# UK SHOCKS AND IRISH BUSINESS CYCLES, 1922-1979

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## Abstract

In this paper I estimate a SVAR model to study the transmission of UK shocks to the Irish economy over the period 1922-1979, using annual time series for CPI inflation and output growth. UK aggregate demand and supply shocks have large and significant impacts on Irish inflation, but smaller impacts on Irish real GDP growth. A historical decomposition indicates that UK aggregate demand shocks played a more important role than domestic shocks in the evolution of Irish inflation. In contrast, the evolution of Irish real GDP is driven by idiosyncratic domestic aggregate supply and demand shocks than by UK shocks.

## 1. Introduction

In 1922 the Irish Free State was established, effectively separating the administrative and economic functions of the southern counties of Ireland from those of the UK and Northern Ireland. Nonetheless, the two economies, which had been completely integrated up to this point, continued to be closely linked, largely as a result of international trade links, free mobility of labour and a fixed exchange rate policy.[1]

While it is recognized that colonial economies often developed in response to demand from the colonizer (for instance, the specialization in sugar production in the West Indies, or studies of extractive colonial rule[2]), trade, financial and monetary linkages often persist in the post-colonial period. However, although many studies look at the legacy of colonial rule as a determinant of future economic growth – the legal framework, institutions or investment made by the colonizer[3] – few, if any, look at the ongoing economic influence of the former colonizer on the newly independent state.[4]

This paper examines the ongoing influence of the UK on the Irish economic cycle in the period immediately after independence, 1922-1979, during which a rigorously fixed exchange rate policy was in place and sterling bank notes circulated at par with Irish pound notes in the Republic of Ireland. I do so in a SVAR model that includes Irish and UK real GDP growth and inflation. UK and Irish aggregate demand and supply shocks are identified, these shocks and their impact on output and inflation are discussed, and a historical decomposition is conducted of the role each shock played in the evolution of the Irish macroeconomy.

The paper is interesting for several reasons. First, using a novel identification scheme based on an assumption on the price elasticity of aggregate demand schedule suggested by Ball *et al.,* (1988), I identify the aggregate demand and supply shocks for both the UK and Ireland. The UK shocks should be thought of as capturing both UK

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[1] See for instance, Moynihan (1975), Martin and McAleese (1972) and Fitzgerald (1999).
[2] See Beck *et al.,* (2002) for a discussion.
[3] See, for instance, La Porta *et al.* (1998), Acemoglu *et al.,* (2001) and Huillery (2009).
[4] An exception is the study by Head *et al.,* (2010) which examines post-colonial trade.

and global factors. The Irish aggregate demand and supply shocks reflect largely Irish policy and domestic macroeconomic shocks.

Second, UK aggregate demand and supply shocks have significant effects on Irish inflation throughout the sample period, but they matter less for Irish real GDP growth. The effect of UK shocks is quite large on Irish inflation: a UK supply shock raises UK inflation by 1.8%, and Irish inflation by 1.3%, while a UK aggregate demand shock raises UK inflation increases 2.1% and Irish inflation by 2.3%, in the first year. The effect on Irish GDP is less strong, a UK supply shock raises UK GDP by 1.8% but the impact of Irish GDP is 0.8%, while the impact of an aggregate demand shock on Irish GDP is marginally negative.

Third, the impact of UK shocks on Irish inflation is similar in magnitude to that of Irish shocks: a 1 standard deviation shock to either Irish or UK aggregate supply raises Irish inflation by 1.8% in the first year, while UK aggregate demand shocks raise inflation by 2.3%, compared to a 1.2% and 1.0% for Irish aggregate supply and demand shocks, respectively. However, Irish supply and demand shocks have larger impacts on Irish real GDP growth.

Fourth, the historical decomposition indicates that UK aggregate demand shocks played an important role in the evolution of Irish inflation over the period studied while UK aggregate supply shocks have a much more muted effect. The Irish aggregate supply shock raises inflation in 1932 at the onset of the Economic War with Britain, while demand shocks also have a notable impact during the Second World War. While, domestic shocks do not tend to raise inflation in the years following the Economic Development plan in 1958, the period immediately prior to the first oil crisis, from 1968 to 1972, is dominated by domestic shocks, supporting the view at the time that rising Irish inflation that diverged from UK inflation was largely attributable to increasing wage and other domestic pressures.[5]

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[5] See Geary (1970).

Finally, the evolution of Irish real GDP is much more driven by domestic shocks than UK shocks. Domestic shocks, relating to policies of the Fianna Fáil government which came to power in 1932 have a clear impact, while in the years following 1958 domestic shocks tend to push up output, suggesting that the Economic Development plan had an impact, and the policy of deficit-spending to promote economic activity in the wake of the first oil crisis is visible in aggregate demand shocks in 1973 and 1974. However, this effect petered out in 1975, in line with the notion that the spending programme was unsuccessful at maintaining economic activity.

The paper is structured as follows. The next section discusses the literature on international business cycle coordination and post-colonial development, while Section 3 discusses Irish economic developments over the period 1922-1979. The data are described in Section 4. The model specification, including the identification scheme, is discussed in Section 5. Section 6 discusses the results of the SVAR analysis, particularly the impact of the identified shocks on the Irish economy, and Section 7 concludes.

## 2. Post-colonial influence on economic outcomes

International business cycle theory suggests a number of transmission mechanisms through which a former colonizer is likely to have an ongoing impact on the economy of the newly independent state: aggregate demand shocks which can be propagated through international trade, common external shocks such as changes in oil prices, and the use of foreign goods in the production chain.[6] Eickmeier (2007) conducts an empirical examination of the transmission of US macroeconomic shocks to Germany using data of the period 1975 to 2002 and finds that trade is the most significant transmission channel while monetary policy reactions to strong price movements also play a role. Fidrmuc *et al.,* (2012) also using recent data estimate the determinants of

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[6] See, Backus *et al.,* (1995), Baxter (1995), Backus and Crucini (2000) and Burstein *et al.,* (2008).

output comovement between OECD countries and find that trade intensity, financial integration, and specialization patterns can have significant effects on comovements.[7]

However, when considering post-independence development, most studies focus on the 'legacy' of colonial rule. For instance, La Porta *et al.* (1998) argue that the British legal system left colonies better placed to achieve positive economic outcomes following independence. Similarly, Beck and Levine (2003) provide an overview of the literature examining the role of legal institutions in shaping financial systems. Acemoglu *et al.,* (2001) find that colonizers were more likely to establish institutions that were conducive to growth in areas where settlers experienced lower settler mortality, and that this difference in institutions can explain income differentials today.[8] Similarly, Nunn (2007) develops a model which shows that 'extractive' colonial rule can result in low levels of production in the longer-run. Huillery (2009) examines the role of investment levels during colonial times on current income inequality in former French West Africa. Banerjee and Iyer (2005) find that the how agricultural property rights were granted in India continued to have an impact on agricultural productivity differences after independence.

In contrast, few studies have examined the transmission of business cycles in a post-colonial environment. An exception is Head *et al.,* (2010) noting that Algeria's trade with France declined by two thirds over its first two decades of independence, study the impact of independence on bilateral trade. They find that over four decades, trade between the former colonizers and colonies falls over 65%, although in the case of 'hostile separations', the effect can be faster. They attribute their findings to the decline in institutions and networks of people with knowledge of trade opportunities.

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[7] Another strand of the literature examines the size and volatility of global shocks, without considering the transmission channels; see for instance, Stock and Watson (2005).

[8] Easterly and Levine (2003) show that development more generally is related to institutions, the standard of which can be related to geographical features such as 'tropics, germs and crops' pervasive in a region.

In terms of the international dimension of Irish business cycles, studies focus on the post-EMS period. Goggin and Siedschlag (2010), examine the patterns and determinants of the international transmission of business cycles between Ireland and its trading partners over the period 1980-2009, and find that deeper trade and financial integration had strong direct positive effects on the synchronisation of Irish business cycles with its trading partners. They also find that the adoption of the euro led to more synchronised business cycles between Ireland and its euro area trading partners. Similarly, Bermingham and Conefrey (2014), find that Irish economic growth is highly sensitive to the performance of its trading partners during the period 1995-2007, but do not study what economic shocks these findings reflect.

Since these Irish studies have focused on recent data, it is interesting to consider aa longer sample period, covering the immediate post-independence period. During this time, the UK was the predominant trading partner of the newly independent Irish state, to the extent that is reasonable to think of it as the 'rest of the world' for Ireland.

As such it is interesting to consider the extent to which there was correlation between the two economies and to understand whether these correlations reflect aggregate supply or demand shocks.

## 3. The role of the UK business cycle in Irish economic developments, 1922-1979

Economic developments in the Free State and, after 1948[9], the Irish Republic continued to be influenced by those in the UK, particularly during the period of exchange rate fixity that ended in 1979.

Most noticeably, this is seen in the monetary regime in place until 1979.[10] Following the establishment of the Irish Free State, the monetary system was initially unchanged, however, in 1926 the Government established a Banking Commission to review the

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[9] 'Republic of Ireland Act' was passed by the Irish Parliament in 1948.

