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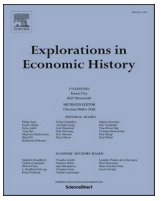

Research Paper

Quarterly GDP for Ireland since 1950☆

Seán Kenny [a,b,c], Rebecca Stuart [c,d,e,f,#,*]

[a] University College Cork, Ireland
[b] Lund University, Sweden
[c] Queen's University Belfast, United Kingdom
[d] University of Neuchâtel, Switzerland
[e] CEPR, France
[f] ZHAW Zurich University of Applied Sciences, Switzerland

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ABSTRACT

We construct estimates of quarterly GDP (and GNP) for Ireland from 1950, linking to official data from 1995 onward, using a novel factor-augmented Chow-Lin interpolation. Compared to the only alternative series (OECD, 2025), our estimates exploit the variation in a large number of official quarterly economic data and are broadly consistent with contemporary reports. Our series permits a more granular identification of turning points in the Irish economy than was previously possible. The frequency and magnitude of quarterly contractions in the 1950s and 1980s dwarfed those of other decades resulting in lower average growth rates. In contrast, the 1990s are confirmed as a decisive period of higher growth and rapid convergence.

1. Introduction

In recent years, a growing number of studies have attempted to shed light on long-run Irish economic development through the construction of various estimates of regional (Geary and Stark, 2019, 2002; de Bromhead and Kenny, 2025) and national GDP (Andersson and Lennard, 2019; Gerlach and Stuart, 2015; Kenny, 2025). While the former group has typically relied on decadal Census benchmarks to track economic growth, the latter group has produced annual estimates from a variety of sources, using alternative methods. To date however, no attempt has been made to measure GDP or GNP at any higher frequency than annual. In this paper we address this issue, producing estimates of quarterly real GDP for the period 1950–1995, that is, the period before official data are

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* Corresponding author at: University of Neuchâtel, Switzerland.
E-mail addresses: sean.kenny@ekh.lu.se (S. Kenny), rebecca.j.stuart@gmail.com (R. Stuart).
Website: https://www.rebeccastuart.net/

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available (quarterly real GNP estimates are provided in Appendix A). Our estimates are constructed from an array of underlying high-frequency economic data drawn from primary sources. The series sheds new light on the timing, scale and magnitude of economic expansions and contractions in recent Irish economic history.

Compiling quarterly estimates of GDP during the 20th century poses a problem for many countries, because of a lack of high frequency data. We construct 19 monthly and quarterly series, collected from primary sources, which cover economic activity for all, or part of, the sample period. This is the broadest possible set of data that we could compile where each series covers a substantial portion of the sample period. Moreover, our data mirror the changing structure of the economy: series drop out or begin during our sample period reflecting their importance as economic indicators. Though 19 series may appear substantial, as we show, it is not sufficient to calculate GDP using sectoral weights based on gross value added. As a comparison, the recent annual GDP series compiled by Kenny (2025) uses in excess of 80 underlying individual series. In light of these considerations, we concluded that a statistical approach which exploits our high frequency economic data to generate intra-year activity, by interpolating the annual GDP data of Kenny (2025), was necessary.

We are not the first researchers to reach this conclusion. Previous studies interpolating historical GDP data have used Chow-Lin or similar methods (Mitchell et al., 2005; Stuart, 2018) and various dynamic factor models (Mitchell et al., 2012; Andersson and Lennard, 2019). Here we apply a factor-augmented Chow-Lin procedure to interpolate annual real GDP. This is a similar approach to that proposed by Angelini et al. (2006), who show that such methods can outperform traditional Chow-Lin interpolations in data-rich environments. We believe that this approach, which combines two well-known methods (principal component analysis and the Chow-Lin procedure), provides economic historians and those working with long-run macroeconomic data series with a tractable method for interpolating low frequency series in the presence of several high frequency indicator series, some of which include missing observations.

The standard Chow-Lin procedure is a regression-based method that uses 'indicator' series to distribute an annual series over the four quarters of the year. Official statistics, including national accounts data, are frequently calculated using variants of the Chow-Lin procedure. For instance, Eurostat (2018, p. 25), the statistical office of the European Union, notes that "the ideal candidate methods to be used for temporal disaggregation are those belonging to a family of regression models. The core of this family is represented by the Chow-Lin method and its variants."

However, a well-known issue with this procedure is that one quickly runs into degrees of freedom constraints as the number of indicator series increases. To deal with this, we use principal component analysis to extract factors that summarize our data into just a few series. This is a methodology widely applied and adapted in the literature on nowcasting macroeconomic data,[1] which similarly uses high frequency indicators to predict low frequency variables. A benefit of principal component analysis is that the factors are straightforward to calculate regardless of the number of indicator series. In addition, within the principal component framework, we can deal with a data irregularity which often confronts economic historians: several of our 19 indicator series contain missing observations. While principal components analysis typically requires a balanced panel, we use the Stock and Watson (2002) algorithm to obtain principal components from our unbalanced panel.

We then use these factors to augment the Chow-Lin procedure and interpolate annual GDP into a quarterly frequency. Our estimates refine our understanding of the timing of, and movements in, Irish economic growth in the post-war period and paint a more detailed picture of the scale of expansions and contractions. In this vein, the paper joins the renewed interest in the economic history of business cycle analysis (Broadberry and Lennard, 2024; Broadberry et al., 2023). While Irish *annual* GDP data show the total change in economic activity from year-end to year-end, they smooth over turning points and mask the scale of economic expansion or decline.

Our quarterly data reveal the magnitude and persistence of the failure of the Irish economy in the 1950s and the early 1980s, as is patently visible across a multitude of zero and negative growth quarters. Average quarterly growth over each decade was as low as 0.4 and 0.6% respectively. While almost 30% of all quarters in the 1950s experienced negative growth, that figure is almost matched in the 1980s at 20%, which experiences the deepest quarterly contraction of the sample in 1983:II [−2.2%].[2] Both epochs are represented by deep troughs, but the initial recovery of the late 1950s was sustained. In contrast, the fragile recovery of the late 1980s represented a false start, as it was followed by a milder crisis at the beginning of the 1990s, driven by historically high interest rates that foreshadowed the EMS crisis and wider European recession.

Similarly, while others have noted the positive transition that occurred from the 1970s (O'Rourke, 2017; FitzGerald and Honohan, 2023), the use of annual data hides the extent of the slump of the mid-1970s (Honohan and Walsh, 2002). Nonetheless, the average quarterly growth rates for the 1960s [+1.0%] and 1970s [+1.1%] were more than double that of the 1950s. Despite the stagnation of the early 1990s, the average quarterly growth rate at 1.6% is four times the equivalent rate in the 1950s and two and a half times that of the 1980s.

The rest of the paper is structured as follows. The next section discusses our 19 newly digitized data series and Section 3 outlines our methodology. Section 4 discusses our estimates of quarterly GDP growth in the context of the historical narrative. Section 5 compares them to the only extant estimates for most of the period, which begins in 1960 (OECD, 2025), and with official data which begins in 1995. Section 6 provides some robustness analysis in the form of alternative calculations of quarterly GDP and compares them with our baseline. Section 7 concludes.

[1] See for instance, Stock and Watson (2002), Bai and Ng (2002), Bai (2003), Forni et al. (2004), Giannone et al., (2004), Giannone et al., (2008), Forni et al., (2009).

[2] Henceforth, economic quarters are referred to by year and Roman numeral. Therefore, 1983:II refers to the second quarter of 1983.

2. Data

The starting point for our study is the annual GDP data (in constant prices) for the period 1950–2000.[3] These are taken from Kenny (2025, Appendix 2), who drew on the *National Income and Expenditure Tables* (1947–1970), making adjustments due to the contemporary official preference for reporting GNP rather than GDP. He also incorporated the latest revisions to the *Historical National Income and Expenditure Tables* 1970–1995 available online on the Central Statistics Office (CSO, 2012) website.[4]

To interpolate annual GDP, we collected data on 19 variables that are available at a monthly or quarterly frequency. These variables are listed in Table 1 and capture economic activity across various sectors of the economy: agriculture (3 series), industry and construction (3 series), trade and distribution (6 series), transport and tourism (3 series), communications (2 series), public spending (1 series), as well as the unemployment rate. These data have not previously been digitized for the full sample period that we use here: while more recent data are available online,[5] earlier data are collected primarily from *The Irish Trade Journal and Statistical Bulletin*. This was an official quarterly publication from the Central Statistics Office (CSO), which provided commentary on economic trends, as well as regularly publishing economic data for a variety of sectors.[6] Though some series were contained in standardized format within the publication's regular "Economic Series", other series were compiled separately from bi-annual or annual issues when activity on a certain sector was reported on. Appendix B online provides a full description of sources and construction. For our analysis, we convert monthly data to a quarterly frequency.[7] We then seasonally adjust the full set of quarterly series.[8]

Our aim is to collect as many series as possible for the sample period. We collect and use series that are available for substantial portions of the sample period,[9] however six of our 19 variables are missing data at the beginning or end of the sample period (in addition, our series capturing tourism/hotel receipts has a gap in reporting in 1983–4). One reason for this is that the data collected represents contemporary economic relevance. A notable example is retail sales, which were not officially collected at the beginning of the sample, but are clearly an important indicator of activity by the end of the 20th century. Nonetheless, the unbalanced nature of our panel is one issue that we must deal with in our methodology.

Fig. 1 presents our data series. Although the analysis below is carried out in quarter-on-quarter growth rates, such changes are quite volatile for some series and are therefore difficult to interpret. We therefore present quarterly year-on-year growth rates in Fig. 1. We also include the growth rates in our annual GDP series for reference. Evidently, some series exhibit higher degrees of volatility than others. Movements in the growth rate for agricultural indicators and new registrations of commercial goods vehicles, in particular, dwarf those of GDP.

It is also evident from Fig. 1 that some series are more concordant with GDP with others. For instance, industrial production, the construction of private housing, new private and commercial vehicles registered and the unemployment rate (inversely) have correlation coefficients with GDP that range between 0.28 and 0.67.[10] On the other hand, several series have correlations below 0.1, with some even exhibiting negative correlations (e.g. beef and cattle exports, electricity production and postal matter delivered). Though these negative correlations appear counterintuitive, in Section 6 we re-estimate quarterly GDP growth excluding these series as a robustness exercise and find little impact on the final quarterly series.

3. Methodology

Our methodology proceeds in two steps. In the first, we create a balanced panel and use principal component analysis to extract five factors which capture more than half the common variation in our 19 indicator series. In the second step, we use these factors to augment the Chow-Lin procedure and interpolate annual GDP growth.

