

# DISCUSSION PAPER SERIES

No. 10567

## UNEMPLOYMENT AND INFLATION IN IRELAND: 1926-2012

Stefan Gerlach, Reamonn Lydon  
and Rebecca Stuart

*ECONOMIC HISTORY and  
INTERNATIONAL MACROECONOMICS*



**Centre for Economic Policy Research**

## **UNEMPLOYMENT AND INFLATION IN IRELAND: 1926-2012**

*Stefan Gerlach, Reamonn Lydon and Rebecca Stuart*

Discussion Paper No. 10567

May 2015

Submitted 23 April 2015

Centre for Economic Policy Research  
77 Bastwick Street, London EC1V 3PZ, UK  
Tel: (44 20) 7183 8801  
[www.cepr.org](http://www.cepr.org)

This Discussion Paper is issued under the auspices of the Centre's research programme in **ECONOMIC HISTORY and INTERNATIONAL MACROECONOMICS**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Stefan Gerlach, Reamonn Lydon and Rebecca Stuart

# UNEMPLOYMENT AND INFLATION IN IRELAND: 1926-2012<sup>†</sup>

## Abstract

We study the determination of Irish inflation between 1926 and 2012. The difference between unemployment and the NAIRU is a significant determinant of inflation in a simple backward-looking Phillips Curve that incorporates import prices. While there is a break in 1979-80, when the link to Sterling was abandoned, this effect is present in the full sample and in the subsamples spanning 1926-1979 and 1980-2012. The econometric model assumes that the NAIRU follows a random walk.

JEL Classification: E3, E4 and N14

Keywords: historical statistics, import prices, inflation, Ireland and unemployment

Stefan Gerlach stefan.gerlach@centralbank.ie

*Central Bank of Ireland and CEPR*

Reamonn Lydon reamonn.lydon@centralbank.ie

*Central Bank of Ireland*

Rebecca Stuart rebecca.stuart@centralbank.ie

*Central Bank of Ireland*

---

<sup>†</sup> This is a completely revised version of an earlier paper entitled 'The Irish Phillips Curve since 1935'. The views expressed in this paper are solely our own.

## 1. Introduction

This paper estimates a Phillips curve model for Irish consumer price inflation, using annual data for the period 1926 to 2012. This period includes the three monetary policy regimes that have been in force since the foundation of the state: the parity link with Sterling to 1979, the European Monetary System (EMS) from 1980 to 1999, when monetary policy effectively operated under an adjustable peg regime, and Economic and Monetary Union (EMU) from 1999 onwards.

With few exceptions, a large literature on the Irish inflation process has failed to find a role for domestic demand.<sup>1</sup> Indeed, the notion of domestic demand playing a role seems to have been dismissed early on, and is not even tested in many papers. Instead, the literature views Ireland during the period of the link to Sterling as a small part of the UK economy and sees inflation pressures as largely determined with little or no role for excess demand in Ireland as captured by the unemployment rate or the output gap; see for example Flynn and Honohan (1986) and the summary in Kenny and McGettigan (1997). Bacon et al. (1982, p. 35) summarise the view of Irish inflation in this period:

*...Up to 1979, the dominant influence on inflation was the relationship between Ireland and the UK. This arose given: (i) the maintenance of a fixed exchange rate with sterling; (ii) that the UK is the dominant trading partner; (iii) exports and imports constitute such a large proportion of activity in goods and services; and (iv) demand patterns for non-tradable goods and services tend to be somewhat similar for a variety of cultural and historical reasons.*

To capture the state of the business cycles we rely on the difference between the rate of unemployment and the NAIRU, which we treat as an unobserved variable. Furthermore, we incorporate import prices in domestic currency to control for external price pressures. Our main finding is that both of these variables played important roles in accounting for movements in Irish inflation both during the period

---

<sup>1</sup> See for example, Geary and McCarthy (1976), Geary (1976), Flynn and Honohan (1986), Kenney and McGettigan (1997). An important exception is Bermingham et al. (2012), who control for international factors and use the short-run unemployment gap as a measure of slack in the domestic economy.

of fixed exchange rate against Sterling and afterwards. Thus, there is a well-defined Phillips curve in Ireland.

One reason why we find a role for domestic demand is our use of data for an extended sample period. Interestingly, prior to Phillips' paper, several other researchers, such as Tinbergen (1936 and 1951) and Klein and Goldberger (1955), studied the causality from unemployment (or some measure of demand slack) to (wage) inflation, with mixed results. However, as Humphrey (1985) notes, the major difference between these "early" estimates of the Phillips curve and Phillips' later work was the latter's implicit emphasis on a long time time-span of data for studying the relationships.<sup>2</sup> To our knowledge, no other authors have studied Irish inflation over such a long sample period.

The remainder of the paper is structured as follows. In Section 2 we briefly review the evolution of monetary arrangements in Ireland since independence and how they might have impacted on the determination of inflation. Section 3 discusses the issue of the interaction of domestic demand and inflation in Ireland. Section 4 provides an overview of how the data are compiled and Section 5 briefly reviews our final data series. In Section 6 we study the unit root properties of the data, discuss our benchmark specification and present estimates of the model. Section 7 concludes.