[10] For a detailed discussion of monetary developments see, for instance, Brennan (1931), Moynihan (1975), Ó Gráda (1995) and Gerlach and Stuart (2014).

monetary and financial system and propose changes. The Commission advised that the State should establish its own currency at par with Sterling and that a new Currency Commission should assume responsibility for the issuance of bank notes.

While these arrangements fell short of those in economies with a central bank, the Irish financial system functioned well and it was not until the report of the Commission of Inquiry into Banking, Currency and Credit in 1938, and the realisation during the Second World War that Irish banks could not rely upon the Bank of England as lender of last resort, that the Central Bank of Ireland (CBI) was established in March 1943. However, the fixed exchange rate against Sterling meant that Irish inflation rates and interest rates followed closely those in Britain and were thus determined with little, if any, reference to domestic economic conditions. As such, despite the establishment of the Central Bank, monetary arrangements in Ireland were close to those of a currency board throughout the period up to 1979 when Ireland joined EMS.[11]

Furthermore, economic linkages with the UK remained strong following independence. Export markets, already well established for agricultural products, continued to operate as before. During the 1920s Ireland traded 'almost exclusively with the UK' (Barry and Daly (2011, p. 1)). This relationship remained strong throughout the sample period, although the composition of exports gradually became less agricultural. McAleese and Martin (1972) report that the UK still accounted for 83% of exports in 1951 and 63% in 1971.

In addition, free movement of labour continued throughout this period, and it has often been considered that UK played an important role as a 'safety valve', helping to keep unemployment in Ireland lower than otherwise (see Walsh (1999)). Indeed, a number of studies have argued that there is an equilibrium unemployment gap between Ireland and the UK, whereby, emigration from Ireland ensured that the Irish unemployment rate never rose too far above that in the UK.[12] The intuition is that

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[11] See Honohan (1995).
[12] For a discussion, see Fitzgerald (1999).

when the gap increases, emigration follows, reducing supply in the Irish labour market and increasing wage and price inflation. Honohan (1984) estimates the equilibrium level of the unemployment gap at which there would be no net flow of migrants, while Honohan (1992) shows that the Irish unemployment rate has tended to adjust in the medium term to movements in that in the UK.

However, while important aspects of the Irish economy remained closely tied to that of the UK, the structure of the Irish economy was different to that in the UK, while Ireland also asserted independence in a number of instances, and pursued its own economic objectives. For instance, in 1929, following the Wall Street crash, having less developed financial markets, Ireland was, initially at least, less affected than other economies (Barry and Daly (2011)). In 1932, the new Fianna Fáil government instigated the Economic War as it withheld land annuities from the UK. The UK retaliated by introducing a tariff on Irish cattle exports. The Economic War and the broader introduction of protectionist policies that followed, led to a decline in net agricultural output, but an increase of some 46% in industrial output.[13] Neary and Ó Gráda (1991) note that the employment effect in the Irish agricultural sector was smaller however, since tariffs imposed on cattle exports by the UK as part of the economic war resulted in a shift in agricultural production away from land-intensive grazing towards labour-intensive tillage.

At the onset of the Second World War the Irish Free State declared its neutrality, placing the two economies on very different paths. While in the UK government spending increased rapidly and the labour force was reorganized, Lee (1989) notes that Ireland was 'unusually ill-equipped' for the economic impact of the Second World War. In particular, in contrast to other small, neutral, European economies, Ireland had no industrial base: while Switzerland, for instance, saw unemployment fall from 13.2% in 1936 to 1.6% in 1945 as a result of an armament drive, Ireland had no similar reduction in unemployment, and no consequent shift towards industrial employment.

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[13] For a discussion, see Lee (1989).

In the post-war period, Ireland pursued a policy of import substitution, in an attempt to move closer towards self-sufficiency. Out of step with the UK and much of the rest of Europe, which experienced a period of strong growth in the 1950s and 1960s, Irish economic performance was comparatively very poor. Although industrial production began to rise as domestic firms benefited from a lack of foreign competition and jobs in industry increased by over 50,000 from 1946 to 1952, the industrial workforce remained less than half the size of that in agriculture, and only 20% of the entire workforce (Lyons (1972)).

The introduction of Whitaker's program for Economic Development in 1958 began the process of opening the Irish economy, and reversing the policy import-substituting-industrialisation. While the immediate effect was an increase in redundancies as domestic firms lost out to foreign competitors, the size of the industrial workforce surpassed that in agriculture in the late 1960s. Throughout the 1970s, industrialization continued, and output increased by approximately 66%. Nonetheless, growth was by no means spectacular, and this is not considered the period during which Ireland 'caught up' for the lack of growth in the post-War period. This did not occur until the Celtic Tiger period in the 1990s (see for instance, Honohan and Walsh (2002)).

Ireland's response to the oil crises in the 1970s was not dissimilar from that in the UK: the government undertook a programme of deficit-spending to promote economic activity. However, as a small open economy, the government spending measures were largely unsuccessful in boosting the economy. In 1975 the National Economic and Social Council of Ireland noted that Ireland appeared to have lost its competitive advantage over the UK entirely, attributing this to three factors: wage agreements that resulted in wages rising strongly in response to soaring inflation; fiscal efforts to prioritise employment and maintain living standards which were funded by taxes that contributed directly to CPI increases[14], and the world recession in the wake of the first oil crisis which reduced demand for exports at the same time domestic costs were

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[14] For instance, increases in indirect taxes and excise duties on petrol alone added 3% to CPI.

rising rapidly.[15] It was not until after our sample period that tough fiscal measures were implemented to address a rapidly rising debt-to-GDP ratio in the mid- to late-1980s resulting in a gradual decline in inflation.

Overall then, the development of the Irish economy during this period was determined both by its exceptionally close links to the UK economy and by domestic policy decisions. This raises a number of questions. First, can separate Irish aggregate supply and demand shocks be identified separately from UK and global shocks? What is the effect of these shocks on Irish macroeconomic variables? Finally, to what extent did each of these forces determine Irish macroeconomic outcomes over the sample period? I next turn to these questions.

## 4. Data description

The data which are used in this analysis are taken from a number of sources. For the UK, data on inflation are from the Office of National Statistics (ONS), for which annual changes in CPI are available from 1800. For UK real GDP, data are taken from the 'three centuries of data' spreadsheet of Hills *et al.,* (2015) for the period to 1947, and thereafter data from the ONS are used. For Ireland, inflation data is available from the Central Statistics Office (CSO) from 1922. The Irish real GDP data are described in Gerlach and Stuart (2015). Briefly, data from 1922 to 1938 are taken from the Maddison website. Data from 1938 to 1947 are taken from official estimates of national income published in 1946 and 1951.[16] Data on real GDP are available from the CSO from 1947 to 2012.

The growth rates of the final series are shown in Figures 1 and 2. The inflation rates, computed using the CPI indices, are generally similar (Figure 1). The main differences occur around the Second World War, perhaps unsurprisingly since Ireland remained neutral. While both economies experienced rising inflation in 1940, Irish inflation

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[15] National Economic and Social Council, (1975).

[16] See, White Paper (1946) and CSO (1951). In both cases, the data are for total national income, and are reported only in nominal terms. However, a retail price trend is also reported in both publications, and this is used to deflate the series for real GDP.

remained high in 1943 before declining thereafter. In years following the War, Irish inflation is generally marginally lower than that in the UK. While both economies experienced high inflation during the first oil crisis, Irish inflation was already rising in the late-1960s. This somewhat higher rate of inflation was much discussed at the time: Geary *et al.,* (1970, p. 347) noted that while Irish and UK process moved similarly in the post-war period to 1966, they began to diverge thereafter, and argue that *'the restoration of the parity, in the interest of our great exports to UK, will obviously be a difficult task. At present we are pricing ourselves out of the British market.'*

Figure 2 shows the growth rate of the final GDP series for both countries. The GDP data move much less closely together than the inflation series, particularly in the first part of the sample. While Ireland experienced negative growth through much of the 1930s, whereas following a large decline in output in the aftermath of the 1929 stock market crash, the UK returned to positive growth in 1932 and remained so for the rest of the decade. Growth also diverged significantly during the Second World War; the UK experienced a large increase in output for most of the War, before a decline in the latter years and immediate post-war period. Thereafter the UK experienced stronger growth than Ireland through much of the 'golden age' of the 1950s. GDP growth in the two economies begins to move more closely in the early 1960s and continues to do so in the 1970s.

## 5. Econometric analysis

Next, I examine the impact of both UK and Irish shocks on the Irish economy in a Vector Autoregression (VAR) framework. However, before proceeding, I test for stationarity in the series.

*5.1 Unit root tests*

Both the Augmented Dickey-Fuller (ADF) unit root test and the Elliott-Rothenberg and Stock (ERS) test are performed on the series, with lag length selected using the Hannan-Quinn information criterion. The tests are performed including just an

intercept and also an intercept and trend. The results of the test for the four variables are presented in Table 1. The test is first carried out on the variables in levels. All the tests fail to reject the null of a unit root at the 1% level. The ERS test for UK GDP rejects the null at the 5% level when a trend and intercept is included. However, the ADF test using a trend and intercept returns a p-value of 0.14. I therefore proceed to testing for stationarity in differences.

