The U-shaped Curve of Health Inequalities over the 20th and 21st Centuries

Introduction

In his seminal work, *Capital in the Twenty-first Century*, the French economist Thomas Piketty identified a u-shaped curve in wealth and income inequality over the 20th and 21st centuries [1]. Given the high-profile parallel discussion about the relationship between income inequality and health [2], this article draws on historical epidemiological studies to argue that there could be a similar u-shaped curve in health inequalities. Whilst evidence from the early part of the 20th century is sparse, the historical data available from the USA, Sweden and the UK suggests declines in health inequalities from the 1920s to the 1950s [3, 4, 5, 6]. A larger body of work from the USA, the UK and Western Europe examines trends from the 1960s to the early 21st century [7-18]. Overall, these studies find that health inequalities further reduced from the mid-1960s until the early 1980s when they increased again – with an acceleration in the pace of increase in the early part of the 21st century. This article documents this 'u-shaped curve of health inequalities over the 20th and 21st centuries', examines potential explanations of the policies and politics that lie 'behind the curve' and uses these to identify how we can 'break the curve' in the future.

Wealth and Income Inequality in the 20th and 21st Centuries

Using novel data sources, Piketty (2014) calculated the share of total national income and wealth held by the top decile of the income distribution (the top 10%) and the top percentile (the top 1%) across high-income countries [1]. This built on earlier work by Piketty and Saez (2003) that had examined similar trends in the USA [19] where they identified a u-shaped curve of wealth and income inequality over the 20th and 21st centuries. Between 1920 and

1929 in the USA, the share of national income taken by the top 10% rose from around 40% in 1920 to 50% in 1929. It then fell sharply following the Wall Street Crash of 1929 and then again during the Second World War, stabilising at around 35% from the mid-1940s to the mid-1970s. It then rose rapidly through the 1980s, peaking again at 50% in 2007. A similar pattern is evident for the share of national income held by the top 1% in the USA (peaking at around 24% in both 1929 and 2007) [1, 19].

These changes over time in the proportion of income and wealth held by the top groups are also evident for the other 'Anglo-Saxon' countries - although with smaller 2007 peaks of a 10% share of income for the top 1% in Australia, 14% in Canada and 15% in the UK [1]. The national share of income held by the highest groups also increased from the 1980s in the other wealthy countries of Japan and Western Europe (e.g. Denmark, France, Germany, Italy, Spain, Sweden) although from a lower base and with a smaller peak: For example, in France, Japan, Italy and Spain the share of the top 1% increased from around 7% in 1980 to 9% in the 2010s; in Sweden for 4% to 7%; Denmark 5% to 7%; and Germany 9% to 11%). As Piketty (2014: 321) notes, *"their trajectory resembles that of the United States in some respects, with a delay of one or two decades"* [1]. Subsequent analysis has found that the higher shares of national income held by the top 10% and top 1% have been maintained since 2010 [20].

The U-shaped Curve of Health Inequalities

This section examines what is known from historical epidemiological studies about trends in health inequalities over the 20th and 21st centuries. Data on early 20th century trends in health inequalities is available in studies of infant mortality rates (IMR) in the USA and Sweden [3, 4] and for premature and working-age mortality in England and Wales [5, 6]. Overall, IMRs fell

dramatically over the 20th century for all social groups. For example, in the USA IMR fell from an average of 61 per 1000 live births in 1935 to 6 per 1000 live births in 2020 and in Sweden from 50 to 2 [21-22]. However, studies have noted a 'fall and rise' of inequalities in IMR in the USA over the 20th century [7]. For example, Rodriguez and colleagues (2022), in a study of state-level trends in IMR from 1925 to 2017, found that inequalities by race/ethnicity in the USA declined between 1925 and 1945, then increased slightly until the mid-1960s, before falling again until around 1980 when they increased again through to 2017 (with a period of slight decrease from around 2000 to 2010) [3]. A similar pattern has been found in analysis of historical trends in inequalities in IMR for Sweden. Socio-economic inequalities in IMR in Sweden first appeared in the late 1890s [23] and then decreased steadily over most of the 20th century, through until 1980 when they were at their smallest [4]. In the early and mid-1980s, socio-economic inequalities in IMR in Sweden then increased between the most and least privileged groups [9].

