# Tackling Trends in Inequality: An International Perspective

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It's a great honour and privilege to have been asked to become Honorary President of the DHI and to deliver this Presidential Address this evening. It's also a real privilege to succeed the distinguished previous Presidents of the Institute, including fellow economists Sir Alan Peacock and the Nobel Prize winner George Stigler.

I am particularly sorry that Alan won't be with us this evening. Conversations with Alan were always inspiring. They ranged from music to Italian art to economics and were never ever dull. Alan sadly left us this August, but I know he will never be forgotten as a giant of economics in this country.

At the outset of this lecture I also want to thank Alfred Duncan – Alfred is a PhD student at the University of Glasgow who worked with me on this lecture. Alas for him we share all the added value and all the errors.

Inequality is much in the news. This lecture is an attempt to try to give you a flavour of some of the international evidence on trends in inequality. We could have equally entitled this lecture 'Inequality and Growth', because one of the most interesting aspects of the concern with inequality relates to the bidirectional links between inequality and economic growth. It is one of the recurring themes in the lecture, partly because it has been identified as an issue in one of the major contributions to this debate in recent years by Thomas Piketty (2014) in his volume 'Capital in the 21st Century'. In fact, as I will hopefully demonstrate, it is the fundamental forces underpinning growth, such as advances in technology, and the formation of skills and human capital that offer the best insights to the forces driving inequality, including inherited wealth and its impact on social mobility.

I will also look at the importance of taxation and public goods in ameliorating inequality trends. This is an important point: it's very easy to conclude that greater inequality can be addressed simply by using income and, as Piketty argues, wealth taxation. In fact public goods provision and the social milieu and what is loosely described as 'social capital' may be just as important.

Finally I will conclude with the point that a lesson from all of this economic literature is that if society really cares about inequality then alongside our normal economic metrics in a country's economic performance framework it would be perfectly natural to test public policies for their impact on inequality. In other words, to assess how policies impact on the distribution of income and inequality within and across generations.

Before looking at the evidence in earnest, given my affiliation with the University of Glasgow I felt I should pay tribute to Adam Smith, and make a serious point in passing. This well-used quote from Adam Smith's Wealth of Nations is often seen as making a point about

inequality. In fact it is always dangerous to selectively quote academics to make political points.

> *Is this improvement in the circumstances of the lower ranks of the people to be regarded as an advantage or as an inconveniency to the society? The answer seems at first sight abundantly plain. Servants, labourers and workmen of different kinds, make up the far greater part of every great political society. But what improves the circumstances of the greater part can never be regarded as an inconveniency to the whole.* No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable. *It is but equity, besides, that they who feed, cloath and lodge the whole body of the people, should have such a share of the produce of their own labour as to be themselves tolerably well fed, cloathed and lodged.*
>
> Adam Smith 'The Wealth of Nations', I.8.35 (emphasis added).

Adam Smith was a man of his era, and if you expand that quote from the phrase that is quoted most often ("No society… poor and miserable"), you see that it comes from a section of the Wealth of Nations in which Smith analyses the wages of labour and indeed develops his perspective on the labour theory of value. Smith wasn't making a point about the unemployed or about inequality *per se*. He was concerned about the working poor, and indeed that section of the Wealth of Nations develops the importance of market forces ensuring that workers receive an appropriate reward for their contribution to the creation of value.

And this would not be a David Hume Institute lecture if I didn't pause briefly on David Hume himself, as a good friend of Smith and on his perspective on the issue of income distribution. The opening part of this quotation, in particular, is something we will return to later when we look at the problems which greater inequality may cause to social cohesion and hence economic development.

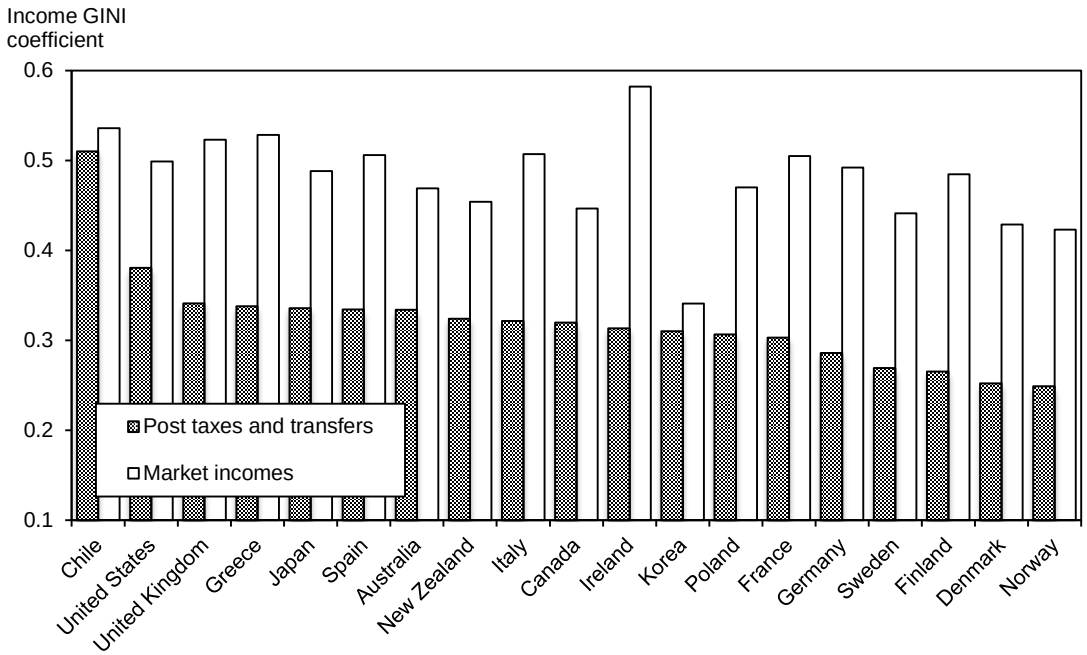
> *A too great disproportion among the citizens weakens any state. Every person, if possible, ought to enjoy the fruits of his labour, in a full possession of all the necessaries, and many of the conveniencies of life. No one can doubt, but such an equality is most suitable to human nature, and diminishes much less from the happiness of the rich than it adds to that of the poor. It also augments the power of the state, and makes any extraordinary taxes or impositions be paid with more chearfulness. Where the riches are engrossed by a few, these must contribute very largely to the supplying of the public necessities*
>
> David Hume: 'Essays, Moral, Political, and Literary', II.1.17 ('Of Commerce')

It's worth recognizing at the outset that there are many dimensions and measures of inequality. I am not going to focus on measurement issues in this lecture, and I will only use some measures of inequality (largely income inequality measures).

