

CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2001

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WP01/05

March 2001

**DEPARTMENT OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD DUBLIN 4**

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Abstract

For a given degree of wage stickiness, there is an inverse relationship between the price-level and employment effects of a nominal shock. Various contributors to the literature on optimal currency areas have extrapolated from this to argue that the real effects of exchange rate changes are smaller for more open economies, reducing the effectiveness of the exchange rate as a macroeconomic instrument. This would imply that more open economies face steeper Phillips curve trade-offs. This proposition has been challenged empirically however. This paper employs standard small-open-economy models to analyse these issues. The propositions are shown to be correct when the non-traded sector is monopolistically competitive. Whether they are true or false under competitive conditions depends on a simple condition that may or may not be satisfied in practice.

Keywords: Openness, Phillips curve, Optimal currency area.

JEL codes: F41

* Helpful comments from Patrick Honohan, Philip Lane and Mick Devereux are gratefully acknowledged.

Introduction

De Grauwe (2000, p.55), in his work on European monetary integration, argues that the cost to an economy of relinquishing its currency declines as the economy becomes more open. Since most economies are opening up over time, this conclusion, if correct, is of considerable importance.

De Grauwe's position reflects McKinnon's (1963) argument that for more open regions, (where openness is defined in terms of the ratio of tradable to non-tradable output), "a devaluation would be associated with a large domestic price-level increase and hence money illusion would not be much help in getting labour to accept a cut in real wages".

The implication is that more open economies face steeper trade offs between the price-level and employment effects of nominal shocks such as exchange-rate changes. This maintained assumption also plays an important role in Romer's (1993) time-consistency explanation of why inflation appears to be lower in more open economies. In his model a domestic output expansion reduces the terms-of-trade of home-produced goods, and the welfare loss from this decline is greater for more open economies. Lane (1997) provides an alternative explanation of the empirical regularity in terms of a small-open-economy (tradable/non-tradable) model. Again the assumption on the slope of the Phillips curve is crucial: in the presence of nominal rigidities a monetary expansion generates a real exchange-rate depreciation which is reflected in a higher inflation cost and a reduced output gain for more open economies.

A problem with these arguments however is that there is little empirical evidence to support that assumption that Phillips curves are steeper for more open economies. Ball (1994) finds

no effect of openness on the sacrifice ratio faced by a group of developed countries, nor does Temple (2000) in an in-depth study of a larger group of countries.

The present paper analyses the circumstances under which openness is or is not likely to be associated with steeper Phillips curve tradeoffs and lower employment responses to exchange-rate changes. This is done in the context of a two-sector small-open-economy model with some nominal stickiness, as in the analyses of McKinnon (1963) and Lane (1997).

We accept at the outset of course that in many cases the exchange rate instrument will not be useful, and that the option to devalue may even be welfare reducing. For the beneficial effects that can arise in the presence of nominal rigidities not to be dominated by the adverse medium-term consequences explored by Horn and Persson (1988) for example will generally require that the private sector perceive the exchange-rate change to be something other than a "quick-fix" solution that might be tried again and again. Such circumstances appear to arise when the devaluation takes place in response to an asymmetric shock requiring a downward adjustment in real wages.¹ The situation of interest to us therefore is one where there is less than full pass-through of exchange-rate-induced inflation into wage demands.

An important assumption made throughout the paper is that this elasticity of wages with respect to consumer prices is not related to the openness of the economy; our analysis of the effects of increased openness takes this elasticity as given. In support of this we refer to Bruno and Sachs (1985) who focus on national wage-setting institutions as the cause of

¹ Examples of such successful devaluations are explored in De Grauwe (2000), Barry (1998) and Calmfors (1993).

cross-country differences in this elasticity, and do not even consider openness as a possible cause.

We assume throughout the analysis that the internationally tradable sector is perfectly competitive in that perfect substitutes for its output are produced elsewhere. The next section assumes a competitive market structure for the non-traded sector while the following section assumes a monopolistically competitive structure. The important differences between these models will become apparent as we proceed.

2. The Model with Perfect Competition in Both Sectors

Let the economy produce two goods, t and n . With the tradable goods sector an unconstrained price taker on world markets, the law of one price ensures:

$$(1) \quad p_t = e p_t^*$$

where p_t^* is the world price in foreign currency and e is the exchange rate (defined as the price of foreign currency),.

