CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2001

The Effect of a Common Currency on Trade: Ireland before and after the Sterling Link

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WP01/10

May 2001

DEPARTMENT OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD DUBLIN 4

NATIONAL BUREAU OF ECONOMIC RESEARCH INC

International Seminar on Macroeconomics

8th – 9th June 2001

University College, Dublin
Graduate School of Business
Dublin

The effect of a common currency on trade:

Ireland before and after the sterling link

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Abstract: This paper uses the introduction of an exchange rate between Ireland and the UK in 1979 as a natural experiment to shed light on the effects of a common currency on the volume of international trade. No evidence is found from time series or panel regressions that the change of exchange rate regime had a significant effect on the pattern of Irish trade. This finding casts doubt on the belief that the European Economic and Monetary Union will have a major effect on the pattern of trade between participating countries.

DRAFT of 11 May 2001

* We are grateful to Vincent Hogan, Patrick Honohan, Phillip Lane, James Lothian, Colm McCarthy, Anthony Murphy, and Peter Neary for helpful comments. Alan Stuart provided valuable research assistance.

'. . .the curious incident of the dog in the night time.'
'The dog did nothing in the night time.'
'That was the curious incident,' remarked Sherlock Holmes.

Sir Arthur Conan Doyle, *Silver Blaze* (1894).

I. Introduction.

The effect of currency unions on trade patterns is a topical issue due to the recent launch of the European Economic and Monetary Union (EMU). Advocates of EMU believe that significant trade creation will be among its benefits, even though it was acknowledged at the time of writing the Cecchini Report that there was little empirical evidence of such gains (European Union, 1990). While there have been many studies of the effects of exchange rate volatility on trade (see, for example, Dell'Ariccia, 1999), less research is available on whether currency unions affect trade other than through their effect on volatility. In a recent study Andrew Rose concluded that 'countries with the same currency trade over three time as much with each other as countries with different currencies' (Rose, 1999). This claim has been used to support the proposition that the EMU will have large beneficial effects on economic growth and welfare (Frankel and Rose, 2000). But Marc Flandreau claims that neither the Latin Monetary Union of 1865 between Belgium, France, Italy and Switzerland nor the Scandinavian Monetary Union of 1873 between Sweden, Norway, and Denmark increased trade integration between members (Flandreau, 2001). Some of the contrast between these conclusions may be due to differences in what is meant by a 'currency union' or 'common currency', but it is clear that further research on this topic is needed.

One of the few available natural experiments for studying the way a currency union and its demise affect trade is offered by Ireland's decision to break the long-standing link between the Irish pound and sterling by joining the exchange rate mechanism (ERM) of the European Monetary System in 1979. If forming a currency union has a large positive effect on trade, the break-up of a

union would be expected to have a significant adverse effect. An advantage of studying the Irish case is that the change of exchange rate regime was an exogenous event, driven largely by Irish and British political agendas, whereas other changes in exchange rate pegs were *ex post* recognition of changes in trade patterns.[1] Moreover, the Irish experience is likely to be a better guide to the implications of EMU for trade between European countries than are generalisations based on a variety of more exotic currency unions, each with its own historical and political peculiarities. Thus while the present paper tests a bilateral hypothesis (Was Anglo-Irish trade affected by breaking the sterling link?) it is one that has broad implications.

The structure of the paper is as follows. The next section provides a brief history of Irish currency regimes. This is followed by a discussion of the Irish trade data. The time series behaviour of Anglo-Irish trade is then modelled, paying particular attention to structural stability and tests for the effects of the change in the exchange rate regime. In the following section this approach is generalised to a gravity model of Ireland's trade with its main trading partners. The paper concludes with a discussion of our findings.

II. Historical Background

One of the provisions of the Act of Union, which incorporated Ireland into the United Kingdom in 1800, was the suppression of the independent Irish pound. This was implemented in 1826 and from then until 1927 there was no separate Irish currency. The twenty-six counties of the Irish Free State (Saorstát Éireann in the Irish language) gained political independence in 1922 but five years elapsed before the introduction of the 'Saorstát pound' (subsequently known as the 'Irish

[1] Examples are former British dependencies such as Bermuda and the British Virgin Islands that switched their currency peg from the pound sterling to the US dollar.

pound' or 'punt').[2] A Currency Commission was established to maintain the new currency in a one-to-one, no-margins peg with the pound sterling (see McGowan, 1990). Although usually referred to as a 'currency union', the arrangement did not involve any international institutions or formal cooperation. In effect Ireland continued to share a common currency with the UK, while gaining the seigniorage of a national currency. This set-up continued after the creation of an Irish Central Bank in 1942, but was broken in principle by the Irish decision to join the ERM in 1978 and the UK's decision not to do so at that time. The actual break occurred at the end of March 1979 when the 153-year-old sterling link proved incompatible with remaining in the ERM and the Irish pound was floated. It fell to a low of GBP0.7338 in mid-February 1981 and reached a high of GBP1.0980 in mid-November 1992.

Breaking the sterling link was not a substitution of one currency peg for another. In the ERM fluctuation margins of ± 2¼% around central rates and realignments of these rates were permitted. Apart from a few years in the late 1980s this regime proved unstable and eventually collapsed in 1993, when the margins were widened to ±15%. For some time after 1993 the Irish pound floated more or less freely on foreign exchange markets. Whereas in the years immediately before the end of the sterling link the Irish pound had been relatively volatile against the continental European currencies, after 1979 it was relatively volatile against sterling and the US dollar (see Figure 1). Because Ireland's trade with the UK and US continues to outweigh its trade with all other countries combined, the overall volatility of the Irish pound has been higher since 1979 than it was under the sterling link (Cotter, 2000; Lothian and McCarthy 2000).

Ireland's political, social, and economic integration as part of the UK went far beyond sharing a common currency. At the time of Independence and for a long time after 'Anglo-Irish' trade was

[2] Since 1922 'the United Kingdom' refers to Great Britain (England, Wales, and Scotland) *plus* Northern Ireland.

more like trade between regions of the same country than international trade. The new Free State was an overwhelmingly agricultural economy trading almost exclusively with Britain, which received 98% of its exports and was the source of 81% of its imports. Between 1932 and 1938 an 'economic war' was waged between Ireland and Britain and Jonathan Swift's slogan 'burn everything British but their coal' was revived,[3] but none the less as late as 1950 the UK accounted for over 90% of Irish exports and almost 60% of Irish imports. During the 1960s, however, while the sterling link was still firmly in place, the UK's share of Irish trade began to decline rapidly. As we show below, there is no clear evidence that this rate of decline increased after the common currency was abandoned.

