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Keywords: business cycles, economic history, United Kingdom

JEL classification: E32, N13, N14

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Dating Business Cycles in the United Kingdom, 1700–2010*

June 2022

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Abstract

This paper constructs a new chronology of business cycles in the United Kingdom from 1700 on an annual basis and from 1920 on a quarterly basis. The new chronology points to a number of observations about the business cycle. First, the cycle has significantly increased in duration and amplitude over time. Second, contractions have become less frequent but are as persistent and costly as at other times in history. Third, the typical recession has been tick-shaped with a short contraction and longer recovery. Fourth, the major causes of downturns have been sectoral shocks, financial crises and wars.

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I. Introduction

As with any modern economy, the British economy is subject to periodic fluctuations in activity, which are typically called business cycles. They are not uniform sine waves but irregular phenomena driven by different shocks across an economic structure that is not itself constant. At the limit these fluctuations have their own narrative as booms or recessions. As a result, there is great interest in understanding the upturns and downturns of the past. There has been much emphasis on what causes recessions? How deep and long are these events? What shape are recoveries? Academics (Hills et al., 2010; Mitchell et al., 2012), journalists (*Telegraph*, 2010; *Guardian*, 2015, 2020; *Financial Times*, 2020), policymakers (Bank of England, 2009, 2010; HM Treasury, 2010; House of Commons Library, 2010) and the wider public seek answers to these questions whenever recession looms.

While there is a rich history of trying to timestamp these events for the United Kingdom, going back to the seminal contributions of Burns and Mitchell (1946), Gayer et al. (1953), Ashton (1959) and Rostow (1972), the result is a patchwork of chronologies, which do not provide a clear, long-run picture of the peaks and troughs in British economic activity. Although impressive in the *longue durée*, the evidence is imperfect.

A reliable record of the turning points in the business cycle is important for a number of reasons. First, to contextualise modern slumps and recoveries in terms of past experience. Second, business cycle chronologies are an important input into economic research, such as for highlighting periods of expansion and contraction (Mountford and Uhlig, 2009; Auerbach and Gorodnichenko, 2012; Lennard, 2018) and for studying non-linearities over booms and busts (Tenreyro and Thwaites, 2016; Ramey and Zubairy, 2018). Third, recording the past incidence of expansions and contractions allows us to calculate not only the unconditional probability of each event but also the conditional probability, which may help us to answer questions such as why recessions occur.

In this paper, we construct a new chronology of the business cycle in the United Kingdom. The chronology extends back to 1700 on an annual basis and back to 1920 on a quarterly basis. In order to do so, the National Institute of Economic and Social Research (NIESR) has

drawn on the expertise of a UK Business Cycle Dating Committee, comprising of leading academics and policymakers.¹ The chronology is based on the authors' judgement in consultation with the committee and the most reliable national accounts available. In the interest of transparency, Appendix A provides a narrative overview of each business cycle. As the quality of the national accounts is not perfect, we communicate the uncertainty with reliability grades.

A number of business cycle facts emerge from the new chronology. First, the business cycle has increased in both duration and amplitude between the long eighteenth century and the postwar period, extending in duration from 3.4 years to 16 years and rising in amplitude from 3.2 per cent to 51.9 per cent. Second, recessions since 1945 have been longer and more severe than in the nineteenth century, although less so than the transwar period. Third, the average recession has been tick-shaped with a short contraction and a slightly longer recovery. Fourth, the main causes of British recessions have been sectoral shocks, financial crises and war.

This paper is structured as follows. Section II discusses previous chronologies of the British business cycle. Section III outlines the methodology. Section IV details the data. Section V presents the results. Section VI concludes. Appendix A provides a history of business cycles in the United Kingdom between 1700 and 2010. Appendix B provides an overview of our quarterly GDP estimates for the United Kingdom between 1938 and 1955.

II. Previous Research

Recording the peaks and troughs in British economic activity has a long history. In 1946, Burns and Mitchell published chronologies of the UK business cycle up until 1938, from 1792 on an annual basis and from 1848 on a monthly basis, based on 141 time series covering different periods (Burns and Mitchell, 1946, p. 20). The series measured production, construction and other areas of real activity, but also commodity prices, security markets, interest rates and money and banking. A number of chronologies followed in this tradition, focusing on a range

¹ See Annex 1 for the membership.

of disaggregated time series, such as Gayer et al. (1953, p. 348) for the period 1792 to 1848, Ashton (1959, p.172-3) for the eighteenth century and Rostow (1972, p. 77) for the years 1788 to 1914.

Economic historians have revisited the British business cycle chronology. Capie and Mills (1991) developed an annual set of business cycle dates between 1870 and 1912 using deviations from an estimated trend in real GDP. Klovland (1998) derived a monthly chronology for the period 1850-1914 based on a composite cyclical indicator and a modified version of the Bry and Boschan (1971) algorithm. The composite cyclical indicator is a weighted average of railway freight receipts, tonnage of ships engaged in the coasting trade, bank clearings, raw material imports, non-cotton exports, raw cotton consumption and cotton goods exports, where the series were detrended using a Hodrick-Prescott filter and the weights determined subjectively. Broadberry et al. (2012) use their new series of real GDP and a Hodrick-Prescott filter to construct a set of annual turning points between 1270 and 1870.

In the postwar period, the Central Statistical Office (CSO, 1993), forerunner to the Office for National Statistics (ONS), maintained a quarterly “reference chronology”, covering the 1950s to the 1990s, based on turning points in real GDP. The Organisation for Economic Co-operation and Development (OECD, 2019) continue to produce a set of turning points for the United Kingdom using detrended real GDP and a version of the Bry and Boschan (1971) algorithm, which extends back to 1955 on a monthly basis.

There is, however, scope to improve on existing chronologies in a number of ways. First, a wealth of new macroeconomic data has been constructed recently that was not available as inputs into existing chronologies. As a number of studies have pointed out, the relative lack of data available to, and the effort devoted by, the National Bureau of Economic Research, for example, compromises the reliability of their chronology for the UK (Capie and Mills, 1991; Friedman and Schwartz, 1982, p. 308; Klovland, 1998). Second, many of the existing chronologies use detrended data. As Section III shows, this is not current best practice and may introduce systematic biases. Third, no single chronology covers both a significant stretch of history and the present. As a result, Friedman and Schwartz (1982, pp. 77), Chadha et al.

(2000) and Chadha and Nolan (2002) have linked various existing chronologies to form a long-run record. However, these series are constructed in different ways, which may lead to incorrect inference about how the business cycle has evolved over time. Fourth, for periods with multiple chronologies, it is not clear which is the most reliable. Five chronologies cover the eighteenth century, for example.

To illustrate the degree of consistency between overlapping chronologies, a concordance matrix is shown in Table 1. Concordance measures the degree to which two series are simultaneously in a state of contraction or expansion, where 0 indicates that the two series are perfectly unsynchronised and 100 that the two are perfectly synchronised. This exercise shows that while there is some agreement between turning points across existing chronologies, there is also a good deal of disagreement. Ashton's (1959) chronology, for example, is consistent with Broadberry et al.'s (2012) series in just 54 per cent of years between 1700 and 1802 and with Rostow's (1972) chronology in 67 per cent of years between 1788 and 1802 and so on. This review suggests that there is scope for a new chronology that consistently spans the period from 1700 to the present.

[TABLE 1 ABOUT HERE]

III. Measuring Business Cycles

A. Definitions

A business cycle is composed of two *phases*: an *expansion* and a *contraction*. An expansion is a significant increase in economic activity ranging from the period following the trough to the peak. A contraction is a significant decrease in economic activity ranging from the period following the peak to the trough.²

² There is some discrepancy in the literature as to whether the peak should be classified as part of the expansion or contraction (Berge and Jordà, 2011). As economic activity is expanding up to the peak, sometimes rapidly, it seems odd to consider it as part of the contraction, particularly if we consider how agents may perceive the state of the economy in real time. We therefore date the contraction from the period following the peak to the trough.

The definitions of the phases hinge upon the significance of the change in economic activity. We interpret significance in terms of *depth* and *duration*. Depth is important so that trivial changes in economic activity are not classified as a specific phase. Duration is vital so that fleeting changes in economic activity are not recorded separately.

B. *Challenges*

Identifying expansions and contractions is challenging. A number of fundamental issues must be confronted. It is to these that we now turn.

Date then Aggregate or Aggregate then Date?— An important issue is whether to study many disaggregated time series or a single aggregated measure. Burns and Mitchell (1946) used a wide array of series as inputs. At that time, aggregate measures of economic activity, such as real GDP, were still in their infancy, particularly given the focus on not only the twentieth, but also the nineteenth, century (Burns and Mitchell, 1946, p. 73; Rockoff, 2019).

There is, however, an important issue with focusing on many individual time series. How should the various “specific cycles” in each time series, which might be contradictory, be weighted to determine the “reference cycle” in the overall economy? Burns and Mitchell (1946, p. 77) note that “there were cases in which the turning points were widely scattered, and others in which they were concentrated around two separate dates.” According to Romer (1994), the precise method used to reconcile these discrepancies “appears to be left deliberately vague”, noting that “they seem to rely on subjective judgement and an informal weighting scheme for deciding which series to use as their main guide.”

As a result, most modern business cycle chronologies use aggregate measures of economic activity to identify turning points. For example, chronologies produced by leading research organisations, such as the Centre for Economic Policy Research (2019), the National Bureau of Economic Research (2019) and the Spanish Economic Association (2022), focus on real GDP (and some of its components) and employment, while many chronologies produced by academics, such as Romer (1994), Davis (2006), Broadberry et al. (2012), Berge and Jordà

(2013), Jordà et al. (2013) and Martínez-García et al. (2015) use real GDP (or industrial production when real GDP is unreliable or unavailable).

Focusing on an aggregate measure of economic activity, such as real GDP, has a major advantage. As real GDP can be expressed as the weighted sum of its components, where the weights represent the share of real GDP, it resolves the problem of how to weight many individual time series. On the expenditure side, it includes consumption, investment, government expenditure, exports and imports. On the income side, it incorporates average earnings, employment and profits. On the output side, it includes the production of the agricultural, industrial and services sectors. These components are, in turn, aggregates of many more sub-components.

A potential concern of using an aggregate measure of economic activity, such as real GDP, is measurement error, particularly given the uncertainty associated with historical national accounts (Solomou and Weale, 1991). However, the measurement error in the aggregate is, at least in part, a reflection of measurement error in the underlying components. Therefore, it is not clear that focusing on individual time series, as opposed to an aggregate measure of economic activity, would circumvent the issue of measurement error. However, using *balanced* estimates of real GDP would help to ameliorate this problem, as real GDP is adjusted based on the reliability of its underlying components.

Overall, we focus on an aggregate measure of economic activity. In theory, whether using many individual time series or an aggregate, the results should be similar as series such as employment, industrial production and real GDP “only fluctuate substantially when many of the individual components fluctuate” (Romer, 1994). Stock and Watson (2010) show in practice that “date then aggregate” and “aggregate then date” methods produce similar turning points for the United States in the postwar period.

Measures of Economic Activity.— The measure of economic activity that we study is real GDP. On an annual basis, there are estimates going back to the 1700s and beyond and, on a quarterly basis, back to 1920. An alternative measure of economic activity is industrial production. However, the economic importance of industry has fluctuated substantially over

time, meaning that its fluctuations may not be representative of those in the wider economy. In addition, industrial production data is not available throughout the period under investigation.

Detrended or Levels?— Another important issue is whether to study the level or the cycle of the time series. According to Romer (1994), the National Bureau of Economic Research have shifted between practices. The dates prior to 1927 were derived using detrended data, while the turning points identified after have been based on data in levels.

A major issue with detrending is that it could lead to systematic biases in the identification of turning points. As Romer (1994) argues, “if the extremes in a series are fairly smooth and the upward trend is significant, then the peak in the detrended data will come before the actual peak and the trough in the detrended data will come after the actual trough.” Both Romer (1994) and Davis (2006) demonstrate that the use of detrended data introduced biases into the National Bureau of Economic Research’s chronology for the period before the Great Depression. Another issue with detrending is that it will classify “growth recessions” as a contraction, which are not typically considered genuine recessions in the literature (Davis, 2006; Romer, 1994). Finally, there are a battery of methods for removing trends, upon which the dating of turning points (Canova, 1994) and the “business cycle facts” (Canova, 1998; Harvey and Jaeger, 1993) will depend.

Harding and Pagan (2002) argue “there is no need to perform a detrending operation to analyse the business cycle.” Indeed, the majority of recent chronologies published by researchers (Romer, 1994; Davis, 2006; Berge and Jordà, 2013; Jordà et al., 2013) are based on data in levels, as well as the modern dates published by the Centre for Economic Policy Research (2019), National Bureau of Economic Research (2019) and Spanish Economic Association (2022). In light of these considerations, we focus on data in levels.³

³ Romer and Romer (2020) emphasise the value of “economic slack”, measured as the difference between GDP and potential GDP and between actual unemployment and the natural rate. However, reliable estimates of potential GDP and the natural rate are not available for most of the sample period and statistical estimates based on time series filters are subject to the criticisms above.

Rules versus Discretion.— The literature is divided between two schools of thought. The first is based on rules to classify expansions and contractions. These chronologies have typically been produced by academics (Romer, 1994; Davis, 2006; Berge and Jordà, 2013; Jordà et al., 2013; Martínez-García et al., 2015). The second is based on expert judgement to chronicle the business cycle. These dates have generally been determined by research institutes (Centre for Economic Policy Research, 2019; National Bureau of Economic Research, 2019; Spanish Economic Association, 2022). An advantage of a rule is that it is transparent and reproducible. A disadvantage, however, is that the ultimate chronology will depend on the rule, the parameters of which are likely to be arbitrary. On balance, we use discretion to classify phases in economic activity. To mitigate the reduced transparency involved with judgement, Appendix A gives a detailed description of every peak and trough between 1700 and 2010.

What is a Business Cycle?— Identifying turning points in the level of economic activity is relatively straightforward. However, describing intervals between successive peaks or troughs is less so as there are alternative definitions of the business cycle. While most chronologies define business cycles in this way (Romer, 1994; Davis, 2006; Broadberry et al., 2012; Berge and Jordà, 2013; Jordà et al., 2013; Martínez-García et al., 2015; Centre for Economic Policy Research, 2019; National Bureau of Economic Research, 2019; Spanish Economic Association, 2022), some emphasise deviations from normal or potential that might prevail given flexible prices (Romer and Romer, 2020). Others focus on specific frequencies (Chadha et al., 2002) so that shorter- and longer-term fluctuations are considered to belong not to the business cycle but to an irregular component, longer-run cycle or trend. These unavoidable conceptual issues should be kept in mind.

C. Reliability

The true state of the economy is unobservable (Berge and Jordà, 2011). While fluctuations in GDP may be a good approximation, it is measured with error. Despite our focus on the most reliable vintage for each period, this measurement error has ebbed and flowed over time (Feinstein, 1972; Sefton and Weale, 1995). As a result, some cycles in GDP may be spurious.

In order to communicate this classification uncertainty, we assign each recession a reliability grade, which takes one of five values: very low, low, medium, high or very high. In doing so, two factors are considered. The first is the signal to noise ratio. While not explicitly calculated, this factor balances the fact that some contractions are more significant than others (signal) and the fact that the accuracy of the data changes over time (noise). The logic is that a small, short-lived contraction or expansion is more likely to be an artefact than a large, persistent one for a given level of measurement error. The second factor is narrative evidence. There are a number of histories of British business cycles and a wealth of contemporary sources that can be used to ascertain the potential reliability of downturns that we identify in the data.

IV. Data

This section outlines the data that is used to identify peaks and troughs in economic activity. The sources are listed in Table 2.

[TABLE 2 ABOUT HERE]

A major input into the chronology is the national accounts. On an annual basis, Broadberry et al. (2015) have constructed a series of output for Great Britain between 1700 and 1870.⁴ Solomou and Weale (1991) have produced a balanced series of real GDP for the United Kingdom between 1870 and 1913 by allocating the discrepancy between the expenditure and output estimates based on their subjective reliabilities. Mitchell (1988) has calculated a compromise series of real GDP for the UK covering the period from 1913 to 1920 as the arithmetic mean between national expenditure and income (in addition to some adjustments). Sefton and Weale (1995) have balanced UK real GDP from 1920 to 1948. The ONS (2020) have calculated gross domestic product and gross value added for the United Kingdom for the period since 1948. A composite annual series of GDP at market prices and GVA at basic prices is shown in Figure 1.

[FIGURE 1 ABOUT HERE]

⁴ According to Broadberry et al. (2020), the amplitude of GDP is believed to be higher prior to 1720 because of the more limited information available to construct the estimates of agricultural output.

On a quarterly basis, Mitchell et al. (2012) have estimated UK real GDP between 1920 and 1938 based on high-frequency indicators, annual GDP and a dynamic factor model. ONS (2020) have produced UK gross domestic product and gross value added for the period since 1955.

However, there is a gap between 1938 and 1955. As a result, we construct a data set of annual and quarterly data from primary and secondary sources and estimate a variety of temporal disaggregation models (Chow and Lin, 1971; Denton, 1971; Litterman, 1983; Proietti and Moauro, 2006; Mitchell et al., 2012) to estimate quarterly GDP. The data, methodology and results are discussed in Appendix B. All of the series have been seasonally adjusted at source and are consistent with the annual estimates. An unbroken quarterly series of GDP at market prices and GVA at basic prices is plotted in Figure 2.

[FIGURE 2 ABOUT HERE]

Between 1700 and 1870, the historical national accounts are not for the United Kingdom but for Great Britain. As a result, Ireland is not included between the Act of Union in 1800 and 1870. Therefore, during this period, the peaks and troughs should be interpreted as relating to Great Britain and not necessarily to the United Kingdom as a whole.⁵

V. Results

This section documents the major results. The first sub-section compares the new record to existing chronologies. The second presents some key summary statistics for the business cycle. The third summarises the explanations for recessions given in the historiography. The final sub-section investigates whether expansions are duration dependent.

⁵ The estimates of real GDP are adjusted for the emergence of the Irish Free State in the 1920s.

A. *Comparison to Other Chronologies*

How does the new chronology compare to existing accounts? The last column of Table 1 shows the concordance between the new chronology and nine others that cover the eighteenth century onwards. The mean concordance is 75, suggesting a relatively high degree of synchronisation. This implies that the majority of turning points are well established in the historiography but also that a minority are not. Our chronology is least concordant with Ashton's (1959) list, who had to rely on many disaggregated series as historical national accounts were not available. It is most concordant with Broadberry et al.'s (2012) record. The two chronologies use the same underlying data, but a key difference is that Broadberry et al. (2012) study an estimated cycle, whereas we focus on the data in levels, which may account for the small differences.

B. *Business Cycle Facts*

The annual and quarterly turning points are listed in tables 3 and 4.

[TABLE 3 ABOUT HERE]

[TABLE 4 ABOUT HERE]

Figure 3 and 4 plot the periods of recession alongside the natural logarithms of GDP at market prices and GVA at factor cost.

[FIGURE 3 ABOUT HERE]

[FIGURE 4 ABOUT HERE]

This information is summarised in Table 5, which shows the number, duration, frequency and amplitude of contractions, expansions and cycles for a number of sub-periods. The first sub-period is 1701-1816, which was a long century of war, beginning with the War of the Spanish Succession and ending with the Napoleonic Wars. The second sub-period is 1817-1908, which

roughly corresponds to a stretch of relative peace known as the *Pax Britannica*. The third sub-period is 1909-47, which broadly relates to the transwar period. The final sub-period is 1948-2009, which is approximately the postwar period. The rough dating of these epochs follows from the business cycle turning points.

[TABLE 5 ABOUT HERE]

Over the course of more than three centuries, there have been 59 contractions, lasting 1.5 years on average, implying that the British economy has been in a state of recession 29.5 per cent of the time. The average output loss, from peak to trough, has been 4 per cent. However, this has been far from constant over time. Recessions have become less frequent, occurring roughly every other year in the eighteenth century, every fourth year in the *Pax Britannica* and transwar periods and every ninth year since the Second World War. While the frequency of recessions has declined to a historical low, the duration and amplitude have not. Postwar recessions have been longer on average than those in the eighteenth and nineteenth centuries, although not as long as those during the transwar period, and have been more costly than those in the nineteenth century, albeit not as much as downturns in the eighteenth century or the transwar period.

Expansions have increased in duration, frequency and amplitude over time. The average expansion has lengthened from 1.8 to 13.8 years, the mean frequency has risen from 53.9 per cent to 88.7 per cent, and the average amplitude has increased from 7.6 per cent to 62.5 per cent since 1700.

The joint implication is that the business cycle has increased in both duration and amplitude, extending in duration from 3.4 years to 16 years and rising in amplitude from 3.2 per cent to 51.9 per cent between the long eighteenth century and the postwar period.