## **2. Inflation and monetary regimes in Ireland since independence**

As noted above, monetary policy in Ireland has operated under several different regimes since the 1920s. Following independence in 1922, the monetary system was initially unchanged since the monetary arrangements appeared to function satisfactorily. Nevertheless, the old arrangements were not deemed suitable for an independent country and in 1926 the Government established a Banking

---

<sup>2</sup> In more recent work, Haldane and Quah (1999) examine the evolution of the UK Phillips curve since the 1950s, paying particular attention to the role of policy-makers' beliefs. Gruen et al., (1999) conduct a similar exercise for Australia, paying particular attention to structural changes in the labour market and the role of import prices.

Commission to review the 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. These recommendations were included in the Currency Act of 1927 that introduced the Saorstát pound, which was fully backed by Sterling assets and redeemable in Sterling in London.

While these arrangements fell short of those in economies with a central bank, the Irish financial system functioned well and was closely integrated with the London money market. With the new currency fully backed and the Currency Commission's objectives limited to ensuring convertibility against Sterling, the credibility of the exchange rate parity was not in question.

Further impetus towards the creation of a central bank came following the Commission of Inquiry into Banking, Currency and Credit which reported in 1938, and which led to the established of the Central Bank of Ireland (CBI) in March 1943. Kelly (2003) notes that the new central bank lacked some traditional banking functions, in particular the ability to restrict credit conditions, which implied that it was not in a position to set interest rates and to conduct an active monetary policy. Indeed, the functioning of the Currency Commission and the CBI, coupled with the fixed exchange rate against Sterling, implied that monetary arrangements in Ireland are best described as those of a currency board, at least until the early 1970s.<sup>3</sup> As a consequence, Irish inflation rates and interest rates followed closely those in Britain and were thus determined with little, if any, reference to domestic economic conditions although, of course, these were shaped by those prevailing in the United Kingdom.

The close link to Sterling was broken in 1979 when Ireland joined the European Monetary System as a founding member. While monetary policy remained focussed on the requirement of exchange rate stability, the central rate of the Irish pound

---

<sup>3</sup> See Honohan (1995).

against the Deutsche Mark was realigned seven times by a total of 35.75% between September 1979 and January 1987.<sup>4</sup> The pound was devalued by a further 8% in January 1993, and the EMS bands were subsequently broadened to +/- 15% in the summer of 1993.

Finally, in January 1999 Ireland became a founding member of European Monetary Union. Irish interest rates and inflation rates were therefore again largely determined by developments outside of the domestic economy.

As this brief history suggests, Ireland experienced three monetary regimes in the period that we study: the 1922-1978 Sterling period that involved a perfectly fixed exchange rate; the 1979-1998 EMS period that involved repeated devaluations against the German Mark; and the 1999-2012 EMU period that involved membership in a hard currency area with policy set with reference to economic conditions in the Euro area. Not surprisingly, these regimes are associated with quite different inflation behaviour. Table 1 shows that the annual inflation rate averaged between 4% and 6% in the two first periods, but less than 3% in EMU period.<sup>5</sup> Interestingly, while Irish inflation was lower than the rate of change of import prices in the Sterling period, it was higher than the rate of import price inflation in the EMS and EMU periods. One interpretation of these findings is that while inflation was largely externally generated in the Sterling period, a large part of inflation was generated domestically from 1979 onward.

---

<sup>4</sup> See Artis and Taylor (1994, Table 1).

<sup>5</sup> Furthermore, the standard deviation of inflation was much lower after 1999 than before.

### 3. Domestic demand and inflation in Ireland

Surprisingly few papers have sought to estimate a Phillips Curve for Ireland, arguably because of a long-held belief that domestic demand had no role to play in the Irish inflation process. This view was apparently formed following a series of papers by P.T. Geary and co-authors in the 1970s (Geary (1976), Geary and Jones (1975), Geary and McCarthy (1976)). These studies, which found no statistically significant role for domestic demand as measured by a number of specifications of unemployment, were based on samples of annual data over periods of approximately 20 years.

The finding was put down to the small, open nature of the Irish economy, despite the fact that non-traded goods constitute a large part of the CPI basket. This sentiment, repeated throughout these papers, was summarized by Geary and Jones (1975, p. 63):

*“In the context of a small open economy, of course, this outcome is hardly surprising. If such an economy is a price taker in trade, domestic excess demand will largely be met at existing prices by imports while domestic excess supply will be absorbed by exports.”*

Even prior to these statistical findings however, the view that domestic demand was not a relevant factor was evident in Geary et al. (1970). This paper notes that in the post-war period to 1966, the trends in consumer prices in Ireland and the UK were similar because money incomes exceeded productivity to the same degree in both economies. The paper notes, with some alarm, the divergence in inflation rates thereafter, and argues that this is the result of wages in Ireland outstripping those in the UK (Geary et al. (1970), p. 347):

*“Wage push inflation is seen to be the major cause of inflation since 1966.”*

Nelson (2008), quoting Central Bank and government texts from the time, argues that the sense that domestic inflation drivers were entirely cost push persisted through much of the 1970s.

