FACTORS AFFECTING LABOUR DEMAND IN A SMALL OPEN ECONOMY - THE CASE OF MALTA

Lino Briguglio*

INTRODUCTION

Like many other small countries, Malta is characterized by limited natural resources and a relatively high reliance on exported output to create employment and to finance a large import bill. Moreover, Malta's lack of resources has led to a high degree of specialization and dependence on a few ranges of goods and services, such as clothing, electrical components and tourism. The recent international recession has clearly exposed Malta's reliance on the export market for job creation, since between 1980 and 1982, the rate of unemployment increased from about 4% to about 10%.

This paper proposes a simple macro-model to explain and quantify Malta's dependence on exports for generating employment. Output is assumed to be determined by domestic demand and by exports, and the latter are assumed to be influenced by economic conditions in foreign countries and by Maltese export competitiveness. The model allows for the interaction of price effects arising from changes in the exchange rate of the Maltese lira on the import content of exports.

THE MODEL

The model consists of five equations as follows:

Labour demand: $$LD = A + b\,TP + c\,WR + d\,YG + e\,LD_{-1} + U_L \quad (1)$$

Induced GDP: $$YG = F + g\,XP + h\,IN_{-n} + i\,GV + U_Y \quad (2)$$

Export Demand: $$XP = J + k\,PX + m\,CE + U_X \quad (3)$$

Relative Export Prices: $$PX = ER + (PM - PC) \quad (4)$$

Domestic Export Prices: $$PM = N + p\,PI + q\,PD + U_P \quad (5)$$

The variables, shown as upper-case double letters (and individually defined in the appendix to this article) are measured in logs, and the

* Dr., University of Malta

coefficients, shown as lower-case single letters, are therefore elasticities of the dependent variables with respect to the explanatory variables on the right hand side of the respective equations.

The terms *A,F,J,N* are constants, capturing autonomous changes in the dependent variables. The variables U are random terms affecting the dependent variables.

Equation (1) states that aggregate labour demand is determined by technological progress (TP), aggregate real wage rates (WR), aggregate real output (YG) and labour demand lagged one period (LD_{-1}). This equation may be derived from the C.E.S. production function, incorporating a partial adjustment scheme to allow for the costs of hiring and firing employees and other factors which which lead to partial adjustment of labour demand. For a rigorous derivation of this equation see Nerlove [5]. The values of the coefficients *b* and *c* are expected to be negative , and those of *d* and *e* positive. (See Briguglio [1]).

Equation (2) states that aggregate output is determined by exports (XP), lagged investment (IN) and government expenditure (GV). This is a reduced form equation and can be derived from a multiplier model, with all the induced variables, such as imports, savings, and taxes, substitued into YG. Investment is lagged to allow for the accelerator relationship. The equation may contain a number of other lagged variables, such as consumption. Such a model for the Maltese economy is proposed in additive form in Metwally [4]. The elasticity *g* of equation (2), in which we are interested, is expected to be positive.

Equation (3) states that export demand is influenced by the relative price of exports (PX) and by economic conditions in Malta's client countries (CE). The equation can be augmented to incorporate a partial adjustment scheme and capacity variables. The coefficient *k* is expected to be negative, suggesting that a decrease in relative export prices would stimulate export demand. The value of *m* is expected to be positive. See Scicluna [6], Gatt [3] and Briguglio [2].

Equation (4) is an identity, stating that the relative price of Maltese exports is measured by the *real* effective exchange rate of the Maltese lira, which is the *nominal* effective exchange rate of the Maltese lira (ER), adjusted for differences between domestic prices (PM) and prices in competitor countries (PC), where prices are measured in the countries' respective currencies. The term *effective* is used here to signify that the exchange rate is a weighted average one. Prices in competitor countries are also computed as weighted averages.

Equation (5) states that export prices in Malta are determined by import prices (PI) and by domestically originating inflation (PD). The variable PD is assumed to be an index of domestic prices, reflecting domestic excess demand only (i.e. not resulting from an increase in import prices). This is also a reduced form equation, with the simultaneous

determination of import prices and wage-rates allowed for by the substitution of wage rates into import prices. The coefficient on PI is therefore a composite one, showing the direct and indirect effects of import prices on final domestic prices. It should be noted that in the model, domestically originating prices PD are assumed to be exogenously determined. A more rigorous model should allow for the influence of excess labour demand on domestic prices. The coefficients of equation (5) are expected to be positive fractions (see Briguglio [2])

The system of equations shown above suggests that labour demand depends on aggregate output, which in turn depends on exports, which in turn depends on export relative prices, which themselves depend on the exchange rate of the Maltese lira, on import prices and on domestic prices.

