The Future of Democratic Capitalism*

A human Capital perspective

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Introduction

The current financial crisis and recession have been likened to the great depression. It has generated calls from world leaders for revising Democratic Capitalism by a much more interventionist government system. Gordon Brown and Nicolas Sarkozy said that we need to develop a new economic order that will assign to the state a much greater role in regulating industries and even nationalizing some, and President Obama has put some of these ideas into action by supporting a highly expansionist fiscal policy, including de-facto nationalization of icons of American industry, like General Motors, that may aim to change the nature of democratic capitalism, at least US style. More surprisingly, the current crisis has also generated some confusion among economists and a surprising revival of old Keyensian ideas that most macro economists, including Neo-Keynesians, came to think of as anachronistic. Other economists, much more predisposed to free enterprise have approached the problem from a different angle by concluding that what's wrong with capitalism is the capitalists. They must have made a big discovery: the market system is not motivated by benevolent players.

I believe that much of the hoopla surrounding the doom and gloom prediction of the end of capitalism is misplaced. This is because paraphrasing Winston Churchill's famous saying, "Capitalism [Democracy] is the worst form of an economic system [government], except for all those other forms that have been tried from time to time". [1]

So first, let me define what I mean by democratic capitalism: an economic system that promotes private enterprise, free markets, and free trade through the rule of law, and thereby encouraging capital accumulation in its broad sense: physical as well as **human**. The adjective "democratic", refers to a system of government that promotes individual rights to life, liberty and the pursuit of happiness, apart from wealth creation, thereby assuring that capitalism can also benefit from wide public acceptance which is necessary for its long-term survival.

The emphasis on "human capitalism" represents an important twist on the concept of capitalism, since human capital is gradually becoming the widest form of capital owned by people, as education, training, and health, i.e., "embodied" human capital, spread across all segments of society. Both embodied human capital, which increases the productivity of human resources in current production, and "disembodied" human capital, or knowledge originating in the mind of researchers and entrepreneurs, which is transformed into process and product innovations, patents, books and other information outlets, are the genuine "engine of growth" that has fueled the unprecedented growth in per-capita income and wealth in the modern era. The relevance of human capital is bound to grow even more in the emerging "global information economy", so the future of capitalism needs to be judged also in view of its success in promoting this essential form of capital, which puts people, rather than physical capital, at the center of the economic system.

The first point I want to make about the current dire assessments of capitalism is that while the current recession has exposed new problems concerning the operation and

regulation of financial markets, the biblical proverb that "nothing is new under the sun" still applies to the current crisis.[2]

As Robert Samuelson reminded me in one of his recent columns, Joseph Schumpeter, one of the 20th century's eminent economists, believed that capitalism sowed the seeds of its own destruction. He said that the chief virtue of capitalism was long-term – facilitating wealth creation. But in the short term he saw capitalism marred by its flaws: unemployment, instability, inequality. These would make short-term politics fixate on anti-free market initiatives and question the legitimacy of capitalistic values – risk taking, self-enrichment – which are necessary for economic success. These values were not hailed just by Adam Smith. Deng Xiao Ping set China's phenomenal economic takeoff on fire by declaring that "to be rich is glorious".

Schumpeter's diagnosis of capitalism seems to be fully validated by the financial crisis and severe recession, except that he was wrong on his main prediction – that capitalism's flaws would cause it to lose its vitality. The reality is that Democratic Capitalism has flourished despite episodes of depression, war, prohibition, and intrusive interventionist policies. It is therefore a mistake to engage in a critical assessment of capitalism while world economies are still close to the ebb of the business cycle. Free markets cannot abolish the business cycle in the same way that free trade and free capital flows cannot abolish investment bubbles. While we are at the depth of recession, it is hard to see light. But we should also have a better understanding of what caused the "tsunami" before blaming democratic capitalism and free markets of being its main culprits. This is what I try to summarize in section 1. In section 2 and 3, I will try to summarize the performance

of American capitalism over the last 150 years or so in terms of both promoting material growth and other welfare attributes. I will conclude with a short summary.