3.1. Step 1: obtaining factors from an unbalanced panel

We use principal component analysis on our 19 high-frequency series to construct new, orthogonal series. The principal components are constructed such that the first component explains as much of the variation common to the 19 underlying series as possible.

[3] Data and replication files are available here: http://doi.org/10.3886/E247462V1

[4] Historical National Income and Expenditure Tables 1970–95

[5] Database https://www.cso.ie/en/databases/

[6] The Journal had been published by the Dept. of Industry and Commerce's Statistics Branch until June 1949 https://www.cso.ie/en/aboutus/historicalperspective/. From 1964, the publication became *The Irish Statistical Bulletin*, but we keep the original, as it contains the later title within while also remaining faithful to the pre-1964 data we collected.

[7] For most series, we do so by taking the sum of the monthly data over the quarter. In the case of exports, imports, retail sales (all of which are indices) and the unemployment rate, we use the value in the final month of the quarter. In these cases, the average value over the quarter could be used without any substantive difference in the results (the correlation coefficient of the two series calculated using the two different conversion methods is 0.98).

[8] Seasonal adjustment calculations were made using the U.S. Census Bureau's X-13 seasonal adjustment tools.

[9] Specifically, we select variables that have observations for at least 60 % of the sample period to ensure that they are adding information to our dataset (see Fig. 1). The six variables missing data on average have observations for 77 % of the sample period.

[10] Correlation calculated using fourth quarter year-on-year growth rate for the indicator series.

Table 1
Factor loadings and correlations with annual GDP growth, first five principal components (PCs).

Sector	Indicator	1st PC	2nd PC	3rd PC	4th PC	5th PC
Agriculture	Beef exports	0.45	0.05	−0.27	0.03	−0.17
	Live cattle exports	0.00	0.52	−0.17	−0.13	0.11
	Creamery production	−0.06	0.09	0.12	−0.05	−0.24
Industry and construction	Industrial production	0.06	0.11	0.28	0.42	−0.08
	Electricity production	0.25	0.03	0.07	−0.01	0.30
	Private housing construction	0.18	0.09	0.36	0.07	0.39
Trade and distribution	Imports	0.21	0.13	0.11	−0.14	0.37
	Exports	0.10	0.06	0.29	0.21	−0.27
	Commercial goods vehicles registered	0.09	0.05	0.30	−0.04	0.09
	Retail sales	0.05	0.01	0.25	−0.53	−0.19
	Rail tonnage	−0.09	−0.02	−0.07	0.36	0.10
	Private vehicles registered	0.13	0.13	0.30	0.19	−0.38
Transport and tourism	Rail passengers	−0.19	−0.15	−0.30	−0.20	0.04
	Road passengers (bus)	0.51	0.05	−0.15	0.00	0.04
	Tourism receipts	−0.13	−0.04	−0.25	0.49	0.23
Communications	Telephone usage	0.34	−0.06	−0.05	−0.03	0.23
	Postal matter delivered	−0.07	0.56	−0.16	0.02	0.00
Public spending	Local authority housing completed	−0.15	0.55	−0.10	0.00	−0.07
NA	Unemployment rate	0.39	−0.07	−0.33	0.08	−0.36
Correlation with GDP growth at annual frequency		0.19	0.39	0.57	0.56	0.20

The second component then explains the maximum remaining variation not captured by the first, and so on, with each component orthogonal to those preceding it.[11] Thus, a few principal components can summarize a large portion of the variance of the underlying series.

Principal component analysis is usually carried out on a balanced panel of data. Since our panel is unbalanced, we use the algorithm of Stock and Watson (2002) to obtain principal components in the presence of missing data. This algorithm is embedded in the procedure for calculating the principal components and we can therefore create a balanced panel and extract factors in a single step.[12]

Suppose $x_{i,t}$ is a vector of i high frequency variables observed at quarterly frequency t that contain observations for the full sample period, and $x_{j,t}$ is a vector of j high frequency variables which are missing data. We first use $x_{i,t}$ to calculate a set of principal components, $F(i)_t$, for the full sample period, and regress these on each of $x_{j,t}$ in turn:

$$x_{j,t} = \alpha F_t(i) + e_t$$

The estimated coefficients, $\widehat{\alpha}$, are then used to obtain an estimate of the missing observations of $x_{j,t}$ and generate a balanced panel of $x_{ij,t}$.

All $x_{ij,t}$ variables are next used to calculate a new set of principal components, $F_t(ij)$, which are again regressed on each of $x_{j,t}$ in turn:

$$x_{j,t} = \alpha F_t(ij) + e_t$$

and a new set of $x_{ij,t}$ are calculated. This process is repeated until the principal components converge between iterations. In our case, this occurred in less than 100 iterations.[13]

The purpose of extracting factors is to summarize the information in our 19 series into a smaller number of factors which can be employed in the Chow-Lin procedure. We find that the first five principal components capture more than half (55%) of the variance of our 19 series. While the first principal component captures almost 15% of the variance, the next four principal components each capture roughly 10%.[14] Thereafter, the remaining principal components capture approximately 5% or less of the variance of the series.

The factor loadings show how heavily each of the underlying series is weighted in the calculation of each of these five principal components. As is evident from Table 1, no principal component loads positively onto all variables. The first component loads particularly heavily onto electricity production, private housing construction, road passengers and telephone usage. The second loads onto the agricultural series as well as public spending, while the third loads onto the trade and distribution series. The fourth component loads particularly heavily onto industrial production, while the fifth loads onto the trade and tourism series as well as unemployment.

The correlation of these principal components with our annual GDP growth rates from Kenny (2025) are provided in the final line of

[11] Specifically, principal components are calculated by obtaining the eigenvectors and eigenvalues of the variance-covariance matrix of the underlying data, sorting them by decreasing eigenvalues and then multiplying them by the underlying series.

[12] To correctly calculate the principal components, the data must be stationary. Standard unit root tests on the log-differenced data reject the null of a unit root (p-value = 0.00) in all cases. As is standard in principal component analysis, we also standardize the data to have mean zero and a standard deviation of one, which ensures that the principal components do not load heavily onto more volatile series.

[13] This is common for this procedure. For instance, Erdem and Tsatsaronis (2013) report convergence in fewer iterations.

[14] 13.1%, 12.3%, 8.6% and 8.0%, respectively.

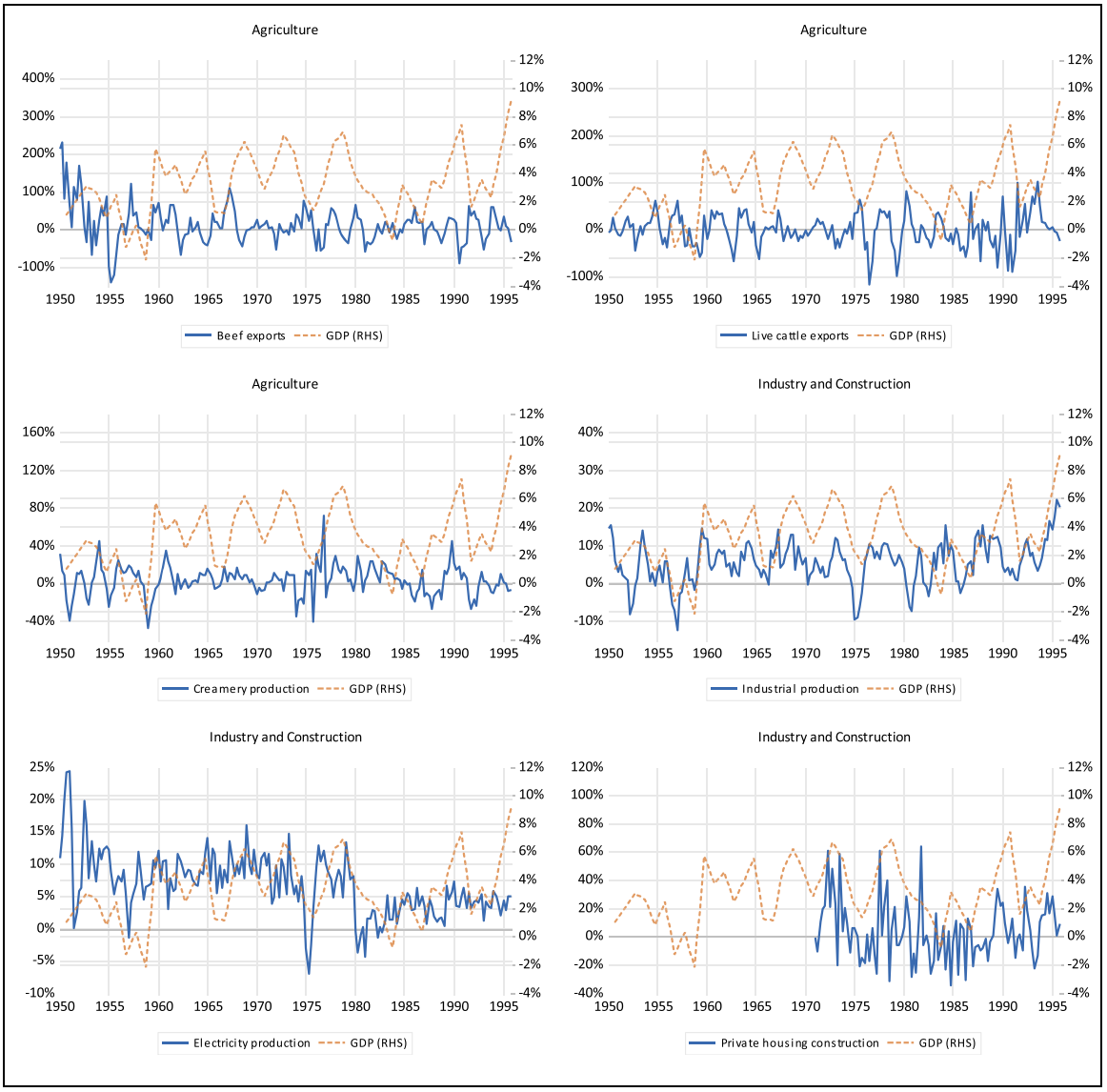

Fig. 1. Quarterly year-on-year growth rates of indicator series and annual growth rates of GDP.

Table 1.[15] The maximum correlation coefficient across all 19 components is 0.57 and the minimum is zero. The correlation coefficients for the first five components ranges from 0.19 to 0.57. In the main analysis, we focus on these first five principal components.

Nonetheless, the ninth and twelfth components have correlation coefficients above 0.40. The question then arises whether the most appropriate factors to use when interpolating annual GDP are those that capture most of the variation in the underlying series (that is, the first five principal components which we use in our main analysis), or those that are most correlated with annual GDP growth. We show in a robustness exercise in Section 6 that using the first five principal components – and thus capturing more of the quarterly variation in the underlying series – provides better estimates of quarterly GDP.

