dw^m \ -\lambda S\,dw - \lambda wdS \\ -(1-a)dw^m \ -Sadw - wadS \end{bmatrix}.$$

The determinant, D, is positive and equals $-U_{xx}(w^m - wS) + 2U_{xa}(w^m - wS) - U_{aa}$.

I shall first show the effects on the share of the work time spent in the amenity sector of an increase in the manufacturing wage. The effects on labor supply (i.e., share of total work time) in the amenity sector are obtained as:

(3.8) $$\frac{\partial a}{\partial w^m} = D^{-1}\left[(1-a)(U_{ax} - U_{xx}(w^m - ws)) - \lambda\right] \gtrless 0.$$

There is an ambiguous effect of an increase in manufacturing wages on part time work in the a–sector. In line with the Slutzky equation, the effect can be broken down into an income effect and a substitution effect. An increase in w^m implies that the income level has increased. If amenity sector work is a normal good, there is a tendency to spend a larger share of total work time in the a–sector. The first term,

D^{-1} $(1-a)(U_{ax} - U_{xx}(w^m - ws))$, which is positive, captures the income effect.

On the other hand, as the manufacturing wage rises, consumption of amenity work becomes more costly since the price of amenity sector work, $(w^m - wS)$, rises. Consequently, the individual spends a larger share of the work time outside the a–sector. The substitution effect is in (3.8) captured by the negative term $-\lambda/D$.

It should be noted that if the effect of an increase in w^m is evaluated at a point where amenity sector participation is unity, i.e., a=1, the effect is negative. Here, an increase in w^m does not add to income since there is no manufacturing sector participation and therefore the only effect is a substitution effect. So, at this point the effect on the a–sector is unambiguously negative.

How is consumption of X affected? The comparative static effects of an increase in manufacturing wages are:

$$\frac{\partial X}{\partial w^m} = D^{-1} \left[(w^m - wS)(U_{xa}(1-a) + \lambda) - (1-a)\, U_{aa}\right] > 0. \tag{3.9}$$

As consumption of amenity work becomes more costly as the price of a–sector work, $(w^m - wS)$, rises there is substitution away from "consumption" of a and towards consumption of X. To this is added the income effect on X as w^m rises. Both effects imply that consumption of X rises.

Performing the corresponding comparative static analysis for an increase in the wage in the amenity sector, the following effects obtains:

$$\frac{\partial a}{\partial w} = D^{-1} S[-U_{xx} a(w^m - ws) + U_{ax} a + \lambda] > 0. \tag{3.10}$$

An increase in the a–sector wage unambiguously raises a, the share of total work time in the a–sector rises. The individual therefore becomes more specialized in a–production. There is substitution toward spending more time in the a–sector since the price of a–work (w^m–wS) has fallen. To this is added the income effect implied by the rise in the wage.

Turning to the effects on consumption of X as the a–wage rises, these are obtained as:

$$\frac{\partial X}{\partial w} = D^{-1}S[(w^m - ws)(U_{xa}a - \lambda) - aU_{aa}] \lesseqgtr 0, \tag{3.11}$$

As the wage rises there is substitution away from consumption of X but the income effect counteracts the substitution leaving the net effect ambiguous.

Consider now the effects of an increase in S. An increase in S can be interpreted as a policy aiming at reducing the wage gap between manufacturing and the amenity sector earnings:

$$\frac{\partial a}{\partial S} = D^{-1}w(-U_{xx}a(w^m - ws) + (U_{ax}a + \lambda)) > 0. \tag{3.12}$$

The subsidy gives incentives to a–sector workers to spend more work time in the a–sector. As for the increase in a–sector wages, there is substitution towards amenity work since its price has fallen. The subsidy also implies an income increase which further stimulates consumption of a. The subsidy unambiguously leads to increased specialization in amenity work.

Finally, the effects on X–consumption are:

$$\frac{\partial X}{\partial S} = D^{-1}w[(w^m - ws)(U_{xa}a - \lambda) + a\,U_{aa}] \lesseqgtr 0. \tag{3.13}$$

The effect is ambiguous: an increase in the subsidy does not by necessity lead to increased consumption. While the subsidy raises incomes and hence stimulates consumption, it also stimulates an increase in the share of amenity work that lowers consumption. The effects are qualitatively, but not quantitatively, identical with an increase in the a–sector wage.

It would be natural to expand the model to allow for leisure. As this is done, no unambiguous results are derived. This should, though, be remembered in the evaluation of the empirical results.

3.b A Target Income Model.

