# Returning to Growth: Lessons from the 1930s

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## Abstract

This paper reviews 1930s' UK experience focusing on the recovery phase. This was initially based on a 'cheap money' policy which reduced real interest rates when nominal rates were close to zero and fiscal consolidation was in full swing. Unfortunately, microeconomic policies to raise prices had adverse effects on competition and productivity performance suffered. Fiscal stimulus from rearmament boosted growth significantly after 1935 but the multiplier was low. Key policy implications for today are the current UK inflation-targeting regime may need to be reconsidered and that it may be optimistic to expect a 'plan B' to provide a major stimulus.

**Keywords**: cheap money; inflation-targeting; fiscal stimulus; productivity; rearmament

**JEL Classification**: E65; N14

## 1. Introduction

The recent crisis in the UK economy has posed severe difficulties for economic policymakers. After a deep recession, growth is still anaemic yet at the same time the government has serious concerns about fiscal sustainability at a time of large deficits and rapidly rising public debt to GDP ratios. With little scope for further reductions in nominal interest rates, it seems difficult to use monetary policy to stimulate growth and to offset fiscal stringency. And while growth has been weak, inflation has been well above the target set for the Bank of England because of the transitory impact of VAT increases, falls in the exchange rate, and energy prices. Fears of a double-dip recession are growing yet inflation hawks still believe that interest rates should soon be increased. Keynesians worry that early deficit reduction threatens to de-rail recovery while at the same time Greece is seen as an awful warning not to delay putting the fiscal house in order.

In 1932, the making of economic policy also seemed very daunting. Britain had been forced out of the gold standard and was facing a possible sovereign debt crisis, the design of monetary policy was highly contentious, memories of German hyperinflation were still fresh, and Keynesian remedies were not acceptable to orthodox opinion. Indeed, after a brief recovery following the devaluation in the autumn of 1931, the economy slipped back into recession in the middle of the following year.

An aspect of the 1930s that is especially relevant for today is that it represents the only experience that the UK has had of attempting fiscal consolidation when nominal interest rates are close to the lower bound and reductions in interest rates cannot be used to offset the impact of tighter fiscal policy on aggregate demand. Over the fiscal years 1932/33 and 1933/34 the structural budget deficit was reduced by a total of nearly 2 per cent of GDP as public expenditure was cut and taxes increased, the public debt to GDP ratio stopped going up while short term interest rates stabilized at about 0.6 per cent. Yet, from 1933 to 1937 there was strong growth such that real GDP increased by nearly 20 per cent over that period.

An overview of macroeconomic outcomes is reported in Table 1. The picture that we see is of an economy that went through a severe recession such that annual output fell by 5.6 per cent between 1929 and 1931 following which, after a faltering start, real GDP grew at an annual rate of at least 3.1 per cent per year in each of the years between 1933 and 1937. Unemployment was always high and rose steeply in the early 1930s but by 1937 was nearly back to the 1929 level. Prices, as measured by the GDP deflator, fell slowly until 1934 but by 1937 inflation was nearly 4 per cent. Thus, contrary to many people's perception, the initial downturn was of similar magnitude to Britain in 2008-9.[1]

This is an episode that has valuable lessons for today as this paper will show. Recovery in the 1930s did not take place under the auspices of inflation targeting. It began while fiscal policy was deflationary but when control of monetary policy moved from the Bank of England to the Treasury. Subsequently, monetary policy can be thought of as targeting an increase in the price level and acting to stimulate the economy through reducing real interest rates. The episode suggests that this

[1] The fall in real GDP from peak to trough based on quarterly data was 7.2 percent (Mitchell et al. 2011). Common beliefs about the 1930s are conditioned by the persistent unemployment in areas of Britain hit by the decline of old industries and the trade wars of the time. These structural problems proved intractable throughout the interwar period but should not be allowed to obscure the fact that this was nothing like the depression that the United States went through or that the economy was growing strongly by 1934. The Jarrow marchers are iconic but their journey in 1936 took them through prosperous southern England.

was a viable way to provide a monetary offset to fiscal consolidation. Although the first phase of recovery was based on monetary policy and the end of deflationary expectations, from 1935 onwards there was a significant fiscal stimulus through rearmament. The news of this change in defence policy was an exogenous shock administered while nominal interest rates remained very low. So, a further interesting aspect of the 1930s experience is the use of expansionary fiscal policy in these unusual conditions which are sometimes thought to be conducive to a high fiscal multiplier.

Finally, it is important to recognize that while the 1930s policy framework succeeded in promoting short-term recovery it had much less favourable implications for long-run growth. In seeking to raise prices and lower real wages, the government pursued a variety of policies including devaluation, imposing a general tariff on manufactured imports and encouraging cartels. This amounted to a big retreat from competition which proved hard to reverse and had a seriously adverse impact on productivity performance through the 1960s.

## 2. Monetary and Fiscal Policy at the Zero Lower Bound

Since 1997, in common with other OECD countries, UK monetary policy has been conducted in terms of inflation targeting by an independent central bank. The rationale for this arrangement is to deal with the problem of 'inflationary bias' that potentially arises from the discretionary conduct of macroeconomic policy by ministers when interest rates may be set for short-term political reasons. The framework might be described as one of 'constrained discretion' (Allsopp and Vines, 2000) rather than a rigid rules-based system like the gold standard. In recent years, the Bank of England's Monetary Policy Committee (MPC) has been mandated to maintain a CPI rate of inflation of 2 per cent per year.

The way in which is inflation targeting is implemented is generally through a Taylor Rule. The central bank raises short-term interest rates if inflation is above target or if GDP is above the economically sustainable level – in the jargon, if the 'output gap' is negative. The standard Taylor Rule is that interest rates should rise by 1.5 percentage points if inflation is 1 percentage point above target and by 0.5 percentage points when GDP is 1 per cent above the sustainable level. Conversely, interest rates would be reduced if inflation is below target or if GDP is below the sustainable level.[2]

Inflation targeting using a Taylor Rule runs into difficulties when it requires that the nominal interest rate be negative. This is the 'zero lower bound' constraint. This is most likely to matter in times of deflation or severe recession especially if this is associated with a banking crisis and credit crunch (Woodford, 2011a). This suggests either that a strategy has to be devised to lower real interest rates by creating inflationary expectations and/or that it may be necessary to use expansionary fiscal policy.

New Keynesian macroeconomic models have been developed which predict that fiscal stimulus may be expected generally to have a larger multiplier effect when interest rates are held constant at the lower bound, as recent discussions have emphasized. One way in which this may work is when a

[2] The Taylor Rule can be written as $R_S = \alpha + \beta(\pi - \pi^*) + \gamma(Y - Y^*)$ where $\pi$ and $\pi^*$ are the actual inflation rate and the target inflation rate, respectively, and $(Y - Y^*)$ is the difference between real GDP and the sustainable level of real GDP. The standard values for $\beta$ and $\gamma$ are 1.5 and 0.5, respectively. The term $\alpha = r^* + \pi^*$ where $r^*$ is the (neutral) real interest rate that is consistent with maintaining aggregate demand at a level consistent with a zero output gap.

deficit-financed increase in government spending leads expectations of inflation to increase. Simulated examples of fiscal stimulus in 'great depression' conditions have suggested values in excess of 2 may be observed (Woodford, 2011b). However, it should also be noted that econometric evidence for the recent past finds that once the level of government debt is over 100 per cent of GDP the response of output to government spending shocks is very small even in deep recessions.[3] Theoretically, the reason for this result may be that expectations of large tax increases are raised by the fragility of the public finances when the debt to GDP ratio is high.[4] There seems to be stronger modern evidence for consumption reductions stemming from 'Ricardian-equivalence' when the debt to GDP is above 100 per cent.[5]