For both Irish and UK GDP, the tests reject the null hypothesis of a unit root at the 1% level in almost all cases. The exception is the ERS test on Irish real GDP when only an intercept is included; in this instance the null is rejected at the 5% level. With respect to UK and Irish inflation, the results are somewhat more mixed. For UK inflation, the ADF test rejects the null at the 5% level when a trend and intercept are included, and at the 10% level when only a trend is included. Although the ERS test fails to reject the null when only an intercept is included, it rejects at the 10% level when both trend and intercept are included. For Irish inflation, when a trend and an intercept are included, the ADF test rejects at the 10% level and the ERS test at the 5% level, but the test fails to reject when only an intercept is included. Overall, these results point towards stationarity, and I proceed on this basis.

*5.2 Testing for cointegration*

The model would be misspecified if cointegration was present and not taken into account, and I therefore next test whether the series are cointegrated. To do so first requires determining the appropriate lag length of a VAR in differences. The Hannan-Quinn information criterion and the Schwarz information criterion indicate that one lag is the appropriate specification. Moreover, a lag exclusion test indicates that when second lags are included in the VAR they are jointly insignificant (p-value = 0.28), whereas the first lags are highly significant (p-value = 0.00). Finally, an LM test indicates that there is no serial autocorrelation in the residuals in the first 6 lags. I therefore proceed with a 1-lag specification.

Based on this lag length structure, a Johansen test is next used to determine whether the series are cointegrated. Both the Trace test or the Maximum Eigenvalue test

indicate that there is one cointegrating vector. This result is robust to whether or not a trend or intercept is allowed for (Table 2).

*5.3 SVAR specification*

Since the variables are cointegrated, they can be described by a Vector Error Correction (VECM) model, that is, by a restricted VAR model for the levels of the variables.[17] Since the appropriate lag length for the VAR in differences is one, it is likely that the appropriate lag length in levels is two. Although the Schwarz criterion indicates that two lags is appropriate, the Hannan-Quinn information criterion indicates that three lags is now appropriate. However, a lag exclusion test indicates that the third lags are not jointly significant (p-value = 0.29), and an LM test indicates that there is no serial correlation when just two lags are included. Overall, I proceed with a two lag specification.

The cointegration test indicates that there may be a trend in the cointegrating relationship. This would make it appropriate to include a trend as an exogenous variable in the VAR. A likelihood ratio test indicates that this trend should be included (p-value = 0.00). I therefore include one in the VAR, although the coefficients on the trend are not significant in the individual equations. The results of the VAR are presented in Table 3.

*5.4 Identification the shocks*

I first estimate a VAR specification which can be written in matrix form as:

$$Y_t = AY_{t-1} + e_t \tag{1}$$

Here $e_t$ is a vector of regression residuals which are a convolution of underlying structural aggregate supply and demand shocks. These structural shocks, $u_t$, are a combination of these reduced form shocks such that:

$$Be_t = Cu_t \tag{2}$$

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17 Imposing the restrictions of the VEC model in estimation improves efficiency but is not necessary. For computation convenience we do not do so here.

Assumptions over *B* and *C* are necessary in order to identify the structural shocks. There are a number of possible identification schemes that can be employed. One is the Cholesky decomposition which assumes *B* is triangular and *C* is the identity matrix so that the first shock affects all variables at time t, the second shock affects the first and second variables at time t, and so on, with the last shock affecting all variables at time t. Such an identification structure is inappropriate in the current setting: since the data are annual, aggregate supply and demand shocks affect prices and quantities within one period.[18]

An alternative approach follows the SVAR model studied by Bernanke (1986) who also relied on contemporaneous restrictions but constrained *B* in other ways than forcing it to be diagonal.

Here, to identify supply shocks I proceed as in Ball *et al.,* (1988) and assume that the price elasticity of aggregate demand is unity. In that case, an expansionary aggregate supply shock will increase GDP but reduce prices, leaving nominal GDP unaffected. While this restriction seems natural, to my knowledge it has not been used to date to identify aggregate supply shocks in a SVAR framework. Ball *et al.,* argue that this assumption seems plausible, given available empirical estimates of the slope of IS LM curves. However, for robustness, I will also estimate the model assuming that the price elasticity of aggregate demand is half (-0.5) and twice (-2.0) as large.

In this case, the identifying structure in (2) can be written as follows:

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\begin{bmatrix} 1 & -b_{12} & 0 & 0 \\ 1 & 1 & 0 & 0 \\ b_{31} & b_{32} & 1 & -b_{34} \\ b_{41} & b_{42} & 1 & 1 \end{bmatrix} \begin{bmatrix} e_{inf}^{UK} \\ e_{gdp}^{UK} \\ e_{inf}^{IE} \\ e_{gdp}^{IE} \end{bmatrix} = \begin{bmatrix} -c_{11} & 0 & 0 & 0 \\ 0 & c_{22} & 0 & 0 \\ 0 & 0 & -c_{33} & 0 \\ 0 & 0 & 0 & -c_{44} \end{bmatrix} \begin{bmatrix} u_{AS}^{UK} \\ u_{AD}^{UK} \\ u_{AS}^{IE} \\ u_{AD}^{IE} \end{bmatrix} \tag{3}
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[18] An entirely different approach to identification scheme uses long-run restrictions, similar to those used in Blanchard and Quah (1989) and Bayoumi and Eichengreen (1992). These restrictions assume that some shocks have no long-run impact on some variables, although all shocks have short-run effects. However, long run restrictions such as these often give unreliable results (see Faust and Leeper (1994) for a discussion).

UK and Irish shocks are formulated slightly differently. Contemporaneous events in Ireland have no impact on UK shocks, a reasonable assumption since Ireland is a small economy relative to that in the UK. However, when considering Irish aggregate demand and supply shocks, it is reasonable to assume there may be some effect from the UK.[19] As such, UK inflation and output are allowed impact Irish shocks.

## 6. UK aggregate supply and demand shocks, Irish business cycles

It is now possible to calculate the estimated aggregate supply and demand shocks, and to consider their impact on the Irish economy over the course of the sample period.

*6.1 Aggregate demand and supply shocks*

The estimated aggregate supply and demand shocks for both the UK and Ireland are presented in Figures 3 and 4. Turning to the UK first, there is a strong positive aggregate supply shock in 1927, following the resolution of general strike in 1926 and subsequent banning of such strikes in the Trade Disputes and Trade Unions Act, 1927 (Figure 3). The Great Depression led to a negative aggregate demand shock through much of the 1930s, while the Second World War is marked by a large positive aggregate demand shock in 1940. There is a negative aggregate supply shock in 1951 and 1952, corresponding with the Korean War. The first oil crisis in the 1973 is marked by a severe negative aggregate supply shock in 1974, while the early effects of the second oil crisis in 1979 are also evident as a negative supply shock.

Turning next to the Irish shocks (Figure 4), there is a marked domestic shock aggregate supply shock in 1932 coinciding with the start of the Economic War. This is followed by an aggregate demand shock in 1934, which is perhaps related to the spending policies of the Fianna Fáil government which came to power two years earlier. The start of the Second World War is not marked by any idiosyncratic Irish shock, however there are negative aggregate demand and supply shocks in 1941 and 1943,

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[19] It is also possible to specify that the UK has no effect on Irish aggregate demand and supply shocks, resulting in an overidentified VAR. However, a likelihood ratio test indicates that these restrictions are not appropriate.

respectively. These were two years when the effects of the War were particularly felt in Ireland. Following the end of the 'phony war' in 1940, wartime conditions began in earnest in 1941. Ó Gráda (1997) reports that the number of new private cars registered dropped from 7,480 in 1939 to just 240 in 1941. The government introduced a 'standstill' on wages in May 1941, such that the share of wages in net manufacturing output declined from an average of 48.9% in 1936-40 to 46.0% in 1941-43. In 1943 war time shortages began to take hold strongly. Lyons (1972) notes that in 1943 private motoring virtually ceased, long distance travel became increasingly difficult even using public transport, gas and electricity usage were cut, coal became almost unobtainable at times, and rationing began of bread, tea, butter, sugar and clothes.

Positive supply shocks are evident with the end of the War and in 1948. An aggregate demand shock is evident in 1958 with the conclusion of a balance of payments crisis that began in 1955 and the announcement of the Economic Development Plan. Negative demand shocks in 1965 and 1966 were reversed thereafter perhaps because the benefits of the Anglo-Irish Free Trade Agreement began to filter through. Finally, in addition to the wider global shock, there is a clear negative effect in Ireland following the first oil crisis.

*6.2 Impact of the shocks*

The responses of the UK and Irish economies to UK aggregate supply and demand shocks are displayed in Figure 5. The first column of Figure 5 shows that aggregate supply shocks tend to lower UK and inflation and raise UK GDP inflation, as would be expected. In addition, the shocks spillover to the Irish economy, lowering Irish inflation and raising Irish GDP. It is interesting to consider the pass-through of a UK shock to Irish and GDP. A one standard deviation shock to UK aggregate supply reduces UK inflation by 1.8%, and Irish inflation by 1.6% in the first year. The effect on Irish GDP is less strong, a shock raises UK GDP by 1.8% but the impact of Irish GDP is 0.8%.

