



Rethinking Debt Sustainability: Lessons from the Austerity Era

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I. Executive Summary

The history of austerity is ideologically rich: each country ought to ‘live within its means’. Austerity, understood as spending cuts and tax increases to reduce government debt, chimes closely with this motto. This culminated in Reinhart and Rogoff’s seminal argument that once the debt-to-GDP ratio rises above 90% of GDP, economic growth declines substantially and tragically. 90% is deemed a ‘tipping point’. Recent literature has provided us with econometric and statistical insights into this, questioning the robustness of this 90% threshold. This provides us with a pivotal offer, to explore ways to ensure economies have healthy debt, considering economic theory and case studies, and examine their relevance to our case in the UK.

This paper deconstructs existing solutions to the problems around austerity, especially how it is that a government should see having a high debt-to-GDP ratio. High debt is not problematic, so long as the debt is sustainable. A government having debt is sustainable when how much the economy grows is greater than how much interest we pay on our debt. The UK’s debt is not sustainable at the time of writing. To solve our debt unsustainability, we examine strategies to increase growth that are actionable in a context that would usually call for austerity. In light of these strategies, we put forward actionable policy solutions that are ready for the UK to put into place.

To introduce the context in which Reinhart and Rogoff wrote, we discuss the intellectual history of austerity policies and evaluate its subsequent rise following their paper. Second, we examine existing literature around Reinhart and Rogoff, including direct critiques of the paper. To that end, we assess their plausibility, and draw conclusions from these critiques. In particular, using econometric and statistical methods, we learn that the argument they make rests on a faulty dataset—correcting for this shows us that there is no tipping point. This is not to justify loose fiscal policies, as the debt-to-GDP ratio is nonetheless inversely proportional to growth. However, further scrutiny evidences that this inverse proportionality may not in fact be causal. Third, we illustrate what would have happened to the UK’s debt-to-GDP ratio had it not experienced austerity, using econometric methods, learning that the UK may have been healthier in this situation. We consider how to increase growth (therefore increasing sustainability) by considering different theories of taxation and how this affects incentives to work. Finally, we provide a post-mortem of various recent and relevant case studies, to make an empirically informed case of how to increase growth. This dovetails from the discussion of theories of taxation and also considers education (to align workforces with industry needs) and production (to ‘crowd in’ private capital). All this serves to justify our actionable policy solutions, and substantiate the recommendations which have been alluded to throughout the paper. Our actionables are sensitive to the UK’s present conditions, especially that its debt interest payments exceed £100bn per annum.

II. Historical Context: Austerity, Geopolitics, And State Capacity

The modern debate surrounding austerity is ultimately a debate about how governments maintain fiscal sustainability while preserving economic growth and political legitimacy. Throughout modern history, policymakers have repeatedly faced the challenge of balancing external financial obligations against domestic economic welfare. While austerity is often presented as a technical response to excessive debt, historical experience suggests that its adoption has been shaped as much by prevailing economic ideas and institutional constraints as by fiscal necessity itself. Understanding this history is essential for evaluating contemporary debates about public debt and economic policy.

The Interwar Experience: Debt, Credibility and Political Stability

The origins of modern austerity debates can be traced to the interwar period. Following the First World War, many governments sought to restore fiscal and monetary credibility through balanced budgets, debt repayment and renewed adherence to the gold standard. These objectives reflected genuine concerns about inflation, capital flight and international confidence. However, the institutional constraints imposed by the gold standard significantly limited governments' ability to respond to domestic economic shocks.

As wages became increasingly rigid due to rising unionism and democratic governments faced growing demands for employment and social protection, tensions emerged between maintaining external credibility and preserving domestic economic stability. In several countries, efforts to prioritise debt servicing and monetary stability contributed to prolonged unemployment and social discontent; for example, Britain sought to defend the gold peg by raising interest rates to attract foreign capital, but in doing so stifled domestic investment and led unemployment to rise beyond 11%. The collapse of democracy in Weimar Germany and rise of Hitler demonstrated the political risks associated with adjustment strategies that imposed substantial economic costs from foreign debtors while offering limited prospects for recovery, forcing governments to prioritise debt obligations over domestic welfare. More broadly, the fragmentation of the international monetary system during the Great Depression illustrated that fiscal and monetary credibility alone were insufficient to guarantee economic stability or political legitimacy.

From Keynesianism to Neoliberalism

Following the Second World War, policymakers increasingly concluded that economic stability required a more active role for the state. Keynesian approaches emphasised full employment, demand management and public investment as mechanisms for preventing the economic dislocation associated with the interwar years. Governments expanded welfare systems, invested in public services and accepted a greater responsibility for maintaining economic activity during downturns.

This consensus began to weaken during the 1970s, when stagflation challenged existing policy frameworks and the expansion of post-Bretton Woods international trade reoriented economic management away from sustaining aggregate demand towards cost competitiveness of national firms. In response, many governments adopted policies associated with neoliberalism, including monetary restraint, deregulation and greater emphasis on fiscal discipline. For example, the UK took a \$3.6 billion loan from the International Monetary Fund in 1976 because it failed to sustain the pound through existing credit lines and reserves, and thus was mandated to drastically cut public spending and lower the public sector borrowing requirement. Public expenditure increasingly came to be viewed not only as a tool of economic management but also as a potential source of inflation and inefficiency. Consequently, balanced budgets and debt reduction regained prominence within economic policymaking.

Importantly, this transition did not eliminate the state's role in economic development. Rather, it was an ideological reorientation that altered the balance between market mechanisms and government intervention. Debates increasingly centred on how governments could promote growth while maintaining fiscal credibility, a tension that continues to shape contemporary discussions of debt sustainability. In the UK, this reorientation was conducted through the intertwining of executive and legislative powers within parliamentary sovereignty, which Margaret Thatcher utilised to lower the Public Sector Borrowing Requirement by redirecting revenue from the North Sea oil boom, council house sales, and privatisation. Hay has even contended that the Winter Discontent (1978–9), which was marked by intense industrial conflict and widespread strikes against wage limits, was a ‘manufactured’ crisis which Thatcher reframed as evidence of the failure of Keynesianism and justification for restoring order through monetarism.

The 2008 Financial Crisis and the Return of Austerity

The global financial crisis of 2007–8 reignited concerns regarding public debt and fiscal sustainability. In the aftermath of the crisis, many advanced economies adopted programmes of fiscal consolidation aimed at restoring market confidence and stabilising public finances. In both the United Kingdom and the Eurozone, austerity became the dominant policy response. Supporters argued that reducing deficits would reassure investors, lower borrowing costs and strengthen long-run economic stability. Critics countered that premature spending cuts risked weakening already fragile recoveries and slowing economic growth. Without an alternative policy program to challenge monetarism, austerity became perceived as the dominant policy prescription that was not just economically unavoidable but also morally necessary to the extent that the state became compared to a family that had to ‘live within one’s means’, a message that resonated strongly with middle-income homeowners at the time.

The Eurozone crisis further demonstrated how institutional arrangements can constrain national policy choices and limit governments' ability to pursue alternative growth strategies. Membership of the Single Currency brought together economies with different growth models and removed

exchange-rate adjustment as a policy tool, leaving deficit countries increasingly reliant on internal devaluation through wage restraint and fiscal consolidation. During the crisis, financial assistance was frequently conditioned on austerity measures and structural reforms, while the strengthening of supranational fiscal rules reduced the scope for national governments to pursue demand-led recovery strategies. As a result, many debtor states were required to prioritise deficit reduction despite severe economic contractions. In several cases, falling output and rising unemployment offset improvements in public finances, demonstrating that fiscal consolidation alone was insufficient to restore debt sustainability. The Eurozone experience therefore highlighted the importance of institutional flexibility and economic growth in achieving durable fiscal adjustment, illustrating how efforts to reduce debt can be undermined when policy frameworks constrain governments' ability to support productive capacity and recovery.

This intellectual history informs the context within which a particularly seminal piece of literature from Reinhart and Rogoff was produced. The RR piece was specifically cited as a rational justification for policies related to austerity after 2008 by Osborne and Bush. However, the intellectual context suggests that a prioritisation on expenditure restraint over alternative conceptions of fiscal adjustment, such as economic growth and political legitimacy, was ideologically adopted before it was theoretically explored. Taken together, these historical episodes suggest that successful fiscal adjustment should move beyond mere expenditure restraint and consider more holistic policy packages that fulfil diverse objectives.

III. Reinhart-Rogoff: A Theoretical Review of Austerity Policy Packages

A large part of policy-making regarding debt and fiscal conservatism since the 2010s has been significantly influenced by an idea proposed by the economists Carmen M. Reinhart and Kenneth S. Rogoff. In 2010, the pair published two papers exploring the idea that there was a non-linear relationship between GDP growth and the amount of public debt in an economy (measured by the debt-to-GDP ratio). In particular, they suggested that while debt at low levels did not impact growth in a meaningful way, at higher levels, debt had a severe negative impact on growth. They identified this limit to be at 90% Debt-to-GDP for developed economies, and that it held true across countries, time periods, exchange rate regimes etc. (Reinhart and Rogoff, 2010a) In this section, it is argued that RR's paper, henceforth known as 'RR' oversimplifies the nature of debt limits.

Results of the "Growth in a Time of Debt":

Growth in a Time of Debt used a new dataset regarding the public debt for 200 years for governments. By looking at the Public Debt-GDP ratio for countries and the associated GDP growth rates for those years, RR saw that for periods with public debt-GDP ratios below 90% there weren't significant differences in GDP growth rates. However, around 90%, average GDP growth rates fall by 4% and median GDP growth rates fall by 1%. They expand on this by looking at the experiences of individual countries, and show that this observation holds true for a range of advanced economies like the US, Finland, Greece etc. (RR, 2010a)

In cases where there was no growth deterioration (particularly Australia and New Zealand), they noted that this growth occurred immediately after war periods, and hence countries were pre-disposed to experience growth.

They do not state a specific reason behind the 90% cutoff, though they speculate that this cutoff results from the phenomenon of debt intolerance, wherein debtors are unwilling to lend to governments with high debt levels, leading to increased risk premia (Reinhart and Rogoff, 2010a).

Results of "Debt and Growth Revisited":

In a similar paper following the first one, RR clarified certain aspects of their methodology and results.

They reiterate the results they found for developed economies, however, specify that this is not a strict limit. As they state, "We do not pretend to argue that growth will be normal at 89 percent and subpar (about one percent lower) at 91 percent debt/GDP" (Reinhart and Rogoff, 2010b). Rather, their limit provides a general area around which a limit might exist, and should be subjected to a sensitivity analysis. They further justify their choice of 90% as it provides a large

enough sample of data (96 observations) in the highest bucket, while still providing meaningful insights into the impacts of debt.

While their work suggests a universal limit, they do not discount the possibility that debt limits might be country-specific. Some of their earlier work (Reinhart, Rogoff & Savastano, 2003) suggests that debt intolerance is dependent on a country's credit and inflation history, and hence varies with time.

Additionally, they clarify that they believe the relationship between debt and GDP growth to be bi-directional, with both variables affecting each other.

The empirical and academic debate surrounding the validity of the 90% threshold will be explored in the subsequent section.

Empirical Papers on Debt and Economic Growth:

Since the publishing of the RR paper, there have been numerous others which take different econometric approaches to understanding the relationship between Debt and Growth. The debate around debt limits can be broken down into 3 main questions:

- a) Are there non-linearities between debt and growth rates?
- b) What is the form of those non-linearities?
- c) And is the debt limit universal (stable across time and advanced countries)?

For the purpose of this section, I focus on papers that use datasets from advanced countries, as they are more relevant to the issue of this policy paper.

“The real effects of debt” - (Cecchetti, Mohanty & Zampoli, 2011)

This paper uses stronger econometric tests to build on the work of RR using data for 18 advanced economies between 1980-2010. They specifically look at medium-term growth rates in economies and show that there is a negative relationship between debt and growth. Furthermore, according to their results, there exists a strong threshold at 85% beyond which more debt is extremely detrimental to growth.

Cecchetti, Mohanty and Zampoli are also unique in that they look at corporate and household debt alongside public debt, and hence can observe interactions between them.

Table 3	
Correlations of per capita GDP volatility with debt	
Total non-financial debt	0.0042 (0.331)
Government debt	-0.0057 (0.301)
Private debt	0.0103*** (0.007)
Corporate debt	0.0102** (0.036)
Household debt	0.0156 (0.293)

Source of table: Cecchetti, Mohanty & Zampolli 2011

Here, total nonfinancial debt, corporate debt, and household debt are negatively correlated with annual growth, and all of them are statistically significant at the 1% level. Public debt is very slightly positively correlated, though not statistically significant from 0. Additionally, certain forms of debt also have a positive correlation with GDP volatility (implying that greater debt may make growth less stable).

Results:

Regardless of the specifications and the combination of variables included, they find that public debt has a negative (and statistically significant) effect on GDP growth. Secondly, they estimate the impact of public and private debt on future credit flows and find that both variables are negatively correlated with future credit. This implies the existence of crowding-out effects within economies, a potential channel for the effect of debt on growth.

Lastly, when testing for threshold effects, they find a strong threshold at 84% not controlling for crises. The effect of public debt on GDP is nearly twice as large after this limit as compared to before. Controlling for crises, this limit is slightly higher, however, it is still close to the estimates provided by RR.

Table 6				
Threshold effects				
	Threshold estimate	Coefficients		
Government debt				
Controlling for crises	96%	<96% -0.0065 (0.232)	>=96% -0.0138*** (0.004)	
Not controlling for crises	84%	<84% -0.0074 (0.382)	>=84% -0.0133* (0.057)	

Source for table: Cecchetti, Mohanty, and Zampolli

While they do find a limit close to the Reinhart-Rogoff limit, they notice that debt has a negative effect on GDP growth regardless of the debt level. The magnitude of the effect increases significantly after the limit, however the nature of the limit is not the same as described by RR.

The Impact of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area - (Checherita and Rother, 2010)

Checherita and Rother investigate a similar question, however, only for 12 countries in the euro area from 1970-2010. They further contribute to the literature by disaggregating the impact of debt on growth into 4 channels: the private saving and private investment rate, public investment, total factor productivity and sovereign interest rates.

Their basic model is similar to Cecchetti, Mohanty and Zampolli's paper, where they use the conditional convergence model (based on the Solow Growth Model) but augment this by adding debt as a regressor and make their model quadratic in debt in order to account for non-linearities. By bootstrapping (running simulations and drawing alternative samples) and a delta method (fitting a Taylor series approximation and calculating the variance), they calculate the confidence intervals for this threshold.

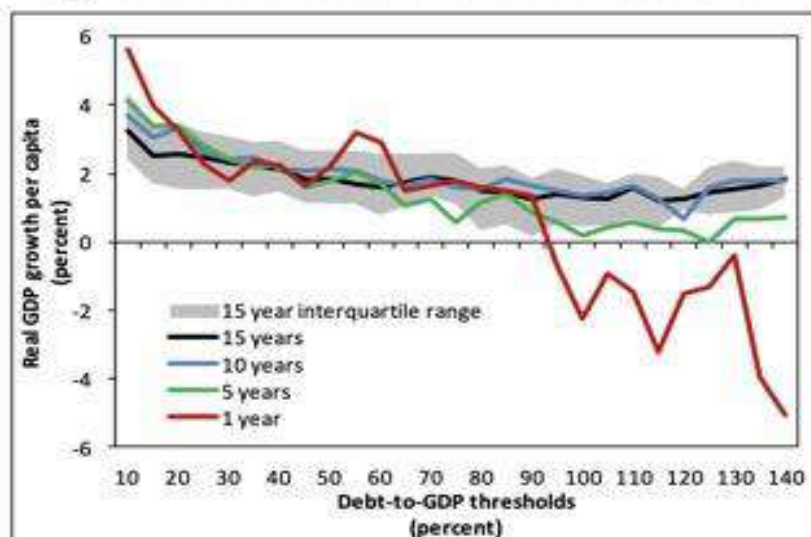
The results largely corroborate RR, with there being significant non-linearities in the relationship between debt and GDP growth and that the turning point in the relationship lies between 90-100% of debt-GDP. They find that the threshold could be as low as 70-80%.