While the Bank of England cannot reduce its interest rate below zero, real interest rates can be negative. In principle, the central bank can stimulate the economy by holding its interest rate down while encouraging people to expect inflation. Indeed, this is the classic recipe for escaping the so-called 'liquidity trap', much discussed in the context of Japan's 'lost decade' of the 1990s. Reductions in the real interest rate sustained over a period of time have the potential to act as an expansionary policy so monetary policy is not impotent after all even when interest rates hit the zero lower bound.[6]

This strategy may be hard to implement, however. There is a problem of 'time inconsistency' in that the private sector may anticipate that the central bank will change its policy as soon as the economy starts to recover. For the real interest rate policy instrument to be effective, it is vital that the central bank is seen as credibly committed to future inflation and the rate of inflation that is needed may well exceed the previous target rate, currently 2%. This might be addressed by an upward revision of the target rate or the adoption of a price-level target which would require higher inflation to be achieved; either way the issue would be how to make this credible. One way to do this might be through exchange-rate policy. Svensson (2003) suggested that a 'foolproof' way to escape the liquidity trap is to combine a price-level target path with an initial currency devaluation and a crawling exchange-rate peg which will require a higher price level in equilibrium and can be underpinned by creating domestic currency to purchase foreign exchange.

If raising the price level is necessary to escape the liquidity trap, then this might be facilitated by abandoning competition policy and allowing firms to form cartels or otherwise exploit market power. Eggertsson (2012) sets out the theory behind this and argues that the New Deal in the USA in the 1930s epitomized this strategy. However, it is crucial to notice that the justification is only for a temporary, emergency competition policy suspension. The need for an exit strategy is obvious but returning to normal competition policy settings may be easier said than done, as the British post-1930s experience shows.

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[3] Auerbach and Gorodnichenko, "Fiscal Multipliers".
[4] Perotti, "Fiscal Policy in Good Times".
[5] Rohn, "New Evidence".
[6] The central bank can manipulate short term interest rates but long term interest rates matter for investment decisions. Given that long term rates must reflect the expected sequence of short term rates through time which it can control, the central bank can also affect long term rates but generally with less certainty because it may be less successful in influencing expectations and markets have to take a view on how the authorities will respond to inflation in future. For a review of these topics which concludes that policy matters for both short- and long-term real interest rates, see Allsopp and Glyn (1999).

The implications of this discussion are as follows. First, in present circumstances, inflation is not public enemy number one; an increase in the expected rate of inflation would help avert fears of a double-dip recession. Second, conventional inflation targeting at 2% may not be appropriate in present circumstances. Third, in principle, a credible commitment to a price-level target that could only be met through significant inflation may be preferable to the current MPC rules for the time being. There are, however, obvious difficulties for the government in changing the remit of the MPC, including communicating the new policy to the public and dealing with the political fallout, and price-level targeting has few precedents.[7] Fourth, it would be nice to believe that fiscal stimulus could come to the rescue if conventional monetary policy is impaired. Whether there is scope for this depends on the size of the fiscal multiplier which is somewhat doubtful.

## 3. A Brief Overview of UK Macroeconomic Policy in the 1930s

In the late 1920s, macroeconomic policy in the UK economy was organized along orthodox Victorian lines although with the much greater burden of public debt which was the legacy of World War I. A return to the (fixed exchange rate) gold standard had been achieved in 1925 at the pre-war parity of $4.86, monetary policy was in the hands of an independent Bank of England with the primary goal of sustaining this parity, and the government budget was expected at least to balance and ideally to run a primary surplus consistent with avoiding unstable debt dynamics and indeed with the aim of slowly reducing the public debt to GDP ratio (d). The world economic crisis which erupted in 1929 and resulted in the Great Depression was a severe shock to this policy framework which was then radically reformed during the 1930s.

### 3.1. Fiscal Policy

Problems in the world economy were transmitted into the UK initially through declines in world trade and thus British exports. The economy entered recession in 1930 and, with unemployment rising rapidly, the budgetary position deteriorated as tax revenues fell while transfer payments rose. The rise in the budget deficit shown in Table 2 in 1930 and 1931 reflects the impact of the recession on public finances not discretionary fiscal stimulus. Fiscal sustainability was jeopardized by falling prices and the threat of risk premia raising interest rates on government debt.[8] The situation was made more difficult by the £2 billion 5% War Loan which had to be redeemed between 1929 and 1947 and which the government was hoping to re-finance at a lower interest rate.

Table 2 reports that fiscal tightening reflected in the constant employment budget surplus began in 1929/30 and continued until 1933/34 during which time it had risen by 3.8 per cent of GDP. The flashpoint was the report of the May Committee on public expenditure which was published on July 31, 1931. This forecast a budget deficit of £120 million (3.1% GDP) in 1932/33 and proposed a fiscal adjustment of a similar magnitude, 80 per cent from expenditure cuts, notably on unemployment

[7] The example usually cited is the apparently successful experiment in Sweden from 1931 to 1937 (Berg and Jonung, 1999). I shall argue below that de facto, though not de jure, the UK after 1932 is another case in point.

[8] Using the standard formula that for fiscal sustainability $b > d(r - g)$ where b is the primary surplus/GDP, d is the public debt to GDP ratio, r is the interest rate on government debt and g is the growth rate of nominal GDP with the data set from Middleton (2010), on average in the late 1920s, d = 1.7, r = 4.6 and g = 2.5. If inflation is zero then b = 3.6% but if prices fell at 5 per cent per year, b rose to 12.1%. Conversion of the war debt and gently rising prices in the post gold-standard world changed this so that b fell below 2%. The value of b is quite small in each of these scenarios if d is at the 1913 level of 0.25.

benefits, and 20% from tax increases. This led to the resignation of the minority Labour government which was succeeded by the coalition National Government. Following their election victory in October 1931, the scene was set for a substantial fiscal consolidation although the May proposals were watered down and the initial adjustment for 1931/2 was £76 million (Middleton, 2010).

Already by 1933/34, the automatic stabilizers having been over-ridden, the budget had returned to surplus. After 1934, as recovery from the recession progressed, fiscal policy was eased and a process of reversing the expenditure cuts and tax increases was implemented. From 1935 to 1938, defence expenditure rose from a 'peacetime' level of £118 million (at 1938 prices) to £181 million in 1936 and £353 million in 1938 (Feinstein, 1972, Table 33). Only at this point might fiscal policy be described as 'Keynesian' but even then the justification of a military emergency would have been familiar to earlier centuries.

### 3.2. Exchange Rate Policy

The fixed exchange rate era came to an end on September 18, 1931 when, in the face of massive losses of foreign exchange reserves, the UK was forced off the gold standard. After this, the pound fell sharply against the dollar from its gold-standard parity of $4.86 reaching a low point of $3.24 in early December 1931 but recovered to $3.80 by the end of March 1932. By that point, the Treasury had decided that it wished to lock in a devaluation of about 30 percent and moved to a policy of implementing exchange rate targets defined in terms first of pegging the pound against the dollar at $3.40 and then, after the American devaluation of March 1933, against the French franc at Ffr. 88 and later at 77 (Howson, 1980). The policy was underpinned through market intervention using the Exchange Equalisation Account set up in the summer of 1932 and by a 'cheap money' policy symbolized by the reduction of Bank Rate to 2% on June 30, 1932.