Research examining more recent historical trends in inequalities in IMR is available for the USA, Sweden, Norway, Denmark and England. Analysis by Krieger and colleagues (2008) [7] of county-level trends in IMR in the USA between 1960 and 2002 found that absolute and relative racial/ethnic inequalities in IMR fell between 1966 and 1980 (and particularly between 1965 and 1971 [8]) but that relative inequalities rose again between 1980 and 2002, whilst absolute inequalities stagnated [7]. They also found similar trends for income inequalities in IMR in the USA: shrinking relative and absolute inequalities between the top and bottom quintiles of income before 1980, followed by their widening or stagnating thereafter [7]. Relative inequalities in IMR also increased in Norway and Sweden between 1980 and 2001, and in Denmark absolute inequalities increased in IMR in this period [10].

Analysis of trends in IMR in England from 1983 to 2017 also found that from the early 1980s to the late 1990s, absolute and relative inequalities in IMR increased, there was then a slight decline in inequalities in the early part of the 21st century (1999-2010) before inequalities increased again from 2011 to 2017 [11].

This u-shaped curve is also evident in terms of trends in inequalities in premature and all-cause mortality in England and Wales, the USA, France and other European countries. Analysis by Thomas et al (2010) of trends in socio-economic area-level deprivation in under-65 mortality in England from 1921 to 2007 found that the relative index of inequality in Standardised Mortality Ratios (SMR) declined from a ratio of 2.50 in 1921-30, through to a low of 1.92 in the early 1970s [6]. From the 1980s onwards, it increased consistently rising to 2.79 in the mid-2000s. They found the same pattern for the SMR of best to worst of the most deprived 10% to the least deprived 10% [6]. Likewise, work by Wilkinson (1989) also noted a u-shaped curve with a decrease in the slope index of relative occupational class inequalities in working-age SMRs amongst men by in England and Wales between 1921 and 1951 – with increases from 1961 to 1971 [5]. Trends for women paralleled those for men from 1931 – but with a less steep gradient [5].

A similar trend was noted by Krieger and colleagues' (2008) research in the USA [7]. They found that inequalities by income and race/ethnicity in premature mortality rates (under 65 years) also present a u-shaped curve with absolute and relative inequalities by income and race/ethnicity falling between 1966 and 1980, with relative inequalities widening - whilst absolute inequalities stagnated - from 1980 onwards [7].

Analysis of trends in educational inequalities in France in premature all-cause mortality rates (for men and women aged 30-64) from 1968 to 1996 also noted increases from the 1980s: the relative index of inequality increased from 1.96 (men) and 1.87 (women) in 1968–1974, to 2.77 (men) and 2.53 (women) in 1990–1996 [12]. The rise in health inequalities since the 1980s is also evident in other European countries. For example, Mackenbach and colleagues (2018) analysis of trends in relative educational inequalities in all-cause mortality for seventeen European countries from 1980 to 2014 found that whilst mortality rates declined steadily amongst all educational groups over this period, relative inequalities increased considerably [13].

Looking into the early 21st century, evidence from the USA and the UK shows a further increase in health inequalities – to such an extent that they maybe leading to a stall in overall health improvement [14-18]. Prominent research in mortality trends between 1999 and 2013 in the USA by Case and Deaton (2015) found an increase in all-cause mortality among middle-aged white non-Hispanics [16]. These increases were concentrated among those without a 4-year college or bachelor's degree [17]. Since 2010, death rates have also risen among Black non-Hispanics and Hispanics without a degree [17]. Overall, adult life expectancy in the USA over the last decade has risen for the college educated and fallen for the rest [18]. Similarly, analysis by Marmot and colleagues [14-15] of trends in inequalities in life expectancy in the UK has found that *"over the decade since 2010, the social gradient in life expectancy has become steeper and the inequalities by area-level deprivation greater"* [15]. So, this recent increase in health inequalities in the USA and the U is due to stagnation or declines in lower socio-economic groups alongside continued improvement in higher groups [15].