Furthermore, when analysing specific channels, they saw that the threshold for private saving was similar to the overall threshold (82-91%), the threshold for public investment was lower (45-68%), and the threshold for total factor productivity was higher (above 100%). They found no significant non-linearities in the sovereign interest rate channel however, it was still economically important (a 10% increase in the Debt-GDP ratio was associated with a 0.7% increase in interest rates)

Debt and Growth: Is There a Magic Threshold? - (Pescatori et al. 2014)

Pescatori et al. use a new dataset constructed by the IMF covering the years 1875-2010 and a new methodology to approach the question of debt limits.

In order to control for reverse causality, they take different minimum lengths for episodes (1, 5, 10 and 15 years) and show that while there seems to be a supposed limit around 90% for 1-year episodes, a similar limit does not exist for 5, 10, and 15-year episodes. This can be seen in the graph below.

Figure 2: Debt and Growth over the Medium Run

Source for Table: Pescatori et al. (2014)

This suggests that the limit identified might be due to reverse causation, as longer episodes which are more robust to reverse causation do not show the same pattern. They put greater emphasis on the direction of debt ratios in the long run as their results show that a country with falling debt ratios in the medium term can grow just as fast regardless of debt levels.

Is There a Debt-threshold Effect on Output Growth? - (Chudik et al. 2015)

Chudik et al. further improve on the methodologies used by previous researchers by creating new empirical tests for thresholds. In particular, they correct for the fact that previous models assumed slope homogeneity across countries, cross-sectional independence of errors, and no spillover effects of debt from one country to another, which can lead to biased estimates and spurious thresholds to be identified.

They develop new tests, which perform well within small sample sizes, and show that without accounting for the cross-sectional dependence of errors, there is a threshold identified at 80% Debt-GDP for advanced economies. Once accounting for this dependence (possibly driven by unobserved factors and spillovers), the evidence for threshold effects reduces significantly, and you cannot reject the null hypothesis of no universal thresholds.

They further test whether debt buildup (when public debt continues increasing to a high level) has a negative impact on long term growth, for which they find that there is a significant negative impact. Most of their results are statistically significant at the 1% level, although they stress the importance of the trajectory of debt in their results, stating that “Provided that debt is on a downward path, a country with a high level of debt can grow just as fast as its peers in the long run.”

Conclusion:

As we can see, there is still significant debate around the policy issues of the impact of debt and whether there are universal thresholds with regard to levels of debt.

Although there is still a lack of clear consensus, meta-analysis and literature surveys seem to show greater evidence for a negative relationship between debt and GDP, with a meta-analysis conducted by Heimburger (2022) showing a general negative relationship.

Similarly, recent studies have shown that there is a likely heterogeneous relationship between growth and debt. This goes against the supposed universal limit suggested by RR and suggests that their conclusions lacked sufficient foundation.

Criticisms of Reinhart-Rogoff's Methodology

Having explored some empirical evidence in support of the 90% threshold this section will review the methodology used by RR in coming to such a conclusion by considering alternative empirical techniques, datasets, and wider criticisms of RR's theory.

'Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff' (Herndon, Ash, and Pollin, 2013)

The most pertinent criticism against RR's work was undertaken by Herndon, Ash, and Pollin (2013) (henceforth 'HAP'). Particularly, they critique the methodology employed, data selection, and the extent to which there is a clear 'tipping point' at which economic growth is actually affected by the level of public debt. We shall address each of these criticisms in turn.

Overall, they argue that the illustrated effect of public debt on growth is captured by RR in a descriptive sense though not empirically.

Methodological Criticism

Firstly, the methodological criticism. The authors begin by analysing the unorthodox weighting methodology used by RR to measure average real GDP growth of an individual country. RR start by classifying the various debt brackets (0-30, 30-60, 60-90, >90). They then look at their data set and determine the number of years that a country might have debt levels >90%. The various years that face this level of public debt are then taken, and their **respective yearly growth rates** are summed / divided by the number of data points, thereby computing a simple mean. For example, the growth rate and debt level per year of the UK might be taken, and for each year that the UK has debt >90% a growth rate will be obtained respectively. The >90% group growth rates are then added up and divided by the number of data years who are in the group - thereby calculating the simple mean for the >90% group for the UK. This process is repeated with other countries e.g. France, Germany, Spain. Then each simple country mean is used to calculate one single >90% group growth mean. A similar method is used to compute the median. This is repeated for each country and across the 4 debt buckets. It is notable that if a country only had 1 year >90% public debt, the simple average would be taken in the same way.

Therein lies HAP's objection to RR. By using this simple mean method, RR disregards the potential gaps in data where some countries can provide more/less data than others and therefore the implications of distorted outcomes.

For example, HAP highlight New Zealand which accounted for 1 data year, 1951, experiencing growth of -7.6%. However, due to this faulty method of averaging, this single data point was given a weight of 14.3%, the same amount given to longer time frames such as the UK (1946-64) and Greece (1991-2009). Therefore, the method used by RR is criticised, which magnifies anomalous and extreme years of negative growth and high public debt in some countries, while diminishes other countries which might have high public debt combined with high growth for a long period of time, such as the UK. HAP find that this methodology is the cause for the seeming 'tipping point' relationship found by RR; rather, whilst using their own methods, HAP produce a more gradual relationship between debt and growth.

Data Selection

A further criticism lies in the method of data selection. RR had stated that 20 advanced economies were chosen for his data set though in reality only 15 were used, excluding Australia, Austria, Belgium, New Zealand, and Canada. In New Zealand's case, the years 1946-49 were removed though this has a significant impact as within these 4 years, New Zealand was experiencing high levels of economic growth (7.7%, 11.9% etc.) while being in the >90% public debt category. The removal of these years contributes to a lower calculated average growth in NZ from 2.6% down to -7.6%, and therefore a 1.9% lower average real GDP growth for the >90% debt bucket growth rate as well. As extended above, unconventional weighting exacerbates this distorted effect and limits the accuracy and replicability of RR's method and results. Similarly, the exclusion of Canada from the dataset is significant. The country faced an average of 3% economic growth despite being in the highest debt category over these years. Exclusion therefore drags down further the calculated average for the 90% bucket, undermining the reality of the 'tipping point' assertion.

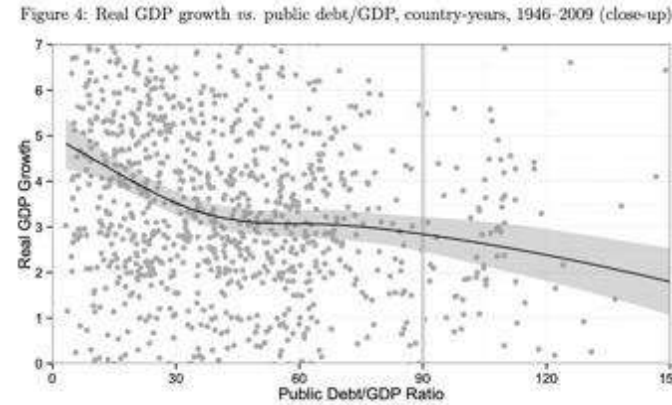
Time Periods

Data selection extends further to the time periods used. RR states their data spanning 1946-2009 though not all countries have information across this range, with only the US extending back to 1946 and Greece not having data until 1970. Further, there are discrepancies in year intervals, with France providing no data in 1973-78 and Spain 1959-80 (real GDP growth). HAP highlight a misreporting of data in Austria, which experienced a different real GDP growth in 1948/49 compared to what RR had published in their paper.

Exogenous effects are also unaccounted for. Portugal for example, experienced an increase of 25% debt to GDP in 1999-2000 having joined the Eurozone, which would distort its dataset. Indeed, HAP emphasise the simplicity of RR's method and use of descriptive statistics contributing to an inability to make causal inference from the data itself.

HAP considers whether there exists a boundary of public debt-to-GDP level at which growth rate becomes negative. In 'Growth in a Time of Debt' RR sought to argue that debt intolerance has a nonlinear relationship to growth, and that movement towards a certain public debt threshold

would contribute to slower economic growth. HAP challenges this. By replicating RR’s method and using their data set, HAP uses a regression function to determine that there is not a statistically significant effect between growth rates and public debt levels, and no statistically significant nor discernible effect on growth as the public debt ratio increases:



Source: Herndon, Ash, and Pollin (2013)

As above, the gradient of the function is relatively flat from 40% onwards. It seems that if there were to be a negative relationship between debt on growth, this would occur between the 0-30% range, where the gradient is much steeper. It is clear however, that after 120%, GDP growth becomes negative. Yet this is reflected by HAP less as a ‘tipping point’ towards negative growth but rather the continuation of a negative growth trend which starts from around the 60% mark. As such, HAP shows that, by correcting for methodological mistakes and data selection issues, there is actually no clear relationship of negative growth at the 90% threshold level initially proposed by RR.

In subsequent years, RR replied (2013), highlighting a lack of significant difference between the mean results found by HAP and their original paper:

1945-2009				
Debt/GDP	RR AER (2010)		HAP (2013)	
	Mean	Median	Mean	Median
0 to 30	4.1	4.2	4.2	NA
30 to 60	2.8	3.9	3.1	NA
60 to 90	2.8	2.9	3.2	NA
Above 90	-0.1	1.6	2.2	NA

Source: Reinhart and Rogoff (2013)

Though the means are numerically proximate between RR and HAP’s findings, the implications of the results are significantly different. RR’s results are dramatic in showing the drop in economic growth at high levels of public debt (2.8% to -0.1%), contributing to policies justifying massive government contraction in an attempt to pursue growth. In contrast, HAP’s results indicate a smoother reduction in growth, and no negative rate at the 90% level, *justifying perhaps fiscal awareness as opposed to massive contractionary policies.*

‘Public debt and economic growth: Is there a causal effect?’ (Panizza and Presbitero, 2014)

Panizza and Presbitero (henceforth PP) make the conclusion that once endogeneity is accounted for, any previous relationship between debt and growth disappear, finding no causal link - however it does support the conclusion of the existence of a correlation between the two variables.

Endogeneity may occur in the relationship between growth and debt situation via 2 channels: two-way causality and simultaneity. **Two-way causation** is when two variables simultaneously influence each other such that it is not possible to identify a single causal relationship between them. **Simultaneity** arises when two variables move together in a given period of time not because of causation but rather due to a common exogenous factor that influences both variables concurrently. Accounting for and eliminating these statistical issues, PP's conclusion finds that there is no relation between debt and growth, undermining the potential proposals arising from RR's work. Absent of causality, austerity or severe fiscal contractions are not justified to support economic growth. Accounting for these two issues is crucial when considering the descriptive nature of RR's findings.

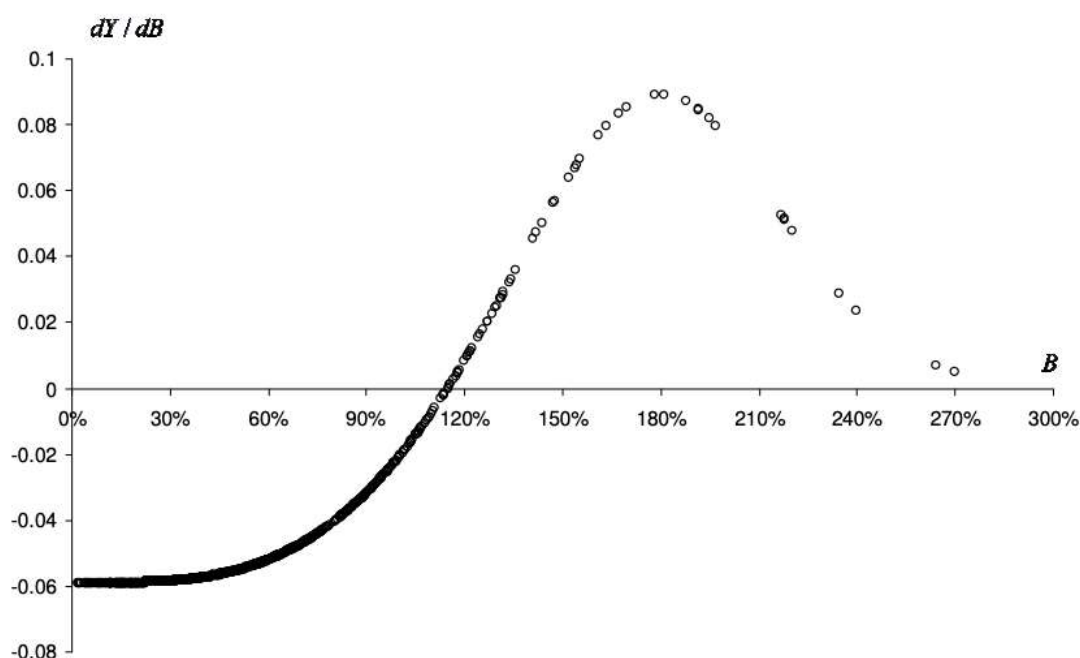
This method goes further than a standard regression model which tests correlation. Because of simultaneity issues (as per Chudik et al. and Egert below), time will clearly have an effect on whether there is correlation or causation between the two variables. When applying PP's findings to RR's conclusion, there is actually no causal relationship between debt and growth and therefore invalidating the 90% level and indeed any such level overall.

'Is High Public Debt Always Harmful to Economic Growth? Reinhart and Rogoff and some complex nonlinearities' (Minea and Parent, 2012)

A 2012 study by Minea and Parent (henceforth 'MP') studies the existence of RR's proposed threshold using econometric techniques. As opposed to HAP, MP uses a different database to test RR's hypothesis, stating the intention to determine whether the 'findings still hold when using a different database on public debt'. However, the time period covered is the same i.e. 1945-2009, and looks specifically at the 20 advanced economies. Using equality tests (ANOVA and Welch), the authors find no statistically significant difference between the growth rates of countries in the 60-90% and >90% categories.

MP uses the panel smooth transition regression method (PTSR) to determine the endogenous threshold at which negative growth is caused by public debt. PTSR (Gonzalez et al., 2005) was introduced for heterogeneous panel data. Panel data is a database with variables being observed over time which further assumes that all variables observed behave in the same way i.e. the same relationship between X and Y for every variable/observation. By including heterogeneity, this latter assumption is relaxed, allowing the relationship between X and Y to vary across units. For this case, heterogeneity is an advantage because the effect of an increase in the level of public debt will have varied effects depending on the country. Further, PTSR is beneficial for capturing non-linear relationships.

MP reject a linear relationship between debt and GDP finding statistical insignificance, justifying the use of PTSR. They include a transition function. This functional shape is common to all countries, though the timing and degree of transition differs leading to countries being at different positions along this nonlinear curve. The threshold level is where the relationship between debt and growth begins to change. The smoothing parameter determines how sharp vs smooth the relationship change occurs. The transition function is shown below:



Source: Minea and Parent (2012)

MP's findings broadly align with those by HAP, who find that negative economic growth effects are prominent at low levels of public debt, and less so towards the 90% level.

The illustrated relationship finds that as the level of public debt increases, there is a decrease in the level of economic growth. This relationship is denoted particularly in the 60-90% bracket, with a steeper gradient. However, it is notable that the y-axis is made positive at the 115% debt level, indicating that the increase in public debt coincides with an increase in economic growth. Though an increase past 90% does contribute to a reduction in economic growth, in line with the conclusion proposed by RR, MP find that at 115%, the sign change proposes an endogenous threshold at which an increase in public debt levels could lead to an increase in the economic growth rate.

In application to RR's thesis, MP disputes the 90% 'tipping point' thesis, rather, asserting the *positive growth trajectory* after 115%. This implies that to constrict public debt is unnecessary.

'Is There a Debt-threshold Effect on Output Growth?' (Chudik et al., 2013)

Chudik et al. use data from 1965-2010 spanning 40 developed and developing countries with available data in the period to find no statistically significant threshold at which economic growth becomes negative but does find that a negative relationship emerges with increasing levels of public debt. The paper comments on the strong homogeneity assumptions that RR used as well as their failure to consider endogeneity issues, fixed effects, and cross-sectional dependence (i.e. dependence between countries e.g. in terms of commodity prices, global financial cycles) which can all influence economic growth as well. Indeed, the authors underline that the effect of public debt on economic growth is likely to vary between countries and be dependent upon institutions and internal factors.