The 1930s was an era of competitive devaluations. The extent of the depreciation of the pound is best measured against an average of other currencies, as in Table 3, which shows that a fall of close to 25 per cent was sustained over the period 1932 to 1936. Taking into account relative inflation rates, the real exchange rate was nearly 20 per cent lower than in 1929 so the competitiveness of British exports was increased (Dimsdale, 1981). Other implications of leaving the gold standard were, however, more important. By abandoning the fixed exchange rate, the UK regained control over its monetary policy and could reduce interest rates, eliminated the need for deflation of prices and wages to remain competitive and revive employment, improved the fiscal arithmetic, and created an opportunity to change inflationary expectations.

### 3.3 Monetary Policy

Until the UK left the gold standard, the Bank of England set interest rates with a view to maintaining the $4.86 parity. In practice, this meant that policy had to ensure that rates were not out of line with foreign, especially American, interest rates. After leaving gold, it took some time for policy to be re-set. The opportunity to redeem the 5% War Loan was taken in mid-1932 and £1.92 billion was converted to 3.5% War Loan 1952 saving interest payments of £28.8 million annually, a non-trivial amount in the context of the £120 million savings proposed by the May Committee. At the same time, the so-called 'cheap money' policy became reasonably settled and clearly articulated; the Treasury Bill rate fell from 3.77% in the first quarter of 1932 to 0.60% in the third quarter of that year, a level close to which it remained through 1938 (Howson, 1975). Senior Treasury officials

wanted the price level to rise and when the cheap money policy was introduced believed that prices would return at least to the 1929 level by 1935.

The cheap money policy was a major change which was central to the recovery of the economy and acted to offset contractionary effects of fiscal consolidation once it was clear and credible. Table 4 reports short and long term nominal interest rates and shows that long-term rates also fell. From mid-1932, there was little scope for further nominal short term interest rate reductions. It can also be seen in Table 4 that ex-post real interest rates fell sharply from 1932 as the price falls of the early 1930s came to an end and then modest price inflation set in. As might be expected, especially early on, policymakers were more successful in reducing short- than long-term real rates but eventually both fell substantially.[9]

## 4. The First Phase of Recovery, 1933-35

It is well-known that leaving the gold standard was good for recovery across the world in the 1930s (Bernanke and Carey, 1996); crucially, it offered a route out of deflation. The UK devalued in September 1931 but this was not the signal for rapid economic growth to begin. Instead, as Table 5 reports, in the second and third quarters of 1932 the UK economy fell into a double-dip recession, with the implication that real GDP a year after devaluation had barely risen, before strong growth became established in mid-1933. It was not until the first quarter of 1934 that real GDP surpassed the previous peak level of 4 years earlier. By contrast, Table 5 shows that the United States did experience a surge in real GDP following its departure from gold in March 1933; a year later real GDP was 13 per cent higher and the economy avoided a second recession in the next 3 years. As is set out below, the contrast between the British and American experiences shows the importance of clarity and credibility in policy formulation.

### 4.1 'Regime Change' in the United States

This was, of course, the era of the New Deal and it would be easy to suppose that the difference lay in Keynesian stimulus in the United States compared with deficit reduction in the UK. However, this would be a mistake. Ever since the work of Brown (1956) it has been known that the New Deal was not a massive fiscal stimulus since it was largely financed by tax increases and the discretionary increase in the federal deficit between 1933 and 1936 was less than 3 per cent of GDP. With interest rates at the lower bound, the multiplier effects of an aggressive Keynesian policy might have been big, as the estimates of Gordon and Krenn (2010) suggest, but it was not tried.

The most persuasive account of the American turning point in 1933 is to explain it as a 'regime change' linked to the exit from the gold standard (Temin and Wigmore, 1990); they argue that the impact of the new policy stance was reflected in a doubling of share prices between March and July 1933. Recent research has clarified and amplified this proposition in the context of the zero lower bound. Eggertsson (2008) sees devaluation as a necessary but not sufficient condition since the key is not devaluation per se but creating inflationary expectations which reduce real interest rates by credible commitment to raising the price level, which was an often-stated goal of the Roosevelt administration. In his analysis, the role of the New Deal and deficit spending is central but as a

[9] The estimates of long-term real rates are subject to more uncertainty than the short-term real rates, as Chadha and Dimsdale (1999) make clear. Moreover, it is ex-ante real rates that we would really like to track.

credible policy that raised inflationary expectations with the government targeting a return of prices to the 1926 level. The calibrated dynamic stochastic general equilibrium model used by Eggertsson (2008) to quantify his argument predicts that, if the regime change was seen as credible, its impact accounted for around 75 per cent of the rapid rise in real GDP between 1933 and 1937. It is clear from Table 6 that real interest rates fell quite dramatically and very quickly while movements in the exchange rate, which fell to $5.10 against the pound from $3.45 and remained in the range $4.90 to $5.10 during the next 4 years, and in gold reserves, which almost doubled within a year, were consistent with the 'Foolproof Way' to escape the liquidity trap.

**4.2 Policy Vacuum in the UK**

There is quite some contrast here with the formation and communication of policy in the UK. It is clear from the archival research reported in Howson (1975) that during the 6 months after leaving gold there was confusion and debate over the policy framework to adopt. The 'cheap money' or 'managed economy' strategy was not settled upon until the second quarter of 1932 and in the meantime the exchange rate was rising in early 1932 when nominal interest rates were higher than in the summer of 1931. A comparison based on Table 4 and Table 6 shows that the declines in real interest rates were slower to materialize after devaluation and were also less pronounced than in the United States. Share prices did not reach the bottom until June 1932 and then doubled over the next three years.

Not surprisingly, Mitchell et al. (2011) suggest that the double-dip in 1932 has to be understood in the light of the authorities' ineffectiveness in changing expectations. Given the absence of monetary policy stimulus and the presence of large falls in world trade, fiscal consolidation risked pushing the economy back into recession. There was no equivalent to the New Deal to signal regime change. Taken together, these contrasting episodes suggest that, while a large fiscal stimulus was not necessary for a strong upturn in the exit from the depression in the 1930s, fiscal consolidation without a compensating boost from monetary policy was not conducive to recovery and ran the risk of prolonged stagnation in a difficult world economic environment which had little to encourage business investment and exports. The potential parallels with today are readily apparent.

**4.3 The 'Managed-Economy Strategy'**

The Chancellor announced the objective of raising prices at the British Empire Economic Conference at Ottawa in July 1932 and subsequently reiterated it frequently. The fall in the exchange rate from $3.80 in March 1932 to $3.28 in December 1932 is consistent with escaping the liquidity trap in the 'Foolproof Way', as is the sustained fall in the value of the pound and the large increase in foreign exchange reserves over the next four years which reflected intervention by the authorities to keep the pound down (Howson, 1980). So market reactions suggest that the cheap money policy quickly became credible.

Based on archival research, economic historians have provided an overview of the strategy for economic recovery after the UK left the gold standard and control over monetary and exchange rate policy passed from the Bank to HM Treasury. Partly building on Howson (1975), Booth (1987) argued that from 1932 there was coherence in the Treasury's thinking which deserved the label of a 'managed-economy' approach. The hallmark was a central objective of a steady increase in the price level - which on the assumption that money wages would not react also amounted to reducing real

wages and restoring profits – subject to not letting inflation spiral out of control. The rise in the price level would be promoted through cheap money, a weak pound, tariffs, and encouraging firms to exploit their (enhanced) market power, similar to the proposal in Eggertsson (2012), but fears of an inflationary surge would be allayed through balancing the budget and intervening if necessary to prevent a currency crisis.