Ireland adopted thoroughgoing protectionism in the 1930s and was slow to move back to free trade. An Anglo-Irish Free Trade Area Agreement (AIFTAA) was signed in1965. This abolished tariffs on Irish exports to the UK from 1966 and dismantled tariffs on British imports into Ireland over the period 1966-75. Both the UK and Ireland entered the EEC in 1973. Integration into the European and world trading systems was completed with the full implementation of the Single European Act in 1993. We would expect that both the trade-creating and trade-diverting effects of the AIFTAA would have increased Anglo-Irish trade and that the entry of both Ireland and the UK into the European Economic Community would have diverted some Anglo-Irish trade to third countries.

III. Previous research on Irish trade patterns

Those in favour of Ireland's joining the EMS in 1978 argued that the gains from reducing

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Breaking the sterling link introduced an exchange between the two parts of the island of Ireland.

[3] The original phrase was 'burn everything English but their coal and their people' and Swift quoted it as 'a pleasant observation of somebody's': see Meenan, 1970, p. 316.

exchange rate volatility *vis-à-vis* the continental currencies would outweigh any losses due to the introduction of volatility *vis-à-vis* sterling; those opposed took the opposite view. This debate was renewed in the context of the decision to adopt the euro (Economic and Social Research Institute, 1996; Neary and Thom, 1997). On both occasions, however, almost no empirical research findings were available to help decide between the competing claims.

One of the first detailed studies of the geographical pattern of Irish trade applied a gravity model to establish whether the volume of 'North-South' trade (that is between Northern Ireland and the Republic of Ireland) was exceptionally low, as claimed by some commentators (Fitzsimons, Hogan, and Neary, 1999). They used panel data on bilateral trade in manufactured goods between 28 industrialised countries for the years 1970-92. In addition to the classical gravity variables (income, population, and distance) their model included variables to control for the existence of a common border, the use of a common language, and membership of the European Union, but not for exchange rate volatility or the existence of a currency union. Because North-South trade accounts for about 10% of Irish-UK trade, even though Northern Ireland GDP is only about 3% of UK GDP, the authors were not surprised to find that this trade was significantly higher than predicted by the gravity model. This suggests that trade between the two parts of Ireland remained exceptionally high after the break in the sterling link and is *prima facie* evidence that ending the currency union did not have an adverse effect on at least one component of Anglo-Irish trade. This is also supported by a recent study that accepted the hypothesis of the long-run neutrality of the nominal IEP/GBP exchange rate with respect to Irish exports to Britain (Morgenroth, 2000).

Thus the available Irish studies do not report any disruption of Anglo-Irish trade following the end of the link with sterling. If it occurred, Irish commentators remained unaware of it.

IV. The data

Data on Ireland's merchandise trade by country have been published continuously since 1924.[4] Following the completion of the Single European Market in 1993 greater reliance has had to be placed on sampling techniques to collect intra-EU trade data and the statistical offices warn that reliability suffered as a result.

Attention should be drawn to two aspects of the published trade data, both of which lead to an understatement of the share of Anglo-Irish trade in the total. The first is the perennial phenomenon of cross-border shopping and smuggling. The partition of Ireland in 1922 created recurrent arbitrage opportunities that have been exploited over the years through legal and illegal cross-border trading. Originally these were due to tariffs and tax differentials, but during the 1980s the divergence of the IEP/GBP exchange rate added to the incentives for cross-border trade. It was estimated that in 1986 purchases by southern residents in the north amounted to 2% of total personal consumer expenditure (FitzGerald *et al* 1988). At present, due to the strength of sterling relative to the euro and higher levels of excise taxes in the UK, the flow of trade is predominantly from south to north. It was recently estimated that the UK Treasury is annually losing GBP300 million in excise tax revenue year as a result of illicit sales of fuel smuggled from the south to the north, mostly by paramilitary organizations.[5] The implied level of illicit exports of this item alone equals at least 50% of the official figure for total exports. Further evidence of the importance of unrecorded trade between the two parts of Ireland was provided when the Irish Minister for Agriculture admitted to being 'amazed' at the scale of illicit animal movements across the border uncovered during the recent foot and mouth disease crisis! Far from hindering such trade, the existence of two currencies and two tax regimes on the island has stimulated it. We

[4] See the *Statistical Abstract of Ireland* and the *Trade Statistics of Ireland.*
[5] *Financial Times*, April 25 2001.

should recall the smugglers' motto: 'divided we stand, united we fall'.

A second feature of the official data also tends to understate the UK's share of Irish trade. This is the growing importance of MNCs in the Irish economy. In 1998 the 34 largest exporting firms – all of them foreign-owned - accounted for half Irish exports (Keating, 2000). The recorded value of MNC exports is inflated by the incentive to attribute profits to subsidiaries operating in the low-tax Irish jurisdiction. The scale of this phenomenon is shown by the fact that Irish GDP exceeds GNP by approximately 15% and most of the gap is due to MNC-related flows. As the vast majority of the MNCs are American companies exporting either to continental countries or back to the US, this phenomenon artificially increases the recorded share of non-UK trade in the total.[6]

We must therefore bear in mind that the official statistics on which our econometric analysis is based tend to understate the importance of Anglo-Irish trade in Ireland's total trade due to the operation of two biases that have increased in importance in recent years.

A final issue concerns the manner in which current trade data are deflated to arrive at volume figures. Nominal data allow us to calculate trade flows and trade shares in a given year, but these figures must be deflated by an appropriate price index to derive volume data for time series and panel studies. Different approaches are found in the literature. Many recent empirical studies use large databases of bilateral trade flows converted to US dollars at the current market exchange rate. These are then deflated either by specific trade price indices or PPP exchange rates (Baldwin, 1994; Feenstra, Lipsey and Brown, 1997; Dell'Ariccia, 2000) or by US price deflators (Fitzsimons, Hogan, and Neary, 1999; Rose, 2000). The ideal approach might be to apply Geary's 'world

prices' analogous to the 'international dollars' that lie behind the widely-used estimates of GDP at purchasing power parity but these are not readily available for imports and exports (Neary, 1996). However, the availability of Irish export and import price indices facilitates the calculation of a reliable time series of the volume of Irish trade.[7] We have used these indices to deflate the current Irish pound export and import series. The effect of the choice of deflator on the measurement of Anglo-Irish trade is discussed in more detail in an Appendix.

V. Time series evidence on the effects of breaking the sterling link

Figure 2 shows the share of the UK in Irish merchandise exports, imports, and total trade since 1924. It may be seen that Ireland's trading dependence on the UK declined slowly and erratically in the early decades of Independence but after 1960 the rate of decline increased, especially for imports. The UK's share of Irish trade declined at approximately 1% a year over the period from 1965 to 1979, illustrating how a country can diversify its trade away from the country with which it shares a common currency.

