The David Hume Institute

Wealth of the Nation

Scotland's Productivity Challenge

About the David Hume Institute

The David Hume Institute is an independent, non-partisan, evidence-based policy institute that has been operating at the heart of Scottish policy debate for over 30 years.

Research on some of the country's most pressing challenges

We aim to produce original research with an emphasis on economic and education policy issues. Our research is independent and evidence-based and we share our ideas with policy makers from all sides of the political spectrum.

We take the perspective of the Scottish public rather than that of any interest group. To safeguard our independence, we receive no government funding and do not undertake commissioned work. We are rigorous in obtaining the best-available evidence from our own data analysis and from published work.

Events that are open to all

We host thought-provoking events which bring together expert speakers and an informed, interested and engaged audience. Our speakers come from across the political spectrum, both nationally and internationally.

Acknowledgments

This report was co-funded by the Scottish Policy Foundation (SPF) and Baillie Gifford. It was written by Jane-Frances Kelly, Director of the David Hume Institute. Mark Mitchell and Robert Zymek provided substantial research support.

The Fraser of Allander Institute provided modelling assistance using the SPF model of the Scottish economy; we'd particularly like to thank Graeme Roy, James Black and Peter McGregor. We would also like to thank Rudiger Ahrend, Mike Emmerich, Meredith Sussex, Stephen Boyd, Martin McCluskey, Alisdair McIntosh, Josef Konvitz, Iain Docherty, Andrew Wilson, David Torrance, Anna Sloan and Brody Viney. The cover photo is by Iain Ferguson: we would like to thank Transport Scotland for their assistance in obtaining permission.

The opinions in this report are those of the authors and do not necessarily represent the views of the David Hume Institute's trustees, members or affiliates. Any remaining errors or omissions are the responsibility of the authors.

September 2018

Co-funded by the Scottish Policy Foundation, Scotland's grant-giving foundation for public policy research.

Overview

Productivity is the single most important determinant of a country's average living standards and wealth. But, despite a skilled workforce and no shortage of strategies, Scotland's productivity performance underperforms compared with many advanced economies.

This report puts Scotland's productivity performance in context and asks what it can learn from places which have made significant improvements to one or more of its main drivers. Sizeable increases in productivity are notoriously hard to make happen, but modelling shows that even a small change can make a big difference.

Scotland's productivity challenge has a range of aspects. There has been little employment growth in our most productive industries; business investment is relatively low, as is R&D spending; we export less than the EU and OECD averages, from a narrow base of industries and firms; while the Scottish workforce is well-educated, it is not clear we make the most of it, given our relatively low levels of management quality and our high concentration of small, lower-productivity firms; recent declines in Scottish education survey scores are also cause for concern, as is our shrinking working-age population.

In order to stimulate a more thoughtful – and productive – conversation about how to address our lagging performance, the report looks at what has worked elsewhere. We tell evidence-based stories about five places which increased their performance: Sweden (high skill, high value); Ireland (internationalisation); Australia (negotiating major economic reform); Greater Manchester (acting as one city-region) and London (transforming school results). A set of lessons of success emerge from their experiences:

- a focus on evidence is necessary to diagnose and face up to problems, and then to develop and sustain a response.
- effort must be made to build consensus and collaboration across political parties, policymakers, business and trade unions. Without it, any progress will be fragile.
- reform must be underpinned by strong and credible institutions, which are independent of day-to-day politics, command the confidence of people across the country and are able to hold decision-makers to account.

In every case, there was a concerted effort to deliver, not just for a year or two but over a long period of time.

Finally, we found that a focus on skills was prominent in each place, providing access to opportunity for individuals as well as a boost to the productivity of the community as a whole.

There are no quick fixes to Scotland's productivity challenge. Productivity is a long-term game, and turning it around is something a whole country does – government, business, unions and others – by acting together.

Table of Contents

1. Introduction 3

2. What is productivity and why does it matter? 5

3. Scottish productivity: how we compare 9

4. Case studies 21

4.1 Sweden: high skill, high value 22

4.1 Ireland: embracing internationalisation 28

4.2 Australia: negotiating major reform 33

4.3 Greater Manchester: the power of cities 40

4.4 London: transforming school results 44

5. Lessons of success 49

6 Conclusion 54

Appendix: Scottish Policy Foundation Modelling ... 56

1. Introduction

1.1 What this report is about

This report looks at productivity in Scotland. It asks what we can learn from places which have made significant improvements to one or more of the drivers of productivity.

By putting Scotland's productivity performance in an international context and providing evidence-based stories of what has worked elsewhere, we hope to improve the quality of the debate about the future of Scotland's economy.

Looking at comparable countries (and/or places with similar levels of devolution) can be a powerful way to learn from what has worked in other places, and to set expectations for what can be achieved. But we are not suggesting that Scotland should necessarily adopt any of the approaches described– we will need to develop our own bespoke blend of answers. So we do not draw lessons from individual case studies, but instead lay out common lessons of success in the following chapter.

The report is not aimed solely at government because there is no single policy lever to pull, and no single responsible authority to do the pulling. Governments, businesses, communities and individuals all have a role to play: productivity is something a whole country creates, and from which a whole country can benefit.

The intended audience is therefore anyone who cares about the future of the Scottish economy. Only a small proportion of those are economists, and, as productivity is for most people an abstract economic concept, we have included a chapter explaining productivity and why it matters.

In a broad sense, the report is an invitation to join a conversation. Rigorous discussion about the future of our economy is an important part of achieving progress, and the nature of the discussion matters. By framing the issue in a fresh way, we hope to stimulate a more thoughtful – and productive – conversation.

1.2 What the report does not do

This report operates within current constitutional arrangements, not as a statement of political preference, but rather in recognition of the fact that the Scottish Parliament already possesses significant powers to influence long-term economic performance, including education, health, housing, planning, transport and economic development.[1]

The report does not seek to provide definitive accounts of how the Scottish economy works, or to provide a comprehensive list of what is important. For example, the report does not concentrate on economic inclusion, or the role of productivity in increasing opportunity. We also do not

[1] This is not to say that the UK Government does not also have an important role in promoting productivity in Scotland.

look at public sector productivity. These subjects are vital, but not the focus here.

Finally, we do not provide different possible scenarios for the global economy, the Brexit process or future constitutional arrangements. We focus instead on lessons Scotland can learn about raising productivity and living standards irrespective of what happens on these fronts.

1.3 How the case studies were carried out

We used a combination of methods to identify reasonably comparable countries, regions, or cities. First, we looked at headline productivity figures over the last three decades for OECD countries. We also directly identified places that are known to have improved performance significantly in one or more *drivers* of productivity.

We then examined the process through which these improvements were made, studied relevant expert research and analysis, and conducted interviews with participants where possible. Each case study was checked by experts.

It was important to ensure any case study was relevant to Scotland, in that the economy and political systems were not too dissimilar. Where a power that Scotland does not have was used, we sought to draw out the underlying concept of the changes made, and see if there were any lessons to be learned that were not related to the power.

1.4 How the report is structured

Chapter 2 discusses the nature of productivity, and asks why it is so important. Chapter 3 puts Scottish productivity in context. Chapter 4 presents five case studies, with a focus on what happened in each place, and how. Lessons from their stories are considered in Chapter 5, and the implications of these findings for Scotland are discussed in Chapter 6.

To illustrate how much difference to the economy various types of productivity increases could make, macroeconomic modelling is used to answer several ‘what if’ questions. Summary results are shown in Boxes 2, 3 and 4, and full details of the modelling can be found in the Appendix.

2. What is productivity and why does it matter?

2.1 What is productivity?

A country's productivity is the single most important determinant of its average living standards and wealth.[2] As a whole, the UK benefited from increasing productivity in the decade before the financial crisis in 2008.[3] Recently, however, productivity has stalled, depriving the country of economic gains and improvements in the standard of living.

At its simplest, productivity measures the efficiency with which people's work is converted into the goods and services which we consume. For example, if we think of a bakery in Glasgow as a micro-economy, the productivity of its workers (the bakers) could be measured by the value of the potato scones they bake over an average one-hour period. Productivity, in short, measures the economy's capacity to generate its total output from the labour it employs.

Productivity can be affected by a variety of factors which could be historical, environmental, political or demographic. Our Glasgow bakers, for example, could have benefited from an inheritance of a large amount of equipment, while their competitors in Edinburgh and Aberdeen may lack this advantage. The bakers in Glasgow may also have received better training, or their bakery may be more efficiently managed, leading to higher productivity.

2.2 Why does productivity matter so much?

Productivity is of central importance in economic policy as the more productive an economy becomes, the more goods and services it can produce. As a result, its residents can enjoy higher standards of living without requiring them to work more.

Returning to our bakers, becoming more productive would enable them to work the same hours as today but to sell more potato scones. As a result, they could buy a bigger house, consume more, or go on better holidays – all with no increase in the time they have to work. Likewise, if a baker becomes more productive in making potato scones, they have more time to allocate to the production of other items such as bread.

Given this, it should be no surprise that productivity is an important determinant of an economy's ability to expand: those that use raw inputs more efficiently to generate output (and thus GDP) can grow at a faster rate. Evidence shows that highly-productive countries often out-perform their low-productivity counterparts in per-capita income and health as well as other characteristics.[4]

Since at least the Industrial Revolution, people have

[2] For brevity we refer to labour productivity as "productivity" throughout.
[3] In Chapter 3, we will see that Scotland's productivity deficit predates the financial crisis. See McLaren, 2018. Since 2008, a productivity slowdown has affected all advanced nations, further increasing the challenge.

[4] Caselli, 2005; Jones, 2015; Sacks, et al., 2012.

speculated that growing productivity – especially through automation – might put jobs at risk. However, despite dramatic increases in productivity over the last 150 years, there is no evidence that there are now fewer jobs in the UK than there were in the past.

Productivity growth can nevertheless be disruptive: it may be accompanied by job losses in some areas, which are compensated by new opportunities in others. This is not a reason to avoid discussions about increases in productivity. Rather, it should prompt us to consider how best to mitigate any negative effects of changes in the nature of work and to support people to train, and re-train, to take advantage of the new opportunities that are emerging.

> Productivity isn't everything, but in the long run, it's almost everything.
>
> **Paul Krugman**

2.3 The main drivers of productivity

It is notoriously difficult to measure GDP and annual average hours worked, which are the components of productivity. (See Box 1). However, economists – who are not known for their ability to agree on things – do agree on the main drivers of productivity. In the following sections, we look at each of these drivers and ask how they can be improved so as to increase productivity over time.

Productivity is driven by a variety of factors. Workers may improve their productivity by being more highly skilled or trained, by having access to new machines or technology or by using more efficient processes.

Physical capital (like machinery, equipment or buildings) and workforce skill are the most basic of these drivers. In the Glasgow bakery, the bakers use their ability to mash and knead potato in combination with mixers and ovens to make a certain amount of potato scones. It makes sense, then, that the amount of physical capital each individual has to work, on average, and the skill level of an economy's workforce, are drivers of how productive they can be.[5]

In a globalised world, it also matters how favourably a country can exchange the goods and services it produces for the produce of others. If the Glasgow baker can sell their potato scones overseas at a higher price, because of clever marketing and a reliable delivery service, they will be better off without working longer hours.[6]

These factors above can be described as equipment, skills and terms of trade (economists refer to the first two of these as physical and human capital).

In addition to equipment, skills and terms of trade, economists recognise a fourth driver of productivity which they refer to as Total Factor Productivity, or TFP, for short.

[5] See Engelbrecht, 1997, on the role of workforce skill.
[6] See, for example, Feenstra et al., 2009, 2015; Cuñat and Zymek, 2018.

TFP is how economists refer to “everything else”. As such, it is more ambiguous and represents all determinants of productivity which do not fall into the previous categories. Many of these are the intangible lubricants of an economy’s production processes. For example, TFP may encompass how effectively equipment and skills are combined (“management quality”), and how well they are distributed across the economy’s sectors (“allocative efficiency”). In our bakery, high TFP may reflect experienced owners who have skilfully allocated bakers across tasks based on their competencies.

Many other facets of an economy feed its TFP. The amount of investment in Research and Development (R&D) and the degree of innovation can improve the efficiency with which workers, their skill and capital are utilised to generate output.[7]

Likewise, there are many aspects of a country’s legal and political systems which influence its productivity, and which economists place under the “everything else” label of TFP. For example, the openness of its labour market and the reliability and transparency of its legal system affect the ease with which business can be conducted in a country. These factors are often described as the country’s “institutions”, and they have been shown to have a significant effect on the value of output produced in an average hour of work.[8]

In Chapter 3, we provide an overview of Scotland’s productivity and its drivers and compare it to other regions and countries. We use available official statistics as well as novel calculations we made on the basis of official data.

Sometimes, there are several alternative measures of performance. In these cases, we conduct our analysis with their respective merits and limitations in mind. Sometimes data is sparse. In those cases, we use the best-available measure, taking guidance from earlier studies of productivity across countries (see Box 1).

Box 1 - Measuring productivity

For an economy as a whole, productivity is measured as Gross Domestic Product (GDP) per hour worked. GDP is equal to the total income generated within a country’s borders over a given period of time.

When looking at productivity in specific parts of the economy, challenges arise. For example, productivity is measured as economic value added divided by the number of hours worked. Yet “value added” can be difficult to measure, especially in services. It is more difficult still for public services (e.g. NHS healthcare, state schools).

[7] See, for example, Griliches, 1986, and Griffith, et al., 2006, respectively.
[8] See Acemoglu, Johnson and Robinson, 2004.

Measuring productivity (cont.)

On top of this, any attempt to assess Scottish productivity needs to face up to several additional obstacles. Scottish national accounts, which record data on GDP and hours worked, only go as far back as 1998. This means that a shorter time period is available for analysis than in many other EU and OECD countries.

There are some well-established international collections of data on the drivers of income and productivity differences across countries, such as the Eurostat and the Penn World Tables. But while the UK is covered in these collections, the coverage of its component parts is either patchy, or non-existent. Therefore, for the analysis of the drivers of Scottish productivity in Section 3, we had to calculate figures for Scotland ourselves. We did so using the best-available Scottish data from a range of sources, and methods commonly employed in research on international income and productivity differences.

Finally, while income certainly contributes to people's wellbeing, it is far from the only factor which makes for a happy and fulfilled life. Moreover, an economy's overall productivity says nothing about whether its rewards are distributed equally, or skewed towards a few.

3. Scottish productivity: how we compare

Scotland's productivity over the past fifteen years has remained broadly stagnant and has underperformed compared with many other European countries. While Scotland is more productive than most other regions of the UK, this comparison is limited as the UK as a whole has lower productivity than many other advanced economies.

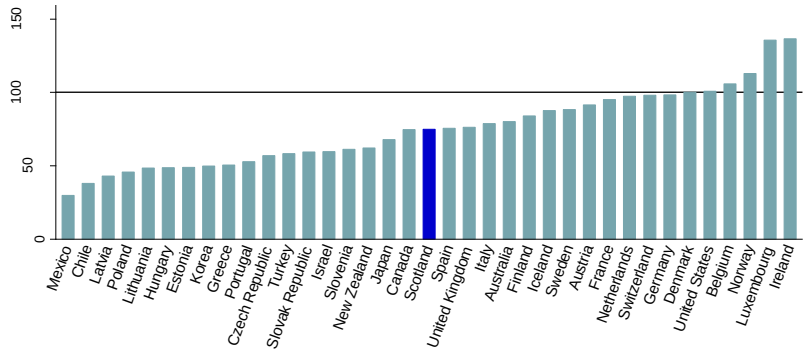
This section examines the evidence relating to Scotland's productivity in the UK and European context, and then goes on to detail Scotland's performance in terms of the drivers of productivity highlighted in Chapter 2.

3.1 Scottish productivity

Among UK regions, Scotland is behind only London and the South East for productivity, and among city-regions, Aberdeen and Edinburgh are second and third to London.[9]

However, a look beyond the UK reveals how much more might be possible. Scotland sits mid-table for productivity among OECD countries, and falls below other European economies such as the Netherlands, France, Italy, Germany, and Spain (see Figure 1). If Scotland wanted to move to the top quarter of the table, it would need to become roughly as productive as Denmark. Yet in 2014, its productivity was 20% lower than Denmark's.[10]

Figure 1 - OECD productivity, 2016[11]



Sources: OECD and Scottish Government.

The mix of a country's economic activities can have a large impact on its productivity. Like many other European

[9] ONS, 2018c. We use GVA per hour worked in UK regions due to lack of GDP data. Aberdeen's productivity is volatile due to dependence on the oil industry.

[10] Eurostat, 2017, and associated data.

[11] Productivity is PPP adjusted GDP in 2016 US dollars and prices per hour.

economies, Scotland is reliant on its services sector.[12]

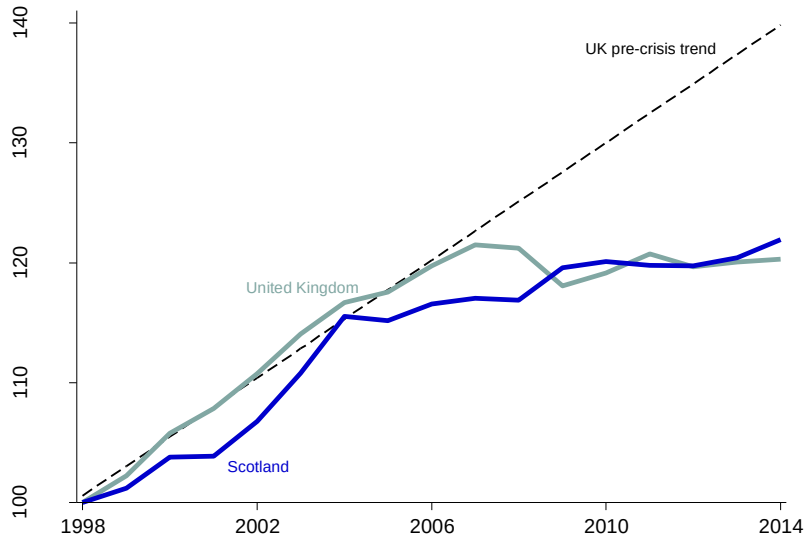
Financial services in Scotland are more productive than in all other parts of the UK except London. Similarly, Scottish manufacturing – which makes up 10.6% of Scotland's national income – is more productive than the UK average, and is outperformed only by the North West of England.[13]

Productivity Growth

Scotland has a low unemployment rate and its workers already work a high number of hours. Meanwhile, its working-age population is shrinking. This means that productivity growth will be of central importance to future increases in Scottish incomes and living standards.[14]

Scotland's productivity growth has been stagnant for some time. Figure 2 shows that since 2004, growth has slowed to a rate much lower than the trend up to this point. In the aftermath of the global recession, this stagnation has been exacerbated, with the UK the centre of a so-called "productivity puzzle", an unprecedented slow-down in productivity growth to virtually zero.[15] Figure 2 highlights that the same puzzle applies to Scottish productivity, but that the slow-down in growth actually began earlier.