3.2. Step 2: interpolating annual real GDP growth

In the second step of our methodology, we use a factor-augmented Chow-Lin procedure to interpolate annual real GDP. The original Chow-Lin procedure (1971) is a regression-based method that relates higher-frequency indicators, x_t, observed in quarter t, to a lower-frequency benchmark series, y_a, observed in year a, to obtain a quarterly interpolated series, z_t. The values of y_a are first

[15] To calculate these correlations, data on the four quarters of the year are summed to an annual total for each of our five principal components.

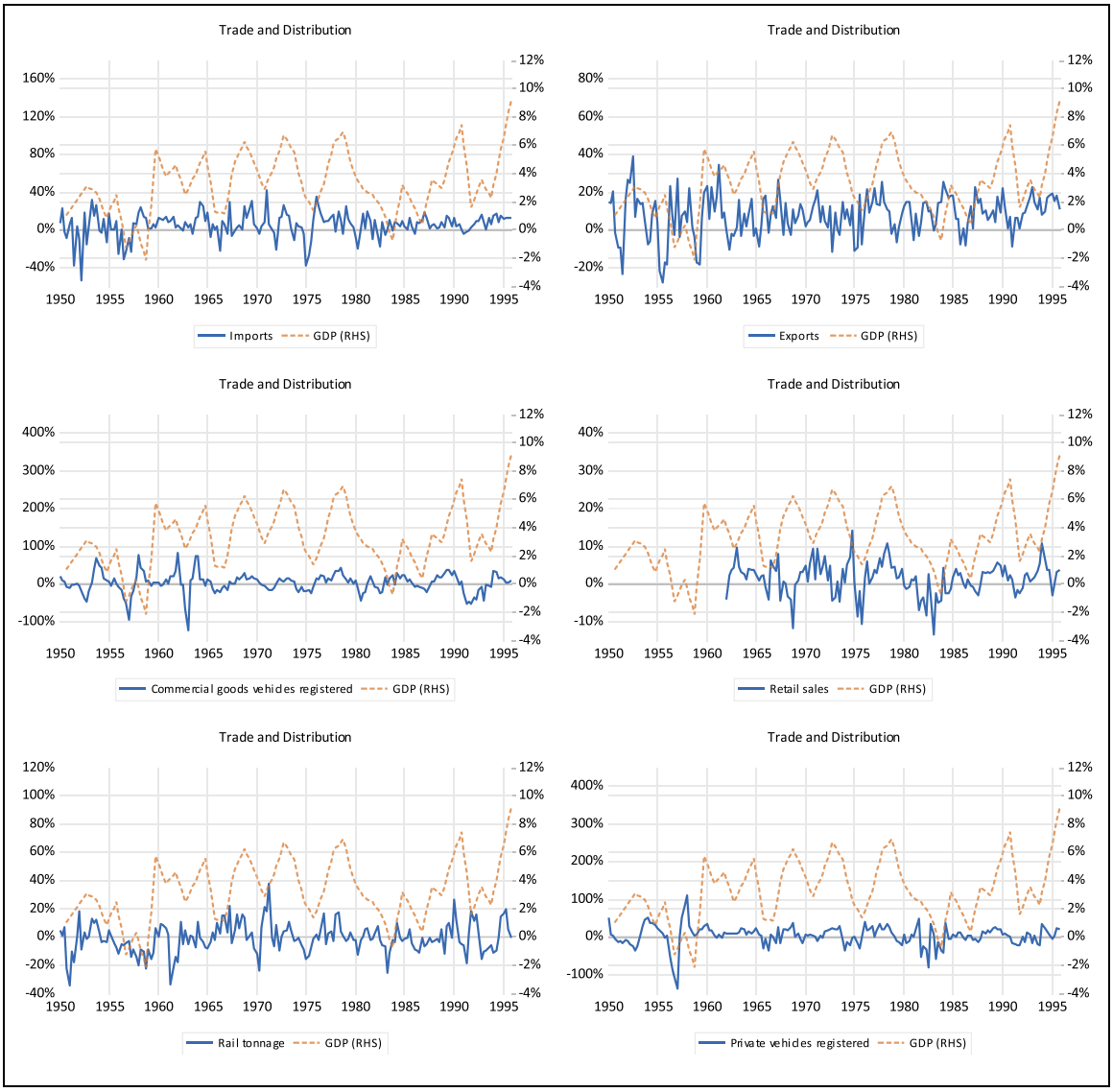

Fig. 1. (*continued*).

regressed on the annualized values of the high frequency indicators

$$y_a = \beta x_a + e_a$$

The estimated coefficients, $\widehat{\beta}$, are then applied to the quarterly observations of the indicators, x_t, to obtain a preliminary quarterly interpolated series, z_t^*:

$$z_t^* = \widehat{\beta} x_t$$

One well-known issue with this method is it quickly runs into degrees of freedom constraints, as the number of high frequency series increases. That is because the degrees of freedom is given by $(N-(k+1))$ where N is the number of low-frequency observations in the initial regression and k is the number of high-frequency indicator series used. Since the number of low-frequency observations is by nature usually low, the degrees of freedom quickly become small in data-rich environments. This can lead to imprecise estimates, an increased risk of overfitting and, particularly in the presence of correlated high-frequency variables, difficulty estimating the regression.

As a result, Chow-Lin interpolations usually use a narrow set of high frequency variables which may not be representative of the wider economy. Our solution is to use the five $F(ij)_t$, which capture over 50% of the variance of the underlying 19 high-frequency series, $x_{ij,\,t}$, in our interpolation. Compared to selecting a narrow set of indicators to use in the Chow-Lin, our method enables us to use much of the common variation in the 19 underlying series, while screening out idiosyncratic movements that have little impact on

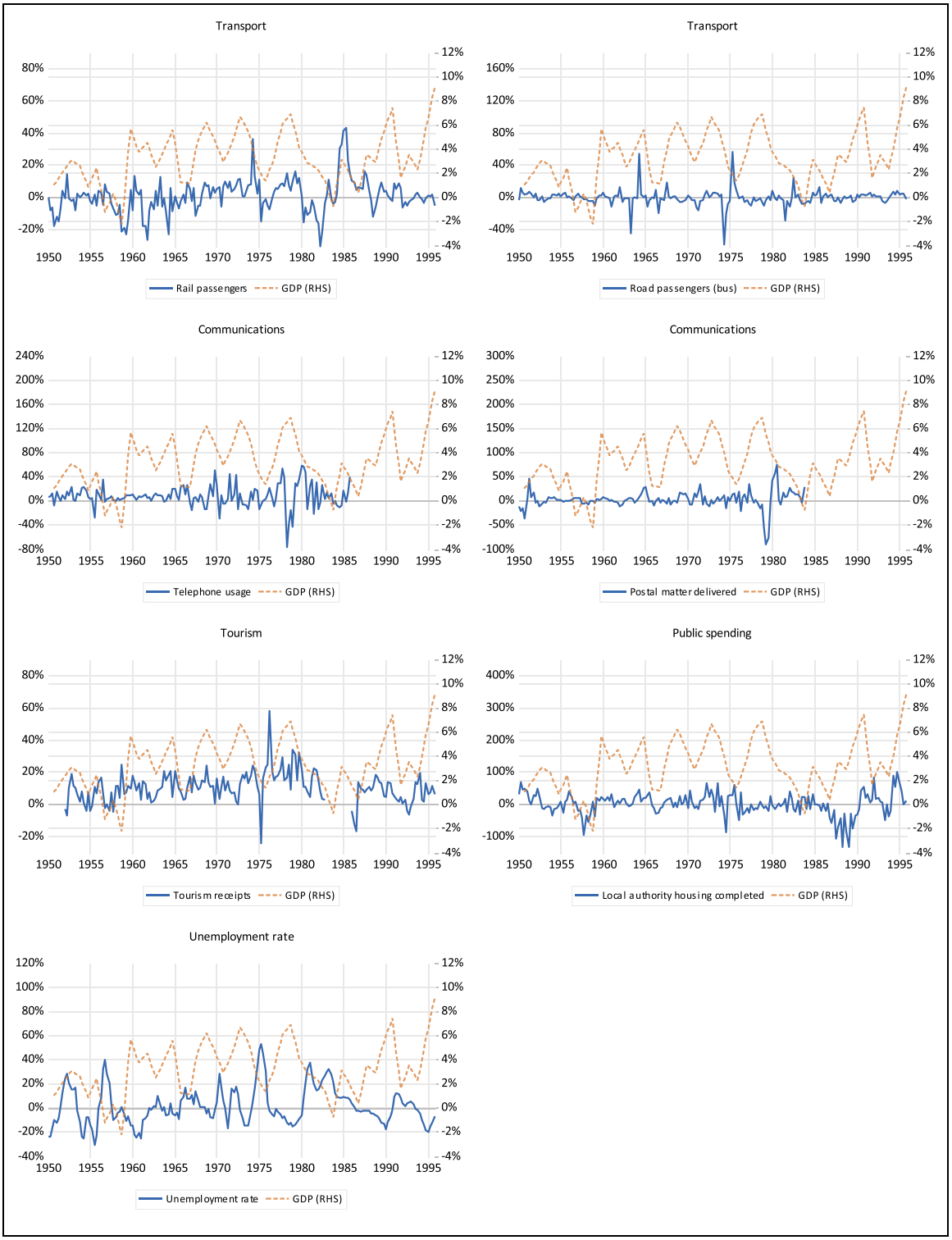

Fig. 1. (*continued*).

the overall economy.

Finally, the difference between the annual value of y_a and the sum of values of z_t^* in each year is distributed across the quarters of the year using an AR(1) process. The distribution is subject to the following condition:

$$\sum_{t=1_a}^{4_a} z_t = y_a$$

where z_t contains observations for each of $Q1_a$, $Q2_a$, $Q3_a$ and $Q4_a$, for all a. This ensures that the quarterly log changes in the final interpolated series, z_t, sum to the annual log change of the actual data.

4. Quarterly GDP

In this Section, we present our estimates of quarterly GDP growth (the full data series, along with quarterly growth rates in GNP, are presented in Appendix A). We first compare them to the historical narrative for the period, to consider whether they capture the nature and timing of shocks and fluctuations in a manner that we would expect to see. We subsequently compare decadal quarterly GDP growth rates using a standard contribution framework.

4.1. New estimates in historical context

Fig. 2 presents the headline result of the paper, showing quarterly GDP growth rates for Ireland for the period 1950–2000. However, here we restrict ourselves to a discussion of the period 1950–94, that is, the period before official data are available.