Many factors may be advanced to account for the long-run decline of the share of the UK in Irish trade:

- After Independence the social and cultural links between Ireland and the UK gradually weakened, and some differences between the legal systems emerged.
- Irish exports to the UK were initially dominated by agricultural raw materials, livestock and semi-processed foodstuffs, for which the income elasticity of demand was low.
- During the post-war period the UK economy under-performed relative to the 'miracle' economies of Western Europe such as Germany, Italy, and France.

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[6] By the end of the 1990s one of the largest export categories was base chemicals, which includes the key ingredient for Viagra produced by Pfizer in Cork.

[7] These are unit value indexes. For a description of how they are calculated see McGilvray, 1968, p. 126.

- The decline of long distance transportation costs would be expected to have a greater impact on trade with more distant markets than on trade with the UK.
- While the Anglo-Irish Free Trade Area Agreement of 1965 tended to reinforce the UK's dominance of Irish trade, the entry of both countries to the EEC in 1973 and the completion of the Single European Market in 1993 promoted diversification.
- The growing importance of FDI and the use of Ireland by US firms as an export platform to Europe promoted diversification of export outlets, while the high import content of these exports led to a parallel surge in imports from the US. As we noted, transfer pricing inflates the value of this trade.

The question of interest in the present paper is whether, in addition to all these considerations, breaking the sterling link accelerated the decline of the UK's share of Irish trade. This could have happened either due to a slump in trade between the two countries or a boom in trade with third countries or some mixture of these trade-creating/trade-diverting possibilities. However any tendency for the end of the sterling link to divert trade to third countries would have been weakened by the uncertainty about the launch of EMU that lasted until the late 1990s.
Time-varying estimates of the rate of decline in the UK's share in Irish trade over the 74-year period help identify structural breaks in the composition of Irish trade occurred. Utilising the data stretching back to 1924 we performed a rolling regression of the log of the UK's share on time for successive 20-year sub-periods. There are two distinct kinks in the graph of the trend coefficient (equal to the rate of decline) in Figure 3, one in 1967 and the other in 1993. We can relate the first to the movement to free trade in the mid-1960s and the second to the full implementation of the Single European Act in the early 1990s. The evidence of a dip after 1979 is less clear – whereas the rate of decline increased from 0.3% in 1966 to 1.3% in 1979, between 1979 and 1987 it increased to 2.4% and then leveled off, to decline again after 1992. The rate of decline increased

between 1981 and 1986 but by 1992 it was back to where it would have been on the basis of an extrapolation of the decline from 1966 to 1981. The effects of the movement to free trade, entry to the EEC, and completion of the Single Market are much more evident than any effect of breaking the sterling link.

These simple tests can be supplemented by an examination of the trend in Irish trade by region. In Table 1 and Figure 6 we compare the rate of growth of exports and imports to/from the UK and third countries over the periods 1950-78 and 1979-98. Trade with third countries grew much more rapidly than trade with the UK over both sub-periods. The only *prima facie* evidence of an effect that might be attributable to the change in the exchange rate regime is the slight fall in the growth rate of Irish imports from the UK and the rise in the rate of growth of imports from third countries after 1978. The remarkable growth rate of Irish exports to third countries over the entire period does not seem to be related to the exchange rate regime. (As already noted, these exports are more affected by the transfer pricing practices of the MNCs located in Ireland than are traditional exports to the UK.)

Figure 6 displays the volume of Anglo-Irish trade since 1950, measured as the log of the sum of imports and exports deflated by their respective price indices. There were some cyclical fluctuations around the long run growth rate. The volume of trade fell by 7% over the period 1979-1982 but had recovered fully by 1984. The pause coincided not only with the break in the sterling link but also with the onset of a severe recession in both countries. Anglo-Irish trade expanded rapidly in later years and by 1998 had reached three times its 1979 level.
While it is still too early for an assessment of how membership of EMU is affecting Irish trade patterns but the Eurozone does not appear to be increasing its share of our trade. During 2000 the US became our largest single export market.

Table 1: *Growth of volume of Irish trade by area*

(Annual average growth rates)

	Imports		Exports		Total Trade	
	1950-78	1979-98	1950-78	1979-98	1950-78	1979-98
Anglo-Irish trade	5.4%	4.4%	5.2%	6.9%	5.3%	5.5%
Irish trade with third countries	5.9%	8.1%	13.0%	13.3%	7.6%	10.9%

Imports and exports deflated by Irish import and export price indices

Differential growth rates of trade by area could arise from differences in income growth rates between countries or - an issue that we will show is very significant – different responses of trade to income growth. We now explore whether the link between Irish and British incomes and trade underwent a structural break in the late 1970s.

To explore whether the change of exchange rate regime dampened the growth of trade when the influence of income is taken into account we estimate a simple model.

$$\ln [(X/P_x)_{ij} + (M/P_m)_{ij}]_t = á_0 + á_1 \ln Y_{it} + á_2 \ln Y_{jt} + å_t \qquad (1)$$

where *i* and *j* denote Ireland and the UK, *t* runs from 1950 to 1998, and

X = the volume of Irish exports to the UK,

M = the volume of Irish imports from the UK,

P_x = the Irish export price deflator,

P_m = the Irish import price deflator,

$Y_{i,j}$ = Irish, UK real GDP in international $ (from the WPT 5.6 updated from national sources),

$å_t$ = a stochastic error term.

In addition, the following variables were included:

SL = an intercept-shift dummy variable for the period when the sterling link was in force

= 1 1950-78, 0.25 in 1979, and 0 thereafter,

AIFTA = an intercept-shift dummy variable for the period when the Anglo-Irish Free Area Agreement was in force but Ireland and the UK had not yet joined the EEC = 0 1950-65, 1 between 1966 and 1972, and 0 thereafter,

EEC = an intercept-shift dummy variable for membership of the European Economic Community = 0 1950-73 and 1 thereafter,

VOL_t = a measure of bilateral exchange rate volatility - the standard deviation over a year of the percentage change in (i) the monthly and (ii) the daily IEP/GBP exchange rate (s.d. $\Delta \ln s_t$). *VOL* is zero until 1979 and averaged 1.6% (monthly) or 0.4% (daily) over the period 1979-98.