An excellent recent paper for the David Hume Institute by David Bell et al. (2014) published a month ago examines a number of issues in relation to inequality in Scotland. Again, I will refer you to that paper in terms of the analysis of the changes affecting Scotland. These include important demographic issues like the participation of women and older people in the labour market, which we will not have time to consider here.

The following two charts show some of the trends in income inequality for some OECD countries. The first chart shows income inequality across a number of OECD economies using the Gini measure of inequality. The Gini index varies from 0 to 1 as one moves from complete equality (all persons have an identical income) to complete inequality (one person in an economy receives all the income). So a higher Gini coefficient indicates greater inequality.

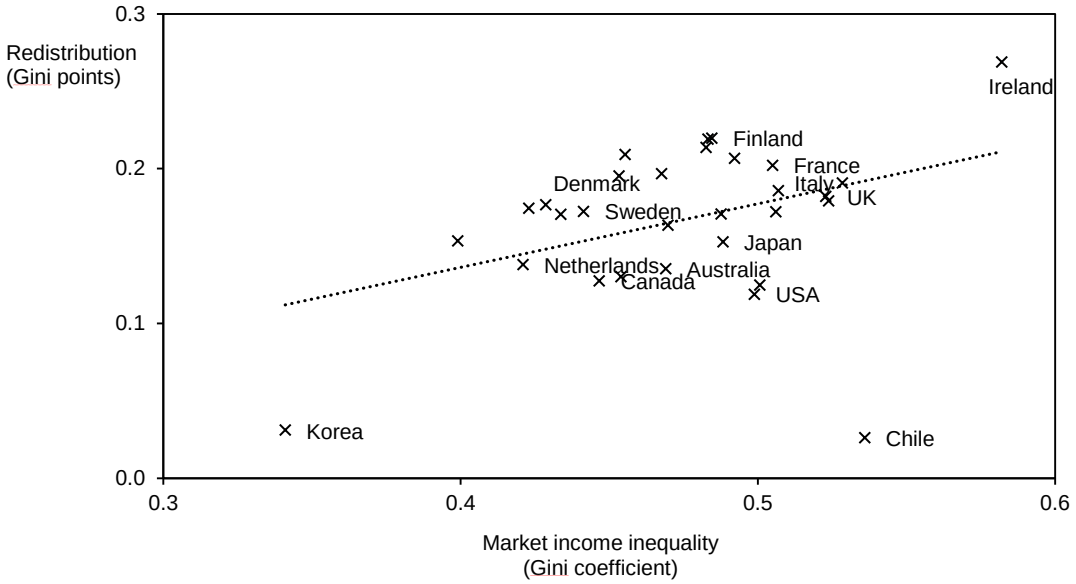
**Figure 1: Market and disposable income inequality. Selected OECD countries, 2011. Source: OECD.**




This figure shows income inequality in a number of developed economies in terms of market incomes and after the impact of taxes and transfers/benefits is taken into account for 2011. A

number of points should be made: First, the degree of inequality in OECD countries is less than in many developing and emerging economies. If I had shown you a map of Gini indices across the world the highest numbers would be seen in Latin America, Asia and sub-Saharan Africa. Second, it is apparent that some countries' tax and benefit systems (Finland, Norway, Sweden, and Denmark) are much more equalizing than those of others (Chile, USA, UK, Australia, Korea). Third, there is a correlation between the degree of redistribution in each country through the tax and benefit system and market income inequality as can be seen from the next slide.