In summary, the available historical studies reviewed here suggest that there is a u-shaped curve of health inequalities over the 20th and 21st centuries. For IMR, there is a u-shaped curve in relative inequalities – particularly evident from the 1960s onwards - in Sweden, the USA, and the UK. This curve is also evident – albeit to a lesser extent - in studies of relative inequalities in premature mortality in the USA, England, France and for all-cause mortality in England and Wales and continental Europe. There is also more recent evidence from the USA and the UK of an acceleration in the increase in health inequalities in the early part of the 21st century.

Behind the Curve

These trends in health inequalities echo what Piketty (2014) and other economists, including Goldin and Margo (1992) and Krugman (2007), have found regarding inequalities in wealth and income: decreases in inequality in the mid-20th century (what Goldin and Margo term the 'Great Compression' in relation to income and wealth in the USA) then widening again, from the 1980s, to levels higher than those in the 1920s [1, 23, 24]. This parallel between long-term trends in wealth and income inequality and trends in health inequalities are suggestive of an association between the two [5]. The role of income inequality and *between* country inequalities in health and wellbeing has been extensively set out by Pickett and Wilkinson (2015) (e.g. that more equal countries have better overall life expectancy) [2]. However, there has been less attention paid to the role that income inequality might have for *within* country health inequalities (a notable exception being Wilkinson, 1989 [5]) and the limited analysis that has been undertaken to date has been somewhat inconclusive [25]. The overview of historical trends in both income and health inequalities presented here suggests that there

could be an association over the longer term. This would need to be explored more systematically but income inequality might drive health inequality through various mechanisms including lower wages, higher rates of unemployment, lower taxation rates on capital (and therefore less expenditure on public services and welfare support systems), and higher poverty rates [5, 26]. Indeed, the economist Paul Krugman notes that the expansion and contraction of the welfare state was the main driver of income inequalities over the 20th century [24]. This section examines chronologically how changing policy regimes might explain the u-shaped curves of income *and* health inequalities across the 20th and 21st centuries, identifying four key periods (Figure 1): the *Interbellum Era* (1920-1950); the *Trente Glorieuse* (1950-1980); *Neoliberalism* (1980-2010); and the *Crisis Age* (2010 to date).

INSERT FIGURE 1 HERE

The *interbellum era* – or between the wars – was a period of social reform with the beginnings of welfare state systems in many countries. In Sweden, for example, Burstrom (2003) describes how improvements in water, sanitation, hygiene, social housing, nutrition, family policies and health care over the early part of the 20th century in Sweden particularly benefitted children in the poorest families [4, 27]. Average incomes also increased in this period in many countries and poverty rates and income inequalities fell [1, 4, 5]. Likewise in the UK, the 1920s and 1930s saw the introduction of pensions, slum clearances and the start of social housing as well as an increase in the coverage of community-based health insurance schemes. Poverty rates also decreased substantially in the UK in this period – because of improved social security benefits ('poverty relief') [5]. Technical advances in medicine were also beneficial including better understanding of infectious diseases and more vaccination

programmes [4]. In the USA, income inequality also fell dramatically because of progressive taxation, stronger unions, strong economic growth, and wage regulation under Roosevelt's New Deal [28]. The New Deal also entailed public works projects; protection for labour organising; establishing minimum wages; funded a house-building programme; and introducing pensions, unemployment insurance and the welfare programme 'Aid to Dependent Children' [29].