Alternative specifications of the model were explored (such as adding separate variables for income *per capita* as well as total income) but not found to make any significant differences to the results. The hypothesis that the coefficients on the two income variables are equal ($\alpha_1 = \alpha_2$) could not be rejected, so we used the parsimonious specification

$$\ln [(X/P_x)_{ij} + (M/P_m)_{ij}]_t = \alpha_0 + \alpha_3 \ln(Y_i Y_j)_t + \varepsilon_t \qquad (2)$$

The trade and income variables are non-stationary I(1), but the residuals of a regression of trade on income are stationary and the hypothesis of a cointegrating relationship between these variables cannot be rejected.[8] The model was therefore estimated as a long-run relationship between the levels of the variables and as an error correction model (ECM) to explore the dynamics of the adjustment of changes in trade to changes in income. The forms of the ECM estimated were:

$$\Delta \ln [(X/P_x)_{ij} + (M/P_m)_{ij}]_t = \hat{\alpha}_0 + \hat{\alpha}_2 \Delta \ln(Y_i Y_j)_t + \hat{\alpha}_3 \ln[(X/P_x)_{ij} + (M/P_m)_{ij}]_{t-1} + \hat{\alpha}_4 \ln(Y_i Y_j)_{t-1} + \varepsilon_t \qquad (3)$$

and

$$\Delta \ln [(X/P_x)_{ij} + (M/P_m)_{ij}]_t = \tilde{a}_0 + \tilde{a}_2 \Delta \ln(Y_i Y_j)_t + \tilde{a}_3 u_{t-1} + \mathring{a}_t \quad (3')$$

where u_{t-1} is the lagged residual from equation (2).

Estimates of equation (2) for the period 1950-98 are shown in Table 2. This simple model does a good job of summarizing the behaviour of Anglo-Irish trade over the period 1950-98. The income variable is highly significant. The intercept-shift dummies for the Anglo-Irish Free Trade Area Agreement and for EEC membership have the expected signs and are significant. The evidence that exchange rate volatility depresses trade is inconclusive – the estimated coefficients, while negative, are not statistically significant. Moreover, they imply that eliminating volatility completely in 1992, the year of greatest turbulence in the currency markets, would have increased the volume of trade by only about 0.5%. Experimentation with alternative measures of volatility produced no stronger results. The key finding relates to the stability of the relationship before and after breaking the sterling link. The *SL* coefficient is negative rather than positive as expected. Even stronger support for the absence of a sterling link effect is provided by the fact that the forecast of Anglo-Irish trade for 1979-98 based on the relationship estimated over the sterling link years easily passes standard predictive failure and stability tests.[9] The estimated ECM sheds light on the dynamics of the relationship between income and trade. Equations (1) and (2) in Table 3 provide similar estimates of the adjustment. The elasticity of trade with respect to income is 0.8, while about 70% of the equilibrium error is corrected in a year. Firmer estimates of the short-term influence of volatility are obtained but other than this there is no evidence that breaking the link with sterling had a significant effect. The model estimated for the sterling link period (equations 2 and 3) passes the predictive failure test for the period 1979-98.

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[8] The ADF(1) test statistic for the residuals for equation (1) in Table 2 is –3.65 compared with the 95% critical value of –3.47.

Table 2: *Regression of Anglo-Irish trade on Income, 1950-98*
(t-ratios in parentheses)

	Dependent variable: ln $[(X/P_x) + (M/P_m)]_t$		
Sample period:	1950-98	1950-78	
Equation no:	(1)	(2)	(3)
Intercept	0.98 (4.4)	0.901 (5.89)	0.80 (2.6)
Ln $(Y_j Y_j)_t$	0.859 (35.9)	0.867 (48.1)	0.879 (20.0)
VOL_{-1}	-1.94 (1.4)		
AIFTA	0.07 (2.5)		0.05 (1.4)
EEC	-0.069 (2.6)		-0.03 (0.5)
SL	-0.02 (0.5)		
$\bar{R}^2$	0.997	0.988	0.991
S.e.e.	0.04	0.05	0.04
D.W.	1.37	1.21	1.64
Chow test for stability of regression coefficients $\chi^2(6)$, $[P(\chi^2)]$		2.4 [0.30]	n.a.
LM predictive failure test $\chi^2(20)$, $[P(\chi^2)]$		14.9 [0.78]	18.3 [0.56]

[9] It is possible to perform a Chow test only when *EEC, AIFTA, SL*, and *VOL* are omitted because they are collinear with the intercept term in one or other of the sub-periods.

Table 3: *Error correction model of Anglo-Irish trade*
(t-ratios in parentheses)

	Dependent variable: Äln $[(X/P_x) + (M/P_m)]_t$			
Sample period:	1950-98		1950-78	
Equation no:	(1)	(2)	(3)	(4)
Intercept	0.70 (2.7)	0.06 (2.1)	0.59 (1.01)	0.94 (2.2)
Äln $(Y_j Y_j)_t$	0.85 (5.3)	0.75 (5.2)	1.02 (4.2)	1.01 (4.5)
ln $[(X/P_x) + (M/P_m)]_{t-1}$	-0.65 (4.9)		-0.58 (3.1)	-0.77 (4.1)
ln $(Y_i Y_j)_{t-1}$	0.55 (4.8)		0.50 (3.1)	0.64 (3.7)
u_{t-1}		-0.75 (5.1)		
VOL_{-1}	-2.60 (2.2)	-2.82 (2.5)		
AIFTA	0.05 (1.8)	0.009 (0.5)		0.06 (1.6)
EEC	-0.002 (0.1)	-0.020 (1.0)		0.015 (0.3)
SL	-0.04 (1.1)	-0.05 (2.1)		
$\overline{R}^2$	0.59	0.61	0.43	0.52
S. e. e.	0.04	0.04	0.04	0.04
D.W.	1.82	1.88	1.68	1.91
Chow test for stability of regression coefficients $\chi^2(6)$, $[P(\chi^2)]$			1.22 [0.875]	n.a
LM predictive failure test $\chi^2(20)$, $[P(\chi^2)]$			11.7 [0.93]	14.6 [0.80]

We can summarize by stating that the time series evolution of Anglo-Irish trade reveals no evidence of a structural break following the change in the exchange rate regime in 1978. The rate of decline of the UK's share in Irish trade did not increase after the link with sterling was broken; Irish trade with the UK continued to grow rapidly, although trade with the rest of the world grew more rapidly both before and after 1978. A simple model linking the volume of Anglo-Irish trade with Irish and UK income shows no evidence of a structural break after 1978. When estimated over the period 1950-78 the model forecasts the growth of trade over the period 1978-98 very accurately. The exchange rate volatility introduced by breaking the sterling link may have had a small negative effect on the volume of trade, but even this effect is not statistically significant. is generally not statistically significant, reinforcing the conclusion of the trend analysis. But even

