Employers' Social Insurance Contributions and Employment

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Abstract: Holmlund (1981) presents a simple model of the incidence of employers' social insurance contributions. Hughes (1985) applies this model to Irish data, and examines the employment effect of employers' social insurance contributions. Hughes concludes that the employment effect is small. Examination of Holmlund's model and of the results obtained by applying it to Irish data suggest that this conclusion should be treated sceptically.

1 INTRODUCTION

There is considerable interest in the employment effects of employers' social insurance contributions. Holmlund (1981) presents a simple model of the incidence of employers' social insurance. Hughes (1985) applies this model to Irish data and examines the employment effect of employers' social insurance. Hughes concludes that the employment effect is small and that reductions in employers' social insurance contributions are more costly than grant aid as a method of job creation. These strong policy conclusions have gained some acceptance. However examination of Holmlund's model and of the results obtained by applying it to Irish data suggest a number of reasons why these conclusions "should be treated sceptically".

First, Holmlund's wage equation is derived from labour demand, supply and market adjustment equations. The labour demand and supply equations omit variables that have been shown in other studies to be relevant. The labour market adjustment equation is implausible. These flaws in the specification imply that estimates of the tax incidence obtained using Holmlund's wage equa-

1. For example, see the section on PRSI in the report of the Department of Social Welfare (1985).
2. This is Hughes' comment on Kirwan (1979).
tion are inconsistent. Second, the empirical results obtained when these equations are estimated support these theoretical conclusions. Third, the employment effect of employers’ social insurance contributions is not estimated but is obtained by combining the estimated tax incidence effect with an assumed value for the elasticity of labour demand. This assumed value is at the low end of a wide range. Fourth, a proper examination of the employment effect of employers’ social insurance contributions and grant aid requires the use of a theoretical framework in which output, employment and the capital stock are jointly determined. This framework was not used.

Holmlund’s model is outlined and discussed in the next section. In the following section the application of this model to Irish data is considered. Some empirical results for the labour demand, supply and adjustment equations and further results for the wage equation are presented. The derivation of the employment effect of employers’ social insurance contributions is then examined. The final section contains some general comments.

II THE HOLMLUND MODEL

Holmlund derives a quasi-reduced form wage equation from labour demand, supply and market adjustment equations. Holmlund uses this wage equation to examine the incidence of employers’ social insurance but does not consider its effects on employment.

Labour demand or employment is given by:

\[ \ln L^d = \alpha_0 - \alpha_1 \ln \left( \frac{W(1+t_s)}{p_q} \right) - \alpha_1 \lambda t \] (1)

where \( \alpha_1 \) is the wage elasticity of labour demand, \( W \) is the nominal wage, \( p_q \) is the price of output, \( t \) is time and \( t_s \) is the rate of employers’ social insurance. This equation is derived under profit-maximisation from a Cobb-Douglas production function where time proxies omitted variables. The wage term in brackets is the product real wage \( W_r \). Equation (1) may be expressed as:

\[ \ln L^d = \alpha_0 - \alpha_1 \ln W_r - \alpha_1 \lambda t \] (1a)

The supply of labour is approximated by:

\[ \ln L^s = \beta_0 + \beta_1 \ln \left( \frac{W(1-t)}{p_c} \right) + \beta_2 t \] (2)

where \( \beta_1 \) is the wage elasticity of labour supply, \( t \) is the rate of direct tax (income tax and employee social insurance), \( p_c \) is the price of consumption and the
appropriate wage term is now the consumption real wage $W_c$. Equation (2) may be expressed as:

$$\ln L^s = \beta_0 + \beta_1 \ln W_c + \beta_2 t$$

(2a)

Labour supply refers to the insured population and is thus a notional rather than an effective measure of supply. From the definitions $\ln W_p - \ln W_c \approx t_s + t_y + \ln \left( \frac{P_c}{P_q} \right) \approx t_s + t_y + t_c = T$ where $t_c$ is the rate of indirect tax. Thus the difference between the product and consumption wage is the tax wedge.