The *Trente Gloriuses* refers to the sustained period of economic growth experienced in Europe (and other high income countries) from the 1950s through to the late 1970s. To a greater or lesser extent, this was the 'golden age' of welfare state capitalism - characterised by centralism, universalism, and active macroeconomic management by the state (Keynesian economics) with an interventionist fiscal policy, a large public sector, and a mixed economy, full (male) employment and high public expenditure, and the promotion of mass consumption via a redistributive tax and welfare system [30]. There was also a mainstream political consensus in favour of the welfare state and the redistribution it effected [26]. Western European countries experienced significant improvements to public housing, health care, and the other main social determinants of health [30]. This meant that in the 1950s and 1960s, income and wealth inequalities were historically at their smallest – and poverty rates the lowest [1, 5, 23, 24]. Similarly, the USA in the 1960s saw the 'Great Society' policy program which enhanced public health care coverage, the civil rights acts - which outlawed racial discrimination ('Jim Crow' laws) and segregation in public services - and poverty was reduced through increasing the value of the state pension; higher wages and expanding the scope of 'Aid for Dependent Children' [31-32].

This golden age of the welfare state effectively ended with the economic crisis of the 1970s and the rise of *neo-liberalism* or 'market fundamentalism' [26]. The fundamental presuppositions of neoliberalism are that markets are the normal, natural, and preferable way of organising the economy and society and that the primary function of state institutions and policies is to ensure the efficient functioning of markets and market outcomes [26]. Initially in the Anglo-American countries (under Reagan and Thatcher administrations) but then more broadly (e.g. Kohl in West Germany), the political consensus of the post-war settlement between labour and capital broke down as governments started to follow monetarist theories and dismantle and restructure the interventionist Keynesian welfare state [33]. The 'reforms' were characterised by the privatisation and marketisation of state services and industries; the retrenchment of social security benefits and social housing; modified taxation arrangements (with a shift away from business taxation); restrictions on labour organising, and the abandonment of the state's role in promoting full employment [26]. Wages fell and income inequality, poverty rates and unemployment all increased [26].

The *Crisis Age* started with the Global Financial Crisis (GFC) of 2007/8 which resulted from a downturn in the USA housing market. The GFC led to a massive collapse in global financial markets, a huge rise in government debts, and increases in unemployment and poverty [34]. The GFC was accompanied in many European countries (including the UK, Italy, Greece, Portugal, and Spain) by escalating public expenditure cuts: austerity [35]. This entailed large scale cuts to public service budgets, including health care, as well as steep reductions in welfare services and benefits for the poorest [35]. Income and wealth inequality increased because of stagnating wages and higher poverty rates and tax cuts for the wealthy and corporations [1]. The period since 2007/8 has been a time of permanent crisis for high-income

countries - with simultaneous instability across political, economic, environmental, and global health systems. This includes threats to democracy (with the rise of the populist and far right) and rolling wars in Europe and the Middle East; the return of protectionism (and a seemingly new 'cold war' with China); environmental disasters and the impacts of climate change more commonplace and widespread (with, for example, the highest ever recorded temperatures in Europe and China in summer 2022); and the COVID-19 pandemic resulting in over 7 million recorded deaths, and leading to unprecedented social and economic upheaval across the world [15]. The latter has since merged into the current 'cost of living crisis' with rising inflation, interest rates, and unemployment. Poverty rates and income and wealth inequalities have increased in many countries in this period [20].

Breaking the Curve

Looking back over the 20th and 21st centuries and these four distinct policy periods, the *Trente Gloriuese* appears as an historic exception when income *and* wealth *and* health inequalities were at their lowest [1, 5, 19]. This era teaches us that to break the u-shaped curve and reduce health inequalities requires large scale policy action across all aspects of society. Previous research has identified three main mechanisms for 'levelling' health inequalities in this period: poverty reduction through a redistributive welfare system, improved healthcare access, and enhanced political incorporation of the working classes and marginalised groups [36]. These levelling mechanisms worked together to improve the health situation of the poorest in society – historically speaking, democratisation and the political incorporation of the working classes and minority groups has tended to result in increases in welfare state and health care provision [37]. This is particularly evident in the USA in the 1960s, for example, when the expansion of social security safety nets (and the reduction of poverty) was

accompanied by increased health care access particularly for Black Americans - enabled by the Civil Rights Act of 1965 [8].