This particular 'managed-economy' strategy is clearly quite similar to a price-level target. It was sustained over several years from the middle of 1932 onwards although prices rose by a bit less than Treasury officials expected and had still not returned to the 1929 level in 1937. As Table 4 reports, it brought about a big reduction in real interest rates compared with the start of the decade. On this measure, monetary stimulus was still being provided after nominal interest rates bottomed out. Obviously, this strategy does not represent an irrevocable commitment but it was a credible policy given that the Treasury and the Chancellor of the Exchequer were in charge.[10] Cheap money and a rise in the price level were clearly in the Treasury's interests from 1932 as a route to recovery, better fiscal arithmetic, and to provide an alternative to the Pandora's Box of jettisoning balanced-budget orthodoxy and adopting Keynesianism (Howson, 1975).

**4.4. The Policy Offset to Fiscal Consolidation**

Fiscal consolidation is normally deflationary and there is no obvious reason to think that this was not the case in the early 1930s UK. The severity of its impact typically depends on the extent to which it is offset by the beneficial effects of currency depreciation on net exports and by interest rate reductions (Guajardo et al., 2011). So was the strong economic recovery which began while fiscal consolidation was still in full swing attributable to policy activism? Two possibilities need to be considered: protectionism and cheap money. The former made a difference in 1932 and the latter was the main policy stimulus to growth between 1933 and 1935.

As part of the so-called 'managed-economy strategy', the UK abandoned free trade and imposed a tariffs on manufactures in 1932 at an average rate of nearly 20 per cent. The share of imports in domestic demand for manufactures fell from around 12.5 per cent to about 9 per cent as a result of the combined effects of the tariff and the devaluation – probably mainly the former (Kitson and Solomou, 1990); this reduced imports by about £100 million and was responsible for much of the substantial improvement in net exports in 1932/3.[11]

The direct effects of cheap money were felt from mid-1932 onwards with reductions in nominal and real interest rates, as reported in Table 4. Business investment responded to lower interest rates (Broadberry, 1986), improved profit expectations reflected in higher share prices and increased sales (Lund and Holden, 1968) while bank lending was largely maintained in a climate of business as usual in the absence of a banking crisis (Billings and Capie, 2011). Housebuilding was the sector most positively affected by the cheap money policy but was well positioned for a number of other reasons including enhanced availability and affordability of mortgage finance, permissive land-use planning rules, and a shortfall of investment in the 1920s (Humphries, 1987; Richardson and Aldcroft, 1968).

[10] This would not have been the case had the Bank of England run monetary policy. Governor Norman plainly disliked cheap money and regarded it as a temporary expedient (Howson, 1975, p. 95).
[11] This can be inferred using the method proposed by Foreman-Peck (1981) but correcting an arithmetic error in the original.

Private housebuilding investment increased by £55 million, or about 23 per cent of the increase in GDP, between 1932 and 1934. The number of private unsubsidized houses built rose sharply from the 4th quarter of 1932 and almost doubled from 63,000 in the half year ending September 1932 to 122,000 in the half-year ending March 1934. Broadberry (1987) estimated that about half the additional housing investment was due to lower interest rates. An increasing ratio of rents to construction costs was also favourable but, as Howson (1975) stressed, the leap in housebuilding only occurred once it was believed that construction costs had bottomed out. Here may be the most concrete illustration of the importance of monetary policy in changing inflationary expectations.

## 5. The Second Phase of Recovery, 1935-38

The cheap money policy was sustained through 1938 by which time inflation had clearly replaced the deflation of the early 1930s (cf. Table 1). The Treasury Bill rate remained at about 0.6% and real short rates were negative from 1936 while real long rates were around 1% (Table 4). The distinguishing feature of this second phase was a switch to expansionary fiscal policy associated with rearmament; in these circumstances, it might be thought that there was scope for fiscal policy to have a sizeable multiplier effect. The budget which had been balanced in 1934 showed a deficit of 3.7% of GDP in 1938 (Table 2) although the ratio of public debt to GDP continued slowly to decline. As the discussion below suggests, it is plausible that rearmament added considerably to the recovery after 1935 but it is important to understand how this stimulus worked.

### 5.1. Rearmament

The formal announcement that the British government intended to re-arm came in the Defence White Paper of March 1935 (Cmd. 4827) and by the end of the year defence spending had risen 28 % compared with a year earlier. The ante was upped considerably in February 1937 when the Defence White Paper (Cmd. 5374) warned of expenditure of £1500 million over the next 5 years which would be partly deficit-financed and the Defence Loans Bill which authorized borrowing of £400 million over 5 years was approved. It is generally believed that this promoted a substantial increase in GDP and employment. Using a Social Accounting Matrix, Thomas (1983) estimated that the fiscal multiplier was about 1.6 in 1938 and that about 1 million jobs were created over the three years after 1935. However, his technique assumes no crowding out – an assumption which is defended informally by reference to contemporary comment on economic conditions. Dimsdale and Horsewood (1995) estimated a structural model comprising both an aggregate demand side based on income-expenditure and an aggregate supply side based on wage and price equations. In simulations holding short-term interest rates constant, their estimate of the multiplier after one year was 1.9 which would imply that increased defence spending raised GDP by about 6% in 1938.

### 5.2. Defence News and the Multiplier

The methods employed to obtain estimates of the multiplier in these papers are open to challenge and are not those which would be used by macroeconomists today. The models they rely upon basically embody Keynesian ideas in their specification with a traditional consumption function and may not adequately reflect crowding out, with the implication that the estimated multipliers are too large. For example, models in either the neoclassical or new Keynesian traditions which embody optimizing behaviour by forward-looking households typically expect consumer expenditure to fall

rather than increase in response to an increase in government expenditure and envisage that the multiplier may be less than 1.[12]

An alternative is to let the data speak and to use time-series econometric techniques as in Crafts and Mills (2013) which uses the concept of 'defence news' introduced by Ramey (2011) to deal with problems of endogeneity in estimating the government-expenditure multiplier. This also allows explicit analysis of the impact of rearmament which was the news from 1934/35 onwards. Table 7 provides a series for 'defence news' which has been obtained as in Ramey (2011) by examining government announcements in the annual (and supplementary) defence estimates, information from running totals of government defence spending issued every 3 months and commentaries on defence spending intentions in *The Economist*. While the exact details of this series obviously require some judgement, it is beyond doubt that there were really big shocks at the end of 1935 and at the beginning of 1936 and again in early 1937. The announcements were of major expansions in equipment expenditure for the Royal Air Force and the Royal Navy with a view to being fully prepared for serious military conflict by 1942. 'Defence news' is found to predict subsequent defence spending and also increases in real GDP.

The defence news series from 1935 onwards may not be ideal for estimating multipliers because the values are so large and uncertain. Using defence news in similar fashion to recent papers by Barro and Redlick (2011) and Ramey (2011) on quarterly data for the period through $1934_{Q4}$ gives estimates for the multiplier of about 0.8. This implies that rearmament boosted real GDP by about £160 million or 3.3 per cent in 1938. This is half the estimate by Thomas (1983). There may have been an additional effect from 'crowding in' of private investment as firms anticipated the need for more capacity to cope with massive increases in future defence spending, as suggested by Robertson (1983) but it is doubtful that this could have added very much on top of the £160 million.

### 5.3. The Fiscal Multiplier at the ZLB

The analysis in Crafts and Mills (2013) produces an estimate that the government-expenditure multiplier was no higher than 0.8 for the period through $1934_{Q4}$ and finds no evidence that it was higher than this in the cheap-money years after 1932. The implication is that a conventional temporary programme of expenditure on public works to provide a 'Keynesian solution' to interwar unemployment problems was not feasible in the 1930s even when interest rates were very low. The multiplier was too small and unemployment too high, as has been recognized for some time (Dimsdale and Horsewood, 1995; Middleton, 2010).