The rising duration of business cycles has implications for the literature that use time series filters to estimate business cycles. For example, the Baxter-King (1999) and Christiano-Fitzgerald (2003) models typically retain cycles of 1.5 to 8 years. For British business cycles since the twentieth century, this suggests that these filters would misidentify some of the

business cycle as part of the lower frequency components, such as the trend. This is also evidence against filtering prior to business cycle dating.

The shape of recessions is a question of great importance. Does economic activity fall and rise according to a short, sharp V-shape, a double-dip W-shape or a more permanent L-shape? Figure 5 plots the mean recession profile. In the first year of a contraction, GDP falls, on average, by 2.5 per cent. In the second year growth returns but the level of economic activity remains below the peak. The recovery is complete in the third year as the pre-recession peak is surpassed. Therefore, British recessions have been somewhat tick-shaped, with a short contraction and longer recovery. The standard errors around these point estimates are relatively large, demonstrating the heterogeneity of recessions in British history.

[FIGURE 5 ABOUT HERE]

C. The Causes of Recessions

The long historiography on British business cycles is a rich resource for understanding the causes of recessions, from Thorp's (1926) annals for the late eighteenth to the early twentieth centuries to Dow's (1998) history of major recessions since the Great War. In Appendix A, we summarise the shocks associated with each recession since 1700 that have been advanced in the previous literature to give an indication of what have been the historic drivers of business cycles.

Table 6 presents the results. The dominant shock between 1700 and 2010 has been sector-specific, which have largely been concentrated in agriculture. These shocks were particularly important in the eighteenth century, less so in the nineteenth and had largely disappeared by the twentieth. This characterisation is consistent with previous research. Ashton (1959, p. 62), for example, writes of the 1700s that "among the causes of instability of economic life in this century variations in the yield of the soil must be given first place." In addition, Solomou (1994, pp. 263-4) finds a significant correlation between fluctuations in agricultural output and aggregate economic activity as late as 1890, although the association ended thereafter.

[TABLE 6 ABOUT HERE]

The second most important shock has been financial crises. While other shocks have risen or fallen in prominence over time, financial crises have been a fairly constant source of sorrow. From the eighteenth century when Hoppit (1986) noted that “growth provided the temptation, credit the snare, and crises destruction and perdition,” to the nineteenth when “most major cyclical contractions [...] were accompanied by crises” (Matthews, 1964, p. 138), and to the twenty-first century when the 2007-8 crisis had “a major and long-lasting effect on the economy” (Turner, 2014, p. 64).

The next most common source of recessions has been war. According to Aldcroft and Fearon (1972, p. 57):

The most influential type of shock has undoubtedly been that of war, the only one of sufficient strength to upset cyclical patterns substantially. The French and Napoleonic Wars certainly distorted the cyclical pattern in Britain up to 1815, though precisely in what way is more difficult to say because we have only a hazy notion of what went before. The impact of the First World War was even greater since it was global in its effects and had repercussions for many years afterwards.

Another important shock is economic policy, which has risen through the ranks from a minor source of recessions in the eighteenth century to the major source since 1900. In the eighteenth century, the scope for monetary policy shocks was limited by the usury laws that were binding until 1833 (Dimsdale and Thomas, 2019). Fiscal policy was a major source of instability during the 1700s, but it was mainly used in response to war (Barro, 1987). In the twentieth century, policy has been used to achieve macroeconomic objectives, although these have not always related to minimizing economic fluctuations but to the stabilization of the exchange rate and inflation.

Other shocks have been important in specific periods. As economies opened up to trade and capital flows in the nineteenth century, shocks to commodity prices and international trade have become regular causes of recessions. Similarly, as labour became more unionised at the

beginning of the twentieth century (Boyer and Hatton, 2002), labour supply shocks have also risen in significance.

D. Do Expansions Die of Old Age?

An important question in macroeconomics is whether expansions exhibit duration dependence. Despite its importance, however, the literature is divided on the answer (Diebold and Rudebusch, 1990; Sichel, 1991; Zuehlke, 2003; Castro, 2013). As recessions are rare, small samples are a problem in this literature. By extending the chronology back to the recession prone eighteenth century, we are able to investigate this question using the largest sample yet.

A common method for studying duration dependence is the Kaplan-Meier (1958) nonparametric estimator of the survival function, which is plotted in Figure 6.⁶ The green line shows that 62 per cent of expansions lasted longer than 1 year, 41 per cent more than 2 years and so on between 1700 and 2009. The other lines show the survival function for various sub-periods. Between 1701 and 1816, the probability of an expansion lasting 5 years was 0 per cent. Between 1948 and 2009, the likelihood had risen to 75 per cent. The successive shifting to the right of the survival function as the sample period approaches the present shows that expansions were more likely to reach a given age in each period than was the case in the period before. To summarise, expansions of the long eighteenth century had little chance of surviving to old age as more than half had ended within 2 years. However, by the postwar period, expansions were much more likely to reach old age as 50 per cent made it to age 15.

[FIGURE 6 ABOUT HERE]

VI. Conclusion

The British business cycle has fundamentally changed over three centuries. The cycle has quadrupled in length between the eighteenth century and the postwar period. Recessions are

⁶ See Beaudry and Portier (2019) for an explanation of parametric and nonparametric methods.

less frequent than at any point in history. When recessions do occur, however, they are as deep and as durable. Historically, the major cause of recessions was sectoral shocks, mainly in agriculture, but these had faded by the twentieth century. Financial crises have been a persistent bane of the British economy, being at the root of 1 in 5 recessions since 1700.

An economic statistic is only as good as its component parts. A business cycle chronology is no different. In this paper, we have made full use of the corpus of national accounts available for the United Kingdom. As the mass of economic information evolves over time, so too will the business cycle chronology. Looking to the past, new data would be valuable to address the inconsistencies in quality and quantity over time, be it improved income or output estimates of GDP for the nineteenth century, balanced estimates of GDP for the Great War, or high-frequency estimates of GDP prior to 1920. Looking ahead, as blue books continue to be published, the chronology will be extended to include the expansions and contractions of the future.

Table 1. *Concordance Matrix (%)*, 1700-2010

	Ashton (1959)	Broadberry et al. (2012)	Rostow (1972)	Gayer et al. (1953)	Burns and Mitchell (1946)	Klovland (1998)	Capie and Mills (1991)	OECD (2019)	CSO (1993)	New
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	100	54	67	64	73					58
(2)	54	100	72	68	71	86				91
(3)	67	72	100	100	98	78	84			76
(4)	64	68	100	100	98					75
(5)	73	71	98	98	100	78	79			75
(6)		86	78		78	100	79			72
(7)			84		79	79	100			65
(8)								100	79	69
(9)								79	100	75
(10)	58	91	76	75	75	72	65	69	75	100
Frequency	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Quarterly	Quarterly	Annual and quarterly
Sample	1700-1802	1700-1870	1788-1914	1792-1848	1792-1938	1850-1914	1870-1912	1955-2010	1958-1992	1700-2010

Notes: The degree of concordance between chronology x and y is: $C_{xy} = \frac{1}{T} \sum_{t=1}^T [S_t^x S_t^y + (1 - S_t^x)(1 - S_t^y)]$, where $S_t^j = 1$ if chronology j is in a state of expansion at time t and zero otherwise.

Table 2. *Data Sources*

Variable	Source	Coverage	Units
<i>Panel A. Annual</i>			
Gross domestic product	Broadberry et al. (2015, pp. 239-44)	Great Britain, 1700-1870	1700 = 100
Balanced estimate of gross domestic product	Solomou and Weale (1991)	United Kingdom, 1870-1913	£ millions in constant prices
Compromise estimate of gross domestic product at factor cost	Mitchell (1988, p. 836)	United Kingdom, 1913-20	1913 = 100
Balanced estimate of gross domestic product at factor cost and market prices	Sefton and Weale (1995, pp. 258-65)	United Kingdom, 1920-1948	£ millions in constant prices
Gross domestic product at market prices	ONS (2020). Series ID: ABMI	United Kingdom, 1948-2010	£ millions in constant prices
Gross value added at basic prices	ONS (2020). Series ID: ABMM	United Kingdom, 1948-2010	£ millions in constant prices
<i>Panel B. Quarterly</i>			
Gross domestic product at factor cost and market prices	Mitchell et al. (2012)	United Kingdom, 1920-38	£ millions in constant prices
Gross domestic product at factor cost and market prices	Appendix B	United Kingdom, 1938-55	£ millions in constant prices
Gross domestic product at market prices	ONS (2020). Series ID: ABMI	United Kingdom, 1955-2010	£ millions in constant prices

Table 2. *Data Sources (Continued)*

Variable	Source	Coverage	Units
Gross value added at basic prices	ONS (2020). Series ID: ABMM	United Kingdom, 1955-2010	£ millions in constant prices

Table 3. *Annual Turning Points in the United Kingdom, 1700-2010*

Peak	Trough	Peak	Trough	Peak	Trough
1701	1703	1769	1770	1846	1847
1704	1706	1771	1772	1849	1850
1708	1710	1773	1774	1854	1855
1712	1713	1777	1779	1857	1858
1714	1715	1781	1783	1860	1862
1718	1719	1784	1785	1878	1879
1720	1721	1786	1788	1883	1885
1722	1724	1792	1794	1891	1893
1725	1727	1796	1797	1899	1900
1728	1729	1802	1804	1902	1903
1730	1731	1805	1806	1907	1908
1733	1735	1807	1808	1918	1921
1736	1737	1810	1812	1925	1926
1738	1740	1813	1814	1929	1931
1742	1744	1815	1816	1943	1947
1747	1749	1817	1819	1973	1975
1750	1751	1825	1826	1979	1981
1753	1754	1836	1837	1990	1991
1755	1756	1838	1839	2007	2009
1761	1765	1840	1842		

Table 4. *Quarterly Turning Points in the United Kingdom, 1920-2010*

Peak	Trough
1926:I	1926:III
1930:I	1932:III
1943:II	1947:II
1973:II	1975:III
1979:II	1981:I
1990:II	1992:II
2008:I	2009:II

Table 5. *Frequency and Duration of British Business Cycles, 1700-2010*

	1701-1816	1817-1908	1909-47	1948-2009	1701-2009
<i>Contractions (Peak to trough)</i>					
Number	35	16	4	4	59
Mean Duration (Years)	1.5	1.3	2.5	1.8	1.5
Mean Frequency (%)	46.1	22.8	25.6	11.3	29.5
Mean Amplitude (%)	-4.0	-2.1	-12.0	-2.8	-4.0
<i>Expansions (Trough to peak)</i>					
Number	34	16	4	4	58
Mean Duration (Years)	1.8	4.4	7.3	13.8	3.7
Mean Frequency (%)	53.9	77.2	74.4	88.7	70.5
Mean Amplitude (%)	7.6	15.7	32.0	62.5	15.3
<i>Cycles (Peak to peak)</i>					
Number	34	16	4	4	58
Mean Duration (Years)	3.4	5.8	9.0	16.0	5.3
Mean Frequency (%)	100	100	100	100	100
Mean Amplitude (%)	3.2	13.0	19.9	51.9	10.4

Table 6. *The Share of Recessions Due to Various Shocks (%)*

	1700-1800	1800-1900	1900-2010	1700-2010
Animal spirits	0.0	0.0	6.3	1.2
Commodity price shock	0.0	7.4	12.5	4.7
Economic policy	2.3	3.7	25.0	7.0
Financial crisis	18.6	25.9	6.3	18.6
International shock	4.7	14.8	12.5	9.3
Labour supply	0.0	0.0	12.5	2.3
Public health crisis	7.0	0.0	0.0	3.5
Sectoral shock	46.5	29.6	6.3	33.7
Unknown	2.3	3.7	6.3	3.5
War	18.6	14.8	12.5	16.3

Sources: See Appendix A.

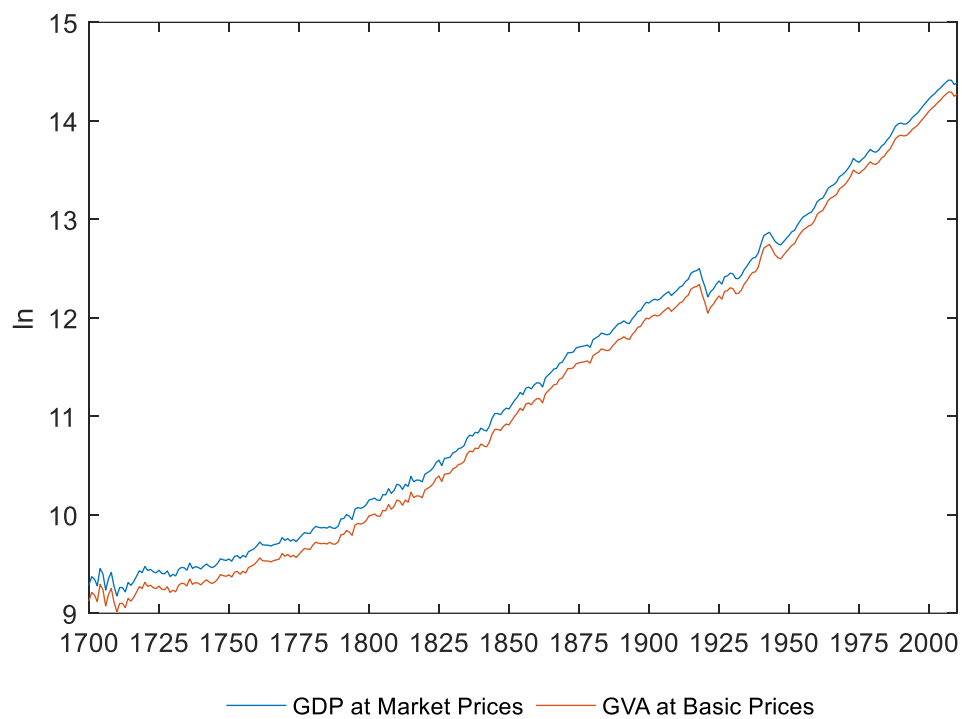


Figure 1. *Annual GDP, 1700-2010*

Source: See Panel A of Table 2.

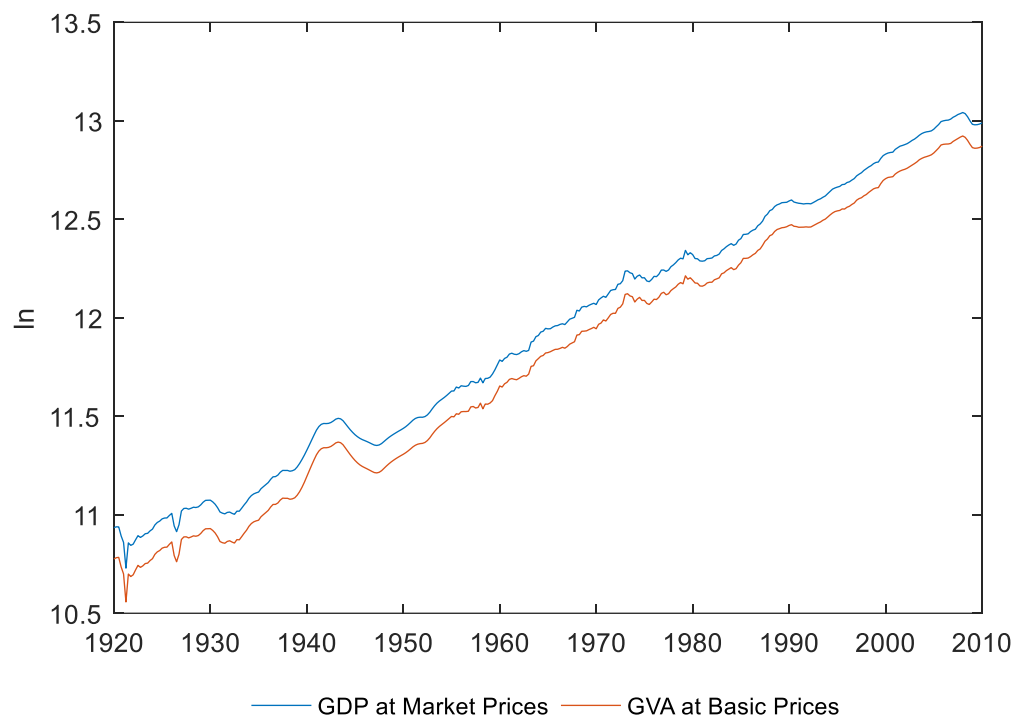


Figure 2. *Quarterly GDP, 1920-2010*

Source: See Panel B of Table 2.

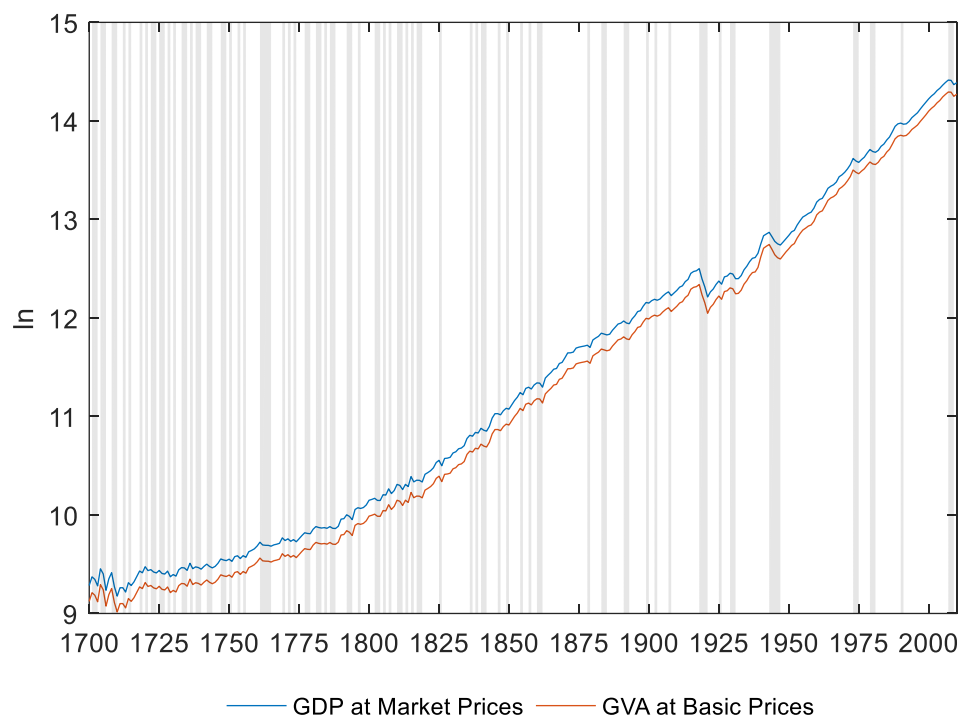


Figure 3. *New Annual Chronology of British Business Cycles, 1700-2010*

Note: Shaded areas represent recessions.

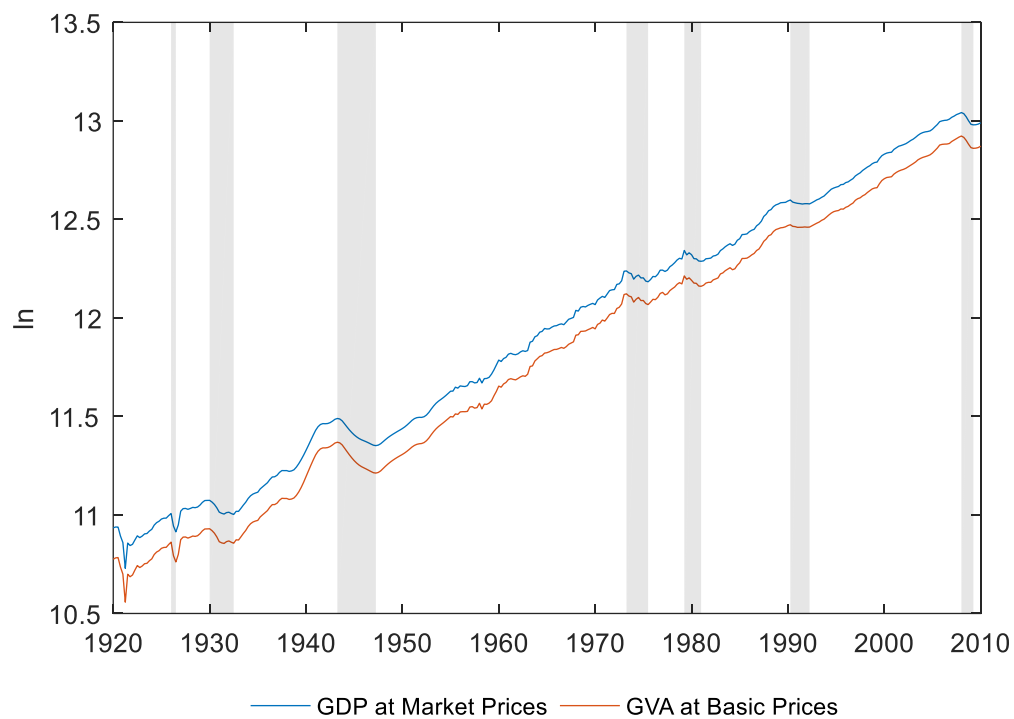


Figure 4. *New Quarterly Chronology of British Business Cycles, 1920-2010*

Note: Shaded areas represent recessions.