**Figure 2: Market income inequality and redistribution. Selected OECD countries, 2011. Source: OECD.**

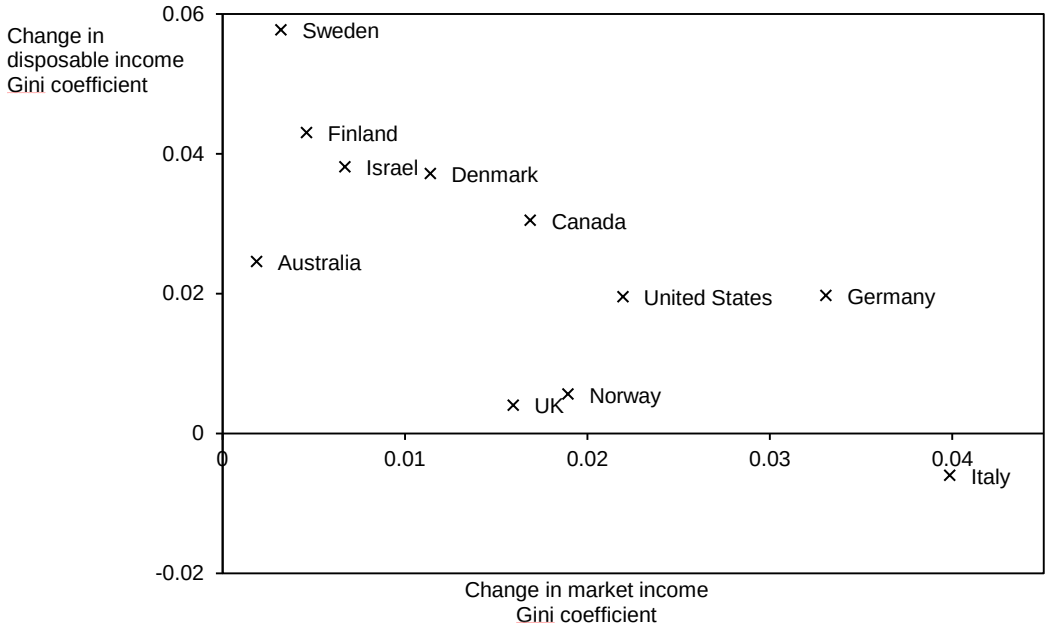



This is because most tax and benefit systems are progressive. What this plot shows is that some countries have higher degrees of redistribution conditional on their market income inequality (Finland, Germany, Scandinavia) and others have far less than expected (USA, Canada, Chile) suggesting less progressivity. Perhaps surprisingly the UK is on the line, suggesting that in the UK inequality is due to market outcomes (inequality as great as Portugal, Spain and Greece – not shown on this chart) as much as lack of progressivity in the UK tax system. Bell et al. (2014) show moreover using regional data that much of the UK inequality comes from growing inequality due to the London region. Excluding London, UK inequality as measure by Gini indices has been stable since the early 1990s. Indeed if I had plotted Gini coefficients over time you would have seen that growing inequality is not a recent phenomenon in these advanced economies. In most cases growing inequality dates from the early 1980s.

So why is there such increasing concern about inequality now if it is not a new phenomenon? In part it's because the financial and economic crisis has had a differential effect, compressing or reducing real incomes at the bottom end of the distribution whilst higher incomes seem to have been protected. Indeed, including at the very top end of incomes, the 0.01 per cent as the *Economist* has recently noted. In addition, at the lower end absolute poverty has become apparent. In part it's because prospective growth has been reduced, thus focusing attention much more on the distribution of income. Finally, as we will see later, in some countries, if not all, there are real concerns about the degree of social mobility.

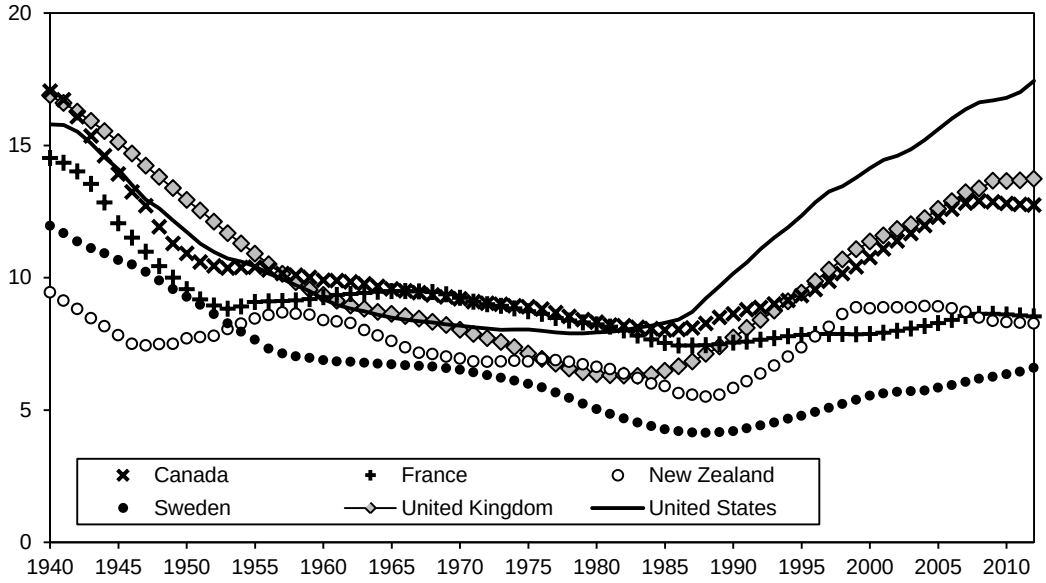
Interestingly the stories vary a bit across countries. If one looks at the changes in market income and post tax and disposable (net) income Gini coefficients between 1995 and 2010 one sees that in some countries there has been an increase in market income Gini coefficients, but in others there has been an increase in disposable income Gini coefficients. Even the Nordic countries have seen increases in inequality.

**Figure 3: Changes in market and disposable income. Selected countries, 1995 to 2010. Source: OECD and authors' calculations.**




As I said in part the concerns about inequality are fuelled by the growth in the share of national income accruing to the 'top 1 per cent' of earners (see Atkinson, Piketty and Saez, 2010). This is apparent if one plots a 10-year moving average.

**Figure 4: Top 1 per cent income share. Selected countries, 10 year moving average. Source: World Top Incomes Database and authors' calculations.**




What is striking is that there has been an increase in this ratio across many industrialized economies. However, it's also worth noting that in some cases (the US, UK and Canada) the trend is more marked. The divergence of the earnings distribution is the key theme of the book by Thomas Piketty (2014). It is difficult to do justice to a major book in a few minutes. In essence, Piketty's argument can be summarised as follows:

Piketty argues that inequality is driven by inequality in capital income – where capital is not equally owned, and at the limit is owned by only part of the population (a capitalist class). Those of you familiar with the work of Nicholas Kaldor will recognise some similarities. The share of national income earned by capital owners is defined by:

$$\alpha \equiv r \times (K/Y),$$

where $r$ is the real rate of interest (the rate of return on capital), $K$ is the stock of capital and $Y$ is national income or GDP. In economic growth models the (equilibrium) capital output ratio is given by the ratio of the savings rate, $s$, and the growth rate of GDP, $g$:

$$K/Y = s/g$$

It follows by substituting the second equation into the first that capital's share of income depends on the savings rate, the real rate of interest and the growth rate:

$$\alpha = r \times (s/g)$$

Piketty argues that $s$ (and $r$) will not vary as much as $g$, and as $g$ falls the capital share (and hence capitalists' share) in GDP grows. Piketty argues that generally $r > g$ and that in these circumstances inequality will tend to naturally increase. Increases in the capitalists' share of national income mean reductions in the share of national income paid to workers through wages and salaries.