VI. A Gravity Model

It is desirable to generalize our study of Anglo-Irish trade to allow for any possible effects of the change in the exchange rate regime on Ireland's trading patterns as a whole. A gravity model is suitable for this purpose.[10] This model is widely used in trade studies and has been hailed as providing 'some of the clearest and most robust empirical findings in economics' (Leamer and Levinsohn, 1995). A theoretical foundation can be given for the model based on the frictions and costs of international trade (Anderson and van Wincoop, 2000). We adopt as our basic model the following specification:

$$\ln [(X_j/P_x) + (M_j/P_m)]_t = \ddot{a}_0 + \ddot{a}_1 \ln(Y_{IRL} Y_j)_t + \ddot{a}_2 \ln[(Y/Pop_{IRL})(Y/Pop_j)]_t + \ddot{a}_3 \ln Dist_{irlj} + \ddot{a}_4 SL_{jt} + \ddot{a}_5 EEC_{jt} + \ddot{a}_6 Contiguity_j + \ddot{a}_7 English_j + \mathring{a}_t \quad (4)$$

where

X_j/P_{xt}, M_j/P_{mt} = Ireland's exports, imports from country *j* deflated by the Irish export

and import price indices in year *t*,

Y_{jt} = real income in country *j* in year *t*,

Y/Pop_{jt} = real income per capita in country *j* in year *t*,

$Distance_j$ = the distance between Ireland and country j,

SL_{jt} = a dummy variable = 1 if the country was in a currency union with Ireland in year t, 0 otherwise,

EEC_{jt} = a dummy variable = 1 if country *j* was a member of the European Economic Community in year *t* (*t* 1973 when Ireland became a member) and 0 otherwise,

$Contiguity_j$ = a dummy variable = 1 if country *j* has a land border with Ireland, 0 otherwise,

$English_j$ = a dummy variable = 1 if country *j* is English speaking, 0 otherwise.

Our data comprises a panel of 43 annual observations (1950-92) on Ireland's trade with 19 countries (treating Northern Ireland (NI) and Great Britain (GB) separately). These countries accounted for 88.5% of Ireland's total external trade in 1950 and 91.8% in 1992. The Irish pound was pegged to sterling for the first two thirds of the time period and in the ERM for the last third. The inclusion of separate data for NI and GB enables us both to control for the unique historical links between Ireland and the UK and to allow for the land border between Ireland and part of the UK. The income data were taken from WPT 6.1 and the trade data from the Irish sources described earlier. The variables *Distance*, *Contiguity*, and *English* are time invariant. *Contiguity* is zero for all countries except NI. *English* is equal to 1 for the USA, GB and NI, Canada, Australia, and New Zealand, and 0 for all other countries. The currency union variable, SL_{jt}, takes the value 1 only for the years 1950-78 for the GB and NI. No measure of volatility is included for the full time period because exchange rates were pegged until the 1970s.

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[10] Because we study only trade with Ireland it might be more accurate to our model as a panel study of Irish trade.

The results of estimating this model are displayed in Table 4. The first equation reports the results of estimating the model including country-specific fixed effects only for the UK. (Given the unqiue historical relationship between Ireland and the UK it would be wrong not to include a fixed effect Anglo-Iris trade.) The results appear very satisfactory. The income, income per capita, language, and distance variables are highly significant and the estimated values of the coefficients are similar to those recorded in other studies using much larger samples. The *EEC* variable is also highly significant and implies that *ceteris paribus* Ireland trades twice as much with other members of the EEC as with non-members. The coefficient of the *AIFTA* variable is much smaller and not statistically significant. The *Contiguity* variable is positive but not significant. Of greatest interest, however, is the very significant positive coefficient of the *SL* variable, which suggests that the sterling link doubled trade between Ireland and the UK ($e^{0.688} = 1.99$).

How do we reconcile this finding with the lack of time series evidence of a break in the pattern of Anglo-Irish trade in the late 1970s when the sterling link ended? The answer, we believe, lies in the need to take greater account of country-specific effects.[11] We have noted that Anglo-Irish trade accounted for almost all Irish trade in the early years after Independence but that it grew relatively slowly over subsequent decades. The reverse was the case for Irish trade with continental European countries, which was initially low but grew rapidly. This point is illustrated in Figure 6, which shows that Anglo-Irish trade responded very differently to rising incomes than did Franco-Irish trade. At the income levels prevailing in the early 1950s Irish trade with the UK was about twenty times the level of Irish trade with France, but at the higher income reached in the 1990s the ratio was 'only' 4:1. This suggests that Anglo-Irish trade was much less responsive to rising incomes than was trade with other countries. Another possibility is that entry to the EEC

[11] In fact a fixed effects model is more appropriate for a data set that covers all available cases rather than a sample from a defined universe.

diverted Anglo-Irish trade to other countries, as suggested by the time series results.

The second and third equations in Table 4 show how expanding the model to allow for further fixed effects renders the sterling link effect insignificant. In equation (2) a second intercept shift is introduced to allow for the possibility that membership of the EEC affect Irish trade with the UK differently than Irish trade with other countries. The coefficient of the EEC-UK interaction term is negative and highly significant. Its inclusion renders the *SL* coefficient insignificant without materially altering the results for the other variables. The same result is obtained when the slope with respect to *Income* is allowed to vary between the UK and other countries equation 3). The interaction term between the UK and income is highly significant and its negative coefficient reflects the relatively low responsiveness of Anglo-Irish trade to rising income seen in Figure 6. When this is taken into account the *SL* effect evaporates. We interpret these results as showing the positive coefficient of *SL* in equation (1) reflects either the trade-diverting effect of EEC membership on Anglo-Irish trade and/or the relatively low responsiveness of this trade to rising income levels rather than a genuine currency union effect.

It is of interest to explore further the importance of country-specific responses, but due to collinearity it is not possible to obtain estimates of all the coefficients of the time-invariant variables and a full set of dummy variables. By including country-specific effects one at a time we established a reference group of countries for which dummies were not significant - Belgium, Germany, Denmark, Spain, the Netherlands, Sweden, and the USA. Slope and intercept dummies were highly significant for all other countries. Inspection of the coefficients of the fixed effects revealed two sub-groups of countries. The first comprises the Commonwealth countries plus Finland, for which and the intercept dummies were positive and the slope dummies negative. These countries' initial level of trade with Ireland was relatively high, but subsequently grew

Table 4a. *Gravity models of trade between Ireland and 19 countries, 1950-92*

Dependent variable: ln Trade with Ireland
(t-ratios in parentheses)