From the second column of Figure 5, UK aggregate demand shock tends to raise both inflation and GDP in the UK. Again, this is as would be expected for a demand shock. The shock also tends to raise inflation in Ireland, and the pass-through from the UK appears to be quite high: UK inflation increases 2.1% in the first period, and Irish inflation increases by 2.3%. However, Irish output initially declines marginally before rising.

In Figure 6, we can see the response of Irish inflation and GDP to the idiosyncratic Irish aggregate demand and supply shocks. The impact of both shocks on output and inflation is significant. Aggregate demand shocks raise both inflation and output, and aggregate supply shocks tend to reduce inflation and raise output. Since all four shocks are of the same magnitude[20], it is interesting to compare their impact on Irish inflation and output. Interestingly, the impact of UK shocks on Irish inflation is larger than Irish shocks: in the first year, UK aggregate supply shocks lower Irish inflation 1.6% compared to 1.2% for Irish shocks, while UK aggregate demand shocks tend to raise Irish inflation 2.3% compared to 1.0% for Irish shocks. In contrast, the effect of Irish shocks on GDP is greater than that for UK shocks: in the first year, UK aggregate supply shocks raise Irish GDP 0.8% compared to 1.2% for Irish shocks, while UK aggregate demand shocks tend to reduce Irish output, while Irish shocks raise it 1.6%.

*6.3 Historical decomposition*

It is interesting to assess the role of UK and Irish shocks in the evolution of Irish CPI and GDP over the period. To do this, I next decompose the movements in Irish inflation and real GDP growth (since it is easier to interpret the effect of shocks on the growth rate, rather than the level, of the variables) into the four shocks. Figures 7 and 8 show this decomposition of inflation and real GDP growth (relative to a deterministic trend) into the parts due to the four shocks.

Turning first to Figure 7, UK aggregate demand shocks play an important role in the evolution of Irish inflation over the period to 1979. They tended reduce inflation

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[20] The shocks in Figures 5 and 6 are 1 standard deviation innovations, and all the shocks are normalised to have the same standard deviation.

relative to trend during the great depression between 1929 and 1933, before markedly increasing it during the early years of the Second World War. The effect is then subdued during much of the 1950s and 1960s, before raising inflation relative to trend during the years of the oil crises in the 1970s. By contrast, UK aggregate supply shocks have a much more muted effect. There is a noticeable UK aggregate supply shock in 1941 when war time conditions began in earnest after the 'phony war' ended. Also notable are 1951 and 1952, when the Korean War led to a supply shock which raised Irish inflation. Similarly, the oil crisis in the 1970s caused a negative supply shock, which raised inflation in Ireland.

The Irish aggregate supply shock raises inflation between 1932 and 1938 during the Economic War with Britain. Domestic demand shocks also have a positive impact on inflation in 1934-1936. These may be attributable to the programme of house building instituted by the same government during this time.[21] There are few domestic shocks during the Second World War, indicating no idiosyncratic domestic effect of the war. Interestingly, no domestic shocks raise inflation relative to trend in the years following the Economic Development plan in 1958 and the opening up of Irish trade. Indeed, negative aggregate supply and demand shocks in the following years may indicate the negative employment effect of opening domestic firms to foreign competition. Furthermore, domestic supply shocks over the period, 1969 to 1971 tend to raise inflation relative to trend. Although not large, they give some support to the view at the time that rising Irish inflation that diverged from UK inflation was largely attributable to increasing wage and other domestic pressures.[22]

In contrast to inflation, domestic shocks play much more of a role than UK shocks in the evolution of Irish real GDP (Figure 8). UK aggregate demand shocks are apparent as UK economy began to pick up in 1931 following the crash in 1929, and in 1940 at the beginning of the Second World War. In the immediate post-War period, UK aggregate demand shocks tend to raise GDP growth. UK supply shocks tend to push

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[21] For a discussion of these measures see Lee (1989).
[22] See Geary (1970).

GDP growth down relative to trend during the Korean War, and are also in evidence following the oil crisis. Although there are no other major shocks, UK supply and demand shocks are in evidence throughout the period, indicating its ongoing influence on the Irish economy.

In terms of domestic shocks, the Fianna Fáil government which came to power in 1932 instigated the Economic War in 1932 and 1933, the impact of which on output is evident in both supply and demand shocks. In contrast, positive domestic aggregate demand shocks over the years 1934-1936 may be attributable to that government's already-mentioned programme of house building. We can see a large negative aggregate supply shocks in 1940 and 1941 as the scale and impact of the Second World War became apparent, as discussed in Section 5.4.

Interestingly, and in contrast to inflation, in 1958 there is a shift in the role of domestic shocks on output. In the years prior to 1958, domestic shocks had generally played a negative role, pushing output down relative to trend. However, from 1958 onwards, we see that these shocks tend to push up output, suggesting that the Economic Development plan introduced in 1958 had an impact.

Domestic aggregate supply and demand shocks are also evident during the period of increasing wages in the late 1960s and early 1970s. Subsequently, the oil crisis in the 1973 prompted the government into a policy of deficit-spending to promote economic activity in its immediate aftermath. The immediate effect of this is evident in aggregate demand shocks in 1973 and a 1974; however, the effect petered out in 1975. This is in line with the common understanding of the period, that the government spending was unsuccessful at maintaining economic activity.

*6.4 Robustness checks*

The above shocks are identified on the basis of a price elasticity of demand of -1. While this specification is based on the arguments of Ball *et al.,* (1988) and seems plausible, it is of interest to explore how sensitive to results are to it. I therefore re-estimate the model assuming the price is elasticity is half (-0.5) and twice (-2.0) as large. This is

implemented by varying how $u_{AD}^i$ is defined. Specifically, instead of setting the coefficients on the residuals from the output equations, $e_{gdp}^{UK}$ and $e_{gdp}^{IE}$, equal to 1 as in equation (3), are now set equal to 0.5 and 2.0. The resulting aggregate demand and supply shocks are presented in the four panels of Figure 9. While the magnitude of the shocks is slightly different depending on the elasticity, there is little change to the sign or timing of the shocks as a result of this change in specification. Indeed, the matrix in Table 3 indicates that the correlation between aggregate demand shocks when a unit elasticity is assumed and when and elasticity of -0.5 and -2.0 are assumed, is in excess of 0.94 in all cases. For aggregate supply shocks, the correlation coefficient is in excess of 0.95 in all cases.

It is arguable that the Second World War period is different from the remainder of the sample period. I therefore re-estimate the VAR for the sample period 1924-1939 and 1946-1979, and calculate the shocks using the shocks using these residuals, assuming a unit price elasticity of demand. The estimated shocks are very similar to those using the entire sample period (Figure 10). Furthermore, Table 4 indicates that the correlation coefficients between the shocks estimated excluding and including the Second World War period are always 0.90 or higher.

## 6. Conclusions

Few studies have considered the ongoing economic ties of post-colonial economies. Although many studies consider the legal and institutional legacy of colonial rule, this paper is one of the first to examine the ongoing economic influence of the former colonizer on the newly independent state. While the Irish Free State was established in 1922, Irish economic developments, in many respects, remained tightly bound to those of the UK, due to trade, labour market and exchange rate links. Nonetheless, the Free State, and later the Republic, asserted its independence in a number of ways that placed the two economies on separate paths.

This paper developed a SVAR framework to examine the ongoing influence of the UK on the Irish economic cycle in the period immediately after independence. There are a number of findings in the paper.

First, idiosyncratic Irish aggregate demand and supply shocks are identified which capture the effect of Irish policy and domestic macroeconomic shocks. Second, the model indicates that while UK aggregate demand and supply shocks have relatively large and significant effects on Irish inflation, they a much smaller impact on Irish real GDP growth. Third, the impact of UK shocks on Irish inflation is similar in magnitude to that of Irish shocks.

In addition, the historical decomposition indicates that UK aggregate demand shocks played a more important role than supply shocks in the evolution of Irish inflation. In contrast, the evolution of Irish real GDP is driven by idiosyncratic domestic aggregate supply and demand shocks than by UK shocks. In particular, the role of the Economic War in 1932, the Economic Development Plan in 1958, the wage-push inflation in 1968 to 1972, and the government policy deficit-spending to promote economic activity in the wake of the first oil crisis is visible in aggregate demand shocks in 1973 and 1974 all play a role.

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**Table 1: Unit root tests, p-values and p-statistics**

| | Augmented Dickey-Fuller test, p-value | | Elliott-Rothenberg and Stock test, p-statistic | |
| --- | --- | --- | --- | --- |
| | **Intercept** | **Intercept and trend** | **Intercept** | **Intercept and trend** |
| **Variable** | Levels | | | |
| UK CPI | 0.999 | 0.984 | 140.301 | 52.240 |
| UK real GDP | 0.967 | 0.147 | 268.970 | 5.039** |
| Irish CPI | 0.996 | 0.963 | 120.784 | 39.066 |
| Irish real GDP | 1.000 | 0.989 | 888.062 | 155.066 |
| | Differences | | | |
| UK CPI | 0.087* | 0.0463** | 9.139 | 6.252* |
| UK real GDP | 0.001*** | 0.004*** | 0.826*** | 3.046*** |
| Irish CPI | 0.112 | 0.056* | 4.865 | 5.302** |
| Irish real GDP | 0.000*** | 0.000*** | 2.187** | 1.736*** |

Note: Lag length selected using Hannan-Quinn criterion. ***/**/* indicate significance at the 1%/5%/10% level.