Holmlund argues that the wage does not clear the labour market. Instead it is the outcome of firm-union bargaining and it eliminates part of the current excess demand for labour. Specifically Holmlund’s labour market adjustment equation is:

$$\Delta(\ln L^d - \ln L^s) = -\gamma(\ln L^d - \ln L^s) + \varepsilon$$

(3)

where $\gamma$ is positive and $\varepsilon$ is an error term. Note that $\ln L^d - \ln L^s \approx -U$ where $U$ is the unemployment rate. Equation (3) may be expressed as:

$$\Delta U = -\gamma U + \varepsilon$$

(3a)

This implies that $U$ is a first order autoregressive process.

The market clearing real wage $W_p^*$ and the actual real wage $W_p$ are related:

$$\ln W_p^* = \text{const} - \frac{\alpha_1 \lambda + \beta_2}{\alpha_1 + \beta_1} t - \frac{\beta_1}{\alpha_1 + \beta_1} T$$

(4)

$$\ln W_p = \ln W_p^* - \frac{1}{\alpha_1 + \beta_1} (\ln L^d - \ln L^s)$$

(5)

$$= \ln W_p^* + \frac{1}{\alpha_1 + \beta_1} U$$

(5a)

Holmlund’s wage equation is obtained by differencing the above expression for $W_p$ and by substituting out $\Delta \ln W_p^*$ using (4) and $\Delta U$ using (3a):

$$\Delta W_c = \text{const} - \frac{\alpha_1}{\alpha_1 + \beta_1} \Delta T - \frac{\gamma}{\alpha_1 + \beta_1} U + \varepsilon'$$

(6)

Thus the change in the consumption wage $W_c$ depends upon the change in the tax wedge $T$, the unemployment rate $U$ and a constant. Note that the coefficient
on the tax wedge is $-\alpha_1/(\alpha_1+\beta_1)$ and indicates the incidence of taxes. An equivalent expression for (6) is:

$$\Delta \ln W = \text{const} - \frac{\alpha_1}{\alpha_1+\beta_1} \Delta \ln \left(\frac{1+t_s}{P_q}\right) - \frac{\beta_1}{\alpha_1+\beta_1} + \Delta \ln \left(\frac{1-t_y}{P_c}\right) + \frac{\gamma}{\alpha_1+\beta_1} \left(\ln L^d - \ln L^s\right) + \epsilon'$$

(6a)

This is the expression used by Holmlund.

It is obvious that the validity of the wage equation depends on the validity of the structural labour demand and supply equations and the reduced form labour market adjustment equation. If the labour demand and supply equations are mis-specified because of "invalid marginalisation" then the estimated reduced form coefficient on the tax wedge in the wage equation is inconsistent and should not be interpreted as an estimate of $-\alpha_1/(\alpha_1+\beta_1)$. If the labour market adjustment equation is implausible then the usefulness and validity of the wage equation must be in doubt.

Recent empirical work on the short run (unconditional) demand for labour has shown the importance of including variables for the capital stock, measures of technical progress, the price of raw materials and possibly demand shift variables to capture imperfect competition in the output market. In addition there are significant dynamics arising from a mixture of adjustment costs, aggregation across different types of labour and the elimination of exceptiontal terms. Among the relevant omitted variables in the supply of labour equation are the normal consumption wage and the \textit{ex-ante} real interest which capture inter-temporal substitution effects, the replacement ratio, population and relative earnings in other sectors and abroad.