Figure 2 - Scottish and UK productivity, 1998-2014[16]



Sources: Scottish Government, Penn World Tables 9.0, and authors' calculations.

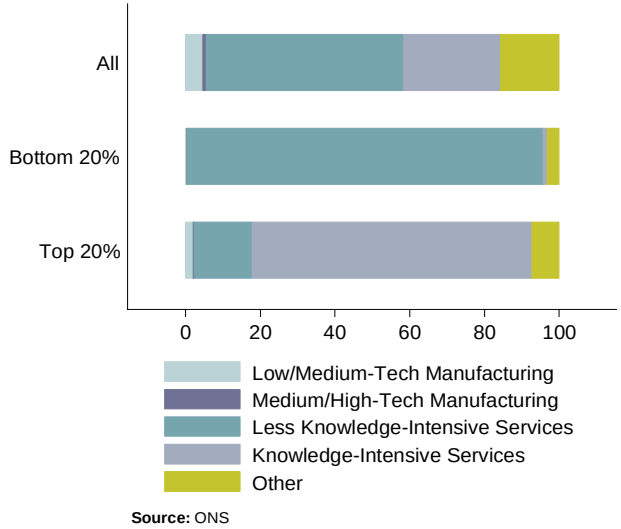
Between 1997-2017, employment growth has skewed away from Scotland's most productive sectors, the financial and manufacturing industries. As a result, many Scottish jobs are now concentrated in "less knowledge-intensive" services and "low-medium tech" manufacturing firms, which happen to be less productive (See Figure 3).[17] This trend can be observed

[12] It is important to disaggregate this large sector. Some parts of the services sector, such as financial services, are among the most productive. Others, such as healthcare and social work, constitute a much larger proportion of the economy. These types of services are inherently labour-intensive, and so have lower productivity: it would be inappropriate to expect them to achieve the productivity growth rates we might hope for in the economy as a whole.
[13] ONS, 2017e; ONS, 2018c.
[14] National Records of Scotland, 2018 & National Records of Scotland, 2017.
[15] See, for example, Barnett, et al., 2014, and Haldane 2017.

[16] Productivity is measured as GDP per hour at constant 2011 prices.
[17] ONS, 2018d. Knowledge intensity is determined by the proportion of tertiary educated workers in the industry. For example, architectural, accounting, and engineering services are considered knowledge-intensive.

across the UK, but is more pronounced in Scotland.[18]

Figure 3 - Industry shares of the least and most productive firms, 2015



Source: ONS

This highlights one possible way in which Scotland can meet its productivity challenge: by identifying the obstacles to growth in its most productive industries, such as the financial and manufacturing industries, and removing them where possible. As we will see in future chapters, the focus on driving growth in knowledge-intensive industries has been crucial for productivity growth in other European countries.

To identify other ways in which Scotland may be able raise the productivity of its workforce, we return to an international comparison. We have already shown that Scottish productivity is middling by OECD standards. In the following section, we dissect how this performance can be attributed to the different drivers of productivity outlined in Chapter 2. This points towards further lessons about productivity which Scotland can learn from elsewhere.

Box 2 - Modelling productivity growth in different sectors

The Scottish Policy Foundation's macroeconomic model exists to answer "what if" questions about the Scottish economy. We used it here to find out how much productivity would have to increase in the services sector and the manufacturing sector to achieve the same uplift in GDP.

According to the model, to achieve an increase in GDP of just under 0.4%, or £590 million, the required increase in productivity of the manufacturing sector would need to be 2.5 times as large as in services. Although services are less productive than manufacturing on average, they make up a bigger share of output in Scotland, so a small difference in service sector productivity would make a big difference to GDP.

See appendix for full results and further details of modelling.

[18] Ibid.

3.2 Equipment, skills and terms of trade

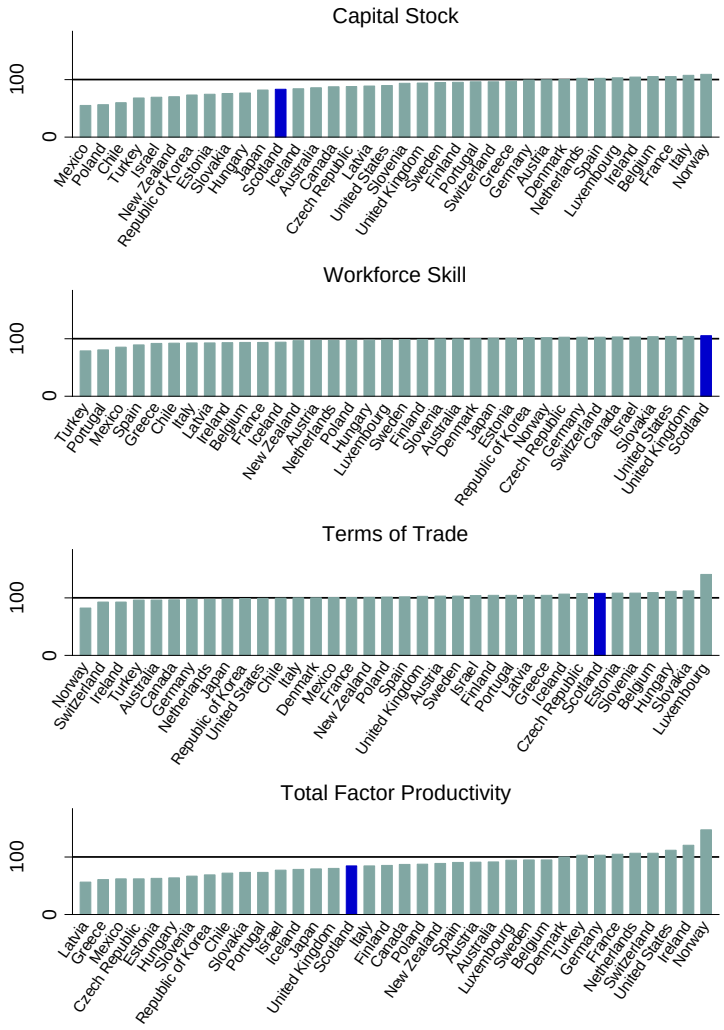
As outlined in Chapter 2, economists attribute productivity differences between countries to four different drivers – equipment, skills, terms of trade and TFP ("everything else"). Breaking productivity down in this way makes it easier to understand why some countries are more productive than others. Figure 4 shows how Scotland performs on each of these drivers relative to other OECD economies.

Equipment

Figure 4 shows that Scotland operates with significantly lower machinery, equipment and infrastructure ("capital stock") per worker than the most productive OECD economies. Its capital stock per worker was 17% lower than Denmark's in 2014.

The availability of equipment and infrastructure is the result of past investments undertaken. Business investment has been falling in Scotland since 1998, and is much weaker than in the UK, where total investment as a share of GDP has been consistently lower that 90% of OECD countries since 1997.[19] Figure 5 shows the trend on Scottish business investment over the past twenty years.

Figure 4 - Productivity drivers in the OECD, 2014

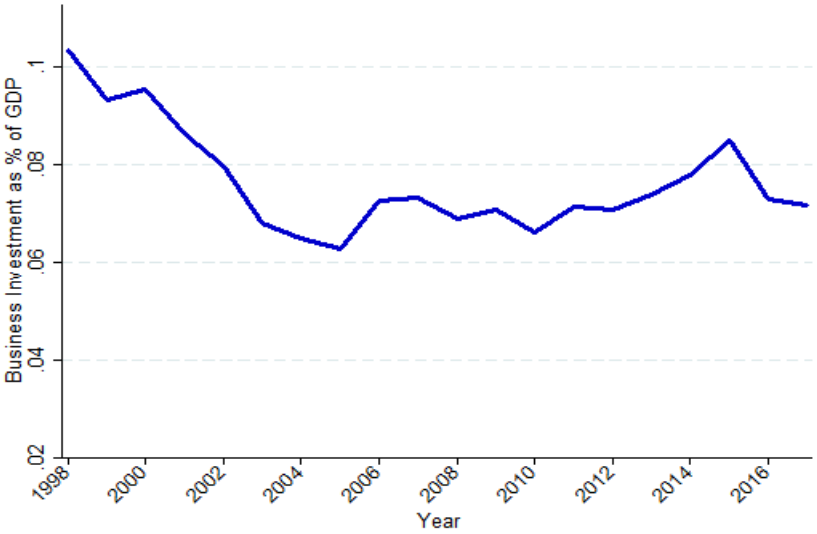


Sources: Scottish Government, Penn World Tables 9.0, and authors' calculations.

[19] See Fraser of Allander, 2018 and ONS, 2017a, respectively. The Scottish National Investment Bank (SNIB) is intended to increase business investment through the provision of patient capital.

The story with government investment is similar. While the Scottish Government has been investing more in fixed capital than the UK average, this investment has lagged considerably behind other developed countries: government investment spending as a proportion of GDP was less than roughly half of other OECD nations in 2015.[20]

Figure 5 - Business investment in Scotland, 1998-2017



Sources: Scottish Government and authors' calculations.

Skills

Scotland has a well-educated workforce, with a tertiary education attainment rate among the highest in Europe.[21] Figure 4 shows that Scotland has a similar level of workforce skill to the UK as a whole, one of the highest in the OECD.[22] Workforce skill is clearly not the reason for Scotland's current middling productivity.

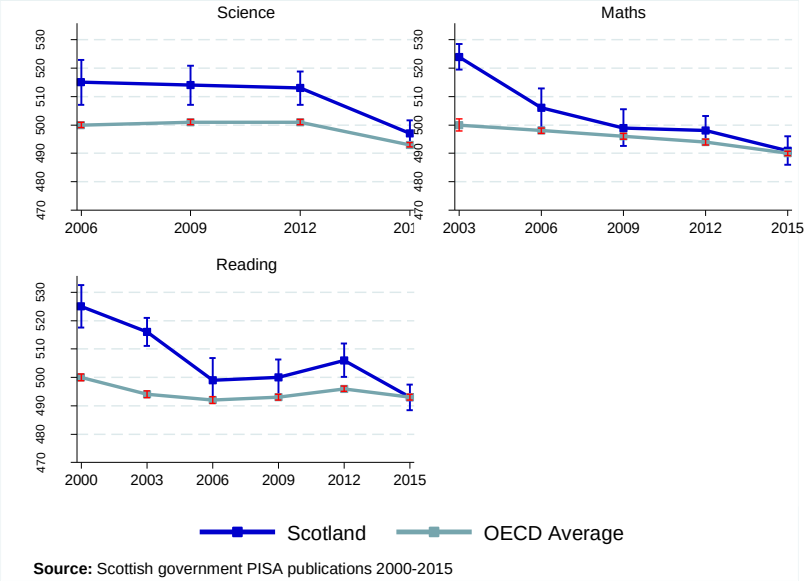
Looking to the future, it is important that Scotland provides first-rate education and training to those who have not yet entered the labour force. The OECD's Programme for International Student Assessment (PISA) scores show Scottish 15-year-olds, on average, obtaining scores in standardised tests of maths, reading, and science similar to the respective OECD averages.[23] There has, however, been a decline in the science and reading scores within Scotland over time, and no movement in maths scores (see Figure 6). [24]

Similar declines occurred in parts of the Scottish Survey of Literacy and Numeracy (SSLN) between 2011-2016. Over that period, fewer students aged 13-14 reached expected numeracy standards. And while reading, and listening and talking, scores in this age group stayed steady, by 2016 only 49% performed "well" in writing, a dramatic decline.[25]

Another challenge for the future will be the need for training and re-training to get ready for the challenges of digitalisation, which has been estimated as the source of up to 60% of productivity boosting opportunities.[26]

[20] Scottish Government, 2018b; OECD, 2015b.
[21] Eurostat, 2017, and associated data.
[22] Workforce skill is calculated as in Feenstra, et al., 2015.
[23] Scottish Government, 2016a.
[24] See OECD, 2018e for a detailed description of PISA assessments.
[25] Scottish Government, 2016c, Scottish Government, 2017c, associated data. The SSLN was discontinued in 2017.
[26] Remes et al., 2018.

Figure 6 - Scottish PISA results, 2000-2015[27]



Source: Scottish government PISA publications 2000-2015

Terms of trade

As can be seen from Figure 4, most OECD countries buy and sell goods internationally on similarly favourable terms of trade. Scotland appears to sell its exports at relatively high prices compared to its imports, giving a boost to its living standards. While international prices are not currently a drag on Scottish productivity, there are reasons to think Scotland could benefit even more from international trade.

Economies which export more tend to be more productive, as having a strong export base opens up the economy to external demand. Companies are forced by the competition to become more efficient, increasing innovation, investment, and ultimately productivity.[28]

As a share of GDP, Scotland's international exports are lower than the EU and OECD averages. Roughly 60% of Scottish exports go to the rest of the UK, with 17% going to the rest of the EU and 23% to the rest of the world respectively. Ireland and Denmark, two countries of similar size to Scotland, rely much less on their largest export markets, exporting around 13% to their largest trading partners.[29]

Scotland is also dependent on a small number of industries and firms for international trade. In 2016, despite only contributing to 10% of national output, manufacturing industries accounted for 52% of Scotland's exports. Scotland's largest export industry is food and drink, a large proportion of which is whisky. The narrowness of our export base is reflected in the Scottish Government estimate that more than half of Scotland's exports can be attributed to just 70 firms.[30]

TFP

Total Factor Productivity is the other component of productivity in which Scotland lags significantly behind the OECD's top performers. Figure 4 documents that Scotland's TFP is 15% lower than Denmark's. Since TFP is a catch-all for

[27] For Maths, scores from 2000 are not comparable, nor are those from 2003 and 2006 for Science. Vertical bars are 95% confidence intervals.

[28] OECD, 2018f, found that two major contributors to regional productivity were a large tradeable sector and well-functioning cities.
[29] Scottish Policy Foundation, 2018.
[30] Ibid.

determinants of productivity other than equipment, skills and terms of trade, the next section explores what factors may contribute to Scotland's relatively low TFP, including the business environment, the nature of companies, management quality, research and innovation, and demographics.

3.3 Other drivers of productivity

Business environment

Businesses often call for lower regulation and lower taxes, arguing that less stringent labour and other business regulations and lower corporate taxes, will lead to higher productivity. The UK, however, already has the third least-stringently-regulated labour market and the second least-stringently-regulated product market in the OECD, yet performs relatively poorly on productivity.[31]

Similarly, some nations which have higher productivity than the UK, such as Belgium and Sweden, have significantly higher total tax burdens on business.[32]

This suggests that lighter regulation and lower taxes are not an answer in themselves.

Research and innovation

There is less innovation activity in large Scottish enterprises than observed in other EU countries. Moreover, Scotland ranks sixth for spending on gross R&D per capita among the eleven UK regions, and spends substantially less as a share of GDP than the OECD average.[33]

Business R&D is similarly low. As a share of GDP, businesses in Scotland spend almost half as much on R&D as the UK average and spend less per capita than nine of the eleven UK regions. In 2015, almost two-thirds of OECD countries had higher levels of business R&D.[34]

Quality of Firms

The increase in the number of companies being registered in Scotland is often held up as a success story for the Scottish economy. However, 97% of private enterprises in Scotland consist of fewer than forty-nine employees and 71% have none (i.e. they are made up of a sole proprietor with no employees).[35] In 2017, such small businesses employed 43% of the Scottish workforce, and yet they tend to be characterised by much lower levels of productivity than medium and large firms (50+ employees) in the UK.[36]

While enterprise and innovation should be encouraged, many fewer firms end up operating at scale in Scotland than in other European countries.[37] The preponderance of these small (or

[31] Koske, et al. 2015; OECD Indicators of Labour Market Regulation. Also see Scottish Government policies on Fair Work and Pay here
[32] World Bank, 2018; European Commission, 2017.
[33] Gross R&D includes both business and government R&D. ONS, 2018b, Scottish Government, 2018a, and authors' calculations.
[34] Fraser of Allander Institute, 2018, Scottish Government, 2018a, OECD, 2018g, and authors' calculations.
[35] Scottish Government, 2017a.
[36] ONS, 2017b.
[37] Mason, 2018, provides an overview of the evidence. Coutu, 2014, describes the gap between the UK and other countries in detail.

micro) companies will only benefit the Scottish economy if they can be supported to grow effectively.

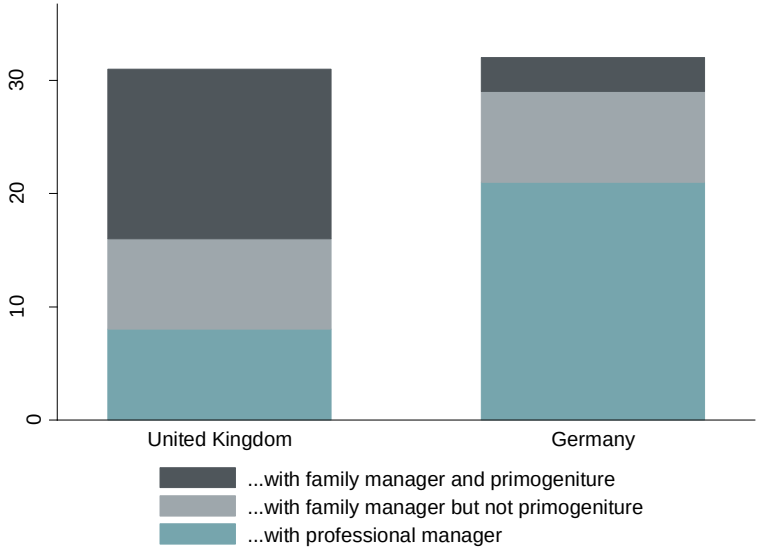
Management Quality

How well firms are managed is strongly associated with their productivity. According to World Management Survey (WMS) data, the percentage of managers scoring highly on evaluations of their practice is higher in Scotland than the UK, but much lower than in Sweden and Germany. Relative to other advanced economies, Scotland suffers from poor management quality, which may be linked to the small size of many of its firms.[38]

The management scores of multinationals, large businesses (with 250 employees or more) and non-family-owned businesses in the UK tend to be higher than those of domestic, smaller and family-owned businesses.[39]

Small firms, particularly those that are family run and in which management positions are passed down through the family – a practice more common in the UK than Sweden and Germany – tend to be poorly managed.[40] For example, as shown in Figure 7, professional management of family-run businesses is far more prevalent in Germany than in the UK.