Upon first inspection, we note comparatively wide troughs in the late 1950s and early 1980s. Both periods have been described as economically the worst decades of Irish independence in previous analyses (Ó Gráda and O'Rourke, 1996; Kenny, 2025), but the relative duration of the stagnation is striking, when viewed at this frequency. In contrast, one can observe broad crests that characterize the 1960s and 1970s, though in the middle of the latter decade, one can sense the missed opportunity described by Honohan and Walsh (2002) who claimed that Ireland was "thrown badly off course by the first oil crisis [late 1973] and the policy response to it". Finally, at quarterly frequency we can observe the turbulent first years of what would become the golden decade of Irish growth (the 1990s) with an appreciation that it had been another "Rocky Road" along the path to eventual convergence (Ó Gráda, 1997).

Starting with the 1950s, we observe a trend in declining growth rates in the early years and a relatively high frequency of negative quarterly growth from the middle of the decade. As documented elsewhere, the 1950s in Ireland are generally considered to be a decade of "lost growth" when contrasted with European peers (Ó Gráda and O'Rourke, 1996; O'Rourke, 2017). The continued economic viability of an independent Irish state seemed at risk, as 40,000 emigrated per annum (Kennedy, 1989, p. 9). The crisis of 1955–6 materialized due to a decision by the Irish banks (under political pressure) *not* to reciprocate a rise in the rate of interest by the Bank of England (Honohan and Ó Gráda, 1998) in early 1955, brought on by external problems facing the pound sterling (McLaughlin et al., 2025). As the balance of payments deteriorated and economy began stalling at the end of 1955, the Irish authorities exacerbated the problem by allowing a larger gap in interest rates to emerge in January 1956 and followed this with an austerity budget. As Kennedy et al. (1988, pp. 61–2) note, the government introduced another deflationary budget in the throes of recession in 1957 – "a year of record emigration and unemployment" (*Irish Examiner*, 6 January 1958, p. 6) – and continued the restrictive fiscal stance through 1958 which predictably implied that "economic progress was severely retarded". By 1958:II, reports showed that the building industry was "in an extremely depressed condition" (*Strabane Chronicle*, 31 May 1958, p. 4) and weather conditions contributed to the significant contraction in agricultural output (Kennedy et al., 1988, pp. 62). Meanwhile, emigration reached its highest level since independence (Ó Gráda, 2011) which had the effect of reducing *reported* unemployment rates (Kennedy et al., 1988, p. 62).

The recovery that we trace to the first quarters of 1959 [1959:*I* + 1.0%, 1959:II +2.0%] is observed in contemporary accounts. In early 1959, one report noted a "renewed growth of confidence in the country's capacity to overcome its difficulties" (*Evening Echo*, 30 January 1959, p. 5). Introducing the Budget in April 1959, the Minister for Finance commented on the reversal of the downward trend: "the trade figures are a good indication of the improvement in our economic affairs" (Dáil Éireann debates, Wednesday, 15 Apr 1959, Vol. 174 No 3). By mid-year, it was observed that "in the short run, the country's accounts are satisfactory"(*Irish Examiner*, 18 June 1959, p. 8). In September, The *Irish Trade Journal* (1959 III, p. 203) reported favorably on the mid-year decline in unemployment and the renewal of growth in manufacturing production and new cars registered. "Heartening signs that current activities will produce more beneficial results" were recognized by 1959:IV (*Irish Examiner*, 11 December 1959, p. 8).

From the 1960s through much of the 1970s, a distinctive upward shift in the average level of quarterly GDP growth can also be observed in Fig. 2. The temporary decline in the growth rate in 1962 and early 1963 has been attributed "mainly to external factors" such as a reduction in demand for industrial products, a fall in exports of live cattle and beef, and a poor harvest driven by bad weather conditions (OECD, 1963, pp. 4–5, 19) – these series are all included in the calculation of our factors, and our measure of GDP shows a slowdown in 1962:II [−0.2%]. However, the emergence from this dip was marked by a large expansion in 1963:III [+2.5%] which coincides with a period of optimism in the press: "Ireland was a country with a poor past record of growth, but this record has recently greatly improved" (Irish Independent, 31 August 1963, p. 4). The government of the time made political capital of this: "there has been an immense growth of activity in increasing productivity…There is a feeling in the country that real prosperity can be achieved. There is a real feeling of confidence in our land of a kind that there has not been since the war" (E. Childers, Dáil Éireann debates -Thursday, 7 Mar 1963, Vol. 200 No 6).

The deepest contraction of the 1960s (1966: II, −0.7%) coincides with the bank strike which saw a near complete blackout in

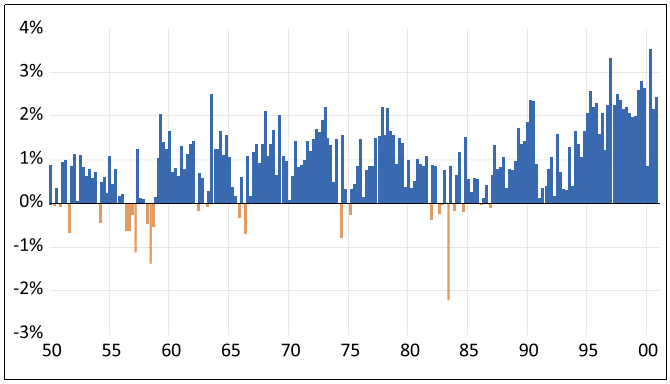

Fig. 2. Estimated quarterly GDP, 1950–2000.

banking services for three months (Horgan et al., 2023). Growth recovered from 1967, though it slowed towards the end of 1973 as the first oil crisis unfolded. However, the economic effects of the shock were somewhat delayed as the first contraction in GDP [−0.8%] occurred some months later in 1974:II. Over the period October 1973–June 1974, Ireland's terms of trade fell by 17%.[16] For our series, this event marks the beginning of the "slump of the mid-1970s" (Honohan and Walsh, 2002) and stagnant growth continued through 1975. For the years 1974–75, quarterly growth averaged just 0.5%, in spite of two budgets that were stimulative in nature (FitzGerald, 2026). While growth had begun to pick up by 1976:I [+1.4%], the new series reveals a sudden standstill in 1976:II, coinciding with the most contractionary budget of the last fifty years which "took 5 per cent of national income out of the economy" (FitzGerald, 2026; FitzGerald and Honohan, 2023, p. 57; Kearney et al., 2000).

Our series shows a renewal of growth for the final three-quarters of 1977 [+1.5%, +1.5%, 2.2%] on the back of an expansionary budget (FitzGerald, 2026) and a subsequent reversion which is predicted by the Irish Independent (13 July 1978, p. 4): "an acceleration in the growth of the economy during May….on the other hand, the outlook for the coming months is not so favorable".

However, the switch towards an expansionary fiscal stance following the election of 1977 had produced unsustainable deficits which contributed to the subsequent fiscal crisis of the early 1980s (FitzGerald, 2026; Ó Gráda, 2011). Growth rates began to fall in late 1979 [IV:0.4%] as the second oil crisis materialized, and the Irish *punt*'s exit from the sterling zone in March caused a decline in the Irish terms of trade of 14% to the trough in February 1981.[17]

These negative developments ushered in a new decade (1980s) with a marked deterioration in the average level of quarterly growth. The sharpest contraction in quarterly GDP growth in the whole sample period occurred in 1983:II [−2.2%] when the economy reached its decadal nadir. It also coincided with the first of two consecutive contractionary budgets, 1983 and 1984 (FitzGerald, 2026). Contemporary reports mirror the decline in our quarterly series: "Ireland is in the grip of the worst recession in three decades. Every day, it seems, another factory closes, and more workers end up on the dole queues. The numbers out of work, now standing at a record 188,000, show no sign of falling and the spiral towards the psychological 200,000 continues unabated" (Irish Independent, 7 April 1983, p. 6). One particularly pessimistic report wrote in the aftermath of a "mini-budget of savage proportions" that "there appears to be little hope that this nation will ever struggle to its feet again" (Irish Independent, 7 February 1983, p. 6). Notably, unemployment reached its highest level in the history of the state (Irish Examiner, 2 April 1983, p. 7). Three changes in government between June 1981 and November 1982 delayed an effective policy response that may have limited the impact of the subsequent crisis and, as is evident in Fig. 1, the deterioration in the early 1980s can be seen across a broad range of indicators in the agricultural, industrial and service sectors.

While the first two quarters of 1984 showed tentative signs of recovery [+0.6%, +1.1%], the mild contraction in 1984:III [−0.2%] is remarked upon by the *Irish Independent* (21 September 1984, p. 4): "the momentum of recovery in the Irish economy…ground to halt in July." 1985 and 1986 showed such stagnation that a trough in quarterly GDP growth in the middle of the decade is plainly visible in Fig. 2. While the 8% devaluation in August 1986 was "timely" in terms of Irish wage competitiveness (Honohan and Walsh, 2002), it did not result in a marked deterioration in the terms of trade, as in 1979.[18] Nonetheless, at the beginning of 1987, a negative view of the 1980s as a whole had manifested: "put bluntly, the Irish economy has gone nowhere since '80" (*Irish Independent*, 13 January 1987, p. 6).

However, between 1989 and 1990, there was a steady increase in the rate of quarterly GDP growth and cautious optimism in the press: "[annual] growth is on target for a 6 per cent surge this year [1989] with the same again forecast for 1990, but…this does not mean an end to the country's most intractable problem-unemployment" (*Irish Independent*, 23 August 1989, p. 1). This occurred against the backdrop of two austerity budgets in 1988 and 1989 that were of the same order of magnitude as those of 1983 and 1984

[16] Calculated from the 'Economic Series' in the *Irish Trade Journal and Statistical Bulletin*.
[17] Calculated from the 'Economic Series' in the *Irish Trade Journal and Statistical Bulletin*.
[18] According to the CSO series, by July 1987, it had fallen by less than 3% and remained stable up to 1990, averaging 98.6% of the August 1986 level (CSO, TSM02).

(FitzGerald, 2026).