**Table 2: Johansen cointegration test, number of cointegrating relations indicated**

| Data trend | None | None | Linear trend | Linear trend |
| --- | --- | --- | --- | --- |
| Test type | No intercept, no trend | Intercept, no trend | Intercept, no trend | Intercept, trend |
| Maximum eigenvalue | 1 | 1 | 1 | 1 |
| Trace test | 1 | 1 | 1 | 1 |

Note: Selected at the 5% significance level.

**Table 3: VAR results, 1924-1979**

|  | UK CPI | UK Real GDP | Irish CPI | Irish Real GDP |
|---|---|---|---|---|
| Lagged UK CPI | 1.112 | 0.337 | 0.293 | 0.016 |
|  | (0.251) | (0.249) | (0.284) | (0.203) |
| Twice lagged UK CPI | -0.620 | -0.233 | -0.461 | 0.024 |
|  | (0.206) | (0.204) | (0.233) | (0.167) |
| Lagged UK real GDP | 0.296 | 1.191 | 0.391 | -0.049 |
|  | (0.147) | (0.146) | (0.167) | (0.119) |
| Twice lagged UK real GDP | -0.413 | -0.337 | -0.302 | 0.093 |
|  | (0.159) | (0.158) | (0.180) | (0.129) |
| Lagged Irish CPI | 0.266 | -0.245 | 1.231 | -0.042 |
|  | (0.233) | (0.231) | (0.264) | (0.179) |
| Twice lagged Irish CPI | 0.206 | 0.107 | -0.121 | 1.128 |
|  | (0.221) | (0.220) | (0.251) | (0.161) |
| Lagged Irish real GDP | -0.141 | -0.051 | 0.030 | -0.203 |
|  | (0.199) | (0.198) | (0.226) | (0.160) |
| Twice lagged Irish real GDP | 0.274 | 0.130 | 0.083 | -0.203 |
|  | (0.198) | (0.197) | (0.225) | (0.160) |
| Constant | -1.775 | 1.643 | -2.534 | 0.130 |
|  | (0.990) | (0.983) | (1.122) | (0.802) |
| Trend | 0.003 | 0.003 | -0.002 | 0.000 |
|  | (0.002) | (0.002) | (0.002) | (0.002) |

Log likelihood:   -557.7998                                                                 No. of obs:   56

Note: Standard errors in parenthesis.

**Table 3: Correlation of shocks under assumption of varying price elasticities**

| Price elasticity | Aggregate supply shocks | | Aggregate demand shocks | |
| --- | --- | --- | --- | --- |
| | UK | Ireland | UK | Ireland |
| | Price elasticity = -1.0 | | | |
| -2.0 | 0.98 | 0.95 | 0.94 | 0.94 |
| -0.5 | 0.97 | 0.96 | 0.94 | 0.96 |

**Table 4: Correlation of shocks over full sample and excluding Second World War**

| | Aggregate supply shocks | | Aggregate demand shocks | |
| --- | --- | --- | --- | --- |
| | UK | Ireland | UK | Ireland |
| | Full sample, 1924-1979 | | | |
| Excl. Second World War | 0.98 | 0.92 | 0.93 | 0.90 |