Piketty's take on history is that the period 1940-1980 was an anomaly and that there is an inexorable tendency for inequality to increase. It follows that the only way to tackle this tendency in a world where capital is mobile is to impose co-ordinated global wealth tax.

Now to save time I've simplified the analysis, and in reality Piketty's book contains much richer arguments about divergent labour incomes as well as capital income, although his emphasis is very much on capital. He also nicely describes how in this scheme the tendency for capitalism to become dominant has led to a class of 'supermanagers' to dominate the scene much as the land-owner class and then the factory owner class topped the capital income (wealth) distribution in times past.

There have been some critiques of Piketty, notably Acemoglu and Robinson (2014). Again, for brevity I'll keep to a summary of their arguments: First, they argue Piketty's analysis ignores institutions (That's probably an unfair criticism, as Piketty does provide some historical analysis of how institutional changes have impacted through his model on inequality). However the Acemoglu-Robinson point is that the interactions between income inequality and political and economic institutions are central to any analysis of inequality. These interactions in turn depend on economic growth. For example, if, as a result of a slowdown in growth, inequality were to increase, would that not trigger a change in those institutions governing the distribution of income, such as rent-seeking behaviour? (Rent-seeking behaviour can be very loosely described as behaviour by economic agents to increase their share of the distribution of the 'economic pie', sometimes at the expense of overall economic activity, rather than trying to grow the size of the pie itself). Second, $r$, $s$ and $g$ are not independent ($r$ and $g$ are linked through household and production technology, including the degree (elasticity of substitution) between capital and labour). In essence Piketty is assuming that there is a high degree of substitution between capital and labour which is not always the case. Third, $r > g$ may not increase inequality if there is sufficient social mobility. It is an empirical question. Fourth, the authors find that across countries, the difference $r - g$ does not appear to be correlated to increasing inequality. This appears a more serious shortcoming.

I would also add the following issues concerning Piketty's approach: First, an implication of Piketty's analysis is that slower growth generates inequality, which is a testable empirical proposition, and which may not fit the data well, as we shall see later. Second, the growing share of capital in GDP may have more to do with asset classes such as housing wealth which are less of a part of Piketty's story.

A model focusing on 'general' laws may miss the 'fundamental forces' driving the income distribution. These fundamental forces include the role of institutions, technology improvements, human capital, international trade and social behaviour, which all both drive and are driven by changes in income and wealth inequalities. Without considering the important role of the fundamental forces interacting with inequality, we may find it difficult to reach useful policy prescriptions except very general ones, such as Piketty's call for globally coordinated capital taxation.

So as an alternative to the 'grand theory' approach of Piketty, I think there is much more value to be had by trying to understand the fundamental forces which may be behind increasing inequality. I will focus on four broad types of explanation: First, the race between education and technology; second, scalable tasks and 'Superstars'; third, international trade and globalisation, and fourth, changes in bargaining power and the power of different interest groups

The first two focus mainly on technology and human capital formation as explanatory factors. The third asks if a more integrated world economy can explain the observed changes in inequality. The fourth explanation suggests that changes in the relative political and economic power of different sections of society lie behind the changes in inequality. My main focus will be on the first and second of these explanations, which are in some way connected.

Goldin and Katz (2008) highlight the importance of the varying supply of human capital in the face of technological change as a driver of inequality in labour income. Their insights develop a theme in Jan Tinbergen's work. Their thesis is based on a number of key points: First, human capital is a key determinant of economic growth. Second, technological progress is 'skills-biased', that is as technological progress drives growth, it requires higher-level skills. So, for example, routine tasks in manufacturing and services are automated and as a result individuals who have accumulated human capital through education are better placed to achieve higher earnings. Third, Investments in human capital through education should help moderate earnings inequality. Conversely, a slowdown in education participation in the light of a steady pace of technological change should see an increase in inequality. Fourth, the USA had a leadership in universal education in the 20$^{th}$ century (the Human Capital Century), which it gradually lost over time. The Goldin and Katz analysis focuses very much on the US as a case study.

The most striking distinction between the arguments of Goldin and Katz and Piketty is the relationship between growth rates and inequality. Goldin and Katz argue that inequality will increase when advances in technology – high growth – are not matched with public investments in human capital through education. In Piketty's model, it is low growth that will lead to increases in inequality if not matched with capital taxes. The stubbornness of real

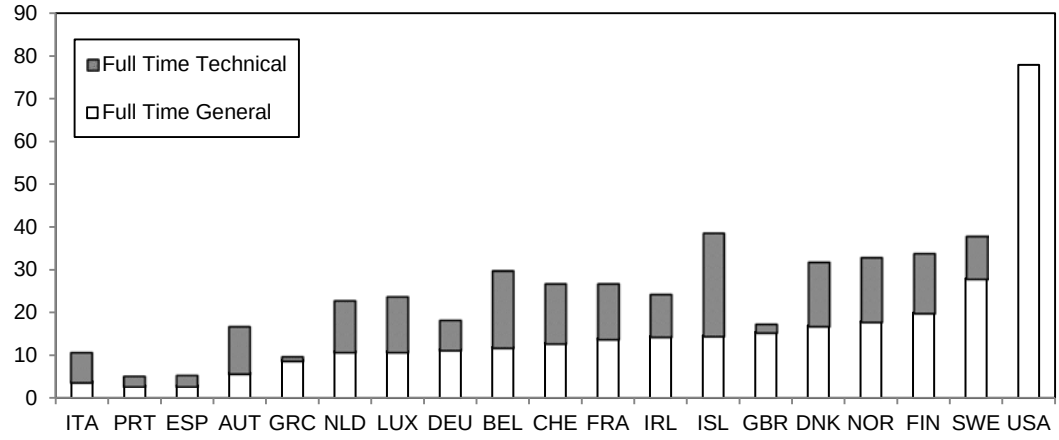
returns to capital allow capitalists to capture a greater share of national income at the expense of workers.

