

Some Effects of North Sea Oil on the Irish Economy

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I INTRODUCTION

Over the past few years, relatively high levels of inflation in the UK and Ireland have coincided with substantial declines in the international purchasing power of the currencies of these countries, which are linked by a one-for-one parity. This experience has tended to give credence to simple models of the inflationary process in small open economies, according to which such an economy will not experience for any length of time a rate of inflation different to that of the currency to which it is pegged. Sometimes this proposition is argued in disequilibrium terms,¹ for example, excessive expansion of demand leading to an acceleration of inflation is seen as being reversed as agents rebuild the depleted purchasing power of their money holdings. But, usually, equilibrium conditions are presented where the small country's external reserves neither grow nor diminish and the balance of trade, like relative prices, remains unchanged.

There may be a tendency to believe that the inevitable deviations from these predictions will be small, temporary and unsystematic. Indeed, mentioning possibilities which can nullify theories is often an unwelcome and destructive business, reducing order to chaos. However, systematic and prolonged deviations need to be taken account of, and the impact of North Sea oil on the Irish economy could be a source of exactly this kind of deviation.

It will be argued here that the formulation of policies, whether of the private or public sector, based on the assumption that the Irish inflation rate will be (and can safely be) close to that in the UK are likely to prove seriously misleading over the coming decade as a result of North Sea oil.

*The views expressed herein are those of the author alone.

1. This dichotomy is paralleled by McDowell: (1975).

Nothing, of course, is certain in this area, especially to the extent that the prospects for sterling exchange-rate trends are an important element in the analysis. For this reason, we begin with a qualitative discussion of the forces which are likely to operate on the economy. We then proceed with a more formal analysis that follows as closely as possible the monetarist position, which would normally predict quite different conclusions.

We conclude that, unless account is taken of the effects of North Sea oil, the very least that could happen in Ireland is a loss of external reserves. Also likely, but not analysed at more than a superficial level, are losses in employment and output.

II THE EFFECTS OF THE OIL BALANCES

Commentators in the United Kingdom² have already noted the adverse effect that the reduction in oil imports consequent upon the availability of new domestic sources of oil will have on export sectors there if the impact effects of a strengthening in the balance of payments leads to a rise in the sterling exchange rate against other currencies, making some exports uncompetitive. The same economists who two years ago were arguing against depreciation of sterling are now reluctant to see it rise from the position to which it has fallen because of their anxiety in this regard.

This raises several questions which we will consider in turn. First, if the exchange rate does move upward, are the anxieties justified? One would suppose that such a change in competitive position, (considered in isolation from other developments which could occur simultaneously, but which could in principle be avoided by appropriate policy measures) must surely reduce the profitability of exporting to the point where some exporters must turn their attention to the domestic market. Given the specialised nature of products, so unlike the theoretical constructs common in macroeconomics, even a competitive environment with no deficiency of aggregate demand would experience a period of adjustment involving unemployment and dead-weight capital losses in the form of redundant specialised equipment and training. A Keynesian economy where adequate aggregate demand need not always appear would of course experience a worse disturbance, the analysis of which is rendered more and more slippery by the ever-increasing elasticity of expectations and adjustment coefficients. In a fix-price world, adequate Keynesian demand could be added to re-employ the displaced labour force

2. See, for example, Kahn: (1977) An alternative analysis has been carried out by Gordon Pepper *et al.* (1977). Kahn's apocalyptic analysis extends to the depressing effect of loss of competitiveness on the capital stock of the UK, eventually leading to a country denuded of capital when the oil has run out. In this paper we have a shorter-time horizon.

at a lower level of exports and higher exchange rate than before the initial shock.

The second question which arises is whether the exchange rate will in fact tend to be supported by the oil flows. The usual elasticity conditions for the stability of the exchange rate arise here, but they are compounded by the expectations factors surrounding the still large and variable overhang of foreign holdings of sterling. To some extent, the capital flows and the exchange rate can be influenced by the authorities in the medium-term, and the direction of that influence will depend on whether the authorities' eye is caught more by those who see a rising exchange rate as a means of facilitating the attempts of monetary policy to reduce inflation or by the other school which has just been mentioned. The presumption would be that upward pressure on the exchange rate would be predominant — as has been the case during the first half of 1977 when a large inflation rate differential between the UK and its main trading partners has scarcely been reflected in exchange-rate movements. (Exchange-rate movements which reflect general inflation differentials are of little interest here, even though their repercussions through the factor markets can be a cause of cumulative spirals, upward or downward.)