These variables are not an arbitrary selection but come from well specified and widely accepted labour market models which have been estimated and reported in the literature. This is not to say that all these variables are significant in every model, because they are not. In the case of Ireland, Geary and Murphy (1986) find that many variables are significant. More importantly they find that the omission of these variables has a large effect on the estimated labour demand and supply elasticities. In any case the variables mentioned represent the set of relevant variables to be included in one's most general specification. One could then test "down" from this general specification to a more parsimonious but data coherent specification. Use of such a procedure allows one to examine the extent of reparameterisation caused by marginalisation. It must be

3. Marginalisation refers to the reduction in size of a model by "integrating out" certain variables. Omitting variables from a model automatically enforces marginalisation and an associated reparameterisation. Invalid marginalisation occurs when important or relevant variables are omitted. See Hendry and Richard (1980).
emphasised that the inclusion of a time trend does not overcome the problem of
omitted variable bias. Thus the Holmlund labour demand and supply equations
should be viewed as mis-specified due to invalid marginalisation. This implies
that the wage equation is mis-specified resulting in inconsistent estimates of the
coefficient on the tax wedge.

The model underlying equation (3) is somewhat unusual. It is normal to
assume that price adjusts to remove an imbalance in quantity, or vice versa, not
that quantity adjusts to quantity. However equation (3) can be interpreted as a
partial adjustment model in quantities:

$$\Delta U = \frac{\gamma}{1+\gamma} (U^* - U_{-1}) + \frac{1}{1+\gamma} \varepsilon$$

where the desired unemployment rate $U^*$ is constant and equal to zero. Thus the
unemployment rate is independent of all other variables and tends to zero in the
absence of stochastic shocks. Both these implications are implausible and are not
implied by other plausible models.\(^6\)

Two alternative non-market clearing models that could be considered are
outlined in Nickell (1985b). Both models rationalise the expectations-aug­mented Phillips curve. In the first model the wage does not clear the labour
market continuously. Instead some ad-hoc adjustment mechanism (partial
adjustment or error correction) is postulated so that the wage adjusts toward its
equilibrium value and the market clears in the long run. Holmlund seems to have this sort of model in mind. However the partial adjustment model is
considerably more general than equation (6).\(^7\) In wage bargaining models the

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\(^6\) Honohan (1984) estimates reduced form unemployment equations. However unlike the present case the unemployment rate in these equations is not independent of all other variables.

\(^7\) In the partial adjustment case:

$$\Delta \ln W_p = \delta_1 (\ln W^*_p - \ln W_{p,-1}) + \delta Z^w$$

where $W_{p,-1}$ is the last period's real wage and $Z^w$ is some set of variables that maintains the real wage
away from equilibrium (e.g., union effects). $\ln W^*_p - \ln W_{p,-1} = \ln W^*_p - \ln W_p - \Delta \ln W_p$. Substituting for $\ln W^*_p - \ln W_p$ implies that:

$$\Delta \ln W_p = - \frac{\delta_1}{(1 - \delta_1)(\alpha_1 + \beta_1)} U + \frac{\delta}{(1 - \delta_1)} Z^w$$

However:

$$\Delta \ln W_p = \Delta \ln W^*_p + \frac{1}{\alpha_1 + \beta_1} \Delta U$$

Some manipulation yields:

$$\Delta U = - \frac{\delta_1}{1 - \delta_1} U + (\alpha_1 + \beta_1) \left( \Delta \ln W^*_p + \frac{\delta}{1 - \delta_1} Z^w \right)$$

which is a generalisation of equation (3).
wage bargain depends on the non-wage variables in the labour supply and demand equations, the unemployment rate and some measures of firm union power. Holmlund’s reduced form labour market equation cannot be considered to be the outcome of any plausible bargaining model. His wage equation can be interpreted as an ad-hoc expectations-augmented Phillips curve only if trend productivity and other relevant variables are constant or if the wage bargain is set independently of trend productivity with no adaptation.

It is obvious that there are many alternative plausible labour market models, some of which give different answers to the question of the effect of employers’ social insurance on employment. Some of these models are nested so in theory one can select the “best” model. For example continuous and long run market clearing wage equations are special cases of the more general wage bargain equation. However in practice the “correct” model is not identified quite so easily as different data sets give different answers, not all models are nested, and even when nested are often very close to being observationally equivalent due to imprecision in the coefficient estimates. In view of this, it is desirable to consider a number of alternative models since the “correct” model is very difficult to ascertain in the absence of very strong priors.