Equation number:	(1)	(2)	(3)	(4)
Intercept	-16.1 (26.1)	-16.1 (26.5)	-16.2 (26.4)	-12.8 (16.6)
ln *Income*	0.63 (37.3)	0.62 (37.6)	0.62 (37.6)	0.64 (29.0)
ln *Income per capita*	0.53 (16.3)	0.53 (16.6)	0.53 (16.5)	0.68 (19.2)
SL	0.688 (4.9)	0.098 (0.5)	-0.05 (0.2)	0.06 (0.4)
ln *Distance*	-0.50 (14.8)	-0.49 (14.5)	-0.49 (14.6)	-1.37 (19.4)
English	0.57 (7.2)	0.57 (7.3)	0.57 (7.2)	1.63 (11.6)
AIFTA	0.22 (1.3)	-0.001 (0.0)	0.45 (2.5)	0.19 (1.8)
EEC	0.62 (10.0)	0.71 (11.0)	0.68 (10.7)	0.19 (3.6)
Contiguity	0.083 (0.6)	0.09 (0.6)	-2.03 (3.6)	-2.07 (6.1)
UK	0.98 (5.9)	1.83 (7.4)	21.3 (4.1)	11.9 (3.8)
*UK*EEC*		-0.88 (4.6)		
*UK*Y*			-0.54 (3.9)	-0.34 (4.1)
				Plus intercept and slope dummies for 10 other countries
	$\overline{R}^2$ = 0.90 S. e. e = 0.550	$\overline{R}^2$ = 0.90 S. e. e. = 0.545	$\overline{R}^2$ = 0.90 S. e. e. = 0.545	$\overline{R}^2$ = 0.97 S. e. e.=0.315

Table 4b. *Gravity models of trade between Ireland and 19 countries, 1978-80*

Dependent variable: ln Trade with Ireland
(t-ratios in parentheses)

Equation number:	(1)	(2)
Intercept	-29.5 (3.9)	-29.7 (4.0)
ln *Income*	0.65 (14.4)	0.65 (14.7)
ln *Income per capita*	1.16 (2.9)	1.18 (2.9)
SL	0.028 (0.1)	0.071 (0.2)
ln *Distance*	-0.36 (3.3)	-0.37 (3.4)
English	-0.19 (0.7)	-0.17 (0.7)
EEC	0.69 (4.5)	0.71 (5.0)
Contiguity	0.63 (1.6)	0.62 (1.6)
UK	1.95 (1.6)	1.94 (4.5)
$Voatility_{-1}$	-0.047 (0.4)	
	$\overline{R}^2$ = 0.93 S. e. e = 0.37	$\overline{R}^2$ = 0.93 S. e. e = 0.37

relatively slowly. The same could also be said of Finland, due to the dominance of paper and pulp in Finnish-Irish trade in the pre-Nokia days! In the second sub-group - Austria, Switzerland, France, Italy, Japan, and Norway - the intercept shift dummies were negative and the slope dummies positive, indicating that the volume of trade was initially low but then grew rapidly. New industrial and consumer products now predominate in Ireland's trade with these countries.

As a final test for the short-run effects of breaking the sterling link, in Table 4b we present panel results for the three years centred on 1979. We used this sample period to capture any short-term

'before' and 'after' effect of breaking the link with sterling and to see the effect of volatility *vis-à-vis* sterling (*VOL*) on Anglo-Irish trade. The coefficients on income and several other variables are very similar to those reported for the full time series.[12] Neither *SL* nor *VOL* is significant. Thus even in the short run there is no evidence that breaking the link with sterling had an adverse effect on the volume of Anglo-Irish.

VII. Concluding remarks.

This paper exploits the opportunity offered by the break between the Irish pound and sterling in 1978 to study how the use of a common currency affects trade patterns. First, we looked for evidence of an increase in the rate of decline of the UK's share of Irish trade in the late 1970s. Second, we estimated a model of Anglo-Irish trade over the period 1950-98 and tested for evidence of a structural break in the relationship between income and trade after 1978. Finally a panel regression of Irish trade with its main trading partners was used to estimate the influence of the sterling link on the pattern of Irish trade over the period 1950-92 and over the three years centered on 1979.

None of these tests provided any firm evidence that the break-up of the long-standing currency union between the Irish pound and sterling significantly lowered the volume of Anglo-Irish trade below what it would have been in the absence of a change in the exchange rate regime. The volume of Anglo-Irish trade grew as rapidly after 1978 as it had in earlier years and by 1998 had reached three times its 1978 level. The UK's share in Irish trade had been declining long before the sterling link was broken and there is no clear evidence that the rate of decline increased after the change in the exchange rate regime. A variety of time series tests reveal no structural break in the relationship between income and trade after 1978. The volatility introduced by floating the

[12] Slope dummies would not be appropriate over a three-year period.

exchange rate may have dampened the growth of Anglo-Irish trade, but any such effect was small and not statistically significant. A gravity model of Irish trade with nineteen countries over the period 1950-92 provides no evidence that trade with Great Britain or Northern Ireland was *ceteris paribus* lower because of breaking the sterling link. No short-run effects were found over the years 1978-80. These findings are all the more convincing because the official figures tend to understate the importance of Anglo-Irish trade in the total due to unrecorded cross-border transactions and the effect of transfer pricing on the declared value of MNC exports from Ireland.

Several reasons may be advanced to explain why the change in the currency regime had no effect on the growth of Anglo-Irish trade. At the time of Independence Irish trade patterns were those of a UK region. They changed gradually in response to a variety of long-run structural developments, compared with which the nature of the currency regime was unimportant. Moreover, the impact of introducing an exchange rate between Ireland and the UK was minimised by the development of an efficient forward foreign exchange market, while the stimulus to trade with the countries of the ERM was reduced by the continued volatility of the Irish pound *vis a vis* the continental currencies.

The Irish case offers a unique opportunity to disentangle the effects of a currency union from the other factors that influence trade between countries that have shared a currency. While findings based on the aftermath of the collapse of a currency union cannot be extrapolated to predict the effects of the creation of a new one, our results give grounds for scepticism about how much trade creation will result from the adoption of a common currency by the countries of the Eurozone.

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Appendix

Measuring the volume of Anglo-Irish trade

In studies of multilateral trade it is common to collect trade flows expressed in current US dollars and deflate by a US price deflator to obtain a measure of trade volumes (see Rose, 2000, for example). This can introduce a spurious variability in the data reflecting changes in the dollar exchange rate. This effect is particularly serious for the measurement of trade between countries such as Ireland and the UK whose currencies have recorded major real appreciation or depreciation relative to the US dollar.

Figure A1 compares the volume of Anglo-Irish trade in constant dollars and in constant Irish pounds. In Irish pound terms the volume of trade fell by 7% between 1979 and 1982. The 1979 peak was surpassed in 1984. In dollar terms, however, trade fell almost *fifty percent* between 1979 and 1985 and did not regain its previous peak until the end of the 1980s. The contrast is due to the fact that the US dollar appreciated from £1=$2.25 in 1979 to above £1=$1 in 1985. The exceptional rise in the dollar after the break in the Irish pound-sterling link introduces a spurious cycle in the trade figures that should not be attributed to the change of the exchange rate regime.