**Figure 1: UK and Irish inflation, 1923-1979**
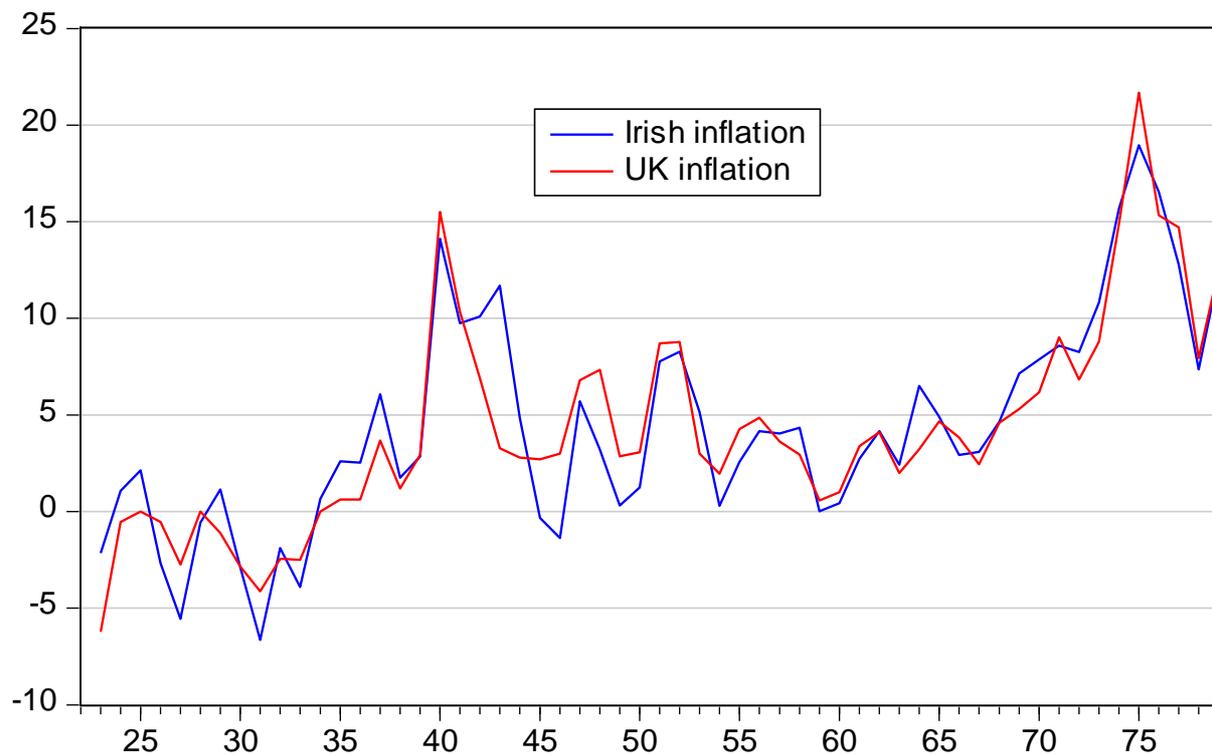


**Figure 2: UK and Irish real GDP growth, 1923-1979**
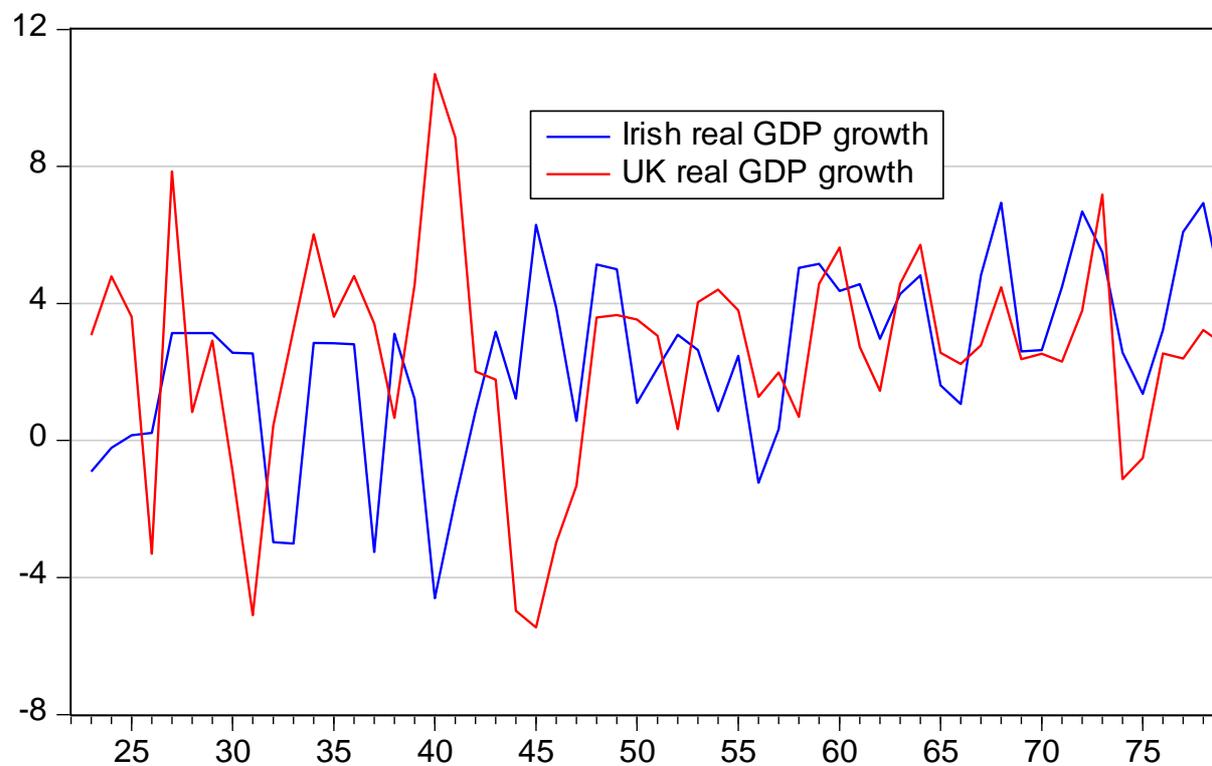
**Figure 3: Estimated UK aggregate supply and demand shocks, 1924-1979**
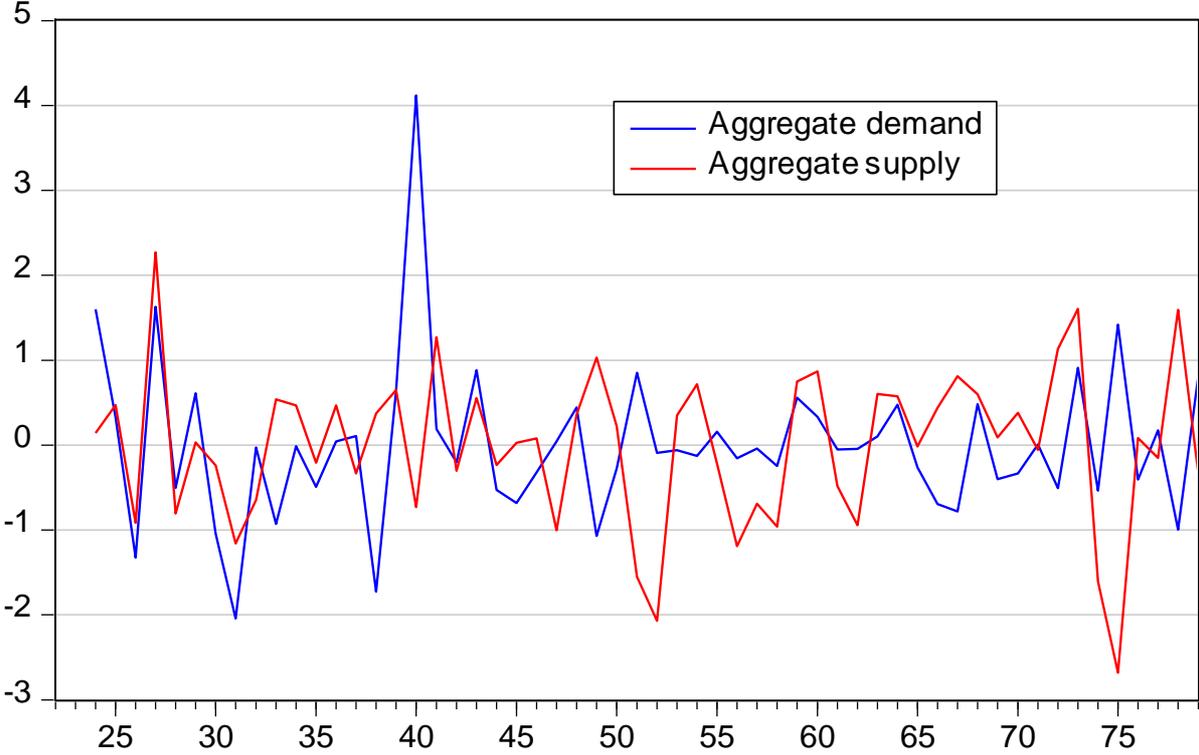


**Figure 4: Estimated Irish aggregate supply and demand shocks, 1924-1979**
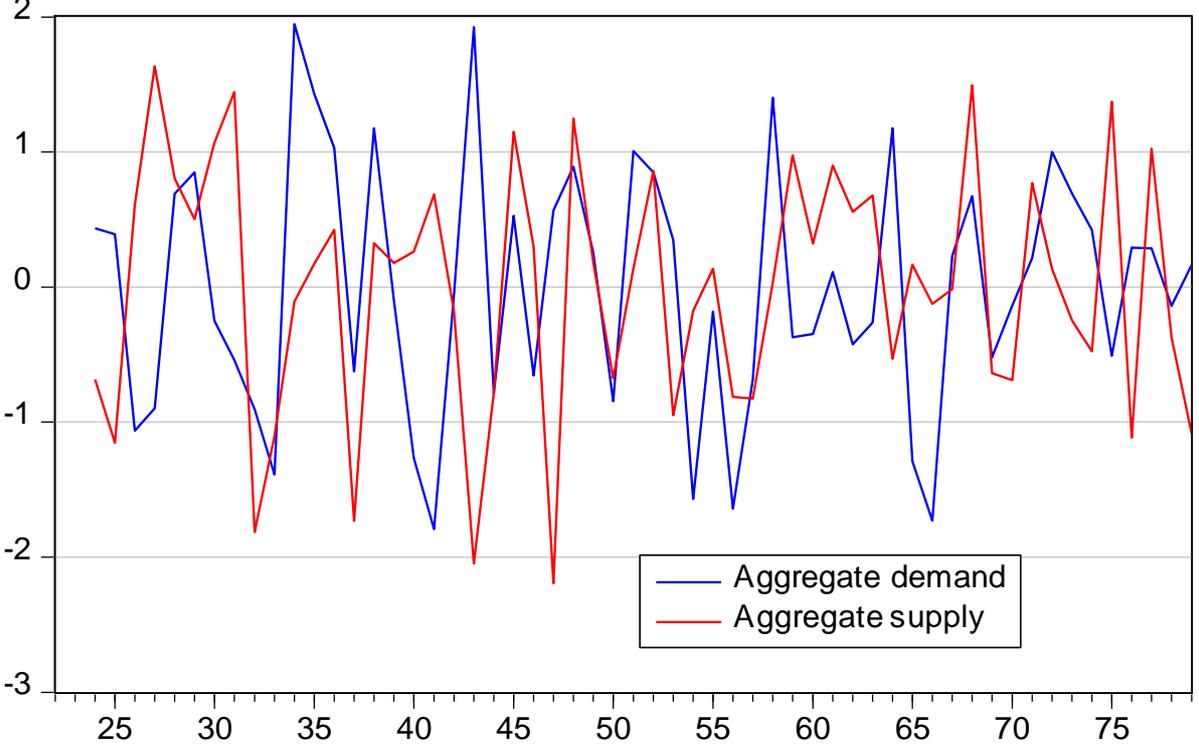
**Figure 5: Impulse responses to UK aggregate demand and supply shocks**