Profit maximisation yields labour-demand functions for each sector i of the form $L_i = L_i(w_i)$, with negative first derivative, where w_i represents the real product wage in sector i ; i.e. $w_i = w/p_i$. With capital fixed in the short run and with perfect competition prevailing, output in each sector, Y_i , also depends only on the sectoral real product wage.

The price of the non-traded good, p_n , is endogenous, with equilibrium determined at the intersection of the non-tradable supply and demand schedules. Assuming Cobb-Douglas utility:

$$(2) \quad U = Y_t^{1-\theta} Y_n^\theta$$

nominal demand for non-tradeables is a fixed proportion of nominal income. The price of non-tradeables is then determined by

$$(3) \quad p_n Y_n(w_n) = \theta [p_n Y_n(w_n) + e Y_t(w_t)]$$

This utility function has the property that the fraction of income spent on each good equals the elasticity of the overall price level, P , with respect to the price of that good. Letting $\varepsilon(x;y)$ represent the elasticity of x with respect to y , this implies

$$\varepsilon(P;e) = \theta \varepsilon(p_n;e) + (1-\theta) \varepsilon(p_t;e),$$

which via (1) gives

$$(4) \quad \varepsilon(P;e) = \theta \varepsilon(p_n;e) + (1-\theta).$$

From (3) we can find the impact of an exchange rate change on the price of non-tradeables.

Under the assumption of a fixed capital stock, the elasticity of a sector's output level with respect to the real product wage can be written as labour's share in sectoral value added (s_i) times the sectoral labour-demand elasticity, allowing us write:

$$(5) \quad \varepsilon(p_n;e) = \frac{\{1-s_t \varepsilon(L_t) + \varepsilon(w;P) \varepsilon(P;e) [s_t \varepsilon(L_t) - s_n \varepsilon(L_n)]\}}{\{1-s_n \varepsilon(L_n)\}}$$

From (4) and (5) it is immediately clear that the price of non-tradeables rises one-for-one with the exchange rate when real wages are rigid; i.e. $\varepsilon(p_n;e) = 1$ when $\varepsilon(w;P) = 1$. We return to this equation in a moment.

Using the labour-demand functions derived for each sector, total employment is:

$$(6) \quad L = L_n(w_n) + L_t(w_t)$$

Straightforward differentiation then yields:

$$(7) \quad \begin{aligned} \varepsilon(L;e) = & \varepsilon(L_t;w_t)[L_t/L]\{\varepsilon(w;P)\varepsilon(P;e) - 1\} \\ & + \varepsilon(L_n;w_n)[L_n/L]\{\varepsilon(w;P)\varepsilon(P;e) - \varepsilon(p_n;e)\} \end{aligned}$$

where $e=p_n = p_t = 1$ initially.

This is the equation whose properties we wish to explore. It shows that the responsiveness of employment to exchange rate changes depends on a weighted average of the sectoral labour-demand elasticities times the effect of an exchange-rate change on the real product wage in each sector.

The signs of these terms are straightforward: $\varepsilon(L_i;w_i) < 0$, $\varepsilon(P;e) > 0$, $\varepsilon(p_i;e) > 0$, while the exogenous elasticity $\varepsilon(w;P)$, which is assumed to be determined by national wage-setting institutions, varies along a range from zero to one.

This model of course generates standard results. To see that a devaluation raises employment when nominal wages are rigid [$\varepsilon(w;P) = 0$], note via (5) that this yields a positive value for $\varepsilon(p_n;e)$, and a positive value for this elasticity along with $\varepsilon(w;P) = 0$ guarantees, via equation (7), that $\varepsilon(L;e)$ is positive. To see on the other hand that a devaluation has no effect on employment when real wages are rigid [$\varepsilon(w;P)=1$], note the earlier result that $\varepsilon(P;e)=1$ in this case, which when plugged into equation (7) confirms that $\varepsilon(L;e)$ is now zero.