Using an autoregressive distributed lag model (ARDL), various thresholds are tested to determine the relationship between debt and GDP growth. The advantage of this method is the inclusion of a time lag term.

Testing against multiple thresholds, the authors find no statistically significant nor uniform point at which growth becomes negative. However, they do find that high and increasing levels of public debt will contribute to a lower growth rate. Applying this conclusion to the initial assertion proposed by RR, it is evident that there is not a defined ‘tipping point’ at the 90% level.

‘Public debt, economic growth and nonlinear effects: Myth or reality?’ Egert (2015)

Directly tests the thresholds proposed by RR. Egert uses the public debt data provided by RR and a macroeconomic data set on economic growth in the same years 1946-2009. Notably, Egert regresses debt as a lagged effect (debt in the time period $t-1$), which is helpful to eliminate the simultaneity issue presented above. The author subsequently tests the thresholds provided by RR (30,60,90), but also attempts to find a natural threshold point at which the negative growth pattern occurs. As in Chudik et al. (2013), they use a grid search, and tests for statistically significant difference in growth above and below the threshold using a bootstrapping method, ultimately finding that there is no statistically significant threshold at 90%. This rejects the claim put forward by RR.

Concluding Remarks

Having considered some academic and methodological criticisms of RR’s method and findings, it is clear that the 90% threshold is not as robust as initially thought. The results are weakened significantly given the lack of econometric model to back it, and therefore the inability to account for endogeneity and nonlinearity issues. Further, the excessive simplicity of RR’s model, computing simple means and median with basic weighting has distortive effects owing to the data used.

The strengths of some of the academic criticisms and models have been the ability to account for simultaneity (Chudik et al., Egert) as well as the use of heterogeneous panel data, which is more effective at accounting for the variation between country characteristics. In all academic criticisms, it is evident that RR's findings amount to stylised facts as opposed to theoretically and empirically grounded rules and hence the subsequent austerity policies resulting from their findings cannot be justified on such grounds.

Considering the dataset that RR had used, and focusing primarily on the advanced economies, a model which allowed for heterogeneous panel data would be most effective for demonstrating the variation in country characteristics (between effects) and each country-year (within effects). Accounting for the former, differences in countries' situations - ranging from internal economic weakness to political instability, can contribute to a more holistic view of the relationship between growth and debt. In terms of the latter, determining the differences on a year-on-year basis accounts for changes in business cycles.

Multiple econometric and statistical methods are evidently effective for assessing the existence of thresholds and relationship, but particular emphasis when considering where thresholds exist should be deferred to those that can account for endogeneity and the dynamic nature of economic growth - so the use of time lags is a strength benefitting the research question here.

Further, if attempting to answer the question of whether a threshold or 'tipping point' exists at all, it is first important to denote that any statistical inference will require some assumption of distribution. In most cases, common F tests are used to determine whether such tipping point exists though this requires normal distribution assumptions. Rather, bootstrapping circumvents this by repeatedly resampling from the observed data to construct an empirical distribution of the test statistic, deriving critical values directly from the data rather than from assumed distributional properties. It is noted though the vulnerability of bootstrapping to noise in data. RR's methodology is notably absent from any statistical method to determine this threshold point, relying on the data speaking for itself.

Despite this, it is important to note that the discussion on whether growth declines after reaching 90% level of public debt is purely academic. The notion that there may ever be an unconditional 'tipping point' seems naive, rather, debt's effects on countries are context-specific. RR themselves did not endorse the austerity policy. Rather, their results simply influenced austerity policies and politics at the time, justifying severe fiscal contractions. It is understandable though that policymakers are motivated by having a certain benchmark, in this case 90%, upon which they can base their policy proposals upon and assert explanations for contemporary issues.

Overall, the 90% threshold is *not* singular benchmark for fiscal sustainability though in many cases, there is an observed negative empirical correlation between the level of economic growth and public debt. Therefore, given RR's threshold is untenable, we cannot use this data to justify loose fiscal policies or austerity. This is not to say however, that the findings are fruitless, especially when considering the immense academic debate and criticism arising from it. Rather, there is importance in discussing threshold and trajectory effects of acquiring public debt on

economic growth. However, rather than understanding a binary ‘tipping point’ effect, policymakers can be made more aware of their spending and taxation, doing so within conservative limits rather than either extremes

IV. An Empirical Illustration of Austerity on Growth

We construct a ‘synthetic’ UK using a weighted average of a select group of countries that did not experience significant austerity in the aftermath of the global financial crisis, which forms a ‘donor pool’. The weights for each country in the donor pool are selected using the synthetic control method (SCM) so that the synthetic UK closely resembles the treated unit’s (UK’s) real GDP trend, i.e. the actual real GDP trend of the UK between 1992 and 2009 inclusive.

Figure 1 shows the trend of real GDP in terms of millions of 2017 USD for the synthetic UK (denoted as synthetic) and the actual UK trend (denoted as ‘treated’). The divergence in the aftermath of the Global Financial Crisis in 2008 is clearly followed by an exacerbation of the gap after austerity was introduced in 2010.

Figure 2 more clearly shows this using a gap plot, depicting the difference in the real GDP between the synthetic and the actual UK trend. Since 2009, the gap between the two groups has diverged (likely a problem reflecting the fact that these countries did not experience a recession as severe as the UK). However, this divergence is made worse after 2012, providing support for the story that the austerity may be part of the driver that negatively affected the output trend in the UK.

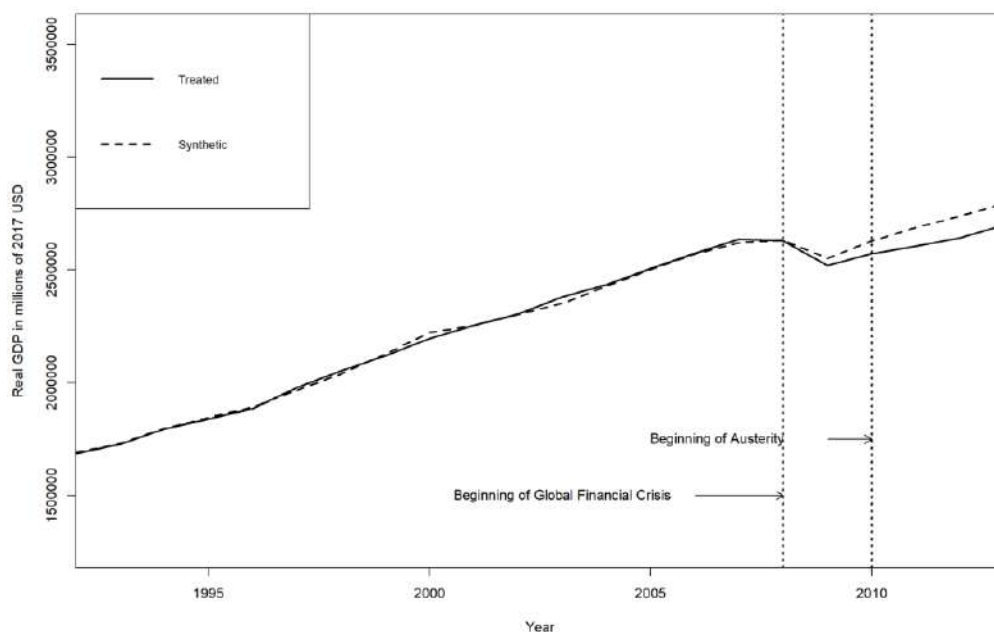


Figure 1

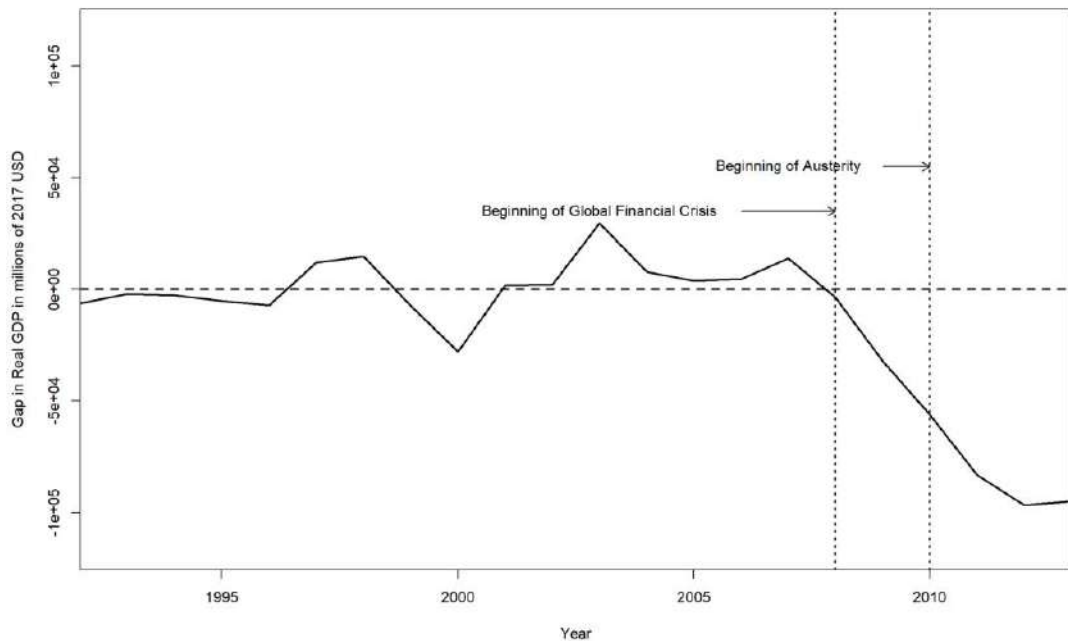


Figure 2

The Theoretical and Empirical Link Between Debt Sustainability and Growth

For the trajectory of government debt to be sustainable, it is imperative that the following condition is satisfied:

$$r < g - \varphi$$

where r denotes the real interest rate of the debt payment, g the growth rate of the economy and φ the sensitivity of the real debt interest rate on the debt level.

Intuitively, the variable $r + \varphi$ captures the increase in real debt payment over a certain time period, while g captures the growth in the government's real repayment capacity over the same period of time. By having the latter exceed the former, we are able to grow the deficit while ensuring that the improvement in repayment capacity covers the increase in the need for repayment, ensuring debt sustainability even in the face of deficit.

Currently, the level of uncertainty is high both internally and externally for the UK economy. The tariffs from the Trump administration, combined with the heightened geopolitical risk facing Europe, likely will translate to more uncertain economic growth. We expect this will cause private investors to invest more in government debt as it is considered to be a relatively risk-free asset option, leading to an increase in the supply of loanable funds that adjusts r downwards.

By construction, Mian et al. (2025) finds that when the debt-to-GDP ratio (henceforth 'd') is already high, a given percentage rise in GDP lowers d by less than an equal percentage rise in debt raises it, since the same proportional change has a larger effect when applied to a large numerator (debt) than to the denominator (GDP). As such, the heightened uncertainty means that the UK will likely see its fiscal headroom reduced in the near future, making it a more urgent mission to ensure debt sustainability using its various fiscal apparatus. The following subsection will review current theories on how a country like the UK could achieve this primarily through ensuring a high level of g .

Labour income tax

The optimal labour income tax schedule is highly controversial, not because the fundamental theory is unclear, but rather that when applied in practice, how the theory manifests itself is rarely clear. The theory of optimal taxation, as introduced by the Mirrlees framework considers the government and the taxpayer as two agents in a game of imperfect information, where the government's objective is to ensure those with higher ability are taxed more, but the system is set up in such a way as to not induce the high ability individuals to evade taxes by pretending to be low-ability. In the context of growth, it is also imperative that individuals exert as much effort as they can, in order to maximise productivity and the rate of g .

This framework of taxation means that the optimal taxation should not only depend on current earnings, but rather on the history of earnings. This is because income only offers a snapshot of an individual's life cycle ability profile, which, considering the history of earnings, provides a more comprehensive picture of the 'true' ability of an individual (hence closing the possibility of high ability individuals pretending to be low ability).

However, the optimal marginal labour income tax structure is highly sensitive to the assumed distribution of ability. Using a lognormal distribution to model the distribution of those with high ability, Tuomala (1990) finds that the optimal labour income tax should be decreasing with respect to income, as the gains from efficiency outweigh the cost associated with redistribution. By contrast, academics like Saez (2001) reach the conclusion that the optimal income tax rate should not only be increasing, but be as high as 80% in some of his estimates. Mankiw et al. (2009) attribute these drastically different conclusions to the fact that Saez used a Pareto distribution when modelling the distribution of high-ability individuals in an economy (rather than a lognormal distribution). Empirically, the latent abilities of individuals, including measures such as IQ, are typically thought to be closer to a lognormal distribution while the realised outcomes, such as income and test scores, are thought of as closer to a Pareto distribution.

Another aspect of consideration is that the marginal labour income tax rate should be higher for groups with lower elasticity of substitution for labour supply, typically called Frisch elasticity (i.e., those whose hours worked decision is less sensitive to effective wage changes—perhaps induced by tax rate changes). In practice, this means that the tax system should leverage various “tags” to distinguish between groups with different elasticities. This has three practical implications of note. Firstly, the marginal tax rate should be lower for those just entering the workforce and those near

the retirement age, i.e., “hump-shaped” in age. Secondly, the marginal tax rate should be decreasing in household assets, as individuals with a higher value of household assets could afford to live off savings income, and are thus more likely to adjust their labour supply decision at the extensive margin and exit the workforce when the wage rate decreases. Thirdly, the rate should be lower for individuals from households with more than one wage-earner. The reason for this is intuitive: with more earners, it means that the taxpayer is able to quit while being supported, affording them more outside options compared to working. Some work has gone further and argued that based on the different Frisch elasticity, males and females should, in theory, experience different marginal tax rates, although Mankiw and coauthors make the point that tags based on inherent characteristics of an individual are infeasible in practice, as voters would typically object to such a tax system. A more just distribution is one in which such tags were based upon acquired characteristics.

The literature on Frisch elasticity further implies that the marginal tax rate could be set quite high, especially for high-income individuals. One study found no statistically significant effect on an individual’s decision to quit from the labour force, co-occurring with a significant but low Frisch elasticity. However, Feldstein (2012) argues that much of this literature fails to take into account the long-term effect of tax rate changes on an individual’s occupation, human capital, and other decisions. The existing literature seems to suggest that a higher tax rate lowers the return to working, which serves to disincentivise human capital accumulation, which by itself further lowers labour supply (Blundell et al., 2016). As such, over the long term, the estimate for the elasticity would be underestimated if the effect of human capital were not taken into account (Muslim, 2023).

Another aspect to consider for the debate is one that concerns the administrative burden of the tax system. Slemrod argues for a relatively flat labour income tax schedule due to the high administrative cost associated with enforcing a progressive income tax system, as it requires staff and resources to be put into checking the income eligibility of each of the filer¹⁶. In the UK context, HMRC spent £4.3 billion in tax collection for the fiscal year 2023-24 (NAO, 2017). This figure would likely decrease drastically in the context of a flatter labour income tax system. However, a significant problem with this proposal likely lies in its political feasibility. Bierbrauer et al (2021) found that the most politically feasible income tax reform is one that is monotonic, i.e., tax either increases or decreases for each and every person, and those with higher income see greater tax increases or reductions. Between 1981 and 2016, it is found that 77% of all tax reforms are monotonic in this sense (ibid.).

Even without considering the administrative cost of tax collection, Mankiw et al. (2009) in the same paper still reached the conclusion that the optimal income tax structure is one where the marginal rate is flat for all income. However, this has a negative impact on redistribution, which could perhaps be remedied by pairing with an equal transfer to all taxpayers. This would be progressive as the transfer would take up a greater proportion of income for the low-income group.

Whatever the specifics of the reform are, it is relatively uncontroversial to argue that the UK tax system requires significant change so as to ensure that the growth rate g is kept high. At the

moment, low-income individuals face significant effective tax rates due to the phasing out of benefits programmes. This is despite high work subsidies relative to other OECD countries, which should push the effective wage rate above the reservation wage, encouraging labour force participation and thus production. A single-parent household with two adolescent children faces an effective marginal tax rate of 77.68% (Maniquet and Neumann, 2021). This significantly reduces the incentive to work, as an individual earning every additional pound only takes home about 22 pence. A more recent estimate for 2025, before the most recent budget, suggests that individuals earning £40,000 a year face an effective marginal tax rate above 40%, while those earning around £60,000 face an effective marginal tax rate close to 70% (Pepin-Hall, 2025). This significantly impedes the incentive to work, adding strains to the ability of ensuring fiscal sustainability by maintaining a high g .