While Nelson's review has been criticised (see for instance, Honohan and Murphy (2010)), during the late 1970s and into the 1980s, the literature continued to focus on factors other than domestic demand as drivers of inflation. The role of exchange rates, and tests for the presence of purchasing power of parity through cointegrating relationships with foreign price levels became a particular focus, as the public discussion moved towards the issue of EMS membership and a break in the Sterling parity link.<sup>6</sup> Even studies from this period which examined the role of domestic drivers of inflation, for instance Hackett and Honohan (1981), focused on cost developments, leaving demand factors "*for further work*".<sup>7</sup>

Indeed, in that year, Honohan (1981), discussing the issue of whether Ireland is a Small Open economy, solely pointed to the unpublished master's thesis of O'Caseide (1977) as a study which found a link between consumer prices of non-traded goods and a measure of domestic excess demand. Only in 1989, did O'Connell and Frain provide evidence of a role for domestic demand: over the period 1977Q1 to 1985Q4, they found that foreign inflation explained 52% of domestic inflation, and excess domestic demand explained 26%. However, the authors capture domestic demand by the difference between the growth rate of the money supply and the realized growth in output, and attach little weight on this finding.

Some more recent studies have studied the role of excess domestic demand, with varied success. Kenny and McGettigan (1996, p. 83) estimated both traded and non-traded inflation over the period 1979 to 1995. While a role for domestic demand in traded prices may be more difficult to detect, they report that even for non-traded prices, they found no impact of domestic demand:

*"The supplementary aggregate demand type effects, somewhat surprisingly, do not indicate a significant short-run role for either the change in the unemployment rate or the stance of fiscal policy."*

---

<sup>6</sup> See, for example, Browne (1984), Callan and Fitzgerald (1989), Honohan and Flynn (1986) and O'Connell and Frain (1989).

<sup>7</sup> Of course, it is possible that demand factors impact on production costs, for instance if wage rates depend on business conditions.

In contrast, Leddin (2010) finds a role for unemployment in a New Keynesian framework while Bermingham et al. (2012) find a significant role for the short-term unemployment gap. However, the sample periods in these later studies differ from those examined by Geary and others, suggesting that there may have been a change in the structure of the economy, perhaps post-EMS. This is an issue we will examine in more detail in Section 6.

Nonetheless, the dominant idea from that earlier time period, summarized by Bacon et al. (1995, p. 35), that *“up to 1979, the dominant influence on inflation was the relationship between Ireland and the UK”*, seems difficult to justify when looking at long-run data from that time. In the first instance, although the correlation between annual inflation in the UK and Ireland is 0.92 over the period 1923 to 1979, this says little about the transmission mechanism at work. A naive and obviously too simplistic view was that all components of the CPI were tradable with prices set in British markets. A more developed hypothesis was that while that was true only for traded goods, non-traded goods prices were determined by production costs that were very similar to those on British economy because of the close integration of the two economies, similar demand conditions and the fixed exchange rate. Under the latter view, inflation in Ireland, at least that for non-traded goods, were determined by Irish factors, but these were in turn so strongly influenced by developments in the British economy that it was difficult to detect their role, given the short time periods and samples typically studied.

Furthermore, while the median difference between CPI inflation in Ireland and the UK between 1923 to 1979 is very small at 0.05 percentage points, the standard deviation is in excess of 2.5 percentage points, implying that a 95% confidence band for the difference in inflation is 10 percentage points wide. Even omitting the Second World War period (and thus excluding an 8 percentage point deviation in 1943), the median difference in the rates is approximately 0.01 percentage points but the standard

deviation is in excess of 1.8 percentage points (Figure 1), implying a 95% confidence band in excess of 7 percentage points. Such large deviations point to the possibility of a role for domestic demand in determining inflation in Ireland.

#### **4. The data**

In this section we review the data used in our econometric analysis. We use data on Irish GDP, unemployment, inflation and import prices over a period of 80 years. Such long time series are not readily available from a single source; the data used here are compiled from a number of secondary sources.

We draw on Gerlach and Stuart (2014) who discuss in detail the compilation of long time series from a number of sources. Briefly, the current vintage of data is used as far back as possible since it is assumed that it is subject to smaller measurement errors than older vintages. Older time series are then spliced in order to construct a single time series. Since, due to base year effects or definition changes the levels of the series are significantly different, the series are spliced together using growth rates. When more than one series was available, the decision of what series to use was based on a comparison of growth rates over overlapping periods.

##### *4.1. Unemployment*

Unemployment from 1923 to 1938 are taken from the ILO's International Labour Review. For the period 1939 to 1982, data are from Mitchell (2007). Finally, for the most recent period, 1983 to 2012, data are available from the Central Statistics Office (CSO).