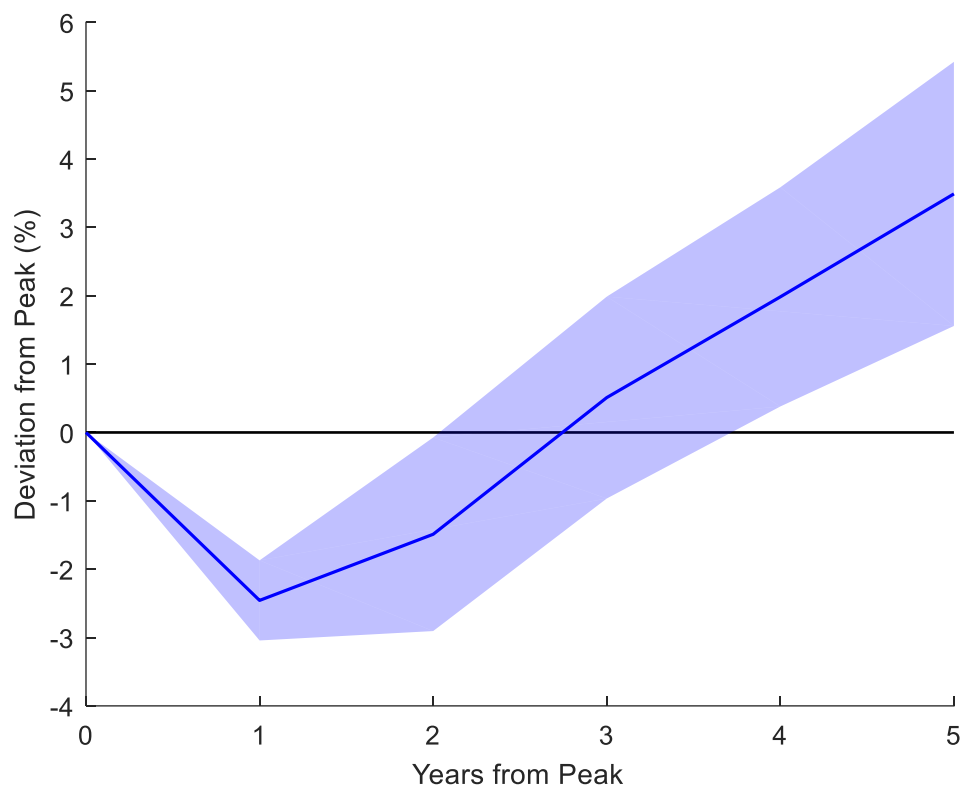


Figure 5. *The Shape of Recessions*

Note: Shaded area represents the 95 per cent confidence interval.

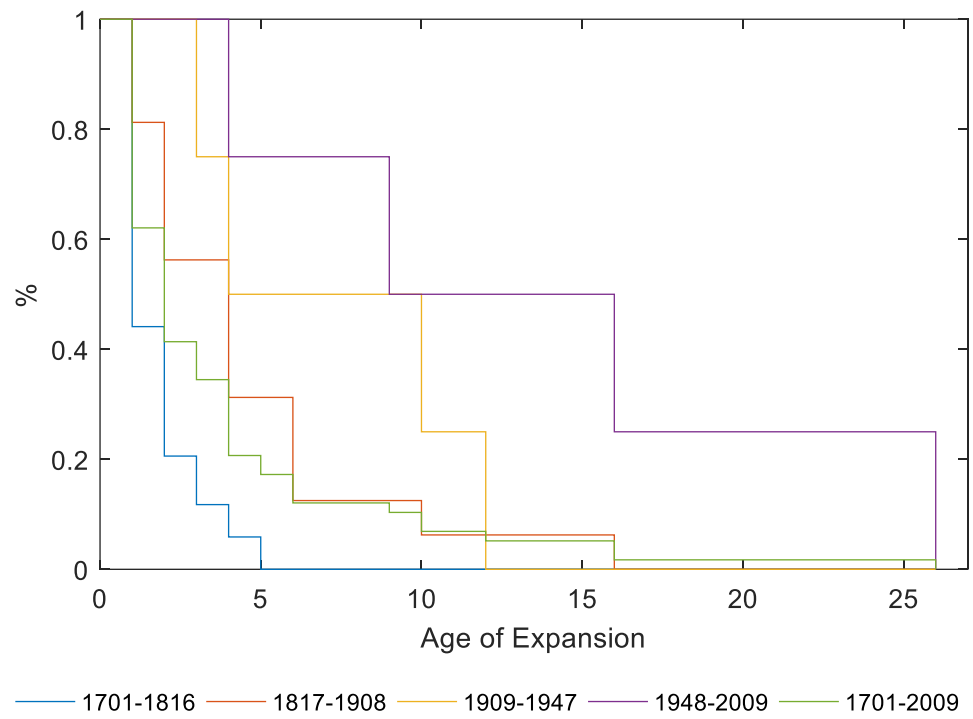


Figure 6. *Kaplan-Meier Survival Estimate*

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Annex 1: The UK Business Cycle Dating Committee

The task of guiding our judgement and supporting our technique in recording turning points in British economic activity of the past and present belongs to the UK Business Cycle Dating Committee. The committee was formed by the National Institute of Economic and Social Research with support from the Office for National Statistics as part of the research programme of the Economic Statistics Centre of Excellence. The committee consists of leading policymakers and academics:

- Chair, Jagjit Chadha, Director, National Institute of Economic and Social Research
- Secretary, Jason Lennard, Assistant Professor of Economic History, London School of Economics
- Andrew Harvey, Professor of Econometrics, University of Cambridge
- Andrew Scott, Professor of Economics, London Business School
- Clare Lombardelli, Director General, Chief Economic Adviser, HM Treasury
- Stephen Millard, Deputy Director, National Institute of Economic and Social Research
- Dame Kate Barker, External Member of the Monetary Policy Committee (2001-2010), Bank of England
- Martin Weale, External Member of the Monetary Policy Committee (2010-2016), Bank of England, and Professor of Economics, King's College London
- Rebecca Riley, Director, Economic Statistics Centre of Excellence, and Professor of Practice in Economics, King's College London
- Richard Heys, Deputy Director and Deputy Chief Economist, Office for National Statistics
- Roger Farmer, Professor of Economics, University of Warwick and UCLA
- Ryland Thomas, Senior Economist, Bank of England
- Solomos Solomou, Professor of Economics and Economic History, University of Cambridge
- Stephen Broadberry, Professor of Economic History, University of Oxford

Appendix A: A History of Business Cycles in the United Kingdom, 1700-2010

The Recession of 1702-3

	<i>Annual</i>
<i>Peak</i>	1701
<i>Trough</i>	1703
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 8.8%
<i>Explanation</i>	Sectoral shock and war
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

The recession of 1702-3 was relatively mild by the standards of the early eighteenth century. The explanation for this recession is not entirely clear. Ashton (1959, pp. 58, 140) suggested that the downturn came “with the outbreak of war” as “the decline in the shipments of woollens [was] sufficient to give rise to distress in the manufacturing areas”. The War of the Spanish Succession had begun in 1701, while Queen Anne’s War had commenced in 1702 in England’s American Colonies. Another potential explanation is that “the harvest of 1703 seems to have been unfavourable” (Tooke, 1838, p. 35).

Real GDP fell by 2.6 per cent in 1702 and by 6.4 per cent in 1703 (Broadberry et al., 2015). The contraction was diffuse, affecting pastoral farming, metals and mining, textiles and leather, other industries, and trade and transport in the first year, and arable and pastoral farming, textiles and leather, and trade and transport in the second. This pattern is consistent with an agricultural shock, which could have diffused through input-output linkages to other industries, such as trade and transport. The data suggest a spectacular recovery in 1704 when output increased by 19 per cent. All major industries increased in that year, except for pastoral output. In no year since 1704 has economic growth been faster.

We grade the reliability of this recession as low. A major concern is that the amplitude of GDP is too high prior to 1720 due to the nature of the information used to estimate agricultural

output (Broadberry et al., 2020). Minor offsetting factors are that the recession lasted two years, which would require some serial correlation in the measurement error for the recession to in fact be spurious, and there is broad agreement with existing chronologies. Ashton (1959) and Broadberry et al. (2012) agree with the peak in 1701 but differ on the timing of the trough. The former puts it in 1702, the latter in 1703.

The Recession of 1705-6

	<i>Annual</i>
<i>Peak</i>	1704
<i>Trough</i>	1706
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 19.6%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

In the midst of the war, a second, much larger, contraction struck in 1705. The precise cause of this recession is hard to discern. Ashton (1959, p. 140) notes that there was a “financial crisis in the autumn of 1704”, which may have accounted for the recession of the following years, given the delayed effects of the British economy to historical banking crises (Kenny et al., 2021). However, Hoppit (1986) does not list 1704 in his chronology of financial crises in eighteenth-century England. There was a 24.8 per cent fall in agricultural production, potentially a result of “bad weather” (Broadberry et al., 2020), although Hoskins (1968) describes the years 1705 and 1706 as having “abundant harvests”.

Real GDP slumped by 5.1 per cent in 1705 and by 15.3 per cent in 1706 (Broadberry et al., 2015). The output of the agricultural, industrial and services sectors declined during this recession. In agriculture, it was arable farming that fell steepest. In industry, it was textiles and leather. And in services, it was trade and transport. There was a general revival from 1707 as economic activity increased by 12.3 per cent, affecting not only those industries worst

impacted by the recession, but virtually all others, particularly government services, which coincided with the Union with Scotland.

Even if the cause of the recession is uncertain, the timing is less so. Compared to the historiography, Ashton (1959, p. 140) confirms that “the year 1705 saw a return of general depression”, although he also notes that “improvement began in 1706”. Compared to existing chronologies, Ashton (1959) and Broadberry et al. (2012) both agree on the peak in 1704, although the former opts for a trough in 1705, the latter in 1706. Despite the scale of the contraction and the general agreement with existing research, we grade the reliability of this recession as low because of the problems with the amplitude of agricultural output for this period (Broadberry et al., 2020).

The Recession of 1709-10

	<i>Annual</i>
<i>Peak</i>	1708
<i>Trough</i>	1710
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 21.2%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

The war’s third recession hit in 1709. This was even more costly than the second, ranking as the second deepest in the three centuries since 1700. The proximate cause seems to have been the Great Frost of 1709, when the “frost was greater (if not more universal also) than any other within the memory of man” (Derham, 1708). “Large numbers of cattle and sheep perished in the long frost, and there was little grass in the spring of 1709” (Ashton, 1959, p. 17) and there was a run of poor harvests, with some historians describing 1709 and 1710 as a famine (Hoskins, 1968). According to Ashton (1959, p. 141), this agricultural shock had aggregate implications due to network effects: “the relatively poor harvest of 1708 and the almost complete failure of that of 1709 brought depression to industries dependent on grain,

and reduced the volume of exports.” Hoppit (1986) notes that while there was a financial crisis in 1710, it was a consequence, not a cause, of the downturn.

Real GDP dropped by 13.4 per cent in 1709 and by 9.0 per cent in 1710 (Broadberry et al., 2015). Contractions were widespread. The first year saw slumps in pastoral farming, textiles and leather, other industries, and trade and transport, the second in arable farming, metals and mining, textiles and leather, other industries, government services, and trade and transport. In 1711 most industries returned to growth, expanding by 8.9 per cent in the aggregate.

The existing chronologies also lend some support to our classification. Broadberry et al. (2012) are in agreement with our timing of both the peak and trough. However, Ashton (1959), while consistent on the peak, differs on the trough, recording a longer recession that continued to 1712. Although this deep recession is well documented in the historiography, so too is the problem of the high amplitude of GDP prior to 1720 (Broadberry et al., 2020). As a result, we grade the reliability of this recession as low.

The Recession of 1713

	<i>Annual</i>
<i>Peak</i>	1712
<i>Trough</i>	1713
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 4.3%
<i>Explanation</i>	Economic policy and sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

As the war approached its end, the economy suffered a fourth recession, albeit milder than those that had come before. This contraction was seemingly the consequence of multiple shocks. The first was a fiscal contraction. In the summer of 1712, “400 men were dismissed from the government establishments at Deptford and Woolwich, and demobilization –

100,000 men were involved – had probably begun” (Ashton, 1959, p. 142). The second was another bad harvest (Hoskins, 1968).

Real GDP fell by 4.3 per cent in 1713 (Broadberry et al., 2015). In keeping with this recession being caused by an agricultural shock and economic policy, the worst affected sectors were arable farming, in which production declined by 30 per cent, and government services, in which output contracted by 34 per cent. There was a broad recovery in 1714, supported by rising output in most industries.

According to Ashton’s (1959) chronology, this contraction was a continuation of the recession of 1709-10, with 1713 a year of “impeded recovery” (Ashton, 1959, p. 142). Our timing of this recession is, however, consistent with Broadberry et al. (2012). Given the mixed agreement, the problem of high amplitude and the short, mild nature of this recession, we record the reliability as very low.

The Recession of 1715

	<i>Annual</i>
<i>Peak</i>	1714
<i>Trough</i>	1715
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.8%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The post-war recovery was short-lived as recession bit in 1715. According to Ashton (1959, p. 142), while there are several possible explanations, such as “the political uncertainties that followed the death of Queen Anne in August, the disturbances that led to the Riot Act, and the outbreak of the rebellion, in 1715, were all unfavourable to enterprise [...] it was the financial crisis of 1715 that was responsible for the general depression”. Hoppit (1986) claims that this was one of the “great crises of public finance”.

While this recession was mild – real GDP declined by 2.8 per cent – it was diffuse, affecting most major industries from arable farming to metals and mining and government services (Broadberry et al., 2015). “With a clearing of the political situation and a restoration of credit” (Ashton, 1959, p. 142), a long and widespread expansion began in 1716.

While our dating of the peak is the same as the existing literature (Ashton, 1959; Broadberry et al., 2012), we place the trough in 1715, in line with Broadberry et al. (2012), instead of 1716, as recorded by Ashton (1959). On the basis of mixed agreement in the historiography and the relatively weak signal in the national accounts, we regard the reliability of this recession as very low.

The Recession of 1719

	<i>Annual</i>
<i>Peak</i>	1718
<i>Trough</i>	1719
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 1.7%
<i>Explanation</i>	Public health crisis and sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

Just as it begun, the 1710s seemingly closed with recession. According to Creighton (1894, p. 63), 1718-9 was one of the “three worst periods of epidemic fever” between 1715 and 1765, which afflicted all classes from weavers in the East End to the family of the Archbishop of Canterbury. At the same time, there seems to have been some problems with the harvest, which declined in quality from “good” to “average” and was “deficient in West” (Hoskins, 1968). “In 1719 the oats were so badly scorched that, in the south of England, the price was nearly as high as that of wheat” (Ashton, 1959, p. 15).

This downturn was neither deep nor diffuse. Output fell by 1.7 per cent in 1719, which can be accounted for by just 2 industries: arable output was short by 27 per cent and government

services by 6 per cent (Broadberry et al., 2015). Activity rebounded by 6.3 per cent in 1720, despite 5 out of 9 industries contracting. The growth was driven mainly by an abundant harvest as arable production increased by 56 per cent.

Although Ashton (1959, p. 143) notes that it is “impossible to think of the years 1718-20 as a time of general depression”, Broadberry et al. (2012) share the peak and trough of 1718 and 1719, respectively. Given the insignificance of the downturn and the divided historiography, we assign this episode a reliability grade of very low.

The Recession of 1721

	<i>Annual</i>
<i>Peak</i>	1720
<i>Trough</i>	1721
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 3.9%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

An expansion of hitherto unprecedented duration was interrupted by one of the great financial crises of history. Ashton (1959, p. 143) explains that “in the summer of 1720 the South Sea boom collapsed the demand for liquidity brought a sharp contraction of industry and trade of all kinds”, while Mirowski (1979, p. 545) notes that “there was a very marked contraction of business after the South Sea Bubble burst”.

Output in all but one major industry contracted in 1721, falling by 3.9 per cent in the aggregate (Broadberry et al., 2015). As Hoppit (1986) gleaned from bankruptcy records, “the depressions of 1709-10 and of the late 1720s were much worse than that caused by the pricking of the Bubble”. “There was a return to prosperity in 1722” (Ashton, 1959, p. 143), as output expanded by 1 per cent. The recovery, while relatively weak, was widespread, raising output in 7 out of 9 industries.

We grade the reliability of this event as low. While our chronology of this contraction is the same as Broadberry et al.'s (2012), Ashton (1959) records an earlier peak of 1717-8. In addition, the slump was relatively mild and short.

The Recession of 1723-4

	<i>Annual</i>
<i>Peak</i>	1722
<i>Trough</i>	1724
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 3.3%
<i>Explanation</i>	International shock and sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

Prosperity after the South Sea crisis was fleeting as crisis returned in 1723. Although the historiography is thin, there are reports of a “recession in 1723” in the export of manufactured goods (Ashton, 1959, p. 143) – the total exports of England and Wales fell by 10 per cent at official values (Mitchell, 1988, p. 448) – and “drought in the summer”, which “bore heavily on the pastures and enforced the killing of good cattle” (Ashton, 1959, p. 18). Given the paucity of information on this recession, we accept Ashton’s explanation of international and sectoral shocks.

Economic activity dropped by 2.4 per cent in 1723 and 1 per cent in 1724 (Broadberry et al., 2015). The downturn was widespread, impacting arable and pastoral farming, metals and mining, other industries, government services, and trade and transport in the first year, and arable farming, metals and mining, textiles and leather, and government services in the second. There was a resurgence of activity in every industry in 1725. According to a contemporary, the harvest was “much better than expected [and] the linen and cotton manufacture in good demand” (Harland, 1851, p. 107).

The existing chronologies are mixed. While Broadberry et al. (2012) also record the recession of 1723-4, Ashton (1959) does not identify a recession at all. As the contraction was small at a time of potentially large measurement error and previous research is divided not on the timing but on the existence of a recession, we classify the reliability as low.

The Recession of 1726-7

	<i>Annual</i>
<i>Peak</i>	1725
<i>Trough</i>	1727
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 3.6%
<i>Explanation</i>	Public health crisis, sectoral shock and war
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

In 1726 the British economy suffered its third recession of the decade. A number of shocks contributed to the downturn. The first was war. According to Ashton (1959, p. 144), the outbreak of war with Spain led to a financial crisis, which was the turning point from expansion to contraction. However, as the financial crisis of 1726 was a product of the war (Hoppit, 1986), we regard the war, as opposed to the financial crisis, as the primitive shock. The second is agricultural. Hoskins (1968) reports that the harvests of 1726 and 1727 were “average” and “bad”, respectively. The second and third were “the advent of harsh weather and the outbreak of disease which, together, precipitated the worst mortality crisis of the eighteenth century” (Broadberry et al., 2020).

Real GDP fell by 3.0 per cent in 1726 and by 0.6 per cent in 1727 (Broadberry et al., 2015). The downturn was quite diffuse. In the first year, production contracted in arable and pastoral farming, other industries, trade and transport, and financial services. In the second year, output slumped in metals and mining, textiles and leather, other industries, and trade and transport. 1728 saw a fast, but relatively limited, recovery as real GDP increased by 3 per cent.

Although the contraction was not particularly large, the existing chronologies are in perfect agreement with our timing of the turning points for this episode (Ashton, 1959; Broadberry et al., 2012). Therefore, we grade the reliability of this recession as high.

The Recession of 1729

	<i>Annual</i>
<i>Peak</i>	1728
<i>Trough</i>	1729
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 5.5%
<i>Explanation</i>	Sectoral shock and war
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

1729 saw the fourth and final recession of the decade. Mirowski (1979, p. 546) claims that “the 1720s is the worst decade of the century from the point of view of the economic actors. It was, if you will, the Great Depression of the eighteenth century: a decade following a massive financial crash in which there is only indifferent recovery punctuated by repeated downturns”. On the cause of this recession, the historiography is vague. Ashton (1959, p. 145), for example, writes that the “depression” of 1729 may have been due to “the poor harvest, the renewal of tension with Spain, or some other malign influence”.

The national accounts, which declined by 5.5 per cent, show that it was not arable, but pastoral, production that declined, which seemingly affected related industries, such as wool/textiles, leather and foodstuffs (Broadberry et al., 2015). However, other unrelated industries also slumped, such as construction and the whole of the services sector. Overall, 7 of the 9 major industries contracted. Although the recovery in 1730 was relatively mild, it was widespread, stimulating activity in two-thirds of the major industries.