One further preliminary is to confirm our earlier statement that "for a given degree of wage stickiness, the stronger the price level effects of an nominal shock the weaker will be the employment effects". To see that this remains true in the two-sector case, substitute equation (5) into equation (7). Holding $\varepsilon(w;P)$ constant, we find:

$$d\varepsilon(L;e)/d\varepsilon(P;e) = \varepsilon(w;P)[\varepsilon(L_t;w_t)\{L_t/L\} + \varepsilon(L_n;w_n)\{L_n/L\}\{1-s_t\varepsilon(L_t)\}/\{1-s_n\varepsilon(L_n)\}] < 0,$$

which confirms the proposition.

The main issue with which we are concerned is whether the responsiveness of employment to the exchange rate necessarily declines as the economy becomes more open. Our definition of openness is in terms of L_t/L . Thus the De Grauwe-McKinnon argument is that $d\varepsilon(L;e)/d(L_t/L) < 0$.

Rather than differentiating immediately however, it is more intuitive to proceed as follows.

Substitute (5) into (7) to get:

$$(8) \quad \varepsilon(L;e) = \{\varepsilon(w;P)\varepsilon(P;e) - 1\} \{\varepsilon(L_t)[L_t/L] + \varepsilon(L_n)[L_n/L][\{1 - s_t\varepsilon(L_t)\}/\{1 - s_n\varepsilon(L_n)\}]\}$$

where the sectoral labour-demand elasticities $\varepsilon(L_i;w_i)$ are written in shorthand as $\varepsilon(L_i)$. Since these are negative, the overall employment effect of a devaluation will be positive so long as the impact of the exchange rate on the nominal wage, $\varepsilon(w;P)\varepsilon(P;e)$, is less than one. From (4) and (5) we find that for $\varepsilon(w;P)$ less than unity this is indeed the case:

$$(9) \quad \varepsilon(w;P)\varepsilon(P;e) - 1 = -\{1 - s_n\varepsilon(L_n)\}\{1 - \varepsilon(w;P)\}V < 0$$

where $V = 1/\{1 - s_n\varepsilon(L_n) - \varepsilon(w;P)(\theta)[s_t\varepsilon(L_t) - s_n\varepsilon(L_n)]\} > 0$.

To evaluate at the theoretical level how the employment response to an exchange-rate change is affected by the openness of the economy we need to consider the relationship between labour-demand elasticities and sectoral labour shares in value added. Cobb-Douglas production functions immediately suggest themselves as a useful benchmark in this regard. For fixed capital stocks, and with output and output-price effects fully taken into account as in equation (7) above, the Cobb-Douglas relationship is:

$$(10) \quad \varepsilon(L_i; w_i) = 1/(s_i - 1) < 0$$

This allows us rewrite (8) as

$$(11) \quad \varepsilon(L; e) = \frac{1 - \varepsilon(w; P)\varepsilon(P; e)}{1 - s_n\varepsilon(L_n)} \{s_t - 1\} \{s_n - 1\}$$

The only term in this expression that varies consistently with economic openness is the elasticity of the price level with respect to the exchange rate, $\varepsilon(P; e)$. From (8), $d\varepsilon(L; e)/d(L_t/L)$ is the opposite sign to $d\varepsilon(P; e)/d(L_t/L)$; this simply confirms our earlier point that weaker employment effects are associated with stronger price effects. It may be thought that the latter will always depend positively on openness; i.e. that the exchange rate will always have a more substantial effect on the price level in a more open economy. Indeed this is explicit in McKinnon's argument. Is it necessarily the case however?

From (4) and (5) we find

$$(12) \quad \varepsilon(P; e) = \frac{1 - \theta \{ [s_t \varepsilon(L_t) - s_n \varepsilon(L_n)] / [1 - s_n \varepsilon(L_n)] \}}{1 - \theta \varepsilon(w; P) \{ [s_t \varepsilon(L_t) - s_n \varepsilon(L_n)] / [1 - s_n \varepsilon(L_n)] \}}$$

There is an inverse relationship between θ (which measures Y_n/Y) and our measure of openness, which is in terms of L_t/L . Using the definition of labour's share reveals that

$$1/\theta = 1 + (s_n/s_t) (L_t/L)/(L_n/L)$$

from which it easily follows that $d\theta/d(L_t/L) < 0$.

We need to evaluate the sign of the derivative $d\varepsilon(P;e)/d\theta$. From (12) this has the same sign as $[s_t\varepsilon(L_t)-s_n\varepsilon(L_n)] \{\varepsilon(w;p)-1\}$, which for some degree of nominal wage rigidity and Cobb-Douglas production functions, has the same sign as $s_t - s_n$.