Value Added Tax

Another popular tax system among economists is Value Added Tax (VAT). Mankiw and coauthors in the same paper suggest that the optimal VAT schedule should be one that is uniform in proportion for all final goods (Atkinson and Stiglitz, 1976). This is so that the relative prices are not being distorted, leading to inefficient resource allocation that would impede production and thus the growth rate g in our equation of debt sustainability. In addition, VAT should be zero for all intermediate goods (Diamond and Mirrlees, 1971), except for those that generate externalities. This is so that all production happens at its most efficient scale and that no deadweight loss is created, as deadweight loss often is created in such a process. The Mirrlees Review calculated that this rate should amount to 17.5% for all goods (Mirrlees, 2010).

Correia (2010) reframes consumption taxes like VAT as a lump-sum tax on both labour and capital income sources. In addition, VAT exerts the same marginal effect on labour and on capital income, making the tax efficient. This is because wealth and income are both potential purchasing power for consumption, and as such any tax imposed on consumption effectively drives down the returns to both working and to capital income equally. The authors further argue that not only is VAT efficient, it is also equitable in the sense that, as VAT acts on all income able to be used for consumption, including wealth, but those with the highest wealth will bear the brunt of the burden.

The complexity of the VAT tax, with their various exemptions and loopholes, means that the UK collects far below the maximum amount of VAT it could be collecting (taking into account also the cost of enforcing all the exemptions). Brockmeyer et al (2024) gave the example of woollen clothing: all woollen items of children's clothing are tax free, except for those coming from Yemen, Tibet and Mongolia. These exceptions add enforcement costs to the VAT system.

Capital Income and Corporate Tax

The matter of capital income and corporate tax has always been controversial. Conesa et al. (2009) argue that after considering the long-run household borrowing constraint as well as the possibility of uninsurable and unique income shocks, the optimal uniform capital income tax rate should be positive at 36%.

They argue that this kind of positive capital income tax has three desirable properties. Firstly, as individuals at the early stage of their work-life have relatively little capital income, their borrowing constraint is relaxed, thus driving up consumption. What this does, in the frame of the debt sustainability equation, is that the growth rate variable g is driven up in the short term.

Secondly, capital income tax can be thought of as an implicit labour income tax that uses age as the “tag”—echoed by Karabounis (2016) when discussing the optimal design of labour income tax: the capital income tax reduces the future value of this saving, acting as an effective tax on their earnings at the moments when decisions to save are being made. This then distorts their effort of working at those moments; when individuals are older, they save less, which means that the capital tax distorts their labour effort less. This serves to minimise distortions on labour supply, as the optimal taxation principle of taxation (that those with higher ability and lower elasticity of labour substitution are taxed more) is being followed, which in turn positively impacts g .

Thirdly, as mentioned previously, the fundamental problem with tax design is that high-ability individuals have the incentive to feign being an individual with low ability to avoid taxes. They could afford to do so by having their capital income compensate for their loss of labour income. A capital income tax, on the other hand, as highlighted by the Mankiw et al., could make this costly to the high-ability individual, preventing some degree of distortions in work effort caused by the labour income tax system.

However, the positive rate of capital income tax is not without critique. A practical objection is found in Feldstein. He makes the point that in practice, it is difficult to evaluate the value of all capital and assets. Examples of this would be real estate that is not for sale and small businesses. An alternative would be taxing corporations at the point of transaction. However, in this case, the problem persists: the tax revenue is impacted by the “lock-in” effect, where investors are incentivised to hold onto assets instead of selling them, thereby creating distortions in the timing of transactions. This also incentivises selling the asset at the point of lower evaluation in order to optimise tax savings, thus reducing the potential revenue to be collected (Feldstein, 2012).

In addition, a capital income tax will raise the cost of investment, which will likely produce some of the opposite effects compared to the investment tax credit. Lerche (2025) estimated that in the German context, lowering a firm’s investment cost raises its capital stock and employment, with spillover effects on the general equilibrium leading to doubling the effect on employment. Conceivably, this implies that imposing investment tax will hurt firm production and employment, putting downward pressure on g that could further shrink the UK’s fiscal headroom.

If the UK’s current investment or tax on capital income were to be reformed, the US tax reform of 1986 provides some valuable lessons. Ballentine (1992) points out that the 1986 reform failed

to prioritise revenue collection on the old existing capital. As they are already formed, imposing higher taxes on them will not distort capital accumulation decisions, and by extension production.

According to Feldstein, it is worse to tax dividend income if the government is seeking to maximise tax revenue. Currently, the UK taxes all dividend income received above £50,029. Feldstein suggests that the dividend income encourages retention of earnings, which prevents the flow of capital from investors to efficient sectors of the economy (Feldstein, 2012), hindering growth as a result.

In addition, Feldstein further argues that having a separate corporate tax and labour income tax system, a tax wedge (where individuals shift income between their registered business and personal income account to take advantage of the advantaged tax rate, rather than doing so with the intention of maximizing personal productivity) is created. Indeed, in the UK context, Devereux et al. (2014) estimates that high elasticity of corporate taxable income to corporate tax is driven primarily by a shift between personal income and corporate profit, and this creates a deadweight loss equal to about 29% of the tax revenue. As such, he proposes a system where corporate income is considered to be part of the labour income of the owners. This effectively eliminates the wedge, allowing investment decisions in firms to be based more on productivity concerns rather than on minimizing tax payment.

Additionally, Link et al. (2024) highlights the fact that corporate tax also lowers the after-tax net present value for investment projects. As only projects with positive net present value would be invested, the marginal project becomes unprofitable on net, leading to a reduction of investment. Specifically in the German context, another OECD country, an average of 3 percentage points increase is recorded for the share of firms deciding to invest less than previously planned after every tax hike.

Another common argument against the implementation of corporate and wealth tax in general is the possibility of capital flight, where assets and capital owners take advantage of the international mobility of capital and move investment to countries with lower capital and corporate tax rate (Mankiw et al., 2009). However, the extent of the capital flight response has been questioned. Jakobsen et al. (2024) found that for every 1 percentage point increase in the top wealth tax rate, aggregate employment, investment and value-added in the economy studied decreased by no more than 0.1%. Any efficiency cost from wealth tax hike does come more from tax evasion and avoidance than any migratory response by the entrepreneurs. They additionally calculate that in the absence of a wealth tax, productive spending will have to be reduced, which will likely reduce the number of jobs created from such spending and thus reduce the fiscal revenue that can be generated using spendings from these jobs. The fiscal cost of this reduction in jobs amounts to around \$340,000 per job on net, providing strong evidence that in the context of debt sustainability, maintaining such a tax is more beneficial than abolishing it.

Spending and the Multiplier

After focusing on the revenue side, it is important to examine the argument for the spending side of the fiscal apparatus. This section will first make the case that in contrast to neoliberal ideas of

a small government, government spending, if done correctly, can be highly effective in growing the economy by considering the empirical estimate for the size of government fiscal multiplier. Linking back to the Mian et al. equation in the introduction, although spending may push up r , it will do so while raising g to more than offset the corresponding increase. The section will then move on to consider opportunities specific to the UK, which can be exploited by the government to grow the economy via fiscal spending.

To start off, Berg et al. (2012) outlines a growth model where government spending enters the production function of an economy. As a result, an increase in productive spending will increase the marginal product of private capital, resulting in a crowding in of private capital following an increase in productive public spending, which gives rise to a supply-side multiplier greater than 1. Indeed, in its World Economic Outlook in 2014, IMF estimates that the public investment multiplier is between 1 and 1.3 (IMF, 2014). A meta-analysis in 2015 also found that even as the public spending multiplier in general is close to 1, public investment multiplier is about 0.5 units higher (Gechert, 2015).

It is worth mentioning that the multiplier value is higher, rising to close to 2 when an economy is stuck at zero lower bound (when the nominal interest rate of an economy is around 0). Intuitively, one potential reason is that the additional demand of loanable funds coming from public investment does not push up the real interest rate of an economy—due to the surplus of loanable funds—resulting in an absence of crowding out of private expenditure. In addition, linking to the UK context, the UK's total fixed investment has averaged only 19% of GDP, in the 40 years since 1979, ranking it bottom among all OECD countries³⁶. This suggests that compared to its peers, the UK has huge potential, requiring the government to tap into in order to unlock. The reason for this has long been subject to academic debate. But it is often attributed to a lack of external financing and anaemic public investment, as well as idiosyncratic shocks such as Brexit that adds to business uncertainty (Carella et al., 2023)

However, it is also the case that import represents a source of leakage from the country's circular flow of income (defined as a source of income generated in the economy but is diverted out of the domestic economy, rather than being spent on domestically produced goods and service). The study also found that a 1 percentage point increase in the import-to-GDP ratio lowers the multiplier by 0.01-0.02 units due to leakage. The ratio for the UK stood at 33.4% in 2024, slightly above the OECD average of 31.5³⁷. As such, the UK may benefit less than its peers when it comes to public investment multipliers.

Yet, the UK government could remedy this by targeting areas of investment with particularly high values of multipliers. Deleidi and Mazzucato suggest that high multiplier values are typically associated with mission-orientated R&D, where the government invests to solve a specific societal or technological problem³⁸. They argue that public investment in this area sends a signal to the market, resulting in a crowding in of private investment due to the expectation that the government spending in this specific mission will raise the return to private investment. When this happens, the multiplier rises from the most optimistic estimate of between 1.5 and 2³⁹ to 5.76 in the case of the US³⁸.

Arguably, this is particularly relevant to the UK as it stands at the crossroad of global green and AI transition. The Green Alliance estimates that an extra £500 billion is needed for over 150GW of offshore wind energy generation capacity in order to make the UK completely self-reliant, even becoming a net exporter, on electricity⁴⁰. In addition, it is estimated that in order to satisfy demand from Data centres, power generation capacity needs to grow by six-fold between now and 2035⁴¹. This provides ripe opportunities for the UK government to take initiative and boost growth by taking advantage of these potentially “mission-orientated” areas of investment.

To sum up, the literature suggests the multiplier value associated with government spending is likely significantly greater than 1. Combined with the UK’s unique context—where its low fixed investment level provides huge untapped opportunities compared to its peers, and its position at the beginning of the green and AI transition—this likely means that the UK government should consider fiscal spending as a positive boost to debt sustainability due to its highly positive impact on raising the level of g .

V. Evaluating Case Studies of Fiscal Discipline

As Section 2 showed, fiscal discipline can have many different effects based on the specific policies chosen. This section now compares policies across three historical cases of fiscal discipline to attempt to find lessons for ‘successful austerity’:

1. The UK in 2010–19, in response to the 2008 financial crisis, after the formation of the Cameron-Clegg administration in May 2010;
2. Sweden in 1993–2000, in response to the 1990 housing bubble crisis, after the passage of the first major austerity bill in September 1992; and,
3. Ireland in 1987–95, in response to economic weakness and high debt in the 1980s, after the formation of the Haughey administration in March 1987, and preceding strong growth from 1995 (known as the ‘Celtic Tiger’ period).

The latter two cases have received praise as models of fiscal discipline that also enabled strong growth.

Key Indicators

The table below presents 13 numerical indicators of socio-economic performance to identify core differences in the outcomes of fiscal discipline:

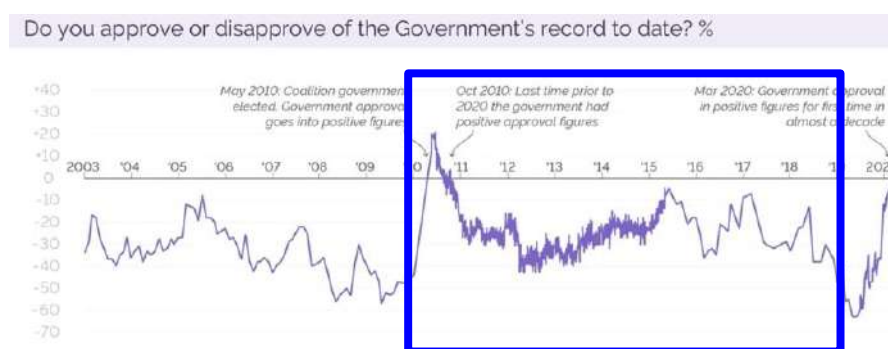
Indicator	UK 10s	Sweden 90s	Ireland 80s–90s
<i>MACROECONOMIC</i>			
Public debt (% of GDP)	2010: 75.9% 2019: 85.7% +1.09 p.p. p.a.	1993: 66.1% 2000: 50.4% -2.24 p.p. p.a.	1987: 108.3% 1995: 78.5% -3.73 p.p. p.a.
Real GDP (billion domestic currency)	2010: 2,081 2019: 2,474 1.94% growth p.a. (base 2022)	1993: 3,183 2000: 4,106 3.70% growth p.a. (base 2024)	1987: 73.6 1995: 107.7 4.87% growth p.a. (base 2023)
Real GDP per capita PPP (thousand intl. dollar, 2025)	2010: 37.66 2019: 49.94 3.19% growth p.a.	1993: 20.78 2000: 29.89 5.33% growth p.a.	1987: 11.94 1995: 21.70 7.75% growth p.a.
Unemployment rate	2010: 7.9% 2019: 3.8% -0.46 p.p. p.a.	1993: 11.2% 2000: 6.3% -0.70 p.p. p.a.	1987: 18.8% 1995: 14.1% -0.59 p.p. p.a.
<i>INCOME AND WEALTH DISTRIBUTION²</i>			
Post-tax income share (lowest 50%)	2010: 33.2% 2019: 32.5% -0.08 p.p. p.a.	1993: 40.0% 2000: 38.7% -0.19 p.p. p.a.	1987: 33.6% 1995: 32.1% -0.19 p.p. p.a.
Wealth share	2010: 5.0%	1993: 10.1%	1987: -2.5%

¹ “IMF Data,” International Monetary Fund, accessed December 2025, <https://www.imf.org/en/Data>.

² “Data,” World Inequality Database, accessed December 2025, <https://wid.world/data/>.

Indicator	UK 10s	Sweden 90s	Ireland 80s–90s
(lowest 50%)	2019: 4.7% -0.03 p.p. p.a.	2000: -4.7% -2.11 p.p. p.a.	1995: -2.5% -0.00 p.p. p.a.
Post-tax income share (lowest 20%)	2010: 11.5% 2019: 11.1% -0.04 p.p. p.a.	1993: 14.6% 2000: 13.6% -0.14 p.p. p.a.	1987: 10.3% 1995: 9.7% -0.08 p.p. p.a.
Wealth share (lowest 20%)	2010: -0.6% 2019: -0.2% +0.04 p.p. p.a.	1993: 1.9% 2000: -6.2% -1.16 p.p. p.a.	1987: -4.5% 1995: -4.5% -0.00 p.p. p.a.
<i>SOCIAL WELLBEING⁷</i>			
Life expectancy (years)	2010: 80.40 2019: 81.37 0.13% growth p.a.	1993: 78.06 2000: 79.64 0.29% growth p.a.	1987: 74.43 1995: 75.47 0.17% growth p.a.
Net secondary enrolment	2010: 96.2% 2017: 97.1% ⁴ +0.13 p.p. p.a.	1993: 90.5% 2000: 95.5% +0.71 p.p. p.a.	1991: 78.0% ⁵ 1995: 82.9% +1.23 p.p. p.a.
Gross tertiary enrolment	2010: 59.8% 2019: 65.5% +0.63 p.p. p.a.	1993: 38.9% 2000: 67.6% +4.10 p.p. p.a.	Data not available; sources show modest growth in enrolment ⁶

Charts of approval ratings for the governments in power are also shown below:



³ “DataBank,” World Bank Group, accessed December 2025, <https://databank.worldbank.org>.

⁴ Data for 2018 and 2019 are not available.