The reason for a low multiplier may well be the overhang of a high ratio of public debt to GDP, a pattern which is found in modern studies (Auerbach and Gorodnichenko, 2011). As Middleton (1985) stressed, contemporaries, including key officials in HM Treasury, thought in terms of 'psychological crowding out', in the context of deficit-financed public works programs, through adverse effects on business confidence which might undermine investment, as a major reason to believe that the multiplier effects would be small. Middleton also noted that, in the debate on the budget in 1933, the Treasury publicly maintained that any possible expansionary effects from an

[12] For a convenient summary of predictions from a variety of macroeconomic models see Hebous, "The Effects of Discretionary Fiscal Policy". The traditional literature on 1930s' Britain mostly finds that the multiplier was in the range 1.2 to 1.9, see Middleton (2010).

unbalanced budget might be vitiated by expectations of future tax increases and that the strong public commitment to the balanced budget rule by government ministers meant that any suggestion of a deficit would lead to expectations of higher taxation. Crowding out of private expenditure is observed in the interwar data and is consistent with a multiplier of about 0.8 (Crafts and Mills, 2013).

### 5.4 Self-Defeating Austerity?

It has been widely noted that in some circumstances fiscal consolidation can actually worsen standard fiscal indicators such as d (Holland and Portes, 2012). For example, where the multiplier is greater than the reciprocal of the marginal tax-and-transfer rate ($\tau$), deficit-financed government spending improves the public debt-to-GDP ratio. This clearly did not obtain in the 1930s when a reasonable estimate is $\tau = 0.44$ (Middleton, 1985) and the multiplier would have had to be 2.28. However, the first-year effect on d could easily have been adverse. Here the requirement is that the multiplier exceeds $1/(d + \tau)$ which in 1931 = $1/(1.7 + 0.44) = 0.47$ which probably was met. However, the effect in subsequent years is to raise d since the impact of the borrowing on y is temporary but on D is permanent.

Nevertheless, despite rearmament, the public debt-to-GDP ratio (D/Y) was falling in the years after 1934 when fiscal consolidation was abandoned. How could this happen? An important aspect of the period is that the real interest rate on government debt was below the growth rate of real GDP. Using the formula in footnote 8, this implies that it was no longer necessary to run a primary budget surplus to reduce d. In fact, primary surpluses continued through 1938. A check on the fiscal arithmetic shows that about 2/3 of the fall in d came from continuing primary budget surpluses with about 1/3 from the real interest rate falling below the real growth rate in an economy with capital controls.[13] This experience does, however, underline the point that 'financial repression' reduced considerably the severity of the required fiscal squeeze to improve this fiscal indicator.[14]

## 6. Adverse Effects on Productivity Performance

The interwar economy saw a major shift in supply-side policy away from Victorian orthodoxy. Prompted initially by high unemployment and the travails of the old staple industries and given considerable impetus by the world economic crisis, governments became more willing to intervene. This period saw the beginnings of industrial policy in the 1920s, the general tariff on manufacturing in 1932, the encouragement of cartels and the imposition of controls on foreign investment in the 1930s. These changes were complemented by exit from the gold standard in 1931 followed by the era of cheap money so that Britain in the 1930s has been described as a 'managed economy' (Booth, 1987). Looked at another way, this was a major retreat from competition which turned out to be quite long-lasting. What were the implications for productivity performance?

### 6.1. Productivity Growth in the 1930s

[13] These proportions are derived using the method proposed by Ali-Abbas et al. (2011), which is an application of the fiscal sustainability formula in footnote 8.

[14] 'Financial repression' occurs when governments intervene to gain access to funds at below market interest rates typically through regulations imposed on the capital market including imposing obstacles to international capital mobility. This played a major part in the post-World War II reduction in D/Y in Britain and other European countries.

The growth performance of the British economy in the 1930s has sometimes been viewed quite favourably, especially by writers sympathetic to the view that Britain failed in the pre-1914 period. For example, in a widely-used textbook, Pollard stated: "The view that, after a poor performance in the 1920s, the 1930s saw a genuine breakthrough, is indeed widespread and finds support not only in the output statistics but also in the quality of the modern investment and the structuring of British industry towards the growth-oriented sectors" (1983, p. 53). This relatively optimistic interpretation has its roots in the thesis, originally argued by Richardson (1967), of a regeneration of the economy through the productivity advance of 'new' industries and in the strong emphasis that Matthews et al. (1982) placed on the revival of TFP growth following a climacteric in the early twentieth century.

It is, however, difficult to accept the suggestion that there was a marked improvement in British growth performance in the 1930s. The most obvious point to make is that the growth rate of real GDP and TFP between 1929 and 1937 fell back from that of 1924 to 1929 and was lower than in 1873 to 1899 while TFP growth remained well below the standard set by the United States during the first half of the twentieth century (Crafts, 2004). Time series econometric analyses do not indicate a break in 1929 either in GDP or industrial production growth (Mills, 1991; Greasley and Oxley, 1996). Labour productivity growth in manufacturing was much stronger in the 1930s than before 1913, as Table 8 reports, but that table also shows that, notwithstanding the much greater severity of the depression in the United States output per hour worked continued to grow faster in American manufacturing with the result that the level of American labour productivity was 2.74 times that of the UK in 1937 compared with 2.41 in 1913 and 2.64 in 1929. There is no reason to think that the contribution of the new industries was particularly special. Since, on average, they represented about 6 per cent of total employment, their impact on the growth of labour productivity could not have been dramatic (Broadberry and Crafts, 1990).

**6.2. The Productivity Impact of Increased Market Power**

As might be expected, the interwar economy exhibits symptoms of a considerable increase in market power. By 1935, the share of the largest 100 firms in manufacturing output had risen to 23% following a merger boom in the 1920s; growing industrial concentration and increased barriers to foreign entry greatly strengthened domestic cartels (Hannah, 1983). Mercer (1995) showed that by 1935 at least 29 per cent of manufacturing output was cartelized. A proxy for the price-cost margin [(value-added – wages)/value added] calculated from the Census of Production shows an average increase of 3.8 percentage points across manufacturing sectors (from 0.563 to 0.601) from 1924 to 1935 while in the sectors identified by Mercer as cartelized the increase was 9.0 percentage points. An econometric study by Henley (1988) found that the coal cartel raised the price-cost margin by 13.8 percentage points. Hart (1968) estimated that the rate of return on capital employed for manufacturing companies had risen to 16.2% by 1937 from 11.4 % in 1924.

There is no evidence that the retreat from competition in the 1930s was good for productivity performance; if anything, the opposite is the case. Broadberry and Crafts (1992) examined the impact of reduced competition on productivity performance. Controlling for other variables, they found a negative correlation between changes in the price-cost margin and productivity performance for a cross-section of British industries in the period 1924 to 1935 and that British industries which had a high 3-firm concentration ratio had lower labour productivity relative to the same industry in the United States in 1935/7. They also presented a number of case studies which

led them to conclude that cartelization, weak competition and barriers to entry had adverse implications for productivity outcomes. It is also clear that government-sponsored restraint of competition in coal (Supple, 1987), cotton (Bamberg, 1988) and steel (Tolliday, 1987) was ineffective in promoting productivity improvement through rationalization although this was supposedly a key policy objective. Tariffs were definitely not an 'infant-industry' policy; in fact, the largest increases in effective protection went to 'old' industries such as hosiery & lace and railway rolling stock (Kitson et al., 1991). A difference-in-differences analysis based on timing and extent of protection of manufactures finds no evidence that tariffs improved productivity performance (Crafts, 2012a).