Though the 1990s would come to be associated with rapid economic growth in Ireland, as it converged on its international peer group, our series show that this interpretation was not representative of the early years of that decade. The short-lived growth of 1990 was not sustained due to, amongst other factors, a sharp rise in the central bank rate of interest which climbed from 8% in April 1989 to 12% by March 1990, as an internationally observed response to German reunification. The rate of interest remained persistently high for 1991, averaging 10.5% per month for 1991. The timing of the slowdown in our series in 1990:IV [0.1%] was confirmed by a contemporary survey: "there is clear evidence of a substantial slowdown in our industrial markets" and that the "sharp decline in the order books" followed a weak third quarter by Ireland's European trading partners (*Irish Press*, 27 November 1990, p. 15). The slowdown in the early quarters of 1991 [+0.1%, +0.4%] is similarly supported by newspaper reports: "growth in property has slowed down over the first half of 1991…in sharp contrast with favourable trends last year" (*Irish Independent*, 17 July 1991, p. 19). However, the timing of the bottoming out of the economy during the worst quarter of 1991 [I: 0.1%] and the mild subsequent recovery thereafter is predicted in a report from the Irish Examiner (3 May 1991, p. 13): "the latest survey results for March showed slight signs of the slow down levelling out."

Similarly, the short-lived recovery at the first quarter of 1992 [+1%] is observed: "Ireland's economic prospects have been boosted in recent months" (Irish Examiner, 21 March 1992, p. 24). In parallel with our series, the reporting shifted back to a mood of gloom in the second half of 1992 – "economy facing sluggish growth" (Irish Independent, 21 July 1992, p. 4) – and the beginning of 1993 in line with another unremarkable quarter, 1993:I [0.3%]. Here again, growth was affected by extreme movements in monetary policy. When the UK pound exited the EMS system in September 1992, uncertainty surrounding the Irish punt culminated in a speculative attack, provoking the highest short-term central bank rates in the history of the state (Kelly, 2003; Conroy and Honohan, 1994) until the ultimate 10% devaluation that occurred in January 1993.

1994 marks the turning point in the decade. *The Irish Examiner* (16 June 1994, p. 28) corroborates the sudden uptick in economic activity that we observe in the first quarters of 1994 [+1.6%, +1.4], compared to 1993: "The recovery in the first few months of this year [1994] has far outstripped expectations, given the failure of the economy to produce a pick in the wake of the very favourable interest rate regime that came in to play in the second quarter of last year [1993] following the currency crisis." Indeed, our series confirms that the second, third and fourth quarters of 1993 averaged 0.65% growth [+0.3%. +1.3%, +0.4%]. Nonetheless, despite the turbulence of the early 1990s, no quarter experienced negative GDP growth.

The national gains can be seen in the clear rise in the level of average quarterly growth throughout the 1990s in Fig. 2 and it is well established that the 1990s marked the beginning of a sustained convergence of Irish living standards on its international peer group (O'Rourke, 2017; Honohan and Walsh, 2002).

4.2. Contributions to decadal quarterly growth, 1950–2000

The new series allows us to compare quarterly GDP growth across the decades by calculating the contributions to growth, using the amplitude of expansions and contractions and the share of quarters per decade spent in each state. Formally, this can be written as

$$G = p_c * g_c + p_e * g_e$$

where G is the average quarterly growth rate, p_c and p_e are the share of the relevant period (decade) in contraction and expansion respectively, while g_c and g_e are the average rate of quarterly GDP growth for contractionary and expansionary quarters respectively. Table 2 reports the decadal numbers underpinning Fig. 2.

Evidently, the 1950s suffered from the lowest average quarterly growth rates of 0.4%, dragged down by a high incidence of quarters exhibiting negative growth (27.5%) and deeper average contractions [−0.6%]. The 1980s differ only slightly from the 1950s, by having experienced a lower frequency of negative quarters (20%) with milder (average) contractions [−0.4%]. At an average quarterly growth rate of only 0.6%, growth in the positive quarters of the 1980s [0.8%] matched the weak equivalent of the 1950s [0.7%] and the principal difference between the two periods was the comparative frequency and amplitude of the contractions. In both cases, the negative contribution weighs heavily on the weak positive contribution leaving immaterial quarterly growth. The 1960s and 1970s look rather similar in terms of material positive contributions and insignificant negative contributions due to a lower frequency of negative quarterly growth. As the 1970s produce only three negative quarters, the severity of the oil crisis is heavily represented in the

Table 2
Quarterly contributions to growth per decade.

		Contraction		Expansion		Contributions to quarterly growth		
		Avg. amplitude (%)	Quarters (%)	Avg. amplitude (%)	Quarters (%)	*Negative Contr.* (%)	*Positive Contr.* (%)	*Avg. quarterly growth* (%)
1950:I	1959:IV	−0.6	27.5	0.7	72.5	−0.2	0.5	0.4
1960:I	1969:IV	−0.3	10.0	1.1	90.0	0.0	1.0	1.0
1970:I	1979:IV	−0.5	5.0	1.2	95.0	0.0	1.1	1.1
1980:I	1989:IV	−0.4	20.0	0.8	80.0	−0.1	0.7	0.6
1990:I	1999:IV	0.0	0.0	1.6	100.0	0.0	1.6	1.6

Source: See text and Appendix B online. Contributions are the product of the average amplitude and share of quarters in a contractionary and expansionary state. May not sum to avg. quarterly growth due to rounding.

amplitude of average contractions [−0.5].

The average quarterly growth rate for the 1990s at 1.6% marks the onset of the "Celtic Tiger" era and the decade saw no contraction in quarterly GDP. This rate of growth was four times the equivalent for the 1950s, almost three times that of the 1980s and approximately 50% higher than that of the next best decades (1970s at 1.1%; 1960s at 1%). This period of convergence growth has been attributed to a combination of factors: rectifying the fiscal imbalances of the 1980s, a reduction in wage pressure through social partnership, employing a new generation-with higher educational qualifications and, in the case of women, a higher propensity to labour force participation—in the modern sector outside of traditional agriculture (Honohan and Walsh, 2002).

5. Comparisons with extant data

Having shown that our estimates of quarterly GDP growth match well with the historical narrative, we next compare our series with the extant data. As noted, a particular reason for carrying out this exercise on Irish data is the lack of alternative high-frequency measures in the period before 1995. The only other extant quarterly measure of GDP spanning much of the sample period (beginning in 1960) is from the OECD (2025).[19] We also compare our estimates for the period 1995–2000 with the official quarterly data (which begin in 1995) as a final layer of validation.

5.1. Comparison with other measures of quarterly GDP

Before comparing OECD growth rates with ours, we note that both are bound by the annual rates of growth that they take as their respective points of departure. While it might seem reasonable to assume that these would not differ dramatically, the OECD does not specifically source the *National Income and Expenditure Tables* that it uses, nor does it mention whether subsequent revisions are incorporated into the earlier estimates. Our quarterly GDP numbers take the most recent annual GDP revisions and adjustments to the CSO's (2012) *Historical National Income and Expenditure Tables* 1970–95 into account (Kenny, 2025 Appendix 2). As we show in Appendix D (Table D1, online), substantial differences exist in various years between the OECD's annual series (generated from every year's fourth quarter) and our series. Though decadal averages track each other closely, during the 1980s the OECD's estimates diverge substantially from Kenny's (2025) [2.4%] and the traditional (pre-revision) *National Income and Expenditure Tables* by some margin, showing a 1 per cent higher average annual growth rate [3.4%] for the period 1980–89. It is important to bear this in mind in the comparison that follows.

As mentioned above, the OECD provides little information on how its quarterly estimates were obtained.[20] However, scaling a cubic spline interpolation of the Kenny (2025) annual GDP series yields a similar quarterly index to that of the OECD (Fig. 3). Indeed, the two series yield a correlation coefficient of 0.78 over the period 1960:II to 1994:IV. It is therefore unlikely that quarterly variation in the OECD series is driven by movements in production data obtained from official statistics, in contrast to the new series which uses real economic data documented in Appendix B online.[21] Furthermore, the OECD series notably misses the first oil crisis and understates other shocks, which is likely due to the nature of its construction which smooths over temporary deviances.

Fig. 4 compares the quarterly GDP growth from the OECD's series and the new series over the period of interest.

In sum, we believe that our measure of quarterly GDP is a substantial improvement over the OECD's. First, it is difficult to reconstruct the annual benchmarks which the OECD takes as a starting point. Second, in contrast with our own series which uses production and consumption data, it is unlikely that the OECD series is interpolated using economic data. Finally, the behaviour of our series, with regard to turning points and shocks is supported by contemporary records, subsequent scholarship and official reports, as outlined in the previous Section.

5.2. Comparison with official estimates after 1995

The lack of benchmarks for the sample period makes validation difficult. However, we have specifically estimated our quarterly GDP growth rates up to the end of 2000 so that we can compare our estimates with the official estimates that are available after 1995. While we could have estimated quarterly GDP for a longer sample period, we chose five years for several reasons. First, our contribution is to fill a data gap by providing estimates of quarterly GDP where none exist, and we therefore do not need to provide an alternative measure of GDP when official data exist. Second, as noted above, our data series capture the indicators that were deemed important at the time they were collected. While we do add series over the course of the sample period, unless we continue to add new and different series, those that we use will necessarily become outdated. For instance, while postal data was a useful indicator of economic activity in the 20th century (Mitchell et al., 2012), the growing importance of e-mail more recently has reduced its importance. Consequently, we are less likely to accurately capture the state of the economy if we extend our estimates into the 21st century.

[19] In addition, we are grateful to Patrick Honohan for pointing out that there is a measure of quarterly GNP available for the period 1963 to 1977 from O'Reilly (1981). We discuss this in Appendix C online.

[20] Quarterly real GDP growth - OECD countries, last update June 12, 2025. The OECD was contacted but provided no additional detail on how the data were generated other than the official description applied to all countries (see Appendix D online). In Ireland's case, every quarter before 1995:I is marked with an "E" implying that it is an estimate.

[21] Indeed, using industrial production or the unemployment rate in a Chow Lin interpolation of real GDP yields lower correlation coefficients.

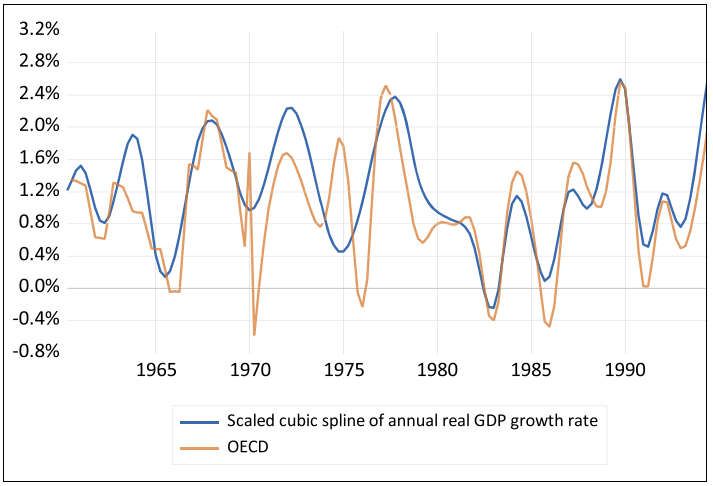

Fig. 3. Comparison of OECD quarterly real GDP growth rates and a cubic spline interpolation of annual real GDP, 1960–1995.
Note: The cubic spline interpolation is scaled by a factor of 1/3.
Source: OECD, Kenny (2025) and authors' calculations.