In words, if labour's share in tradeables is higher than in non-tradeables, increased openness (a reduction in θ) reduces the impact of the exchange rate on the price level, and expands its effect on employment, in contrast to the De Grauwe-McKinnon proposition. This is our first result.

- With Cobb-Douglas production functions and a competitive market structure in both sectors, increased openness enhances (reduces) the ability of the exchange rate to influence employment and reduces (raises) its impact on prices if labour's share in tradeables is higher (lower) than in non-tradeables.

The fact that increased openness can reduce the impact of the exchange rate on the price level may sound counterintuitive, and warrants some discussion. The impact of the exchange rate on the price of tradeables is always one-for-one. If its impact on non-tradable prices were always less than one-for-one then a smaller non-traded sector would imply that the exchange

rate would have a higher impact on the overall price level. When labour's share in tradeables is greater than in non-tradeables however the impact of the exchange rate on non-traded prices is greater than one-for-one, because any increase in traded-sector employment is associated with a strong increase in traded-sector income and hence in spending on non-tradeables. Hence a decline in the relative size of the non-traded sector as openness increases is associated with a reduction in the impact of the exchange rate on the price level, with lower knock-on effects on wage demands and a greater expansion in employment in the now more sizeable traded sector.

This situation is illustrated in Figure 1. Under real wage rigidity the impact of a devaluation on wages, on non-traded prices and on the overall price level is all one-for-one. The figure shows the impact on non-traded prices as being greater than one-for-one under nominal wage rigidity. With nominal wages rigid there is no shift in the non-traded sector supply curve, while the demand curve shifts much further to the right than under real wage rigidity because of the extra employment and income generated in this case.

(For FIGURE 1, please go to Page 21)

The assumption is frequently made, however, that labour's share in non-tradeables is higher; this raises the question of whether this finding is of any practical importance. In answer we refer to Helpman (1976) and Prachowny (1984) who found that the relative labour shares in the two sectors varied across time and across country.²

² Given their assumption of wage equalisation across sectors, their finding that relative sectoral labour-output ratios varied from one country to another implies that labour shares also vary.

The implications for the slope of the Phillips curve (defined in terms of the trade-off between employment and price level effects) are also clear. The smaller the impact of the exchange rate on the overall price level the more effective it is in stimulating employment. This allows us restate our earlier result as follows.

- With Cobb-Douglas production functions and a competitive market structure in both sectors, openness improves (worsens) the terms of the employment/price-level trade-off if labour's share in tradeables is higher (lower) than in non-tradeables.

We now wish to consider more general functional forms for the production functions of the two sectors. Equation (8) continues to apply. Differentiation yields:

$$(13) \quad d\varepsilon(L;e)/d(L_t/L) =$$

$$\{ \varepsilon(L_t) - \varepsilon(L_n) + \varepsilon(L_n)\varepsilon(L_t)(s_t - s_n) \} \{ \varepsilon(w;P)\varepsilon(P;e) - 1 \} / \{ 1 - s_n\varepsilon(L_n) \}$$

$$+ \varepsilon(w;P) \{ d\varepsilon(P;e)/d(L_t/L) \} \varepsilon(L;e) / \{ \varepsilon(w;P)\varepsilon(P;e) - 1 \}$$

As before, $\varepsilon(w;P)\varepsilon(P;e)$ is less than unity. From (13) then, and from the discussion following equation (12), sufficient conditions to guarantee a positive (negative) sign for this derivative are that $\{ \varepsilon(L_t) - \varepsilon(L_n) + \varepsilon(L_n)\varepsilon(L_t)(s_t - s_n) \}$ and $[s_t\varepsilon(L_t) - s_n\varepsilon(L_n)]$ both be negative (positive).

It will be clear of course that if both sectors have the same labour shares and labour-demand elasticities, the degree of openness will have no implications either for the real effects of exchange-rate changes or for the terms of the employment/price-level trade-off. Since the

sectors are indistinguishable, an expansion in one at the expense of the other can have no effect. Our next result states a set of sufficient conditions for this not to apply.