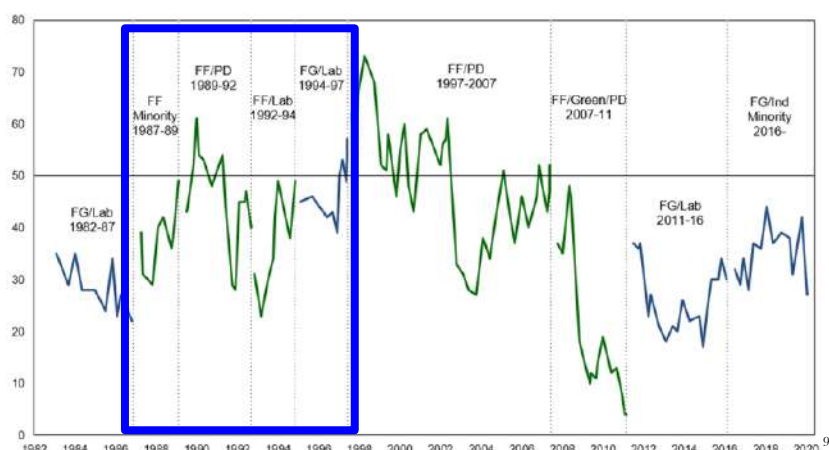
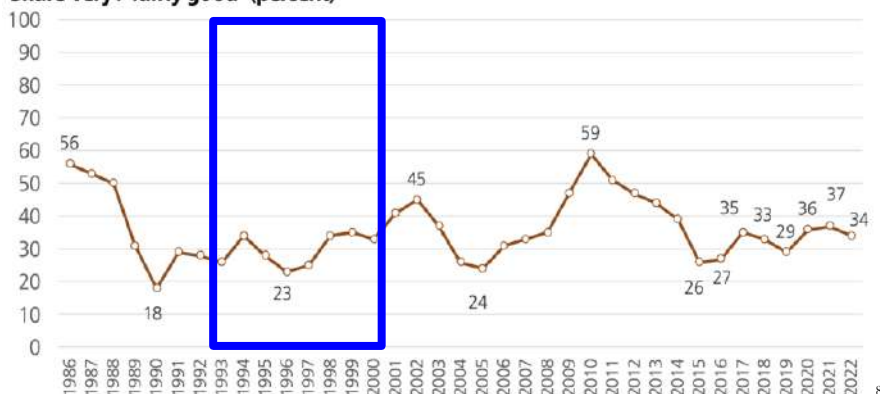
⁵ Data for 1987 to 1990 are not available.

⁶ “Census of Population 2016 – Level of Education,” Central Statistics Office, 2016, <https://www.cso.ie/en/releasesandpublications/ep/p-cp10esil/p10esil/le/>; proportion of citizens with ‘third level’ education increased from **13.6%** in 1991 to **19.7%** in 1996, an increase of **1.22 p.p. p.a.**

⁷ Chris Curtis, “For the First Time in Nearly a Decade, Britain Approves of Its Government,” YouGov, April 2, 2020, <https://yougov.co.uk/politics/articles/28796-first-time-nearly-decade-britain-approves-its-gove>.

The governments job performance

Share very / fairly good (percent)



Sweden and Ireland outperformed the UK in:

1. **Public debt:** in both Sweden and Ireland the debt-to-GDP ratio decreased substantially, while in the UK the ratio increased;
2. **Economic growth:** GDP growth rates were higher in both Sweden and Ireland than in the UK;
3. **Education:** university enrolment grew fastest in Sweden, and secondary enrolment grew fastest in Ireland, while the UK had slowest growth in both.

Politically, the charts above show that satisfaction in government performance fluctuated in all three cases, with similar low points of 20–30%. While comparisons are complicated by the diversity of challenges faced in part by Ireland and the UK, including European relations and social issues such as abortion and policing, the data does suggest that fiscal consolidation is rarely beneficial for governing parties.

⁸ “The National SOM Survey Cumulative Dataset,” Swedish National Data Service, accessed January 8, 2026, <https://researchdata.se/en/catalogue/dataset/snd0905-1>.

⁹ “The Irish Times Poll,” The Irish Times, n.d., <https://www.irishtimes.com/politics/poll/>.

However, this section also suggests that well-designed policies can limit polarisation and the growth of anti-establishment sentiments. In Sweden and Ireland, while the Sweden Democrats and Sinn Féin started gaining votes and would become major parliamentary players in the 2010s and 20s, they only joined parliament in 2010 and 1997 respectively with limited seats. In the UK, however, the Jeremy Corbyn-led Labour Party's anti-establishment platform in 2017 successfully gained 40.0% of the vote (Bate et al., 2019). This section will explore how various economic policies impacted citizens' perceptions of institutional exclusion and trust.

Production

Section 2 cited Deleidi and Mazzucato's argument that targeted spending, such as mission-oriented R&D investment, could help crowd in private investment via signalling. Contrary to impressions of the association between fiscal discipline and neoliberalism, all three of Sweden, Ireland and the UK enacted measures to boost industrial development. However, Sweden and Ireland were more successful at achieving short-term growth and consolidating social cohesion based on this.

Sweden

One of the most important macroeconomic events Sweden faced in the 90s was joining the European Union and its single market in 1995. This created favourable environments for investment inflows via cross-border regulation alignment, as FDI inflows increased from 1.7% of GDP to 8.7%, but also exposed domestic industry to more competition. Sweden's main economic task was arguably to direct investment towards productive sectors and boost its industry's international competitiveness.

The main pillar of Sweden's interventions was labour competitiveness. In terms of skill, labour training programmes were updated to emphasise computer skills; and the 'Knowledge Lift' scheme was introduced to subsidise undereducated workers to receive secondary education, which more than 10% of the workforce participated in (Nuder, 2012). In terms of wage, the 1997 collective bargaining agreement adopted the wages agreed upon by the sector most exposed to international competition as the national norm (Chabert and Clavel, 2012). This aimed to protect industries most in need from cost pressures.

Intervention was catered not just towards boosting labour competitiveness but also expanding access to work. Labour training programmes were simultaneously means to boost business' productivity and to assist underprivileged workers to participate in new knowledge-heavy job opportunities. Moreover, by subsidising employers who hired long-term unemployed workers, it ensured the employment of almost 2.5% of the workforce by 1995 while helping businesses expand capacity (Nuder, 2012).

State intervention in labour was complemented by privatisation in public utilities. In particular, services that functioned as production inputs, such as electricity, rail and telecommunications, introduced private business alongside existing public enterprise (Folster and Kreicbergs, 2014). According to the Reform Institute's modelling, such privatisation has lowered the production

costs for business relative to neighbouring economies or to hypothetical cases without privatisation (ibid.).

Ireland

Despite pursuing a strategy of fiscal consolidation, Ireland maintained its active support for industrial development. For example, the Industrial Development Authority, which started attracting data processing and software firms like Microsoft to invest in Ireland during the early-1980s, continued its liaison with US enterprises in these sectors during the early 1990s (Burnham, 2003). The telecommunications firm Telecom Eireann also remained state-owned rather than privatised, helping protect it from competition as it built up infrastructure and achieved its first profitable year in 1988 (ibid.).

However, Ireland also reformed its industrial programs to correct past shortcomings. One problem was low levels of foreign investment, deterred by high indebtedness and tax rates during the 1970s and 80s. While general spending cuts boosted investor confidence, corporate tax cuts, including expanding the 10% concessionary rate to various enterprises in Dublin's International Financial Services Centre in 1987, also helped attract foreign investors (ibid.). While Ireland's reputation of economic weakness may have limited the extent of growth in investment inflows, this still increased considerably from 0.5% of GDP in 1989 to 2.1% in 1995.

Though investment inflows were low compared to other economies in the early 1980s, much profit was repatriated overseas, leading to criticisms of the state being too lenient towards multinationals (OECD, 1987). Thus, other reforms aimed to include domestic interests in the economic process. For example, the Programme for National Recovery during 1987–90 brought together various economic actors, including employers and trade unions, to reach national agreements on a range of issues including wage levels and welfare systems via centralised bargaining (O'Donnell, 1998). This aimed primarily to balance issues of limited wages under profit repatriation against concerns of rising wage costs, but also to alleviate general concerns that fiscal consolidation would be detrimental to grassroots livelihoods (OECD).

Another problem was inefficient use of public funds, which created budget burdens without boosting industry performance. Changes in funding methods indicated the state's new focus on profitability and performance. Replacing grants with equity gave the state greater stake in profit-sharing and likely placed

The UK

State intervention in the UK focused on sector-specific funding. The government focused on industries most relevant to future growth and social health, including low-carbon cars, biotechnology, and artificial intelligence (Owen, 2024). These industries received funding from UK Research and Innovation, channelled through various public and private bodies including Innovate UK and the Faraday Institute (Owen, 2024). However, this funding was inconsistent. While R&D spending from the government initially increased from £3.59 billion (2021 prices)

in 2010 to £4.08 billion in 2013, it again decreased to £3.23 billion in 2019 (Office for National Statistics, 2021).

Simultaneously, stagnation in FDI may have limited industrial growth. FDI inflows constantly vary between 1% and 3% of GDP, and this was perhaps caused by geopolitical uncertainties surrounding Brexit which weakened investor confidence in Britain's long-term outlook (DataBank). A consequence of this was that employers had difficulties expanding capacity and absorbing trained workers (Sissons and Jones, 2016). While local businesses increased their R&D spending from £13.5 billion (2021 prices) to £20.7 billion, stagnating public and foreign funding strained these private resources (Office for National Statistics, 2021).

Mixed results in labour training may also have limited growth. The Institute for Fiscal Studies found that public investment in adult skills training decreased by around 50% in real terms, resulting in a decrease in participation in publicly funded qualifications of around 40% (Tahir, 2023). While participation in employer-provided training increased, inconsistent funding meant that trainees averaged only 6 days of training in 2019, compared to 8 in 2011; and average per-trainee investment also decreased by 27% (Tahir, 2023). This suggests that emerging technology industries lacked the resources required for short-term expansion.

Comparison

Sweden's greatest advantage lay in its ability to attract foreign investment. While this benefitted from factors beyond executive policy, including a devalued currency and generally strong global economy, Sweden took advantage of these favourable conditions through policies that trained competitive labour and lowered production costs (Chabert and Clavel, 2012). Without government policy to improve Sweden's factors of production, liberalisation via entering the European Common Market and unpegging the Swedish krona would likely have had lesser effects on attracting investment.

While Sweden's intervention strategy focused on improving production inputs, Ireland's focused on improving the efficiency of ongoing industrial policy. Growing emphasis on efficiency and profit suggested influences from contemporary New Public Management thinking, further reinforced by the government's decision to recruit businessmen to lead Telecom Eireann (Burnham, 2003). While the continuation of industrial policy was enabled by generous funding from the EU, a philosophical shift in funding approaches was necessary to achieve industry maturation and profitability (Honohan, 1997). Moreover, given the poor reputation of the Irish economy in the 1980s, active state-led funding and marketing was perhaps more necessary to create signalling effects for private investors than in Sweden.

Despite different philosophies towards supporting industry, Sweden and Ireland similarly sought to include grassroots in industrial strategy for political stabilisation. Particularly in Sweden, labour training broadened access to new jobs and strengthened linkages to improved living standards. In both countries, collective bargaining also built perceptions of grassroots inclusion, helping to mitigate grievances against governance institutions and establishment parties amidst pushback against welfare spending cuts (Despite modest vote gains, the right-wing Sweden Democrats only

entered parliament in 2010; while political violence in Ireland was centred around ongoing tensions with Northern Ireland rather than inter-party confrontation).

In comparison, the UK's industrial strategy made perceptions of inclusive growth less feasible. As its choice of industries required higher technological sophistication, employment opportunities in these sectors were likely seen as less accessible for grassroots workers. Moreover, longer maturation periods may also have limited short-term growth and led to perceptions that government priorities were mismatched with citizens' needs, intensifying institutional distrust.

Taxation

Section 2 suggested two criteria for well-designed tax policies amidst fiscal discipline: different marginal rates based on Frisch elasticity, and simpler rules to reduce revenue loss. These two criteria form a wider goal of strengthening individual work incentives while broadening the range of taxable income. Sweden and Ireland had differing approaches towards the balance between work incentives and revenue collection, but they had similarly less complex systems compared to the UK, giving them considerable efficiency advantages.

Sweden

Sweden's major tax reform came in 1991, before the first major spending cuts in September 1992, under Carl Bildt's Moderate administration. The reform expanded the coverage of VAT and cut all labour income rates, with higher income levels having larger cuts (Agell et al., 1995). It also shifted away from high corporate income rates alongside fixed capital investment allowances as a means of investment stimulation, opting instead for a lower rate of 30% (ibid.). Moreover, whereas capital income had been taxed with labour income progressively, the 1991 reform created a separate flat capital income rate of 30% (ibid.). Including property in the capital income tax reduced the mortgage interest deduction rate from 47% to 30% (ibid.).

During austerity, the tax code was amended along similar principles: the capital gains rate was reduced to 12.5%, VAT rates were raised to 25%, and corporate taxes on energy and payroll were cut (Henrekson, 2017; Swedish National Tax Board, 2000; Fölster and Kreichbergs). There were also simplifications to the tax system, including the abolition of double taxation on dividends and a simplified income tax form (Agell et al., 1995). Interestingly, the government had innovative ways to tie taxation to industrial growth, most notably a tax deduction for workers who obtained home computers under employer-led leasing agreements (Levy and Lovegrove, 2009).

Ireland

Ireland enacted some similar tax reforms to Sweden during its fiscal consolidation. Notably, income and corporate taxes were simplified from three-rate into two-rate schedules, with a standard rate of 24% and a concessionary rate of 10% for manufacturers (Haughton, 2002). However, Ireland's other reforms suggest that it emphasised rate cuts over base-broadening, perhaps because its poor economic situation led it to prioritise individual income growth. For instance, it introduced tax exemption for child-bearing households, and a lower income limit under which citizens did not have to make social insurance contributions (Callan et al., 1998).

Moreover, it reduced rates for VAT, a tax with regressive effects, from 35% to 21% (Haughton, 2002).

One of the programmes highlighting Ireland's relatively concessionary approach to taxation was the 1988 tax amnesty, which allowed taxpayers to submit unpaid taxes without penalty by a set deadline (Baer and Le Borgne, 2008). Even as Ireland grew its tax monitoring capacity with technology and effectively broadened its base, its choices to not immediately penalise underpayers indicates that it prioritised a non-extractive reputation (Ibid).

The UK

The UK's reforms consisted of lowering direct taxes and raising indirect taxes. Relevant measures included reducing the highest income tax rate from 50% to 45%; raising the VAT main rate from 17.5% to 20%; and cutting the corporation tax main rate from 28% to 19% (Bourquin et al., 2019; Adam, Miller and Upton, 2024). However, some changes were inconsistent. For example, the higher-rate income tax threshold was lowered in 2014 then raised in 2019, and the North Sea fossil fuel profits tax rate was raised in 2011 then lowered in 2015 (Adam et al., 2024).

The record on base-broadening was also somewhat inconsistent. On one hand, the 2013 General Anti-Abuse Rule provided guidelines on identifying tax avoidance arrangements and helped reduce the tax gap (Pinsent Masons, 2023). On the other hand, raising the income tax personal allowance to £12,500 lowered the proportion of adults paying income tax from 61% to 58%, and increased the proportion of taxes levied on highest-income individuals (Adam et al., 2024). An increase in the number of schemes – including the High Income Child Benefit Charge, under-occupancy charge, and personal savings allowance – also contributed to variable tax burdens on households (Bourquin et al., 2019).

Comparison

The correlation between Frisch elasticity and marginal tax rates was seen most profoundly in Ireland. The Economic and Social Research Institute found that the poorest two deciles and richest decile saw the greatest growth in disposable income (5–7%), while the 4th and 5th poorest decile saw the greatest decrease (2–3%) (Callan et al., 1998). The poorest deciles' income growth is best explained by new allowances, while the richest decile's income growth is best explained by the removal of top rates in income and corporate tax. This provides an explanation for Ireland's strong growth under robust work incentives. However, revenue hovered between 25.5% and 27.5% of GDP, and muted increases may have limited the degree of debt reduction (DataBank).