III ECONOMETRIC APPLICATION

In applying the Holmlund model to Ireland, Hughes uses data from 1953 Q4 to 1980 Q4. Labour demand is employment. Labour supply equals employment plus registered unemployment. There are some problems with the data. The direct tax variable is calculated on the basis of a single person’s tax allowances and may not be the best proxy in view of the relative increase in married couples’ tax allowances during this period. Some weighted average of the tax rates of single persons and married couples (with children) would be preferable. The unemployment rate in the last two years is overstated somewhat since the denominator in the published unemployment rate is the insured population at the end of 1978.

Holmlund uses annual data to estimate the wage equation (6). Hughes uses quarterly data. With quarterly data it is likely that a more complicated dynamic specification is necessary and this is not adequately dealt with by merely adding seasonal dummies. Hughes estimates both unrestricted and restricted versions of equation (6). From (6a) the unrestricted version is:

\[
\Delta \ln W = \text{const} - \pi_1 \Delta \ln (1 + t) + \pi_2
\]

\[
\Delta \ln P_q = -\pi_3 \Delta \ln (1 - t) + \pi_4
\]

\[
\Delta \ln P_c + \pi_5 (\ln L^d - \ln L^s) + \epsilon
\]

8. See Nickell and Andrews (1983) for example. Oswald (1985) argues that, even when firms and unions bargain over employment as well as the wage, one can assume firms are on their demand for labour curves.
The restricted version of this equation is obtained by imposing the following joint restrictions:

\[ \pi_2 = \pi_1 \]
\[ \pi_3 = \pi_4 = 1 - \pi_5 \]

A lagged output price term is added and \((\ln L^d - \ln L^s)\) or minus the unemployment rate is replaced by \((\ln Q - \ln \hat{Q})\) or the percentage deviation of output from trend where \(Q\) is actual output and \(\hat{Q}\) is trend output. If trend output is produced when the wage clears the market then this substitution should make no difference. However, it is reported that the deviation of output from trend is superior to the unemployment rate as a measure of the excess demand for labour.

Equation (5) is a quasi-reduced form since current prices and the deviation of output from trend are endogenous. Only the former is referred to as a source of potential simultaneous equation bias. The 2SLS or instrumental variable estimates are obtained using the change in labour productivity as one of the instruments. As this variable is endogenous it is an invalid instrument. The stochastic specification of Holmlund's model is unsatisfactory — there is no stochastic specification of the labour demand and supply equations. If these have white noise errors then the wage equation has an MA(1) error. Because of omitted variables, it seems more likely that the errors in the labour demand and supply equations are autocorrelated which implies that the wage equation has an ARMA error. These assumptions should have been spelt out.

If strong policy conclusions are to be drawn from a simple model it is essential to test the robustness of the results by subjecting the equation to a battery of diagnostic tests. However a limited range of diagnostics is reported by Hughes. In the literature tests for identification or validity of the instruments, higher order AR or MA errors, and, within and out of sample stability are commonly presented.

In Holmlund's model the wage equation is derived from the underlying labour demand, supply and market adjustment equations. Neither Holmlund nor Hughes estimate these equations. These underlying equations are estimated in this paper. The results of estimating these equations by the instrumental variable method using Hughes' data are set out in Table 1. Sub-sample estimates and various relevant diagnostics are also presented. The labour demand and supply equations are estimated as first differences. If the undifferenced equations are highly autocorrelated because of the omission of relevant variables then the most favourable versions of these equations are likely to be the first

9. The within-sample Chow test, out-of-sample stability or forecast test, instrumental variable or identification test, LM test for AR(4)/MA(4) errors and modified Box-Pierce test for AR(10)/MA(10) errors are all distributed as chi-squares with the degrees of freedom shown. Small sample corrections have been made. See Barr (1984).
Table 1: Labour demand, supply and market adjustment equations