Although the downturn was short, it was relatively sharp and the timing is consistent with the two existing chronologies available for this period (Ashton, 1959; Broadberry et al., 2012). As a result, we classify the reliability of this recession as high.

The Recession of 1731

	<i>Annual</i>
<i>Peak</i>	1730
<i>Trough</i>	1731
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 1.6%
<i>Explanation</i>	Sectoral shock and war
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The recession of 1731 is not one of the great episodes of economic history. A contemporary (Harland, 1851, p. 120) wrote that “corn [...] is very low, and also provisions of all sorts cheap.” Indeed, agricultural prices fell steeply in 1730 and further still in 1731 (Broadberry et al., 2015). Tooke (1838, p. 41) notes that the “great fall of prices in 1731 [...] was productive of great agricultural distress” and alludes to a farm channel in which lower agricultural prices led to reduced incomes of farmers and landholders, which in turn, may have had aggregate economic implications (Hausman et al., 2019). Ashton (1959, p. 59) conjectures that the “slight recession in 1731 may have been the result of strained relations with Spain”.

This downturn was relatively minor in terms of depth (1.6 per cent of GDP), duration (1 year) and diffusion (5 out of 9 industries contracted) (Broadberry et al., 2015). A recovery began thereafter, at first driven by an agricultural boom in 1732, then diffusing throughout much of the industrial and services sectors by 1733.

There is scant independent evidence of a recession in 1731. While Broadberry et al. (2012) do acknowledge this episode, Ashton (1959) does not identify a contraction and Mirowski (1979, p. 552) writes that the “boom of the early 1730’s [...] seems to have been quite a significant

expansion on all economic fronts. Profit rose to an exceptional peak, population expanded appreciably and continuously; share prices rose from 1730 to 1732.” Given that this recession was limited along several dimensions, within the bounds of measurement error and in conflict with the historiography, we grade the reliability of this event as very low.

The Recession of 1734-5

	<i>Annual</i>
<i>Peak</i>	1733
<i>Trough</i>	1735
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 2.8%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The recession of 1734-5 was triggered by a financial crisis in 1734 and compounded by a poor harvest in 1735. On the origins of the financial crisis, “there are scraps of evidence that prosperity again bred speculation; and the expansion of credit was sufficiently great for news of the outbreak of the War of the Polish Succession to bring about at least a minor financial crisis. In 1734 some of the indices – exports, the price of wool, imports, employment in ships and so on – point to recession” (Ashton, 1959, p. 145). On the agricultural shock, Hoskins (1968) identifies a “deficient” harvest in 1735.

Indeed, there was a small decline in financial services output in 1734 and a large drop in arable production in 1735 (Broadberry et al., 2015). Overall, real GDP slumped by 2.8 per cent. In 1736, growth returned to the agricultural, industrial and services sectors, which was associated with an expansion of 7.5 per cent in the aggregate.

In comparison to existing chronologies, our identification of the peak is uncontroversial (Ashton, 1959; Broadberry et al., 2012). While Broadberry et al. (2012) agree with the trough in 1735, Ashton places it in 1734. On the basis that there is mixed agreement in the

historiography, and that this recession spanned several years, we assign this recession a reliability grade of medium.

The Recession of 1737

	<i>Annual</i>
<i>Peak</i>	1736
<i>Trough</i>	1737
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 5.4%
<i>Explanation</i>	Public health crisis and sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

A short, sharp recession struck in 1737. It had its roots in a number of seemingly unrelated factors. First, “some slackness appeared in the woollen industry of Wiltshire in 1737, owing to French competition in the markets of Levant” (Ashton, 1959, p. 146). Second, a contemporary from Lancaster wrote that “there was a general distemper of violent coughs and colds all over the nation, of which many died” (Harland, 1851, p. 129). This affected animals and humans alike. The people of Plymouth were struck with “violent swelling of the face, the parotids and maxillary glands, followed by an immense discharge of an exceedingly acrid pituita from the mouth and nose; toothache and, in some, hemicrania; ‘in multitudes,’ wandering rheumatic pains; in others violent sciatics; in some griping of the bowels” (Creighton, 1894, p. 349), while the horses of Devonshire were reported to suffer from cough, angina and death (Creighton, 1894, p. 348). This “epidemic of colds and fever – probably influenza – may have reduced industrial activity in the country generally” (Ashton, 1959, p. 146).

The data shows output fell by 5.4 per cent (Broadberry et al., 2015). The contractions were sharp in pastoral farming and textiles and leather industries, consistent with the impact of competition on woollens and of the epidemic on livestock. In 1738 there was a broad rebound in economic activity.

While Ashton (1959) describes a number of negative shocks in 1737, he does not include the year as recession in his chronology. However, Broadberry et al. (2012) are consistent with our dating of this recession. Overall, while this recession was relatively large, it is not consistent with some independent accounts in the historiography. Therefore, we regard the reliability of this recession as low.

The Recession of 1739-40

	<i>Annual</i>
<i>Peak</i>	1738
<i>Trough</i>	1740
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 3.3%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

A weak expansion was cut short by the recession of 1739-40. There are several potential explanations. First, a “deficient” harvest in 1739 was followed by a “dearth” in 1740 (Hoskins, 1968). These were years of climatic extremes. In 1739 “many tradesmen were frozen out of their trades and employ, and starved for want of fire” (Harland, 1851, p. 134). 1740 was one of the coldest and driest years of the century (Mirowski, 1979, p. 560), which saw “ice that sealed up the Thames to shipping” and “a dearth of fuel” (Ashton, 1959, p. 5). Second, there was a “slump in textiles of all kinds” (Ashton, 1959, p. 146).

Real GDP declined by 0.7 per cent in the first year, with lower output in arable farming, textiles and leather, other industries, trade and transport, and financial services, and by 1.7 per cent in the second, with reduced production in arable farming, textiles and leather, and trade and transport (Broadberry et al., 2015). From 1741, the bulk of industries were expanding once again, marking the onset of recovery.

Our timing of this recession is similar to the previous literature (Ashton, 1959; Broadberry et al., 2012), except that Ashton (1959) places the trough in 1741. As the downturn was relatively mild at a time when the national accounts are less reliable, we regard the reliability of this episode as low.

The Recession of 1743-4

	<i>Annual</i>
<i>Peak</i>	1742
<i>Trough</i>	1744
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 3.7%
<i>Explanation</i>	War
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

The War of the Austrian Succession not only marked the end of a period of peace but also of expansion. Ashton (1959, p. 147) notes that “with the formal beginning of the war [...] prosperity came to an end.”

During this recession, there were losses in arable and pastoral production, other industries, trade and transport, and financial services, amounting to 3.7 per cent overall (Broadberry et al., 2015). A notable exception was the output of government services, which increased by 31 per cent. Growth returned to most industries in 1745.

In terms of timing, our turning points are in keeping with Broadberry et al. (2012). However, Ashton (1959) shifts both the peak and trough forward a year to 1743 and 1745, respectively. As this downturn was minor and inconsistent with other independent chronologies, we assign this episode a low reliability grade.

The Recession of 1748-9

	<i>Annual</i>
<i>Peak</i>	1747
<i>Trough</i>	1749
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 1.7%
<i>Explanation</i>	War
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

1748 marked the onset of the second recession of the war. According to Ashton (1959, p. 148), this period can be “thought of as one of depression engendered by war”.

Economic activity declined by 1.1 per cent in 1748, as output fell off in arable farming and government services, and by 0.6 per cent in 1749, as the production of arable, textiles and leather, other industries and trade and transport dropped. 1750 was a year of expansion, as the majority of industries grew, as did output overall.

While our dating of this contraction is in keeping with Broadberry et al. (2012), Ashton (1959) confusingly records 1747 as a trough instead of a peak. As the contraction has a limited trace in the historical and statistical record, we regard the reliability of this recession as very low.

The Recession of 1751

	<i>Annual</i>
<i>Peak</i>	1750
<i>Trough</i>	1751
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.2%
<i>Explanation</i>	International shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

It was not long before the second half of the eighteenth century had its first recession. The most convincing explanations are an external demand shock. As Ashton (1959, p. 148) notes, “English exports fell off”. The data confirm that the volume of domestic exports from England and Wales dropped by more than 6 per cent in 1751, although this was somewhat offset by a rise in re-exports (Mitchell, 1988, p. 448).

This downturn affected arable and pastoral production, as well as output in textiles and leather, other industries and government services (Broadberry et al., 2015). Overall, real GDP fell by 2.2 per cent. There was a revival in 1752 of 4.9 per cent, as growth returned to two-thirds of major industries.

In terms of reliability, we classify this episode as very low. While Broadberry et al. (2012) also record turning points in 1750 and 1751. Ashton (1959) views 1751 as a peak instead of a trough. In addition, the downturn was minor at a time of potentially sizeable measurement error.

The Recession of 1754

	<i>Annual</i>
<i>Peak</i>	1753
<i>Trough</i>	1754
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.8%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

In common with many downturns in the eighteenth century, the origins of the recession of 1754 were seemingly in agriculture. A contemporary noted that the wet summer of 1754 was “a time of scarcity” (Barker and White, 1786).

Both arable and pastoral production declined, as did the output of more or less related industries such as textiles and leather, other industries, trade and transport and financial services (Broadberry et al., 2015). Overall, GDP fell by 2.8 per cent. A widespread expansion began in 1755, lifting agriculture, industry and services.

In comparison to existing chronologies, Ashton (1959) dates the peak earlier, in 1751, and the trough later, in 1755, while Broadberry et al. (2012) also put the peak earlier, in 1752, but the trough in 1754. As the size of the contraction and the synchronicity with the historiography is limited, we grade the reliability of the recession as low.

The Recession of 1756

	<i>Annual</i>
<i>Peak</i>	1755
<i>Trough</i>	1756
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 1.7%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The last of three mild downturns of the 1750s came in 1756. The evidence suggests that the best explanation is a sectoral shock to agriculture, as there was a “greatly deficient” harvest not only at home but also abroad (Tooke, 1838, p. 48). According to Smith (1766, p. 58), “it is certain, that the weather during the spring, summer and harvest, was generally unfavourable, great quantities of corn perished by the rains and winds, and most of what remained proved defective, both in quantity and in substance.”

While this contraction was seemingly quite deep and durable, it was not diffuse (Broadberry et al., 2015). There was a depression in a few industries, such as arable, textiles and leather, and other industries. However, the majority of industries were on the rise, particularly government services, which increased by 56 per cent following the outbreak of the Seven Years’ War.

We assign this recession a reliability grade of very low. While Broadberry et al. (2012) agree on the turning points of 1755 and 1756, Ashton (1959) does not, recording 1756 as the first year of expansion. What’s more, a contraction of 1.7 per cent is well within the bounds of measurement error.

The Recession of 1762-5

	<i>Annual</i>
<i>Peak</i>	1761
<i>Trough</i>	1765
<i>Duration</i>	4 years
<i>Output Loss</i>	GDP: 3.9%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The longest expansion of the eighteenth century was followed by the longest contraction. There seems to be a number of potential causes. First, in 1762 there was an “unparalleled drought” in the summer and an “intense frost” in the winter that “put a stop to several handicraft trades (Ashton, 1959, pp. 6, 151). This is reflected in the national accounts, which show a decline in arable and wool and textiles production (Broadberry et al., 2015). Second, in 1763 Hoppit (1986) argues that there was a twin crisis of public and private finance. This too is visible in the data, as financial services output fell by 7 per cent (Broadberry et al., 2015).

Economic activity fell by 2.8 per cent in 1762, 0.3 per cent in 1763, 0.1 per cent in 1764 and 0.8 per cent in 1765. At its most diffuse, this recession saw output fall in most major industries. The recovery began in 1766 as growth returned, later spreading to every major industry.

While our dating of this recession is consistent with Broadberry et al. (2012), Ashton (1959) recorded a shorter episode, reaching the peak in 1761 and the trough in 1762. Despite the discord with some of the historiography, this downturn was relatively deep and durable. Therefore, we grade the reliability as medium.

The Recession of 1770

	<i>Annual</i>
<i>Peak</i>	1769
<i>Trough</i>	1770
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.7%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

Little has been written on the recession of 1770. The available evidence suggests that there was a sectoral shock to agriculture associated with “unproductive harvests” that lasted for five years (Tooke, 1838, p. 68).

The contraction of 1770 was limited to a few specific industries. Production of arable declined by 19 per cent (consistent with the explanation of an agricultural shock), of textiles and leather by 4 per cent and of financial services by 3 per cent (Broadberry et al., 2015). However, the six remaining major industries grew at an average rate of more than 5 per cent. 1771 recorded growth of 1.8 per cent.

While Broadberry et al. (2012) do record this as a recession, Ashton (1959) places this as part of an expansion. Combined with the relatively weak signal-to-noise ratio, we regard the reliability of this recession as low.

The Recession of 1772

	<i>Annual</i>
<i>Peak</i>	1771
<i>Trough</i>	1772
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.6%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

The recession of 1772 coincided with two shocks. The first was the Ayr bank crisis, which is regarded as a major banking crisis in British history (Kenny et al., 2021). According to Mirowski (1979, p. 571), “the downturn in 1772 was internally generated by a credit contraction”. The second was the persistent agricultural slump that began in 1770 (Tooke, 1838, p. 68).

In line with these explanations, the 2.6 per cent drop in output was driven by three industries: arable agriculture, pastoral agriculture and financial services (Broadberry et al., 2015). Metals and mining, textiles and leather, other industries, government services, trade and transport, and housing and domestic services all expanded.

The previous literature is mixed, as Ashton (1959) regards 1772 as a peak, while Broadberry et al. (2012) record it as a trough, leading to a low reliability grade.

The Recession of 1774

	<i>Annual</i>
<i>Peak</i>	1773
<i>Trough</i>	1774
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.2%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The recession of 1774 has been reported bleakly in the historiography, describing scenes of “distress” and “outbreaks of violence” (Ashton, 1959, p. 160). The cause is not exactly clear, but Ashton (1959, pp. 158-9) writes of problems in the textile industry. At the same time, the harvest of 1774 was “adverse” (Tooke, 1838, p. 170).

Problems in agriculture and textiles is reflected in the national accounts as the output of wool/textiles slumped by 21.6 per cent and of arable farming by 6.2 per cent (Broadberry et al., 2015). These were not the only industries in decline during this recession: the output of pastoral farming, metals and mining, other industries, and government services also fell. In the aggregate, real GDP fell by 2.2 per cent. As Mirowski (1979, p. 572) notes, “recovery appears to have been complete by 1775”. Growth returned to 8 of the 9 major industries, which contributed to an increase in output of 3.1 per cent.

Both Ashton (1959) and Broadberry et al. (2012) identify a trough in 1774. However, the former locates the peak in 1772, the latter in 1773. On balance, we regard this recession as of medium reliability.

The Recession of 1778-9

	<i>Annual</i>
<i>Peak</i>	1777
<i>Trough</i>	1779
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 0.9%
<i>Explanation</i>	War
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

“A dull state of trade” (Tooke, 1838, p. 80) prevailed between 1778 and 1779. According to Ashton (1959, p. 162), “the financial crisis brought about by the war with France was followed by a further increase of bankruptcies and depression in trade, manufacture, and building alike.” As in 1726, we regard war, and not the financial crisis, as the primitive shock.

1778 coincided with a sharp drop in the output of financial services, as well as of arable and pastoral agriculture, metals and mining, and trade and transport (Broadberry et al., 2015). 1779 was associated with a recovery in agriculture and services, but industrial production slumped, particularly textiles and leather. 1780 marked the onset of recovery, as growth resumed not only in most industries but also in the aggregate.

The existing chronologies are in line with our timing of this contraction (Ashton, 1959; Broadberry et al. 2012), although Ashton (1959) opts for a trough in 1781. However, the downturn was the most mild of the eighteenth century so far, which raises the risk that the decline may in fact be spurious. As a result, we classify the reliability as low.

The Recession of 1782-3

	<i>Annual</i>
<i>Peak</i>	1781
<i>Trough</i>	1783
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 1.5%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

Agricultural problems seem to be at the root of this recession following “very unfavourable” harvests in 1782 and 1783 (Barnes, 2010, p. 52). Ashton (1959, p. 24) describes that “the spring was unseasonable. From February to May there was either frost, snow, or rain. The harvests this year were bad all over Europe [...] According to the Lord Mayor of London the cost of barley was exorbitant; hence there was an extremely sharp fall in the output of malt, beer, and spirits.”

Contractions were completely limited to agriculture in 1782, but crept into government and financial services in 1783 (Broadberry et al., 2015).

There is evidence for and against a recession. In opposition, Mirowski (1979, p. 572) notes that there was a “boom in 1782” in economic activity, while Ashton (Ashton, 1959, p. 164) explains that “the upward movement continued in 1783”. In support, Mirowski (1979, p. 572) also writes of a stretch of depression beginning in 1783. Somewhere in between, Broadberry et al. (2012) include this episode as part of a longer recession that began in 1781 and ended in 1785. Given the modest decline and contrast with the historiography, we assign this recession the lowest reliability grade.

The Recession of 1785

	<i>Annual</i>
<i>Peak</i>	1784
<i>Trough</i>	1785
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.7%
<i>Explanation</i>	Unknown
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

Like the contraction itself, the historiography on the recession of 1785 is small. The key texts on British business cycles offer little evidence on the cause of this downturn.

The decline in economic activity of 0.7 per cent can be accounted for by reduced production in two industries: arable farming (-17.4 per cent) and other industries (-1.3 per cent), as all others expanded (Broadberry et al., 2015), which suggests that this downturn was both narrow and mild.

The existing chronologies are at odds over 1785, as Broadberry et al. (2012) classify it as a contraction and Ashton as an expansion. On balance, we classify the reliability of this recession as very low.

The Recession of 1787-8

	<i>Annual</i>
<i>Peak</i>	1786
<i>Trough</i>	1788
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 1.9%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

Ashton (1959, p. 166) notes that the “crisis of 1788 [...] was largely a result of undue optimism and over-expansion of credit in a single part of the economy. The decline of output that followed was not, however, confined to the cotton industry, for a fall of demand in the North was bound to have general repercussions”.

The data points to a contraction, amounting to 1.9 per cent of GDP overall (Broadberry et al., 2015). Beginning in 1787 with lower output in arable farming, metals and mining, and government services and continuing to 1788 with production dropping off in arable, textiles and leather, other industries and trade and transport. From 1789 a widespread recovery began.

There is confusion in the historiography on whether there was a recession or not. Mirowski (1979, p. 574) argues that “the year 1788 was no crisis or depression year at all”. Silbering (1923) notes that 1779 was a “recession involving serious embarrassment in trade”. While the two existing chronologies agree on a two-year contraction in the late 1780s, Ashton (1959) dates the onset as 1787, as opposed to Broadberry et al. (2012), who put it at 1786. As a result, we grade the reliability of this episode as very low.

The Recession of 1793-4

	<i>Annual</i>
<i>Peak</i>	1792
<i>Trough</i>	1794
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 4.8%
<i>Explanation</i>	War
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

According to a number of accounts, the outbreak of the French Revolutionary Wars led to a financial crisis, which, in turn, triggered a recession. For example, Hoppit (1986) argues that “war hit confidence at every level in public, private, and, less significantly perhaps, corporate finance”. Gayer et al. (1953, p.8) note that “the outbreak of war [...] precipitated sudden panic, with both banks and individuals striving to make all available assets as liquid as possible.” Silbering (1923) writes that “upon the opening of hostilities with the French, a relatively moderate price cycle was associated with very considerable business wreckage, partly owing to military and political circumstances.”

During the downturn, arable farming, metals and mining, textiles and leather, other industries, and financial services output all declined (Broadberry et al., 2015). Economic activity contracted by 4.8 per cent but the recession would have been more costly had it not been for a sharp spike in government services. 1795 was a year of universal recovery (Thorp, 1926, p. 151), as every industry expanded.

The existing chronologies agree on a peak in 1792 (Ashton, 1959; Broadberry et al., 2012; Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972), although all but Broadberry et al. (2012) date the trough as 1793 as opposed to 1794. Thorp (1926, p. 151) characterizes 1793 as a year of “recession; panic; depression” with a “slackening of activity to stagnation”, 1794 as one of “depression” with “industry at a standstill”, and 1795 as “revival”. Despite the material degree of measurement error in the eighteenth-century national accounts, the

contraction was relatively large and there is a good degree of concordance with the historiography, leading us to grade the reliability of this recession as medium.

The Recession of 1797

	<i>Annual</i>
<i>Peak</i>	1796
<i>Trough</i>	1797
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.7%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

The frequent threat of financial crisis returned to the British economy in 1797. Ashton (1959, p. 171) explains, “it was the beginning of the crisis – due largely to an external drain arising from the Imperial Loan and the restoration of a gold standard in France – that was to lead to the restriction of cash payments in 1797 [...] The effects of the crisis can be seen in the decline of the figures of exports, imports of cotton, output of Yorkshire woollens and other commodities.”