In the middle of the 20th century, income inequality in the United States fell dramatically, subsequent to schooling reforms which increased publically funded primary and high school provision to all citizens, regardless of gender or income. In contrast, in Europe, where school access was not freely provided to low-income children, inequality remained high. In recent years, this trend in education has turned, with many European nations first catching up with US participation rates in secondary education and then providing increased access relative to the United States in tertiary education, and income inequality in Europe rising more gradually than in the United States. To see how significant these trends were – see the following charts from Goldin and Katz:

**Figure 5: Schooling of 14-18 year olds in Great Britain and the United States, 1870 to 1960. Source: Goldin and Katz (2008, Table 1.1).**

| British Schooling Attendance Rates (in percent) | | | | US High School Enrolment and Graduation Rates (in percent) | | |
|---|---|---|---|---|---|---|
| Year | 14 year olds | 17 year olds | 15-18 year olds | Year | Enrolment / 14-17 year olds | High school graduates / 17 year olds |
| 1870 | 2 | 1 | n.a. | 1870 | n.a. | 2.0 |
| 1900 / 02 | 9 | 2 | n.a. | 1900 | 10.6 | 6.4 |
| 1911 / 12 | 12 | 1 | n.a. | 1910 | 14.5 | 8.8 |
| 1931 | n.a. | n.a. | 9.4 – 10.6 | 1930 | 51.1 | 29.0 |
| 1936 / 38 | 38 | 4 | n.a. | 1938 | 67.7 | 45.6 |
| 1950 | 100 | 10.5 | 12.6 [14.4] | 1950 | 74.5 | 59.0 |
| 1956 | 100 | n.a. | 14.9 | 1956 | 83.5 | 63.1 |
| 1957 | 100 | 9.0 | 16.1 | | | |
| 1960 / 62 | 100 | 15 | 17.5 | 1960 | 86.9 | 69.2 |

**Figure 6: Europe and the United States 1955/56. Full-Time Secondary School Enrolment Rate (in percent), 15-19 years. Source: Goldin and Katz (2008, Figure 1.7A).**




Does the Goldin and Katz model fit the evidence? Yes, in particular the model explains the increase in inequality in the USA from the late 1970s as the growth in the supply of higher education/college graduates slows down. But, as Acemoglu and Autor (2012) and others note, the model fits less well in other respects. Particularly in explaining why real wages of lower skilled workers are actually *falling*. Indeed since the 1990s it appears that the 'Higher Education/College premium' (the difference in earnings between university/college graduates and those leaving education without tertiary education) has been driven more by the low growth of wages of less skilled/unskilled workers as opposed to particularly high growth of skilled workers.

The last two points are interesting because there is no reason the Goldin-Katz model should imply that unskilled workers should be worse off in *absolute* terms from skills-biased technological change. But the model can be refined to include more than high and low skilled groups, and by extending the model to include a more sophisticated technology in which output is produced by *tasks*. In turn different skills groups might have different comparative advantage in different tasks. In the Goldin-Katz model the only way to combat inequality is by driving investment in education to match the greater comparative advantage of the skills that are in demand.

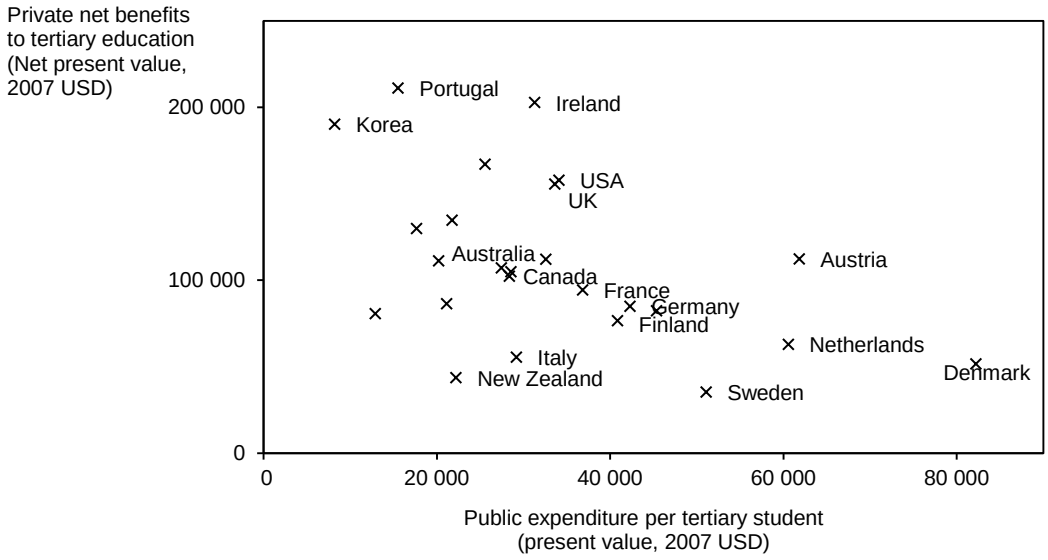
Indeed, the model is even richer if one allows directed technological change. This is technological change resulting from firms' investments in innovation, which responds to the supply of skilled labour. An increase in the supply of skilled labour encourages firms to respond by directing innovation toward increasing the productivity of the newly abundant skilled workforce. One example of directed technological change is the increase in innovation

in IT equipment and software, which may result in larger productivity gains for skilled workers.

I want to also introduce another element here which introduces a spatial element to inequality, and that is the potential importance of network externalities amongst highly - skilled workers or search externalities amongst companies employing highly skilled workers. This could produce agglomeration effects – high earning highly skilled workers concentrated in fast-growing cities with reinforcing effects through the housing market as house prices increase. Does this sound familiar in the UK context from London's experience?