Contrastingly, Sweden focused more on flattening marginal rates, considering that income and corporate tax rates were cut without new allowance schemes. The National Tax Board found that weaker redistribution effects may have reduced work incentives for low-income individuals, in particular for young people, as their disposable income reduced by 31% from 1991 to 1998 (Swedish National Tax Board, 2000). While this may have limited growth to some degree, solid growth figures suggest that work incentives were increased enough for highest-income classes.

Moreover, Sweden's reformed system became highly efficient at tax collection, as revenue grew from 15.5% of GDP in 1993 to 29.9% in 2000, contributing significantly to debt reduction (DataBank).

On both work incentives and revenue collection, the UK had relatively limited success. On one hand, while the Institute for Fiscal Studies found that all income deciles apart from the richest had more disposable income after direct tax changes, the increase was larger for higher-income classes, suggesting that work incentives were growing but not optimally distributed (Bourquin et al., 2019). This was possibly associated with political bargaining power, where middle classes were more able to bargain with politicians for lower taxes than low-income classes. Moreover, sharp decreases in income for the highest-income decile due to direct tax suggests weakened work incentives that may have limited growth (Ibid).

On the other hand, revenue hovered between 25% and 26% of GDP, and its increase was insufficient to substantially reduce debt (DataBank). This was possibly due to mismatches in income and corporate tax rates leading to tax wedge effects as argued by Feldstein, an increase in the number of schemes raising administrative costs and widening the tax gap, and rate cuts for corporate tax that were more rapid than that in Sweden and Ireland. The UK system's complexity is further contrasted by Sweden and Ireland's efforts to simplify their systems.

Tax complexity had political effects as well. Researchers from the Institute for Fiscal Studies have argued that a longer tax code has made the system harder to understand for taxpayers (Adam et al., 2024). Amidst generally weak confidence in the UK's future, especially amidst tensions with the EU, a complex tax regime was likely a contributing factor to perceptions that economic institutions were inaccessible. For instance, a study by the Carnegie Trust, though it was conducted in 2025 rather than in the 2010s, suggests that the regime's complexity increases public frustration over their perceived lack of agency, and leads them to believe that the tax system – alongside welfare spending cuts – aims at unjust extraction (Carnegie UK, 2025). Perceptions of tax wedge effects may also have reinforced perceptions that higher income classes were more adept at navigating the tax system, encouraging discourse around institutional inequality (Ibid). However, this did not mean that businessmen and entrepreneurs had no difficulties navigating the complex tax regime, and business confidence may also have been limited by investor uncertainty.

Education

Tertiary education provides considerable benefits for economies transitioning to knowledge- and technology-based industries, equipping students with skills and enhancing industry's technical maturity through research, given that institutions are oriented towards relevant expertises. By expanding access to and refining the design of higher education, Sweden and Ireland better supported short-term growth and youth inclusion than the UK even amidst the constraints of fiscal discipline.

Sweden

Swedish higher education was free throughout the 1990s, and expansion of access was supported by sustained funding; government spending on tertiary education increased from 25.3% of total education spending to 27.2%, while total education spending increased from 5.5% of GDP to 6.7% (Total). Fiscal consolidation led not to spending cuts, but to measures raising the efficiency and quality of institutions, for example tying funding to enrolment and academic performance (Börjesson and Dalberg, 2021). The geographical distribution of institutions also changed, with an increase in regional colleges that appealed to working-class people living outside cities and towns (Nuder).

Sweden also had policies that created linkages between education and industry. Whereas regional colleges previously focused on undergraduate teaching, legislation on research policy during 1997–99 allowed these colleges to receive direct research funds (Börjesson and Dalberg, 2021). Local industry leaders also participated in research, facilitating the alignment of research findings and technological improvements in industry (Nuder).

Ireland

Ireland's tertiary education strategy was similar to Sweden's, with a dual focus on capacity expansion and industrial linkage. Behind sustained support (government spending on tertiary education increased from 19.6% to 23.3%), new institutions such as the Dublin City University (1989) and regional technical colleges were built (DataBank; McTaggart, 2024). Regional technical colleges, in particular, charged lower tuition fees and allowed students to live with their families, thus being more accessible to lower-income students than universities; though higher-income students still found it easier to attend both types of institutions (McCoy and Smyth, 2011). Moreover, under the Free Third Level Fees initiative, tuition fees were halved in 1995/96 and abolished the next year (McTaggart, 2024).

For industrial preparedness, the regional technical colleges were designed to cater to regional labour demands since their inception in the 1960s (McCoy and Smyth, 2011). To boost their effectiveness, these colleges started offering undergraduate and postgraduate degree courses from 1992, on top of existing sub-degree programmes (Ibid). Moreover, in response to concerns about limited autonomy, the Regional Technical Colleges Act 1992 removed the colleges from the Vocational Educational Committee's governance, making research and industry ties more convenient (McTaggart, 2024).

The UK

Universities in the UK received less financial support from funding councils under austerity, with public funds decreasing by around 60% in real terms (Bolton, 2021). However, spending on research funding remained relatively constant, increasing from £1.5 billion to £1.7 billion (Ibid). Moreover, spending became more targeted on research related to emerging technological industries, such as the Li Ka Shing Centre for Health Information and Discovery at the University of Oxford during 2012 which focuses on automation and big data applications in biological research (GOV.UK, 2013).

Contrastingly, teaching funding derived from funding councils decreased from £4.6 billion to £1.4 billion (Bolton, 2021). This was offset by upwards adjustments of undergraduate tuition fees from £3,290 to £9,000 per year in 2010 (Porter, 2020). While total funding received by universities still increased by around 18% in real terms, a shift from public-heavy to fee-heavy funding suggested that fiscal sustainability was prioritised over student affordability (Bolton, 2021). While the government froze the tuition cap and raised the income threshold on loan repayments in 2017, this only reduced some of the costs for students and still represented a break from the previous grant-based system (Belfield et al., 2017).

Comparison

Amidst tight fiscal constraints, Sweden and Ireland arguably prioritised spending on tertiary education more than the UK. While the UK faced allocative dilemmas and had to choose between accessibility and research, Sweden and Ireland created spending capacity via efficiency initiatives and cuts beyond education. As former Swedish MP Pär Nuder argued, the short duration of one's formative years made education a more urgent priority, whereas cuts on unemployment insurance and other welfare likely had lesser long-term implications (Nuder). Tuition fee policies highlight these different priorities; while Sweden and Ireland kept fees low, the UK valued fiscal strength over student affordability. Decreased affordability likely had a partial effect on youth radicalisation in the UK; the 2011 riots, for instance, a majority of those charged in court were aged under 25 (Rogers and Evans, 2011).

In all three cases, the teaching and research opportunities offered by institutions aligned with that of industry priorities. In the UK, however, this alignment was forged by government agenda-setting in both educational and industrial policy. Thus, as seen for instance with the Li Ka Shing Centre, research resources were directed not towards short-term growth but to long-term strategic industries. Conversely, research-industry alignment in Sweden and Ireland was forged via direct engagement between institutions and industry leaders, thus enabling research to have a more direct impact on short-term recovery and growth.

Conclusion

This section has shown that fiscal discipline in Sweden and Ireland benefitted primarily from three types of policy variations:

- I. **Production:** industrial policy in Sweden and Ireland spurred stronger short-term growth and attracted greater increases in incoming investment, while introducing institutions that included grassroots in industry affairs;
- II. **Taxation:** Sweden's tax system was reformed with the aim of increasing revenue collection and Ireland's was reformed with the aim of increasing growth, while the UK's system performed unfavourably in both aspects;
- III. **Tertiary Education:** Sweden and Ireland expanded access to students while granting institutions autonomy to cooperate with industry.

In general, fiscal consolidation in Sweden and Ireland benefitted from strong state support to direct resources towards industrial growth and create opportunities for citizens to participate in

economic development. These policy variations had not only economic but also political consequences, as expectations of imminent growth and perceptions of inclusion in benefit-sharing helped contain frustration that was created by spending cuts and limit anti-establishment resentment.

Fiscal consolidation measures in Sweden and Ireland were not universally supported, and were even politically divisive at times. These primarily concerned cuts on healthcare and welfare for the elderly or unemployed, where both governments deprioritised spending and focused on efficiency-boosting (Ginsburg and Rosenthal, 2006; Wiley, 2001). These reforms exerted some political costs on the governing parties, as Ireland's Fianna Fáil and Sweden's Social Democrats lost 5.1% of vote share in the 1992 election and 8.85% of vote share in the 1998 election respectively (Nohlen and Stöver, 2010). However, resentment against a specific party did not lead to general anti-establishment radicalisation, making politics more stable in comparison to the UK's dynamics during the 2010s.

The final section will evaluate the characteristics that fiscal policy should have given the UK's present conditions, and substantiate the recommendations that have been alluded to throughout the paper

VI. Policy Suggestions

The preceding analysis has argued that the United Kingdom's fiscal challenge is fundamentally a growth challenge. While debt sustainability is often framed in terms of reducing public expenditure or limiting borrowing, the long-run stability of public finances depends equally on the economy's capacity to generate sustained growth, employment and tax revenue. Consequently, this paper advocates an inclusive-growth framework that seeks to expand the productive capacity of the economy while ensuring that the benefits of growth are broadly shared across regions, sectors and demographic groups. This requires a coordinated policy agenda combining mission-oriented industrial strategy, investment in human capital and labour market participation, and tax reforms that strengthen fiscal capacity while minimising distortions to work, saving and investment. Together, these policies aim to raise productivity, crowd in private investment, improve skills matching and enhance revenue collection, thereby creating the conditions under which economic growth can consistently outpace the cost of public debt and place the UK's public finances on a sustainable long-term footing.

Focus on long-term debt limits

Credible long term debt limits are necessary to anchor fiscal sustainability, as they have shown to be successful as a policy tool to encourage reductions in debt (Aaskoven and Wise, 2018). This matters in the long run, where the UK faces an ageing population and bigger future deficits. This is not because there is a specific universal limit at which debt is bad, but because debt in general has been shown to have a negative impact on growth, regardless of non-linearities.

Yet, short-term decisions to reduce debt should not come at the expense of investment. Debt limits have been shown to be dependent on government policy itself, with productive investment and higher expenditure multipliers raising debt limits (further supported by growth in post-war high debt periods), as well as varying temporal and national context. In particular, 'productive uses' of government expenditure can enable economies to adopt higher debt limits (Butkus et al., 2021; Carranza-Ugarte et al., 2023). Hence, it is often better to use government spending to create the preconditions for growth and invest in productive uses, especially net capital stock and labour productivity in the context of the UK.

Adjust industrial strategy to balance short-term and long-term growth

The solution to the United Kingdom's debt challenge lies less in reducing debt directly than in increasing economic growth. As argued throughout this paper, debt sustainability ultimately depends on maintaining growth rates that exceed the effective cost of government borrowing. Consequently, industrial policy should be evaluated not only by its contribution to long-run productivity, but also by its ability to generate employment, income growth and private investment in the short run.

The Government's Modern Industrial Strategy identifies eight key growth sectors (IS-8), including advanced manufacturing, artificial intelligence, biotechnology and green technologies. While these sectors possess substantial long-term growth potential, an exclusive focus on future

productivity gains risks neglecting the short-term economic outcomes necessary for maintaining public confidence and investor trust. Strong short-term growth generates tax revenue, supports household incomes and reduces pressure on public finances, thereby creating the conditions for sustained long-term development.

To achieve this balance, policymakers should ensure that industrial funding mechanisms promote both immediate job creation and future productivity growth. Although many of the IS-8 sectors are expected to rely heavily on highly skilled labour, low-skilled workers can benefit through linkage effects in supplier industries, logistics networks and complementary services. Public funding could therefore be conditioned on commitments to preserve employment in secondary operational functions or to support employment creation across supply chains. Such measures should be viewed as transitional policies designed to support workers while broader education and training programmes enable upskilling.

Industrial strategy should also incorporate projects with differing maturation periods. While breakthrough technologies may require years before generating significant economic returns, shorter-horizon investments can produce earlier employment, income and tax revenue gains. A diversified portfolio of projects would therefore both reduce risk and strengthen growth performance. Public resources could be concentrated on infrastructure provision, research facilities and workforce training programmes that increase private investors' confidence in emerging sectors, encouraging additional private capital to enter these markets.

This logic aligns closely with the mission-oriented approach advocated by Deleidi and Mazzucato (2021). Rather than attempting to support growth broadly, governments should focus investment on industries capable of addressing major societal and technological challenges. Successful public investment can generate an anticipation effect, whereby credible commitments to future government support encourage firms to invest before public spending fully materialises. As expectations of future profitability rise, private capital is crowded into the targeted sector, amplifying the impact of public expenditure.

Prioritise investments in human capital

While industrial policy can create the conditions for economic growth, its success – especially its ability to bolster inclusive growth – ultimately depends on the availability of a workforce capable of meeting the demands of emerging industries. The UK's debt challenge reflects not only persistent fiscal deficits but also weak productivity growth and underinvestment in human capital. Consequently, improvements in education, vocational training and workforce development should be viewed as complementary to industrial policy rather than as separate objectives. If the government's industrial strategy is to generate sustained growth, labour supply must be capable of responding to changing economic demands.

The IS-8 requires specialised skills that are currently in short supply. Ensuring that workers can enter and transition into these sectors will be essential if industrial investment is to translate into

higher productivity and employment. In particular, policymakers must ensure that existing workers are not excluded from industrial transformation, allowing economic growth to be broadly shared across regions and demographics.

Apprenticeships represent one of the most effective mechanisms for achieving this objective. Unlike conventional academic pathways, apprenticeships combine formal training with practical workplace experience, creating benefits for both employers and workers. Employers gain access to workers whose skills are tailored to industry requirements, reducing recruitment and training costs. Workers benefit from paid employment, industry-specific qualifications and clearer pathways into growing sectors of the economy. Moreover, they support labour market entry and re-entry for both younger and older workers transitioning between industries. As technological change and decarbonisation alter patterns of employment, retraining programmes will become increasingly important in preventing long-term unemployment and facilitating labour mobility. However, its effectiveness has been constrained by persistent underinvestment (AELP, 2025).

To ensure sufficient funding, the UK government should consider:

- I. Protecting funding through greater transparency and monitoring of Levy expenditure, ensuring that resources are directed towards training provision
- II. Regularly updating curricula to reflect the skills required by emerging industries and innovation
- III. Facilitating stronger partnerships between firms and vocational training providers to facilitate continuous workforce retraining and reduce the risk of technological displacement
- IV. Promoting awareness of apprenticeship opportunities alongside local governments and community organisations, particularly in regions experiencing persistent labour market weaknesses.

Adjust the fiscal structure to maximise work incentives

As argued throughout this paper, fiscal policy should seek to strengthen fiscal capacity while preserving incentives to work, invest and innovate. The challenge is not simply to increase tax revenue, but to do so in a manner that minimises administrative complexity, avoidance opportunities and adverse effects on growth.

Income Tax

One significant source of inefficiency within the UK tax system is the existence of high marginal effective tax rates created by interactions between taxation and benefit withdrawal. While the statutory income tax schedule is progressive, the withdrawal of benefits and allowances can create effective tax rates substantially higher than headline rates. At income thresholds around £50,000 and £100,000, individuals can face strong disincentives to increase earnings, creating income traps and reducing labour supply incentives.

To address this issue, the government should reform the personal allowance taper currently applied to higher earners. Rather than gradually withdrawing the tax-free allowance once income exceeds £100,000, policymakers could replace the taper with a fixed proportion of untaxable income applying across the income distribution. Such a system would improve transparency, reduce distortions and simplify tax administration while preserving the progressive nature of the tax system.

More broadly, tax policy should seek to minimise opportunities for arbitrage between different forms of income. Where possible, the tax treatment of labour income, capital income and corporate income should be aligned to reduce incentives for individuals to reclassify earnings solely for tax purposes. A more integrated approach would improve neutrality and strengthen revenue collection without requiring higher headline tax rates.

Consumption Tax

The optimal tax literature has long argued that broad-based consumption taxes are generally more efficient than systems characterised by numerous exemptions and special rates. VAT exemptions increase administrative complexity, create opportunities for avoidance and often benefit higher-income households disproportionately, aggregating to an estimated £100 billion lost per year (Parikh, 2025).