SIMULTANEOUS DETERMINATION

It can be shown that equations (4) and (5) can be substituted into (3) to obtain the following reduced form equation (simplified to exclude the autonomus constant terms and the error terms):

$$XP = k\ ER + pk\ PI + qk\ PD - k\ PC + m\ CE \qquad (6)$$

Equation (6) states that exports depend on the nominal exchange rate of the Maltese lira, on import prices, on prices prevailing in competitor countries, and on demand conditions in client countries. Assuming that a percentage devaluation of the nominal exchange rate of the Maltese lira gives rise to an equivalent percentage increase in import prices, the coefficient on ER and PI in equation (6) can be summed to measure the elasticity of export demand with respect to the nominal exchange rate of the Maltese lira. The sum of the coefficients is $k(1-p)$.

In other words, a given percentage devaluation of the Maltese lira would increase export demand with an elasticity of k implying an improvement in competitiveness. At the same time, such a devaluation would decrease export demand with an elasticity of pk, implying a deterioration in export competitiveness, via import prices. The end result is an elasticity of $k(1-p)$.

Equation (6) can be substitued into equation (2) as follows:

$$YG = k(1-p)g\ ER + qkg\ PD - kg\ PC + mg\ CE + h\ IN_{-n} + i\ GV \qquad (7)$$

where, as already explained, the variation in PI is assumed to be the negative of that of ER when the latter variable changes, so that both variables are shown as ER with a combined coefficient.

Equation (7) states that aggregate output depends on variables affecting exports and on domestic demand conditions. This equation can in turn be substituted into equation (1), thereby capturing the effect of foreign

trade on labour demand. The final reduced form equation is the following:

$$L = b\,TP + c\,WR + k(1-p)gd\,ER + qkgd\,PD - kgd\,PC + mgd\,CE + hd\,IN_{-n} + id\,GV + e\,LD_{-1} \quad (8)$$

Equation (8) states that labour demand is influenced by a number of variables, which influence export demand, including the exchange rate of the Maltese lira (ER), by demand conditions in client countries (EC) and by prices in competitor countries (PC).

Of interest also is that labour demand is influenced by domestic demand conditions through the variables IN and GV, and by domestic price factors, through the variabes WR, PD and ER.

The effects of domestic price factors are worth considering in some more detail. Starting with real wage rates, if the C.E.S. production function is assumed to underpin equation (1), then c, the coefficient on WR would capture the *short run* elasticity of substitution between labour and capital. The *long run* elasticity of substituion can be computed, given the partial adjustment scheme reflected in the coefficient on L_{-1}.

The effect of the exchange rate of the Maltese lira, as measured by the exponent on R, would be negative if it is assumed that (i) a depreciation of the lira would increase export demand, in which case k of equation (3) would be negative (ii) the elasticity of export prices with respect to import prices, which is the coefficient p in equation (5), is a positive fraction and (iii) the elasticities d and g in equations (1) and (2) are positive. Under these plausible assumptions, a devaluation of the Maltese lira would increase employment.

The effect of domestically originating prices (PD) is expected to be negative, since an increase in domestic prices would decrease export competitiveness, everything else remaining constant.

Of interest here is that WR and PD both have a negative effect on labour demand, the first capturing the effect of labour/capital substitution via the production function, whereas the second capturing the effect on labour demand via export prices.

ESTIMATES

Estimates of the coefficients produced in emprical studies on the Maltese economy will now be utilised to compute the coefficients of equation (8). The studies to be referred to are based on annual data from the sources mentioned in the Appendix to this paper. It should be emphazised here that the estimates to be cited are nothing more than approximations of the relevent elasticities. However, they do shed light on the probable causal effects of foreign trade on domestic employment.

Estimates of the coefficient k produced in Scicluna [6], Gatt [3] and Briguglio [2] would seem to suggest that the coefficient k takes a value of around -3. In Briguglio [2], the elasticity p was estimated to take a value of 0.6. This means that the effect of a devaluation on export demand, as measured by the elasticity $k(1-p)$ in equation (6) takes a value of around -1.2. This would seem to indicate that a 10% devaluation would give rise to a 12% increase in exports, after allowing for the effect of the devalution on import prices.

Estimates of g from empirical studies on the multiplier process in Malta (see [4] and [2]) would seem to suggest that this elasticity takes a value of around 0.66, suggesting that a 10% increase in exports would increase GDP by 6.6%, after all the multiplier rounds are considered.

Given the estimates described so far, the exponent on ER in equation (7) would take a value of approximately -0.8, suggesting that a 10% devaluation of the Maltese lira would give rise to an 8% increase in GDP.

Estimates of d, which is the elasticity of labour demand with respect to GDP, suggest that this takes a value of around 0.5 (see Briguglio [1]). This implies that the coefficient on ER in equation (8) takes a value of around 0.4. Given this value, a 10% devaluation would increase labour demand by about 4% in the short run, after the effects of export demand on GDP are considered.