Incidentally, if one plots recent data on private returns to tertiary education and public investment in tertiary education one sees exactly the sort of pattern one would expect from the Goldin and Katz theory. The skill premium as measured by the private net benefits of tertiary education appears to be lower in countries where the public expenditure per tertiary student is higher.

**Figure 7: Public expenditure per tertiary student and private net returns to tertiary education. Selected OECD countries, 2007. Source: OECD.**




Turning to our second explanation, scalable tasks and superstars, much of the recent increases in income inequality reflect increases in earnings at the upper tail of the income distribution, the (often less than) top one percent of earners – in the UK often linked to the financial sector. This presents a challenge to explanations based on education (and indeed globalization to which I will turn next). For example, an increase in the skilled wage premium should increase incomes for all skilled wage earners, who are more numerous than

one percent of the population. It appears that even within skilled wage earners, a few workers are receiving large income gains.

One explanation for increases in pay within the upper tail of the income distribution is the importance of scalable tasks as technology evolves. An example of this is the typical story told of singers and entertainers. Prior to recordings, entertainment was locally provided to a local audience. Earnings were limited by the size of the local audiences and a singer in Dresden was not competing with a singer in Paris. Following the advent of recorded music, these singers were now competing for the combined audience. The 'superior' singer could potentially capture the total market across the two cities, while the other singer's income would dramatically fall.

Some modern business models are inherently scalable. Google, Facebook and Amazon are examples of companies which have found such a scalable business model and expanded worldwide. Perhaps in contrast with traditional, inherently competitive manufacturing industries, these scalable industries resemble 'tournament games' with one clear winner accruing significant remuneration.

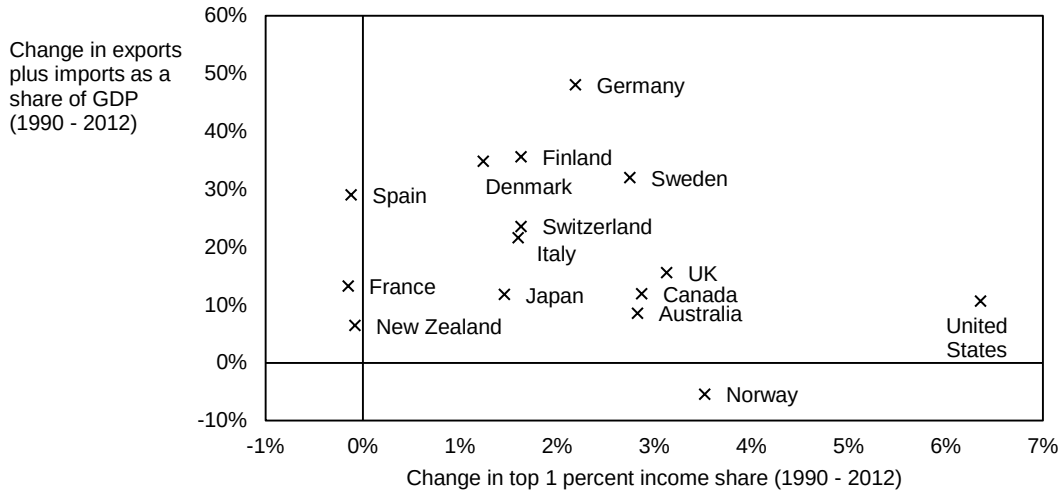
Let me now turn to Trade and Globalisation as an explanatory factor. By itself standard trade theory based on comparative advantage might explain why low-skilled wages in developed economies have fallen and high-skilled wages have risen. But it cannot explain why inequality (and high-skilled wages) are also growing in developing countries. These models predict that without trade, scarce high-skilled workers should be highly compensated in developing countries. With trade, high-skilled workers should earn a smaller premium over low-skilled workers in developing countries as they are now competing with abundant high-skilled workers from developed countries.

So trade and globalisation needs to be combined with a story about technological change affecting all 'tasks' and where global value chains are constructed using different combinations of low-, medium- and high-skilled labour (see for example Maskin and Kremer, 2003). This can explain why we observe increasing inequality in both advanced and emerging economies, as medium-skilled work (for example paralegal services, programming skills) are moved to low wage emerging economies. In advanced economies the middle of the labour market is squeezed as low-skill (often manual service) jobs survive as they are location specific but earnings are compressed. High-skilled professional jobs survive and gain higher returns through comparative advantage in trade. In emerging economies middle-skilled tasks gain higher returns and earn a premium over low-skill jobs in the non-traded sector.

But erecting barriers to trade would make matters worse, not better, for low earners because the costs of consumption goods would rise with protectionism. In any case, there seems to be

little correlation between the growth of top income earners and openness to trade, so it cannot be a trade story alone.

**Figure 8: Changes in openness to trade and top incomes. Selected OECD countries, 1990 to 2012. Source: OECD.**




Finally, let me turn to changes in bargaining power and labour market institutions. There has been a weakening of organised labour since the 1980s. This can explain a shift in share of towards capital and away from labour income. But by itself the weakening of organised labour cannot explain why the trend towards greater inequality is *continuing*, unless technology and human capital accumulation are also playing a role, and one is looking at directed technology adoption.

So let me summarise where we have reached. It is likely that the income distribution and hence inequality in a country is driven by a mix of fundamental factors. The primary factor is technological change, which impinges in a differential (or biased) way on different tasks. Repetitive tasks, some of which previously required a certain (lower and medium) level of education and skills, can now be automated. In addition increased trade and globalization and the fragmentation of the value chain internationally can explain why some medium-level skilled jobs have been taken offshore, thus increasing inequality in both developed and developing economies. Evolving institutions might also play a part in capturing economic rents. But as I mentioned I do think the tension between technology and education (or human capital) is the most convincing explanation for the persistent rise in inequality.