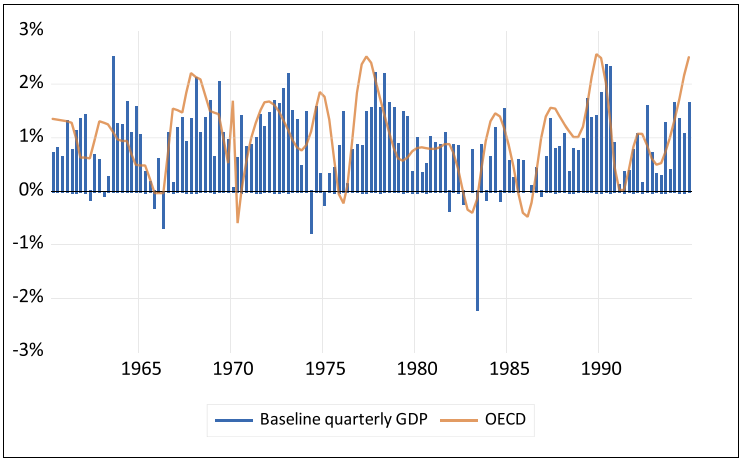

Fig. 4. Quarterly GDP growth rate for Ireland, 1950–1994.

In Fig. 5, panel (a) shows that our series is somewhat less volatile than the official data[22], and we miss a large increase in the first quarter of 1996 and a large decrease followed by a significant expansion at the end of 1998 and beginning of 1999. We have found no explanation for this sharp fluctuation in official CSO releases. However, the Economic and Social Research Institute noted the favourable decline in interest rates, the increase in investment and employment within the construction sector that occurred in 1996:I (ESRI, 1996, p. 15–6, 23). Regarding the next deviation between the two series, 1999:I is when the first official data were published in real time (data back to 1995 were calculated retrospectively).[23] The fluctuation may therefore reflect the break between the data produced in real time and the back data produced separately. Alternatively, it may represent a retroactive accounting adjustment to 1998:IV based upon a lower-than-expected surplus in the balance of payments for the full year (*Irish Examiner*, 20 April 1999, p. 13), though this was unlikely to produce a contraction of the magnitude of −2%. Nonetheless, in 1999 contemporary annual growth estimates for 1998 were revised downwards from 9.75% to 8.25% (ESRI, 1999, p. 20). If this quarter was adjusted downwards on the basis of an accounting peculiarity, the subsequent quarter would necessarily show a notable expansion, as is the case.

Finally, there is little contemporary evidence to suggest a decline in activity. At the end of 1998, the picture was one of optimism: "the number of people at work has risen by almost 100,000 in the last year and unemployment has fallen by a fifth…the increase in employment is the highest on record and was spread evenly over the 12 months" (*Irish Independent*, 1 December 1998, p. 15).

[22] Taken from CSO (2025).
[23] See the official publication on the release of the 1999 quarter 1 data on the Central Statistics Office of Ireland website: https://www.cso.ie/en/media/csoie/releasespublications/documents/economy/1999/qna_q11999.pdf

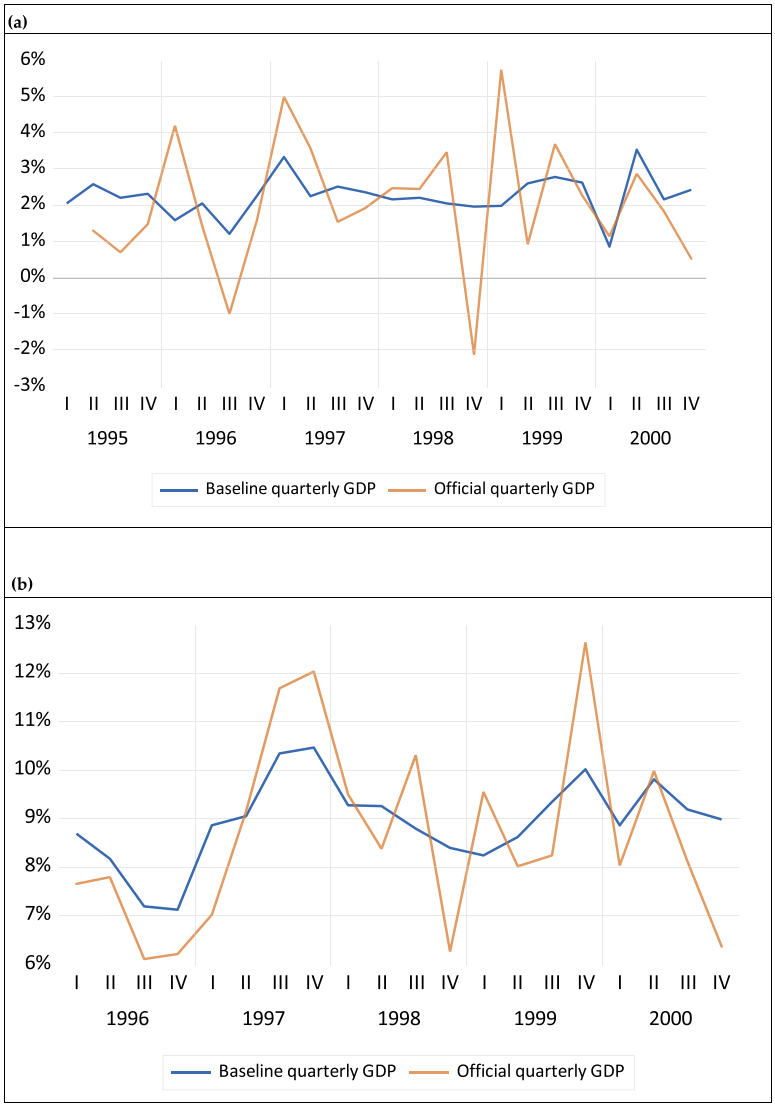

Fig. 5. (**a**): Comparison of official quarter-on-quarter real GDP growth rates and authors' estimates, 1995–2000. (**b**) Comparison of official quarterly year-on-year real GDP growth rates and authors' estimates, 1996–2000.
Source: Central Statistics Office of Ireland and authors' calculations

Otherwise, our series mirrors the official data closely, particularly in the final quarters of the sample. This reassures us that our choice of series still reflects real economic activity, despite this robustness exercise occurring after the conclusion of our own series (1995). Overall, the correlation coefficient over this sample period is 0.32. While ostensibly, this may not appear particularly high, the number of observations is low (24), quarterly GDP is generally volatile, and this correlation coefficient is higher than any we get using the alternative specifications that we test in Section 6. Moreover, quarterly growth rates are generally volatile and difficult to predict. In panel (b) of Fig. 5 we therefore compare quarterly year-on-year growth rates. This is the format in which the quarterly GDP data were presented in official releases at the time. This format reduces the volatility, and the series are considerably more concordant with one another. Indeed, the correlation coefficient is 0.78 for these series.

6. Alternative estimates and robustness tests

In this Section, we consider some alternative estimates and specifications, comparing them with our baseline estimate of quarterly GDP from above. In the first instance, we consider applying a direct (output) approach by using our underlying series and applying weights obtained from annual gross-value added data. This proves not to produce credible estimates of quarterly GDP. We follow this by subsequently assessing whether our estimates are robust to alternative specifications of our model.

In all cases, we compare the correlation of the final quarterly interpolated series with the baseline series estimated above and with

the official quarterly data available after 1995. These are presented in Table 3 along with the standard deviations of the series.

6.1. Is a direct (Output) approach possible?

With 19 data series, a natural question is whether it is possible to apply a direct (output/production) approach. Specifically, can we use the underlying series to interpolate annual sectoral gross value-added by sector (GVA, available in the *National Income and Expenditure Tables*), which we can then aggregate using annual GVA weights to obtain a plausible measure of quarterly GDP?[24]

Fig. 6 presents this new series along with our baseline series calculated above. Overall, the correlation between the series is 0.81. The figure shows that this series is less volatile than our baseline series: the standard deviation of this series is 0.73%, compared to 0.86% in our baseline estimate (Table 3). As a result, the alternative series misses some important quarterly movements.

Similar to the OECD series discussed above, the alternative (direct) approach series smooths over significant shocks in modern Irish economic history. Notably absent from the alternative series are the dips in activity which occurred in tandem with the bank strike of 1966, the two oil crises of the 1970s and the alternative index paints a milder picture of the worst economic crisis in three decades (1982–83). Finally, the uncertainty surrounding the EMS crisis in Ireland (1991–3) shows up distinctly in our baseline index as a series of stops and starts in line with the volatility in newspaper and official reports, in contrast to the alternative specification. Instead, the latter shows a generally smooth emergence from 1991 with a mild decline in growth rates for 1993 over the "false start" period. In essence, while the series are positively correlated, the alternative (direct) approach suffers from an absence of variation that would more accurately reflect contemporary and subsequent accounts.

Finally, we also compare our alternative series with the official post-1995 quarterly GDP data. We find that the correlation coefficient between the two series is 0.22, substantially lower than the correlation of our baseline series with the official data. Thus, it does not seem possible to obtain a credible estimate of quarterly GDP using a direct approach.

6.2. Alternative interpolation specifications

We next test several alternative indictor series in the Chow-Lin procedure. First, as noted above, in a small number of cases, the correlation coefficients between annual growth rates in our indicator series and GDP are negative. We therefore drop these series from our estimation procedure. Second, we check whether by filling missing observations in some series to create a balanced panel, we have substantially altered the estimates. To do this, we compare our baseline estimate with one calculated using principal components for the 13 series for which data *are* available for the full sample period. Finally, as noted above, the ninth and twelfth principal components have correlation coefficients with annual GDP growth of 0.40 or above. We therefore compare our baseline estimates of quarterly GDP calculated using the first five principal components that capture the most variation in the underlying indicator series with estimates calculated using the five components most highly correlated with GDP growth on an annual frequency.[25]

Turning to our first alternative specification, as noted above, the annual growth rates in beef and live cattle exports, electricity production and postal matter (delivered) have a negative correlation with annual GDP growth over the sample period. While counterintuitive, this does not rule out that they provide important information. Nonetheless, as a robustness we drop them from our set of indicators and calculate a new estimate of quarterly GDP.