**6.3. The Long Postwar Hangover**

In the early postwar years, supply-side policy continued along the trajectory established in the 1930s. Protectionist policies were sustained, competition policy was neglected, and there was recourse to industrial policy to support selected sectors. In addition, 10 per cent of GDP was taken into public ownership which typically entailed a state monopoly. This amounted to a policy stance which was conducive to weak competition in product markets. The striking feature is how long it took to reverse this; not until the 1980s were most of these issues addressed.

Table 9 underlines the slowness of the retreat from protectionist policies. Average tariff rates for UK manufacturing remained at 1930s levels until the early 1960s and were considerably higher than those in West Germany in the late 1950s. Trade costs remained above the 1929 level until the 1970s when trade liberalization under the GATT and entry to the EEC drove them down; the contrast with countries which signed the treaty of Rome in 1957 is apparent. Industrial policies were skewed to protecting ailing industries both through subsidies (Wren, 1996), and tariffs (Greenaway and Milner, 1994). When trade liberalization eventually took place, it significantly reduced price-cost margins (Hitiris, 1978; Griffith, 2001).

Competition policy was inaugurated with the Monopolies and Restrictive Practices Commission in 1948, evolved through the Restrictive Practices Act (1956) and the Monopolies and Mergers Commission (1965), but was mostly ineffective (Clarke et al., 1998). Few investigations took place, very few mergers were prevented, the process was politicized, a variety of 'public-interest' defences for anti-competitive activities were allowed, and there were no penalties for bad behaviour. Although during the war some officials at the Board of Trade had planned a tough anti-trust policy, lobbying by industry and the exigencies of the postwar export drive meant that these plans were abandoned. The only significant measure was the 1956 Act but even this was an accident where the interpretation of the law by the courts turned out to be very strict, contrary to the expectations of business. Mercer (1995) documents the strong commitment of industrialists to the retention of their anti-competitive practices and their success in using the political process to obstruct reforms that would have introduced effective competition policies in early postwar Britain.

Not surprisingly, there is evidence that the British economy was characterized by substantial market power in this period. Initially, collusive activity was widespread; an examination of the agreements registered in compliance with the 1956 Act shows that only 27 per cent of manufacturing was free of price-fixing and 35.7 per cent was cartelized (Broadberry and Crafts, 2001). Over time, industrial concentration increased steadily such that the average 3-firm concentration ratio across manufacturing sectors was 41 per cent by 1968 compared with 26 per cent in 1935 (Clarke, 1985). Crafts and Mills (2005) estimated that the price-cost margin in British manufacturing during 1954-73

averaged over 2 compared with around 1.1 in West Germany which is consistent with the finding in Geroski and Jacquemin (1988) that the magnitude and persistence of supernormal profits for large firms during 1949 to 1977 was large in the UK but that significant deviations from competitive outcomes were not observed in West Germany in the 1960s and 1970s.[15]

The evidence on lack of competition and British productivity performance during the Golden Age both shows a strong adverse effect and also that this worked at least partly through industrial relations issues and managerial failure, the standard criticisms of postwar British industry. Broadberry and Crafts (1996) found that cartelization was strongly negatively related to productivity growth in a cross section of manufacturing industries for 1954-63. This result is borne out by the difference-in-differences analysis in Symeonidis (2008) who showed that when cartels were abandoned following the 1956 Restrictive Practices Act labour productivity growth in formerly-colluding sectors rose by 1.8 percentage points per year in 1964-73 compared with 1954-63. This finding suggests that a more vigorous competition policy would have improved productivity performance.

Case studies strongly implicate bad management and restrictive labour practices resulting from bargaining with unions in poor productivity outcomes. Pratten and Atkinson (1976) reviewed 25 such studies and found either or both of these problems in 23 of them. Prais (1981) reported similar findings in 8 out of 10 industry case studies and in each case noted that competition was significantly impaired. Econometric analysis found that in the 1970s and 1980s greater competition increased innovation (Blundell et al., 1999) and raised productivity growth significantly in companies where there was no dominant external shareholder (Nickell et al., 1997). Both these results underline the role of weak competition in permitting agency-cost problems to undermine productivity performance. This diagnosis is confirmed by the out-of-sample experience of the 1980s when as competition intensified productivity performance improved and the process clearly worked through a shake-out of bad management and the erosion of trade-union bargaining power (Crafts, 2012a).

## 7. Lessons for Today

The experience of the 1930s is interesting since the situation in mid- 1932 had some striking similarities with now; the economy had just been through a recession in which real GDP had fallen by about 7 per cent, growth was fragile, fiscal consolidation was seen as imperative, and interest rates were close to the zero lower bound. There was a threat of a double-dip recession –which actually materialized in the 1930s – and yet the economy was about to enjoy several years of growth at 3+ per cent per year, an outcome which would be very welcome now.

The key to promoting economic growth in the early 1930s was to offset fiscal consolidation with other policies that expanded demand, in particular, cheap money. This was a policy package that entailed keeping short term interest rates close to zero while raising inflationary expectations through announcing policies intended to raise the price level. This reduced both short and long real interest rates and then pushed the former into negative territory. The policy worked once it was clearly communicated and was seen as a credible commitment. Credibility came from the fact that

[15] The existence of significant market power in the UK but not in West Germany at this time is confirmed by the similarity of the primal and dual measures of TFP in the latter but not in the former; see Crafts and Mills (2005) for further elaboration.

HM Treasury, which wanted to fix the fiscal arithmetic, controlled monetary policy rather than the Bank of England. The implication is that conventional inflation targeting undertaken by an independent Bank of England may no longer be appropriate if the economy remains weak.

Quantitative easing could in principle work either through portfolio rebalancing or through signalling higher future inflation. It appears that so far its main effects have come through the former channel (Joyce et al., 2012). The MPC's commitment to the 2 per cent CPI target makes that unsurprising. Although the UK has had above-target CPI inflation for some time now, the public's medium-term inflationary expectations have changed very little during the crisis and the Bank has repeatedly emphasized that its central expectation is that inflation will return to the target rate before long as transitory inflationary shocks evaporate. The MPC believes that in the medium term inflation is more likely to undershoot than overshoot the target (Bean, 2011). In sum, this suggests both that there has not been a regime change and that the MPC remains keen to emphasize that.

At the zero lower bound, economic theory tells us that an option is to reduce real interest rates by a policy that convinces people that inflation will be higher in future. If it becomes necessary to go beyond the current version of quantitative easing to a monetary policy that seeks to work by raising inflationary expectations, then it will be important formally to abandon the 2 per cent CPI target and replace it with a new mandate for the Bank of England. This could take the form either of raising the target rate of inflation rate or of adopting a price-level target which entails a significant average rate of inflation over a period of years. The latter is closer to the 1930s approach and has the advantage that the MPC is tasked with correcting any undershooting of the intended average inflation rate. Even more radically, 1930s' experience suggests that it may be necessary to remove control of monetary policy from an independent Bank of England if the new framework is to be credible.