III THE IMPACT ON THE IRISH ECONOMY

Proceeding with the assumption that steadily growing oil revenues will constantly push the sterling exchange rate higher than inflation differentials would imply, at least for the best part of the next decade, we must now ask what impact this development will have on the Irish economy, always assuming the fixed one-for-one parity of the Irish currency with sterling.

In the purest competitive models with instantaneous adjustment there is no reason to believe that the new long-run equilibrium that would be achieved (at full employment) would involve a welfare loss to Irish society.³ Instead, we are concerned with an adjustment problem.

As with the UK, the rise in the sterling exchange rate will make certain exporters to third markets uncompetitive and jobs will be lost unless this production can be shifted immediately to home demand, whether by competitive forces or by the use of Keynesian demand management policies. However, since there is no Irish oil to effect external balance, an external

3. Although there would be distributional effects in the absence of factor mobility. The usual revealed preference arguments do not work since relative prices have changed in an exogenous manner. Besides, the economy described here departs substantially from the neo-classical model.

4. Which have supported Irish foreign exchange reserves for many years.

payments deficit will emerge unless the domestic price level falls sufficiently below that of the UK to attract enough exports (and reduce imports). So long as the sterling exchange rate is being driven up by trade developments which cannot be matched in Ireland, the Irish price level must trend at a rate below that in the UK.

Of course, in all this we are making the same elasticity assumptions as in the case of the UK, and are also abstracting from capital flows.⁴ Since international capital flows are motivated by expected yield differentials as measured in third currencies, we may suppose that arbitrage will insist that Irish interest rates (nominal) remain in line with London rates. If the Irish price level is rising more slowly than that in the UK, this equality of nominal rates will mean a higher real interest rate in Ireland (as measured in domestic currency). This will make capital less attractive relative to other factors. The capital stock may now seem too large and a tendency for reduced long-term capital inflow will emerge. The capital market therefore, is inclined to accentuate the effects in terms of balance of payments and pressure on reserves of the initial disturbance. In the formal analysis which follows, however, we do not incorporate these capital-account factors which would in any event serve to strengthen the conclusions.

To the extent that this stylised description of possible developments is accurate, therefore, plans and policies should be based on an Irish inflation rate below what is forecast for the UK in order to avoid adverse effects in employment and loss of reserves. The conventional wisdom that the inflation rates will be the same, more or less, in each country must be seen to have limited relevance in the immediate future.

IV A MODEL

We proceed in this section to provide a simple set of equations describing a world in which the main features of the predictions of this paper are to be seen. To emphasise the non-Keynesian aspects of the problem, this model abstracts from the whole employment issue and takes output as a constant. Solving the system for a zero trade balance (or zero trend in the trade balance) produces an equation (No. 14) for Irish inflation in terms of the UK inflation. The major assumption here is that UK exchange rates adjust only to maintain UK trade balanced. On this assumption the exchange rate does not fall by the amount of change in relative unit costs because of the degree to which exports are growing through the oil effect. Accordingly, if Irish exports are not to become uncompetitive in third markets, Irish unit costs must rise more slowly than those in the UK. The required rate of increase is the quantity which is determined here.

Here now is the model:

Notation (Starred variables * refer to UK, unstarred variables to Ireland)

e	\$/£ exchange rate
t	time
P	price level
X	exports
T	oil effect
M	money supply
D	sources of growth in money supply other than PX
$\lambda, \gamma, \tau, k, a \geq 0$	parameters (constant)

For notational simplicity we do not treat exports and imports separately but, without any loss of generality in this section, take exports (less price-sensitive imports) to be a substantially positive quantity determined logarithmically by relative prices and an oil-effect:—

$$X^* = k^*(P^*e)^{-a_1^*} T^{a_2^*} \quad (1)$$

$$\text{where } d \log T = \tau dt \quad (2)$$

$$X^{UK} = k_1 (P^*/P)^{a_1} \quad (3)$$

$$X^W = k_2 (Pe)^{-a_2} \quad (4)$$

$$X = X^{UK} + X^W \quad (5)$$

$$\dot{M}^* = \lambda^* P^* \quad (6)$$

$$\text{where } d \log M^* = \gamma^* dt \quad (7)$$

Equations (6) and (7) represent a simple monetarist representation of equilibrium inflation in a closed economy.

$$\dot{M} = \lambda P \quad (8)$$

$$dM = (PX + D)dt \quad (9)$$

This last equation completes the specification of the model and is a standard representation of the determination of money supply in an open economy.