A majority of industries contracted during this short, mild recession, particularly pastoral agriculture, textiles and leather and other industries, declining by 0.7 per cent in the whole (Broadberry et al., 2015). Thorp (1926, p. 152) summarises 1797 as a year of “recession; panic; depression”, during which “activity yields to stagnation”. 1798 saw a swift recovery, as production increased in most major industries.

As there is broad agreement on the timing of the recession of 1797 (Ashton, 1959; Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972), the only exception being Broadberry et al. (2012), who put the peak in 1795 and the trough in 1798, we regard the reliability of this event as high.

The Recession of 1803-4

	<i>Annual</i>
<i>Peak</i>	1802
<i>Trough</i>	1804
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 2.2%
<i>Explanation</i>	War
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The outbreak of the Napoleonic Wars brought an end to a sustained expansion. Gayer et al. (1953, pp. 58-9) summarise the recession as follows, “the general decline that ran from the latter months of 1802 to the early months of 1804 may be attributed, essentially, to the unsettlement of the export trade, especially after the outbreak of war in May 1803”. Similarly, Thorp (1926, p. 153) notes that “with breaking of peace, industry slackens and commerce becomes stagnant”.

In 1803, a year which descended from “prosperity” to “recession” and “depression” (Thorp, 1926, p. 153), output fell by 2.1 per cent, with drops in arable and pastoral farming, textiles and leather, government services, and trade and transport, and in 1804, a year of “mild depression” (Thorp, 1926, p. 153), by 0.1 per cent, with contractions in arable farming, other industries and government services (Broadberry et al., 2015). Widespread recovery did not begin until 1805, by which point every major industry returned to growth.

Burns and Mitchell (1946), Gayer et al. (1953), and Rostow (1972) identify the same peak, in 1802, but an earlier trough, in 1803, while Broadberry et al. (2012) date an earlier peak, in 1800, but the same trough, in 1804. In light of the size of the contraction, the quality of the national accounts and the historiography, we grade this recession’s reliability as medium.

The Recession of 1806

	<i>Annual</i>
<i>Peak</i>	1805
<i>Trough</i>	1806
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.4%
<i>Explanation</i>	Unknown
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The second recession of the nineteenth century was minor along a number of dimensions. This short, mild and narrow downturn leaves as little trace in the historical record as it does in the statistical record. Although a causal link is not made, Thorp (1926, p. 153) comments on the closing of Prussian ports to British shipping in March and Napoleon's Berlin Decree that established the Continental System in November. However, net exports rose in 1806, which suggests that the cause must lie elsewhere (Mitchell, 1988, p. 451).

1806 saw a decline in economic activity of 0.4 per cent (Broadberry et al., 2015). Production fell in a minority of industries: pastoral output declined by 4.3 per cent, textiles and leather by 1.7 per cent, other industries by 10.5 per cent and trade and transport by 1.4 per cent, but increased in the other major industries. Output rebounded by 6.6 per cent and expanded in all but one major sector in 1807.

According to Thorp (1926, p. 153), this was a year of "prosperity". In addition, while Broadberry et al. (2012) do record this year as a recession, the consensus among existing chronologies is that, if anything, it was a peak (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972). As this recession is the shallowest in the sample and is in conflict with most of the historiography, we consider it to be of the lowest reliability.

The Recession of 1808

	<i>Annual</i>
<i>Peak</i>	1807
<i>Trough</i>	1808
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 4.7%
<i>Explanation</i>	Sectoral shock and war
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

Multiple shocks were at the heart of the short, sharp recession of 1808. First, there was a poor harvest. As Tooke (1838, p. 268) describes, “the crops of 1808 proved more deficient than those of the preceding year.” Second, it was not possible to smooth consumption with imports, as “the apprehensions which had been entertained of the exclusion of the British flag from trade in the Baltic were realised.” Third, exports were checked by the implementation of the Continental System and the American embargo (Gayer et al., 1953, p. 87-90).

During this “mild depression” (Thorp, 1926, p. 154), GDP fell by 4.7 per cent and 5 of the 9 major industries contracted: arable farming, textiles and leather, other industries, government services, and trade and transport (Broadberry et al., 2015). The British economy returned to growth in 1809, as the lion’s share of industries expanded.

All major chronologies identify a trough in 1808, although some opt for a peak in 1806 (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972) and others in 1807 (Broadberry et al., 2012). Given the size of the slump and the degree of consensus on the trough, we assign this recession a medium reliability grade.

The Recession of 1811-2

	<i>Annual</i>
<i>Peak</i>	1810
<i>Trough</i>	1812
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 5.1%
<i>Explanation</i>	Financial crisis and war
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

Coinciding with the Luddite Riots, the recession of 1811-2 was a product of financial crisis and war. According to Gayer et al. (1953, p. 60), “in the course of 1810 Napoleon prosecuted vigorously his policy of blockade. And in conjunction with indirections in the financing of the Latin-American trade, a severe credit crisis developed. Depression followed until the latter months of 1811, marked by heavy unemployment, especially in the cotton textile districts and in the Birmingham area, heavily dependent on exports to the United States”. This course of events seems plausible, although the timing differs from the latest national accounts, which were not available to Gayer et al. (1953).

The figures suggest that 1810 was a year of strong growth, exceeding 6 per cent, 1811 was a year of mild contraction, of roughly 1 per cent, and 1812 was a year of more severe demise, approximately 4 per cent (Broadberry et al., 2015). Arable and pastoral farming, textiles and leather, other industries, trade and transport and financial services all declined. 1813 saw a rebound in growth of more than 5 per cent, associated with expansions in two-thirds of industries.

Thorp (1926, p. 154) notes that 1811 saw “deep depression” alongside “complete stagnation of industry; many failures; unemployment; wage cuts; commodity prices decline; marked reduction in foreign trade” but 1812 as a year of “revival” with gradual improvement in industry despite unrest in manufacturing districts; distress and unemployment in cotton industry; [...] many failures”.

The latest estimates of real GDP point to a slightly different dating of the contraction from conventional accounts. As a result, while the existing chronologies all identify a peak in 1810, Burns and Mitchell (1946), Gayer et al. (1953), and Rostow (1972) put the trough in 1811, while Broadberry et al. (2012) place it in 1812. As there is complete consensus on the peak and only minor disagreement on the trough, in addition to the magnitude of the downturn, we grade this recession as of high reliability.

The Recession of 1814

	<i>Annual</i>
<i>Peak</i>	1813
<i>Trough</i>	1814
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.2%
<i>Explanation</i>	Commodity price shock and sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The turbulence since the outbreak of the Napoleonic Wars concluded with the recession of 1814. As agents “expected opening of foreign markets, calculated to follow the conclusion of the final peace [...] a speculative rise in prices resulted, which collapsed in the spring of 1814” (Gayer et al., 1953, p. 111). According to Thorp (1926, p. 155), the “rapid fall in commodity prices after first quarter causes much commercial distress and numerous failures.” At the same time, there was also a “deficient crop” (Thorp, 1926, p. 155).

While there was a contraction in output in 1814 of 2.2 per cent, it was not general but specific to a few industries: arable (-23.6 per cent) and pastoral farming (-2.1 per cent) and other industries (-8.4 per cent).

We classify the reliability of this recession as very low. Not only was it comparatively mild, but it is at odds with much of the historiography. Gayer et al. (1953, p. 111) describe “the boom of 1811-15”, recording 1814 as part of an expansion, as do Burns and Mitchell (1946) and

Rostow (1972). An exception is Broadberry et al. (2012), who do classify this year as a recession.

The Recession of 1816

	<i>Annual</i>
<i>Peak</i>	1815
<i>Trough</i>	1816
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 5.2%
<i>Explanation</i>	Economic policy and sectoral shock
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

Downturns were not only a staple of war but also peace, and not long after the Congress of Vienna, the British economy fell into “deep depression” (Thorp, 1926, p. 156). One of the largest banking crises in UK economic history struck in 1815 and 1816 (Kenny et al., 2021), but the crisis “was triggered by post-war austerity due in part to the Bank of England preparing for the eventual resumption of specie convertibility” (Turner, 2014b, p. 147). The primitive shock, in this case, seems to be economic policy as opposed to the banking crisis. Additionally, 1816 was the “Year Without a Summer” following “the colossal eruption of the Tambora volcano in Indonesia, which led to one of the coldest summers on record and “wheat crop failure” (Thorp, 1926, p. 156). On the relative contribution of the two shocks, Broadberry et al. (2020) summarise that “on this occasion the shadow cast over the economy by these financial and commercial readjustments was deeper than that cast by the volcanic dust veil then enveloping the globe.”

What is clear is the depth and diffusion of this recession, as output declined by 5.2 per cent in 1816 and production fell in all but one major industry (Broadberry et al., 2015). There was a mild but broad recovery in 1817 “as inactivity gradually gives way” (Thorp, 1926, p. 153).

The narrative evidence supports our identification of a recession at this time. Gayer et al. (1953, p. 111) write about “the depression of 1815-16”, during which “the low point in this downswing came late in 1816”. All major chronologies record a peak in 1815 and a trough in 1816 (Broadberry et al., 2012; Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972). We therefore regard the reliability of this episode as high.

The Recession of 1818-9

	<i>Annual</i>
<i>Peak</i>	1817
<i>Trough</i>	1819
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 1.8%
<i>Explanation</i>	International shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The recession of 1818-9 was marked by widespread labour unrest - the Peterloo Massacre being a tragic example. Gayer et al. (1953, p. 110) explain that “by the end of 1818 [...] crisis had occurred both on the Continent and in the United States; and an international depression began which affected all of British industry. 1819 marks the low point, after which a slow and partial recovery can be traced in 1820-1”.

The data is consistent with this account of events. 1818 saw a mild contraction (-0.1 per cent), beginning in agricultural and pastoral farming and government services (Broadberry et al., 2015). 1819 was a year of deeper decline (-1.7 per cent), spreading from agriculture to metals and mining, textiles and leather, and trade and transport. 1820 was marked by recovery, as output expanded in all but one major industry and by more than 8 per cent overall.

We deem the reliability of this episode to be medium because it is more or less synchronised with the historiography. All existing chronologies are aligned on the trough in 1819, although some allocate the peak to 1817 (Broadberry et al., 2012) and others to 1818 (Burns and

Mitchell, 1946; Gayer et al., 1953; Rostow, 1972). Although Thorp (1926, p. 156) classifies 1818 as a year of “prosperity”, he records 1819 as one of “recession; depression”, noting a “release in early spring to stagnation of industry; commodity prices decline; many failures; cotton industry especially depressed; foreign trade greatly reduced, especially exports”. Similarly, Gayer et al. (1953, p. 110) write that “1819 marks the low point, after which a slow and partial recovery can be traced in 1820-1”.

The Recession of 1826

	<i>Annual</i>
<i>Peak</i>	1825
<i>Trough</i>	1826
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 5.4%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	Very high

Source: Broadberry et al. (2015).

After a long expansion in the 1820s, came the “depression” of 1826 (Thorp, 1826, p. 158). “Speculation in real and imaginary investments” led to a banking crisis (Reinhart and Rogoff, 2009, p. 387), during which approximately 12 per cent of the banking system failed or suspended on a capital-weighted basis (Kenny et al., 2021). By this measure, no crisis between the Industrial Revolution and the Second World War was more severe. According to Turner (2014a, p. 62), “the effect of the 1825-6 crisis on merchants and businesses was twofold, in that the money supply fell and merchants found it difficult to raise funds because many bills were refused for discount and surviving banks contracted their lending”, which was associated with “a sharp decline in real GDP”.

Real GDP dropped by 5.4 per cent with contractions in agriculture (arable and pastoral), industry (metals and mining and textiles and leather) and services (trade and transport and financial services) (Broadberry et al., 2015). While severe, the recession was short-lived, as output grew by almost 8 per cent in 1827 and growth returned to 7 of the 9 major industries.

The historiography is clear on the incidence of a “depression” in 1826 (Thorp, 1826, p. 158; Gayer et al., 1953, p. 171) as all existing chronologies agree on the timing of the turning points (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972; Broadberry et al., 2012). For this reason, and for the fact that the downturn was the largest of the nineteenth century, we assign this recession a very high reliability grade.

The Recession of 1837

	<i>Annual</i>
<i>Peak</i>	1836
<i>Trough</i>	1837
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.9%
<i>Explanation</i>	Financial crisis and international shock
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

A decade of expansion was checked by the recession of 1837. Although there is doubt about “how serious and widespread the recession was,” Matthews (1954, p. 209) writes that “there is no denying that there was a recession of some sort. Equally certain is that it was in very large part attributable to the decline in exports to the United States, a decline to be explained principally with reference to causes on the American rather than on the British side. The industries that suffered most in 1837 were those that relied on the American market, and many of the other features of the recession can be traced back to the same source.” Although no direct causal link is made, a tightening of financial conditions also seems to have coincided with this downturn. According to Gayer et al. (1953, p. 268), “the crisis came in the latter part of 1836 and the early months of 1837”, which saw a “fall in discounts and interest rates” and “sharp rise in the reserve”. Thorp (1926, p. 16) refers to the “continued financial strain” and “panic” of 1837.

Real GDP declined by 0.9 per cent, but the drop was not diffuse, as contractions were limited to 4 out of 9 industries: textiles and leather (-6.9 per cent), government services (-32.8 per

cent), trade and transport (-4.6 per cent) and financial services (-1.9 per cent) (Broadberry et al., 2015).

Although the downturn was mild, its timing is in keeping with the historiography. Thorp (1926, p. 160) describes a “gradual recession of activity to stagnation” and previous chronologies consistently identify a peak in 1836 and a trough in 1837 (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972; Broadberry et al., 2012). Therefore, we classify the reliability as high.

The Recession of 1839

	<i>Annual</i>
<i>Peak</i>	1838
<i>Trough</i>	1839
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.6%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The 1830s closed with a second recession. Although Thorp (1926, p. 160) does not make any causal connection, it is reported that “money tightens severely; gold crisis”. Although there is debate among economic historians as to whether 1839 was a financial crisis (Kenny et al., 2021), it does seem that there was at least “severe” financial distress (Bordo et al., 2003). In addition, Thorp (1926, p. 16) associates “deficient harvests, high prices” with this downturn.

This contraction was even milder than its forerunner in 1837. Output fell by 0.6 per cent, with the largest falls in arable and financial services output, consistent with the explanations advanced in the historiography. There were also declines in pastoral, textiles and leather and government services so that most major industries were depressed.

In terms of reliability, we assign the lowest grade as there is great uncertainty. Only the downturn of 1806 was weaker in the history of nineteenth-century recessions and the bulk of

the historiography views 1839 not as part of a contraction but of expansion or recovery (Burns and Mitchell, 1946; Gayer et al., 1953; Matthews, 1954; Rostow, 1972), with the exception of Broadberry et al. (2012).

The Recession of 1841-2

	<i>Annual</i>
<i>Peak</i>	1840
<i>Trough</i>	1842
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 2.9%
<i>Explanation</i>	Financial crisis and sectoral shock
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

The “depression” of 1841-2 (Matthews, 1954, p. 214) is often seen in the historiography as a continuation of the recessions of the 1830s. Tooke (1848, pp. 45-6), for example, wrote that “in the first months of 1841, as in the preceding year, there was a somewhat general feeling of hope prevalent that a revival of trade was about to take place [...] but as the summer advanced it became evident that the continued high price of corn and cattle, together with the general scarcity of employment for the labouring population, precluded any material improvement for the present; and the reports from the manufacturing districts grew gradually more gloomy than ever.” Similarly, Thorp (1926, pp. 160-1) classified every year between 1837 and 1843 as suffering in a state of “recession” or “depression”. If there was an independent shock that separated 1841-2 from this long stagnation, it may have been the banking crisis of 1840-1, which involved widespread runs, panics, failures and suspensions (Kenny et al., 2021), or a sectoral shock “sparked by an industrial contraction in construction and metals” (Broadberry et al., 2020).

Although this downturn is not the most severe in the annals of British business cycles, it was the largest since the recession of 1826. Output fell by 1.9 per cent in the first year and by 1 per cent in the second (Broadberry et al., 2015). The contraction was limited, affecting arable

farming and other industries initially and metals and mining, other industries and trade and transport thereafter. The output losses were more than reversed in 1843, when economic activity expanded by 5 per cent.

Although there is uncertainty over the timing of the peak, there is little about the trough. Burns and Mitchell (1946), Gayer et al. (1953) and Rostow (1972) place the peak in 1839, while Broadberry et al. (2012) put it in 1840. However, each of these chronologies record 1842 as the trough. As this recession was middling in terms of depth and consistency with other evidence, we grade the reliability as medium.

The Recession of 1847

	<i>Annual</i>
<i>Peak</i>	1846
<i>Trough</i>	1847
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 1.2%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	Low

Source: Broadberry et al. (2015).

The recession in this year coincided with the “commercial crisis of 1847”. This occurred in two phases (Ward-Perkins, 1950).

The first phase, which peaked in April 1847, followed the unwinding of a speculative boom in railway shares that in part had been fuelled by the aggressive discount policy of the newly-formed Banking Department of the Bank of England in the years following the Bank Charter Act of 1844. The railway boom of the 1840s was financed by the issuance of shares bought with a deposit, but the “calling up of [the] required sums progressively impoverished the market” (Gayer et al., 1953, p. 305). Together with the poor harvests of 1845-6, the railway mania had left the economy and investors fragile while gold reserves drained abroad to finance food imports. The Bank reacted strongly by raising its discount rate, cutting its lending

to the market and selling government bonds. This sudden change in policy led to a temporary panic, which was partially cured when higher rates led to inflows of gold.

A second period of crisis occurred later in the year. The bad harvests of 1845-6 were followed by a better-than-expected harvest in 1847, and the price of corn fell sharply over the summer. Many individuals and companies had speculated on prices remaining high and so began to suffer heavy losses. As a result, there was a string of commercial failures with a knock-on effect to exposed lenders in the money market and several discount houses and provincial banks were forced to shut their doors.

Another major event was the Great Famine in Ireland. Although the contraction of 10 per cent in Ireland (Andersson and Lennard, 2018) at a time when Ireland accounted for about a tenth of UK economic activity (Geary and Stark, 2015) would have contributed to this recession, the GDP figures are for Great Britain only.⁷ However, it is possible that the tragedy in Ireland affected British output through input-output and financial linkages. For example, when it became known that the government intended to take on new loans in the Poor Relief Bill of 1847 – intended to mitigate the consequences of the Irish potato blight – this compounded the money market difficulties of that year.

This downturn was limited to three industries: textiles and leather, other industries and financial services, which constrained the aggregate impact as output declined by only 1.2 per cent. The damage was short-lived as these industries returned to growth in 1848, which was associated with an increase in activity of 4.2 per cent overall.

The reliability of this episode is low. The contraction was small and no other chronologies record a recession concentrated in 1847 but rather a longer downturn beginning in 1846 and ending in either 1847 (Broadberry et al., 2012) or 1848 (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972).

⁷ Ireland's share of UK GDP is for 1861.

The Recession of 1850

	<i>Annual</i>
<i>Peak</i>	1849
<i>Trough</i>	1850
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.9%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	Very low

Source: Broadberry et al. (2015).

The recession of 1850 had its roots in agriculture. According to Thorp (1926, p. 162), it was a year of “agricultural distress with deficient crops and very low prices.” Although Gayer et al. (1953, pp. 341) reject that there was a recession at this time, problems with the harvest are recognised: “the final two years covered by this study [1849-50] were a period of increasing general recovery, in which agriculture alone did not share”

The national accounts also point to issues in agriculture (Broadberry et al., 2015). Arable farming suffered the largest contraction (17.6 per cent). Other industries to decline were textiles and leather (4.6 per cent) and government services (7.3 per cent). However, the six other major industries grew. Overall, economic activity decline by a modest amount: 0.9 per cent. A brisk recovery began in 1851 as output expanded by 4.5 per cent.

As a recession that ranks low in size and high in controversy, we consider it to be of very low reliability. Aside from Broadberry et al. (2012), the other major chronologies see this as part of the expansion that emerged from the previous recession (Burns and Mitchell, 1946; Gayer et al., 1953; Rostow, 1972). Gayer et al. (1953, pp. 340-1) paint a particularly rosy picture: “By the beginning of 1850 ‘the domestic affairs of the British nation presented a tranquil and, with partial exceptions, a cheering aspect’ [...] The movement of poor-relief expenditure, iron-founders’ unemployment, and bankruptcies, as well, pointed to increasing prosperity. Even shipbuilders ceased to complain and spoke of business in 1850 as being ‘of a decidedly healthy kind’. A moderate amount of railway building was undertaken and rail shares at last rose,

along with other security prices. An appropriate stage was set for the Crystal Palace Exposition of the following year, and the beginning of the era of Mid-Victorianism.”