This analysis of the driving mechanisms behind the post-war reductions in health inequalities, is further reinforced from what can be seen as 'blips in the curve' – reductions in health inequalities in Germany in the 1990s and England in the 2000s *despite* wider trends in terms of increasing income and wealth inequalities [35-36]. The fall of Communism and the reunification of Germany in the 1990s provides an example of how to reduce health inequalities – significantly, at scale and in a fairly short time frame. In 1990, the life expectancy gap between the former East and the former West of Germany was almost three years for women and three and a half years for men. This gap rapidly narrowed in the following decades so that by 2010 it had dwindled to just a few months for women and just over one year for men [35, 36, 38]. This was achieved through similar mechanisms as the *Trente Gloriuese*: political incorporation through democratisation in the East, improvements in the incomes of the poorest as well as better quality health care provision – all made possible by redistributive taxation [35, 38-41].

The English Health Inequalities Strategy in the 2000s is another example. This was a wide-ranging and multi-faceted health inequalities reduction strategy in which policymakers systematically and explicitly attempted to reduce inequalities in health [42]. The cross-government strategy focused specifically on: supporting families, engaging communities in tackling deprivation, improving prevention, increasing access to health care, and reducing child and pensioner poverty rates as well as tackling the underlying social determinants of health [42]. These policies led to reductions in social inequalities in the key social

determinants of health - including unemployment, child poverty, housing quality, access to health care and educational attainment [35]. These were accompanied by some reductions in health inequalities between the most deprived areas in England and the rest of the country: inequalities in life expectancy decreased by just over a year for men and around six months for women [43]; the gap in IMR narrowed by 12 deaths per 100,000 births per year [11]; and inequalities in mortality amendable to health care interventions decreased by 35 deaths per 100,000 for men and 16 deaths per 100,000 for women [44].

These more recent examples provide further evidence of the role of public policies in 'breaking the curve' and reducing health inequalities. We can learn from these – and previous historical periods - in developing health promoting policies for the 21st century.

Conclusion

This article has examined historical trends in health inequalities over the 20th and 21st centuries. Drawing on studies from the USA, UK, Sweden and Western Europe, it has concluded that – as with income and wealth inequalities – the available evidence suggests that there is a u-shaped curve in (relative) health inequalities. Taking a long view, the article argues that health inequalities generally decreased across the 20th century through to the 1980s when they started to increase - with an additional spike since the 2010s particularly in the UK and the USA. These trends in health inequalities broadly parallel the trends identified by Piketty (2014) with regards to the u-shaped curve of income and wealth inequalities across the 20th and 21st centuries [1]. The article sets out four distinct policy periods in the evolution of health inequalities (*Interbellum Era* 1920-1950; *Trente Glorieuse* 1950-1980; *Neoliberalism* 1980-2010; and *Crisis Age* 2010 to date) which together provide evidence that social policies,

health care access and political incorporation have driven changes in trends over time [36]. More recent examples of 'breaking the curve' in Germany and England also emphasise the importance of politics and policy for health improvement [26].

However, the u-shaped curve of health inequalities set out here is very much a working hypothesis and it requires further, more extensive, and systematic historical analysis to fully interrogate it. For example, the sparse historical data available (particularly for pre-1960s) means that more extensive, time series historical data needs to be collated and analysed to fully assess trends over time in different countries and for different outcomes (something which the European Cooperation in Science and Technology [COST Action] *"The Great Leap. Multidisciplinary approaches to health inequalities, 1800-2022"* may enable [45]). This article has also not used systematic review methods and so there may be articles and data which do not support the u-shaped curve hypothesis. Further, the analysis of different health outcomes (e.g. IMR, preventable mortality, life expectancy) for different countries and time periods is also a limitation as is the various ways in which inequality has been measured across the included historical studies (e.g. race/ethnicity; in/out of wedlock children; income; education). Indeed, the curve appears to be more evident for relative compared to absolute inequalities [13].

Funding

This work was supported by the Wellcome Trust [221266/Z/20/Z].