In the mid-1930s, the continued strength of recovery was aided by the exogenous shock of fiscal stimulus from rearmament delivered while short-term interest rates were held constant and on the basis of deficit finance from early 1937. The available estimates suggest that the conventional multiplier effects of rearmament were probably quite small in an economy with high public debt but announcements of large future defence spending increased the stimulus a bit. Here an important point to note is that the public debt to GDP ratio prior to the 2007 downturn of about 0.4 was much more favourable than the 1.6 of the late 1920s leaving more scope for fiscal stimulus and a higher multiplier initially at the time of the banking crisis although by now increases in the public debt to GDP ratio may be about to take this away. In turn, to have the ability to deliver a substantial fiscal stimulus means ensuring that government finances are in robust shape in good times to facilitate fiscal flexibility in bad times and is an extremely good reason to regulate banking well given the fiscal costs of banking crises.

The difference between the 1920s and the 1930s with regard to the pain of reducing the debt-to-GDP ratio is striking. The message is both that this is very hard to do in conditions of price deflation but also that it is much easier to do when in conditions of financial repression when real interest rates can be held well below rapid real GDP growth. Financial repression (together with 'Golden-Age' growth opportunities) also meant that the process of eliminating the debt overhang after World War II starting from d = 2.4 was manageable without massive fiscal surpluses (Reinhart and Sbrancia, 2011). This suggests that the fact that d has been much higher in the past than at present is not a good reason for thinking that we could easily deal with a similar position now.

Finally, it is clear that macroeconomic crises can have long-lasting effects on trend growth (rather than simply levels effects on GDP) through the policy responses which they generate at the time and then become entrenched. For the UK, the 1930s bred protectionism and an economy in which the typical business enjoyed considerable market power. There is clear evidence that this was bad for productivity performance but equally the politics of reversing these developments was difficult. The risks of a supposedly 'temporary' abandonment of competition policy, and the likelihood that the long-term downside of so doing would heavily outweigh any short term gain, are apparent. Probably in today's world the dangers are much less with the UK restrained by its obligations to the EU and the WTO and with a robust architecture for competition policy in place. Even so, the recent revival of interest in 'industrial policy' in government circles indicates that there may be reasons to worry and it certainly would have been desirable for the Doha Round to have concluded successfully with a valuable reduction in bound tariff rates (Hoekman et al., 2010).

**Table 1. The UK Economy in the 1930s**

| | ***Real GDP*** | ***GDP Deflator*** | ***Unemployment (%)*** |
|---|---|---|---|
| 1929 | 100.0 | 100.0 | 8.0 |
| 1930 | 99.9 | 99.6 | 12.3 |
| 1931 | 94.4 | 97.2 | 16.4 |
| 1932 | 95.1 | 93.7 | 17.0 |
| 1933 | 96.0 | 92.5 | 15.4 |
| 1934 | 102.8 | 91.7 | 12.9 |
| 1935 | 106.6 | 92.6 | 12.0 |
| 1936 | 109.9 | 93.1 | 10.2 |
| 1937 | 114.7 | 96.6 | 8.5 |
| 1938 | 118.2 | 99.3 | 10.1 |

*Note*: the measure of unemployment is not the National Insurance concept used at the time (which shows higher numbers) but a constructed series which is intended to be comparable with modern figures.

*Sources:*

Real GDP and GDP deflator: Feinstein (1972)
Unemployment: Boyer and Hatton (2002)

**Table 2. Fiscal Indicators** (% GDP)

| | ***Government Debt*** | ***Government Receipts*** | ***Government Expenditure*** | ***Budget Surplus*** | ***Debt Interest*** | ***Constant Employment Budget Surplus*** |
|---|---|---|---|---|---|---|
| 1929 | 158.4 | 23.8 | 24.5 | -0.7 | 7.7 | 0.4 |
| 1930 | 159.2 | 24.1 | 25.5 | -1.4 | 7.6 | 1.1 |
| 1931 | 169.8 | 25.9 | 28.2 | -2.2 | 7.7 | 2.5 |
| 1932 | 173.6 | 27.4 | 27.9 | -0.5 | 7.8 | 3.0 |
| 1933 | 179.2 | 26.9 | 26.5 | 0.4 | 7.0 | 4.2 |
| 1934 | 173.1 | 25.6 | 25.1 | 0.5 | 6.2 | 3.2 |
| 1935 | 165.0 | 25.0 | 25.3 | -0.3 | 6.0 | 2.0 |
| 1936 | 158.7 | 25.0 | 25.7 | -0.7 | 5.7 | 0.8 |
| 1937 | 147.2 | 24.5 | 26.0 | -1.5 | 5.4 | -0.1 |
| 1938 | 143.8 | 24.4 | 28.1 | -3.7 | 5.2 | -1.5 |

*Notes*:

Government expenditure includes debt interest payments.

The constant employment budget surplus is for the fiscal year, i.e., the first entry is 1929/30; a bigger positive indicates that fiscal policy has been tightened.

*Source*:

Database for Middleton (2010) generously made available by the author.

**Table 3. Exchange Rates** (1929 = 100)

| | ***Pound/Dollar*** | ***Pound/French Franc*** | ***Average Exchange Rate*** |
|---|---|---|---|
| 1929 | 100.0 | 100.0 | 100.0 |
| 1930 | 100.1 | 99.9 | 99.6 |
| 1931 | 93.3 | 93.2 | 93.7 |
| 1932 | 72.1 | 71.9 | 75.2 |
| 1933 | 86.8 | 68.2 | 77.0 |
| 1934 | 103.8 | 62.0 | 75.4 |
| 1935 | 100.9 | 59.9 | 74.5 |
| 1936 | 102.3 | 66.9 | 77.7 |
| 1937 | 101.8 | 100.5 | 84.7 |
| 1938 | 100.7 | 137.6 | 86.9 |

*Notes*:

Average exchange rate is weighted by shares of world trade in manufactures.

*Source*:

Dimsdale (1981)

**Table 4. Interest Rates** (%)

| | *Bank Rate* | *Treasury Bill Rate* | *Yield on Consols* | *Real Short Rate* | *Real Long Rate* |
|---|---|---|---|---|---|
| 1929 | 5.50 | 5.26 | 4.60 | 5.26 | 5.14 |
| 1930 | 3.42 | 2.48 | 4.48 | 8.63 | 8.01 |
| 1931 | 3.93 | 3.59 | 4.40 | 9.73 | 9.20 |
| 1932 | 3.00 | 1.49 | 3.75 | 5.11 | 7.24 |
| 1933 | 2.00 | 0.59 | 3.39 | 0.66 | 5.65 |
| 1934 | 2.00 | 0.73 | 3.10 | 0.80 | 4.26 |
| 1935 | 2.00 | 0.55 | 2.89 | 0.59 | 3.59 |
| 1936 | 2.00 | 0.58 | 2.93 | -2.86 | 1.22 |
| 1937 | 2.00 | 0.56 | 3.28 | -2.09 | 0.93 |
| 1938 | 2.00 | 0.61 | 3.38 | -2.56 | 0.99 |

*Note*:

Real rates of interest are calculated on an ex-post basis. Real long rates are based on the yield of consols minus a 3 year backward-looking weighted average of actual inflation rates; for further details, see Chadha and Dimsdale (1999). I am grateful to Jagjit Chadha for providing me with the data.

*Sources*:

Bank Rate, Treasury Bill Rate and Yield on Consols: Dimsdale (1981)
Real interest rates: Chadha and Dimsdale (1999).