The Recession of 1855

	<i>Annual</i>
<i>Peak</i>	1854
<i>Trough</i>	1855
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.3%
<i>Explanation</i>	International shock and war
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

The first half of the 1850s experienced significant economic growth. Between the trough of 1850 and the peak of 1854, output increased by 18.4 per cent before recession returned in 1855. Tooke and Newmarch (1857, p. 323) wrote that “the year opened amidst great gloom [...] The heavy additional taxes, occasioned by the [Crimean] War, were severely felt by large classes of persons [...] The commercial collapse in the United States, the discredit in Australia, the civil war in China and the unsettled state of Europe, all interfered with the progress of trade – particularly the External Trade.” Although the contractionary impact of taxes was cited, these were raised in response to war, which we classify as the ultimate cause, as well as an international shock.

The majority of industries contracted in 1855 (Broadberry et al., 2015): arable and pastoral output (14.2 per cent and 3 per cent), textiles and leather (1.4 per cent), other industries (9.9 per cent) and trade and transport (1.8 per cent). In all, output decline by 2.3 per cent, although the slump would have been far more severe had it not been for the 48 per cent expansion of government services. There was a significant rebound in 1856, as activity grew by 6.7 per cent.

The reliability of this recession is high. While it was not particularly severe, there is complete consensus among the existing chronologies for a peak in 1854 and a trough in 1855 (Burns and Mitchell, 1946; Rostow, 1972; Klovland, 1998; Broadberry et al., 2012).

The Recession of 1858

	<i>Annual</i>
<i>Peak</i>	1857
<i>Trough</i>	1858
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 1.8%
<i>Explanation</i>	Financial crisis
<i>Reliability</i>	Medium

Source: Broadberry et al. (2015).

According to Thorp (1926, p. 164), the cause of this recession lay not in 1858 but in the banking crisis of 1857, when “money very tight; panic, failures, and bank suspension, November.” This was “one of the greatest nineteenth century crises” (Turner, 2014a, p. 78), during which 4.2 per cent of the banking system failed or suspended (Kenny et al., 2021). The major banks that failed “were all weak institutions that had been taking excessive risks for a long time” (Turner, 2014a, p. 78).

This recession was larger than 1850 but smaller than 1855 as economic activity declined by 1.8 per cent (Broadberry et al., 2015). On a sectoral basis, both branches of agriculture expanded, all branches of industry contracted (metals and mining, textiles and leather and other industries), as did 2 out of 4 services (government services and trade and transport). Curiously, financial services output did not decline in either 1857 or 1858. The effects were not long-lasting it seems, as output grew by more than 4 per cent in 1859.

While on the lower end of the scale in terms of signal to noise, there is a good deal of agreement on a trough in 1858 in the historiography, even if there is debate about whether

the peak was in 1856 or 1857 (Burns and Mitchell, 1946; Rostow, 1972; Klovland, 1998; Broadberry et al., 2012). Therefore, we determine the reliability to be medium.

The Recession of 1861-2

	<i>Annual</i>
<i>Peak</i>	1860
<i>Trough</i>	1862
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 4.2%
<i>Explanation</i>	International shock
<i>Reliability</i>	High

Source: Broadberry et al. (2015).

The outbreak of civil war across the Atlantic caused the downturn of 1861-2. At a time of “uneven prosperity”, Thorp (1926, p. 165) briefly writes that the “American Civil War causes value of raw material to boom late in year” in 1861 and “severe depression of cotton industry due to ‘cotton famine’; unemployment reaches peak in cotton industry, last quarter.” Rostow (1948, p. 37) wrote that “the downward movement can be traced, in part, at least, to an external event; e.g. the coming of Civil War in 1861.” Broadberry et al. (2020) summarise that “the worst slump of the nineteenth century occurred in 1862 when the American Civil War disrupted the supply of raw cotton to Lancashire textile manufacturers, with profound knock-on effects for the economy as a whole.” Therefore, it seems that an international shock to the supply of raw cotton was the source of this recession.

The national accounts show that distress was not just limited to the textiles and leather industry but also hit pastoral farming, metals and mining, other industries, trade and transport and financial services in 1861 and arable farming, government services and trade and transport in 1862 (Broadberry et al., 2015). The contraction was modest at first but more severe after as GDP fell by 0.2 per cent in 1861 and by 4 per cent in 1862. 1863 saw an exceptional recovery as economic growth approached 10 per cent.

The reliability of this recession is high for two reasons. First, the decline in activity was quite large, ranking as the biggest between the recession of 1826 and 1919-21. Second, there is universal acceptance of 1860 and 1862 as the upper and lower turning points among existing chronologies (Burns and Mitchell, 1946; Rostow, 1972; Klovland, 1998; Broadberry et al., 2012).

The Recession of 1879

	<i>Annual</i>
<i>Peak</i>	1878
<i>Trough</i>	1879
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 2.2%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	High

Source: Solomou and Weale (1991).

From the trough in 1862 to the peak in 1878, economic activity increased year after year, growing by 53 per cent overall. But some of these gains were undone as recession returned in 1879. As a possible explanation, Thorp (1926, p. 168) remarks that the harvest yielded “extremely poor wheat and barley crops”.

This explanation is consistent with the national accounts, as output fell by 19.5 per cent in agriculture, forestry and fishing, 3.6 per cent in industry and was basically unchanged in transport and communication and distribution and other services (Mitchell, 1988). In all, economic activity declined by 2.2 per cent (Solomou and Weale, 1991). This was not a long depression as the economy grew by 7.9 per cent in 1880.

The reliability of this recession is high for the following reasons. First, the 1870s marks a milestone in the quality of the underlying data as the national accounts are balanced. As a result, this contraction is less likely to be spurious. Second, most major chronologies signal a

trough in 1879 (Burns and Mitchell, 1946; Rostow, 1972; Friedman and Schwartz, 1982; Capie and Mills, 1991), although the peak is placed towards the beginning of the decade.

The Recession of 1884-5

	<i>Annual</i>
<i>Peak</i>	1883
<i>Trough</i>	1885
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 1.7%
<i>Explanation</i>	Commodity price shock
<i>Reliability</i>	High

Source: Solomou and Weale (1991).

The recession of 1884-5 was a low point during a period of British economic history sometimes known as the Great Depression that began in 1873 and ended in 1896 (Musson, 1959). A general cause of the stagnation is a slump in prices, which accelerated in 1884 as a “more rapid decline in commodity prices sets in” (Thorp, 1926, p. 170). Giffen (1885) observed in 1885 that “it is clearly unnecessary to assign any other cause for the gloom of the last year or two. Given a fall of prices like what is here described [...] ‘depression’ must ensue.” Musson (1959) summarized that “falling prices appear to have had a depressive influence in reducing profit margins, weakening business confidence and expectations, checking investment and the growth of productivity, and producing heavier unemployment.”

Real GDP declined by 1.7 per cent, spread equally between the two years of recession (Solomou and Weale, 1991). In the first year, the sectors in decline were industry (-3.7 per cent) and transport and communication (-0.9 per cent) (Mitchell, 1988). In the second, agriculture, forestry, and fishing also suffered losses. A mild recovery began in 1886 and the peak of 1883 was surpassed in 1887.

In terms of reliability, we grade this recession as high. While not the deepest recession in history, the national accounts are balanced in this period, reducing the risk of spurious

inference. In addition, there is agreement on a recession at this time, as the existing chronologies identify a contraction running from 1883 or 1884 (Burns and Mitchell, 1946; Rostow, 1972; Friedman and Schwartz, 1982; Capie and Mills, 1991; Klovland, 1998). However, the historiography records a longer recession lasting until 1886.

The Recession of 1892-3

	<i>Annual</i>
<i>Peak</i>	1891
<i>Trough</i>	1893
<i>Duration</i>	2 years
<i>Output Loss</i>	GDP: 2.8%
<i>Explanation</i>	Sectoral shock
<i>Reliability</i>	High

Source: Solomou and Weale (1991).

Although there is little reference to causality, Thorp (1926, p. 171) describes a sectoral shock in textiles (“cotton industry severely depressed, with strike at end of year”) and in agriculture (“return to agricultural depression” in 1892 and “drought causes crop failures” in 1893).

The national accounts reveal a fairly widespread slump: agriculture, forestry and fishing declined by 7.2 per cent, industry by 6.4 per cent and transport and communication by 1.6 per cent, while distribution and other services expanded by 0.3 per cent (Mitchell, 1988). 1892 was more severe than 1893 as real GDP fell by 2.1 per cent in the first year and 0.7 per cent in the second (Solomou and Weale, 1991). All industries returned to growth in 1894, as activity jumped by 5 per cent, undoing the losses of 1892-3.

The reliability of this recession is high. The slump was non-trivial and there is evidence of a downturn in the historiography. While existing chronologies identify a peak in 1889 or 1890 not in 1891, the majority agree on a trough in 1893 (Friedman and Schwartz, 1982; Capie and Mills, 1991; Klovland, 1998), although there is some debate as Burns and Mitchell (1946) and Rostow (1972) record the low point in 1894.

The Recession of 1900

	<i>Annual</i>
<i>Peak</i>	1899
<i>Trough</i>	1900
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.6%
<i>Explanation</i>	Unknown
<i>Reliability</i>	Low

Source: Solomou and Weale (1991).

The twentieth century got off to a bad start with a recession in 1900. The historiography is limited on this episode. Thorp (1926, p. 173) describes a number of adverse shocks that may account for the slide from “prosperity” to “recession”: “commodity prices reach peak and then decline”, “coal prices extremely high”, “big increase in volume of foreign trade, slackening late in year”, “money tight”, “stock market unsteady” and “smaller crops”. From this series of potential explanations, the ultimate cause is unclear.

The national accounts do lend some support to one of the causes advanced by Thorp (1926). Of the four major industries, the only one to contract during this downturn was agriculture, forestry, and fishing, which fell by 2.1 per cent (Mitchell, 1988), giving support to the “smaller crops” hypothesis. As the other sectors did not decline, the impact in the aggregate was smaller than in agriculture: real GDP fell by 0.6 per cent, which was the mildest recession since 1839. A diffuse recovery began in 1901.

In terms of reliability, we consider this recession to be low. One factor is the marginal decline in economic activity. Another is that a recession in 1900 goes against the grain of the historiography. Although Klovland (1998) chronicles a recession in 1900 and Capie and Mills (1991) record a longer downturn between 1900 and 1904, Burns and Mitchell (1946), Rostow (1972) and Friedman and Schwartz (1982) regard 1900 as a peak.

The Recession of 1903

	<i>Annual</i>
<i>Peak</i>	1902
<i>Trough</i>	1903
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 0.9%
<i>Explanation</i>	War
<i>Reliability</i>	Low

Source: Solomou and Weale (1991).

The outbreak of the Boer War led to a spike in government expenditure from £116.4 million in 1898 to £202.2 million in 1901 (Thomas and Dimsdale, 2017). The war's end saw government spending reduced to £197 million in 1902 and to £165 million in 1903. According to Dimsdale and Thomas (2019, p. 147), this fiscal consolidation was responsible for the downturn: "the end of the war led to reduced military spending, which pushed the economy into a mild recession with a low point in 1903."

This downturn affected agriculture, forestry, and fishing in particular (-8.4 per cent), as well as industrial production (-2.1 per cent) (Mitchell, 1988). Aggregate activity contracted by 0.9 per cent, making this recession more severe than 1900, albeit still mild by earlier and later standards. In 1904, all industries returned to growth and the output losses were overturned.

We classify the reliability of this recession as low, which reflects both the minor output losses and the uncertainty in the historiography. At one extreme, Burns and Mitchell (1946) record 1903 as a peak. At the other, Klovland (1988) regards 1903 as a recession. In between, Rostow (1972), Friedman and Schwartz (1982) and Capie and Mills (1991) see 1903 as part of a longer downturn that began in 1899 or 1900 and ended in 1904.

The Recession of 1908

	<i>Annual</i>
<i>Peak</i>	1907
<i>Trough</i>	1908
<i>Duration</i>	1 year
<i>Output Loss</i>	GDP: 3.8%
<i>Explanation</i>	International shock
<i>Reliability</i>	Very high

Source: Solomou and Weale (1991).

The first decade of the twentieth century suffered a third recession in 1908. According to Dimsdale and Thomas (2019, p. 147), “a sustained export-led boom [...] was interrupted by an external shock arising from a major financial crisis in 1907. The crisis led to an outflow of gold to New York and Bank Rate was raised to 7 per cent. The rise in Bank Rate and disturbed international conditions pushed the economy into a sharp recession with declines in both exports and domestic investment. There was no domestic financial crisis and both overseas lending and exports rebounded from the recession after 1908.” Lennard (2018) calculated that monetary policy raised unemployment by approximately half a million people.

Thus, two candidate explanations are advanced: economic policy and an international shock. As the tightening of monetary policy was a response to, rather than a cause of, developments, we classify the ultimate explanation as an international shock.

The downturn was more severe than the recessions of 1900 and 1903 combined as real GDP dipped by 3.8 per cent (Solomou and Weale, 1991). The most acutely affected sector was industry as production contracted by 8 per cent, the next was transport and communication as output fell by 2.1, followed by distribution and services (-0.1 per cent) and agriculture, forestry, and fishing, where activity increased by 2.9 per cent. Growth resumed in 1909 and the recovery was complete in 1910 as the peak of 1907 was surpassed.

In terms of reliability, we regard this recession as very high. One reason is that this downturn was the largest since 1861-2, reducing the likelihood that it is a figment of the data. Another reason is that our identification of a peak in 1907 and a trough in 1908 is perfectly synchronised with existing chronologies (Burns and Mitchell, 1946; Rostow, 1972; Friedman and Schwartz, 1982; Capie and Mills, 1991; Klovland, 1998).

The Recession of 1919-21

	<i>Annual</i>
<i>Peak</i>	1918
<i>Trough</i>	1921
<i>Duration</i>	3 years
<i>Output Loss</i>	GDP at market prices: 25.0% GDP at factor cost: 25.3%
<i>Explanation</i>	Economic policy, labour supply and sectoral shock
<i>Reliability</i>	Very high

Sources: Mitchell (1988) and Sefton and Weale (1995).

The recession of 1919-21 is the deepest in the economic history of modern Britain. According to Broadberry (1986), there are two likely explanations. The first is monetary policy. Although it took until 1925 to return to the gold standard, the intention to do so was announced in 1919 (Solomou, 1996, p. 93), from which point Bank Rate was hiked at a time of deflation, leading to an increase in real interest rates. The second is a labour supply shock as hours were reduced in the aftermath of the Great War. Matthews (1964, p. 215) adds a third possible cause: the “collapse of the old staple export industries.”

The annual national accounts suggest that economic activity reached a peak at the war’s end in 1918. Output fell by 9.9 per cent in 1919, by 7.8 per cent in 1920, and by 9.7 or 10.1 per cent in 1921, depending on the measure of GDP. A recovery began in 1922, although it was not until the mid-1930s that the peak of 1918 was surpassed.

While quarterly national accounts are available from 1920, we do not include the recession of 1919-21 in the quarterly chronology as it is not possible to definitively determine the peak from the data available.

We regard the reliability of these turning points to be very high. However, there are factors against the assignment of the highest reliability grade. For example, this period spans several vintages of national accounts: compromise estimates are used up until 1920 and balanced estimates thereafter. Of which, the former are presumably less reliable. In addition, while Burns and Mitchell (1946) and Friedman and Schwartz (1982) also identify a trough in 1921, they both opt for a peak in 1920, including an additional recession between 1918/9 and 1920. Nevertheless, the decisive factor is the depth and duration of the recession, giving the clearest signal in the sample.

The Recession of 1926

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1925	1926:I
<i>Trough</i>	1926	1926:III
<i>Duration</i>	1 year	2 quarters
<i>Output Loss</i>	GDP at market prices: 3.1%	GDP at market prices: 8.9%
	GDP at factor cost: 3.3%	GDP at factor cost: 9.6%
<i>Explanation</i>	Labour supply	
<i>Reliability</i>	Very high	

Sources: Sefton and Weale (1995) and Mitchell et al. (2012).

“The ending of the slump was the beginning of the Doldrums” (Pigou, 1948, p. 7), which involved the transition to a state of persistently high unemployment. But matters were to get worse with the recession of 1926. The likely explanation for this episode is the General Strike of May 1926. According to Mitchell et al. (2012), this had an effect on iron and steel for home consumption, “with the whole economy clearly affected to some extent”. *The Economist* (12 Feb. 1927, p. 51) similarly wrote that the strike not only “closed down the iron and steel

industry; it made it impossible for many other industries to make firm contracts and greatly increased unemployment”.

Annual data shows a short, sharp drop in GDP of 3.1-3.3 per cent in 1926. On the output side, beyond mining and quarrying, which was obviously most severely affected, production dropped in manufacturing, transport and communication, distribution, public administration and defence, and other services. On the expenditure side, gross fixed capital formation, stockbuilding, and exports fell. 1927 saw a rapid recovery as output grew by more than 7 per cent.

The quarterly data also indicates a clear contraction in economic activity from a peak in the first quarter of 1926 to a trough in the third quarter. The timing of the contraction coincides with the start of the General Strike.

The reliability of this recession is very high. The first reason is that the contraction is relatively large, while the balanced national accounts are solid. The second reason is the corroboration with qualitative evidence. *The Economist* (12 Feb. 1927, p. 51; 11 Feb. 1928, p. 51) recorded that “the economic recovery was abruptly cut short at the beginning of May” and that “1926 was a year of unqualified disaster”. In addition, the other chronologies identify a recession in this period between 1925 and 1926 (Burns and Mitchell, 1946; Freidman and Schwartz, 1982).

The Recession of 1930-1

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1929	1930:I
<i>Trough</i>	1931	1932:III
<i>Duration</i>	2 years	10 quarters
<i>Output Loss</i>	GDP at market prices: 5.4%	GDP at market prices: 6.9%
	GDP at factor cost: 5.8%	GDP at factor cost: 7.1%
<i>Explanation</i>	International shock	
<i>Reliability</i>	Very high	

Sources: Sefton and Weale (1995) and Mitchell et al. (2012).

The Great Depression is a watershed in economic history. According to Sayers (1967, p. 53), this “economic blizzard [...] was something that struck Britain from outside”. As Crafts and Fearon (2013b, p. 49) explain, the international shock originating from the United States triggered a large drop in exports, leading to lower output and prices, which was exacerbated by sticky prices and wages (Lennard, 2022; Chadha et al., forthcoming). Economic policy did not initially help to manage expectations and stabilize the economy as a balanced budget and the gold standard was the preoccupation of fiscal and monetary policy (Lennard et al., 2021).

On an annual basis, identifying the turning points is relatively straightforward. Following a sustained recovery from the recession of 1926, GDP at market prices and at factor cost peaked in 1929, falling by 0.8-0.9 per cent in 1930 and by 4.6-5.0 per cent in 1931. A long recovery began in 1932. The contraction was diffuse across industries, but it was most severe in mining and quarrying, manufacturing, and construction (Sefton and Weale, 1995). At first, the revival was weak with economic growth of 0.1 to 0.4 per cent, but momentum built and growth rose above 6 per cent by 1934, at which point output topped the level of 1929.

On a quarterly basis, dating this recession is more challenging. The challenge lies not in determining the peak, which stands out in the first quarter of 1930, but in placing the trough. From 1930:II economic activity contracted quarter after quarter until 1931:III. Around the turn of the year there was then a two-quarter expansion that raised output by about 1 per cent. However, this was a false dawn (Worswick, 1984) and two quarters of contraction of slightly more than 1 per cent followed. Thus, the issue is whether to date the trough at the end of 1931 and treat the contraction of mid-1932 as a separate episode or to date the trough at the third quarter of 1932. We opt for the later trough as it was not until this point that a decisive shift to recovery began.

We grade the reliability of this recession as very high. One reason is that the national accounts, having been balanced, are robust and the data gives a relatively strong indication of the turning points, particularly in the annual data. Another reason is the historiography on this episode. Several studies have talked of this as a double-dip recession (Crafts and Fearon, 2013a; Mitchell et al., 2012), which supports our view that this was a single recession

containing two contractions. In addition, Burns and Mitchell (1946) and Friedman and Schwartz (1982) identify the same peak albeit a later trough of 1932.

The Recession of 1944-7

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1943	1943:II
<i>Trough</i>	1947	1947:II
<i>Duration</i>	4 years	16 quarters
<i>Output Loss</i>	GDP at market prices: 12.2%	GDP at market prices: 14.7%
	GDP at factor cost: 13.7%	GDP at factor cost: 16.9%
<i>Explanation</i>	War	
<i>Reliability</i>	Very high	

Sources: Sefton and Weale (1995) and Appendix B.