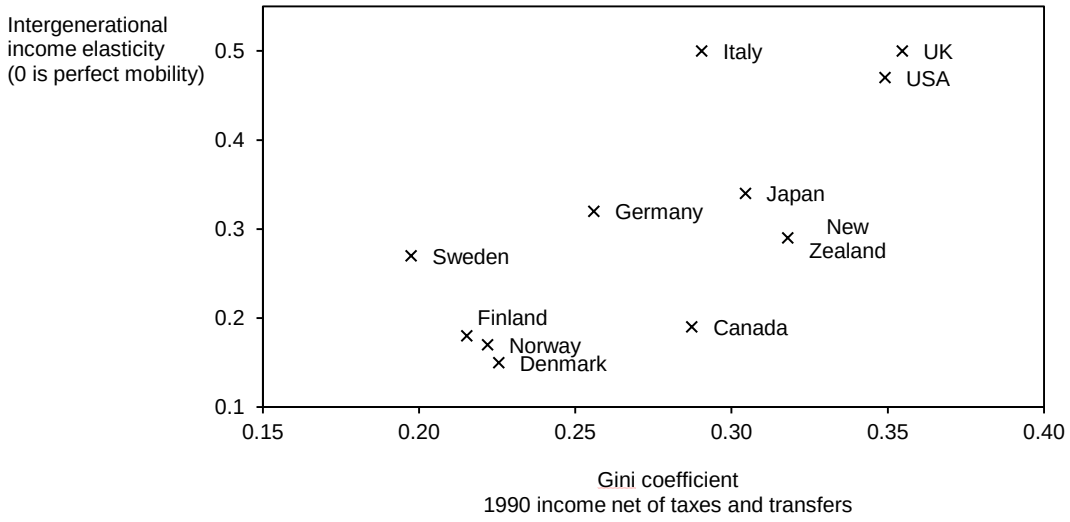
Before turning to what policy solutions might be open to society, I want to turn to another factor which shows the potential persistence of inequality across generations, which makes it more pernicious still. So let's focus briefly on the intergenerational perspective.

Miles Corak (2011) describes a relationship that has since been dubbed the "Great Gatsby Curve". Surveying studies of intergenerational income mobility across countries, Corak presents comparable estimates of income mobility across a selected group of countries. Plotting income mobility against Gini coefficients, Corak finds a positive correlation between income inequality and persistence of incomes across generations. Countries which exhibit greater levels of income inequality are also those with high intergenerational persistence in earnings.

The intergenerational earnings elasticity is a measure of persistence of income across generations. The square of the intergenerational earnings elasticity is equal to the share of the variation in a person's earnings from mean earnings explained by the incomes of their parents. For example, the intergenerational earning elasticity presented for the United Kingdom is 0.5. This means that on average, one quarter of children's earnings variation from the mean can be predicted from their parents' earnings.

While Corak's data ranges across a number of surveys and timeframes, we take 1990 Gini figures as a measure of income inequality within the parents' generation of the studies of mobility:

**Figure 9: Income inequality and subsequent income mobility. Selected OECD countries. Sources: Corak (2011) and OECD.**




We see a positive correlation between the share of income captured by the top 1% and that lack of social mobility. Corak suggests that inequality might be transmitted across generations by investment in human capital, in line with models outlined by Gary Becker and others. In essence these models predict that, on average, lower income parents will invest less

in children's human capital. Thus disadvantage fosters disadvantage; and the reverse also applies.

Gregory Clark (2014) and Clark and Cummins (2015) show a similar effect, but uses different methods. Rather than surveying the incomes of parents and children, Clark measures social mobility by following family lines across many generations in a selection of countries. *Surname data* allows Clark to identify families who were over-represented in high status universities and professions at various periods in history, and he finds that these families typically remain over-represented in high status professions to this day. Doctors beget doctors and lawyers beget lawyers - or indeed vice versa. This approach yields estimates for intergenerational earnings elasticities of between 0.75-0.80 in the sample countries. Surprisingly, Clark finds similar persistence of high status occupations such as physicians and lawyers in Sweden as in the United Kingdom and the United States. In addition, Clark finds no evidence that dramatic changes in social policy in the 20th Century have impacted mobility into high status occupations.

And of course the transmission of inequality through the generations through capital is a theme of Piketty's, so it doesn't have to work solely through the human capital channel. But let's be clear: it's not all about the top 1 per cent – intergenerational inequality happens over a broader spectrum of incomes. If one looks at the top 1 per cent income shares in the United States and Canada, alongside the annual turnover rates within the top 1 per cent of earners one sees that in each country, approximately 25-30% of top 1 per cent earners in any given year were outside the top 1 per cent in the previous year. Panel data confirms that there is turnover within the top 1-20% percentile of earnings.

Before turning to policy interventions we should ask ourselves whether inequality matters beyond the moral imperative. Clearly societies will care about the moral imperative in itself, but a number of economists have suggested that there may be deleterious feedback effects, with inequality in turn having a negative feedback effect on growth. Recent work outlining the mechanisms linking inequality to slow growth includes Ostry, Berg and Tsangarides (2014), Stiglitz (2012) and Berg and Ostry (2011).

Let me quickly identify a selection of important channels through which inequality can lead to a reduction in economic growth. First, as already noted, the poor may invest less in human capital accumulation, stifling future growth. Second, inequality causes political and economic instability, which creates uncertainty and reduces investment (Alesina and Perotti, 1996). Third, in democracies inequality may result in aggressive redistribution, which penalizes investment and growth. Fourth, extreme inequality may encourage rent-seeking behaviour by the rich, thus again reducing investment and growth. Finally, if one believes in a Keynesian demand-constrained world, inequality may lead to slow recovery phases following recessions as growing inequality means that a greater share of income is earned by high wealth

individuals who typically save a larger fraction of their income. Saving is good for long-term growth but in the short run can hold back demand.