Consequently, the government should consider moving towards a more uniform VAT structure (Cochrane, 2023). A broader VAT base would improve revenue collection while reducing distortions across different forms of consumption. Since both labour income and realised capital gains can ultimately be used for spending, consumption taxation also captures a broader range of economic resources than labour taxation alone. While distributional consequences would require careful consideration, a more uniform VAT system would contribute to a simpler and more transparent tax regime.

Welfare Reform

Current benefit withdrawal mechanisms can generate extremely high effective marginal tax rates for some households, weakening incentives to participate in the labour market. One possible long-term reform would be to place greater emphasis on measures of consumption rather than income when determining benefit eligibility. The theoretical rationale is that consumption provides a closer measure of living standards than income alone and may reduce the extent to which saving is penalised through benefit withdrawal (Cochrane, 2023). Despite practical challenges in implementation given the difficulty of accurately measuring household consumption and the potential for behavioural responses designed to avoid reporting requirements, the idea warrants further consideration (UK Finance, 2025).

Another notable pressure on future public finances is the state pension triple lock, which guarantees annual pension increases based on the highest of inflation, earnings growth or 2.5 per cent. This may cost about £15 billion every year by 2030, as a result of the demographic transition (Bootle et al., 2025). As demographic ageing increases pension costs, policymakers may eventually need to reconsider the long-term sustainability of this mechanism. However, any

reform would face substantial political constraints and would require careful consideration of distributional effects.

Administrative Efficiency

More efficient tax collection reduces administrative costs, improves compliance and increases transparency, all of which strengthen fiscal capacity without requiring higher tax rates. Digitalisation offers significant opportunities to reduce compliance costs for businesses while increasing the certainty and reliability of revenue collection. The Making Tax Digital programme represents an important step in this direction, though its implementation remains incomplete.

Future reforms should extend digitalisation while ensuring accessibility for smaller firms. In particular, policymakers should provide support for the adoption of digital accounting systems and avoid imposing excessive reporting requirements that disproportionately burden SMEs (Browne et al., 2025). International experience, including digital bookkeeping requirements in Denmark and electronic invoicing systems in Italy, demonstrates the potential benefits of modernised tax administration (Castro, 2026).

Despite the cost of adjusting the UK tax system, the issue of national debt is high and increasing which mandates policy to address the fiscal imbalance. Given the constraints placed on welfare spending, and risk of increasing taxes on disincentivising business activity, reforming and limiting the leakages would support revenue generation to support debt sustainability in the country.

Strengthen confidence through communicating economic expectations

Programmes for fiscal consolidation, especially those involving changes to taxation and welfare spending, inevitably lead citizens to feel uncertain about the future. This is especially prominent when emerging industries are perceived as inaccessible or for the long term only, and when institutions are perceived as opaque or systematically exclusive. The UK in the 2010s fulfilled both conditions, the former because labour training was insufficient to keep up with investment in high-skill sectors such as AI, and the latter because the tax system's complexity was frustrating for taxpayers.

With an even greater emphasis on AI and green technologies in 2026, the Government should pay even more attention towards public communication efforts which assure that citizens have confidence in their future wellbeing. In particular, a successful communication strategy should have the following characteristics:

- *Attention to both short-term and long-term expectations*

Long-term prospects are crucial for the sustainability of citizens' confidence in the country. However, as the successful experience of Sweden's adult labour training suggests, sufficiently decent short-term outcomes are also required for citizens to be willing to wait for a better future. The capacity to deliver short-term outcomes will also lend credibility to the Government's goals for strong long-term development.

As of now, the Government's Modern Industrial Strategy (2025) focuses on targets for industrial growth by 2035. The public would also likely wish to know of three-year and five-year targets to enjoy confidence over short-term security. Moreover, industrial projections do not exist in a vacuum, but should also show how income and wellbeing are affected in relation to changes in welfare and tax policy.

- *Attention to labour market accessibility*

Projections on GBP growth and reductions in public debt are insufficient to boost public confidence. By contrast, they may even be sources of distrust, specifically when they are perceived as outcomes achieved at the expense of popular wellbeing. Hence, a successful public communication strategy should share projections of income growth, not just the national average but also to different income classes. A prerequisite of that would be to share which sectors have both growth potential and work opportunities with skill demands suited to lower income classes.

Policymakers may be reasonably wary about how an unfavourable projection may affect public confidence. This can be mitigated by comparing the effects of different policy packages, or setting both best-case and worst-case targets to demonstrate that optimism is not unwarranted given national buy-in.

Conclusion

Politicians, economists, and the public agree that the UK has a debt issue. In this paper, we sought to address the landscape of fiscal sustainability and policies for improving public debt in the country. Starting from a historical account of austerity to understand the intellectual history and foundation of its establishment - primarily, we assert that austerity remains a tool not simply for rebalancing the deficit, but its role as a tool to placate investor markets. Subsequent consideration of the Reinhart-Rogoff rule for public debt and empirical analyses underlined the tenuous arguments for austerity cuts in the UK and across Europe. Investment plays a critical role in sustaining economic growth if implementing austerity, which is an inherently contractionary measure. Across all of our considered case studies, we noted the effect of policies which continued to support economic growth ranging from trade, monetary policy changes, or supporting foreign direct investment. At present though, the UK is in a unique position. A stagnant labour market, relatively weak investment, and growing apprehension for the future of trade amidst the current geopolitical climate combined with low economic growth places the UK in a vulnerable position. Significantly, growth has stalled significantly following 2008 into a so-called 'productivity puzzle', and indeed our findings indicate that had it not been for austerity, the UK's real GDP might have been higher than today. Therein we propose policies to address the dual-pronged issue of low growth and high debt with a focus on long-term sustainable growth:

1. **Tax system reform: particularly of VAT but considering also benefits from digitalisation to streamline processes**
2. **Long-term education investment: attempting to match labour skills with emerging industries as identified as IS-8**
3. **Reforms to the benefits system**

Addressing the issue of national debt is no longer reliant solely on austerity, and indeed the effects of such policy has been detrimental to many economies. Rather, when looking to the future, the UK should focus on assessing the system as it exists, fostering a more efficient use of labour, identifying high-potential industries, and addressing issues with clearer and more consistent plans to ensure a fiscally healthy future.

Bibliography

Aaskoven, L. and Wiese, R. (2022) 'How fiscal rules matter for successful fiscal consolidations: new evidence', *CESifo Economic Studies*, 68(4), pp. 414–433. doi:10.1093/cesifo/ifac011.

Adam, S., Miller, H. and Upton, B. (2024) *The Government's Record on Tax 2010–24*. London: Institute for Fiscal Studies.

Agell, J., Englund, P. and Södersten, J. (1995) 'The Swedish tax reform: an introduction', *Swedish Economic Policy Review*, 2, pp. 219–228.

Association of Employment and Learning Providers (2025) *AELP Submission to the Chancellor – Budget 2025: Skills for Growth, Hope – and to Stabilise Public Finances*. Submission #127, October 2025. Available at: <https://www.aelp.org.uk/media/vrxc0qyv/127-aelp-submission-budget-2025.pdf> (Accessed: 11 June 2026).

Atkinson, A.B. and Stiglitz, J.E. (1976) 'The design of tax structure: direct versus indirect taxation', *Journal of Public Economics*, 6(1), pp. 55–75. doi:10.1016/0047-2727(76)90041-4.

Baer, K. and Le Borgne, E. (2008) *Tax Amnesties: Theory, Trends, and Some Alternatives*. Washington, DC: International Monetary Fund.

Ballentine, J.G. (1992) 'The structure of the tax system versus the level of taxation: an evaluation of the 1986 Act', *Journal of Economic Perspectives*, 6(1), pp. 59–68. doi:10.1257/jep.6.1.59.

Bate, A., Baker, C., Uberoi, E., Audickas, L., Dempsey, N., Hawkins, O., Cracknell, R., McInnes, R., Rutherford, T. and Apostolova, V. (2019) 'General election 2017: full results and analysis', *House of Commons Library*, 29 January.

BBC News (2011) 'Anti-cuts march: tens of thousands at London protest', 26 March.

BBC News (2017) 'Reality check: did Jeremy Corbyn have youth on his side?', 20 June.

Belfield, C., Britton, J. and Van Der Erve, L. (2017) *Higher Education Finance Reform: Raising the Repayment Threshold to £25,000 and Freezing the Fee Cap at £9,250*. IFS Briefing Note BN217. London: Institute for Fiscal Studies.

Berg, A. (2003) 'Industrial conflict at low levels', *European Foundation for the Improvement of Living and Working Conditions*, 11 March. Available at: <https://www.eurofound.europa.eu/en/publications/all/industrial-conflict-low-levels>.

Berg, A., Portillo, R., Buffie, E.F., Pattillo, C.A. and Zanna, L.-F. (2012) *Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces*. Washington, DC: International Monetary Fund.

Bierbrauer, F.J., Boyer, P.C. and Peichl, A. (2021) 'Politically feasible reforms of nonlinear tax systems', *American Economic Review*, 111(1), pp. 153–191. doi:10.1257/aer.20190021.

- Blundell, R., Meghir, C., Shaw, J. and Costa Dias, M. (2016) 'Female labor supply, human capital, and welfare reform', *Econometrica*, 84(5). doi:10.3982/ECTA11576.
- Bolton, P. (2021) *Higher Education Funding in England*. London: House of Commons Library.
- Bootle, R., Mansfield, I., Ramanauskas, B. and Sweetman, B. (2025) 'Beyond our means', *Policy Exchange*, 21 October. Available at: <https://policyexchange.org.uk/publication/beyond-our-means/>.
- Börjesson, M. and Dalberg, T. (2021) 'Massification, unification, marketisation, internationalisation: a socio-political history of higher education in Sweden 1945–2020', *European Journal of Higher Education*, 11(3), pp. 346–364.
- Bourquin, P., Keiller, A. and Waters, T. (2019) *The Distributional Impact of Personal Tax and Benefit Reforms*. London: Institute for Fiscal Studies.
- Brockmeyer, A., Mascagni, G., Nair, V., Waseem, M. and Almunia, M. (2024) 'Does the value-added tax add value? Lessons using administrative data from a diverse set of countries', *Journal of Economic Perspectives*, 38(1), pp. 107–132. doi:10.1257/jep.38.1.107.
- Browne, J., Atkinson, I. and Smith, T. (2025) *A Pro-Growth Roadmap for Business-Tax Reform*. London: Tony Blair Institute for Global Change.
- Burnham, J. (2003) 'Why Ireland boomed', *The Independent Review*, 7(4), pp. 537–556.
- Butkus, M., Cibulskiene, D., Garsviene, L. and Seputiene, J. (2021) 'Empirical evidence on factors conditioning the turning point of the public debt–growth relationship', *Economies*, 9(4), 191. doi:10.3390/economies9040191.
- Callan, T., Nolan, B., Walsh, J. and Nestor, R. (1998) *Budget Perspectives: Proceedings of a Conference Held on 27 October 1998*. Dublin: Economic and Social Research Institute.
- Carella, A., Chen, M.R. and Shao, X. (2023) *Enhancing Business Investment in the United Kingdom*. Washington, DC: International Monetary Fund.
- Carranza-Ugarte, L., Díaz-Saavedra, J. and Galdon-Sanchez, J.E. (2023) 'Rethinking fiscal rules', *Journal of Comparative Economics*, 51(3), pp. 833–857. doi:10.1016/j.jce.2023.02.005.
- Castro, G. (2026) *Denmark: Digital Accounting & Key Obligations from 2026*. Auxadi, 22 January. Available at: <https://www.auxadi.com/blog/2026/01/22/denmark-digital-accounting-obligations/> (Accessed: 5 January 2026).
- Cecchetti, S.G., Mohanty, M.S. and Zampolli, F. (2011) *The Real Effects of Debt*. BIS Working Paper No. 352. Basel: Bank for International Settlements. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1946170 (Accessed: 10 December 2025).
- Central Statistics Office (2016) *Census of Population 2016 – Level of Education*. Available at: <https://www.cso.ie/en/releasesandpublications/ep/p-cp10esil/p10esil/le/>.

Chabert, G. and Clavel, L. (2012) 'Lessons for today from Sweden's crisis in the 1990s', *Trésor-Economics*, 105, September.

Chambers, D. (2010) 'Going public in interwar Britain', *Financial History Review*, 17(1), pp. 51–71. doi:10.1017/S0968565009990163.

Checherita, C. and Rother, P. (2010) *The Impact of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area*. ECB Working Paper No. 1237. Frankfurt am Main: European Central Bank. Available at: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1237.pdf> (Accessed: 14 December 2025).

Chudik, A., Mohaddes, K., Pesaran, M.H. and Raissi, M. (2015) *Is There a Debt-threshold Effect on Output Growth?* IMF Working Paper WP/15/197. Washington, DC: International Monetary Fund. Available at: <https://www.imf.org/external/pubs/ft/wp/2015/wp15197.pdf> (Accessed: 14 December 2025).

Chudik, A., Mohaddes, K., Pesaran, M.H. and Raissi, M. (2017) 'Is there a debt-threshold effect on output growth?', *The Review of Economics and Statistics*, 99(1), pp. 135–150.

Ciaffi, G., Deleidi, M. and Capriati, M. (2024) 'Government spending, multipliers, and public debt sustainability: an empirical assessment for OECD countries', *Economia Politica*, 41(2), pp. 521–542. doi:10.1007/s40888-024-00335-0.

Cochrane, J.H. (2023) 'Work requirements', *The Grumpy Economist*, 25 May. Available at: <https://johnhcochrane.blogspot.com/2023/05/work-requirements.html>.

Conesa, J.C., Kitao, S. and Krueger, D. (2009) 'Taxing capital? Not a bad idea after all!', *American Economic Review*, 99(1), pp. 25–48. doi:10.1257/aer.99.1.25.

Correia, I. (2010) 'Consumption taxes and redistribution', *American Economic Review*, 100(4), pp. 1673–1694. doi:10.1257/aer.100.4.1673.

Crafts, N. and Mills, T.C. (2013) 'Rearmament to the rescue? New estimates of the impact of "Keynesian" policies in 1930s' Britain', *The Journal of Economic History*, 73(4), pp. 1077–1104. doi:10.1017/S0022050713000880.

Curtis, C. (2020) 'For the first time in nearly a decade, Britain approves of its government', *YouGov*, 2 April. Available at: <https://yougov.co.uk/politics/articles/28796-first-time-nearly-decade-britain-approves-its-gove>.

Deleidi, M. and Mazzucato, M. (2021) 'Directed innovation policies and the supermultiplier: an empirical assessment of mission-oriented policies in the US economy', *Research Policy*, 50(2), 104151. doi:10.1016/j.respol.2020.104151.

Department for Business and Trade (2025) *The UK's Modern Industrial Strategy*. London: HMSO. Available at: https://assets.publishing.service.gov.uk/media/69256e16367485ea116a56de/industrial_strategy_policy_paper.pdf (Accessed: 11 June 2026).

Devereux, M.P., Liu, L. and Loretz, S. (2014) 'The elasticity of corporate taxable income: new evidence from UK tax records', *American Economic Journal: Economic Policy*, 6(2), pp. 19–53. doi:10.1257/pol.6.2.19.

Diamond, P.A. and Mirrlees, J.A. (1971) 'Optimal taxation and public production I: production efficiency', *The American Economic Review*, 61(1), pp. 8–27.

Égert, B. (2015) 'Public debt, economic growth and nonlinear effects: myth or reality?', *Journal of Macroeconomics*, 43, pp. 226–238. doi:10.1016/j.jmacro.2014.11.006.

Feldstein, M. (2012) 'The Mirrlees Review', *Journal of Economic Literature*, 50(3), pp. 781–790. doi:10.1257/jel.50.3.781.

Fölster, S. and Kreichbergs, J. (2014) *Twenty Five Years of Swedish Reforms*. Stockholm: Reform Institute.

Gechert, S. (2015) 'What fiscal policy is most effective? A meta-regression analysis', *Oxford Economic Papers*, 67(3), pp. 553–580. doi:10.1093/oep/gpv027.

Ginsburg, H. and Rosenthal, M. (2006) 'The ups and downs of the Swedish welfare state: general trends, benefits and caregiving', *New Politics*, 11(1).