An alternative to the model above is to assume that a worker tries to obtain a certain level of lifetime income and after reaching this level spends as much of his working time as possible in the amenity sector.[3/] Assume a minimum consumption level, $\overline{X}$. The target income model then implies that the marginal utility of income is infinite as $X<\overline{X}$ and is zero as $X \geq \overline{X}$. If $\overline{X}$ is attained the problem is:

$$(3.14) \qquad \max_{a} \quad U=U(\overline{X}, a)$$

$$(3.15) \qquad \text{subject to} \quad w^m = \overline{X} + (w^m - Sw)a$$

$$(3.16) \qquad 0 \leq a \leq 1.$$

The first order conditions are:

$$(3.17) \qquad \frac{\partial \Omega}{\partial a} = U_a + \lambda(w^m - Sw) = 0$$

$$(3.18) \qquad \frac{\partial \Omega}{\partial \lambda} = -w^m + \overline{X} + (w^m - wS)a = 0.$$

The following effects on a are obtained:

(3.19) $$\frac{\partial a}{\partial w^m} = \frac{(1-a)}{(w^m - Sw)} > 0,$$

(3.20) $$\frac{\partial a}{\partial w} = \frac{Sa}{(w^m - Sw)} > 0,$$

(3.21) $$\frac{\partial a}{\partial S} = \frac{wa}{(w^m - Sw)} > 0.$$

and

(3.22) $$\frac{\partial a}{\partial \overline{X}} = \frac{-1}{(w^m - Sw)} < 0.$$

If the worker maximizes utility, given a certain level of X, it can be seen that, unlike the model in section 2, an increase in the manufacturing wage unambiguously raises the share of work in the a–sector. Ceteris paribus, the wage increase implies an income increase but the worker is assumed not to be interested in an income increase that raises X. As a response to the wage increase, he therefore shifts from manufacturing to a–sector work. This process continues until the income level again yields the consumption level $\overline{X}$.

An increase in the a–wage also increases a–sector work. With incomes unaffected at the new equilibrium, the only adjustment is again one from manufacturing to a–sector work. Surprisingly, the effects of increases in the two wages are qualitatively identical but generally differ quantitatively.

As in the earlier case an increase in the subsidy raises a: the subsidy stimulates specialization in a–sector production. An increase in the target income level, finally, lowers a. The intuition for this effect is clear: as the target income rises, the worker must spend less time in the low paying amenity sector to reach this level. The target income model yields no ambiguous results as the income level, at any new equilibrium point, is unchanged.

In the next section I introduce leisure in the target income model. As this is shown to generate qualitatively different results it is justified to present the target income model with and without leisure.

3.c <u>A Target Income Model with Leisure.</u>

A natural extension of the above model is to allow for leisure. Unlike the case for the first model, the target income model with leisure yields some unambiguous results. Allowing for leisure seems particularly important as it is reasonable to expect some adjustment of the total work time as a response to falling profitability. Here, it is assumed that the worker determines a target income and after this has been reached, he determines the optimum choice of a–sector participation and leisure.

Assume that the total work time, T, is divided between leisure, L, work time in the a–sector, A, and work time in manufacturing, M so that T= L + A + M holds. Without loss of generality I assume that total time equals unity so that:

$$1 = \ell + a + m \tag{3.23}$$

where ℓ=L/T, a=A/T and m=M/T.

The maximization problem is now formulated as

$$\max_{a} \quad U=U(\overline{X}, a, \ell) \tag{3.24}$$

$$\text{subject to} \quad \overline{X} = w^{m}(1-\ell) + (wS-w^{m})a \tag{3.25}$$

$$0 \leq a, \ell \leq 1. \tag{3.26}$$

The first order conditions are:

(3.27) $$\frac{\partial\Omega}{\partial a} = U_a - \lambda(w^m - Sw) = 0$$

(3.28) $$\frac{\partial\Omega}{\partial\lambda} = -w^m(1-\ell) + \overline{X} + (w^m - wS)a = 0.$$

(3.29) $$\frac{\partial\Omega}{\partial\ell} = U_\ell - \lambda w^m = 0$$

The negative determinant is obtained as

$D = U_{aa}w^{m2} + (w^m - wS)[(w^m - wS)U_{\ell\ell} - U_{\ell a}w^m] - U_{a\ell}(w^m - wS)w^m < 0.$

The first issue to deal with is the effects on a of an increase in the manufacturing wage. These are:

(3.30) $$\frac{\partial a}{\partial w^m} = D^{-1}\{(1-\ell-a)[-U_{a\ell}w^m + U_{\ell\ell}(w^m - ws)] + wS\lambda w^m\} \gtrless 0$$

As in the general model, in equation (3.8), but unlike the target model without leisure as in (3.19), there is an ambiguous effect of an increase in manufacturing wages. As the manufacturing wage rises, consumption of amenity work becomes more costly since $(w^m - wS)$ rises. With the introduction of leisure, the substitution effect reappears and there is a tendency to reduce the share of amenity work.