Figure 7 - Management in family run businesses[41]



Source: Bloom and van Reenen (2007)

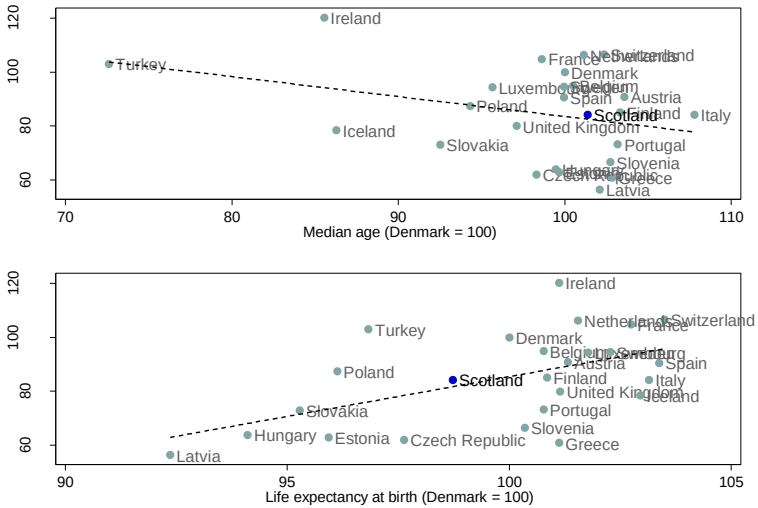
Demographics

The growth, age structure and health of a country's population are important determinants of its productive capacity.[42] Figure 8 illustrates that, among European countries, those with a younger population and higher average life expectancy tend to have higher levels of TFP and, hence, overall productivity.

[38] These statistics are from authors' calculations using WMS data. See Figure 13 for an international comparison of scores.
[39] KPMG, 2017. Management scores measure the presence of factors such as performance management, training and staff development
[40] Bloom & van Reenen, 2007.

[41] Firms are defined as family-controlled if second-generation family (or beyond) are the largest combined shareholder.
[42] Lisenkova, 2018, outlines the various ways in which the age structure of the population contributes to productivity, including in the UK.

Figure 8 - TFP and demographics, 2014



Source: Eurostat, Penn World Tables 9.0, Scottish Govenrnment, and authors' calculations

While Scotland's population has grown over the past two decades, this growth has been concentrated among older age-groups. Between 1997-2017 the number of individuals aged 75 and over grew by 31%, whereas the population of children between 0-15 decreased by almost 9%.[43] Projections suggest this trend will continue, with the largest increases in population in the next ten years 2026 being among those groups aged 65 and over, while the number of individuals in younger groups – including the working-age population – is expected to decrease.[44]

Most of Scotland's recent population increase has come from positive net in-migration, driven by those entering from outside the UK. Since the EU referendum in 2016, however, migration from overseas has begun to decrease and, consequently, so has overall net migration.[45]

Various aspects of health are strongly associated with the productivity of both individuals and countries.[46] As shown in Figure 8, Scotland has a much lower life expectancy than much of western Europe.[47] Scotland scores substantially lower than the OECD average in the organisation's measure of health – part of the "Better Life Well-Being Index".[48]

Finally, where people live relative to where jobs are matters to a country's economy: productivity is higher when people are able to access large numbers of jobs within commuting distance of where they live. Unsurprisingly, then, there is evidence to suggest that better functioning cities are more productive.[49]

3.4 Economic policy in Scotland

From its establishment in 1999, each successive Scottish Government has developed economic development

[43] National Records of Scotland, 2018.
[44] National Records of Scotland, 2017.
[45] Immigration can boost productivity in a number of way, such as improving skills and innovation. See, for example, Hunt & Gauthier-Loiselle, 2010.
[46] See, for example, Weil, 2007.
[47] This data is from 2014, however National Records of Scotland, 2017 note this is still the case based on the most recent data.
[48] OECD, 2018c and associated data for description of the index and the measures that are used to construct each; McSorley, 2018 provides UK regional performance.
[49] OECD, 2018f.

strategies.[50] Each saw productivity as playing a critical role.

The first of these, the 2000 "Framework for Economic Development in Scotland" (FEDS), outlined the importance of improved productivity to international competitiveness and sustained economic growth. This emphasis on productivity was mirrored in the 2004 FEDS, and also in the 2007 and 2015 economic strategies, the 2004 "Smart, Successful Scotland" strategy and the 2016 Labour Market Strategy. [51]

In a recent Fraser of Allander Economic Commentary, the Institute listed an additional 19 industry- and demographic-specific economic strategies. The same report highlighted that sitting below these government strategies are a wide range of authorities and advisory boards to oversee and inform decision making.[52]

In 2007 (and refreshed in 2011, 2016 and 2018) the Scottish Government set out a "National Performance Framework" (NPF) to provide "a clear vision for Scotland with broad measures of national wellbeing covering a range of economic, health, social and environmental indicators and targets".[53]

Eleven "purpose targets" were set for a range of social and economic outcomes, one of which focused on improving Scotland's productivity.[54] This target – to rank among the top quarter of most productive OECD countries – was an ambitious one; as shown in Section 3.1, it would have required Scotland to close a roughly 20% productivity gap. The NPF and its productivity target were set out immediately before the global financial crisis of 2007-08, and the subsequent recession. As highlighted in Section 3.1, however, productivity growth was already stagnant prior to 2007/8. The necessary productivity growth over the span of a decade has only ever been achieved by other OECD countries in exceptional circumstances, even during periods of prosperity.

In March 2018, changes to the NPF were approved by the Scottish Parliament that laid out new goals for the economy and established more transparent methods by which to assess progress towards them. Productivity remains of central importance in the framework.

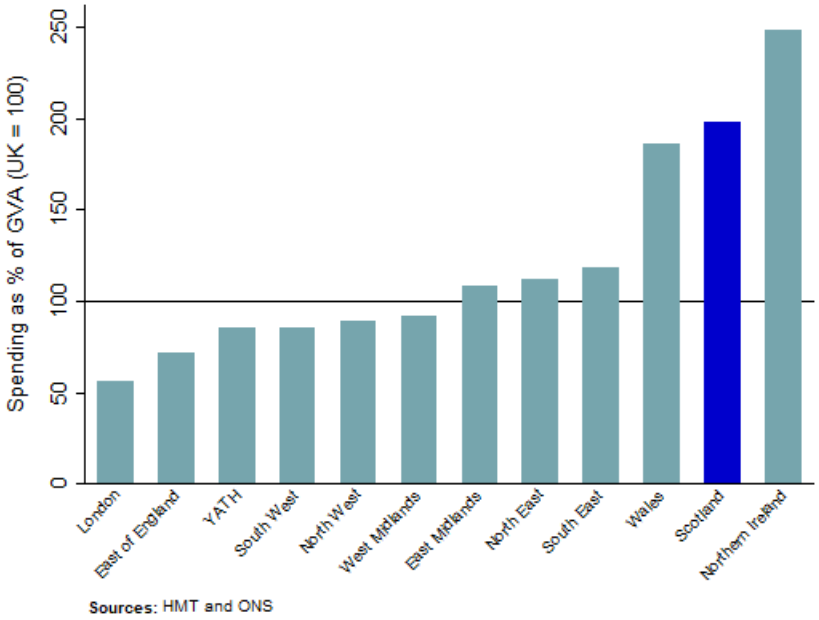
We spend a lot on economic development

In the 2016/17 financial year, the Scottish Government spent £1.04 billion on enterprise and economic development, which amounts to 1.5 and 0.8% of total expenditure and Gross Value Added (GVA) respectively, a much larger amount than most other parts of the United Kingdom. This pattern of higher spending on economic development has been consistent since the Scottish Parliament was established in 1999, and in the period since (see Figure 9).[55]

[50] Previously the "Scottish Executive", its legal name until 2012.
[51] Scottish Executive, 2004; Scottish Government, 2007; Scottish Government, 2015a; Scottish Government, 2004; Scottish Government, 2016b.
[52] The Fraser of Allander Institute article can be found here.
[53] For the latest, see here.
[54] The Purpose Targets can be found here.

[55] Scottish Government, 2017b; ONS, 2018a. GVA is GDP minus net taxes on products. We use GVA per hour worked in UK regions due to lack of GDP data.

Figure 9 - Regional spending on 'enterprise and economic development', 2016[56]



When looking at a broader measure of government investment in the economy – what the UN and OECD define as expenditure on "Economic Affairs" – a similar picture emerges: Scotland spends more as a percentage of GDP than the UK,[57] but less than two-thirds of European countries.

But productivity remains a major challenge

Despite these intentions to boost productivity, no progress has been made on the 2007 target, with Scotland still far away from the top quarter of the most-productive OECD economies.

3.5 Summing up

We have seen that Scotland's productivity is only middling when compared with other OECD economies, and that – despite sustained attempts by successive Scottish governments to raise productivity – there has been little productivity growth in Scotland over the last 15 years.

Our review of the evidence suggests that Scotland's productivity challenge has a range of aspects. There has been little employment growth in our most productive industries. Scottish workers operate with less machinery, equipment and infrastructure than their counterparts in the most productive OECD countries, and there is low business investment, and low R&D spending. We export less than the EU and OECD averages, from a narrow base of industries and firms. While the Scottish workforce is well-educated, it is not clear we make the most of it, given our relatively low levels of management quality and our high concentration of small, lower-productivity firms. Recent declines in Scottish education survey scores are also cause for concern, as is our shrinking

[56] Figures are for ***projected*** regional expenditure from ONS, 2018a and differ from adjusted figures published by the Scottish Government. As adjusted figures are not available for all regions we use the projections assuming errors are not systematic.

[57] See United Nations Statistical Division, 2000, for classifications of government spending, and Eurostat, 2018a, for data.

working-age population.

Figure 10 below shows whether Scotland's performance in drivers of productivity is above or below OECD and UK averages.

Figure 10 - Scotland's performance compared to OECD and UK averages[58]

	OECD	UK
Productivity	x	x
Equipment	x	x
Business investment	x	x
Government investment	x	✓
Workforce Skill	✓	✓
Terms of Trade	✓	✓
International exports	x	✓
TFP	x	✓
Gross R&D expenditure	x	✓
Business R&D	x	x
Health/Wellbeing	x	x

It is extremely hard to make large increases to a country's productivity. Indeed, there is a remarkable degree of stability in the rankings: most of the current top 10 in the OECD have been there for over 30 years. The UK has remained at a similar position since OECD records began in 1970.

However, Box 3, opposite, shows that even a very modest increase in productivity would make a big difference.

[58] The averages to which Scotland is compared are those referred to in the text. For example, Gross R&D is taken as a percent of GDP.

The next chapter introduces case studies of regions and countries which have experienced a turnaround on one or more driver of productivity. Chapter 5 then highlights what Scotland can learn from these examples in its quest for a more productive future.

Box 3 Modelling TFP Growth

We used the Scottish Policy Foundation's macroeconomic model of the Scottish economy to simulate a 1% growth in TFP, or "Total Factor Productivity", discussed in section 2.3. In short, TFP is all aspects of the economy that allow the workforce to use the physical capital at their disposal efficiently. As a result it is an important determinant of **labour productivity** – the amount of output that can be generated by an average employee in an hour of work.

The result of a 1% increase in TFP amounts to just over £2.3 billion extra GDP – a sizeable increase for modest change in the efficiency with which output is produced.

Appendix A provides full results and further details of modelling.

4. Case studies

Learning from other places

Many aspects of an economy, such as its industrial make-up, workforce, physical capital and institutions, drive its productive capacity. Devolved powers in Scotland significantly affect these drivers and therefore productivity. The Scottish Government has the power to influence, among other things, workforce education, investment in the infrastructure used by businesses, funding for R&D, and how well our cities work.

Findings from overseas cannot be imported wholesale to Scotland. The experience of most places in the world is of limited usefulness when thinking about Scotland, as they do not share sufficiently similar characteristics. Useful insights can be better gleaned from places which are "reasonably comparable" to Scotland.

Our examples, therefore, were selected not only on the basis of proven success, but also because they had reasonably similar characteristics to Scotland, such as demographics and political frameworks. So, for example, there are no Asian places in our sample, as Asian countries generally have markedly different political systems. In particular, countries that are not democracies were excluded.

Some of the better performing nations also do not make for good or relevant comparators because the structure of their economy is too different. For example, the huge scale of Norway's capital-intensive extractive sector explains its high rate of productivity, while Luxembourg's statistics are flattered by the attribution of economic activity solely for tax purposes. Finally, data availability at sub-state level is very limited. This meant that we were unable, for example, to look at the experience of individual German *lander*.

The Greater Manchester and London case studies focus on *specific* drivers of productivity: urban infrastructure investment and school education respectively. Sweden, Ireland and Australia, meanwhile, tackled the need for wide-ranging reform in their economies.

Scotland is different to all these places, and we do not suggest that any of the models described should be adopted here – we will need to come up with our own bespoke solution. So, we do not draw lessons from individual case studies, but rather lay out common lessons of success in Chapter 5.

List of case studies

Sweden – high skill, high value

Ireland – embracing internationalisation

Australia – negotiating major reform

Greater Manchester – the power of cities

London – transforming school results

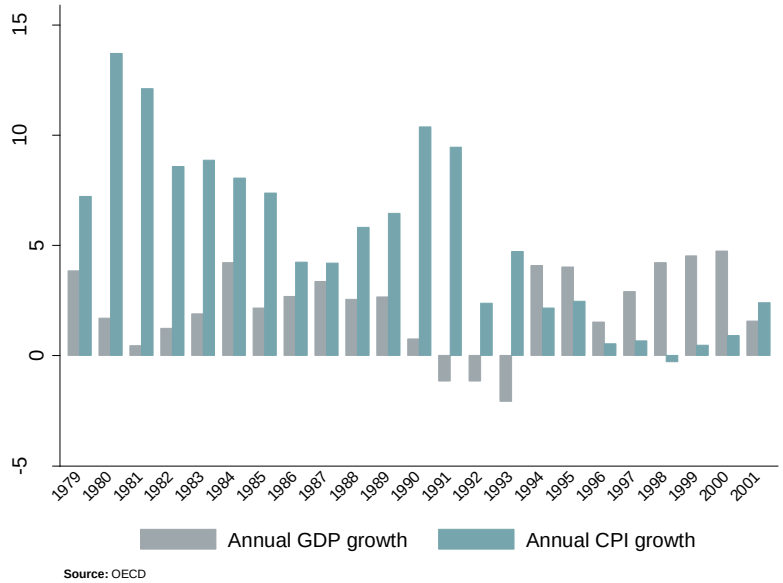
4.1 Sweden: high skill, high value

Sweden and other Nordic countries are often cited as examples of what Scotland should aspire to be: small countries with high levels of social protection, high living standards and open but resilient economies. Much has been written about Sweden's welfare state and the political consensus that exists around it. Less has been written about how the country emerged from a prolonged period of stagnation and a major slump to stabilise its economy and improve productivity without sacrificing the character of its famously well-funded and activist state.

During the 1980s, Sweden experienced low GDP and productivity growth, high inflation, and a large fiscal deficit. In the early 1990s, this culminated in a financial crisis which in many ways presaged the global crisis of 2007-08. Figure 11 shows that, by 1993, Sweden's GDP had fallen for three consecutive years. The fiscal deficit stood at just over 13% of GDP.[59]

The Swedish crisis created a cross-party consensus that broad reforms were needed to turn the economy around. New budgetary rules and institutions were devised to improve Sweden's fiscal position. Labour market regulations were relaxed. Changes in competition law and the break-up of public monopolies created opportunities for entrepreneurship. Moreover, protectionist policies were removed to open Swedish capital markets to foreign investment.[60]

Figure 11 - CPI and GDP growth in Sweden, 1978-2002



In the wake of these reforms, from the mid-1990s until the onset of the global financial crisis, Sweden experienced substantial productivity growth. From ranking 20th among OECD countries in terms of GDP per hour worked in 1990, the country jumped to 10th by 2007. Sweden is now also considered to be among the easiest and most competitive

[59] OECD, 1995.

[60] Neyman, et al., 2015; Folster & Kreicbergs, 2014.

economies in which to do business, being ranked 10th and 7th on each measure by the World Bank and World Economic Forum respectively.[61]

During the 1990s, Sweden was able to forge a more open, competitive and dynamic economy, despite high taxes and a continued strong involvement of the state in economy affairs. It did so in large parts by reining in budget deficits through a new, more credible management of fiscal policy; by promoting participation in a flexible labour market while protecting its workforce; and by enabling investment in high-value industries.

Fiscal discipline through credible institutions

Like Ireland, the Swedish economy became significantly more competitive and internationally open during the 1990s. The deregulation of many state-dominated markets reduced the barriers to entrepreneurship, as defined by OECD measurement of market regulation.[62] At the same time, the removal of barriers to foreign investment caused the foreign ownership of Swedish companies to increase rapidly from 7% to 40%.[63]

Unlike in the case of Ireland, this international competitiveness was achieved in spite of a high-tax environment. Sweden has the third highest VAT rate among EU member states, and is among those with the highest average marginal income tax rates at 57%.[64]

This is possible because some revenues are spent on improving drivers of productivity that make Sweden an attractive place to do business: the Swedish government spends a larger share of GDP on public investment than any other OECD member country. Furthermore, a range of institutions have evolved to monitor and enforce fiscal discipline.

The Swedish crisis of the early 1990s, and the widespread public dissatisfaction it generated, forced the Swedish government to reduce its deficit and introduce new budgetary rules and institutions. The objective of these was to lock political parties into longer-term budgeting processes which would provide greater certainty about the path of public finances.

A deficit goal of 1% over the business cycle was established, and budgets – set within a margin to allow for inflation and any unforeseen events – were required to be written three years in advance to reduce overspending in the case of tax windfalls. In addition, the monitoring of economic and fiscal developments was handed to two independent institutions.

The central bank became formally independent in 1994, charged with managing monetary and exchange-rate policy, and the analysis and forecasting of macroeconomic developments. Furthermore, the Swedish Fiscal Policy Council was established in 2007 with the aim of providing

[61] World Bank, 2018; Schwab, 2018.
[62] Neyman, et al., 2015.
[63] Henrekson & Jakobsson, 2003.

[64] The European Commission provides information on tax rates here.

independent assessment of government policy and spending. Made up of eight academic economists, the Council reviews progress towards government targets every year, and evaluates the government's statistics.[5]

In 1998 the long-term "Convergence Plan", assessing the economic outlook and the previous year's policy impacts as well as making recommendations on regional budgets, was put in place for the Swedish economy.[65] Today Sweden is among the most equal of OECD countries and each region has a GDP per capita above the EU average.[66] The inclusive nature of Sweden's economic model also finds its reflection the country's labour market policies.