##### *4.2 Price series*

The Consumer Price Index (CPI) is available from the CSO for the full period from 1923 to 2012. An import price index is available from the CSO beginning in 1930. Prior to this, the import price is proxied using UK wholesale prices taken from Mitchell (2007).

## 5. Review of individual time series

In this section we briefly review the final data series used. We begin by plotting Irish CPI inflation and the unemployment rate in Figure 2. Note that their correlation depends on the nature of the shocks that hit the economy. Thus, shifts in aggregate demand will tend to raise inflation and lower unemployment relative to trend, generating a negative correlation between inflation and the unemployment rate. By contrast, contractionary supply shocks tend to raise unemployment relative to trend and raise inflation, and thus generate positive co-movements. The correlation between inflation and the output gap does indeed seem to vary over time (Figure 2). Thus, during the period of the Second World War, both the inflation rate and the unemployment rate rose, suggesting that a contractionary supply shock had occurred. Following the establishment of EMU and during the recent financial crisis, however, the correlation turned negative.

Figure 3 plots the annual change in the import price series and Irish CPI. Unsurprisingly, import prices are more volatile than CPI. While this is particularly the case during the Second World War and the first oil crisis in the middle of the 1970s, changes in import prices are also much larger than changes in the CPI through the late-1940s/early-1950s and the late 1980's/early-1990's.

## 6. Econometric estimates

### *6.1 Unit root tests*

Before estimating the econometric models, we first test whether the rates of change of consumer and import prices and the unemployment rate have unit roots. We perform Augmented Dickey-Fuller (ADF) and Elliott-Rothenberg-Stock (ERS) unit root tests on the annual changes of consumer and import prices and the unemployment rate (Table 2).

The Augmented Dickey-Fuller tests indicate that when the lag length is selected using the Schwarz Information Criterion (SIC) we can reject the hypothesis of a unit root at the 1 per cent confidence level in all cases, except for inflation for which we can reject it at the 5 per cent level. When the Akaike Information Criterion (AIC) is used we fail to reject the null for the inflation rate. However, this may be because of a lack of power. Using the Elliott-Rothenberg-Stock (ERS) test, which has greater power, we reject the null at the 5 per cent level for inflation, and at the 1 per cent level for the unemployment rate and import price inflation. We therefore treat all variables as stationary.

### *6.2 Benchmark Specification*

We use a standard Phillips curve model to explain Irish inflation. Whilst there has been much theoretical and empirical debate over the specification of the Phillips curve relationship since the 1960s, it remains a central part of the toolkit of many policy makers and central bankers.<sup>8</sup>

The model holds that inflation,  $\pi_t$ , depends on its lagged value, proxying inflation expectations; the difference between unemployment,  $u_t$ , and the NAIRU,  $u_t^*$ ; and the rate of change of import prices (measured in local currency),  $\omega_t$ . Since the lag structure is not known a priori, we allow for two lags of past inflation, the current and two lagged values of the output gap and the rate of change of import prices to enter. The regression model can be written:

$$(1) \quad \pi_t = \alpha_0 + \alpha_1\pi_{t-1} + \alpha_2\pi_{t-2} + \beta_0\tilde{u}_t + \beta_1\tilde{u}_{t-1} + \beta_2\tilde{u}_{t-2} + \gamma_0\omega_t + \gamma_1\omega_{t-1} + \delta_2\omega_{t-2} + v_t$$

In the interest of brevity, we refer to  $\tilde{u}_t \equiv u_t - u_t^*$  as unemployment below.

This model is deliberately overparametrised but will allow us to determine, for instance, whether inflation depends on the current or the lagged unemployment, and

---

<sup>8</sup> For instance, a Phillips curve relationship has been used to explain why core inflation failed to decline and why unemployment rose so dramatically in the aftermath of the “Great Recession”. Montoya and Döhning (2011) summarise the recent evidence.

the dynamic responses of inflation to innovations in unemployment and import prices.

In order to estimate this model, we need to make some assumptions about the NAIRU. Two possibilities are obvious. We first assume that it is constant, in which case it is subsumed in the intercept that we will include when estimating equation (1). Of course, it seems highly implausible that the NAIRU has been constant in the 80-year period that we consider. We therefore go on to estimate the unemployment-inflation relationship under the assumption that the unobserved NAIRU has followed a random walk, that is,  $u_t^* = u_{t-1}^* + \varepsilon_t$ .