Figure A1: Anglo-Irish trade volume in dollars and Irish pounds

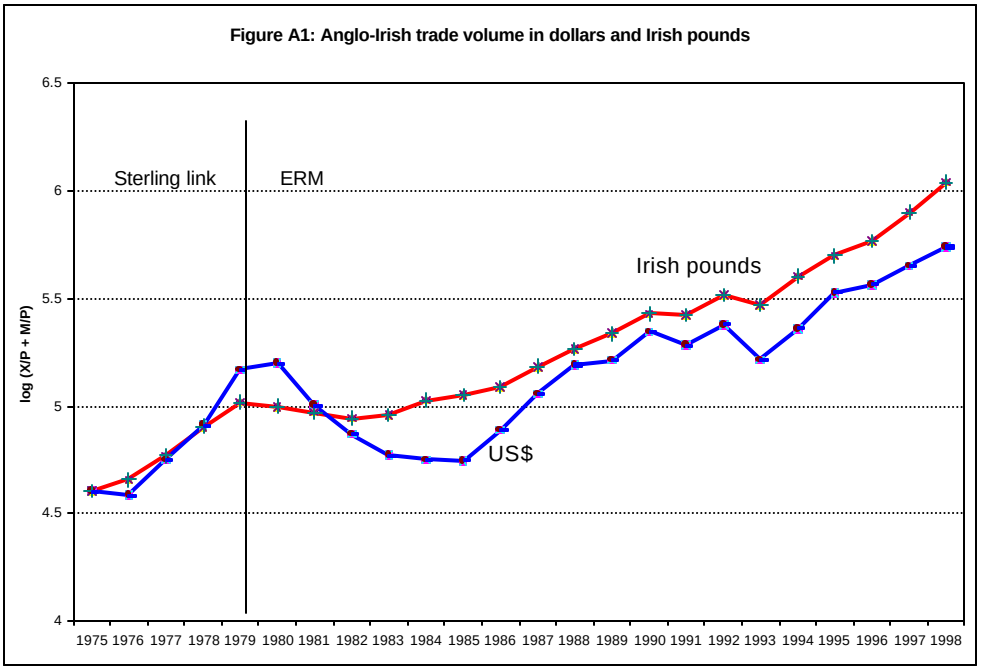


Figure 1: Volatility of Irish pound against key currencies before and after end of sterling link

(standard deviation of change in monthly rate)