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Notes:

DEPENDENT VARIABLES: DE (DEMAND), DL (SUPPLY), DU (ADJUST).
SAMPLE PERIOD: (A) 53:3 to 80:4, (B) 53:3 TO 76:4.
INSTRUMENT LIST: CONST, S1, S2, S3, TIME, TIMESQ, DUMMY75, DRTY, DRSI, DRTY(-1), DRSI(-1), DE(-1), DL(-1), QDEV(-1), DPC(-1), DPQ(-1), DPM(-1), DHW(-1).
T STATS IN PARENTHESES.

N=NO OF OBS, K=NO OF LHS VARS, M=NO OF INSTRUMENTS
SE=STD ERROR, DW=DURBIN WATSON
CHOW=CHOW TEST OF STABILITY, FRCST=TEST OF STABILITY/FORECAST
IV=SARGAN TEST FOR IDENTIFICATION/STABILITY OF INSTRUMENTS
LM=LAGRANGE MULTIPLIER TEST OF AR(4)/MA(4) ERROR
BP=MODIFIED BOX-Pierce TEST OF AR(10)/MA(10) ERROR
CHOW, FRCST, IV, LM AND BP ARE ALL DISTRIBUTED AS CHI-SQUARES WITH DEGREES OF FREEDOM SHOWN ABOVE.

differenced ones. (In fact the estimated labour supply and demand equations in levels have high $R^2$ which exceed the very low Durbin-Watson statistics — a classic sign of mis-specification. The other diagnostics are all very significant.
The elasticity of demand is positive and thus incorrectly signed but insignificant although the labour supply elasticity is positive and significant.)

Consider the first differenced labour supply and demand equations in Table 1. The wage coefficients in both equations are imprecise and are not significantly different from zero. This means that most of the explanatory power of these equations is due to the seasonals. The explanatory power of the full-sample labour supply equation is zero since the standard error of the equation exceeds the standard deviation of the dependent variable. The coefficient on the product real wage in the demand for labour equation is correctly signed but unstable. The Durbin-Watson statistic indicates the presence of first order autocorrelation or mis-specification and the Lagrange Multiplier statistic is evidence of higher order AR or MA errors. The forecast test decisively rejects the out-of-sample stability of the labour supply equation. The Sargan tests of identification or validity of the instruments are borderline in both the demand for and supply of labour equations which suggests that some of the instruments should appear in these equations. The coefficient of the unemployment rate in the adjustment equation is unstable and changes sign! The Durbin-Watson statistics are very low while the out-of-sample stability of this equation is decisively rejected. To summarise, there is little empirical support in the data used by Hughes for the labour demand, supply and adjustment equations that underlie Holmlund's wage equation.

Hughes only estimates the wage equation. However the results of estimating this equation cannot be interpreted independently of the underlying model. Estimates of the unrestricted and restricted versions of the wage equation are presented in Table 2. These estimates will differ somewhat from Hughes' estimates because a different instrument set and two sample periods are used. In addition a broader range of diagnostics is presented. In fact the choice of instruments and data periods do affect the estimated values of the coefficients. While there is some evidence of out-of-sample instability in the unrestricted equation and higher order AR or MA errors in the restricted equation, on purely statistical grounds the equations are not unsatisfactory. This result is not altogether surprising as any set of trending time series data on wages, prices and tax rates would probably yield results that are equally satisfactory. This serves to emphasise the need to examine the plausibility of the underlying model. Hendry (1980) contains an amusing illustration of this point. The tax coefficients in the unrestricted equations are significant while the price coefficients are not significant and are unstable possibly due to multicollinearity. A joint Wald test of all the restrictions is passed, although the point estimates of the coefficients are quite different in the unrestricted and restricted equations. For example the coefficient on the rate of employers' social insurance contributions is greater than one and significant in the unrestricted equation and twice the size of the same coefficient in the restricted equation. Hughes reports similar results. The tests of
Table 2: Wage Equation