Using, protecting, and developing the workforce

As part of the reforms of the 1990s, the Swedish Government set about reforming the labour market, with the aim of increasing its flexibility while maintaining the protection of those in work. After the breakdown of centralized wage-bargaining in the 1980s that resulted in uncoordinated agreements within industries, action was taken to organize this process. By 1997, the Industry Agreement, enabling coordinated, industry-level wage bargaining, was concluded.

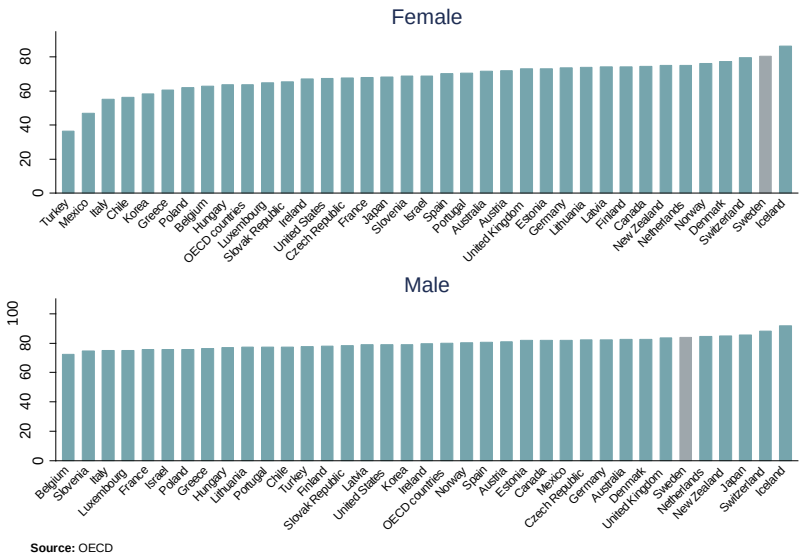
At the same time, restrictions applying to temporary work contracts were removed, in order to make it easier to find temporary jobs. However, the strict employment protection enjoyed by those in permanent work was maintained, and continues to be in place today, with Sweden having the strictest employment protection among all Nordic nations for those on regular working contracts.[67]

There are also now numerous policies in place designed to encourage participation in the labour market. For example, low earners are afforded certain tax breaks; subsidies are given to employers who offer jobs to the long-term sick or unemployed; and parents are protected by generous leave policies. In 2013, Sweden had the fourth highest expenditure on parental leave among OECD countries.[68]

Many of the rights parental leave policies provide, such as 390 days of leave paid at 80% of a parent's full wage, are available to both parents for each child and are extended until the child's eight birthday. Childcare is also subsidised in Sweden, meaning couples have the fourth lowest net costs for childcare in the OECD.[69] This has helped Sweden achieve the third highest participation rate among OECD countries, and the second highest for females (see Figure 12).[70]

[65] Detailed information on the FPC can be found here.
[66] Eurostat, 2018b.
[67] OECD, 2017a.
[68] Forslund & Krueger, 2008, outline labour market policies in Sweden. Detailed information on OECD countries' parental leave systems can be found here.
[69] OECD, 2017a.
[70] OECD, 2017b.

Figure 12 - OECD Labour force participation rates, 2017



Source: OECD

Adding to this, industrial relations are uniquely organised in Sweden. As of 2015, 90% of employees in Sweden are covered by a collective bargaining agreement, and the proportion of all employees who are members of a trade union, is the third highest in the OECD.[71] A self-regulatory wage-setting approach is used, allowing agreements to be made between employers, unions, and employee organisations that account for competitiveness and productivity.[72]

Sweden spends well above the EU average on educating its workforce. In 2016, investment in education was 6.5% of GDP in comparison to an OECD average of 5.2%.[73] Consequently, Sweden has the highest rate of participation in lifelong learning in this group of countries, with 66% of those aged 25-64 engaged in formal or non-formal education.[74] Also, tertiary education is frequently obtained later in life in Sweden, with only 75% of first time graduates being under 30, the lowest proportion among Nordic countries and far below the OECD average of 82%.[75]

"Value-high innovation-high" investment

In addition to high public investment, Sweden also stands out for its high gross spending on R&D. In 2016, out of all OECD economies only Korea and Israel out-spent Sweden in this category as a percentage of GDP. In the same year there were 14.4 R&D personnel employed per 100 workers in Sweden; only Denmark had more R&D personnel per worker. Business expenditure in this category was 2.4% of GDP in 2015, in comparison to only 0.07% in Scotland.[76]

Swedish firms undertake large-scale investments in so-called intangible assets – that is, in computerised information, innovative property, and economic competencies.[77] Relative to OECD countries for which data are available, Sweden's investment in such assets is second only to the United States and is roughly as high a percentage of GDP as tangible business investment, which refers to the investment in

[71] OECD, 2017b.
[72] Schwab, 2018.
[73] OECD, 2018b.
[74] OECD, 2014.
[75] OECD, 2015a.
[76] OECD, 2018g,
[77] OECD, 2013.

traditional machinery and equipment.[78]

This investment in intangible R&D is not a recent feature of Sweden's economy. Between 1930-80 extensive research and development was carried out in operations management and workplace organization within industry.[79] Characterised by high levels of trust and a flat hierarchy with decentralized decision making, today Sweden's management style is unique.[80]

As a result of this sustained R&D, Sweden has the highest patenting rates among OECD countries[81]. As Figure 13 shows, Sweden also has one of the highest percentages of well managed firms among EU countries, according to figures of the World Management Survey (WMS). Only Germany has a (slightly) larger percentage of well-managed firms.

Sweden's high-quality management practices are highlighted by Nicholas Bloom and John van Reenen, two of the lead researchers behind the WMS.[82] The OECD points to Sweden's high rate of investment in intangible assets as a potential reason for its good management practices.

Figure 13 – Management quality and TFP[83]

Sources: WMS, PWT 9.0, and authors' calculations.

All of this makes Sweden an ideal place for knowledge-intensive businesses, and it has been embraced by them: the knowledge-intensive share of employment in Sweden is among the highest among OECD countries, and businesses are well integrated in to global value chains.[84]

Innovation has also fostered a culture of entrepreneurship in Sweden, with the Global Entrepreneurship Monitor's entrepreneurial spirit index ranking Sweden as the second most entrepreneurial country amongst those at a similar level

[78] OECD, 2015c; Corrado, et al., 2012.
[79] Isaksson, 2008.
[80] Bloom, et al., 2012.
[81] See OECD, 2015c for comparison of Sweden's patenting rates.
[82] For example, Bloom & van Reenen, 2007; Bloom & Van Reenen, 2010.

[83] Countries used are those in which firms are surveyed by the WMS.
[84] OECD, 2015c.

of development.[85] Importantly, Swedish start-ups have also scaled in to high-growth firms, with six billion-dollar companies emerging from the country since 2003.[86] This means that Sweden is now one of Europe's most prolific tech hubs, and Stockholm has produced the second most billion-dollar companies per capita behind the United States' Silicon Valley.[86]

Weathering the global financial crisis

The Swedish economy was hit hard by the 2008 financial crisis: output fell dramatically more than hours worked, resulting in a large drop in measured productivity: from ranking 10th for GDP produced per hour worked among OECD countries in 2007, Sweden fell to 26th in 2008[87].

This was temporary, however, and partly due to the flexible nature of the country's post-reform labour market. Sweden saw a much smaller decline in full-time employment during the crisis than many other OECD members due to the labour market's ability to rapidly adjust wages and labour costs.[88] Consequently, Sweden has enjoyed a much stronger recovery than most OECD countries.

[85] Global Entrepreneurship Monitor, 2018.
[86] See, for example, Atomico & Slush, 2017.
[87] OECD, 2018a.
[88] Ulku & Muzi, 2015.

4.1 Ireland: embracing internationalisation

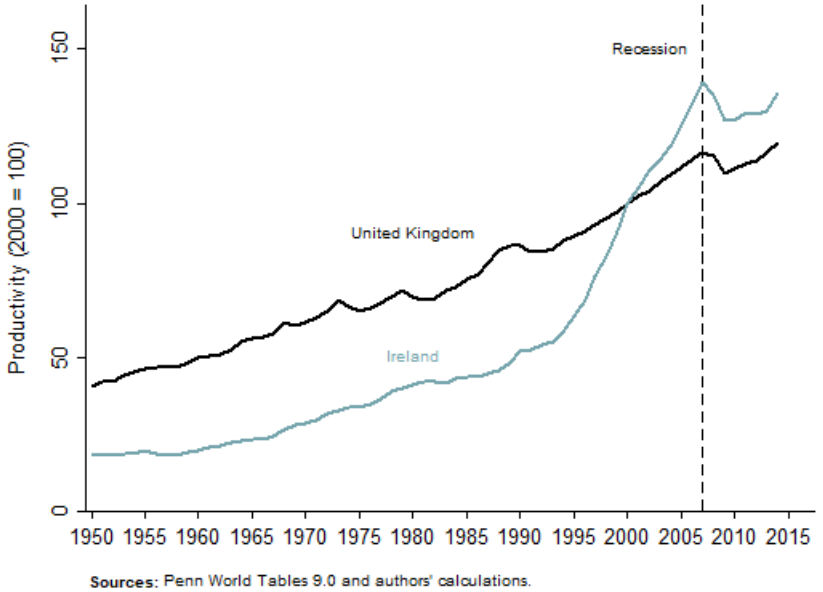
For the majority of the 20th century, Ireland's economy lagged behind those of other Western European nations, earning it a reputation as the region's "sick man". By 1986, there was 17% unemployment, a fiscal deficit of around 12% of GNP, and the second highest government debt in the OECD.[89] Net migration from Ireland was negative for decades, and many Irish families watched their children leave for better economic opportunities elsewhere. The contrast with the Ireland of today could not be starker. Thanks to rapid growth from the second half of the 1980s on, Ireland's economy now ranks among the most prosperous and productive in the OECD.

Facing up to the challenge

Widespread frustration about Ireland's decades of economic stagnation and mass emigration finally led to the growth of a consensus for change by the mid-1980s. This was accompanied by the rise of a new sense of confidence that Ireland could, and indeed had to, compete on the world stage.[90]

Politicians of all parties gradually placed domestic divisions to one side in order to focus on economic goals and, in 1987, the first of six successive "social partnership accords" aimed at turning around Ireland's economy was adopted.

Figure 14 - Productivity in the UK and Ireland, 1950-2014[91]



The "Programme for National Recovery" was a three-year national agreement between the government and a range of social partners: the Irish Congress of Trade Unions, the Federation of Irish Employers, the Construction Industry Federation, and farming organisations. Public spending was cut and workers accepted pay restraint.

These sacrifices in the name of fiscal discipline sent a credible signal to international investors that Ireland was serious about

[89] OECD, 1999.

[90] Kennedy, 2015, outlines the longstanding perception that the Irish were "hard done by", and Foster, 2004, highlights the changing of this attitude from the late 1980s onwards. Alexander, 2003, comments: "It's hard to be a victim when you are richer than the mother country".

[91] Productivity is measured as GDP in constant 2011 prices per hour worked.

its economy and maintaining fiscal stability. [92]

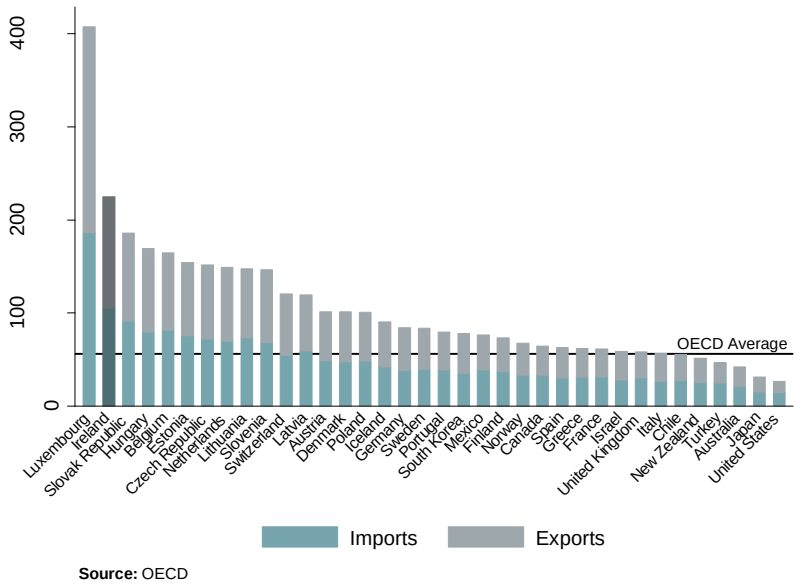
Internationalisation

During the first half of the twentieth century, the Irish economy was heavily reliant on agriculture and trade with the UK. In 1960, roughly 75% of Ireland's exports were to the UK.[93] Figure 15 shows the dramatic increase in Irish trade with other countries over the past sixty years.

Ireland took full advantage of access to the European Union's Single Market – the sale of goods and services to Member States other than the UK today makes up 38% of total exports.[94] Ireland also took advantage of its use of the English language and its links with the United States. Trade with all foreign countries surged from 114 to 163% of GDP in the eight years between 1990-98.[95] Today, Ireland's is one of the world's most open economies.

Ireland developed a range of policies to foster new domestic firms and facilitate access to international markets for those with high-growth potential. Significant tax reliefs on exports and grants for capital investment were introduced. Credit was made easier to access, and there was a shift away from supplying capital to taking equity in growing businesses, and to offering services that aided their development.

Figure 15 - Total trade in OECD countries, 2016[96]



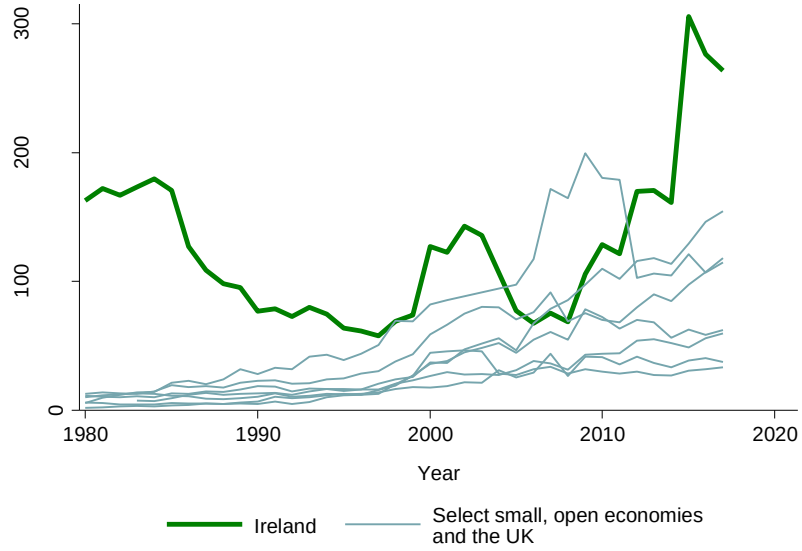
Source: OECD

Although corporation tax had been relatively low since the 1950s, the 1990s saw Ireland adopt some of the lowest corporate taxes in the world. While there have been small changes to the tax structure and rates since the 1990s, this is still the case today. This has contributed towards high levels of inward investment in Ireland compared to similar open economies and the UK (see Figure 16).

[92] Alexander, 2003.
[93] Bradley, 1999.
[94] CSO, 2018.
[95] OECD, 1999.

[96] Total trade is measured as exports plus imports as percent of purchasing-power adjusted GDP.

Figure 16 - Inward FDI stocks in Ireland and select countries, 1980-2016[97]



Sources: UNCTAD Stat.

Finally, and perhaps most importantly, Ireland established and developed strong economic institutions. First established in 1949, for two decades the Industrial Development Authority (IDA) acted as a government body within the Department of Industry & Commerce. The IDA's strategic approach then developed in tandem with Ireland's overall economic strategy, its purpose evolving over time to match the government's approach to increasing productivity and growth. The lowering of corporate tax rates followed the 1994 restructuring of the IDA to solely focus on the promotion of Ireland to foreign firms and investors in high-performance, high-employment sectors, further facilitated by the deployment of cultural and diplomatic services to promote Ireland abroad. Following the GFC, the IDA developed a forensic targeting focus on IT services. By 2017, 210,000 people in Ireland were employed in firms supported by the IDA.[98]

This deliberate pursuit of attracting high-value activity has resulted in consistently high levels of innovation,[99] but also means that headline productivity is buoyed by the efficiency of foreign-owned firms residing in Ireland.[100] Domestic firms in all manufacturing and services sectors lag behind severely in output per hour worked.[101]

Concerns over how much of this international activity was embedded within local supply chains led to efforts to more closely link those of foreign-owned firms with domestic companies, for example by highlighting opportunities for the latter to supply firms based overseas.[102]

Ireland has also pushed to increase the amount of R&D carried out in the country by multinationals, aiming for spill-overs in knowledge, technology and, ultimately, productivity.[103] Policy instruments included the use of R&D tax credits, the re-structuring of public investment in R&D activities, and the

[97] SOEs are Switzerland, Norway, Sweden, Belgium, Netherlands, and Denmark.

[98] Industrial Development Agency Ireland, 2017.
[99] Scottish Government, 2015b; World Bank, 2018.
[100] Using Gross National Income rather than GDP places Ireland much closer to countries like the US, France and Germany in terms of productivity, albeit ahead of the UK and the OECD average.
[101] Irish Department of Finance, 2018.
[102] OECD, 2018d.
[103] Irish Department of Business Enterprise, and Innovation, 2015.

establishment in 2016 of the “Knowledge Development Box”, whereby firms can claim tax reliefs on profits arising from an asset or intellectual property developed within Ireland. This approach has helped attract digital companies such as Apple, Google and Microsoft, as well as convincing major life sciences companies like Wyeth and Pfizer to move their R&D activities to Ireland.

Attracting and developing skills

Low corporate tax rates would not have been enough in themselves to effect Ireland’s internationalisation; after all, the country had had relatively low corporate tax rates since the 1950s. The right kind of labour supply was also necessary for overseas businesses to invest, and successive Irish governments recognised the importance of skills.

During the economic stagnation of the 1980s, net migration from Ireland was negative. In the 1990s this was reversed with those moving to Ireland outnumbering those moving away.[104] Both returning migrants and foreign immigrants over this period were, on average, more educated than the general population.[105]

This influx of skilled labour helped lift Ireland’s productive capacity. The inflow of highly-educated workers continued until the onset of the Global Financial Crisis (GFC) which resulted in many leaving and a drastic reduction in those arriving.[106]

Ireland’s indigenous working-age population also became increasingly educated. One reason for this was the investment in education made by Irish governments during the 1960s, including the introduction of free secondary school education. The fruits of this spending were realised in the 1990s as the first cohorts to benefit entered the labour market with, on average, higher levels of education than those who came before them.