To see how this can be done, for ease of exposition consider a simplified version of equation (1):

$$(2) \quad \pi_t = \alpha_0 + \alpha_1 \pi_{t-1} + \beta_0 (u_t - u_t^*) + v_t$$

Differencing the equation and noting that  $\Delta u_t^* = \varepsilon_t$ , we have that:

$$(2') \quad \Delta \pi_t = \alpha_1 \Delta \pi_{t-1} + \beta_0 \Delta u_t + (v_t - v_{t-1} + \varepsilon_t).$$

Equation (2') implies that, under the assumption that the NAIRU follows a random walk, the estimates of the parameters should be unaffected if equation (1) is estimated in first differences, provided that the errors are allowed to follow a first-order moving average structure. It is easy to see that the relative importance of the  $v_t$  and  $\varepsilon_t$  shocks, as captured by their variance, will determine the size of the MA coefficient. Thus, if the  $v_t$  shocks are dominant, the MA parameter will be close to -1 whereas if the  $\varepsilon_t$  shocks are dominant the MA parameter will be close to 0. Since it seems likely that shocks to inflation are much larger than innovations to the NAIRU, we expect a moving average coefficient "close to" -1. The steady-state inflation rate implied by equation (1) is given by  $\pi^* = \frac{\alpha_0}{1-\alpha_1}$ . Since the inflation rate is stationary in the full sample,  $\alpha_0$  is constant so that  $\Delta \alpha_0 = 0$ . Equation (2') does therefore not include an intercept even if equation (2) does.

However, it is of interest to estimate the model for both the period and before and after the abandonment of the peg to Sterling in 1979. Since inflation in Ireland fell after 1980, one would expect that, adding time subscripts,  $\alpha_{0,t}$  declined in that period. To allow for this possibility, in what follows, we assume that  $\Delta\alpha_{0,t} = \delta + \phi_t$ . The final regression model for the 1980-2012 period therefore incorporates a constant. In the case of the example given above, it is given by:

$$(2'') \quad \Delta\pi_t = \delta + \alpha_1\Delta\pi_{t-1} + \beta_0\Delta u_t + (v_t - v_{t-1} + \varepsilon_t + \phi_t).$$

### 6.3 Estimates

Next we turn to the econometric work and estimate equation (2''). Since the constant was insignificant in the full sample, as expected, we dropped it and estimated equation (2'). Following the suggestion in Stock and Watson (2011), we report ordinary and White standard errors in Table 3. Given that the price level data starts in 1924 and we have one lagged inflation rate, we use the sample period 1926-2012. Since preliminary estimate of equation (1) in level form indicated that dummies for 1941, 1943 and 2009 were highly significant, we included these too (in first-differenced form).

The results in the first column of Table 3 show that lagged inflation and the current and lagged rate of change of import prices are highly significant. The long-run pass-through of import prices is estimated to be  $\frac{\gamma_0 + \gamma_1}{1 - \alpha_1} = \frac{0.39}{0.56}$  and thus somewhat below unity. The twice lagged unemployment rate is also highly significant, suggesting a slow passthrough from the cyclical state of the economy to inflation. These findings are not sensitive to whether standard or heteroscedasticity robust standard errors of the White type are used.

A Q-test of the hypothesis that the residuals do not display second-order serial correlation does not reject ( $p = 30.9\%$ ) and a Jarque-Bera test of the hypothesis of normality also does not reject the null ( $p = 32.1\%$ ). However, a Chow test for a break

in 1979-80, when the fixed exchange rate to Sterling was abandoned, rejects the hypothesis of parameter stability ( $p = 1.9\%$ ).<sup>9</sup>

#### *6.4 Subsample estimates*

Next we therefore re-estimate the equation for the subsample 1926-1979 when the Irish pound was linked to Sterling. As before, we first explored whether a constant was significant if included but found that it was not ( $p = 6.1\%$ ). The results in column 2 of Table 3 show that the parameter estimates for this subperiod are very similar to those for the full period. In particular, twice-lagged unemployment is highly significant. The hypothesis that the residuals do not display serial correlation of the second order cannot be rejected ( $p = 32.8\%$ ) and the hypothesis of non-normality of the residuals also does not reject ( $p = 95.9\%$ ).

Column 3 of the same table presents the results for the 1980-2012 period. With inflation falling from almost 19% in 1981 to less than 2% in 2012, there is a strong declining trend in this subsample. The fit of the equation, as captured by the Adjusted R-squared, is not as good as before and, crucially, the twice-lagged unemployment rate is now insignificant. These results suggest that the Phillips curve evaporated after the peg to Sterling was abandoned.

For the reasons discussed above, with inflation declining in this sample it seems appropriate to introduce a constant in the regression. The results, in column 4, show that it is highly significant. Interestingly, so is the twice-lagged unemployment rate. The estimated parameter is also much larger in absolute value than in the full sample. Tests for serial correlation and non-normality of the residuals again do not reject ( $p = 15.1\%$  and  $p = 86.8\%$ , respectively).