1. Anatomy of the crisis

Like other economists, I believe that the current economic contraction has its origins in the housing bubble promoted by federal policies and the major mortgage providers in the economy. This bubble has been stoked by an excessively expansionary monetary policy and a regulatory failure. The bubble has ultimately imploded, causing a contraction in the housing sector, a meltdown in the financial-intermediation market, and a severe recession.

a. The role of Government mortgage providers: Fannie Mae and Freddie Mac

Born as a government agency in 1938 to support the mortgage market, Fannie Mae became a government sponsored enterprise (GSE), i.e. a private corporation, in 1968 – to remove it from Fed balance sheet – with Ginnie Mae set up as a guarantor of mortgages. Freddie Mac was later added in 1970 to facilitate a secondary mortgage market. These two GSEs became the main players in the housing market controlling 50% of all mortgages. Initially these companies served as intermediaries between borrowers and lenders lubricating the operations of the credit market. But the initial success of these institutions was later used as a vehicle to serve public policy objectives lacking a solid economic foundation. The GSEs, through the federal Community Reinvestment Act (CRA), were encouraged to make mortgage loans to people who couldn't afford them, and which a private lending enterprise would eschew. In particular, mandates were placed on Fannie and Freddie requiring that the percentage of mortgages to be allocated to

households below median income should rise to 52% in 2005, and that the percentage of loans going to households with income in the four lower deciles of the income distribution should rise to 28% in 2008.

b. The role of financial derivatives and regulatory agencies

The mandate of the GSEs to engage in sub-prime lending has created an unprecedented demand for private residences and a strong upward pressure on real estate prices. The opportunity to profit from a bubbling real estate market created a bandwagon effect on private investment companies by enticing them to enter the mortgage-lending business and provide the necessary capital to finance sub-prime mortgages through mortgage-based securities (MBS) and related financial derivatives. One could also make the argument that private investors were willing to purchase such derivatives and issue subprime mortgages because they believed that if the housing market collapses, the government would bail out the GSEs as well as the private lenders. Financial innovation, like most technological innovations, which is usually a catalyst of economic growth, played in this case a key role in stoking the housing bubble. Investment banks, GSEs, and other lenders spread the inherent risk from mortgage transactions not just to the rest the domestic economy, but to the international economy as well through issuance of MBS and collateralized debt obligations (CDO), and these were snapped by investors who were not able to price them correctly. Insurance companies like AIG absorbed a huge part of that risk through the use of credit default swaps (CDS) and other derivatives.

c. The role of the Fed

A central factor explaining why the bubble had grown so big over so long a period was the expansionist monetary policy by the Fed. Concerned about the potential

economic contraction created by the recession of 2001-2 following 9/11, the Fed embarked on a cheap money policy by lowering and maintaining short-term interest rates and their real level too low for too long a period. The cheap money made it irresistible for investment banks and insurers to take advantage of the short term profit opportunities. Moreover, most of these financial institutions did not fall within the regulatory framework of the "traditional" banking system. This has enabled excessive leveraging by these credit providers. Rating agencies also share the blame, partly because, like most other market players, they failed to assess correctly the value of the new financial instruments they were rating, and also because they were pressured to serve the demand for such securities by corporations they were dealing with.

All these factors added up to a ticking time bomb which ultimately exploded when the Fed started raising the interest rate in June 2006 to combat possible inflationary pressures. As the prices of private residences and commercial real estate started to implode, the huge worldwide stock of MBSs, CBOs and CDOs became "toxic". The inability of banks and other financial intermediaries to assess the multi-party risk inherent in financial transactions as a result of trillions of dollars tied up in toxic assets clogged the arteries of the credit market and created a severe credit crunch. Despite the huge injection of funds by the FED to bail out investment banks "too big to fail" and to provide liquidity through the discount window, the credit markets have so far remained largely frozen because of the uncertain values of the toxic MBS and the real estate assets they represent. This is the main factor that has inhibited the provision of credit for private investments, causing a general contraction in economic activity, employment, and consumption.

The implication of this short anatomy of the crisis is that the current crisis has been brought about as much by Government intervention and the failure of regulation as by the failure of markets to correct. It therefore questions the argument that the way to correct the economic system is through a significant expansion of regulation of private enterprise and private markets. As George Stigler's "capture hypothesis" has demonstrated, regulation is not a panacea: regulators often become proponents of the business interests they are supposed to regulate. So the best regulation may be the least, in order to insure its effectiveness where it is really needed, notably over the supply of money.

2. Is Capitalism losing Its Vitality?

The second point I would like to make is that since we are dealing with the **future** of capitalism, it is imperative to examine its long-term performance. In this context, I'd like to refer to a recent paper of mine, which illustrates the growth of the US economy over the 20th Century as a consequence of the accumulation of a type of capital not typically emphasized in the literature on capitalism – **human capital**. What I find is a resounding contradiction to Schumpeter's view that because of its short-term flaws, Capitalism is losing its vitality. I will illustrate it via two significant historical developments over the last 150 years or so, which elevated the human condition at speeds unprecedented in human history.

a. Continuous growth in productivity and per-capita income over 150 years

In the early1800s the U.S. had levels of GDP and GDP per capita considerably

below that of the U.K. and it was not until 1872 for GDP and 1905 for GDP per capita when the U.S. overtook the U.K. Figures 1 and 2 illustrate the comparisons poignantly.[3] Abstracting from year-to-year and cyclical fluctuations, both the U.S. and U.K. graphs relating the logarithm of GDP or GDP per capita to chronological time appear over the long haul to resemble the shape of an upward-sloping straight line. The slope of each line represents the long-term annual growth rate of GDP or GDP per capita.