Since the turnaround of the 1990s, Irish governments have worked to maintain and further develop workforce skills through the implementation of education and skills strategies. Ireland now ranks 19th globally and 10th among Western European countries in terms of human capital, as measured by the World Economic Forum’s index. The UK’s positions in the same rankings were 23rd and 12th respectively.[107]

This high level of human capital among the Irish workforce is an asset the IDA has used to draw investment from foreign businesses to Ireland. It also actively promotes itself as a varied, multi-cultural workforce, the skillset of which is boosted by the high proportion of non-Irish nationals based in the country.[108]

[104] Fitz Gerald & Kearney, 1999.
[105] Barrett & Trace, 1998.
[106] For example, CSO, 2017.
[107] World Economic Forum, 2017. Data for Scotland is not available.
[108] See IDA website.

All strategies involve trade offs

Such a pronounced turn to openness carries risks. The small, open nature of the Irish economy and its large dependence on inward investment meant Ireland was hit particularly hard by the GFC.[109]

Income inequality is also high in Ireland. Before redistribution, it is the second most unequal country in the OECD behind Greece, while post-redistribution, Ireland ranks in the middle, with the largest gap between the two measures.[110]

[109] It should be noted that a decade-long housing bubble, extraordinary growth in credit and poor macroeconomic policies were also involved.
[110] OECD, 2018d.

4.2 Australia: negotiating major reform

Australia – a small open economy with high living standards and a political system marked by multiple tiers of government – provides an important example of the power of economic reform and the steps governments can take to ensure change is understood and accepted by the public.

Over the course of the 1980s and 1990s, Australia undertook a series of significant economic reforms aimed at improving productivity, economic growth and the wellbeing of the population. This process was undertaken by a progressive federal government in conjunction with labour unions, business and State governments, and has had lasting benefits for Australia's economy.

Australia's highly-protected economy faced a number of challenges

Australia enjoyed a period of relative economic success after the Second World War due in part to the strength of its agricultural and mining exports, but by the early 1980s was facing a number of significant economic challenges. Economic policy in this period consisted of a system of protection for local industry, coupled with high levels of regulation and intervention in product and service markets. This system included high tariffs, exchange rate controls, centralised wage-setting and Government ownership and control of transport, telecommunications and utilities infrastructure.[111]

These policies protected industries from overseas and even domestic competition. Businesses continued to use outdated technologies and work practices, investment was directed towards products without long-term potential to add value and many businesses failed to pursue gains from increasing their scale.[112] As a result, Australia's productivity stagnated, growing at 2.5% annually between 1950 and 1973 relative to the OECD average of 3.5%.[113]

Australia's reliance on commodity exports left it exposed to international price movements. When agricultural export prices fell in the 1970s, weak underlying productivity growth was exposed. GDP per-capita in Australia fell from 5th in the world in 1950 to 9th in 1973, and 15th by the late 1980s.[114]

Accompanying the productivity slowdown were other economic challenges including high inflation (above 10% for much of the 1970s and early 1980s) and a high rate of unemployment (10.2% at its peak in 1983).[115] Growth in GDP slowed and Australia experienced a recession in 1983, with journalist Paul Kelly reflecting that "there was a fairly pervasive sense of national stagnation and decline".[116]

[111] Productivity Commission, 1999.

[112] Ibid.
[113] Banks, 2005.
[114] Ibid.
[115] See figure 20.
[116] Kelly, 2000.

A series of reforms made Australia's economy more open, more flexible and more competitive

In 1983, Australia elected a government led by Prime Minister Robert "Bob" Hawke and Treasurer (and later Prime Minister) Paul Keating. Over the course of more than a decade, this government significantly reformed the policies and systems that governed Australia's economy. These reforms can be broadly grouped as follows:[117]

Trade and capital market liberalisation – the process of "opening up" Australia's economy began with the floating of the Australian dollar in March 1983, followed by the removal of some industry protections. Then, from 1988, the government implemented a series of across-the-board tariff reductions which left most tariffs below 5% by the mid-1990s. As these reforms took effect, businesses in Australia were faced with greater international competition, driving them to become more productive and also creating pressure for other reforms.

Labour market reform – Australia's centralised industrial relations system was one area where international competition created pressure for change. Through an "Accord" with the trade union movement, the government secured support for wage restraint and changes to the wage-setting system in exchange for other social policy changes (discussed below). In particular, the introduction of enterprise bargaining as an alternative to industry-wide negotiations created a system in which wages more closely reflected the productivity of a particular business, improving the incentives for both workers and managers.

Infrastructure, network and competition reforms – regulation and government monopolies in sectors such as transport and utilities were a further barrier to more productive product and service markets. From the late 1980s, the government began partially deregulating sectors such as airlines, coastal shipping and telecommunications. In 1995, the Federal Government and Australia's six state governments came together to establish the National Competition Policy (NCP), under which all governments implemented a co-ordinated set of reforms to allow greater competition in energy, telecommunications and transport as well as the removal of anti-competitive regulation and the introduction of competitive neutrality principles for government business enterprises.

Macroeconomic reform – inflation targeting was introduced in 1993 with the Reserve Bank of Australia given independence in the management of monetary policy. Efforts were also made to reduce government debt (through asset sales) and increase national saving (through compulsory retirement savings) to reduce Australia's current account deficit.

Taxation reform – in the late 1980s, the government reduced the rates of personal income tax and corporate tax and broadened the base of these taxes, including through the introduction of income tax on capital gains. This helped improve economic incentives while also improving allocative efficiency in the economy.

[117] For more detail on these reforms, see for instance: Banks, 2005; Sims, 2013; Shanahan, 2009.

Australia's Productivity Commission has noted that "reform did not proceed according to a predetermined blueprint" and that changes were implemented "gradually, sequentially in a number of important respects, and in an order determined in part by opportunity and political judgement".[118]

Nonetheless, together these reforms represent an ambitious transformation of Australia's economy. This transformation was made possible by a number of factors, including the existence of detailed research on the need for reform, consensus building between governments and stakeholders, clear public communication and the existence of a safety net for those adversely affected by change.

Establishing the case for reform

The structural economic challenges Australia faced were first highlighted by a series of government-commissioned reports and inquiries through the 1960s and 1970s.[119] They were explored further by the then-Tariff Board, which was charged with providing independent advice to the government of the day on the level of protection for particular industries.

In 1974, the Tariff Board was remade as the Industries Assistance Commission (IAC). The IAC had a mandate to provide advice and scrutiny of the economy-wide implications of industry assistance, and its research provided a strong base of evidence in support of reform.[120] The IAC would later become the Productivity Commission.

A further independent inquiry, the 1992 Hilmer Review, set in motion the process of coordinated competition policy changes across the national and State governments that came under the banner of the NCP. The National Competition Council was also established in 1995 with a mandate to review and report on the progress of Australian governments at implementing reforms under the NCP.[121]

Consensus was built across the political spectrum

Hawke's campaign slogan, "Bringing Australia together", was an indicator of the approach he intended to take in government.[122] A month after coming to power in 1983, the Hawke Government held a National Economic Summit with representatives from all political parties, state governments, trade unions, businesses and community organisations. The summit resulted in a communiquè agreeing a national approach to economic reform. Hawke later reflected that "virtually all the successes…stemmed from the summit".[123] A similar Tax Summit was held in 1985 to build consensus around tax reform options, leading to tax changes implemented in 1987.[124]

A key plank of the Hawke Government's consensus approach was the Prices and Incomes Accord (the Accord), an agreement between the Government and the trade union

[118] Productivity Commission, 1999.
[119] Parham, 2000.
[120] See, for instance, Productivity Commission, 2003.
[121] COAG, 1994.
[122] National Archives of Australia.
[123] Hawke, 2012.
[124] National Archives of Australia.

movement first signed in 1983 and updated throughout the life of the Government.[125] The Accord saw unions agree to moderate their wage demands in return for a "social wage" in the form of expanded public health care and improvements to pensions, unemployment benefits and superannuation. This wage moderation contributed to stabilising inflation and reducing unemployment in the 1980s. In 1991, the seventh iteration of the Accord also facilitated the transition of the industrial relations system to enterprise bargaining.

Another area of focus was relations with lower tiers of government. Australia's system of Federation means that responsibility for many policy issues rests with Australia's state governments. For this reason, Hawke described microeconomic reform as a "national endeavour" and a "common ground that is absolutely essential, if we are to have a more competitive economy".[126] He emphasised that reform would require "co-operation on a scale we've seldom seen hitherto in this country" and, in the early 1990s, set about reinvigorating the system of cross-Government negotiation to make this cooperation possible. This system became the Council of Australian Governments (COAG).

Importantly, the Hawke Government's reforms also enjoyed a degree of bi-partisan support in the Parliament and in some cases the Opposition argued for reform to be taken further (for instance, on industrial relations reform).

Clear communication on the need for reform

As political leaders, Hawke and Keating understood that policy research and consensus building with unions and businesses needed to be paired with broader communication with the public in order for reforms to be understood and accepted. In this task, Keating – who had risen to the position of Treasurer despite never finishing high school or receiving formal training in economics – played a key role.

Keating spoke regularly on radio and on television, explaining complex economic topics in frank terms and using plain English. In perhaps the most memorable of these appearances, he warned on radio in 1986 that if the economy was not reformed then "Australia is basically done for" and would risk becoming "a banana republic". The comments sparked significant controversy but marked a turning point in public perceptions of the challenges Australia faced. Several years later, as Australia entered a severe recession in 1990-91, Keating commented it was "the recession we had to have", providing a structural shift that would eventually break the back of Australia's persistently high inflation.

While these frank public comments stand out, they are emblematic of the broader and largely successful efforts of the government to communicate the purpose and effect of reforms to the community. As Martin Shanahan argues, in many ways the most important legacy of the Hawke-Keating Government "has been the shift in how Australians think about markets, the role of government, the importance of the individual and the

[125] Forsyth & Holbrook, 2017.
[126] Hawke, 1990.

extent to which they expect governments to help others."[127]

Australia's strong social safety-net provided protections

Mindful of the impact of significant economic adjustment on those in the industries and regions most affected, the government sought to ensure that generous welfare and social policies were in place. This was the "quid-pro-quo" of the Accord, with the government providing a "social wage" in the form of increased unemployment benefits and pensions as well as home assistance packages and payments to low-income families.

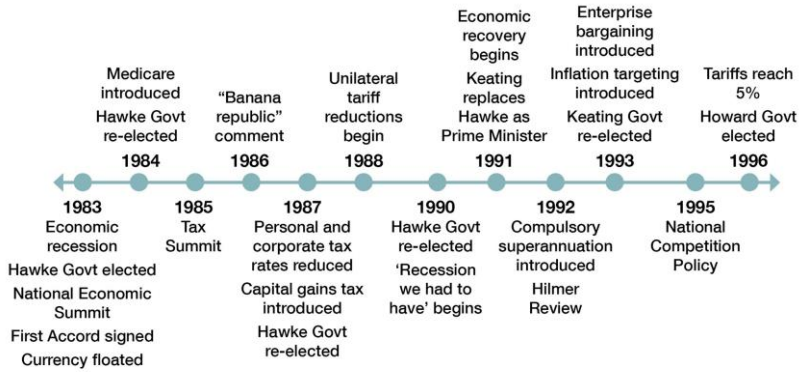
The most significant reform committed to under the Accord was the introduction of a universal health care scheme. The existing public heath scheme had been altered and partly privatised by the previous government and in 1984 the Hawke Government replaced it with Medicare, a universal single-payer scheme. At the time, the Health Minister described Medicare as "a major social reform" that would ensure healthcare was "simple, fair and affordable".[128]

The government also moved to establish an individualised occupational superannuation scheme, reflecting the need to induce unions to exercise wage restraint, the need for an earnings-related source of retirement income and the need to bolster national savings. Employer superannuation contributions became compulsory from 1992, initially at 3% of income and eventually reaching 9.5% in the 2000s.

[127] Shanahan, 2009
[128] Biggs, 2004.

Research has indicated that the combined impact of tax, welfare and social policy changes under the Hawke-Keating Government broadly offset any increase in income inequality generated by market reforms over the period, signalling that this approach effectively protected the community from some of the adverse impacts that can accompany reform.[129]

Figure 17 - Timeline of reform



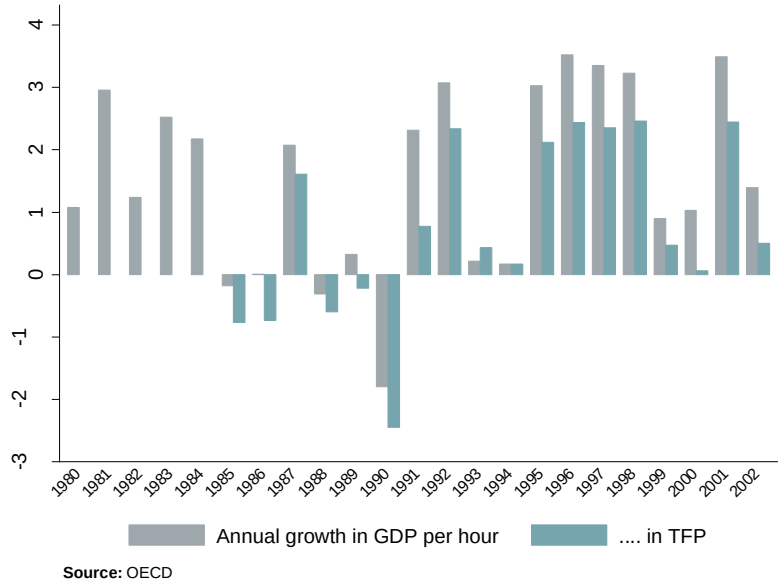
Australia's productivity and per-capita income improved significantly once reforms were in place

Following the recession in 1990-91, Australia has enjoyed a 27-year stretch of economic growth without a recession. Australia's real GDP growth was below the OECD average through the late 1970s and 1980s but has exceeded the OECD by a significant margin since the 1990s. This period of economic strength reflects a significant rebound in Australia's

[129] McLelland & St John, 2006.

productivity. Growth in GDP per hour worked and multifactor productivity both reached unprecedented lows at the end of the 1980s but, as Figure 18 shows, both grew strongly through the 1990s as reforms began to take effect.

Figure 18 - Annual productivity and TFP growth in Australia, 1980-2002[130]

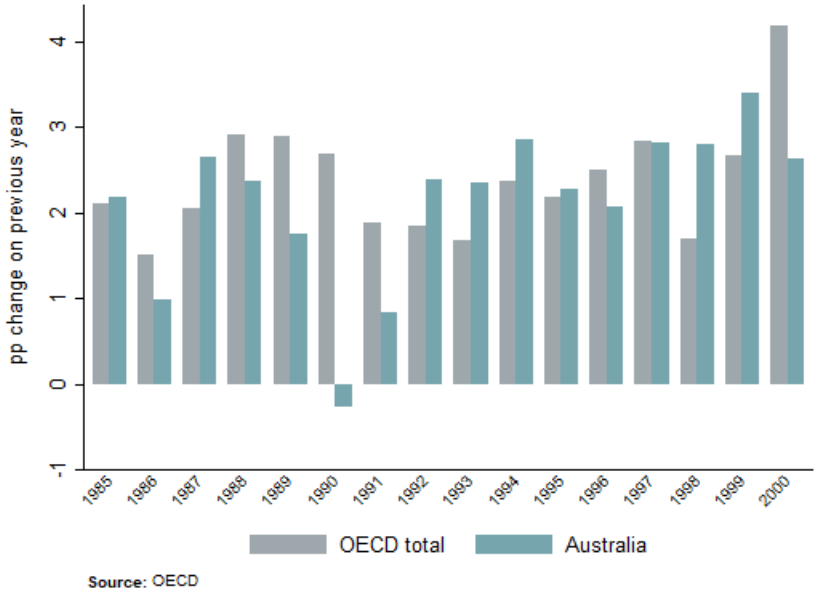


Source: OECD

Australia's standard of living also improved following the reform period. GDP per capita, which had grown below the OECD average through the 1970s and 1980s, grew faster than the OECD average through the 1990s and 2000s (see Figure 19).

This period of economic growth has also coincided with improvements in other key macroeconomic indicators. As Figure 20 shows, Australia's unemployment rate declined following the 1990-91 recession and remained low even during the Global Financial Crisis, while inflation also stabilised at a lower level of around 2 to 3%.

Figure 19 - Annual change in GDP per capita, 1985-2000[131]



Source: OECD

The Productivity Commission has highlighted how the significant turnaround in Australia's productivity and economy performance indicates that "something has changed in the way the Australian economy operates to make a break with a

[130] TFP figures, as estimated by the OECD, are not available until 1985 so are not included before this date.

[131] The pp change is on previous year relative to 2010.

very long history of underperformance compared with other countries".[132] It cites greater freedom to allocate resources to their most productive use, as well as improvements in production techniques and management and industrial practices as some of the key drivers of this rebound.

Importantly, research indicates that the combination of employment growth and productivity growth experienced through the 1990s amounted to "doing more with more" rather than "doing more with less".[133]

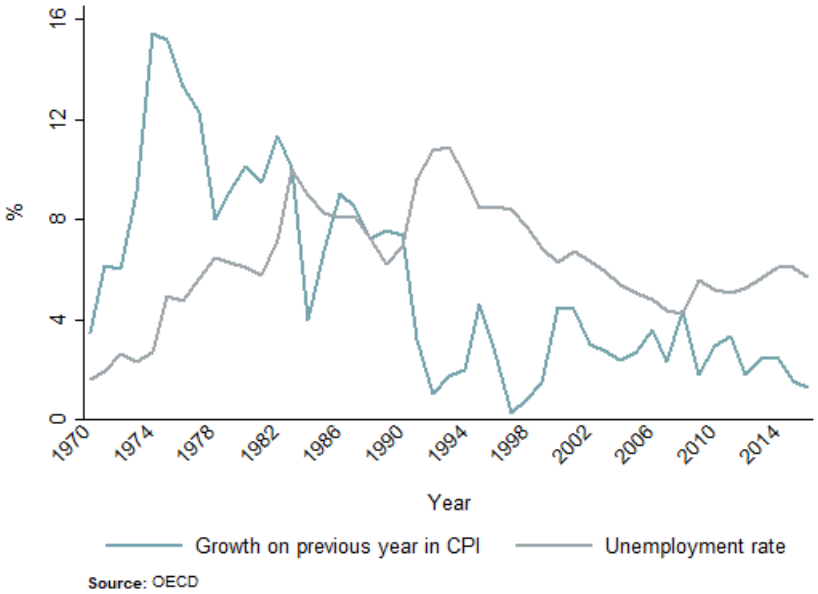
Reform with an Australian accent

Australia's experience of economic reform is unusual in a number of ways. The government achieved a broad political and social consensus in favour of reform; it successfully co-ordinated changes across multiple tiers of government; and it delivered significant improvements to social policy alongside market reforms to provide a safety net for the community.