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<tr>
<td>K</td>
<td>10</td>
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<tr>
<td>M</td>
<td>17</td>
<td>17</td>
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<tr>
<td>RSQ(ADJ)</td>
<td>0.462</td>
<td>0.362</td>
<td>0.457</td>
<td>0.437</td>
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<tr>
<td>SE</td>
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<td>0.018</td>
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<tr>
<td>DW</td>
<td>1.897</td>
<td>2.067</td>
<td>1.727</td>
<td>1.814</td>
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<td>CHOW(16)</td>
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<td>0.424</td>
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<td>FCST(16)</td>
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<td>19.746</td>
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<td>IV(M-K)</td>
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<td>9.368</td>
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<tr>
<td>LM(4)</td>
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<td>4.285</td>
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<tr>
<td>BP(10)</td>
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<td>18.300</td>
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<tr>
<td>WALD(3)</td>
<td>1.598</td>
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</tbody>
</table>

Notes:

DEPENDENT VARIABLE: DHW.
SEASONALS NOT REPORTED.
INSTRUMENT LIST: C, DRSI, DRTY, DPQ(-1), SEASONALS, DPC(-1), DPM(-1), DHW(-1), D75, DE(-1), DL(-1), TIME, DRTY(-1), DRSI(-1), QDEV(-1).
(t-RATIOS IN PARENTHESES).

Identification or validity of the instruments are not significant possibly because the set of instruments is a limited set.
IV ESTIMATE OF THE EMPLOYMENT EFFECT

Hughes is concerned with the effect of employers' social insurance contributions on employment. This could be estimated within the framework of the Holmlund model by estimating the quasi-reduced form employment equation obtained by substituting the wage equation into the demand for labour:

$$\Delta \ln L^d = -\alpha_1 \lambda - \frac{\alpha_1 \beta_1}{\alpha_1 + \beta_1} \Delta T + \frac{\alpha_1 \gamma}{\alpha_1 + \beta_1} U + \varepsilon^\prime$$  (8)

As U is an AR(1) process it tends to zero in the long run. In the short run unemployment is not equal to zero so Hughes' labour demand and supply diagram is incorrect. The coefficient of the tax wedge $-\alpha_1 \beta_1/\left(\alpha_1 + \beta_1\right)$ is both the short- and long-run effect. This coefficient equals the incidence of the tax wedge — the coefficient of the tax wedge in the wage equation — multiplied by the elasticity of labour supply. Hughes, however, did not use equation (6) to estimate the tax incidence relying instead on the results obtained from estimating equation (4). Hughes' estimate of the incidence coefficient is approximately a half and implies the labour demand and supply elasticities are approximately equal.

Hughes' low estimate of the employment effects of employers' social insurance reflects the use of a low value of -0.2 for the elasticity of labour demand. Hughes cites studies by Walsh (1978) and Hughes (1982) as evidence. Both studies estimate the elasticity of demand for labour conditional on output. However the relevant elasticity in the present case is the unconditional elasticity which is always larger in absolute value.\(^\text{10}\) This implies that Hughes underestimates the effect of employers, social insurance on employment, even if one accepts the value of -0.2 for the conditional elasticity of labour demand. Four recent studies using Irish data have found considerably higher elasticities of labour demand in the range -0.75 to -1.25 in value.\(^\text{11}\) The current consensus in Britain is that the aggregate elasticity of labour demands is in the range -0.5 to -1.0.\(^\text{12}\) This suggests that Hughes' value of -0.2 for the elasticity of labour demand falls at the low end of a wide range.\(^\text{13}\) Hughes however does not present a corresponding

10. If labour is inferior then when the wage rises marginal cost falls and output rises, and, the output effect reinforces the substitution effect. This is easily proved. Let $C(W, ..., Q)$ be the cost function where $W$ is the wage and $Q$ is output. Then $\partial C/\partial W = L$ and by the definition of an inferior factor $\partial L/\partial Q < 0$. However,

$$\frac{\delta L}{\delta Y} = \frac{\delta C}{\delta Q W} = \frac{\delta}{\delta W} \left( \frac{\delta C}{\delta Y} \right) < 0$$