Estimates of the exponent m suggest that this takes a value of around 4 (see [2], [3] and [6]) indicating that export demand is highly sensitive to economic conditions in client countries. Taking this value, the effect of economic conditions in client countries on labour demand, measured by the exponent on CE in equation (8), would be around 1.3. This suggests that a 10% increase in production in Malta's client countries, would increase employment in Malta by 13% in any one year. In the long run, this effect is likely to be higher. This finding is a confirmation of the dramatic effects that the recent international recession has had on domestic employment.

These predictions are of course subject to a number of important considerations, one of which is capacity in the Maltese economy.

In the presence of full capacity, the effect of increased demand from abroad would not translate itself into increased exports and employment, as predicted in the model. This is obviously the case if Maltese producers do not respond. If, on the other hand, such an increase in demand for Maltese exports is partially or totally met at full capacity, inflationary pressures would most probably ensue. This would reduce export competitiveness, and negatively effect demand for Maltese exports.

Another consideration is the response of trade unions. If for example, these over-react in the face of increasing import prices which are likely to follow a devaluation, the end result could well be spiralling inflationary pressures, which again would work against export competitiveness.

CONCLUSION

An important conclusion that emerges from this paper is that in a small open economy, such as Malta's, employment depends to a very large extent on exports, and therefore on economic conditions abroad, on domestic prices and on exchange rate policies. A five equation model was presented to show this interdependence. Actually the model implies a number of other equations, since as already explained, some of the equations are themselves reduced form equations. The model is very aggregative, and the estimates utilised can only be considered as rough and ready values of the elasticities involved.

The results would seem to suggest that policy makers in a small economy have to assign major importance to export competitiveness. Small countries generally have a relatively large foreign trade sector, and are not in a position to influence economic conditions in the rest of the world. However, they are in a position to influence the relative prices of their exports. A policy aimed at promoting employment and reducing unemployment should therefore be implemented in conjunction with an exchange rate policy and a price policy conducive to the maintanance and improvement of export competitiveness. There is of course nothing new in this conclusion, but the quantitative estimates produced in this paper, highlight the fact that this dependence is of considerable importance.

APPENDIX

Description of Variables:

CE Economic conditions in client countries measured by the weighted average of the indices of industrial production of the four most important buyers of Maltese exports. In Briguglio [2] these countries were West Germany, Italy, United Kingdom and Belgium.

ER The *nominal* effective exchange rate of the Maltese lira, measured as the weighted average rate with respect to the countries mentioned in the definition of PC.

GV Maltese Government current expenditure, measured in real terms.

IN Investment, measured by Gross Capital Formation in Malta, in real terms.

LD Labour Demand, measured by the number of gainfully employed persons in Malta.

PC Prices of exports in competitor countries, measured by a weighted average prices of exports in competitor countries. In Briguglio [2], competitor countries included seven Mediterranean and four EC Countries.

PD Domestically originating prices, measured by an index of excess labour demand. In Briguglio [2] the unemployment rate is used.

PX Relative prices of exports in a common currency. It is measured as shown in equation (4). The anti-log of PX would be an index of the *real* effective exchange rate of the Maltese lira, measured as the ratio of Maltese to foreign prices in the respective currencies, multiplied by the *nominal* effective exchange rate of the Maltese lira.

TP Technological progress, measured by Time. The coefficient on TP would represent the annual average rate of growth, as given in an exponential time trend. This variable could also capture structural changes in the economy.

WR The average real wage rate computed by dividing total income from employment by the number of wage and salary earners in Malta, and deflated by the GDP implicit deflator.

XP Maltese exports of goods and services, measured in real terms.

YG The Maltese Gross Domestic Product at factor cost, measured in real terms.

For model-estimation purposes, all variables, with the exception of TP, were measured in logarithms.

Data Sources:

The sources of the data are *The National Accounts of the Maltese Islands*, the Maltese *Annual Abstract of Statistics*, both published by the Central Office of Statistics, Malta, and the *IMF International Financial Statistics Yearbook.*

REFERENCES

[1] Briguglio, L.,"The Specification and Estimation of a Disequilibrium Labour Market Model" in *Applied Economics*, 16(1984), pp. 539-554.
[2] Briguglio, L., "Price and Income Effects of a Devaluation", Paper prepared for the Malta Federation of Industries Public Forum on Export Competitiveness, May 1984.
]3] Gatt, J., *Decline in Tourism - Causes and Effects*. University of Malta, B.A. (Public Admin.) Dissertation, 1984.
[4] Metwally, M.M., *The Structure and Performance of the Maltese Economy*, Malta: A.C. Aquilina, 1977.
[5] Nerlove, M.,"Notes on the Production and Derived Demand Relations Included in Macroeconomic Models", in *International Economic Review*, 8(1967), 223-242.
[6] Scicluna, E., *Export Competitiveness and the Maltese Lira*, Malta: Federation of Industries, (1984).