From (1):

$$d \log X^* = -a_1^* (d \log e + d \log P) + a_2^* d \log T$$

For unchanged trade balance

$$0 = d \log X^* = -a_1^* (d \log e + d \log P) + a_2^* d \log T$$

leads to

$$d(\log e)/dt = -\gamma^* + (a_2^*/a_1^*)\tau \quad (10)$$

(using (2) and (7))

From (3) and (4)

$$d \log X = -W_1 a_1 (d \log P - d \log P^*) - W_2 a_2 (d \log P + d \log e) \quad (11)$$

where $W_1 = X^{UK}/X$; $W_2 = X^W/X$; $W_1 + W_2 = 1$;

thus $d \log X = (W_1 a_1 + W_2 a_2)(\gamma^* dt - d \log P) - W_2 a_2 (d \log e + \gamma^* dt)$

$$= a(\gamma^* dt - d \log P) + (W_2 a_2 a_2^*/a_1^*)\tau dt \quad (12)$$

(using (13))

Where $a = W_1 a_1 + W_2 a_2$

Denoting $d(\log P)/dt$ by π we have

$$d(\log X)/dt = a(\gamma^* - \pi) + (W_2 a_2 a_2^*/a_1^*)\tau \quad (13)$$

For zero change in (Irish) trade balance

$$d(\log X)/dt = 0, \text{ so that}$$

$$\pi = \gamma^* - (W_2 a_2 a_2^*/(a a_1^*))\tau (< \gamma^*) \quad (14)$$

Comments on the assumptions of the model—

(a) Imports and exports can easily be treated separately, with

$$X^* - IM^* = k_1^*(Pe)^{-a_1^*} T^{a_2^*} - k_3^*(Pe)^{a_3^*}$$

instead of (1), etc. No additional features emerge and the notation becomes heavy.

(b) Equation (6) is a more substantial assumption in this context than appears at first sight. Wealth effects are excluded from the equation which forces their entire effect on to the exchange rate.

(c) The UK money supply determination process is included in this form simply as a benchmark.

(d) Capital flows are excluded. In essence the assumption is that interest rates remain always equal to world interest rates less the exchange rate change element. This means that domestically, interest rates in the UK will be lower than without the oil effect and real rates in Ireland will also be lower, but to a lesser extent. Any effect of this on money demand functions is postulated to be small, and any effect on income via capital stock growth is considered to be a second order term and therefore small.

(e) Note that the model does not appeal to the law of one price, which is an extreme monetarist view at this level of aggregation and which would allow any deficiency of rest of the world demand to be made up by exports to the UK. Instead the long term (i.e., balance of payments equilibrium) equality of inflation in the two countries in the absence of oil is ensured by the export and money demand equations.

The conclusions of this model is that if γ^* is the constant UK inflation rate and other variables are as defined; then for Irish trade balance as well as UK trade balance, the Irish inflation rate must be

$$\gamma^* - (W_2 a_2 a_2^* / (a a_1^*)) \tau$$

Plausible values for the a s would all be of the same order of magnitude. W_2 is probably about $\frac{1}{2}$, so that the Irish inflation rate must be below the UK rate by about half the growth rate in the effect of oil on the UK trade balance.

For the value of τ we can only make broad guesses. If X is really exports and imports are not price sensitive, then $\tau = 1.5$ per cent according to a Cambridge estimate.⁵ However, if X represents, more realistically, a net exports less price sensitive imports figure, the value of τ should be more, perhaps of the order of 5–15 per cent.

In the Appendix, we simplify further to obtain an estimate of the loss of reserves involved in pursuing a monetary policy which does not take account of this equilibrium relationship between Irish and UK inflation rates. Monetary outflows will provide a corrective mechanism but not without reserve losses.

Monetarists may be puzzled at these conclusions. However, the effect is not in contradiction with the monetary approach if we regard the oil production as providing an accelerating increase in UK wealth over the period. If this increase in wealth can be foreseen, of course, then it has already happened and might in principle be capitalised immediately. We are then left

5. Department of Applied Economics, University of Cambridge, (1977) p. 17. Since this note was written, a London Business School estimate apparently corresponding to a τ of 10 per cent for 1976-1978 has been reported in the press.

with a transfer problem, a question on which the monetarist approach is not particularly helpful. The accelerating increase in wealth, with each increment in wealth leading to an increased demand for other assets is a reasonable, though arbitrary, way of resolving the transfer problem in the monetarist framework.