The recession of 1944-7 was one of the deepest since 1700. The likely explanation is the war and its aftermath. Just as defence spending stimulated the economy during rearmament (Crafts and Mills, 2013), the winding down of the war effort from the peak in 1943 was probably contractionary (Broadberry and Howlett, 1998, p. 47). However, the ending of the war posed a different set of problems as the economy was “grossly distorted for peacetime purposes” (Woodward, 2004, p. 20).

The annual data indicates that 1943 was the high watermark in economic activity. Output slid thereafter, falling monotonically until 1947. This contraction was completely concentrated in public consumption, which supports the explanation of an adjustment from war to peace. A recovery that was to be long-lived began in 1948, overtaking the previous peak in GDP at market prices in 1951 and GDP at factor cost in 1952.

The quarterly data provides greater resolution, identifying the peak in the second quarter of 1943. Thereafter, both measures of GDP fell continuously until the second quarter of 1947. There was a sustained rebound from the third quarter of the year.

The reliability of this recession is very high. While the national accounts for the war years are less reliable than for the interwar and postwar periods (Sefton and Weale, 1995, p. 85), the depth and duration of this recession is a strong signal. In addition, the other chronology that covers this period (Friedman and Schwartz, 1982) also points to a recession, although it shifts the peak forward to 1944 and the trough back to 1946.

The Recession of 1974-5

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1973	1973:II
<i>Trough</i>	1975	1975:III
<i>Duration</i>	2 years	9 quarters
<i>Output Loss</i>	GDP at market prices: 3.9%	GDP at market prices: 5.3%
	GVA at basic prices: 3.7%	GVA at basic prices: 5.3%
<i>Explanation</i>	Commodity price shock and economic policy	
<i>Reliability</i>	Very high	

Source: ONS (2020).

The first OPEC recession marked the end of the Golden Age (Dow, 1998, p. 235). The main causes for this downturn were “the oil price shock and the rapid tightening of monetary policy” (Dow, 1998, p. 297). In terms of oil, prices increased by a factor of 4 following the Yom-Kippur War of 1973 (Woodward, pp. 127-8). In terms of monetary policy, the Minimum Lending Rate was raised to 13 per cent (Thomas and Dimsdale, 2017). At the same time, there were also industrial disputes, involving the National Union of Mineworkers and the Electrical Power Engineers’ Association (Blackaby, 1978, p. 74). As a result, the government declared a state of emergency, imposing a 50 mile per hour speed limit, a three-day week and restrictions on heating and lighting (Blackaby, 1978, pp. 74-5).

On an annual basis, there is a clear peak in 1973, which had been the strongest year of growth in postwar Britain. GDP at market prices and GVA at basic prices increased by 6.5 and 6.8 per cent, respectively. The contraction began in 1974, as economic activity slumped by slightly more than 2 per cent, and continued into 1975, as output fell by about 1.5 per cent. This

recession saw a particularly sharp fall in gross capital formation (ONS, 2020) and in the output of the oil and gas extraction, construction and distribution industries (Sefton and Weale, 1995). Recovery began in 1976 but it was not until the following year that it was complete and GDP exceeded the previous peak.

On a quarterly basis, the data quite consistently points to a peak in the second quarter of 1973. Both GDP at market prices and GVA at basic prices declined from the subsequent quarter. However, the data is less revealing about the trough. The peak in 1973:II was followed by three quarters of decline, which in turn was followed by alternating quarters of expansion and contraction until 1975:III. After which, there was a decisive shift to recovery.

In terms of reliability, we grade this recession as very high. One reason is that the recession was relatively deep and persistent, while the national accounts are of good quality in this period. Another is that, on an annual (Friedman and Schwartz, 1982, p. 177; Dow, 1998, p. 297) and quarterly (CSO, 1993; OECD, 2019) basis, previous research has opted for the same peaks and troughs.

The Recession of 1980-1

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1979	1979:II
<i>Trough</i>	1981	1981:I
<i>Duration</i>	2 years	7 quarters
<i>Output Loss</i>	GDP at market prices: 2.8%	GDP at market prices: 5.3%
	GVA at basic prices: 2.5%	GVA at basic prices: 5.1%
<i>Explanation</i>	Commodity price shock and economic policy	
<i>Reliability</i>	Very high	

Source: ONS (2020).

The second OPEC recession had similar antecedents to the first. First, oil prices increased by 130 per cent following the 1979 Revolution in Iran (Woodward, 2004, p. 157). The UK was now an oil producer and this was partly responsible for a 10 per cent appreciation of sterling.

Second, Thatcher's newly-elected government implemented a policy of tight money, raising the Minimum Lending Rate to 17 per cent, and austere fiscal policy, increasing Value Added Tax to 15 per cent, among other measures (Dow, 1998, p. 304).

The annual data clearly suggests that, following four years of economic growth in the aftermath of the first OPEC crisis, recession returned as GDP at market prices and GVA at basic prices contracted by 2 per cent in 1980 and by a little less than 1 per cent in 1981. On the output side, it was construction that was hit hardest (Sefton and Weale, 1995). On the expenditure side, it was gross capital formation (ONS, 2020). From 1982, a broad recovery began, stimulating the majority of industries and every expenditure component. In 1983, this recovery was complete as economic activity surpassed the peak of 1979.

The quarterly data is less clear cut. In the first quarter of 1979 GDP at market prices and GVA at basic prices contracted by 0.4 per cent and 0.6 per cent. However, these measures of activity rebounded by more than 4 per cent in the second quarter. It is from this quarter that we identify the peak. From the third quarter, GDP and GVA slumped, albeit with a minor interruption in the final quarter of the year. Dating the end of the recession is more straightforward. From the second quarter of 1981, there was a sustained revival in both GDP and GVA.

The reliability of this recession is very high. There is some uncertainty in the historiography not on the incidence of a recession in the early 1980s but on the precise timing. On an annual basis, Dow (1998, p. 303) writes of the "recession of 1979-82". On a quarterly basis, the OECD (2019) also identifies the peak as 1979:II but a later trough of 1981:II, while the CSO (1993) records a later peak of 1979:III but the same trough. However, this was a persistent contraction at a time of highly reliable national accounts.

The Recession of 1991

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	1990	1990:II
<i>Trough</i>	1991	1992:II
<i>Duration</i>	1 year	8 quarters
<i>Output Loss</i>	GDP at market prices: 1.1%	GDP at market prices: 1.9%
	GVA at basic prices: 0.7%	GVA at basic prices: 1.2%
<i>Explanation</i>	Animal spirits and economic policy	
<i>Reliability</i>	High	

Source: ONS (2020).

Multiple shocks were seemingly at the heart of the recession of 1991. According to Woodward (2004, p. 195), the contraction was “partly due to a build-up of debt in the late 1980s, which made the economy particularly sensitive to the high interest rates that were introduced to counter the inflationary consequences of the Lawson boom.” However, Dow (1998, p. 353) argues that the recession “was entirely due to a reversal of the over-confidence that had been built up in the preceding boom years”.

On an annual basis, economic activity peaked in 1990, almost a decade after the recession of 1980-1. GDP at market prices and GVA at basic prices fell by 1.1 per cent and 0.7 per cent in 1991. Consistent with a collapse in sentiment and tight monetary policy, the major contributor to this contraction was gross capital formation, which fell by 11.5 per cent (ONS, 2020). The majority of industries slumped, particularly affected were construction and manufacturing (ONS, 2020). Recovery sprang in 1992, with GDP and GVA returning to growth, topping the pre-recession peak in 1993. The end of this recession marked the onset of the Great Moderation.

On a quarterly basis, it is clear this recession began in the third quarter of 1990. Both GDP at market prices and GVA at basic prices declined from this point. The recovery is less clear. GDP at market prices fell until the third quarter of 1991, rose briefly for two quarters, and fell once again in the second quarter of 1992. GVA at basic prices, declined for three quarters from

1990:III but had a longer revival, growing slightly for three quarters, before falling for an additional quarter. However, it was not until the third quarter of 1992 that a sustained recovery began.

The reliability of this recession is high. While the contraction was relatively short and mild, the quality of the national accounts in this period is good. The qualitative evidence is also largely supportive. In terms of primary sources, there were frequent reports of continued depression throughout the first half of 1992. For example, in February the National Institute of Economic and Social Research commented on “the persistence of the recession” (Pain, 1992), while in April, the *Financial Times* noted that the “recession continues” (24 Apr. 1992, p. 3). In terms of secondary sources, the historiography is consistent on the return to recession in the early 1990s but not on when. Dow references the “recession of 1989-93”. While the CSO (1993) and OECD (2019) diverge on the timing of the peak, placing it in 1990:I and 1988:IV, respectively, these chronologies agree with our view on the trough, despite the mixed signals in the national accounts.

The Recession of 2008-9

	<i>Annual</i>	<i>Quarterly</i>
<i>Peak</i>	2007	2008:I
<i>Trough</i>	2009	2009:II
<i>Duration</i>	2 years	5 quarters
<i>Output Loss</i>	GDP at market prices: 4.5%	GDP at market prices: 6.0%
	GVA at basic prices: 4.3%	GVA at basic prices: 6.1%
<i>Explanation</i>	Financial crisis	
<i>Reliability</i>	Very high	

Source: ONS (2020).

The recession of 2008-9 is one of the major events in postwar economic history. A run on Northern Rock in September 2007 developed into a severe banking crisis, leading to the failure of five of the nine major banks in the United Kingdom (Turner, 2014a, p. 98). The

banking crisis is generally accepted as the main cause of this recession. According to Hills et al. (2010), for example, “the financial sector was both the source and propagator”.

Annual data suggests that the Great Moderation reached its peak in 2007. The initial contraction was modest, output declined by 0.1-0.3 per cent in 2008, but it became more severe subsequently, shrinking by 4.2 per cent in 2009. This recession affected almost every branch of economic activity: production fell in 50 per cent of all industries in the first year of the recession and 80 per cent in the second (ONS, 2020). There was a mild drop in private consumption and a sharper fall in gross capital formation (ONS, 2020). The recovery began in 2010, but it was not until 2012 that the pre-crisis peak was reached.

Quarterly data suggests that there was a sharp drop in economic activity from the second quarter of 2008. From the third quarter of 2009, a sustained recovery began.

We regard the reliability of these turning points to be very high for the following reasons. First, this deep and durable contraction occurred at a time when the national accounts are at their most reliable. Second, while the timing and depth of the Great Recession was not known in real time, our dating of the turning points is not controversial today. The OECD’s (2019) chronology, the other set of turning points available in this period, also dates the peak as 2008:I and the trough as 2009:II.

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Appendix B: Quarterly GDP Estimates for the United Kingdom, 1938-55

The Second World War and its aftermath is a watershed in economic history. Despite its importance, however, our understanding is limited by a critical gap in the statistical record. On one hand, there is annual data on GDP, which represents market-based activity in the whole economy but at a low frequency. On the other hand, there is quarterly data for various macroeconomic indicators, which are high frequency but are not individually representative of the aggregate economy. Researchers therefore face a trade-off between the coherence and the frequency of the data that is studied.

In this appendix, we construct the first quarterly estimates of GDP for the United Kingdom between 1938 and 1955. At the annual frequency, we have compiled existing estimates of GDP. At the quarterly frequency, we have collected data from primary and secondary sources for some of the components of GDP, such as consumption, exports and government spending on the expenditure side, (un)employment and wages on the income side and industrial production on the output side. We have also collected data for a number of series that are potentially correlated with GDP, such as the broad money supply and share prices.

In order to exploit the data available at both frequencies, we estimate temporal disaggregation models that use the high-frequency indicators subject to the constraint that the quarterly estimates sum to annual GDP.

Higher frequency estimates of GDP are valuable economic statistics for a number of reasons. First, turning points in economic activity can be more precisely located at higher frequencies, which may have important implications for determining the causes of contractions and recoveries. Second, short phases of contraction or expansion may be concealed in annual data but emerge at higher frequencies. For example, while annual GDP shows that 1932 was the first year of recovery from the Great Depression, quarterly GDP reveals that there was a double-dip recession in mid-1932 (Mitchell et al., 2012; Crafts and Fearon, 2013, p. 20). Third, taken together with other series, higher frequency data boosts the sample sizes for econometric analysis, leading to more precise estimates. For example, high-frequency historical national accounts for the United Kingdom have been used in the analysis of

government spending multipliers (Crafts and Mills, 2013, 2015), tax multipliers (Cloyne, 2013; Cloyne et al., 2018) and uncertainty (Lennard, 2020).

These advantages may be important to the study of many interesting events and policies in this period. Foremost was the Second World War, during which the British economy was transformed so that a fifth of employees were mobilised into the Armed Forces (Feinstein, 1972, T126) and more than half of GDP was devoted to the war (Broadberry and Howlett, 1998, p. 72). Beyond the war, there was the fuel shortage in the winter of 1946-7 (Woodward, 2004, p. 256), the convertibility crisis in 1947 and devaluation in 1949, the hire-purchase restrictions and “credit squeezes” of 1952 and 1955 (Dow, 1964, pp. 246-7), the “bonfire” of controls on consumption, investment, imports, materials and prices that reduced the extent of post-war regulation (Dow, 1964, pp. 49-50, 144-77), the major strikes of 1955, first in newspapers and then in railways, leading to the declaration of a State of Emergency, and the “stop-go” of fiscal and monetary policy that led to frequent reversals in the stance of policy (Woodward, 2004, pp. 65-6).

This appendix is related to a strand of work on the temporal disaggregation of historical national accounts. For the United States, Balke and Gordon (1986) construct quarterly estimates of GDP between 1875 and 1946 using the Chow and Lin (1971) approach, which interpolates annual GDP on the basis of a quarterly index of industrial production. Gordon and Krenn (2010) build on this with new estimates for the period 1919 to 1951. First, by using the Chow and Lin (1971) approach to interpolate annual series of the components of national expenditure using multiple high-frequency indicators. And second, by summing the estimated quarterly series of the components to yield GDP. For Sweden, Edvinsson and Hegelund (2018) estimate quarterly GDP for the period 1913 to 2014, using the Denton (1971) method to interpolate annual GDP and industrial production as a high-frequency indicator. For Ireland, Andersson and Lennard (2018) calculate annual GDP between 1842 and 1913 based on a dynamic factor model and decadal benchmarks of annual GDP. For a panel of 28 countries during the Great Depression, Albers (2018) constructs monthly economic activity indices, which reduce a large array of macroeconomic time series into composite indicators using principal component analysis.

For the United Kingdom, Hayes and Turner (2007) estimate quarterly GDP between 1920 and 1938 using annual GDP, quarterly industrial production and the Chow and Lin (1971) method. Mitchell et al. (2012) improve on these estimates by using a dynamic factor model (Proietti and Moauro, 2006). For the period since 1955, the Office for National Statistics (ONS, 2019) has produced a direct measure of quarterly GDP. The Mitchell et al. (2012) and ONS (2019) series are plotted in Figure 1. As can be seen, there is a gap between the late 1930s and the mid-1950s. The goal of this appendix is to fill this void in British macroeconomic history.

[INSERT FIGURE 1 ABOUT HERE]

The rest of the appendix is structured as follows. Section I describes the data that underpins the new series. Section II outlines the methodology. Section III presents the results. Section IV concludes.

I. Data

In order to construct quarterly estimates of GDP, we collect a number of quarterly and annual time series. Table 1 shows the variables that we use, as well as the underlying source, coverage and a description. Panel A lists the annual data. Between 1938 and 1948, we use balanced estimates of real GDP at factor cost and market prices from Sefton and Weale (1995). Between 1948 and 1955, we focus on real GVA at basic prices and real GDP at market prices from ONS (2019). Figure 2 plots spliced series of real GDP at factor cost and at market prices. GDP at market prices includes taxes and subsidies, while GDP at factor cost does not. Therefore, the level of GDP at market prices is typically higher than at factor cost.

[INSERT TABLE 1 ABOUT HERE]

[INSERT FIGURE 2 ABOUT HERE]

Panel B lists the quarterly data. We have collected an extensive set of macroeconomic time series that are either components of GDP on the expenditure, income or output sides or are correlates of GDP. In terms of the components of GDP, on the expenditure side we have

collected data on retail sales, household consumption, government expenditure, exports and imports. On the income side, we have data on wages and unemployment. Income from employment constituted more than 60 per cent of GDP in this period (Sefton and Weale, pp. 192-3). On the output side, we have collected data on bank clearings, industrial production, postal receipts and the output of coal, pig iron and steel ingots and castings, as well as munitions production, which increased significantly during the war (Harrison, 1990). In addition, we have also included the aggregate days lost in industrial disputes to capture disruptions to production arising from strikes. For example, a strike in the second quarter of 1955 put a complete stop to national newspaper presses.

In terms of the correlates of GDP, we have collected data on the broad money supply, consol yield and share prices. There are a number of theoretical reasons why these variables would be correlated with economic activity. For example, the money supply is linked to GDP through the quantity equation, given constant velocity, and equity prices should contain information about economic fundamentals given efficient markets. The variables are plotted in Figure 3.

[INSERT FIGURE 3 ABOUT HERE]

The data set consists of both existing and new time series. Where existing series have been used, we have sought the best vintage available. For example, we use Sefton and Weale's (1995), as opposed to Feinstein's (1972), estimates of annual GDP, as the former are balanced. The majority of the series, however, are new, such as bank clearings; coal, pig iron and steel ingots and castings production; exports and imports; government expenditure and revenue; household consumption; industrial disputes; industrial production; postal receipts and retail sales. These series were collected from contemporary copies of the *Accounts Relating to Trade and Navigation of the United Kingdom* (various years), which were published by the Board of Trade; Bank of England's *Statistical Summary* (various years); *Board of Trade Journal* (various years); *Economist* (various years); *Ministry of Labour Gazette* (various years); *Monthly Digest of Statistics* (various years), which was published by the Central Statistical Office (CSO), and *Statistical Digest of the War* (1951), which was also published by the CSO.

Prior to estimation, the nominal series are first deflated by the retail price index. All series are then seasonally adjusted using TRAMO-SEATS, except for the consol yield, imports and share prices, which were identified as not following a seasonal pattern.

The sample period is 1938 to 1955. However, where possible, we have collected data for a longer time span. First, we have extended back to 1935 to allow a burn-in period because the dynamic factor model requires an arbitrary choice of an initial state, which the estimates for the beginning of the sample are sensitive to. Second, we have extended forward to 1960 so that we can re-run the model over a longer sample period to assess the reliability of our results against existing estimates, which are available from 1955.

II. Methodology

There are two main methods for finding high-frequency analogues of low-frequency data. Regression based models (Chow and Lin, 1971; Denton, 1971; Litterman, 1983) are relatively simple to estimate but impose a “restrictive ad hoc structure on the dynamics” (Mitchell et al., 2012) and limit the number of indicators that can be included due to degrees of freedom constraints. State-space models (Proietti and Moauro, 2006; Mitchell et al., 2012) overcome these disadvantages but are more complex to estimate.

In order to gauge how sensitive the turning points are to these methodologies, we run variants of both models. For the regression-based approach, we estimate Litterman’s (1983) model. Because of the degrees of freedom issue, we estimate the model using subsets of the indicators: an “expenditure” estimate includes government expenditure, exports and imports and retail sales; an “income” measure includes government revenue, wages and unemployment; an “output” estimate includes bank clearings, coal production, industrial disputes, munitions production, pig iron production, steel ingots and casting production; and a “financial” model includes the broad money supply, consol yield and share price index.

For the state-space approach, we estimate a mixed frequency dynamic factor model:

$$\begin{cases} y_t = \theta\mu_t + \mu_t^* \\ \phi(L)\Delta\mu_t = \eta_t \\ D(L)\Delta\mu_t^* = \beta + \eta_t^*. \end{cases} \quad (1)$$

where y_t is a vector of N variables, which is a function of an $N \times 1$ vector of factor loadings, θ , a common factor, μ_t and an idiosyncratic component μ_t^* . μ_t and μ_t^* are assumed to be difference stationary, identically and normally distributed and mutually independent with variance 1 and Σ_{η^*} respectively. $\phi(L)$ is a degree p root stationary autoregressive polynomial and $D(L)$ is a diagonal matrix polynomial with typical diagonal element being $d_j(L) = 1 - d_{j1}L - \dots - d_{jp_j}L^{p_j}$ for $j = 1, \dots, N$ a root stationary autoregressive process. β is the drift of the idiosyncratic component. The model assumes that the common factor has zero drift and the disturbances unit variance (Proietti and Moauro, 2006), which ensures identification of the parameters. Proietti and Moauro (2006) show how to cast this model in state-space form and perform temporal disaggregation based on Harvey (1989).

III. Results

Figures 4 and 5 plot the new estimates of quarterly real GDP in levels and percentage changes from the state-space model. We focus on these estimates as the model makes full use of the data set and is considered to be methodologically superior (Proietti and Moauro, 2006; Mitchell et al., 2012). However, the estimates appear to be overly smooth and are highly uncertain. In any case, the turning points derived from the various models are heaped around a peak in the second quarter of 1943 and a trough in the second quarter of 1947, give or take a quarter.