## **7. Conclusions**

In this paper we study the determination of consumer price inflation in Ireland in the

---

<sup>9</sup> The test is conditional on the estimated values for the parameters on the dummy variables.

period 1926-2012. This sample spans three different monetary regimes and a period of increasing economic development. We estimate a backward-looking Phillips Curve incorporating unemployment relative to the NAIRU, to capture the state of the business cycle and import prices to capture external price developments. We model the NAIRU as a random walk and let steady-state inflation follow a random walk with drift in the 1980-2012 period. In contrast to most previous studies which focus on shorter sample periods, we find a statistically significant effect of unemployment on inflation.<sup>10</sup> While the exact estimate varies over time, the effect is present in both the 1926-1979 period, when the Irish pound was pegged to Sterling, and the 1980-2012 period when the Irish pound first participated in the ERM and then was subsumed in the euro area.

---

<sup>10</sup> This finding is in line with that of Bermingham et al., (2012), who found that the short-run unemployment gap had a significant effect on Irish inflation over the period 1980-2012.

## References

- Bacon, Peter, Joe Durkan and Jim O'Leary (1982), "The Irish Economy: Policy and Performance 1972-1981", *The Economic and Social Research Institute*.
- Bermingham, Colin, Dermot Coates, John Larkin, Derry O' Brien and Gerard O'Reilly (2012), "Explaining Irish Inflation During the Financial Crisis", Central Bank of Ireland Research Technical Paper, 9/RT/12.
- Browne, F.X. (1984), "The international transmission of inflation to a small open economy under fixed exchange rates and highly interest-sensitive capital flows", *European Economic Review*, 25, 187-212.
- Callan, Tim and John Fitzgerald (1989), "Price determination in Ireland: Effects of changes in exchange rates and exchange rate regimes", *Economic and Social Review*, 20, 165-188.
- Central Statistics Office (CSO) (1951), "Tables of National Income Expenditure, 1938 and 1944-50."
- Geary, Patrick T. (1976), "World Prices and the Inflationary Process in a Small Open Economy – The Case of Ireland", *Economic and Social Review*, 7, 391-400.
- Geary, R.C., E. W. Henry and J. L. Pratschke (1970), "Recent price trend in Ireland", *Economic and Social Review*, 1, 345-357.
- Geary, Patrick T. and Roderick M. Jones (1975), "An appropriate measure of unemployment in an Irish Phillips Curve", *Economic and Social Review*, 7, 55-63.
- Geary, Patrick T. and Colm McCarthy (1976), "Wage and Price Determination in a Labour Exporting Economy: The Case of Ireland", *European Economic Review*, 8, 219-233.
- Gerlach, Stefan and Rebecca Stuart (2014), "Money, Interest Rates and Prices in Ireland, 1933-2012", Central Bank of Ireland, Research Technical Paper, 07/RT/14.
- Gordon, Robert (2011), "The History of the Phillips Curve: Consensus and Bifurcation", *Economica*, 78, 10-50.
- Greene, William H., (2011). *Econometric Analysis*, Pearson Education, 7th Edition, May.
- Gruen, David, Pagan, Adrian and Christopher Thompson (1999), "The Phillips curve in Australia", *Journal of Monetary Economics*, 44, pp. 223-258
- Haldane, Andrew and Danny Quah (1999), "UK Phillips curves and monetary policy", *Journal of Monetary Economics*, 44, pp. 259-278.
- Honohan, Patrick (1981), "Is Ireland a Small Open Economy?", Paper presented at the Dublin Economic Workshop, Policy Conference, September.

Honohan, Patrick and John Flynn (1986), "Irish Inflation in EMS", *Economic and Social Review*, 17, 175-191.

Honohan, Patrick and Alison Hackett (1981), "Some determinants of consumer prices", Central Bank of Ireland, Research Technical Paper 10/RT/81.

Honohan, Patrick and Gavin Murphy (2010), "Breaking the Sterling link: Ireland's decision to enter the EMS", IIS Discussion Paper No. 317, February.

Humphrey, Thomas M. (1985), "The Early History of the Phillips Curve", *Economic Review*, Sep/Oct 1985, Federal Reserve Bank of Richmond.

Kenny, Geoff and Donal McGettigan (1997), "Inflation in Ireland: Theory and Evidence", *Journal of the Statistical and Social Enquiry of Ireland*, Vol. XXVII, Part IV.

Kenny, Geoff and Donal McGettigan (1996), "Non-traded, traded and aggregate inflation in Ireland", Central Bank of Ireland, Research Technical Paper 06/RT/96.

Kelly, John (2003), "The Irish Pound: From Origins to EMU", Central Bank of Ireland Quarterly Bulletin, Spring, 89-115.

Klein, Lawrence R. and Arthur S. Goldberger (1955), "An Econometric Model of the United States 1929-1952", Amsterdam : North-Holland Publishing Company,

Leddin, Anthony (2010), "The Phillips Curve and the wage inflation process in Ireland", in Kinsella, Stephen and Anthony Leddin (eds), Understanding Ireland's economic crisis: Prospects for recovery, Dublin, Blackhall, 159-179.

Mitchell, B.R. (2007), International Historical Statistics: Europe 1750-2005, Sixth ed., Palgrave McMillan.

Montoya, Lourdes Acedo and Björn Döhring (2011), "The Improbable Renaissance of the Phillips Curve: The Crisis and Euro Area Inflation Dynamics", *Economic Papers 446, European Commission, Economic and Financial Affairs*.