- For any constant-returns production functions, openness enhances or reduces the ability of the exchange rate to affect the real economy, as the expressions $\{\epsilon(L_n) - \epsilon(L_t) + \epsilon(L_n)\epsilon(L_t)(s_n - s_t)\}$ and $[s_n\epsilon(L_n) - s_t\epsilon(L_t)]$ are positive or negative. If positive, the employment/price-level trade-off improves with openness; if negative it deteriorates.

Helpman (1976) and Prachowny (1984) found labour's share in the two sectors to be about equal. If this is so then the above conditions boil down to whether the absolute value of the labour-demand elasticity is higher in tradeables or non-tradeables. This is likely to vary country-by-country, but may warrant a little further discussion.

Note that the general form of (10) for constant-returns production functions is

$$(14) \quad \epsilon(L_i; w_i) = \sigma / (s_i - 1)$$

where σ is the absolute value of the elasticity of substitution between capital and labour. With labour shares assumed equal across sectors the sign of (13) then hinges on the elasticity of substitution in the two sectors. One of Hamermesh's (1993; page 117) strongest conclusions in his detailed study of empirical findings on labour-demand issues is that "additional education reduces the degree of ... substitutability of labor with capital services" (when factor prices shift exogenously). Using Prachowny's (1984) categorisation of the traded sector as embracing Manufacturing, Agriculture and Mining, and the non-traded sector as including everything else, data from Prais (1995) on the vocational qualifications of employees by industry provide a further indication that again, perhaps contrary to one's priors, the

employment/price level trade-off may improve with increased openness.³ His data shows that in the late 1980's eleven percent of employees in the non-traded sector in the UK were university educated, compared to only seven percent in the traded sector. Equivalent figures for Germany were thirteen percent for the non-traded sector compared to six percent for the traded sector.

3. A monopolistically-competitive non-traded sector

In this section we assume that non-traded goods are produced in a monopolistically competitive environment.⁴ If prices are a mark-up on wages, nominal wage stickiness will imply stickiness in the price of non-tradeables also.⁵ The economy can then be said to be demand-constrained, since an expansion in demand will expand output even with wages and non-tradable prices fixed (up to the point where full employment is reached, at which stage wages are likely to become flexible); Neary (1990). With traded goods prices remaining perfectly flexible, a devaluation continues to affect tradable-goods production exclusively through its impact on the traded-sector real product wage; it affects the non-traded sector in this case, however, only through the knock-on demand effects of an expansion in the tradable sector.

We adapt Lawrence and Spiller's (1983) model of monopolistic competition, which allows us

³ It might be thought that the scale effect, by which inelastic product demand reduces the factor demand elasticity, would reduce the labour-demand elasticity in non-tradeables still further. This effect is separate from the terms under discussion however, as seen in equation (7), where the general-equilibrium impact of the exchange rate on the price of non-tradeables is accounted for separately.

⁴ Dixon (1994) explores some implications of models with a competitive traded sector and imperfectly competitive non-tradeables.

⁵ Obstfeld (1998) argues for the value of assuming simultaneous wage and price stickiness in modelling open-economy macroeconomics.

retain our assumption of a fixed capital stock. The Cobb-Douglas utility function (2) employed earlier, which expresses preferences over traded and non-traded goods, is now supplemented by a CES utility function that expresses preferences over each variety of non-traded good.

$$(15) \quad Y_n = \left[\sum_{i=1}^n Y_{ni}^s \right]^{1/s}$$

The price-elasticity of demand for each variety is $-1/(1-\sigma)$, with $1 > \sigma > 0$.

The first-order condition for utility maximisation allows us re-express equation (3) as:

$$(16) \quad n p_{ni} Y_{ni} = [\theta/(1-\theta)][eY_n]$$

where n is the number of non-traded sector firms, each of which produces a single non-traded variety.

There is a fixed-cost element to production, which is made up of capital, and a variable cost element made up of labour. The total cost of each variety is

$$(17) \quad TC_{ni} = \gamma r + w\beta Y_{ni}$$

where γ is the amount of capital required to set up production, r is the rental rate on capital, and $1/\beta$ is the marginal and average product of labour.