Together these factors enabled the economic system to be transformed, transitioning Australia from an isolated country with rigid price and regulatory regimes and extensive protections for industry, into a flexible and open nation with an educated workforce and more competitive business sector.

The benefits for Australia's productivity and, in turn, the living standards of Australians, have been significant and stand as an example to other countries of what can be achieved through economic policy reform.

Figure 20 - Unemployment rate and and annual CPI growth, 1970-2016



[132] Productivity Commission, 1999.
[133] Parham, 2000.

4.3 Greater Manchester: the power of cities

As foreshadowed in Section 3.3, well-functioning cities that offer lots of employment opportunities within commuting distance of people's homes are strongly correlated with higher productivity.[134] This case study therefore explores the evolution of Manchester into one of the UK's best-functioning cities.

Manchester experienced the rapid, industrial growth of the nineteenth century, then the consequences of industrial decline in the twentieth.[135] Recently the city has revived, with output, productivity, and employment growth significantly above UK averages.[136]

Interdependent local authorities

The Local Government Act of 1972 established the metropolitan county of Greater Manchester, comprising ten independent local authorities, five in the north: Wigan, Bury, Bolton, Rochdale, Oldham; and five in the south: Tameside, Stockport, Trafford, Salford, and Manchester.[137]

The City of Manchester accounted for 29% of the region's economic output in 2016, considerably more than the other local authority areas; the next largest local authority contribution, Salford's, was 13%.[138] As such, the City of Manchester's re-generation has been central to the region's growth in the past four decades.[139]

In contrast, Greater Manchester's population is much more equally spread across its local authorities, with less than 20% resident in the City of Manchester.[140] This means many of the suburbs that are home to its workforce lie outwith the City's local authority boundaries.

Figure 21 - Greater Manchester

[134] OECD, 2018f.
[135] See Emmerich, 2017, for account of the rise and decline of British cities.
[136] ONS, 2017d, ONS, 2018d, Emmerich, 2017.
[137] Of the five metropolitan counties established in 1972, only Greater Manchester contained the name of the city at its economic centre. The others were Avon, Cleveland, Western South Yorkshire, and West Midlands.
[138] ONS, 2017c; ONS, 2017d.
[139] Swinney, 2016.
[140] Holden & Harding, 2015.

The 1996 IRA bombing of the Arndale Centre is often cited as the turning point for the city due to the regeneration that followed. According to Sir Richard Leese, the leader of Manchester City Council, however, the city had begun to change long before the bombing. Its combination of economic and administrative geography made cross-authority cooperation necessary for economic growth.[140] This meant that the successful re-building of the city was enabled by decisions made in the mid-late 1980s, decisions founded on an understanding that Greater Manchester was one integrated economy.[141]

Infrastructure investment based on city-region economics

Well-functioning city economies rely heavily on connectivity between residential and business areas. City centres are usually dominated by commercial property, so the employees of these companies generally do not live centrally. The larger a city is, the higher the cost of living in the city-centre.[142] The further away from the centre employees live, the more important well-functioning transport links are.

Because they understood that improving connectivity would "get people to jobs, rather than get jobs to people",[143] Greater Manchester's ten local authorities made joint investments in infrastructure, particularly transport, based on the economics of the overall city-region rather than on the priorities of individual authorities.

The first of these major transport investments, starting in 1991, was the construction of the Metrolink tram and rail system. This first phase connected Manchester Piccadilly with the centres of Bury and Altrincham – two important commuter towns – with roughly 31km of tram and light rain lines. In 1999, a line was added to Eccles in Salford.

Between 2009 and 2014, thirty kilometres were added across four lines, connecting Manchester Piccadilly to Rochdale, Ashton (Tameside), East Didsbury (Manchester), and Manchester Airport at a cost, as of 2018. In 2017, a fifth line was completed, and construction began on a connection to the Trafford centre, the UK's second largest retail centre.

These recent additions to the Metrolink system were carried out in parallel with significant changes to Greater Manchester's bus and road systems. These included the Bus Priority Package, a £122 million expansion and improvement across the city region; the introduction of the North West's first guided "Busway"; and a programme to improve connections between Bolton, one of Greater Manchester's most northerly cities, with Salford, already well integrated with the City of Manchester's main transport systems.

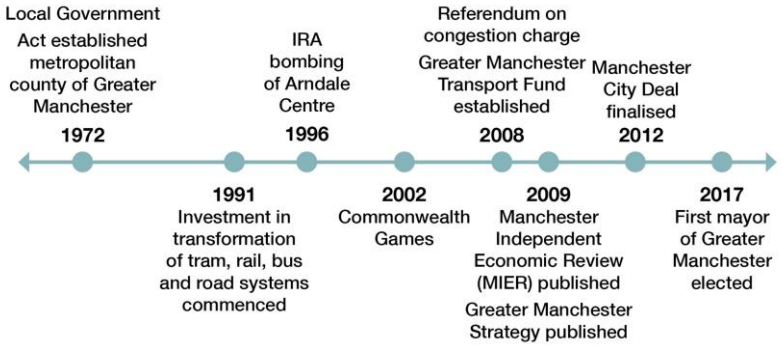
These investments in Greater Manchester's infrastructure were made through a combination of public and private borrowing. Later investments would be financed differently. After a referendum on congestion charging was lost in late 2008, the Greater Manchester Transport Fund (GMTF), to which all ten local authorities contributed, was established.

All proposed projects were evaluated according to their

[141] Leese, 2018.
[142] See Glaeser, 2010, for an introduction to agglomeration economics.
[143] The FT interview from which this quote was taken can be found here.

potential economic impact on the whole city-region, particularly in terms of GVA and productivity.[144] Investments were made in the proposals which made the most difference, regardless of where they were situated. The GMTF also acted as an assurance to central government that Greater Manchester was willing to invest its own resources in its economic development, and helped secure an additional £3 billion from the Treasury.[145]

Figure 22 - Greater Manchester Timeline



An understanding of how the city-region functions has also been used to inform other types of economic development. The eventual location of Greater Manchester's Enterprise Zone,[146] an already strong, well-connected economic area near Manchester Airport, was not an obvious selection but was chosen on the basis that it would complement existing businesses and provide the largest net economic impact for the whole city-region, instead of being situated where it might help smaller-scale or struggling businesses.

Using evidence

New Economy, a trading arm of the GMCA, was established to provide "policy, strategy and research advice to promote economic growth and prosperity in Greater Manchester".[147] An early evidence review paper produced by New Economy in 2007 suggested that there was a need for a greater understanding of Greater Manchester's economy to better respond to its structural strengths and weaknesses.[148]

In response, the GCMA established the Manchester Independent Economic Review (MIER), led by an independent panel made up of Jim O'Neill, Head of Global Economic Research, Goldman Sachs, Professor Edward Glaeser, Professor of Economics, Harvard University, Diane Coyle, Managing Director, Enlightenment Economics, Sir Tom McKillop, then Chairman of RBS, and Jonathan Kestenbaum, Chief Executive of Nesta.

The MIER led in turn to the Greater Manchester Strategy (GMS), all ten local authorities having agreed that the MIER's recommendations ought to be prioritised.

As well as strategic priorities, the MIER also recommended a

[144] Greater Manchester Combined Authority, 2014.
[145] HM Treasury, 2017.
[146] Enterprise Zones are areas, initially introduced in the 1980s and re-established by the 2010-15 Coalition government, in which businesses receive benefits, including tax relief on investments.
[147] Detailed information on New Economy can be found here.
[148] Holden & Harding, 2015.

change in the GMCA's approach to economic and policy analysis. A Single Assessment Framework (SAF) was developed and used to evaluate the economic impact of development proposals in its local authority areas including potential transport funding and Enterprise Zones. Similarly, Greater Manchester used a Cost Benefit Analysis (CBA) model, which evaluated potential projects in terms of economic impact. The model is now an annex to the HMRC's "Green Book" and is used to evaluate projects in all ten Greater Manchester local authorities.

Population and employment have both increased

Robust productivity data isn't available at the city level. We do know, however, that Manchester has experienced a significant population increase without a decrease in its employment rate. Between 1998 and 2015, Manchester's population and employment increased by 149%, and employment by 84%, giving it the fastest combined growth in these measures among UK cities.[149] In addition, the working-age population is increasingly highly qualified.

In 2012, Greater Manchester secured a "City Deal", an historic devolution deal with the UK government, providing the means and powers to further invest in the region's economy. In 2014, it was announced that Greater Manchester would hold elections for a "metro-mayor", with similar powers to the Mayor of London. The first mayor of Greater Manchester was elected in 2017.

[149] McDonald & Bessis, 2018.

Box 4 - Eight lessons on using evidence

In 2015, the What Works Centre for Local Economic Development's case study on the use of evidence in Greater Manchester listed the following eight lessons:

Recognise that developing an evidence-led approach is a long-term project. Create an 'evidence ecosystem' where evidence is asked for, created and acted upon.

Create demand for evidence, don't just create evidence. Evidence needs to be seen as robust and useful by those best able to exert influence on policy.

Bring your partners along. Only through the right type and right amount of engagement can buy in be achieved from a suitably wide range of organisations and individuals.

Encourage external challenge. Externally verified evidence can ensure that findings are seen as high-quality, robust and independent, helping avoid evidence being seen as skewed to a particular agenda. It is also more difficult to ignore.

Acknowledge and address negative findings. Findings that show that past approaches do not work, or new proposals are flawed, are at least as valuable as positive findings.

Create compelling narratives. This helps evidence move into live political discourse and implementation.

Use it or lose it. Unless evidence is seen to be acted on, an evidence-based approach will quickly lose currency.

Shape your own destiny. Anticipate developments and develop understanding of the opportunities and challenges.

4.4 London: transforming school results

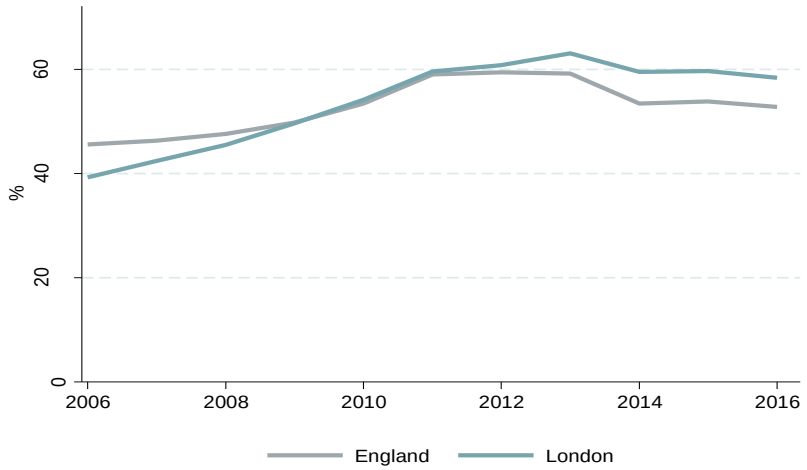
The London Challenge was established in 2003 by the then Labour Government to combat poor performance in London schools.[150] At the time of its establishment, only around 40% of pupils in London, and around 30% of the most deprived pupils,[151] were achieving 5 A*-C results at GCSE.

Over the period of the London Challenge, and its successor City Challenge programme, results improved dramatically. By 2011, roughly 60% of pupils in London schools were achieving 5 A*-C at GCSE, surpassing the national average. London had not just improved outcomes – but moved ahead of the rest of the country. Students in London have continued to outperform the national average, and in 2016 the gap between the two had widened to over 5.5 percentage points (See Figure 23).[152]

In the early 2000s, the problem of poor outcomes in London schools was seen by many in the education establishment as intractable and the result of low levels of investment, high levels of disadvantage among pupils and difficulty in recruiting and retaining quality staff. As the Labour Government moved into its second term, there was a growing sense that while much had been done to improve education, not enough had been achieved to improve the worst performing schools. In his introduction to the document launching the London Challenge, the Education Secretary Charles Clarke said:

"There are still far too many schools which are failing to inspire and lead their communities and far too many areas where educational aspirations are low. Too many parents are anguished and fearful, rather than proud or confident, when choosing their child's secondary school. And there are far too many who feel that either expensive private education or lengthy journeys across the city from home to school are the only satisfactory answer."[153]

Figure 23 - Students achieving 5 A*-C GCSEs[154]



Source: Department for Education

[150] We refer to the combined NUTS 2 regions "Inner London West" and "Inner London East" as "London".
[151] As measured by those eligible for Free School Meals (FSMs).
[152] Due to methodological changes from 2013 onwards, attainment has declined from a high in 2012 in both London and in the majority of local authorities. See Department for Education, 2017.
[153] Department for Education and Skills, 2003.
[154] Includes maths and English. Data prior to 2005/6 is not available.

The establishment of the London Challenge

The Labour Government of 1997 was elected on a platform that prioritised education. Famously, the then Prime Minister Tony Blair, when asked about his priorities, said "education, education, education". In the first term of the Labour Government from 1997-2001, record levels of investment were made in schools and innovative policies put in place to tackle underachievement. By the beginning of the second term in 2001, there was widespread recognition that standards were improving, but that the most disadvantaged schools were still lagging behind.

Among underachieving schools, London's secondary schools had some of the worst performance, with exam results trailing other parts of the country. Special emphasis was therefore needed to turn them around. The London Schools Challenge project became a focus of the Prime Minister's attention and, as such, a focus for the whole of Government. Inside the Department for Education, the appointment of a dedicated Minister for London Schools was unusual but meant there was a driving force for the work across Government.

Stephen Twigg, who was appointed to that portfolio in 2002, described the creation of a Minister for London Schools as "crucial to getting [the London Schools Challenge] off the ground".[155] Alongside him were a small team of dedicated civil servants who were tasked with running the challenge, led by a senior Director and London's first "Schools Commissioner", Tim Brighouse. Hardwiring the London Challenge into the machinery of government in this way, and providing ministerial oversight and political heft, was an essential component of its success.

A significant early challenge was bringing London's local authorities onboard. The team leading the reforms had to bring 32 boroughs with them, each with their own political dynamic and fiercely protective of their independence. Having a dedicated minister and Civil Service team contributed to achieving this, with the officials largely left to implement the policy while the minister undertook the outreach and engagement. Stephen Twigg, then Minister for London Schools, described the importance of this work:

"When we were setting up we identified [resistance from local authorities] as one of the biggest risks. The levers available to us if local government had resisted would have been quite limited. I spent a lot of my time going around London and meeting the Councils. I made a point of going to every single borough, even the ones that didn't have that many issues compared to the priority boroughs. In particular, I made a point of reaching out to all the different parties."[156]

This close and collaborative working between the department and local authorities meant that, in most cases, local government did not resist the roll out of the London Challenge and in many cases it was welcomed even by boroughs under the political control of an opposition party.

A similar challenge was faced by teaching unions and this was

[155] Interview with Stephen Twigg, August 2018.

[156] Ibid.

identified in the early days of the project. While the government would later face some resistance from the trade unions to the roll out of academies, any opposition to the London Challenge was relatively low key and was handled effectively. The appointment of Tim Brighouse was key to achieving this. Given his long-established reputation in opposing Conservative education proposals and as an education campaigner, he commanded the support of the teaching unions throughout the reform process.

The London Challenge was built on a solid foundation from the outset, making chances of success far higher. The priority placed on the programme, the hardwiring of it into the machinery of government and the significant effort put into bringing stakeholders onboard all contributed to its success. A similar programme – with lower levels of support from the educational establishment – would not have had as high a chance of success.

Improving school leadership and management

A key part of the London Challenge was identifying that underperformance of many schools was linked to the low quality of leadership and management. A large body of evidence, including many international studies, now exists showing that management quality and pupil outcomes are positively correlated,[157] but in the early days of the London Challenge interventions around leadership were often seen as fairly radical.

Support for school leadership was underpinned by the network of London Challenge advisers who were independent and experienced education experts appointed by the Department for Education. Each adviser had a cluster of local authorities which they oversaw and took a lead in supporting each school, usually chairing improvement partnership boards made up of school senior staff, governors and local authority representatives. The availability of the advisers and their focus on individual schools meant that they were available to quickly establish programmes of support for schools that were causing concern, putting together bespoke solutions for each school.[158] The presence of the advisers also meant that there was always a direct line back to the Department for Education to monitor progress.

As well as the London Challenge advisers, headteachers and senior management of schools were provided with peer support from other senior education leaders across London who provided mentoring and guidance for school leaders in underperforming schools. Much of this was provided by the London Leadership Strategy, co-ordinated by the London Challenge and the National College for Leadership. This programme provided a pool of “system leaders” that could be called upon by the London Challenge advisers to support headteachers.[159]

Finally, for some schools, becoming an academy was identified as the best way to improve outcomes. English academies are free of local authority control and have the

[157] Bloom, et al., 2014.

[158] Ofsted, 2010.
[159] Ibid.

support of an external sponsor, such as a charity or private company. While academisation transformed the outcomes of many secondary schools in London, it should be noted that the London Challenge was not reliant on a change in school status. In 2010, after seven years of the London Challenge, fewer than a quarter of London Challenge schools had become academies, but all had shown significant improvement in pupil outcomes.[160]

Teaching quality

One of the key challenges faced by London Schools at the outset of the London Schools Challenge was the recruitment, retention and development of teachers. For a range of reasons, many aspiring teachers avoided London as a destination for work. In the 2002 government paper launching the London Challenge, the UK government stated its aim that "we want London to be recognised, as in many other professions, as the peak of the teaching profession".[161]

Turning the tide in teacher recruitment in London was one of the first steps in achieving an improvement in teaching quality. To achieve this, several measures were put in place to attract teachers to the capital.

Firstly, the Chartered London Teacher programme was rolled out to eligible teachers, offering improved terms and conditions for teachers who met a set of high standards and remained teaching in London.

Secondly, the government recognised the need to reduce barriers to entry to teaching in London and to hold existing teachers in the capital. Therefore, a mortgage guarantee scheme and other support for housing was made available to teachers across London to enable them to afford family homes.

Third, the London Challenge advisers were available to help identify training and development needs among staff in schools, and to broker support to enable support to be put in place. For example, this could involve helping schools access small grants from central government to cover the cost of supply teachers, thus enabling permanent staff to be absent from teaching in order to receive further training.