González, A., Teräsvirta, T. and van Dijk, D. (2005) *Panel Smooth Transition Regression Models*. SSE/EFI Working Paper Series in Economics and Finance, No. 604. Stockholm: Stockholm School of Economics.

GOV.UK (2013) *£30 Million Investment in Health Research Centre to Tackle Major Diseases*, 3 May. Available at: <https://www.gov.uk/government/news/30-million-investment-in-health-research-centre-to-tackle-major-diseases>.

GOV.UK (2023) *Business Population Estimates for the UK and Regions 2023: Statistical Release*, 5 October. Available at: <https://www.gov.uk/government/statistics/business-population-estimates-2023/business-population-estimates-for-the-uk-and-regions-2023-statistical-release>.

Green Alliance (2024) *Why the UK Needs Nature-Positive Fiscal Rules*. London: Green Alliance.

Haughton, J. (2002) *Trade Agreement and Tax Incentives: The Irish Experience*. Washington, DC: Inter-American Development Bank.

Henrekson, M. (2017) 'Taxation of Swedish firm owners: the great reversal from the 1970s to the 2010s', *Nordic Tax Journal*, 1, pp. 26–46.

Herndon, T., Ash, M. and Pollin, R. (2014) 'Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff', *Cambridge Journal of Economics*, 38(2), pp. 257–279. doi:10.1093/cje/bet075.

HM Treasury (2025) 'Changes to tax rates for property, savings & dividend income', *GOV.UK*, 26 November. Available at: <https://www.gov.uk/government/publications/changes-to-tax-rates->

for-property-savings-dividend-income/changes-to-tax-rates-for-property-savings-dividend-income.

Hoddinott, S., Fright, M. and Pope, T. (2022) *'Austerity' in Public Services: Lessons from the 2010s*. London: Institute for Government.

Honohan, P. (ed.) (1997) *EU Structural Funds in Ireland: A Mid-Term Evaluation of the CSF*. Dublin: Economic and Social Research Institute.

Hutchins, K. (2024) *National Grid CEO: Data Centre Power Demand to Soar Six-Fold by 2035*. Data Centre Review, 28 March. Available at: <https://datacentrereview.com/2024/03/national-grid-ceo-data-centre-power-demand-to-soar-six-fold-by-2035/>.

IMF (2014) *World Economic Outlook October 2014*. Washington, DC: International Monetary Fund. Available at: <https://www.imf.org/en/publications/weo/issues/2016/12/31/legacies-clouds-uncertainties>.

International Monetary Fund (2025) *IMF Data*. Available at: <https://www.imf.org/en/Data> (Accessed: December 2025).

Jakobsen, K., Kleven, H., Kolsrud, J., Landais, C. and Muñoz, M. (2024) *Taxing Top Wealth: Migration Responses and Their Aggregate Economic Implications*. NBER Working Paper No. 32153. Cambridge, MA: National Bureau of Economic Research. doi:10.3386/w32153.

Karabarbounis, M. (2016) 'A road map for efficiently taxing heterogeneous agents', *American Economic Journal: Macroeconomics*, 8(2), pp. 182–214. doi:10.1257/mac.20140274.

Lait, A. (2024) 'What do we know about voter turnout in parliamentary elections?', *Economics Observatory*, 30 July. Available at: <https://www.economicsobservatory.com/what-do-we-know-about-voter-turnout-in-parliamentary-elections>.

Lakomaa, E. (2024) 'On the pros and cons of the Swedish voucher system', *European Center of Austrian Economics Foundation*, 21 May. Available at: <https://ecaef.org/swedish-voucher-system/>.

Leahy, P. and Burgess, P. (2011) *Youth Participation in the Republic of Ireland*. Cork: Youth Work Ireland Cork.

Lerche, A. (2025) 'Direct and indirect effects of investment tax incentives', *American Economic Review*, 115(8), pp. 2781–2818. doi:10.1257/aer.20220656.

Levy, A. and Lovegrove, N. (2009) 'Reforming the public sector in a crisis: an interview with Sweden's former prime minister', *McKinsey & Company*, 1 June. Available at: <https://www.mckinsey.com/industries/public-sector/our-insights/reforming-the-public-sector-in-a-crisis-an-interview-with-swedens-former-prime-minister>.

Link, S., Menkhoff, M., Peichl, A. and Schüle, P. (2024) 'Downward revision of investment decisions after corporate tax hikes', *American Economic Journal: Economic Policy*, 16(4), pp. 194–222. doi:10.1257/pol.20220530.

- Maniquet, F. and Neumann, D. (2021) 'Well-being, poverty, and labor income taxation: theory and application to Europe and the United States', *American Economic Journal: Microeconomics*, 13(2), pp. 276–310. doi:10.1257/mic.20180269.
- Mankiw, N.G., Weinzierl, M. and Yagan, D. (2009) 'Optimal taxation in theory and practice', *Journal of Economic Perspectives*, 23(4), pp. 147–174. doi:10.1257/jep.23.4.147.
- Martínez, I.Z., Saez, E. and Siegenthaler, M. (2021) 'Intertemporal labor supply substitution? Evidence from the Swiss income tax holidays', *American Economic Review*, 111(2), pp. 506–546. doi:10.1257/aer.20180746.
- Mason, P. (2017) 'Demonstrations matter – they create the kind of power politicians despise', *The Guardian*, 27 March. Available at: <https://www.theguardian.com/commentisfree/2017/mar/27/demonstrations-matter-power-protesters-revolts>.
- McAleer, M.-C. (2018) *50 Voices from the Last 50 Years: An Oral History of the National Youth Council of Ireland, 1967–2017*. Dublin: National Youth Council of Ireland.
- McCoy, S. and Smyth, E. (2011) 'Higher education expansion and differentiation in the Republic of Ireland', *Higher Education*, 61(3), pp. 243–260.
- McTaggart, B. (2024) 'Fifty years on – limitations and opportunities within Ireland's higher education system and structures', *Policy Futures in Education*, 22(8).
- Mian, A., Straub, L. and Sufi, A. (2025) 'A Goldilocks theory of fiscal deficits', *American Economic Review*, 115(12), pp. 4253–4291. doi:10.1257/aer.20220308.
- Minea, A. and Parent, A. (2012) *Is High Public Debt Always Harmful to Economic Growth? Reinhart and Rogoff and Some Complex Nonlinearities*. Working Paper halshs-00700471. Available at: <https://shs.hal.science/halshs-00700471> (Accessed: 23 December 2025).
- Miron, G. (1996) 'Free choice and vouchers transform schools', *Association for Supervision and Curriculum Development*, 1 October. Available at: <https://www.ascd.org/el/articles/-free-choice-and-vouchers-transform-schools>.
- Mirrlees, J., Adam, S., Besley, T. et al. (2011) 'The Mirrlees Review: conclusions and recommendations for reform', *Fiscal Studies*, 32(3), pp. 331–359. doi:10.1111/j.1475-5890.2011.00140.x.
- Mirrlees, J.A. (1971) 'An exploration in the theory of optimum income taxation', *The Review of Economic Studies*, 38(2), pp. 175–208. doi:10.2307/2296779.
- Mirrlees, J.A., Adam, S., Blundell, R. et al. (2010) *Dimensions of Tax Design: The Mirrlees Review*. Oxford: Oxford University Press.
- Muslim, M. (2025) 'Income tax and work incentives: a literature review', *ResearchGate*, 10 August. doi:10.60079/atrv.v1i3.480.

National Academies of Sciences, Engineering, and Medicine (2003) 'The Taiwanese approach', in *Securing the Future: Regional and National Programs to Support the Semiconductor Industry*. Washington, DC. Available at: <https://www.nationalacademies.org/read/10677/chapter/9>.

Nohlen, D. and Stöver, P. (2010) *Elections in Europe: A Data Handbook*. Baden-Baden: Nomos.

Nuder, P. (2012) *Saving the Swedish Model: Learning from Sweden's Return to Full Employment in the Late 1990s*. London: Institute for Public Policy Research.

O'Boyle, E.H. and Aguinis, H. (2011) 'The best and the rest: revisiting the norm of normality of individual performance', *Academy of Management Proceedings*, 2011(1), pp. 1-2. doi:10.5465/ambpp.2011.65869128.

O'Donnell, R. (1998) *Ireland's Economic Transformation: Industrial Policy, European Integration and Social Partnership*. Pittsburgh: University of Pittsburgh Center for West European Studies.

OECD (1987) *OECD Economic Surveys: Ireland*. Paris: Organisation for Economic Co-operation and Development.

OECD (2024a) 'Consumption Tax Trends 2024: VAT/GST and excise, core design features and trends', *Consumption Tax Trends*, November. doi:10.1787/dcd4dd36-en.

OECD (2024b) 'OECD Economic Surveys: United Kingdom 2024', *OECD Economic Surveys: United Kingdom*, September. doi:10.1787/709e70b8-en.

Office for Budget Responsibility (2025) *Economic and Fiscal Outlook - November 2025*, 26 November. Available at: <https://obr.uk/efo/economic-and-fiscal-outlook-november-2025/>.

Office for National Statistics (2021) *Gross Domestic Expenditure on Research and Development Time Series*, 4 August. Available at: <https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/researchanddevelopmentexpenditure/datasets/governmentexpenditureonresearchanddevelopment>.

Office for National Statistics (2025) *Average Sterling Exchange Rate: US Dollar*. Available at: <https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/timeseries/auss/diop> (Accessed: 21 December 2025).

Owen, G. (2024) *Where Now for UK Industrial Policy? Lessons from the Past, and from Other Countries*. London: Policy Exchange.

Panizza, U. and Presbitero, A.F. (2014) 'Public debt and economic growth: is there a causal effect?', *Journal of Macroeconomics*, 41, pp. 21-41. doi:10.1016/j.jmacro.2014.03.009.

Papadopoulos, T. and Roumpakis, A. (2012) 'The Greek welfare state in the age of austerity: anti-social policy and the politico-economic crisis', in Kilkey, M., Ramia, G. and Farnsworth, K. (eds.) *Social Policy Review 24*. Bristol: Policy Press, pp. 203-227.

Parikh, T. (2025) 'Britain's budget must put growth first — here's how', *Free Lunch, Financial Times*, 16 November. Available at: <https://www.ft.com/content/fdbc4fdb-89f5-4647-aeef-54c242d53eff>.

Pepin-Hall, J. (2025) 'Why do some people in the UK face marginal tax rates of over 60%?', *Economics Observatory*, 19 November. Available at: <https://www.economicsobservatory.com/why-do-some-people-in-the-uk-face-marginal-tax-rates-of-over-60>.

Pescatori, A., Sandri, D. and Simon, J. (2014) *Debt and Growth: Is There a Magic Threshold?* IMF Working Paper WP/14/34. Washington, DC: International Monetary Fund. Available at: <https://www.imf.org/external/pubs/ft/wp/2014/wp1434.pdf> (Accessed: 20 December 2025).

Pinsent Masons (2023) *The UK's General Anti-Abuse Rule (GAAR)*, 29 November. Available at: <https://www.pinsentmasons.com/out-law/guides/the-uks-general-anti-abuse-rule>.

Porter, A. (2020) 'Ten years on: the politics behind the 2010 tuition fee reforms', *Higher Education Policy Institute*, 9 December. Available at: <https://www.hepi.ac.uk/2020/12/09/ten-years-on-the-politics-behind-the-2010-tuition-fee-reforms/>.

'Public perceptions of the UK tax system' (2025) *Carnegie UK*, September.

Reinhart, C.M. and Rogoff, K.S. (2010a) *Growth in a Time of Debt*. NBER Working Paper 15639. Cambridge, MA: National Bureau of Economic Research. Available at: <http://www.nber.org/papers/w15639> (Accessed: 4 December 2025).

Reinhart, C.M. and Rogoff, K.S. (2010b) *Debt and Growth Revisited*. MPRA Paper No. 24376. Munich: Munich Personal RePEc Archive. Available at: <https://mpra.ub.uni-muenchen.de/24376/> (Accessed: 10 February 2026).

Reinhart, C.M., Rogoff, K.S. and Savastano, M.A. (2003) *Debt Intolerance*. NBER Working Paper 9908. Cambridge, MA: National Bureau of Economic Research. Available at: <http://www.nber.org/papers/w9908> (Accessed: 10 December 2025).

Resolution Foundation (2022) 'Stagnation nation', *The Inquiry*, 13 July. Available at: <https://economy2030.resolutionfoundation.org/reports/stagnation-nation/>.

Reuters (2025) 'UK's Starmer replaces Blair-era university target with broader skills ambition', 30 September.

Rogers, S. and Evans, L. (2011) 'UK riots: the demographics of magistrate cases and convictions', *The Guardian*, 18 August.

Rogoff, K. and Reinhart, C. (2013) 'Reinhart and Rogoff respond to criticism', *Institute for New Economic Thinking*, 16 April. Available at: <https://www.ineteconomics.org/perspectives/blog/reinhart-and-rogooff-respond-to-criticism-1> (Accessed: 23 December 2025).

Saez, E. (2001) 'Using elasticities to derive optimal income tax rates', *The Review of Economic Studies*, 68(1), pp. 205–229. doi:10.1111/1467-937X.00166.

Scoville, J. (no date) 'Statistical distribution of childhood IQ scores'. Available at: <http://miyaguchi.4sigma.org/BloodyHistory/ratioiq.html> (Accessed: 30 November 2025).

Sissons, P. and Jones, K. (2016) 'Local industrial strategy and skills policy in England: assessing the linkages and limitations – a case study of the Sheffield City Deal', *Local Economy*, 31(8), pp. 857–872.

Slemrod, J. (1990) 'Optimal taxation and optimal tax systems', *Journal of Economic Perspectives*, 4(1), pp. 157–178. doi:10.1257/jep.4.1.157.

Smith, K.M. (2021) 'Explaining the emergence of complex networks through log-normal fitness in a Euclidean node similarity space', *Scientific Reports*, 11(1), 1976. doi:10.1038/s41598-021-81547-3.

Socialism Today (2000) 'Sweden's neo-Nazi menace', April. Available at: <https://socialismtoday.org/archive/46/sweden.html>.

Stott, C., Drury, J. and Reicher, S. (2019) 'London's 2011 riots: report blames deprivation and poor policing – not mad, bad, dangerous people', *The Conversation*, 14 February. Available at: <https://theconversation.com/londons-2011-riots-report-blames-deprivation-and-poor-policing-not-mad-bad-dangerous-people-111770>.

Swedish National Data Service (no date) *The National SOM Survey Cumulative Dataset*. Available at: <https://researchdata.se/en/catalogue/dataset/snd0905-1> (Accessed: 8 January 2026).

Swedish National Tax Board (2000) *Taxes in Sweden 2000: A Summary of the Tax Statistical Yearbook of Sweden 2000*. Stockholm: Swedish National Tax Board.

Tahir, I. (2023) 'Investment in training and skills', in *IFS Green Budget*. London: Institute for Fiscal Studies.

'The administrative cost of the tax system – NAO report' (2025) *National Audit Office (NAO)*, 10 February. Available at: <https://www.nao.org.uk/reports/the-administrative-cost-of-the-tax-system/>.

The Irish Times (no date) *The Irish Times Poll*. Available at: <https://www.irishtimes.com/politics/poll/>.

Tuomala, M. (1990) *Optimal Income Tax and Redistribution*. Oxford: Oxford University Press. doi:10.1093/oso/9780198286059.001.0001.

UK Finance (2025) *UK Payment Markets 2025*. London: UK Finance Limited.

Westerlund, P.-Å. (2008) 'World economy: Sweden – the 1990s crisis', *Committee for a Workers' International*, 17 October. Available at: <https://www.socialistworld.net/2008/10/17/world-economy-sweden-the-1990s-crisis/>.

Wiley, M. (2001) 'Reform and renewal of the Irish healthcare system: policy and practice', in *Budget Perspectives – Proceedings of a Conference Held on 9 October 2001*. Dublin: Economic and Social Research Institute, pp. 69–93.

World Bank Group (2025) *DataBank*. Available at: <https://databank.worldbank.org> (Accessed: December 2025).

World Inequality Database (2025) *Data*. Available at: <https://wid.world/data/> (Accessed: December 2025)