Since each variety is produced according to the same cost function and enters symmetrically into utility, all will sell at the same price and be produced in equal volume. We therefore set $p_{ni} = p_n$ and $nY_{ni} = Y_n$

Each firm sets marginal cost equal to marginal revenue, to yield the mark-up pricing rule:

$$(18) \quad p_n = (\beta/\sigma)w.$$

In the present model, the number of firms is constrained by the fixed stock of sector-specific capital:

$$(19) \quad n = K_n/\gamma$$

One way to interpret how the model works is to assume that capital, which is sector-specific, can nevertheless move between non-traded sector firms. Profits will be driven down to zero in this case as excess profitability induces firms to bid against each other for the fixed stock of capital. This drives up the rental rate, causing each firm to expand production to cover the increased level of fixed costs. Formally this zero-profit condition implies:

$$(20) \quad Y_{ni} = (r/w)(\gamma/\beta)\sigma/(1-\sigma).$$

The essential elements of our model of monopolistic competition in non-tradeables then are that prices rise in line with wages [equation (18)], the number of firms and varieties is fixed [equation (19)], and increased demand induces increased output through an expansion in the production level of each firm [equations (16) and (20)].⁶

The mark-up rule, equation (18), implies

$$(21) \quad \varepsilon(p_n;e) = \varepsilon(w;e) = \varepsilon(w;p)\varepsilon(p;e)$$

Since the average product of labour in (17) is constant, we know that in this case

$$(22) \quad \varepsilon(Y_n;e) = \varepsilon(L_n;e).$$

⁶ Monopolistic competition models without capital would yield these same results, except that here non-traded output would expand via an increase in the number of firms, with the production level of each firm

Non-traded output, Y_n , in the monopolistically competitive case varies independently of w_n ; it adjusts to equate the following version of (3):

$$(23) \quad p_N Y_N = [\theta/(1-\theta)][e Y_t(w_t)]$$

Differentiating (23) using (22) then yields

$$(24) \quad \varepsilon(L_n;e) = 1-s_t \varepsilon(L_t)[1-\varepsilon(w;e)] - \varepsilon(p_n;e)$$

$$\text{or } \varepsilon(L_n;e) = \{1-s_t \varepsilon(L_t)\} \{1-\varepsilon(w;P)\varepsilon(P;e)\}$$

Our version of equation (7) in the present case is then

$$(25) \quad \varepsilon(L;e) = \{\varepsilon(w;P)\varepsilon(P;e)-1\} \{\varepsilon(L_t) [L_t/L] - [1-s_t \varepsilon(L_t)] [L_n/L]\}$$

As in the perfectly competitive case the employment effect of a devaluation will be greater than or equal to zero as $\varepsilon(w;P)$ is less than or equal to one. Again the only term in this expression that varies consistently with economic openness is the elasticity of the price level with respect to the exchange rate, $\varepsilon(P;e)$. The derivative of interest, $d\varepsilon(L;e)/d(L_t/L)$, is the opposite sign to $d\varepsilon(P;e)/d(L_t/L)$.

Given (21), (4) becomes $\varepsilon(P;e) = \theta \varepsilon(w;p)\varepsilon(p;e) + (1-\theta)$ or $\varepsilon(P;e) = (1-\theta)/\{1-\theta \varepsilon(w;p)\}$, from which we find

$$d\varepsilon(P;e)/d\theta = -[1-\varepsilon(w;p)] / [1-\theta \varepsilon(w;p)]^2 < 0$$

Since θ (i.e. Y_n/Y) is inversely related to our measure of openness, L_t/L , this indicates that $d\varepsilon(L;e)/d(L_t/L)$ is always negative in the monopolistically-competitive case, unlike in the previous perfectly competitive case. Thus the De Grauwe-McKinnon proposition is correct in the present case.

remaining constant.

The answer as to why this is so is straightforward. With non-traded prices a mark-up on wages, and with wages never rising more than one-for-one with the overall price level, an exchange-rate change can never cause a more than one-for-one increase in the price of non-tradeables. Therefore increased openness can never reduce the impact of the exchange rate on the price level and can never thereby expand the impact of the exchange rate on employment.

This is our final result.

- When the non-traded sector is monopolistically competitive and non-traded prices are a mark-up on wages, increased openness always raises the impact of the exchange rate on the price level and reduces its employment effects, so that the employment/price-level trade-off is invariably worsened.