Finally, new routes into teaching were established to encourage people from non-traditional teaching backgrounds into the profession. The most prominent of these was Teach First, an independent charity which encouraged high performing graduates to spend two years teaching before moving into business or industry. The programme was not an integral part of the London Challenge, but Teach First teachers did contribute to London Challenge schools and were seen by many school leaders as a component of their success in improving outcomes. Since its original cadre of 45 teachers, Teach First has now grown to be the UK's second largest graduate recruiter and has now extended out of London into other urban areas across England.

[160] Ibid.
[161] Department for Education and Skills, 2003.

There is not significant evidence of the direct link between their presence in schools and the impact on results. In London, some success could be attributed to Teach First, but this may also have been a result of other changes that were occurring in the education system at the same time. Regardless, the system did provide a new route into teaching for people who may have otherwise not chosen the career, with many staying beyond their two-year initial term.

The London Challenge a decade on

The London Challenge in its original form concluded in 2008 and was expanded to include several other areas across the UK. As exam results data for the period and beyond shows, the original intention of improving London schools and closing the gap with the rest of the country was met. Outcomes for the most disadvantaged students improved markedly.

It is worth noting that the London Challenge coincided with a period of record investment in schools, with government spending on education increasing by 78% in real terms between 1997 and 2010.[162] Without a doubt, this made a considerable difference to outcomes and to the scope of interventions that were possible.

However, even with current financial constraints, there is much that could be done to improve schools. Many of the lessons about leadership, staff development, clustering of schools and networks of support, are possible in a period of lower public spending.

Box 5 - Skills and productivity growth

The Scottish Policy Foundation's macroeconomic model allows for workers to have different levels of skill and productivity. We use it to assess the potential impact of two changes to the productivity of the Scottish workforce, based on the current proportion of high and low-skilled workers.

In the first scenario, we make everyone more productive. A 1% increase to the productivity of all Scottish workers results in long-term GDP growth of just under 1%, or £1.49 billion.

In the second scenario, we "upskill" the Scottish labour force: we ask what would happen if 20,000 full time employees who are currently low-skilled became high-skilled. This has the effect of increasing GDP by just over £0.26 billion.

See appendix for full results and further details of modelling.

[162] Lupton & Obolenskaya, 2013.

5. Lessons of success

We chose these case studies because an impressive turnaround had been effected, sometimes on just one driver of productivity, such as in London, sometimes across the board, as in Australia. All these places are different from Scotland, and not all the turnarounds would be possible in Scotland. However, all the lessons identified below are applicable.

Following are some common themes which jumped out.

The turnarounds in these case studies generally involved a **focus on the evidence**, first to diagnose and face up to the problem, and then to sustain the response. A degree of **consensus and collaboration**, whether across political parties, sectors of society or geographic jurisdictions, was then required to come to agreement about the way forward. These processes were both often supported and facilitated by **credible and strong institutions**, which were independent of day-to-day politics. Finally, a **focus on skills** was prominent in each case study.

In all cases, there was a concerted effort to **get their act together and make choices**, and to then stick to a consistent strategic direction across a long period of time, including across political cycles.

None of the case studies suggests there are any quick policy fixes for Scotland.

A focus on evidence

In all the cases, there was a focus on building the evidence to understand the problem and design the response.

The structural economic challenges **Australia** faced were first highlighted by a series of government-commissioned reports and inquiries through the 1960s and 1970s.[163] These challenges were explored further by the then-Tariff Board, which was charged with providing independent advice to the government of the day on the level of protection for particular industries. In 1974, the Tariff Board was remade as the Industries Assistance Commission (IAC). The IAC had a mandate to provide advice and scrutiny of the economy-wide implications of industry assistance, and its research provided a strong base of evidence in support of reform.[164]

The IAC would later become the Productivity Commission, which now carries out five year independent reviews of Australia's productivity performance, the most recent of which was published in October 2017. Former Chair of the Productivity Commission, Gary Banks, argues that it "has provided Government with a source of well researched advice on structural reform that is impartial and concerned with the longer-term interests of the community as a whole".[165]

[163] Parham, 2000, pp5-6.
[164] See, for instance, Productivity Commission, 2003, p32.
[165] Banks, 2005, p19.

In **Manchester,** a 2007 review by New Economy that suggested the authorities' understanding of Greater Manchester's economy was insufficient. Mike Emmerich, who led the review, describes how city leaders agreed that they needed *to "put a mirror up to Manchester and get people to look hard at themselves through the eyes of others… It takes a confident set of politicians and business leaders to agree to that."* [166] As described in the case study, this led to the MIER, a major independent review of the city, and the first of its kind in Europe. It produced tough analysis that led to a shared understanding of how the region worked.

In **London**, the focus on the quality of leadership and management in schools, and teacher quality mirrored that findings of research about what was most important in school education. Data about what was happening in schools was also used to sustain efforts as the programme continued.

Consensus and collaboration

The levels of consensus and collaboration we found implies important roles not just for government, but also for business, trade unions and others.[167] In particular, there was a notable assumption that business success was good for the country.

Consensus and collaboration was a highly significant ingredient in the transformation of the **Australian** economy. The government's reforms enjoyed a degree of bi-partisan support in the Parliament through the 1980s and 1990s. In some cases, the Opposition argued for reform to be taken further (for example, on industrial relations reform). Paul Kelly notes that "this was a remarkable and unusual advantage for a reforming government" which provided "great political flexibility and the chance to occupy the middle ground" and "also helped to entrench the reform policies".[168]

Outside Parliament, Bob Hawke's campaign slogan, "Bringing Australia Together", was an indicator of the approach the new Prime Minister intended to take. One month after coming to power in 1983, the government held a National Economic Summit with representatives from all political parties, State governments, trade unions, businesses and community organisations. The summit resulted in a communiquè agreeing a national approach to economic reform. Hawke later reflected that "virtually all the successes… stemmed from the summit".[169] A similar Tax Summit was held in 1985 to build consensus around tax reform options, leading to tax changes implemented in 1987.[170]

A key plank of the consensus approach was the Prices and Incomes Accord (the Accord), an agreement between the Government and the trade union movement first signed in 1983 and updated throughout the life of the Government.[171] The Accord saw unions agree to moderate their wage demands in return for a "social wage" in the form of expanded public health care and improvements to pensions,

[166] Interview with Mke Emmerich.
[167] The Sustainable Growth Commission, 2018, found similar lessons from looking at successful small advanced economies. See Part A, p65.
[168] Kelly, 2000, p224.
[169] ABC, 2012.
[170] National Archives of Australia.
[171] Forsyth and Holbrook, 2017.

unemployment benefits and superannuation.

This wage moderation contributed to stabilising inflation and reducing unemployment in the 1980s. Barbara Pocock writes that "while the Accord's merits for different classes of interests are contested, there can be no doubt of its political success", providing the consensus to underpin major reforms.[172]

By the late 1980s, the decline in the fortunes of the **Swedish** economy had led to anger among many Swedes who began to react to poor economic performance and a lack of reforms to public services.[173] The banking crisis of the early 1990s, together with the widespread recognition of the Swedish economy's poor performance, led to some political unity. This first emerged during the banking crisis when key policies to stabilise the Swedish banking system were agreed by both the centre-right Government and the Social Democratic party.

In **Ireland** in the 1980s, an emerging "politics of change" involved a cross-political consensus that "something had to be done". The eventually resulted in a series of national agreements made between government, public and private sectors, and trade unions, starting with 1998's "Programme for National Recovery".

In **Greater Manchester,** extensive collaboration between the local authorities developed over a long period of time, resulting in mature political and officer level relationships. It was then accelerated by recognition that their economic interdependence made cross-authority cooperation necessary for economic growth.[174]

Finally, in the **London** Challenge, the chances of success were increased by significant efforts to involve local authorities and teaching unions from the beginning.

Strong, credible institutions

There was an important role for credible institutions, independent of day-to-day politics, which could command the confidence of people across the country and were able to hold decision-makers to account.

Australia's influential Productivity Commission is mentioned above. The Australian National Competition Council was established in 1995 with a mandate to review and report on the progress of Australian governments at implementing reforms under the National Competition Policy.[175] Other economic institutions, such as the Treasury and the Reserve Bank of Australia, also provided support for reform and together these institutions and inquiry processes built what economics journalist Paul Kelly describes as "the intellectual momentum" for significant policy changes.[176]

In **Sweden**, the fiscal rule is monitored by independent institutions and agencies which provide an objective view of fiscal policy, including the Swedish Fiscal Policy Commission, established in 2007 and now held up as a "gold standard" for independent fiscal monitoring. Sweden's welfare state is often

[172] Pocock, 2009.
[173] Kreicbergs, 2014.
[174] Holden & Harding, 2015.
[175] COAG Communiquè, 1994.
[176] Kelly, 2000.

cited overseas as a success, but less frequently highlighted are the fiscal measures and institutions that have provided the conditions for social protections to be sustained.

In **Ireland**, the two main economic development agencies – the IDA (primarily concerned with FDI) and Enterprise Ireland (primarily concerned with business growth and internationalisation of domestic firms), enjoy broad political support and help to provide a focus lacking in other countries.

Another institution, the Economic and Social Research Institute (ESRI), was established in 1960. The Institute is staffed by academics and seconded civil servants responding to the demand for rigorous, independent analysis to support effective policymaking to tackle social and economic issues. Today, the ESRI covers 12 broad social and economic areas. In 2017, the Institute worked on a total of 84 projects across these research areas, resulting in 186 publications, 85 radio and TV interviews and 171 events.[177]

In **Greater Manchester**, institutional capacity at city-region level has developed over time and is now perhaps unequalled in any area outside of London. The "family of organisations", includes: the international airport, uniquely and jointly owned by the 10 local authorities; MIDAS, the inward investment agency; Marketing Manchester, the visitor-promotion agency partly sponsored by the Airport; and New Economy, which could be described as the "the ESRI for Manchester".[178] These organisations help to provide the analysis that allows Greater Manchester to remove the politics from infrastructure decision-making. This now happens at city-region level rather than have each authority "bid" for their separate priorities.

[177] ESRI, 2018.
[178] Holden & Harding, 2015.

Focus on skills

Improving education levels was the aim of the **London** Challenge Programme, and so it is not surprising that a focus on skills was at the centre of the London schools case study. But focus on this driver of productivity was prominent much more broadly. This is of particular interest for Scotland, given declining school education survey scores and the training and retraining challenges presented by digitalisation.

In **Australia,** education was a central focus, with Hawke arguing that "since education played the key role in the development of human capital, it was central to a productive and internationally competitive economy".[179]

In 1987 the government announced a Strengthening Australian Schools policy, establishing the Department of Employment, Education and Training and beginning a shift towards outcomes-focused and needs-based funding for schools. Access to higher education was also increased. An income-contingent loans program financed growth, reflecting the Government's intent that education needed to be "a major force in the economic and social life of the country".[180]

Swedish liberalisation of the labour market was accompanied by significant investment in education and skills, with

[179] Brennan and Reid, 2009.
[180] Davey and Ware, 2009.

education spending amounting to 6.9% of Swedish GDP against an EU average of 4.9%.

In **Ireland**, a 2016 "National Skills Strategy" aimed to identify the skills required to support Ireland's economy in the future. Ireland now ranks 19th globally and 10th among Western European countries for human capital in the World Economic Forum's index. The UK's positions in the same rankings are 23rd and 12th respectively.[181]

Getting their act together and making choices

It is not surprising that "getting their act together" is characteristic of successful turnarounds, but the texture of the stories illustrates the kind of leadership required.

As part of getting their act together, the role of fiscal discipline is particularly apparent in both Ireland and Sweden. In **Ireland**, low corporate taxes are often regarded as the thing that resulted in the take-off of the economy. In fact, low corporation taxes for inward investors had been increasing since their lowest rate in the late 1950s. The difference in the late 1980s came with a commitment to balance the budget. With this and the new social partnership, *"Ireland sent a signal of intent that carried credibility with investors".*[182] Similarly in **Sweden, "**getting their act together" started with the realisation that fiscal credibility in the short and medium term would have to be the foundation of any meaningful recovery.

The case studies also make it clear that there are **country-level choices** to be made. For example, Ireland chose to go for low corporate tax rates to make it sufficiently attractive for international companies to base there. Such low tax rates could be argued to be incompatible with an "inclusive economy". Indeed, before redistribution, Ireland has the second highest levels of income inequality in the OECD behind Greece, and post-redistribution ranks only in the middle of the inequality distribution.[183] On the other hand, Sweden retains higher tax rates, resulting in fewer large international companies choosing Sweden as a base, but allowing for the kinds of employment protections and parental leave policies for which the country is well known.

These case studies suggest that it is not possible to combine different models, as if choosing options from a menu. All economic models involve trade-offs, and each country needs to set its own priorities.

[181] World Economic Forum, 2017. Data for Scotland not available.
[182] Alexander, 2003.
[183] OECD, 2018d.

6. Conclusion

As described in Chapter 5, the turnarounds in the case studies involved: a focus on the evidence to acknowledge and understand the problem; consensus and collaboration across political divides, business and unions; credible and strong institutions; and often a prominent focus on skills. These places got their act together and stuck with it, including across political cycles.

Productivity growth requires focus. Of course, decisions will need to be made about how to distribute the gains to ensure broad-based prosperity. But without growth in the first place, there will be no gains to distribute.

Stepping back from these lessons of success, two final implications of the research stood out:

1. All economic models involve trade-offs. Scotland needs to make **a choice about what it wants from its economy** and then act accordingly. The level of clarity, focus and execution in these case studies is an order of magnitude different from what happens in Scotland today.
2. There is no consensus on how the global economy will develop – whether on trade patterns, the pace of digitalisation, or the changes automation and AI will bring. What we can be sure of, whatever constitutional settlements evolve, is that the population of Scotland will need jobs, and that **focusing on the drivers of productivity that increase people's skills and access to jobs will also increase opportunity**.

There are no quick fixes to Scotland's productivity challenge. Productivity is a long-term game, and turning it around is something a whole country does – government, business, unions and others – by acting together.

Appendix: Scottish Policy Foundation Modelling

To assess the potential economic implications of certain changes in productivity and its drivers, we use the Scottish Policy Foundation's Computational General Equilibrium (CGE) macroeconomic model of the Scottish economy.

The model aims to capture the complex interactions that take place between government, households, businesses, the workforce, trade partners, and policy within Scotland. It accounts for various aspects of the economy such as education, skills, public investment, industry structure, the composition of exports and imports, and housing markets.

As a result, it is possible to use the model to "simulate" the impact of certain changes to these structures over time. Like all economic models, the Scottish Policy Foundation's macroeconomic model provides a simplified picture of the intricate economic relationships it aims to capture. However, with due attention to its simplifying assumptions, it provides a framework to assess the effect of a change in the economic or policy landscape within reasonable boundaries.

We summarised the main results of the model simulations in boxes throughout the report. Here, we expand on these and present some analysis of additional implications.

Modelling productivity growth in different sectors

Table A1 provides the results of the simulations for 1% and 2.5% increases in labour-augmenting productivity in Services[184] and Manufacturing industries respectively. It shows that they have the same effect on GDP and wages, but different effects on other economic indicators. [185]

Table A1 Long-run effects after labour productivity shocks

	1% Services	2.5% Manufacturing
GDP	0.38%	0.38%
Consumption	0.14%	0.11%
Exports	0.41%	0.56%
Imports	0.03%	0.08%
Employment	0.05%	0.06%
CPI	-0.19%	-0.07%
Wages	0.10%	0.10%

[184] For the purposes of this simulation, public services and imputed rental have been excluded from the increases in labour productivity.
[185] "Long-term" is considered to be 10-15 years. The increase in productivity is the only exogenous change introduced, so the results should be interpreted as a deviation from what would have occurred if productivity had remained unchanged. In all simulations labour supply is held constant. In the short-run the supply of capital is held constant, but in the long run it adjusts to its new equilibrium level.

Modelling TFP growth

We discussed the results of simulating a shock to TFP – a simultaneously improvement in the efficiency of labour and capital**.** Some of the aspects of the economy that feed in to TFP, however, might only impact the efficiency of labour and not capital, or vice versa. As a result, economists are also interested in two other types of factor productivity: One which improves only the efficiency of labour (labour-augmenting), and another which improves the efficiency of physical capital (capital-augmenting).

Table A1 summarises the short-term and long-term results of a 1% increase in each of labour-augmenting, capital-augmenting, and total factor productivity. These results, and those all tables that follow, are the result of three main effects:

1. The direct ***productivity effect*** – with increased productivity of a factor, a given level of output can be produced with a lower physical amount of it.

2. The ***substitution effect*** – since the effective cost of the more productive factor of production is lower, firms start to switch to using more of it. The strength of this effect is determined by how easy it is to switch capital for labour and maintain output.

3. The ***competitiveness effect*** – a reduction in production costs following improvements in productivity leads to a general fall in prices and makes domestic output more competitive. This results in higher consumption and exports. The effect is bigger the more sensitive demand for output is to changes in price, which depends on the openness of the economy.

In all three scenarios in Table A2 an improvement in GDP, a fall in prices and an increase in exports is expected as a result of the combination of these three effects. The reaction of employment is, however, ambiguous. It depends on whether TFP growth capital-augmenting, labour-augmenting or neutral, and whether we consider the short run (in which capital supply is fixed), or the long run (once the capital supply has adjusted to the change).

Table A2 – Short-and Long-term effects after 1% increase in productivity via different channels.

	Labour-augmenting		Capital-augmenting		TFP	
	Short run	Long run	Short run	Long run	Short run	Long run
GDP	0.36%	0.96%	0.70%	0.53%	1.07%	1.49%
Consumption	-0.15%	0.25%	0.49%	0.37%	0.34%	0.62%
Imports	0.11%	0.11%	0.05%	0.06%	0.16%	0.17%
Exports	0.42%	1.08%	0.70%	0.53%	1.12%	1.62%
Employment	-0.18%	0.09%	0.32%	0.24%	0.15%	0.33%
CPI	-0.20%	-0.39%	-0.25%	-0.18%	-0.45%	-0.57%
Wages	-0.53%	-0.22%	0.36%	0.27%	-0.18%	0.05%
Real wages	-0.33%	0.16%	0.61%	0.45%	0.27%	0.62%

Skills and productivity growth

One way to increase the productivity of the workforce is to invest in skills. Investments in higher and further education and work-based learning programmes are doing just that. The Fraser of Allander Institute has conducted extensive research on the macroeconomic effects of investing in human capital through various training programmes.[186]

We highlighted the importance of considering productivity growth of workers at different skill levels, and the skill composition of the workforce.[187] Tables A3 and A4 provide the detailed results of the simulations.