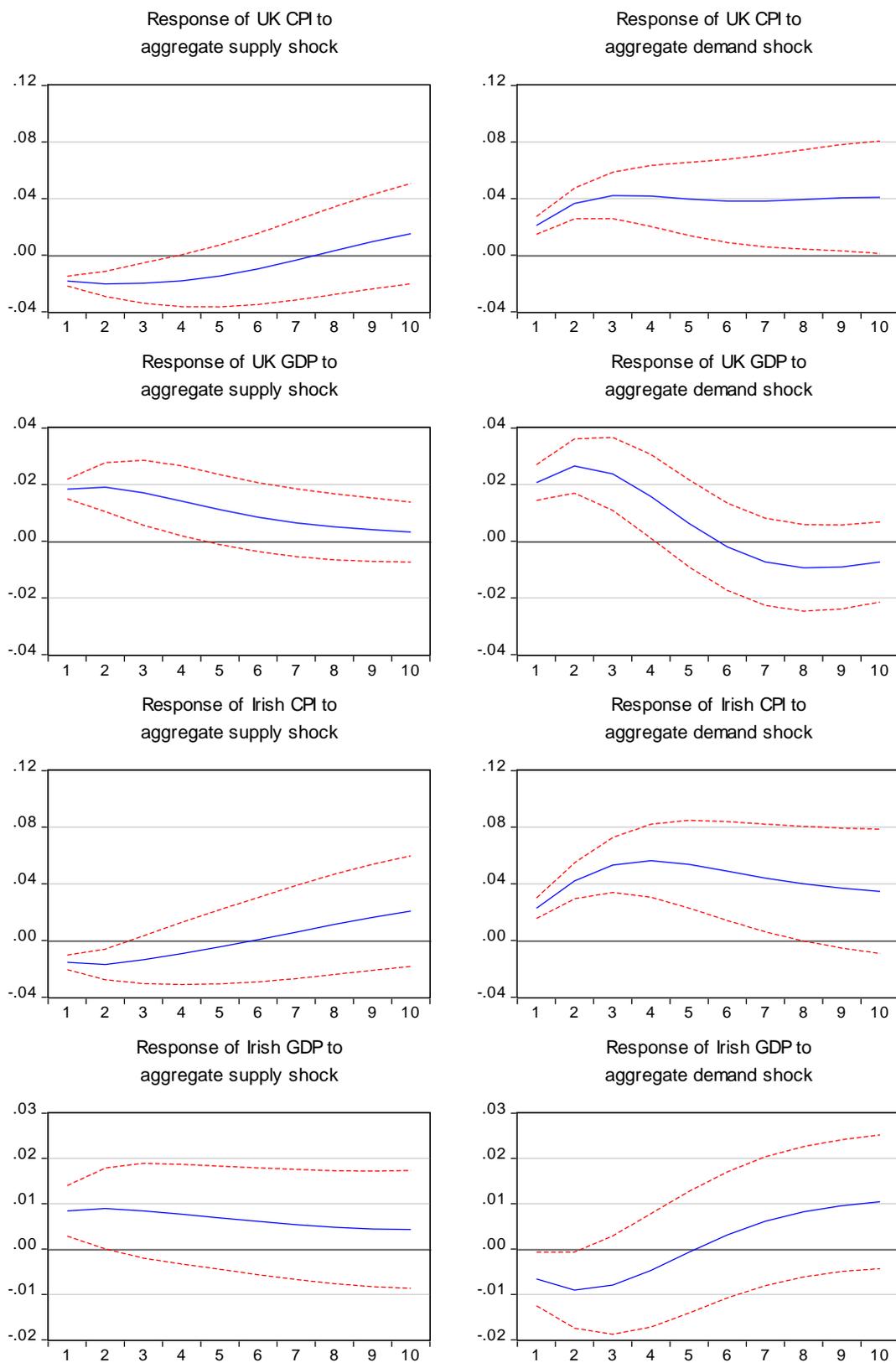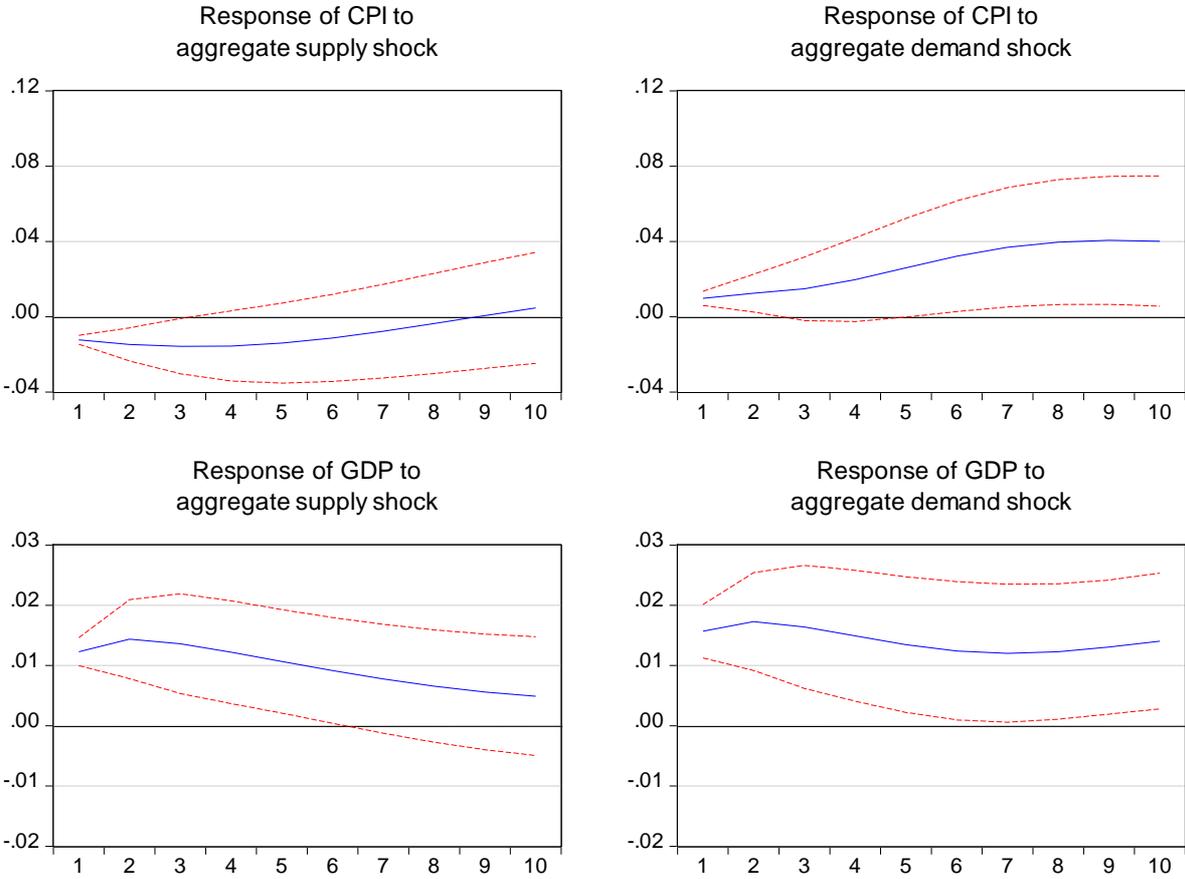Response to Structural One S.D. Innovations ± 2 S.E.

**Figure 6: Impulse responses to Irish aggregate demand and supply shocks**

Response to Structural One S.D. Innovations ± 2 S.E.