Nelson, Edward (2008), "Ireland and Switzerland: The jagged edges of the Great Inflation", *European Economic Review*, 52, 700-732.

O'Caseide, Ciaran (1977), "The international transmission of inflation and the balance of payments under fixed exchange rates", University of Manchester Thesis.

O'Connell, Tom and John Frain (1989), "Inflation and exchange rates: A further empirical analysis", Central Bank of Ireland, Research Technical Paper 01/RT/89.

Phillips, A. W. (1958), "The relation between unemployment and the rate of change in money wages in the United Kingdom, 1861-1957", *Economica*, 25, 283-99.

Stock, James and Mark M. Watson (2011). *Introduction to Econometrics*, Pearson Education, 3<sup>rd</sup> Edition, February.

Tinbergen, Jan (1936), "An Economic Policy for 1936", Reprinted in his Selected Papers. Edited by L. H. Klaassen, L. M. Koyck, and H. J. Witteveen. Amsterdam : North-Holland Publishing Company.

Tinbergen, Jan (1951), "Business Cycles in the United Kingdom, 1870-1914", Amsterdam: North-Holland Publishing Company.

White Paper (1946), "National Income and Expenditure, 1938-1940".

<p style="text-align: center;"><b>Table 1</b>  <b>Mean and standard deviation of inflation, import prices and unemployment in each monetary regime</b></p>			
Variable	Monetary regime	Mean	Standard deviation
Inflation	1923-1978	4.22	5.41
	1979-1998	6.10	5.57
	1999-2012	2.55	2.65
Import price inflation	1923-1978	3.96	10.19
	1979-1998	3.94	6.85
	1999-2012	1.10	4.70
Unemployment rate	1923-1978	8.75	3.50
	1979-1998	13.22	2.96
	1999-2012	7.32	4.35

**Table 2**  
**Tests for unit roots, 1923-2012**

Variable	Augmented Dickey-Fuller tests		Elliott-Rothenberg-Stock test
	SIC	AIC	
Inflation	-3.22**	-2.35	3.08**
Unemployment rate	-2.67*	-2.89*	2.81**
Import price inflation	-6.04***	-6.04***	0.80**

Notes: \*/\*\*/\*\* denotes significance at the 10%/5%/1% level. The exact sample period depends on the number of lags used. SIC and AIC denote the Schartz and Akaike information criteria.

<b>Table 3: Estimates of the Phillips curve for Ireland</b>				
<b>Regression</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Sample period</b>	1926-2012	1926-1979	1980-2012	1980-2012
<b>Constant</b>				-0.13 (0.05)*** [0.06]**
<b>Lagged inflation</b>	0.44 (0.07)*** [0.06]***	0.32 (0.10)*** [0.10]***	0.36 (0.15)** [0.19]	0.41 (0.09)*** [0.10]***
<b>Import price inflation</b>	0.29 (0.03)*** [0.03]***	0.32 (0.03)*** (0.93)***	0.14 (0.05)** [0.06]**	0.20 (0.05)*** [0.06]***
<b>Lagged import price inflation</b>	0.10 (0.04)** [0.04]***	0.13 (0.05)*** [0.04]***	0.12 (0.05)** [0.07]	0.14 (0.06)** [0.07]**
<b>Twice lagged unemployment</b>	-0.17 (0.07)** [0.07]**	-0.19 (0.09)** [0.09]**	-0.23 (0.14) [0.15]	-0.27 (0.05)*** [0.06]***
<b>MA(1)</b>	-0.90 (0.07)*** [0.07]***	-0.92 (0.08)*** [0.07]***	-0.39 (0.25) [0.35]	-1.00 (0.15)*** (0.18)***
<b>Adj. R-squared</b>	0.70	0.75	0.65	0.72
<b>Q-test for 2<sup>nd</sup> order errors, p-value</b>	0.31	0.33	0.54	0.15
<b>Jarque-Bera test for normality, p-value</b>	0.32	0.96	0.61	0.87
<b>Breusch-Pagan-Godfrey test for heteroscedasticity</b>	0.68	0.36	0.74	0.41

Notes: Standard errors are reported in parenthesis, White standard errors are reported in brackets.  
 \*/\*\*/\*\* denotes significance at the 5%, 2.5% and 1% levels, respectively.