**Table 5. Quarterly Real GDP**

| | ***UK ($1930_{Q1}$ = 100)*** | | ***USA ($1929_{Q3}$ = 100)*** |
|---|---|---|---|
| $1929_{Q1}$ | 97.5 | $1930_{Q3}$ | 86.9 |
| $1929_{Q2}$ | 98.9 | $1930_{Q4}$ | 82.8 |
| $1929_{Q3}$ | 99.9 | $1931_{Q1}$ | 83.0 |
| $1929_{Q4}$ | 99.9 | $1931_{Q2}$ | 84.4 |
| $1930_{Q1}$ | 100.0 | $1931_{Q3}$ | 81.1 |
| $1930_{Q2}$ | 99.1 | $1931_{Q4}$ | 77.0 |
| $1930_{Q3}$ | 97.8 | $1932_{Q1}$ | 74.2 |
| $1930_{Q4}$ | 95.9 | $1932_{Q2}$ | 70.6 |
| $1931_{Q1}$ | 93.6 | $1932_{Q3}$ | 68.1 |
| $1931_{Q2}$ | 93.1 | $1932_{Q4}$ | 67.7 |
| **$1931_{Q3}$** | **92.8** | **$1933_{Q1}$** | **63.8** |
| $1931_{Q4}$ | 93.7 | $1933_{Q2}$ | 68.4 |
| $1932_{Q1}$ | 94.0 | $1933_{Q3}$ | 73.8 |
| $1932_{Q2}$ | 93.4 | $1933_{Q4}$ | 68.6 |
| $1932_{Q3}$ | 92.9 | $1934_{Q1}$ | 72.4 |
| $1932_{Q4}$ | 94.6 | $1934_{Q2}$ | 76.5 |
| $1933_{Q1}$ | 94.4 | $1934_{Q3}$ | 73.3 |
| $1933_{Q2}$ | 96.0 | $1934_{Q4}$ | 73.3 |
| $1933_{Q3}$ | 97.6 | $1935_{Q1}$ | 77.9 |
| $1933_{Q4}$ | 99.1 | $1935_{Q2}$ | 78.2 |
| $1934_{Q1}$ | 101.2 | $1935_{Q3}$ | 80.4 |
| $1934_{Q2}$ | 102.6 | $1935_{Q4}$ | 84.8 |
| $1934_{Q3}$ | 103.5 | $1936_{Q1}$ | 85.2 |

*Note*:

Devaluation was in $1931_3$ in the UK and $1933_1$ in the USA

*Sources*:

UK: Mitchell et al. (2011)
USA: Balke and Gordon (1986).

**Table 6. Real Interest Rates in the United States**

| | ***Real Short Rate*** | ***Real Long Rate*** |
|---|---|---|
| 1929 | 5.78 | 5.25 |
| 1930 | 6.00 | 5.87 |
| 1931 | 11.73 | 9.38 |
| 1932 | 14.24 | 13.68 |
| 1933 | 7.16 | 12.17 |
| 1934 | -3.07 | 5.97 |
| 1935 | -1.55 | 2.26 |
| 1936 | -0.75 | 0.97 |
| 1937 | -2.00 | 0.70 |
| 1938 | 2.32 | 2.55 |

*Note*:

Real interest rates are on an ex-post basis similar to that used in Table 4; for details of methods see Chadha and Dimsdale (1999); I am grateful to Jagjit Chadha for providing me with the data.

*Source*:

Chadha and Dimsdale (1999)

**Table 7. Defence News: Estimates of Changes in Net Present Value of Expected Defence Expenditure** (£ million, 1938 prices).

| | | | | | |
|---|---|---|---|---|---|
| $1920_{Q1}$ | | $1927_{Q1}$ | | $1934_{Q1}$ | |
| $1920_{Q2}$ | | $1927_{Q2}$ | +2.2 | $1934_{Q2}$ | |
| $1920_{Q3}$ | | $1927_{Q3}$ | | $1934_{Q3}$ | +44.3 |
| $1920_{Q4}$ | +36.0 | $1927_{Q4}$ | | $1934_{Q4}$ | |
| $1921_{Q1}$ | +112.4 | $1928_{Q1}$ | | $1935_{Q1}$ | |
| $1921_{Q2}$ | | $1928_{Q2}$ | | $1935_{Q2}$ | +178.2 |
| $1921_{Q3}$ | -36.7 | $1928_{Q3}$ | | $1935_{Q3}$ | |
| $1921_{Q4}$ | | $1928_{Q4}$ | | $1935_{Q4}$ | |
| $1922_{Q1}$ | | $1929_{Q1}$ | | $1936_{Q1}$ | +160.0 |
| $1922_{Q2}$ | | $1929_{Q2}$ | | $1936_{Q2}$ | |
| $1922_{Q3}$ | | $1929_{Q3}$ | | $1936_{Q3}$ | |
| $1922_{Q4}$ | -10.9 | $1929_{Q4}$ | | $1936_{Q4}$ | |
| $1923_{Q1}$ | | $1930_{Q1}$ | | $1937_{Q1}$ | +393.0 |
| $1923_{Q2}$ | +72.4 | $1930_{Q2}$ | | $1937_{Q2}$ | |
| $1923_{Q3}$ | | $1930_{Q3}$ | | $1937_{Q3}$ | |
| $1923_{Q4}$ | -0.9 | $1930_{Q4}$ | | $1937_{Q4}$ | |
| $1924_{Q1}$ | | $1931_{Q1}$ | | $1938_{Q1}$ | |
| $1924_{Q2}$ | -22.1 | $1931_{Q2}$ | +7.0 | $1938_{Q2}$ | +98.8 |
| $1924_{Q3}$ | | $1931_{Q3}$ | | $1938_{Q3}$ | +29.1 |
| $1924_{Q4}$ | | $1931_{Q4}$ | | $1938_{Q4}$ | |
| $1925_{Q1}$ | | $1932_{Q1}$ | | | |
| $1925_{Q2}$ | | $1932_{Q2}$ | +52.0 | | |
| $1925_{Q3}$ | | $1932_{Q3}$ | | | |
| $1925_{Q4}$ | | $1932_{Q4}$ | | | |
| $1926_{Q1}$ | | $1933_{Q1}$ | | | |
| $1926_{Q2}$ | +0.9 | $1933_{Q2}$ | | | |
| $1926_{Q3}$ | | $1933_{Q3}$ | | | |
| $1926_{Q4}$ | | $1933_{Q4}$ | | | |

*Source*: Crafts (2012b).

**Table 8. Real Output/Hour Worked in Manufacturing.**

| | *UK growth (% per year)* | *US growth (% per year)* | | *US/UK (UK = 100)* |
|---|---|---|---|---|
| | | | 1870 | 195.2 |
| 1870-90 | 1.58 | 1.75 | 1890 | 201.9 |
| 1890-1913 | 1.33 | 2.11 | 1913 | 241.2 |
| 1913-29 | 2.46 | 3.05 | 1929 | 264.5 |
| 1929-37 | 2.90 | 3.35 | 1937 | 274.0 |

*Source*: de Jong and Woltjer (2011); data kindly supplied by Herman de Jong.

**Table 9. Trade Costs Index, 1929-2000**

| | *UK-France* | *UK-Germany* | *France-Germany* | *Germany-Italy* |
|---|---|---|---|---|
| 1929 | 100 | 99 | 99 | 110 |
| 1938 | 121 | 122 | 133 | 112 |
| 1950 | 122 | 142 | 112 | 127 |
| 1960 | 122 | 115 | 91 | 101 |
| 1970 | 110 | 105 | 73 | 79 |
| 1980 | 74 | 66 | 55 | 61 |
| 1990 | 70 | 61 | 53 | 56 |
| 2000 | 75 | 66 | 61 | 66 |

*Note*: trade costs include all barriers to trade (policy and non-policy) and are derived from estimation of a gravity equation.

*Source*: data underlying Jacks et al. (2011) kindly supplied by Dennis Novy.

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