This general decrease in amenity sector part time work is, however, counteracted. With the increase in the manufacturing wage, there is a reduction of total work time since the target income implies that income should be unchanged. This implies that there is a decrease in the share of a–sector work (and an increase in leisure). The net effect is ambiguous.

As indicated above the effects on leisure are positive and obtained as:

$$(3.31) \qquad \frac{\partial \ell}{\partial w^m} = D^{-1}\{(1-\ell-a)[(U_{aa}w^m - U_{\ell a}(wS-w^m)] - wS\lambda(w^m-wS)\} > 0.$$

With the altered prices, there is substitution away from "consumption" of a–sector work and towards consumption of leisure. As the income level remains constant at $\overline{X}$ and as the manufacturing wage rises there is a reduction of total work time which implies a further increase in leisure.

Performing the corresponding comparative static analysis for an increase in the a–sector wage, the following effects are obtained:

$$(3.32) \qquad \frac{\partial a}{\partial w} = D^{-1}S[U_{\ell\ell}a(w^m-wS) - U_{a\ell}aw^m - \lambda w^{m^2}] > 0.$$

An increase in the a–wage unambiguously raises a, the share of total work time in the a–sector rises. The farmer therefore becomes more specialized in the a–sector. There is substitution toward spending more time in the a–sector since the price of a–work (w^m-wS) has fallen. Furthermore, at an unchanged level of leisure, a–work increases at the expense of manufacturing work since the income level otherwise would rise above that implied by $\overline{X}$.

Turning to the effects on consumption of leisure as the a–sector wage rises, these are obtained as:

$$(3.33) \qquad \frac{\partial \ell}{\partial w} = D^{-1}S[(w^m-ws)\lambda w^m - (w^m-ws)U_{\ell a}a + aU_{aa}w^m] \lesseqgtr 0,$$

As the a–wage rises there is substitution towards consumption of a–sector work since $(w^m - wS)$ falls. Ceteris paribus, this tends to reduce leisure (and manufacturing work). There is therefore a negative effect involved in (3.33). On the other hand, the target income can now be reached by a lower total work time which implies increased leisure so that the net effect is ambiguous.

Consider the effects of an increase in S to lower the wage gap:

$$\frac{\partial a}{\partial S} = D^{-1} w[U_{\ell\ell} a(w^m - ws) + (U_{a\ell} a - \lambda)w^m] > 0. \tag{3.34}$$

The subsidy gives incentives to workers to spend more work time in the a–sector. Like for the increase in a–wages, there is substitution towards a–work since its price has fallen. Ceteris paribus, the subsidy implies an income increase and, to reach exactly the target income, a–sector work is increased at the cost of manufacturing work.

Finally, the effects on leisure are:

$$\frac{\partial \ell}{\partial S} = D^{-1} w[-(w^m - ws)(U_{\ell a} a - \lambda w^m) + w^m a U_{aa}] \lesseqgtr 0. \tag{3.35}$$

The effect is ambiguous: an increase in the subsidy does not by necessity lead to increased leisure. Ceteris paribus, the subsidy raises incomes and to avoid a higher income than $\overline{X}$, leisure is increased.

Finally, two more results are worth mentioning, both being the result of an increase in the target income. The effects of an increase in the a–sector share of work time as $\overline{X}$ rises are:

$$\frac{\partial a}{\partial X} = D^{-1}[-(w^m - ws)U_{\ell\ell} + w^m U_{a\ell}] < 0 \tag{3.36}$$

As in Model 2, the effect is unambiguously negative. The introduction of leisure into the target income model does not alter the results in this respect. The effects on leisure are also negative:

$$\frac{\partial \ell}{\partial X} = D^{-1}[(w^m - ws)U_{\ell a} - w^m U_{aa}] < 0. \tag{3.37}$$

As can be expected the effect is unambiguous. An increase in the target income demands an increase in the share of time spent for work implying a reduction also of leisure. Implicit in (3.36) and (3.37) is also the result that the amount of work in manufacturing rises as the target income rises.