[INSERT FIGURE 4 ABOUT HERE]

[INSERT FIGURE 5 ABOUT HERE]

Table 1. *Data Sources*

Variable	Source	Coverage	Description
<i>Panel A. Annual</i>			
Real GDP at factor cost	Sefton and Weale (1995, pp. 188-90)	1935-48	£ millions
Real GDP at market prices	Sefton and Weale (1995, pp. 188-90)	1935-48	£ millions
Real GDP at market prices	ONS (2019). Series ID: ABMI	1948-60	£ millions
Real GVA at basic prices	ONS (2019). Series ID: ABMM	1948-60	£ millions
<i>Panel B. Quarterly</i>			
Coal production	<i>Statistical Digest of the War</i> (1951, pp. 75-6) and <i>Monthly Digest of Statistics</i> (various years)	1940:I-1960:IV	Tons thousands. Great Britain
Industrial disputes	<i>Ministry of Labour Gazette</i> (various years)	1935:I-1960:IV	Aggregate duration in working days of all disputes
Industrial production	<i>Monthly Digest of Statistics</i> (various years)	1946:I-1960:IV	1948 = 100
Munitions production	Harrison (1990)	1939:IV, 1940:III-1944:IV	1941:I = 100
Nominal bank clearings	<i>Statistical Summary</i> (various years) and <i>Monthly Digest of Statistics</i> (various years)	1935:I-1960:IV	£ millions. England and Wales
Nominal broad money supply	Capie and Webber (2010, pp. 78-80)	1935:I-1960:IV	£ millions. Quarterly average

Table 1. *Data Sources (Continued)*

Variable	Source	Coverage	Description
Nominal exports and imports	<i>Accounts Relating to Trade and Navigation of the United Kingdom</i> (various years)	1935:I-1960:IV	£ millions
Nominal government expenditure and revenue	<i>Economist</i> (various years). From the closest issue following end of the quarter	1935:I-1959:I, 1959:IV-1960:IV	£ millions. Total ordinary expenditure and revenue into and out of the Exchequer
Nominal household consumption	<i>Monthly Digest of Statistics</i> (various years)	1945:I-1960:IV	£ millions
Nominal postal receipts	<i>Board of Trade Journal</i> (various years)	1935:I-1951:IV	£. Quarterly average
Nominal retail sales	<i>Board of Trade Journal</i> (various years)	1935:I-1960:IV	1938 = 100. Great Britain
Nominal share price index	Chadha et al. (2019)	1935:I-1960:IV	1938 = 100. Quarterly average
Nominal wages	<i>British Labour Statistics</i> (1971, p. 53)	1935:I-1960:IV	1938 = 100. End of quarter. Manual workers, all industries and services
Nominal yield on consols	Capie and Webber (2010, pp. 501-2)	1935:I-1960:IV	%. Quarterly average
Pig iron production	<i>Statistical Digest of the War</i> (1951, pp. 103-4) and <i>Monthly Digest of Statistics</i> (various years)	1939:IV-1960:IV	Tons thousands

Table 1. *Data Sources (Continued)*

Variable	Source	Coverage	Description
Retail price index	Capie and Webber (2010, pp. 530-1)	1935:I-1960:IV	1938 = 100. Quarterly average
Steel ingots and castings production	<i>Statistical Digest of the War</i> (1951, pp. 105-6) and <i>Monthly Digest of Statistics</i> (various years)	1939:IV- 1960:IV	Tons thousands
Unemployment rate	Denman and McDonald (1996)	1935:I-1960:IV	%. Quarterly average. New series begins in June 1948

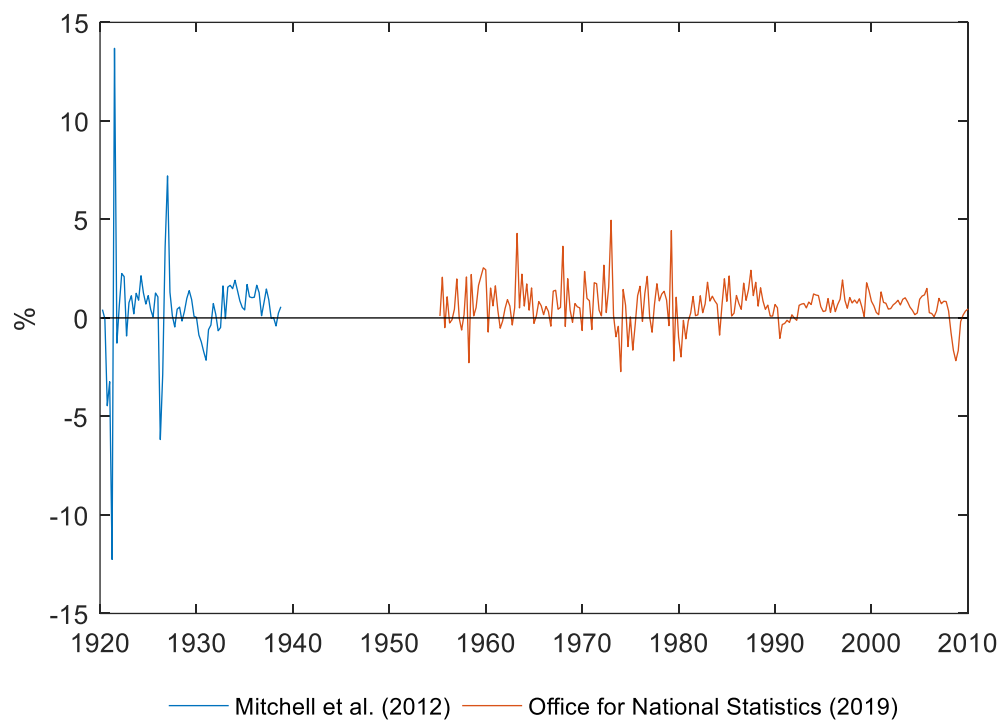


Figure 1. *Quarterly Real GDP Growth, 1920-2010*

Note: The series are at market prices.

Source: Mitchell et al. (2012) and ONS (2019).

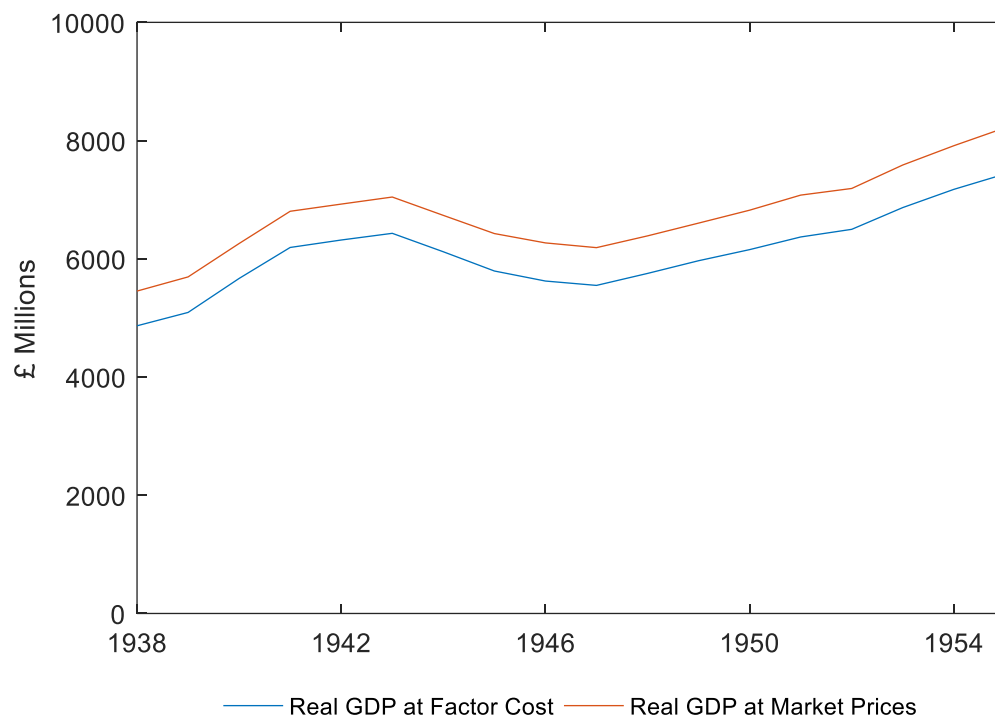


Figure 2. *Annual Real GDP, 1938-55*

Source: Sefton and Weale (1995, pp. 188-90) and ONS (2019).

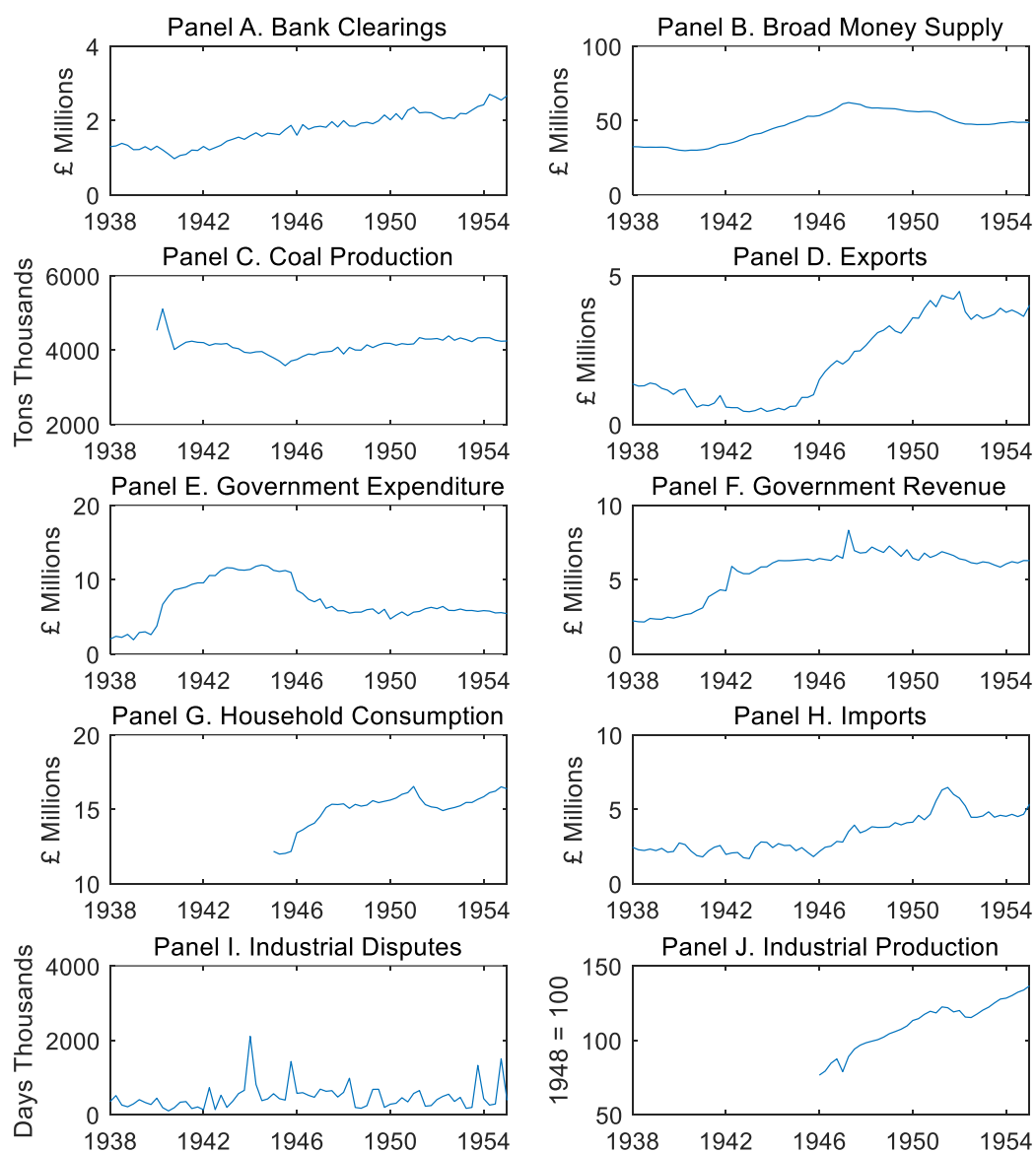


Figure 3. *Macroeconomic Time Series, 1938-55*

Note: Nominal variables have been deflated. Seasonal variables have been adjusted.

Source: See Table 1.

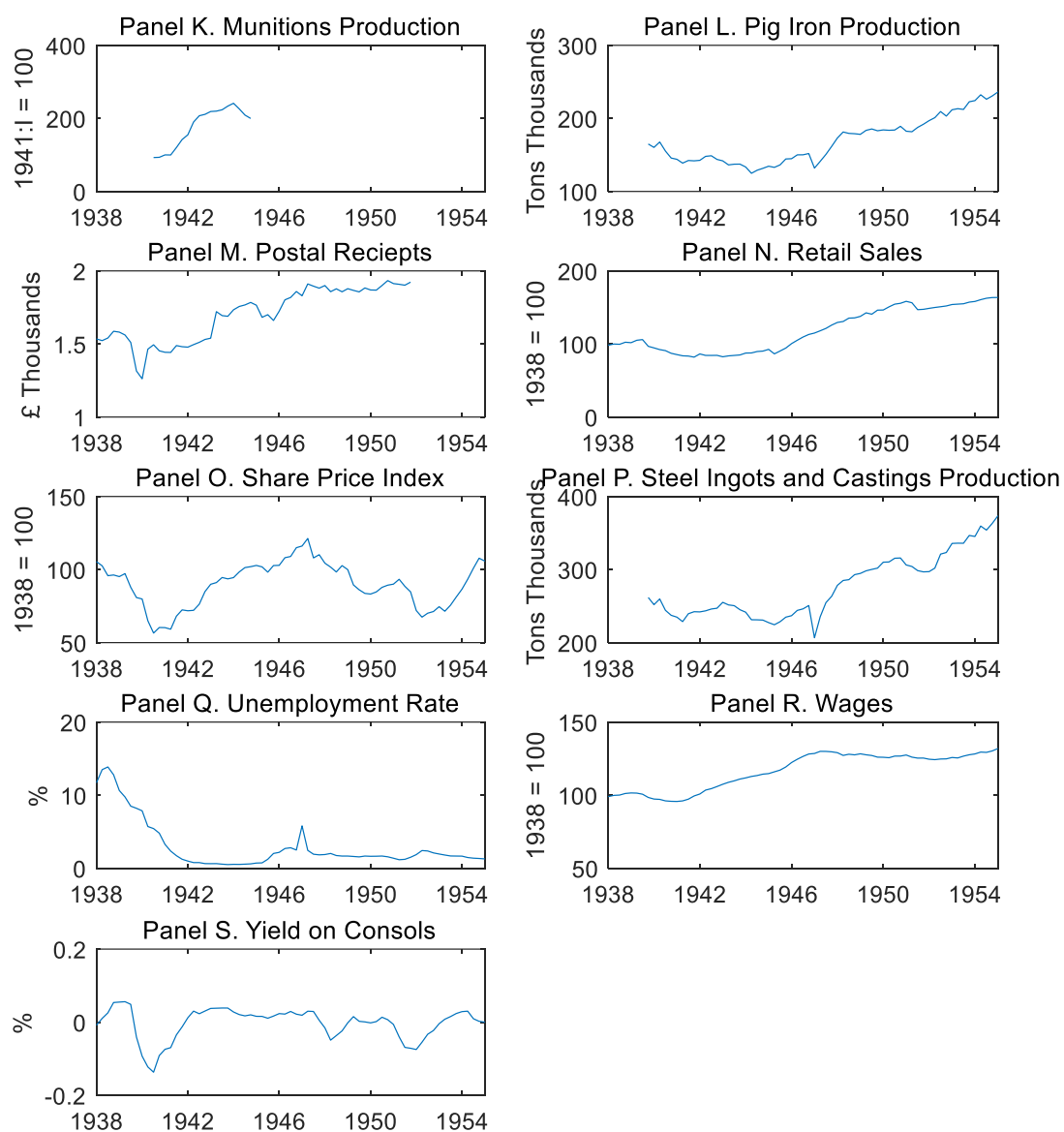


Figure 3. *Macroeconomic Time Series, 1938-55 (Continued)*

Note: Nominal variables have been deflated. Seasonal variables have been adjusted.

Source: See Table 1.

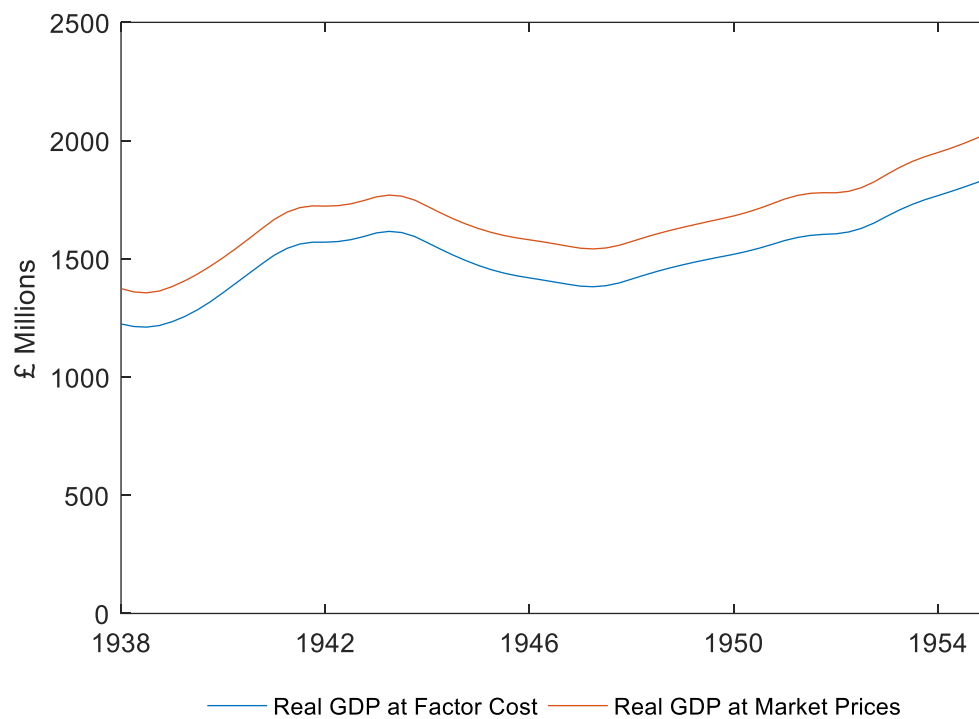


Figure 4. *Estimates of Quarterly Real GDP, 1938-55*

Source: See text.

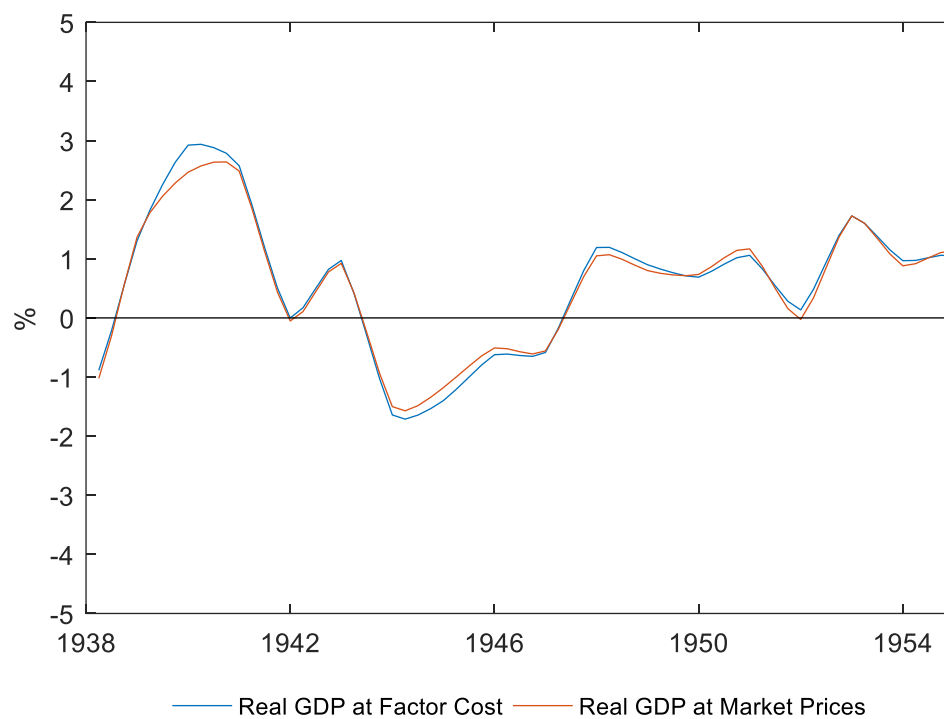


Figure 5. *Estimates of Quarterly Real GDP Growth, 1938-55*

Source: See text.

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