12. See Wallis (1984) and the references above. Whadwani (1985) is sceptical of some of these results.

13. Hughes' low elasticity of labour demand in industry is clearly consistent with a high aggregate elasticity if the elasticity of labour demand is lower in industry than in the rest of the economy because, for example, the share of wages in costs is lower. However the elasticity of labour demand depends on other factors such as the elasticity of substitution in addition to the share of wages in costs so this line of argument is not conclusive.
range of estimates of the effect of employers' social insurance on employment. For example, if the elasticity of labour demand is -0.75 and the tax incidence is 0.5, the same as in Hughes, the employment effect is 3.75 times Hughes' estimate. Thus his single or point estimate of this effect is spuriously precise and accordingly misleading.

Finally, as Ruane (1982) shows, it is difficult to quantify job creation costs anyway. However in comparing the relative job creation costs of reductions in employers' social insurance and grant aid, Hughes fails to distinguish between the average relationship between employment and grant aid (ignoring all other factors) and the marginal relationship between increases in employment and grand aid, holding all other factors constant. The latter is the relevant economic concept as it seems unlikely that doubling grant aid will double job creation, ceteris paribus. A proper treatment of this issue should be based upon a model in which output, employment and the capital stock are jointly determined. In such a model, the cost of capital is the transmission mechanism whereby grant aid and the various corporate tax measures affect employment. The reduced form employment equation in such a model is a complicated non-linear function so that it is difficult to derive a priori orders of magnitudes for the effects of employers' social insurance and grant aid on employment.

V CONCLUSIONS

Detailed examination of Holmlund's model suggests that it is mis-specified and implausible. The labour demand and supply equations omit relevant variables, and the unemployment equation is unusual. Hughes' data provide no empirical support for these equations. The estimated reduced form wage equation is not unsatisfactory from a statistical point of view. However the coefficient estimates cannot be interpreted since there is no support for the underlying model of labour demand, supply and unemployment. The elasticity of labour demand is not estimated. Instead a low value is assumed. There is no treatment of the cost of capital. Accordingly, the conclusion that Hughes derives from applying Holmlund's model to Irish data — that the effect of employers' social insurance on employment is small — should not be accepted. Until a range of plausible labour market models have been estimated using different data sets and data periods no definitive answer can be given to the question of how changes in labour costs affect employment.

Discussion of this question has centred on the effects of global changes in employers' social insurance. The question of restructuring employers' social insurance is of equal importance but this has been relatively neglected. Based on British evidence of a high elasticity of substitution between skilled and unskilled labour, Layard (1985) has proposed a revenue-neutral restructuring of
employers' social insurance contributions that has a large positive effect on employment. Clearly proposals such as this merit further discussion.

**LIST OF VARIABLES**

'D' before a variable denotes log differentiation.

- **E** Employment (TGI)
- **L** Labour Force (TGI)
- **U** Unemployment (TGI)
- **PQ** Gross Output Price Index (TGI)
- **PC** Consumer Price Index
- **PM** Import Price Index
- **HW** Adjusted Average Hourly Earnings (TGI)
- **CRW** Consumption Real Wage (TGI) = \(HW \times (1-RTY)/PC\)
- **PRW** Product Real Wage (TGI) = \(HW \times (1+RSI)/PQ\)
- **RSI** Rate of Employers' Social Insurance
- **RTY** Rate of Direct Tax (Income Tax and Employees' Social Insurance)
- **QDEV** Deviation of Output from Trend (TGI)


**REFERENCES**


HUGHES, G., 1985. "Payroll Tax Incidence, The Direct Tax Burden and The Rate of Return on State Pension Contributions in Ireland", Dublin: The Economic and Social Research Institute, Paper No. 120.