In an interesting new book, Greenwald and Stiglitz (2014) look at learning models of the economy and growth in the tradition of Kenneth Arrow. I cannot possibly do this work justice in a few sentences but suffice it to say that Greenwald and Stiglitz raise concerns about how the combination of deindustrialisation, reductions in public funding and macroeconomic instability is resulting in a reduction in expenditure on research and development (R&D). What both Greenwald and Stiglitz and Goldin and Katz share is an emphasis on the importance of externalities in learning and innovation, which means that there is a role for government in supporting education and innovation. That being said, Greenwald and Stiglitz differ from Goldin and Katz who tell a more individual specific, human capital story of knowledge creation. Indeed for Greenwald and Stiglitz, much of the knowledge capital of an economy is firm specific. This distinction is important for policies in promoting knowledge creation – should this be at the firm level through support for R&D, or at the individual level through education?

I will now turn to what public policy interventions are open to address the issue of inequality. Clearly more progressive taxation has an effect in ameliorating market income inequality, for example within the Nordic countries, but even there inequality has increased recently. One of the issues is that if the processes driving inequality are inextricably linked to the technological innovation driving growth, then redistribution may only have a temporary effect. The targeting of redistributive transfers also seems particularly important to reducing inequality, relative to taxation rates alone. As Bell and his co-authors show, benefit spending has had a large impact in reducing inequality in Britain (about 12-14% in inequality as measured by market Gini over the period 1994-2011, compared to taxes at just over 4% reduction in market Gini).

And of course high taxation does have potential disincentive effects on labour supply and investment. It also acts on the symptoms as opposed to eliminating the causes of inequality. The integration of benefits and income taxation (e.g. in-work benefits), which addresses the powerful disincentive of work for low incomes, is certainly something to look at. Tax credits certainly seem to have played a role in the UK in reducing market income inequality. More generally the disincentive effects of high marginal tax rates at low incomes where cash benefits can be lost if one earns over a certain level is something which needs to be looked at.

Turning to labour market interventions (e.g. minimum and living wage), again Bell and his co-authors analyse the impact of this, and point out that although clearly these measures can help, to some extent they also help households at higher levels in the income distribution, if those receiving low wages are not the only workers in a household. Instead, investment in public goods (education) – funded through progressive taxation - may have a greater impact in reducing the causes of inequality.

More importantly, investments in early childhood health and education investment might increase intergenerational mobility. Anna Aizer (2014)'s study is interesting because it sheds light on how different types of public spending may help to reduce intergenerational inequality. Aizer focuses on spending on childhood education and health and finds that spending on these categories of public goods tends to reduce inequality in educational outcomes as measured by PISA (Program for International Student Assessment) scores. In contrast, greater public spend on older generations can exacerbate the transmission of inequality across generations. In other words intergenerational transmission of inequality, as witnessed in the 'Great Gatsby' curves can be reduced by focusing spending on public good that benefit children (e.g. childcare, health early years education).

This then leads into the debate on whether we care more, or as much, as a society about inequality at all points in time or about the intergenerational transmission of inequality. Other measures that could alleviate the latter include focusing on reforms to inheritance taxation. Interestingly some countries with very high degrees of inequality (for example Italy) have very generous inheritance tax regimes. In the UK, if your estate is over the £325,000 threshold you can reduce your inheritance tax by giving to charity. If you leave 10 per cent of your estate to charity the tax due may be paid at a reduced rate of 36 per cent instead of 40 per cent. One could make the policy more progressive still for very large estates, thus reducing the Great Gatsby effect even more.

Turning finally to the role of social capital, this would merit a lecture in itself. We know for instance from the work of Putnam (1993) on Italy that there is a strong correlation between civic engagement and government quality. Helliwell and Putnam (1995) show in turn that this social capital led to greater growth in those regions that had strong associational activity which created social capital. In addition, in their study across countries Stephen Knack and Philip Keefer (1997) find that 'social capital' as measured by associational activities, interpersonal trust and co-operative norms encouraged growth. Social capital and social cohesion and trust seems to be a determinant of growth. It is not entirely surprising that this should be so. Where trust breaks down, rent-seeking activity becomes more prevalent which disrupts the efficient working of a market economy.

Let me draw to a conclusion. Economists are often blamed for confusing matters with models and ideas that pull in different directions and do not provide a firm conclusion. I hope that I haven't done that. Instead I hope that what I have provided you with is a balanced message that dealing with inequality requires a bit of thinking: that its immediate causes (for example low pay) may not be its fundamental causes (which may include technological change, education and health, particularly in the early years); and also that inequality across generations matters as much as the distribution of income at a given period in time; that sound institutions which do not drive inequality matter as well as good policies, which then reinforce those institutions as opposed to rent-seeking behaviour; and finally that there are

inextricable linkages between those forces which drive inequality and those forces which drive growth, which matters if we do believe in the importance of economic progress (and let's face it, distributional concerns become even more difficult to address in the absence of economic growth).

So let me leave you with the following thought.

If we care about inequality should we not explicitly test each public policy measure against this dimension? If we think that social justice is part of our performance framework, then it would make sense to look at the range of public spending and ask explicitly, and analytically whether each measure is regressive or progressive, to apply an inequality test to public policy measures as part of that national framework. Some countries, like New Zealand, have begun to explore this possibility. And as I have argued, some of the results may surprise us – even if we might instinctively wish to believe that every penny spent on benefits and on public goods is progressive.

This is of course very difficult political terrain, and it's not for economists but for society and their elected representatives to make those judgements. But to enable them to make those judgements we need a strong evidence base. Given demographic and current cyclical fiscal pressures, if as a society we care deeply about growing inequality as well as economic growth then I would argue that this approach makes sense. Indeed, having an evidence base may also help to build social consensus around difficult fiscal choices.

But the lesson from the economic models discussed in this lecture are that we should focus not only on the impact on the income distribution of fiscal choices *now* but on the *long-run* inequality and growth effects – its impact on the growth process itself, but also on institutions which govern that process – thus *reducing future inequality by increasing social mobility*.

Across the world many policymakers are rightly concerned about the issue of inequality. But, if we are serious about economic inequality then we need to design our economic and political institutions and policies with fairness at their heart. Not only to level the playing field for the current generation, but even more importantly to do so for future generations.

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