4. Conclusions

The aim of the paper has been to analyse the validity of the proposition, due originally to McKinnon (1963) and taken up by De Grauwe (2000) and others, that for more open economies the exchange rate is less effective as an instrument to affect the real economy.

The proposition relies on the assumption that the more open the economy the larger the price level effect of a devaluation and, for any given responsiveness of wages to prices, the lower the employment effects will be.

If this were correct it would imply that for more open economies nominal shocks would have stronger price-level effects and weaker employment effects, so that the slope of the trade-off

would be steeper, as Lane (1997) asserts.

This proposition has been explored here in the context of two versions of the standard small open economy model. When the non-traded sector is monopolistically competitive, so that non-traded prices are a mark-up on wages, the proposition is indeed found to be correct. The exchange rate affects the price of tradeables one-for-one but for some degree of nominal wage stickiness (required for the real effects to emerge), the impact on the overall price level can never be greater than one-for-one. For a more open economy (i.e. for a relatively smaller non-traded sector) the impact on the price level will be greater and, again for a given degree of nominal wage stickiness, the employment effects will be less.

The situation may be quite different however when the non-traded sector is perfectly competitive. In this case, if production functions are Cobb-Douglas, the effect of a devaluation on the price of non-tradeables will be greater than one-for-one if labour's share in tradeables is greater than in non-tradeables. This arises because the demand-effects on non-tradeables of the traded-sector expansion will in this case be very strong. For more general production functions and equal labour shares across sectors the relevant condition is that the labour-demand elasticity in tradeables is higher. Under these circumstances a relatively smaller non-traded sector (i.e. a more open economy) will mean that exchange-rate changes have smaller effects on the overall price level, and hence larger employment effects. The Phillips curve trade-off will be more benign for more open economies in this case.

Finally we might ask why the Phillips curve is found invariably to be steeper for more open economies in Lane's (1997) small open economy model, which is similar to ours in many

respects. In Lane the price of non-tradeables is predetermined; this is the nominal rigidity that ensures that a nominal shock (a devaluation in the present paper, a monetary expansion in Lane) will have real effects. By following Obstfeld and Rogoff (1995) in assuming that traded-sector output is fixed throughout the analysis however, Lane (1997) abstracts from a channel whose importance is obvious in the present paper. Since such shocks by construction can only affect the non-traded sector in his model, the shocks clearly have smaller real effects the smaller the size of this sector; i.e. the more open the economy.

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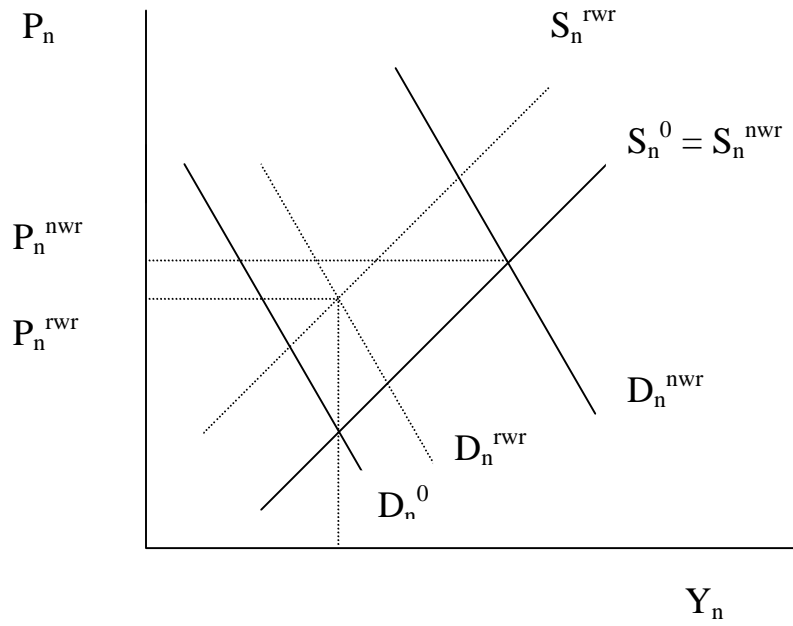


Figure 1: The effects of a devaluation on non-traded prices under nominal and real wage rigidity, when labour's share in tradeables is higher than in non-tradeables.