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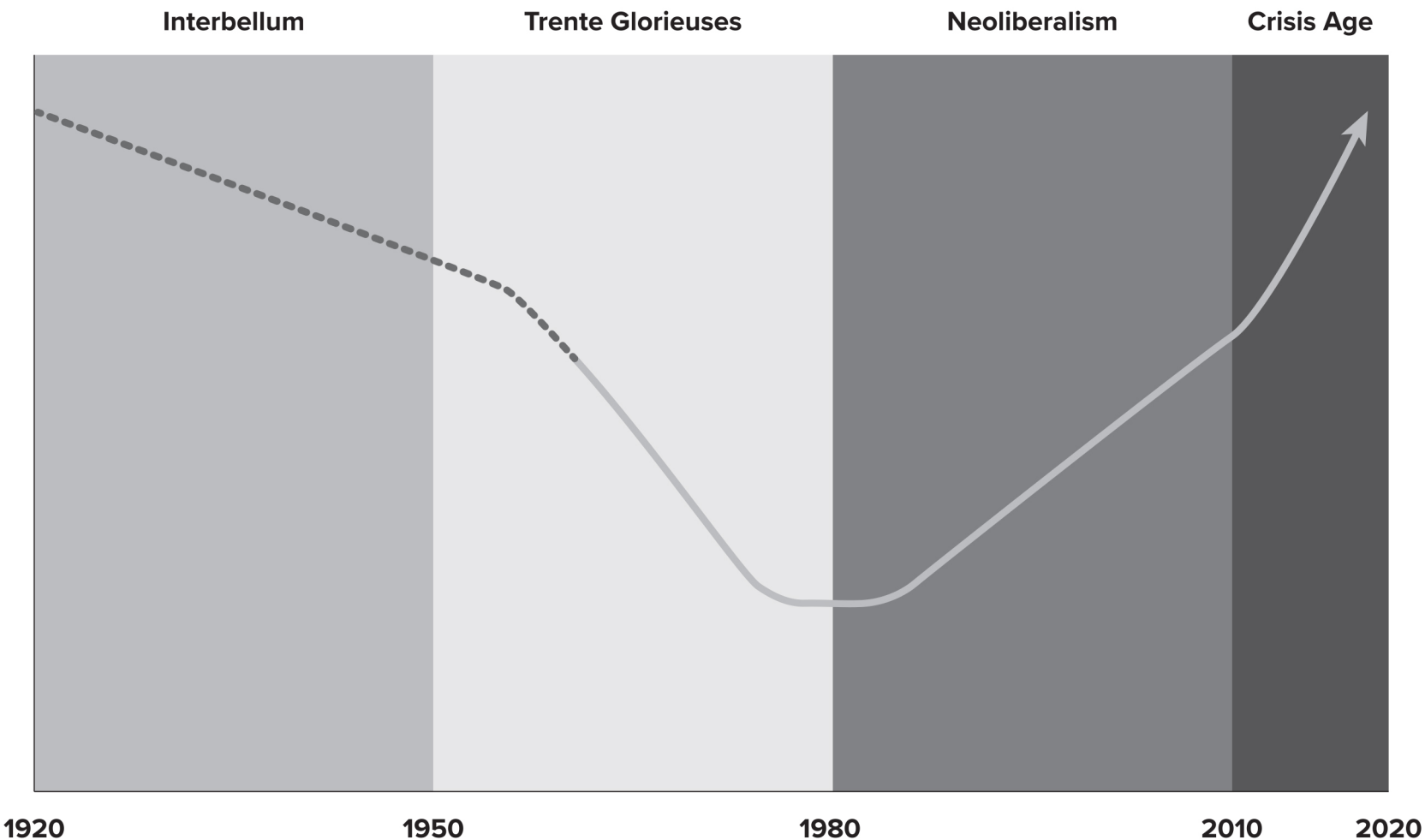
Interbellum
Trente Glorieuses
Neoliberalism
Crisis Age
1920
1950
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