Response of CPI to
aggregate supply shock

Response of CPI to
aggregate demand shock

Response of GDP to
aggregate supply shock

Response of GDP to
aggregate demand shock

**Figure 7: Historical decomposition of Irish inflation, 1924-1979**
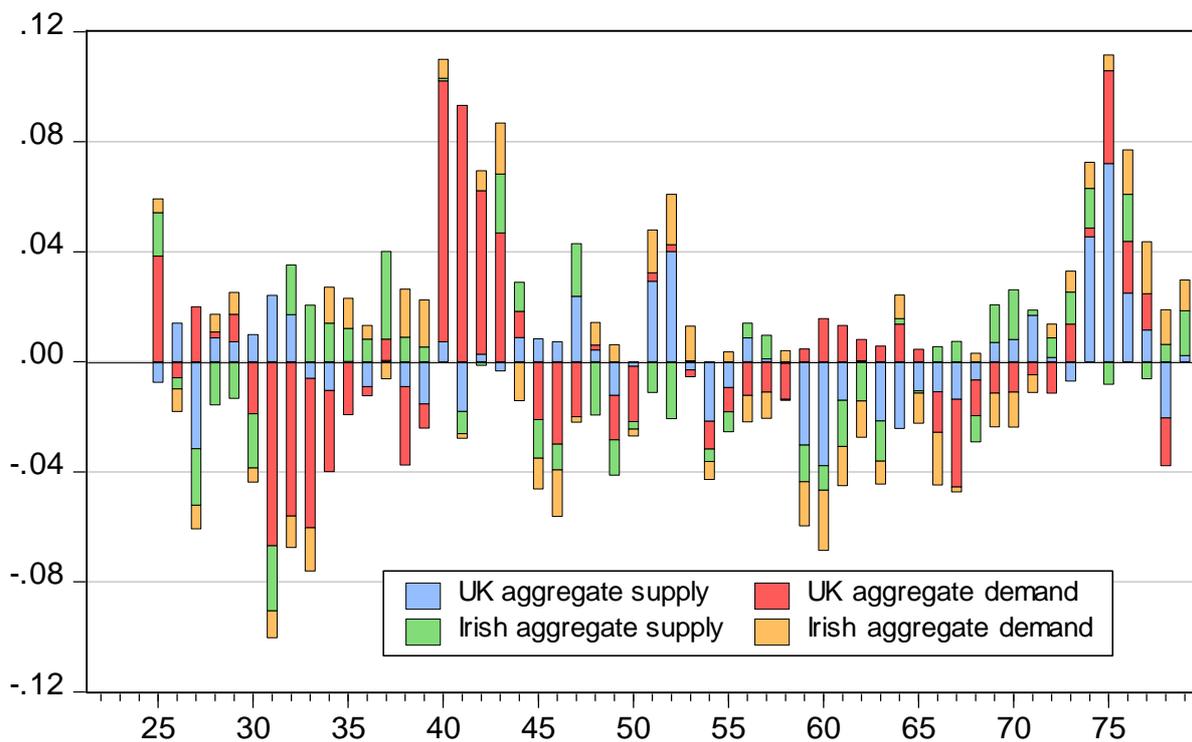


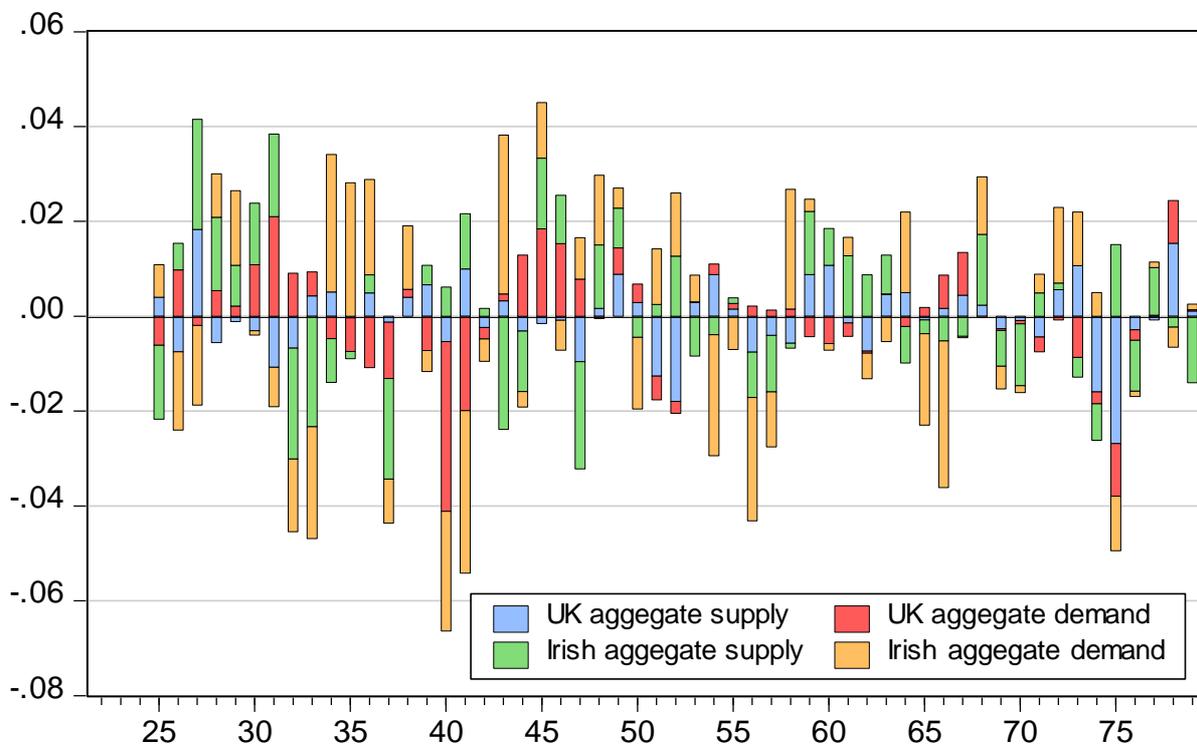**Figure 8: Historical decomposition of Irish real GDP growth, 1924-1979**

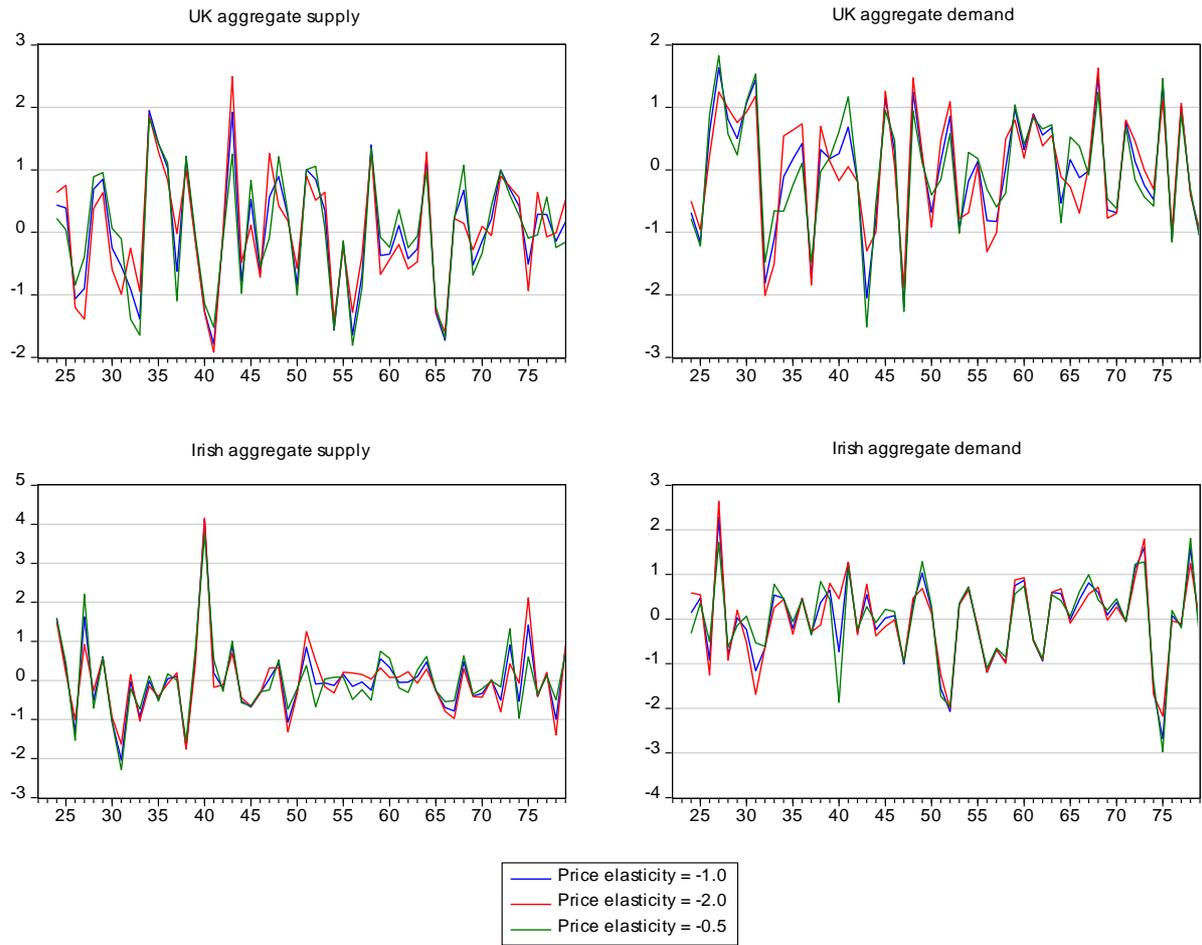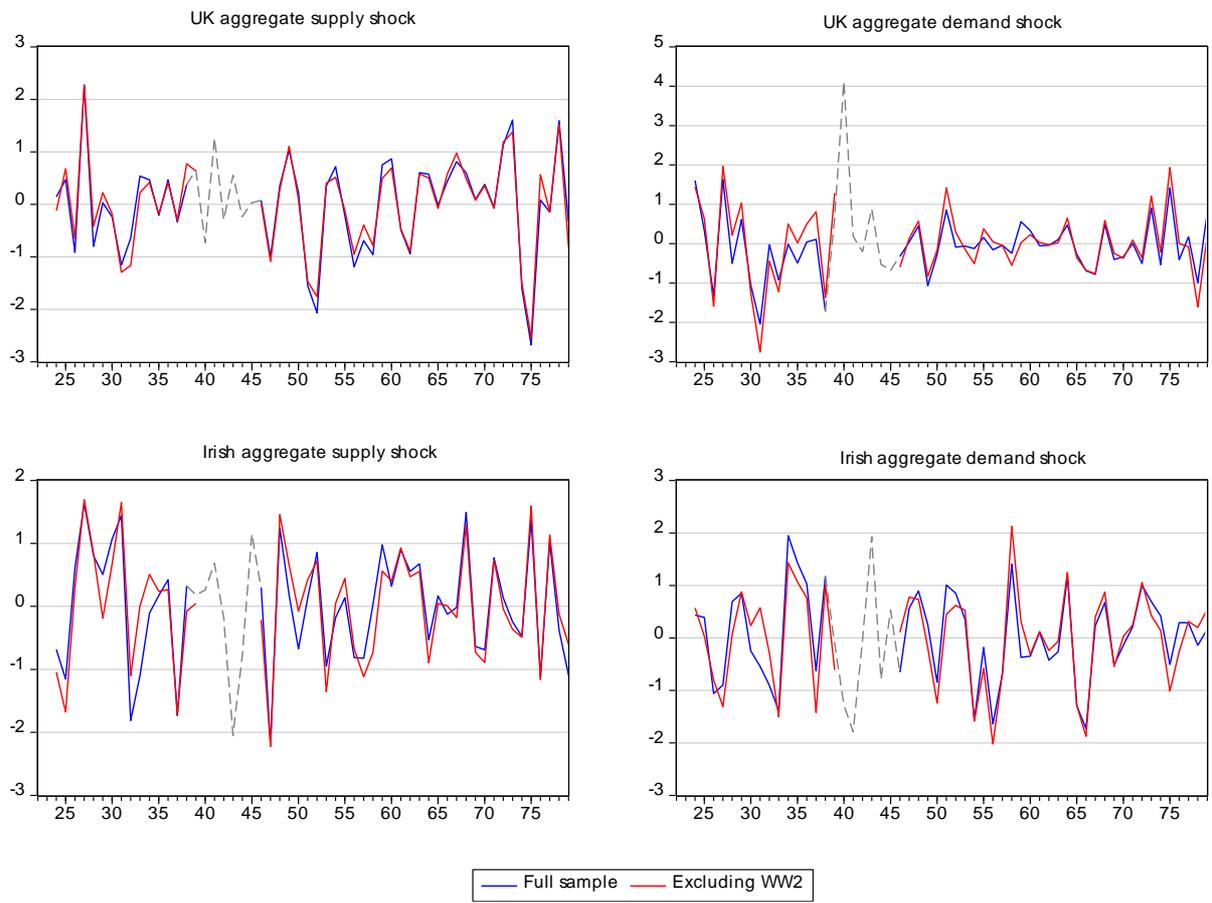# Figure 9: Aggregate supply and demand shocks under varying price elasticities

**Figure 10: Aggregate supply and demand shocks, full sample and excluding Second World War**



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