The series, along with our baseline measure of quarterly GDP growth is included in panel (a) of Fig. 7. Perhaps unsurprisingly, the movements in the series are similar. Indeed, the correlation with baseline GDP is 0.97**.** However, the new series is substantially more volatile than our baseline series (Table 3). The alternative series does not deal with downturns in a credible manner. A first obvious outlier is the contraction observed in 1952. While unemployment spiked in 1952:I and a deflationary budget was introduced which exacerbated the decline in output (Kennedy and Dowling, 1975, p. 214), the 1952 recession has not received attention from contemporaries or subsequent scholars as a major shock event (Ó Gráda, 2011). The alternative specification shows substantially more volatility in three successive quarters which is not consistent with contemporary reports for that period. This volatility is matched during the contraction, which is similarly more extreme than any contemporaries noted.

Finally, the correlation coefficient with the post-1995 official data is just 0.18, the lowest of our alternative specifications (Table 3). In this case, therefore, it seems that including all 19 quarterly data in these series provides useful additional information.

Turning to the question of the balanced panel, our estimate using the 13 series for which we have data for the entire sample period is presented in panel (b) of Fig. 7. It has a correlation coefficient with our baseline GDP measure of 0.95. The relatively strong correlation is reassuring since it suggests that the missing values which we filled to create a balanced panel have not duly impacted the principal components. However, similar to the previous specification, the series behaves in a more volatile manner than the baseline during the first three decades. Moreover, the correlation with the official data after 1995 is still lower than that of the baseline series at

[24] Full details of the method are included in Appendix E online.

[25] We carried out two other robustness tests that the engaged reader may be interested in. First, we are grateful to an anonymous referee for suggesting that we interpolated real GDP in levels rather than growth rates. Here, we calculated the principal components as in step one, but then made an index by calculating a running sum of each of the first five principal components over time. We then used these five indices in the Chow Lin interpolation. Second, we test whether such a broad set of variables is necessary. Specifically, we use the five underlying series that are most highly correlated (in growth rates) with GDP at the annual frequency, in the Chow Lin interpolation. In neither case do the results substantially alter the estimates/main findings or improve upon the correlation coefficient with the post-1995 official data (0.18 and 0.24, respectively) and so in the interest of brevity we do not report them here.

Table 3
Correlations, robustness measures of GDP versus baseline and post-1995 official data.

GDP calculation	Correlation with baseline quarterly GDP growth (1950Q1–2000Q4)	Correlation with official data (1995Q2–2000Q4)	Standard deviation (%)
Baseline measure	NA	0.32	0.86
Bottom-up measure	0.81	0.22	0.73
Excluding negative correlation series	0.97	0.18	0.87
Balanced panel	0.95	0.25	0.96
5 PCS most correlated with annual GDP growth	0.87	0.26	0.89

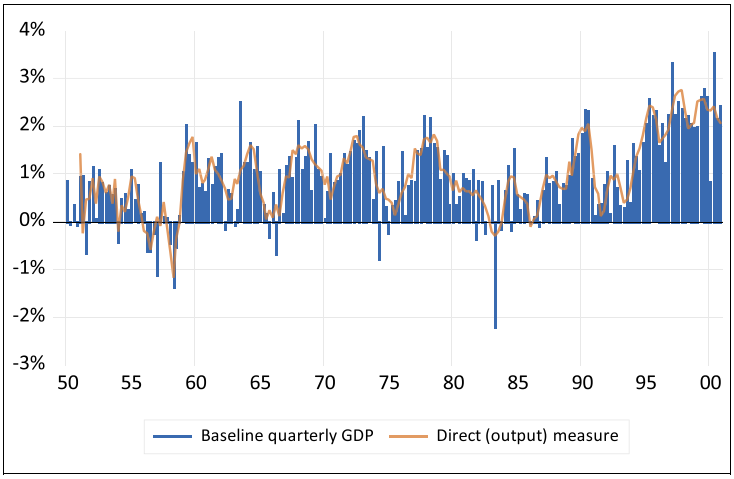

Fig. 6. Direct (output) Approach estimate and baseline estimate of quarterly GDP growth, 1950–2000.
Note: See Appendix E online for calculation of bottom-up measure.

0.25 (Table 3). Therefore, it appears that filling the missing values in order to use the additional series, has enabled us to add useful information.

Finally, we use the same methodology as for our baseline estimates, but used the five principal components which, when summed across the quarters of the year, are most highly correlated with annual GDP growth. This involves switching the ninth and twelfth principal components (which both have correlation coefficients in excess of 0.40) into our set of components used in the Chow Lin procedure. While these components are more correlated with annual GDP growth, at just under 42%, the five components used in this estimate account for substantially less of the variation in the data than the first five principal components (55%).

The correlation coefficient with our baseline measure is 0.87 (panel (c) of Fig. 7). However, it is evident from the Figure there is a notable outlier in 1951:I when a growth rate of 2.5% places it in the unrealistic position of the strongest quarter of growth until 1990, considering the failure of the 1950s economy relative to all subsequent decades since (O'Rourke, 2017; Kenny, 2025; Kennedy, 1989). Finally, the correlation coefficient with the official series post-1995 is again lower than our baseline, at 0.26.

The generally high correlation coefficients of the various alternative estimates calcualted in this section with the baseline quarterly GDP are reassuring. It is also comforting that these series do not pick up any additional fluctuations that the historical narrative would suggest should exist. Finally, none of these alternative specifications correlate more strongly with the official data than our baseline series does. Overall, we believe that our baseline series stands up well to these robustness tests.

7. Conclusions

In this paper, we have constructed quarterly GDP for Ireland for the post war period to join the first official estimates starting in 1995. Building on recent improvements made in historical annual GDP (Kenny, 2025), we use a factor-augmented Chow-Lin interpolation to exploit the variation in high frequency economic data to obtain estimates of quarterly economic activity (1950–95). Our series sheds new light on the scale, timing and magnitude of economic cycles in recent Irish economic history.

The new series are robust to a number of alternate specifications, and we believe they represent a superior alternative to the only existing numbers (OECD, 2025). First, they are constrained by the most recent adjustments to historical *annual* GDP (Kenny, 2025), in contrast with the OECD's. Second, they are produced from real economic data collected from official sources, which we could not determine was the case for the OECD. Third, the timing and magnitude of movements in the series is generally supported by contemporary accounts and subsequent scholarship.

The new quarterly GDP series allows us to explore growth and contraction epochs in greater detail than previous studies could. The

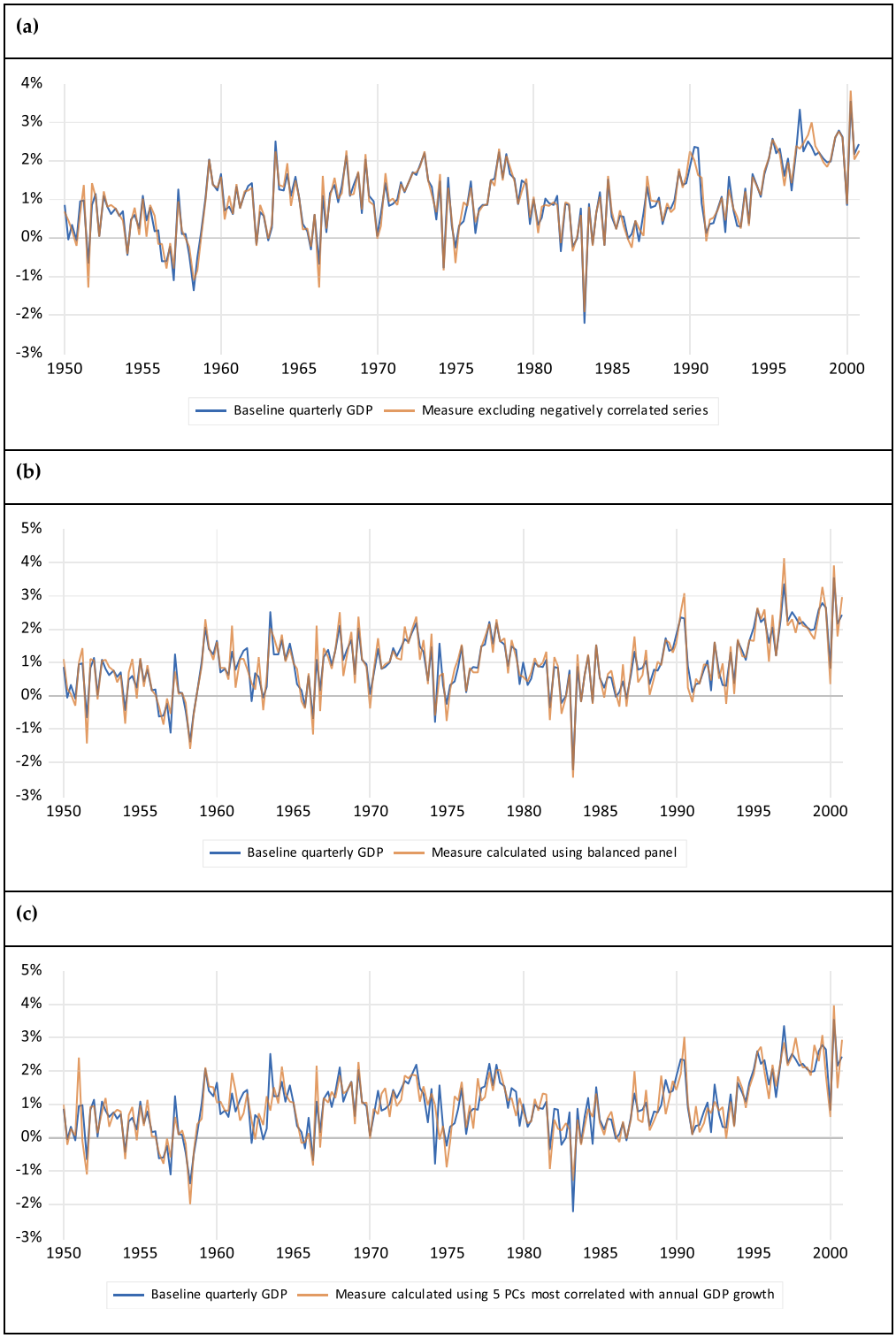

Fig. 7. Measures of quarterly GDP growth calculated for robustness tests compared to baseline quarterly GDP growth. (**a**) Measure calculated excluding series with negative correlation with annual GDP growth. (**b**) Measure calculated with balanced panel. (**c**) Measure calculated 5 PCs most correlated with annual GDP growth.

scale and duration of the stagnation of the 1950s and 1980s is clearly observable in the new series through two large troughs bottoming out in the late 1950s and mid-1980s. In the former decade, almost 30% of all quarters experienced economic growth, against 20% in the latter. Both periods experienced pitiful average quarterly GDP growth: 0.4% for the 1950s and 0.6% for the 1980s. Similarly, the positive growth experienced in the 1960s and 1970s show up as broad crests punctured in both cases by a dip in activity in the middle of each decade. Nonetheless, the rate of quarterly growth in each was almost double that of the 1950s and 1980s and the frequency of negative growth quarters dropped to just 10% for the 1960s and 5% for the 1970s.