Two points about these figures deserve special mention:

- Both resemble straight lines from a distance, where the jagged fluctuations become blurred. The slope of each line is remarkably constant despite the fact that the period represented by the curves transcends the great depression, numerous milder business cycle fluctuations, two World Wars, the wars in Korea, Vietnam, and more recently Afghanistan and Iraq. Every time the curves exhibit significant deviation – drop or rise – from the long-term trend, they do rejoin it with remarkable regularity. What guarantees this remarkable stability of growth over the long haul?
- The slope of the line for the US is steeper than that for the U.K. In other words, the U.S. has overtaken the U.K. because its long-term growth rates have been higher: Over the 132-year period 1871–2003 (starting at the point of overtaking) the U.S. versus U.K. GDP growth rates have been 3.39% versus 1.91% per annum while the corresponding per-capita GDP growth rates were 1.87% versus 1.42%.[4] In recent decades, these gaps have narrowed. For example, over the period 1961–2003, the comparative growth rates of GDP in the U.S. versus the U.K. were 3.37% versus 2.43%, while those for per-capita GDP were 2.25% versus 2.11%, respectively.[5]

b. Human Capital as the underlying engine of growth

My basic thesis is that differences in long-term per-capita income growth stem primarily not from differences in physical stocks, including land or other natural resources, but from differences in the rates of growth of human capital. The reason is that if we apply the simple neo-classical growth mechanics to explain the dynamics of persistent growth, we would expect growth in per-capita income, or TFP, to come from technological innovations. But significant breakthroughs in technology occur discretely, sporadically and unpredictably. Yet the rate of growth of per-capita income shows a remarkable continuity and stability, as we just saw. Endogenous-growth theory ascribes such continuity to the continuous accumulation of human knowledge, i.e., to human capital accumulation.

- Why human capital?

As argued in a famous quote from John Maurice Clark, "Knowledge is the only instrument of production that is not subject to diminishing returns". The secret here is that knowledge does not just augment current factors of production. As an embodied factor of production, knowledge should be subject to diminishing returns like hours of work or capital utilization. However, it also raises our capacity to learn and innovate. But the more important idea here is that human capital can grow persistently and smoothly as a result of deliberate investments a current generation makes in the knowledge and health of future generations. If we model the process in a dynastic or overlapping-generations setting, we can show that a steady state level of investment by parents in the human capital of their offspring that exceeds a critical threshold, guarantees a perpetual formation of human capital and growth.

- What accounts for differences in the rate of human capital formation and growth?

By this thesis the US has taken over the UK because of a faster rate of accumulation of human knowledge and technological prowess. How did that happen?

Recent research has shown that the US has had an advantage over Europe in two respects. It was the first to introduce formal schooling, stressing a uniform set of formal knowledge rather than vocational skills. This gave the US a tremendous advantage over Europe. What is less known is that the US was the first nation to develop a massive public system of tertiary education, starting in 1862, which gave the US a significant advantage over Europe throughout the 20th Century. But the US has achieved superior human capital formation not just by growing it domestically through a massive high school and tertiary education system, but by importing it as well, i.e., by encouraging immigration of skilled people, especially after the second world war.

- Democratic capitalism as the underlying motivating factor

Both human capital formation and its impact on growth, however, are ultimately attributable to underlying institutional and policy factors. The key motivating factor for generating the continuous growth of human knowledge is the *reward* knowledge formation is given within an economy. This has been the main source of strength of democratic capitalism generally and American capitalism in particular. The American education system has been more open and democratic than that of the relatively more elitist Europe. The American legal system has been relatively more protective of property and contractual rights, and more accommodating to free enterprise. The relatively freer labor and capital markets, in turn, have allowed markets to set proper rates of return on investment in education. And this has attracted not just domestic talent to pursue higher

education, but immigration of educated people from other countries who were attracted by the high reward for educational attainments set by the relatively free American labor market and the individual freedoms offered by the American democratic system. These underlying factors have encouraged a faster per-capita human capital accumulation, which enabled the US to overtake the UK and Europe combined and become the economic superpower in the 20th Century.