The realisation that — from the UK point of view — this is a transfer problem, makes us recognise that there will be no general agreement on its UK trade effects. However, the predictions of the representation given in the model would not differ in essence, we believe, from those of applied forecasters in the field at present.

V CONCLUSION

In conclusion, we draw two main lessons from this simple analysis. First, the economic effects on Ireland of the exploitation of North Sea oil could be significant, although we explore the mechanism of this effect only, and not the magnitudes. The exact outcome will depend in part on policy decisions taken in the UK. The second and related lesson is that, even in realistic circumstances, a correspondence in equilibrium between UK and Irish inflation rates need not necessarily occur. Equilibrium could indeed require a several percentage point differential over the next few years if sterling is allowed to float to the point where the UK trade account is in balance.

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APPENDIX

In this Appendix we move to a further level of approximation, so that results are very speculative.

If W_1, W_2 nearly constant, we may carry out global analysis which will discover the loss in reserves involved in pursuing the same domestic credit policy as would yield $\pi = \gamma^*$ if $\tau = 0$.

(a) The path of D for $\pi = \gamma^*$ if $\tau = 0$ (X constant)

Initial values are chosen so that $P_0 = P_0^* = e_0 = 1$

$$\gamma^* = dM/M = (D + PX_0)/M$$

or

$$D + PX_0 = \gamma^* M = \gamma^* \lambda P$$

$$D = (\gamma^* \lambda - X_0)P = (\gamma^* \lambda - X_0)e^{\gamma^* t} \quad (15)$$

(b) by (3), (4) and (5)

$$X/X_0 = k_1^*(P^*/P)^{a_1} + k_2^*(Pe)^{-a_1} \text{ with } k_i^* = k_i/X_0$$

or if $k_1^* = k_2^* = 1/2$; $a_1 = a_2 = a$; $e = \exp(\delta t)$; $p^* = \exp(\gamma^* t)$

$$\delta = -\gamma^* + (a_2^*/a_1^*)\tau \quad \text{by (10)}$$

then $X/X_0 = P^{-a}R$ where $R = 1/2 \exp(-a\delta t) + 1/2 \exp(a\gamma^* t)$ (16)

(c) Now by (9)

$$dP/dt = [D + PX]/\lambda = [(\gamma^* \lambda - X_0)\exp(\gamma^* t) + X_0 P^{1-a}R]/\lambda \quad (17)$$

or writing $a_0 = X_0$; $a_2 = -a\delta$; $a_4 = \gamma^*$; $a_1 = 1 - a$; $a_3 = \gamma^* - X_0/\lambda$; $a_5 = a\gamma^*$, and with (16) we have,

$$dP/dt = 1/2 a_0 P^{a_1} [\exp(a_2 t) + \exp(a_5 t)] + a_3 \exp(a_4 t), \quad (18)$$

which has no closed form solution.

(d) Now without loss of generality, we take $\lambda = 1$ (implying $M_0 = 1$) and $\gamma^* = 0$ (since deviations from trend are of interest); we may also write

$$\tau^I = a_2 \doteq \tau$$

The equation (18) was then solved by numerical methods for various suggestive parameter values. The cumulative reserve loss expressed as a proportion of initial PX, over seven years (measured by the cumulative deviation of PX from its starting value) was computed and is denoted by RL in the table.

Reserves losses (RL)

X_0	a	RL			a	RL		
		$\tau^1 = .05$	.10	.15		$\tau^1 = .05$	.10	.15
0.1	20	.08	.14	.19	60	.03	.05	.07
0.6	3.3	.61	1.09	1.46	10	.17	.31	.42
1.1	1.8	1.60	2.70	3.6	5.5	.35	.62	.83
1.6	1.3	3.9	6.3	7.7	4	.55	.98	1.31

The conclusion is that the automatic stabiliser provided by monetary outflow may have, depending on parameter values, a greater or lesser effect in reducing reserve losses sustained by a domestic credit expansion policy which ignores the considerations set out in this paper. Of course income and employment effects, which are not modelled in this paper, would also arise.