Figure 1: Histogram of differences between Irish and UK inflation rates, 1923-1979

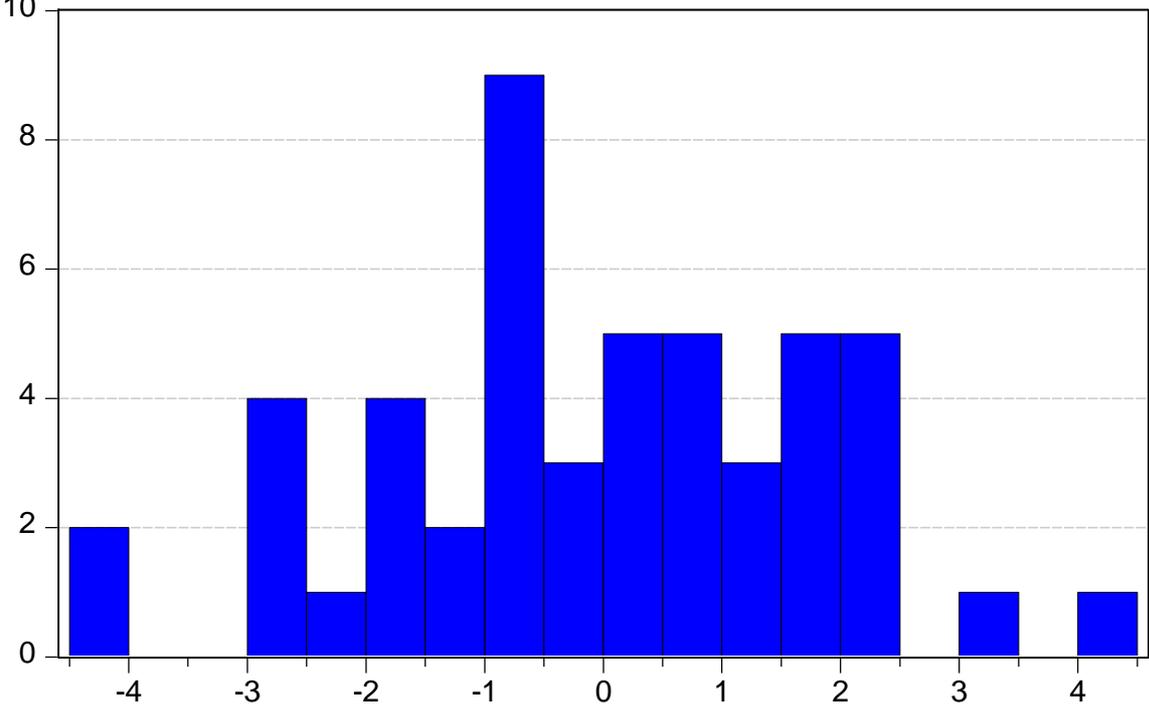


Figure 2: CPI inflation and unemployment

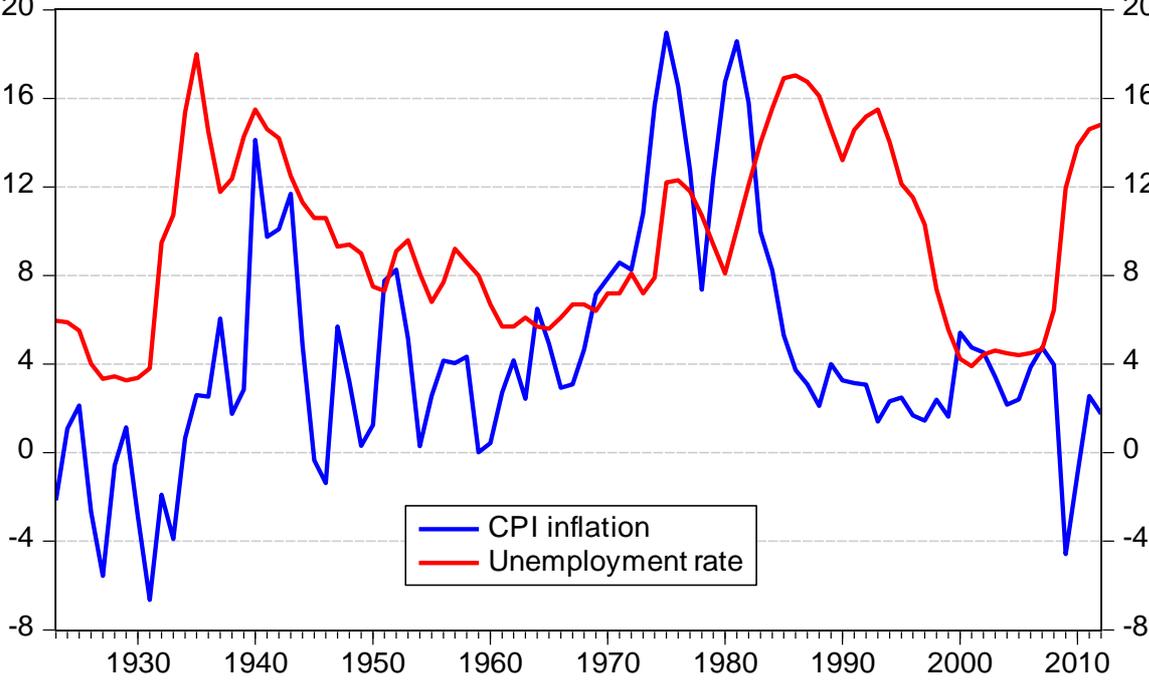


Figure 3: CPI and import price inflation