Table 3.1 summarizes all the results obtained in the three models. Can the rising wages in the manufacturing sector explain the decrease in the share of work time spent in the a–sector? As the manufacturing wage increases the first and the third models yielded indeterminate effects on the a–sector participation rate while the target model without leisure yielded a <u>positive</u> effect on a–sector work. Only to the extent that the first or third model is the relevant one and if the income effect dominates the substitution effect can higher manufacturing wages explain the rise in participation in manufacturing activities. It can also be noted that introducing leisure in the target income model may yield a shift in the effects on a–sector participation of an increase in manufacturing wages.

Table 3.1 Effects of Wage Increases and Subsidies on Choice of Work and Leisure.
n.a. = Not applicable.

	Model 1 (Traditional)	Model 2 (Target income)	Model 3 (Target income with leisure)
$\partial a/\partial w^m$	?	+	?
$\partial X/\partial w^m$	+	n.a.	n.a.
$\partial a/\partial w$	+	+	+
$\partial X/\partial w$	?	n.a.	n.a.
$\partial a/\partial S$	+	+	+
$\partial X/\partial S$	?	n.a.	n.a.
$\partial a/\partial \overline{X}$	n.a.	–	–
$\partial \ell/\partial w^m$	n.a.	n.a.	+
$\partial \ell/\partial w$	n.a.	n.a.	?
$\partial \ell/\partial S$	n.a.	n.a.	?
$\partial \ell/\partial \overline{X}$	n.a.	n.a.	–

Can the fall in a–sector wages explain the fall in the share of time in the amenity sector? All three models indicate that a lower a–sector wage unambiguously lowers time in a–sector. It is noteworthy that the effects of an increase in manufacturing wages and a decrease in a–sector wages are unexpectedly asymmetrical in Model 2, and in Models 1 and 3 symmetrical or asymmetrical depending on which effect that dominates.

Concerning the policy consequences income policies to lower the wage gap yield increases in a–sector participation in all models.

4. Empirical Application.

As argued in Section 2, a good example of a sector with an amenity is agriculture and evidence of an increase in the share of non–agricultural participation were given. It is therefore natural to apply the model to farmers. I shall here rely on the Swedish Level of Living Survey (LNU) which is a longitudinal data set for the years 1968, 1974 and 1981. The total number of respondents each year exceeds 5 000 persons of which approximately 80 are farmers. Using the two years 1974 and 1981, for which all necessary data are available, and eliminating some missing values yields a set of 155 observations.

I shall use the covariance model to allow for all specific individual and time effects. The share of work time spent in agriculture, a, is according to all three models, a function of the manufacturing wage and the agricultural wage. Model 2 and 3 also predict that the agricultural share is a function of total consumption, X. I therefore estimate

$$a = \alpha + \alpha_1 w + \alpha_2 w^m + \alpha_3 X + \gamma_2^1 Z_{it,2} + \gamma_3^1 Z_{it,3} \ldots + \gamma_N^1 Z_{it,N} + \gamma_2^2 Q_{it,73} + \epsilon^1$$

where $Z_{it,i} = 1$ for the i:th cross sectional unit, and

=0 otherwise. (i=2,3,....N);

$Q_{it,t} = 1$ for 1973, and

=0 for 1980, and

ϵ^1 = the error term.

The equation above will also be estimated without X as a deterinant as this in line with Model 1. All three models predict a positive effect of increases in w on a while increases in w^m has a positive effect only according to Model 2 while Models 1 and 3 yield indeterminate effects. The effect of X–increases is negative according to Models 2 and 3.

The third model also showed that leisure should be a positive function of the manufacturing wage, while an agricultural wage increase should have a positive or negative effect on leisure. Consumption should lower leisure according to Model 3. The estimated model for leisure reads:

$$\ell = \beta + \beta_1 \mathrm{w} + \beta_2 \mathrm{w}^{\mathrm{m}} + \beta_3 \mathrm{X} + \delta_2^1 Z_{it,2} + \delta_3^1 Z_{it,3} \cdots + \delta_N^1 Z_{it,N} + \delta_2^2 Q_{it,73} + \epsilon^2.$$

Finally, Model 1 suggested that the level of consumption should be a positive function of the wage rate in manufacturing while the agricultural wage should have an indeterminate effect. The regression for consumption then is:

$$\mathrm{X} = \rho + \rho_1 \mathrm{w} + \rho_2 \mathrm{w}^{\mathrm{m}} + \eta_2^1 Z_{it,2} + \eta_3^1 Z_{it,3} \cdots + \eta_N^1 Z_{it,N} + \eta_2^2 Q_{it,73} + \epsilon^3.$$

Table 4.1 shows the results of applying the covariance model. According to Model, 1 amenity sector work should rise in the agricultural wage w but, as seen in column 1, there is a negative effect. The estimate of the variable non–agricultural wages, w^{m}, is negative and significant and hence consistent with the predictions of the model. The sign indicates that the substitution effect involved is the dominating one. The same model also predicted that the signs on X of increases in w could be either positive or negative. As seen in column 4, the estimations have yielded a positive and significant estimate indicating that the income effect dominates the substitution effect. The effect on X of changes in w^{m} is of the expected positive sign and the estimate is significant. It can be concluded that Model 1 has obtained some support in the regressions. Of the four variables which the model suggested are of relevance to explain a or X, three coefficients have their expected signs and are significant.