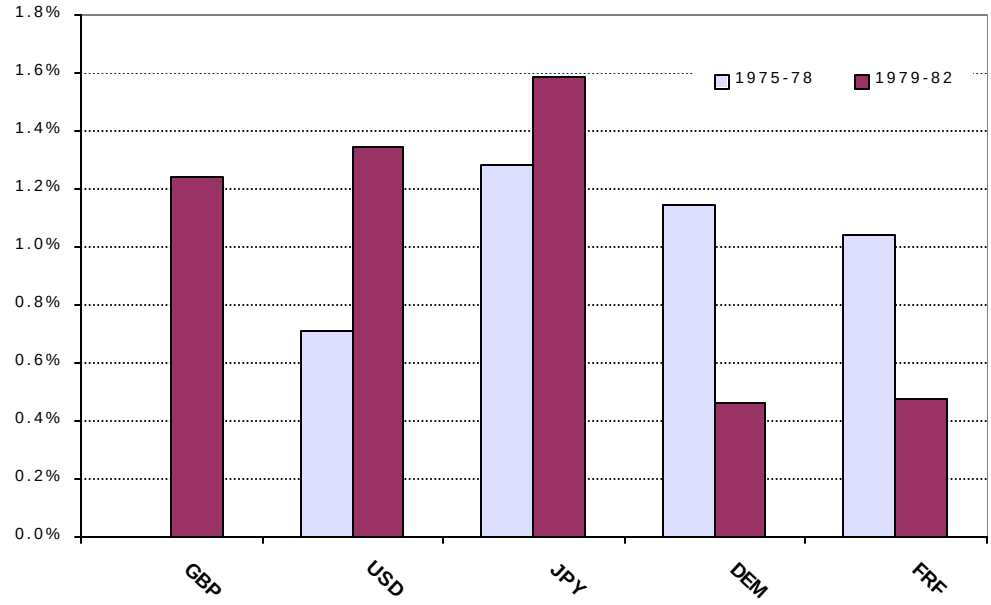


Figure 2a: UK's share of Irish exports, 1924-98

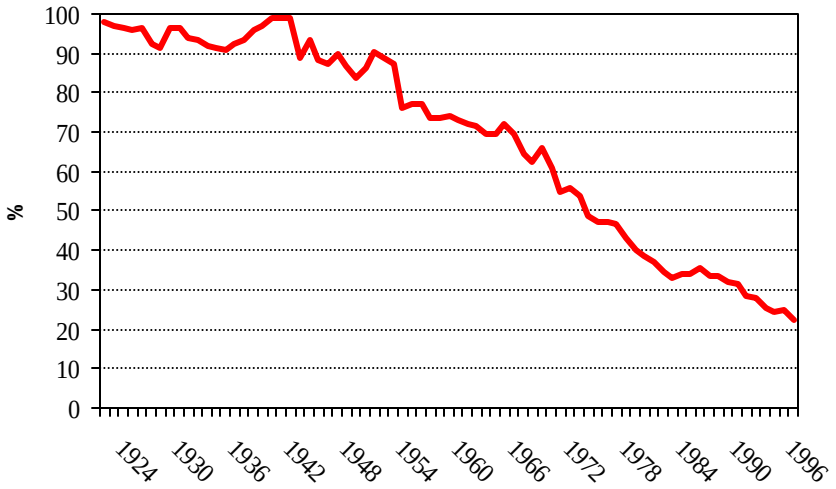


Figure 2b: UK's share of Irish imports, 1924-98

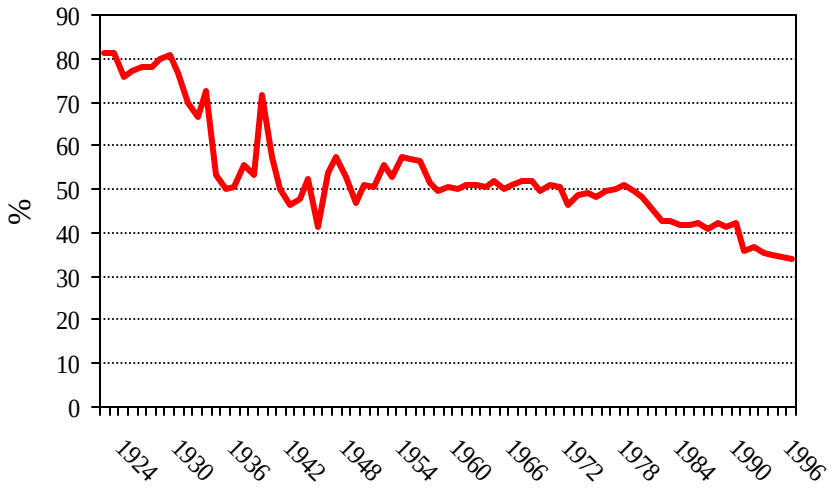


Figure 2c: UK's share of Irish trade, 1924-98

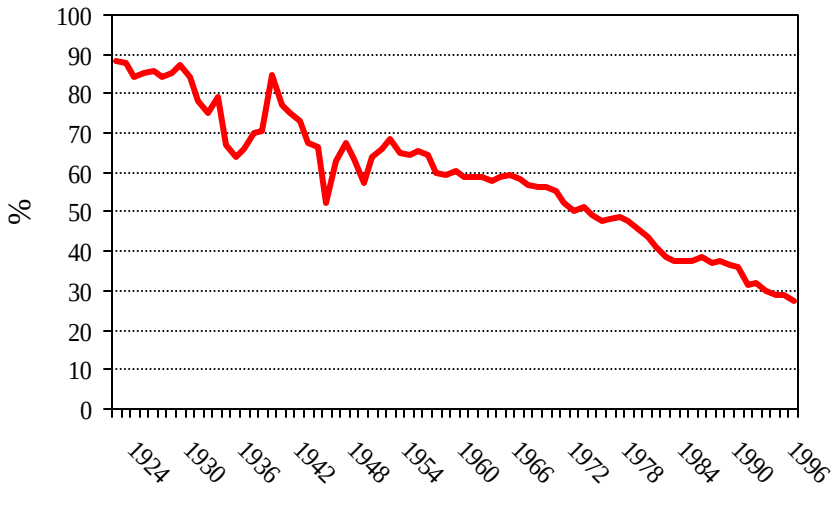
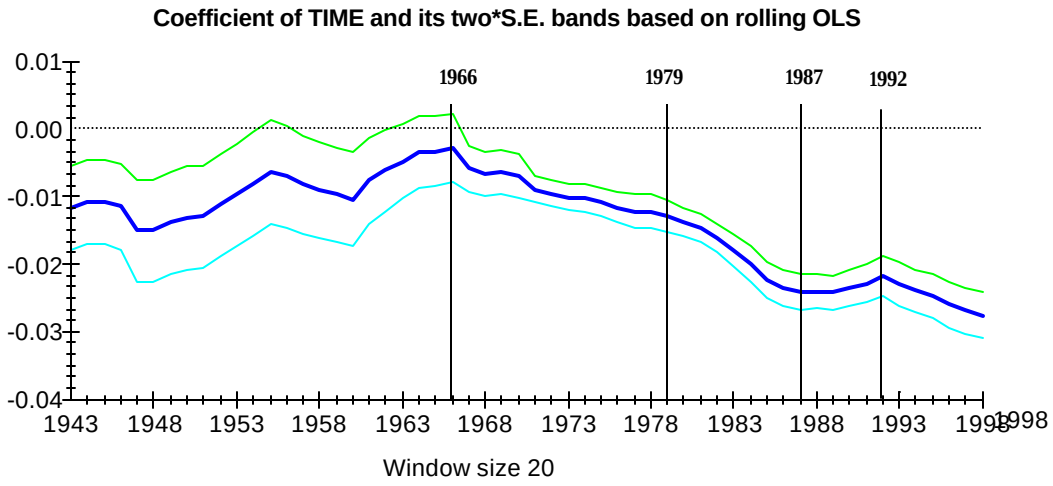


Figure 3: *Twenty year rolling regression of the log of the UK's share of Irish trade on trend*



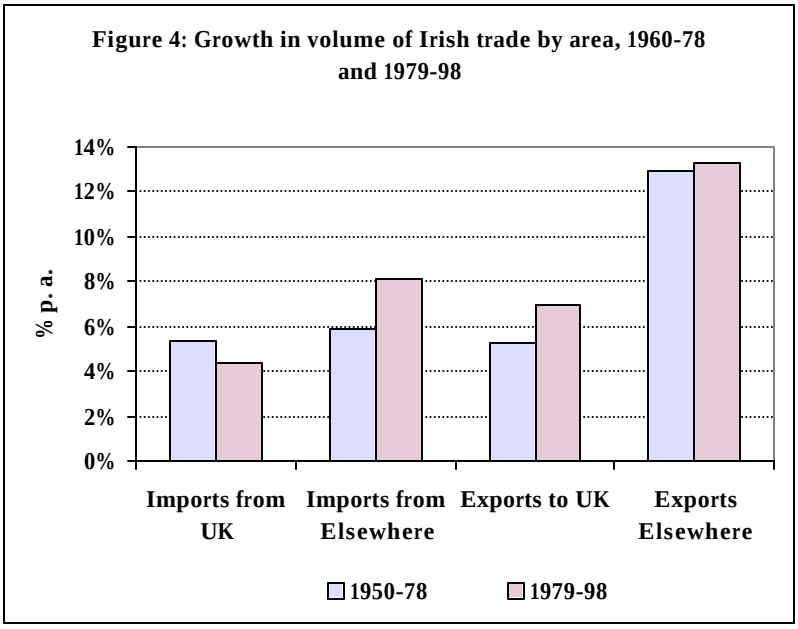


Figure 5: The volume of Anglo-Irish trade, 1950-98

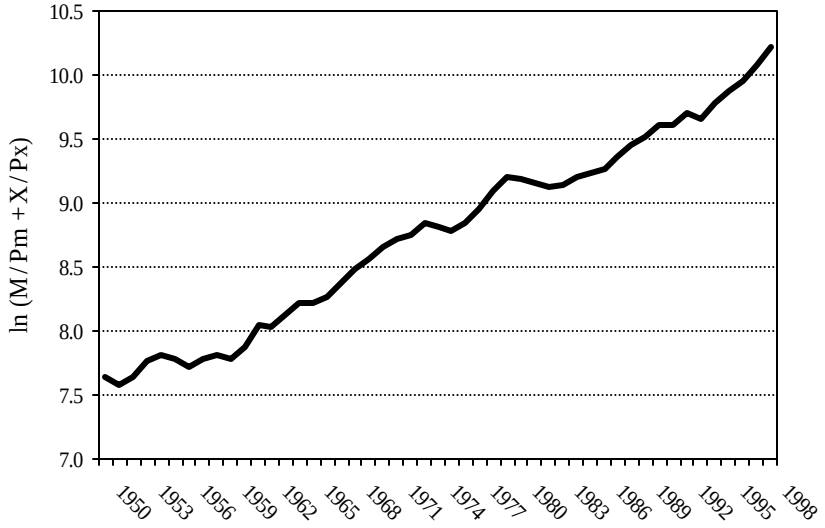


Figure 6: Relationship between income and trade with Ireland, Britain and France, 1950-92