The new data also reveal a false start in the late 1980′s when, after 1986, "there was a lot more catching up to do" (Honohan and Walsh, 2002). Positive growth from 1987 to 9 was halted by a sequence of stagnant or low-growth quarters in the early 90s, likely the result of sharp increases in interest rates stemming from international events, before growth rates finally moved on track for Ireland to converge with its peer group. However, our quarterly data also show another scale of comparison when considering recent decades in Irish economic history. Over the 1990s as a whole, average quarterly growth at +1.6% was four times that of the 1950s, three times that of the 1980s and around 50% higher than the 1960s and 1970s.

Data availability

Data and replication files: http://doi.org/10.3886/E247462V1

CRediT authorship contribution statement

Seán Kenny: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Rebecca Stuart:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.eeh.2026.101766.

Appendix A. Quarterly-on-quarter growth rates in GDP and GNP, 1950–2000 (%)

We provide our baseline estimate of quarterly GDP growth in Table A1. The data are presented in log differences. These can be used to extend backwards official estimates of GDP in levels. We do not present a series in levels here, as revisions to the official data may still occur, raising the prospect of a series in levels being quickly out of date.

For completeness, we provide quarterly estimates of GNP growth alongside those for GDP in the Table below. GNP data are calculated using the same methodology as GDP, see main text for details. The distinction between GDP and GNP in Ireland is important in recent data. However, throughout much of the period we study, GDP and GNP growth rates are very similar. Nonetheless, there are variations in the annual growth rate of the series towards the end of our sample period and thus we provide both interpolated quarterly series here (Fig. A1).

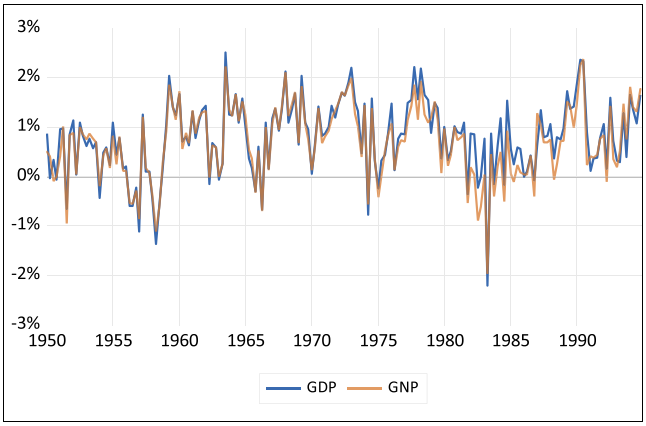

Fig. A1. Quarterly growth rates in GDP and GNP, 1950–2000.

Table A1
Quarterly GDP and GNP growth rates, 1950–2000 (percent).

	GDP	GNP		GDP	GNP
1950Q1	0.864	0.488	1962Q4	0.580	0.585

(*continued on next page*)

Table A1 (*continued*)

	GDP	GNP		GDP	GNP
1950Q2	-0.042	0.406	1963Q1	-0.064	-0.004
1950Q3	0.336	-0.100	1963Q2	0.263	0.262
1950Q4	-0.065	0.000	1963Q3	2.500	2.228
1951Q1	0.947	0.407	1963Q4	1.246	1.348
1951Q2	0.970	1.015	1964Q1	1.237	1.225
1951Q3	-0.651	-0.955	1964Q2	1.664	1.658
1951Q4	0.847	0.834	1964Q3	1.093	1.114
1952Q1	1.136	0.886	1964Q4	1.577	1.516
1952Q2	0.043	0.035	1965Q1	1.044	1.251
1952Q3	1.093	0.997	1965Q2	0.365	0.540
1952Q4	0.817	0.844	1965Q3	0.164	0.356
1953Q1	0.612	0.743	1965Q4	-0.308	-0.328
1953Q2	0.766	0.858	1966Q1	0.601	0.522
1953Q3	0.573	0.761	1966Q2	-0.678	-0.695
1953Q4	0.693	0.693	1966Q3	1.089	0.999
1954Q1	-0.439	-0.198	1966Q4	0.155	0.119
1954Q2	0.476	0.417	1967Q1	1.170	1.068
1954Q3	0.588	0.574	1967Q2	1.364	1.390
1954Q4	0.236	0.172	1967Q3	0.920	0.941
1955Q1	1.087	0.825	1967Q4	1.346	1.418
1955Q2	0.442	0.243	1968Q1	2.118	2.111
1955Q3	0.782	0.808	1968Q2	1.089	1.221
1955Q4	0.159	0.108	1968Q3	1.367	1.464
1956Q1	0.203	0.116	1968Q4	1.680	1.711
1956Q2	-0.604	-0.534	1969Q1	0.647	0.673
1956Q3	-0.599	-0.551	1969Q2	2.032	1.828
1956Q4	-0.235	-0.289	1969Q3	1.081	1.058
1957Q1	-1.108	-0.867	1969Q4	0.956	0.740
1957Q2	1.242	1.207	1970Q1	0.053	0.119
1957Q3	0.103	0.166	1970Q2	0.613	0.552
1957Q4	0.091	0.067	1970Q3	1.414	1.389
1958Q1	-0.444	-0.373	1970Q4	0.818	0.671
1958Q2	-1.365	-1.117	1971Q1	0.867	0.807
1958Q3	-0.511	-0.565	1971Q2	0.993	0.919
1958Q4	0.128	0.257	1971Q3	1.432	1.160
1959Q1	1.036	0.906	1971Q4	1.194	1.343
1959Q2	2.038	1.861	1972Q1	1.460	1.473
1959Q3	1.396	1.407	1972Q2	1.695	1.711
1959Q4	1.239	1.141	1972Q3	1.627	1.633
1960Q1	1.657	1.720	1972Q4	1.901	1.837
1960Q2	0.704	0.555	1973Q1	2.197	1.995
1960Q3	0.800	0.876	1973Q2	1.493	1.258
1960Q4	0.622	0.673	1973Q3	1.329	1.008
1961Q1	1.314	1.342	1973Q4	0.473	0.393
1961Q2	0.782	0.863	1974Q1	1.465	1.438
1961Q3	1.137	1.183	1974Q2	-0.779	-0.568
1961Q4	1.340	1.300	1974Q3	1.570	1.387
1962Q1	1.429	1.319	1974Q4	0.315	0.356
1962Q2	-0.154	-0.027	1975Q1	-0.245	-0.424
1962Q3	0.675	0.622	1975Q2	0.321	0.014

Table A1: Quarterly GDP and GNP growth rates, 1950-2000, continued

	GDP	GNP		GDP	GNP
1975Q3	0.432	0.527	1988Q2	0.360	-0.065
1975Q4	0.854	0.816	1988Q3	0.788	0.240
1976Q1	1.473	1.064	1988Q4	0.753	0.723
1976Q2	0.124	0.122	1989Q1	0.964	0.710
1976Q3	0.761	0.603	1989Q2	1.727	1.516
1976Q4	0.865	0.735	1989Q3	1.360	1.430
1977Q1	0.847	0.698	1989Q4	1.411	0.980
1977Q2	1.485	1.143	1990Q1	1.843	1.445
1977Q3	1.544	1.430	1990Q2	2.355	2.248
1977Q4	2.216	1.848	1990Q3	2.329	2.368
1978Q1	1.562	1.141	1990Q4	0.900	0.224
1978Q2	2.180	1.927	1991Q1	0.115	0.409
1978Q3	1.648	1.246	1991Q2	0.360	0.382
1978Q4	1.546	1.081	1991Q3	0.381	0.430
1979Q1	0.887	1.193	1991Q4	0.771	0.756
1979Q2	1.486	1.509	1992Q1	1.055	0.835

(*continued on next page*)

Table A1 (*continued*)

Table A1: Quarterly GDP and GNP growth rates, 1950-2000, continued

	GDP	GNP		GDP	GNP
1979Q3	1.385	1.138	1992Q2	0.154	-0.110
1979Q4	0.362	0.065	1992Q3	1.593	1.427
1980Q1	0.995	0.962	1992Q4	0.715	0.355
1980Q2	0.337	0.218	1993Q1	0.322	0.179
1980Q3	0.517	0.437	1993Q2	0.292	0.511
1980Q4	1.009	0.994	1993Q3	1.286	1.476
1981Q1	0.895	0.728	1993Q4	0.388	0.741
1981Q2	0.858	0.786	1994Q1	1.645	1.815
1981Q3	1.085	0.859	1994Q2	1.358	1.398
1981Q4	-0.356	-0.543	1994Q3	1.074	1.303
1982Q1	0.866	0.182	1994Q4	1.650	1.770
1982Q2	0.851	0.036	1995Q1	2.060	1.784
1982Q3	-0.225	-0.888	1995Q2	2.581	1.982
1982Q4	-0.010	-0.619	1995Q3	2.208	1.828
1983Q1	0.759	0.044	1995Q4	2.311	2.094
1983Q2	-2.205	-1.975	1996Q1	1.597	1.627
1983Q3	0.865	0.451	1996Q2	2.058	2.014
1983Q4	-0.151	-0.404	1996Q3	1.223	1.059
1984Q1	0.630	0.214	1996Q4	2.243	2.064
1984Q2	1.176	0.502	1997Q1	3.336	3.863
1984Q3	-0.176	-0.511	1997Q2	2.245	1.931
1984Q4	1.525	0.921	1997Q3	2.514	2.107
1985Q1	0.550	0.045	1997Q4	2.360	1.363
1985Q2	0.248	-0.117	1998Q1	2.160	1.857
1985Q3	0.582	0.235	1998Q2	2.217	1.966
1985Q4	0.548	0.081	1998Q3	2.063	1.783
1986Q1	-0.013	0.040	1998Q4	1.963	1.690
1986Q2	0.101	0.037	1999Q1	1.993	1.345
1986Q3	0.424	0.415	1999Q2	2.601	1.867
1986Q4	-0.088	-0.412	1999Q3	2.785	2.262
1987Q1	0.634	1.275	1999Q4	2.633	2.314
1987Q2	1.331	1.033	2000Q1	0.851	0.982
1987Q3	0.786	0.688	2000Q2	3.533	2.984
1987Q4	0.825	0.681	2000Q3	2.167	2.238
1988Q1	1.051	0.746	2000Q4	2.436	2.605

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