Table 4.1. Effects on the share of agricultural work, leisure and consumption. OLS–estimates of the covariance model. Elasticities. t–ratios in parenthesis. Effects of binary variables not shown due to lack of space.

	Dependent variable:			
Indep. variable:	a	a	ℓ	X
Constant	.7204 (6.129)	.7283 (6.433)	6801.8 (10.470)	1861.9 (.229)
Agric. wages (w)	–.0447 (-2.629)	–.0271 (-1.531)	.0101 (.731)	.1351 (3.547)
Non–agric. wages (w^m)	–.0543 (-3.365)	–.0346 (-1.941)	.0250 (1.837)	.1575 (4.357)
Consumption (X)		–.1303 (-2.627)	–.1114 (-2.866)	
$\bar{R}^2$	.69	.71	.19	.62
OBS.	155	155	155	155

Column 2 can be used to evaluate Model 2. Positive effects on amenity sector participation of both wages should be expected and a negative effect of X. Both wages yield estimates of the unexpected sign while consumption, X, yields an estimate of the expected sign which furthermore is significant. Model 2 has therefore been given only a modest support in the regressions.

To evaluate Model 3, consider columns 2 and 3. This model predicts that amenity sector work is positively affected by the agricultural wage. However, the regressions yielded a negative effect. The estimate is not significantly different from zero. The estimated negative effect of an increase in the non–agricultural wage is, however, consistent with Model 3. The negative effect implies that the substitution effect dominates the income effect.

The estimated effect on leisure of agricultural wages is not significant. Manufacturing wage increases should raise leisure according to the model, and the regressions show that they do. As consumption rises leisure is expected to fall and there is an estimated negative effect of consumption. These regressions lend some support to Model 3.

5. Conclusions.

I have specified three models to explain the rising share of double work. In the first model the worker maximized utility by determining consumption of goods and the share of his work time spent in a sector with jobs having an amenity. In the second he maximized utility by determining time in the amenity sector after having reached a target income level. The third model added leisure to the target income model. I focus on the individual's behavior and no economy wide, or general equilibrium, considerations are analyzed. Only "first order" effects are studied.

From a theoretical point of view the models yielded some unexpected effects. For instance, as the wage outside the amenity job sector rises this does not produce the same effect as when the wage in the amenity sector falls. Hence, an asymmetry is present. The second model yielded an increase in amenity sector participation of increases in both the a–sector wage and the manufacturing sector wage. Also, in several respects the models produce counteracting effects.

The empirical work showed that, in general, higher incomes and higher wages outside the a–sector are important determinants of the fall in a–sector participation. Not suprisingly, the first model and the target income model with leisure are given the most support in the regression analysis.

NOTES

1. See Rosen (1986) for a review. Early contributions are Friedman and Kuznets (1954) and Friedman (1962).

2. Note that the wage differences are assumed rather than derived as a result of the preferences for amenity sector work. What is claimed is that the wage differential is consistent with, rather than formally derived from, the amenity.

3. An early formulation of the target income model is found in Berg (1961). See also Byerlee (1974).

REFERENCES

Berg, E.J. (1961):"Backward–sloping Labor Supply Functions in Dual Economies: The African Case, Quarterly Journal of Economics, 75, 468–492.

Byerlee, D. (1974):"Rural–Urban Migration in Africa:Theory, policy and Research Implications", International Migration Review, 8, 543–566.

Friedman, M. and S. Kuznets (1954):"Income from Independent Professional Practice." New York: NBER.

Friedman, M (1962): "Price Theory: A Provisional Text." Chicago: Aldine.

Hill, J.K. (1987) :"Immigrant Decisions Concerning Duration of Stay and Migratory Frequency". Journal of Development Economics. 25, 221–234,

Rosen, S. (1986):"The Theory of Equalizing Differences". in Ashenfelter and Layard (eds) Handbook of Labor Economics, Chapter 12, 641–692.