In Table A3, the skilled/unskilled labour productivity shocks are modelled as if every skilled/unskilled employee can produce more output (other things being equal). This triggers productivity, substitution and competitiveness effects. Since we have now divided labour in to two categories, however, there is substitution between skilled and unskilled workers as well as between labour and capital.

Table A3 shows that regardless of whether the shock comes to skilled productivity, unskilled productivity, or both, the long-run result is a stimulation of economic activity and higher GDP. In the short run, however, the negative productivity effects dominate the substitution and competitiveness effects and employment falls in all but the case of unskilled employment after a shock to unskilled productivity.

In all cases, real wages fall in the short run, reflecting the lower bargaining power of workers in the face of increased unemployment, and so the prices of domestically produced goods fall, as reflected in changes in the CPI. In the long run substitution away from capital and competitiveness effects generate a positive stimulus to employment in all cases which diminishes pressure on wages.

Table A4 shows the impacts of the “upskilling”. The increase in GDP, comes through downward pressure on prices, and a resultant stimulus to exports.

The increase in the supply of skilled labour acts to reduce its real wage and increase its employment. The reverse is true for the decrease in unskilled labour. It should be noted that these simulations do not account for the significant investment in education and training which would be required for such “upskilling” to occur.

[186] Hermannsson, 2014, 2016, and 2017, and McGregor & Ross, 2016
[187] Skill levels are defined by years of schooling.

Table A3 – Effects of 1% increase in labour productivity

	Skilled		Unskilled		Both	
	Short run	Long run	Short run	Long run	Short run	Long run
GDP	0.26%	0.69%	0.10%	0.27%	0.36%	0.96%
Consumption	-0.10%	0.18%	-0.04%	0.07%	-0.15%	0.25%
Imports	0.08%	0.08%	0.03%	0.03%	0.11%	0.11%
Exports	0.30%	0.78%	0.12%	0.30%	0.42%	1.08%
CPI	-0.14%	-0.28%	-0.06%	-0.11%	-0.20%	-0.39%
Employment	-0.13%	0.06%	-0.05%	0.03%	-0.18%	0.09%
Skilled employment	-0.11%	0.08%	-0.07%	0.00%	-0.18%	0.08%
Unskilled employment	-0.18%	0.02%	0.01%	0.08%	-0.18%	0.10%
Wages	-0.38%	-0.16%	-0.15%	-0.06%	-0.53%	-0.22%
Skilled wages	-0.35%	-0.12%	-0.19%	-0.10%	-0.54%	-0.23%
Unskilled wages	-0.46%	-0.25%	-0.04%	0.04%	-0.50%	-0.21%

Table A4 - Effects of a change in skill composition

	Short run	Long run
GDP	0.11%	0.17%
Consumption	-0.07%	0.03%
Exports RUK	0.08%	0.17%
Exports ROW	0.10%	0.17%
CPI	-0.07%	-0.10%
Employment	0.00%	0.00%
Skilled employment	1.54%	1.54%
Unskilled employment	-2.16%	-2.16%
Wages	0.07%	0.21%
Skilled wages	-1.39%	-1.15%
Unskilled wages	1.60%	1.77%

References

Alexander, W., 2003. Chasing the Tartan Tiger: Lessons from a Celtic Cousin?, s.l.: The Smith Institute.

Atomico & Slush, 2017. The State of European Tech 2017, Atomico.

Banks, G., 2005. Structural Reform Australian-Style: Lessons for Others?, Productivity Commision.

Barnett, A. et al., 2014. The UK productivity puzzle.

Barrett, A. & Trace, F., 1998. Who is ocming back? The educational profile of returning migrants in the 1990s. Irish Banking Review, pp. 38-52.

Biggs, A., 2004. Medicare: Background Brief. s.l.:Parliament of Australia Library.

Bloom, N., Lemos, R., Sadun, R. & Van Reenen, J., 2015. Does Management Quality Matter in Schools?. The Economic Journal, 125(584), pp. 647-674.

Bloom, N., Sadun, R. & Van Reenen, J., 2012. The organization of firms across countries. The Quarterly Journal of Economics, 127(4), pp. 1663-1705.

Bloom, N. & van Reenen, J., 2007. Measuring and explaining management practices across firms and countries. The Quarterly Journal of Economics, pp. 1351-1408.

Bloom, N. & Van Reenen, J., 2010. Why Do Management Practices Differ. Journal of Economic Perspectives, Volume 24, pp. 203-224.

Bradley, J., 1999. The History of Economic Development in Ireland, North and South. Proceedings of the British Academy, Volume 98.

Caselli, F., 2005. Accounting for Cross-Country Income Differences. In: S. Durlauf & P. Aghion, eds. Handbook of Economic Growth, pp. 679-741.

Corrado, C., Haskel, J., Jona-Lasinio, C. & Lommi, M., 2012. Intangible Capital and Growth in Advanced Economies: IZA Discussion Paper Series.

Coutu, S., 2014. The Scale-up Report on UK Economic Growth, Information Economy Council.

CSO, 2017. Population and Migration Estimates: April 2017 (with revisions from April 2012 to April 2016), Dublin: Central Statistics Office, Ireland.

CSO, 2018. Trade Statistics. s.l.:Central Statitsics Office, Ireland.

Cuñat, A. & Zymek, R., 2018. International Value-Added Linkages in Development Accounting. Munich: CESifo Working Paper Series, CESifo Group.

Department for Education and Skills, 2003. The London Challenge: Transforming London Secondary Schools.

Department for Education, 2017. GCSE and equivalent results: 2016 to 2017 (provisional). [Online]
Available here. [Accessed 23 August 2018].

Emmerich, M., 2017. Britain's Cities, Britain's Future: London Publishing Partnership.

Engelbrecht, H.-J., 1997. International R&D spillovers, human capital, and productivity in OECD countries. European Economic Review, 41(8), pp. 1479-1488.

ESRI, 2018. Review of Research 2017, Dublin: ESRI.

Eurostat, 2017. Eurostat regional yearbook 2017 edition: European Commission.

Eurostat, 2018a. General government expenditure by function (COFOG). [Online]
Available here. [Accessed 07 August 2018].

Eurostat, 2018b. Regional GDP per capita in the EU in 2016: European Commission.

European Commission, 2017. Taxation Trends in the European Union: Dada for the EU Member States, Iceland and Norway, Luxembourg: Publications Office of the European Union.

Feenstra, R. C., Inklaar, R. & Timmer, M. P., 2015. The next generation of the Penn World Table. American Economic Review, 105(10), pp. 3150-82.

Fitz Gerald, J. & Kearney, I., 1999. Migration and the Irish Labour Market: ESRI.

Folster, S. & Kreicbergs, J., 2014. Twenty Five Years of Swedish Reforms, Stockholm: Reform Institute.

Forslund, A. & Krueger, A. B., 2008. An Evaluation of the Swedish Active Labor Market Policy: New and Received Wisdom. In: The Welfare State in Transition: Reforming the Swedish Model: University of Chicago Press, pp. 267-298.

Forsyth, A. & Holbrook, C., 2017. Australian politics explainer: The Prices and Incomes Accord. [Online]
Available here. [Accessed 15 August 2018].

Foster, R., 2004. The Irish Story: Telling tales and making it up in Ireland: Oxford University Press.

Fraser of Allander Institute, 2018. Economic Commentary 2018 Q11, Glasgow.

Glaeser, E. L., 2010. Introduction to "Agglomeration economics". In: Agglomeration economics. s.l.:UIniversity of Chicago Press, pp. 1-14.

Global Entrepreneurship Monitor, 2018. Global Report 2017/18.

Governments, C. o. A., 1994. Communiquè, 19 August 1994. Darwin.

Greater Manchester Combined Authority, 2014. Greater Manchester City Deal.

Griffith, R., Huergo, E., Mairesse, J. & Peters, B., 2006. Innovation and productivity across four European countries. Oxford review of economic policy, 22(4), pp. 283-498.

Griliches, Z., 1986 . Productivity, R&D, and Basic Research at the Firm Level inthe 1970s. American Economic Review, Volume 76, pp. 141-154.

Haldane, A. G., 2017. Productivity Puzzles. [Online]
Available here. [Accessed 31 August 2018].

Hawke , B., 1990. Towards a closer partnership. [Online]
Available here. [Accessed 15 August 2018].

Hawke, B., 2012. [Interview] 2012.

Henrekson, M. & Jakobsson, U., 2003. The Swedish Model of

Corporate Ownership and Control in Transition: SSE/EFI Working Paper Series in Economics and Finance.

Hermannsson, K., Lecca, P. & Swales, K. J., 2017. How much does a single graduation cohort from further education colleges contribute to an open regional economy?. Spatial Economic Analysis, 12(4), pp. 429-451.

Hermannsson, K. et al., 2014. The regional economic impact of more graduates in the labour market: A 'micro-to-macro' analysis for Scotland.. Environmental Planning A, 46(2), pp. 471-487.

Hermannsson, K. et al., 2016. The external benefits of higher education. Regional Studies, 51(7), pp. 1077-1088.

HM Treasury, 2017. GreaterManchester Autumn Budget 2017 Update: Further commitments between Government and the Greater Manchester Combined Authority and the directly elected mayor: HM Treasury.

Holden, J. & Harding, A., 2015. Using Evidence: Greater Manchester Case Study: What Works Centre for Local Economic Growth.

Hunt, J. & Gauthier-Loiselle, M., 2010. How Much Does Immigration Boost Innovation?. American Economic Journal: Macroeconomics, 2(2), pp. 31-56.

Industrial Development Agency Ireland, 2017. Annual Report & Accounts 2017, s.l.: s.n.

Irish Department of Business, Enterprise and Innovation, 2015. Innovation 2020, Excellence Talent Impact: Ireland's strategy for research and development, science and technology.

Irish Department of Finance, 2018. Patterns of Firm Level Productivity in Ireland: A Technical Background Paper for the Economic Development Review Committee.

Isaksson, P., 2008. Leading Companies in a Global Age - Managing the Swedish Way, s.l.: VINNOVA – Swedish Governmental Agency for Innovation Systems / Verket för Innovationssystem.

Jones, C. I., 2015. The Facts of Economic Growth: NBER WP 21142.

Kelly, P., 2000. The Politics of Economic Change in Australia in the 1980s and 1990s: Reserve Bank of Australia.

Kennedy, L., 2015. Unhappy the Land: The Most Oppressed People Ever, the Irish?: Merrion Press.

Koske, I., Wanner, I., Bitetti, R. & Barbiero, O., 2015. The 2013 update of the OECD's database on product market regulation: OECD Economics Department Working Papers.

KPMG, 2017. Improving UK regional productivity performance.

Leese, P., 2018. City horizons with Sir Richard Leese - Manchester Then and Now [Interview] (13 July 2018).

Lisenkova, K., 2018. Demographic Ageing and Productivity: productivity Insights Network.

Lupton, R. & Obolenskaya, P., 2013. Labour's Record on Education: Policy, Spending and Outcomes 1997-2010: LSE Social Policy in a Cold Climate Working Papers.

Mason, C., 2018. Productivity and the UK's Deficiency in Scale-ups: Productivity Insights Network.

McDonald, R. & Bessis, H., 2018. City Space Race: Balancing the

need for homes and offices in cities: Centre for Cities.

McGregor, P. & Ross, A. G., 2016. Assessing the impact of work-based learning initiatives: Fraser of Allander report for Skills Development Scotland.

McLaren, J., 2018. Scotland's Economic Growth and Productivity Slowdown - Explanations, Implications and Potential Solutions: Scottish Trends.

McLelland, A. & St John, S., 2006. Social policy responses to globalisation in Australia and New Zealand. Australian Journal of Political Science, 41(2), pp. 177-191.

McSorley, L., 2018. Inequality, Well-being, and Inclusive Growth: Productivity Insights Netowrk Evidence Review.

National Records of Scotland, 2017. Life expectancy for areas within Scotland 2014-2016.

National Records of Scotland, 2017. Projected Population of Scotland (2016-based): National population projections by sex and age, with UK comparisons..

National Records of Scotland, 2018. Mid-year Population Estimates: Scotland, Mid-2017..

Neyman, F., Norback, P.-J. & Persson, L., 2015. The turnaround of Swedish industry: Reforms, firm diversity and job and productivity dynamics. IFN Working Paper.

OECD, 1995. Economic Surveys: Sweden 1995. Paris : OECD Publishing.

OECD, 1999. Economic Surveys: Ireland 1999. Paris: OECD Publishing.

OECD, 2013. Supporting Investment in Knowledge Capital, Growth and Innovation. Paris: OECD Publishing.

OECD, 2014. Education at a Glance 2014: Sweden , Paris.: OECD Publishing.

OECD, 2015a. Education at a Glance 2015: Sweden, Paris: OECD Publishing.

OECD, 2015b. Investment (GCFC) (Indicator). [Online] Available here. [Accessed 24 July 2018].

OECD, 2015c. Economic Surveys: Sweden 2015, Paris: OECD Publishing.

OECD, 2017a. Economic Surveys: Sweden 2017, Paris: OECD Publishing.

OECD, 2017b. Employment Outlook 2017, Paris: OECD.

OECD, 2018a. GDP Per Hour Worked. [Online] Available here. [Accessed 13 August 2018].

OECD, 2018b. General government spending. [Online] Available here. [Accessed 10 August 2018].

OECD, 2018c. OECD Better Life Index. [Online] Available here. [Accessed 30 August 2018].

OECD, 2018d. OECD Economic Surveys: Ireland 2018. Paris: OECD Publishing.

OECD, 2018e. PISA 2015: Results in Focus: OECD.

OECD, 2018f. Productivity and Jobs in a Globalised World: (How) Can All Regions Benefit?, Paris: OECD Publishing.

OECD, 2018g. Research and Development Statistics. [Online] Available here. [Accessed 18 August 2018].

Ofsted, 2010. London Challenge: Ofsted.

ONS, 2017a. An international comparison of gross fixed capital formation: Office for National Statistics.

ONS, 2017b. Labour productivity measures from the Annual Business Survey: 2006 to 2015: Office for National Statistics .

ONS, 2017c. LI01 Regional labour market: Local indicators for counties, local and unitary authorities. [Online] Available here. [Accessed 25 July 2018].

ONS, 2017d. Regional gross value added (balanced) by Local Authority in the UK. [Online] Available here. [Accessed 25 July 2018].

ONS, 2017e. Regional gross value added (income approach). [Online] Available here. [Accessed 25 July 2018].

ONS, 2018a. Country and regional public sector finances expenditure tables. [Online] Available here. [Accessed 13th August 2018].

ONS, 2018b. Gross domestic expenditure on research and development, UK: 2016: ONS.

ONS, 2018c. Industry by region estimates of Labour Productivity: April 2018. [Online] Available here. [Accessed 14 August 2018].

ONS, 2018d. Regional and sub-regional productivity in the UK: February 2018. [Online] Available here. [Accessed 25 July 2018].

ONS, 2018e. Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018: Office for National Statistics.

Parham, D., 2000. A More Productive Australian Economy. Agenda, 7(1), pp. 3-16.

Peri, G., 2012. The effect of immigration on productivity: Evidence from US states. Review of Economics and Statistics, 94(1), pp. 348-358.

Pocock, B., 2009. The best of times, the worst of times: The Hawke and Rudd governments, employment and industrial relations. In: G. Bloustein, B. Comber & A. Mackinnon, eds. The Hawke Legacy: Wakefield Press, pp. 180-197.

Productivity Commission, 1999. Microeconomic Reform and Australian Productivity: Exploring the Links: Productivity Commission Research Paper.

Productivity Commission, 2003. From Industry Assistance to Productivity: 30 Years of "The Commission".

Remes, J. et al., 2018. Solving the productivity puzzle: The role of demand and the promise of digitization: McKinsey Global Institute.

Sacks, D., Stevenson, B. & Wolfers, J., 2012. The New Stylized Facts About Income and Subjective Well-Being. Emotion, pp. 1181-1187.

Scottish Executive, 2004. The Framework for Economic Development in Scotland.

Scottish Fiscal Comission, 2018. Sotland's Economic and Fiscal Forecasts, May 2018.

Scottish Government, 2004. A Smart, Successful Scotland: Strategic direction to the Enterprise Networks and an enterprise strategy for Scotland.

Scottish Government, 2007. The Government Economic Strategy.

Scottish Government, 2015a. Scotland's Economic Strategy.

Scottish Government, 2015b. UK Innovation Survey 2015 - Results for Scotland , Edinburgh.

Scottish Government, 2016a. Programme for International Student Assessment (PISA) 2015: Highlights from Scotland's Results.

Scottish Government, 2016b. Scotland's Labour Market Strategy.

Scottish Government, 2016c. Scottish Survey of Literacy and Numeracy 2015 (Numeracy).

Scottish Government, 2017a. Business in Scotland 2017: Office for National Statistics .

Scottish Government, 2017b. Government Expenditure & Revenue Scotland 2016-17. [Online]
Available here. [Accessed 13th August 2018].

Scottish Government, 2017c. Scottish Survey of Literacy and Numeracy 2016 (Literacy).

Scottish Government, 2018a. Gross Expenditure on Research and Development. [Online]
Available here. [Accessed August 2018].

Scottish Government, 2018b. Quarterly National Accounts Scotland, 2018 Quarter 1. [Online]
Available here. [Accessed 14 August 2018].

Scottish Policy Foundation, 2018. Exports - a background note.

Shanahan, M., 2009. Economic policy of the Hawkeyes. In: G. Bloustein, B. Comber & A. Mackinnon, eds. The Hawke Legacy: Wakefield Press, pp. 167-179.

Sims, R., 2013. Australia's experience driving economic growth through competition policy reforms: Australian Competition & Consumer Commission.

Sustainable Growth Commission, 2018. Scotland - the new case for optimism: A strategy for inter-generational economic renaissance.

Swinney, P., 2016. Building the Northern Powerhouse: Lessons from the Rine-Ruhr and Randstad: Centre for Cities.

Ulku , H. & Muzi, S., 2015. Labour Market Regulations and Outcomes in Sweden: A Comparitive Analysis of Recent Trends: The World Bank Policy Research Working Paper Series.

United Nations Statistical Division, 2000. Classifications of Expenditure According to Purpose: United Nations.

Weil, D. N., 2007. Accounting for the Effect of Health on Ecnomic Growth. Quarterly Journal of Economics, 122(3), pp. 1265-1306.

World Bank, 2018. Doing Business 2018: Reforming to Create Jobs.

World Economic Forum, 2017. The Global Human Capital Report 2017, Geneva.