3. Capitalism and human welfare

A. Income distribution

One argument typically taken against the Capitalistic system is that while it may be successful in growing human material wealth, the impact on human welfare needs to be assessed from other angles as well. One is income distribution. As Schumpeter put it, the capitalistic system also tends to produce greater inequality in the distribution of income. In other words, capitalism increases the disparity between rich and poor, which also increases social conflict and political instability. This is a serious objection, I believe, and one that should not be taken lightly. The problem is that the argument is questionable on several grounds, which again come from human capital theory.

- First, inequality in wage earnings, and perhaps in non-wage income as well, comes overwhelmingly from differences in schooling and job training across persons. In other words, wage differences are largely the result of investment in human capital. By any fairness principle, people who invest more in human capital should be expected to get a return on their considerable investment in time and money. Free

market, free enterprise, and free trade – the 3 pillars of capitalism, simply accommodate this norm efficiently.

- Also, extending this argument further, there is a statistical bias in measuring income inequality, since differences in observed income do not account for the opportunity costs of investment in education. It is well documented that differences in the present values of lifetime income across individuals are not as large as differences in current income. (This is despite the fact that educated people also live longer).
- In recent work I published with Jinyoung Kim, we have also investigated the dynamic pattern of income distribution, and we show that it varies over different phases of economic development. It tends to increase during takeoffs from a stagnant equilibrium of low income into a persistent growth equilibrium, which is what China experiences today, but it then converges on a much lower level in the long run, even in the absence of government transfer payments and subsidies. Such trend in inequality is a necessary outcome of the development process.

B. Human longevity

Another measure of an economic system's success are welfare indicators such as health and longevity. In this context, one needs only to point out the unprecedented growth in life expectancy over the last 150 years. To wit:

- In the US, the earliest data are from 1850 in Massachusetts where life expectancy at birth was 38.3 for males and 40.5 for females. In 2005 these numbers rose to 75.2 for males and 80.4 for females. In other words, life expectancy pretty much doubled for both sexes. Several related features of this dramatic trend are worth emphasizing:

- The trends for non whites have been even more accentuated than those for whites over comparable periods (see Table 1-09). To wit: the percentage increases of life expectancy at birth for both sexes over 1970-2005 has been 14.20% for blacks, as opposed to 9.21% for whites. For black males the percentage increase was 15.83% as opposed to 11.32% for white males, while for black females the increase was 12.01% - almost double of the 6.88% for white females.
- The trends reflect a genuine increase in longevity. In fact, in the second half of the 20th Century the percentage increase in age-specific life expectancy has been rising continuously at all age groups, although at a slower pace. Specifically, from age 5 on, the percentage increase in life expectancy has become increasingly higher as age advances. The evidence is significant because it shows that life expectancy at birth has risen not just because of the drop in child mortality. The trends signify a real growth in human longevity (see Table 2).
- The evidence from Hong Kong is even more dramatic than in the US over a comparable period. Over the period 1971-2005 the percentage increase of life expectancy at birth for both genders has been 14.16% for Hong Kong as opposed to 9.89% for the US. For males the percentage increase was 16.2% for Hong Kong versus 12.07% for the US, and for females the increase was 12.22% in Hong Kong versus 7.63 for the US. I am tempted to quip here that Hong Kong has become more capitalistic than the US, but this would be unscientific.. At the very least, however, we could say that far from killing people, capitalism has allowed a dramatic improvement in human health and longevity, which included wide segments of society across different capitalistic countries. In fact, the empirical evidence shows

that the most systematic differences in life expectancy are attributable to differences in education, not income (see Table 4).

At the same time, we know that access to medical services has not been equal under capitalism because of the increasingly higher price of medical services, which has been a primary reason for government intervention through the establishment of old-age support systems. Health is also a public good, as we witness during times of exposure to public health hazards like the SARS epidemic, Mad Cow disease or the current swine flu scare, which require the intervention of public health organizations. However, the more affluent capitalistic countries can more easily support necessary public intervention in situations where private markets fall short, as is the case with the provision of other public goods such as external and internal defense and the rule of law. But even in the case of these public goods, market-based solutions can improve the efficiency of government intervention.

Conclusion

Capitalism is clearly not a perfect economic system partly because it cannot overcome especially the short-term weaknesses underscored by Schumpeter. I would add to it another weakness that classical economists have not paid much attention to: free markets and free trade cannot eliminate crime, by which I mean not just felonies, but economic and white-collar crimes ranging from bureaucratic corruption, fraud, embezzlement, and corporate crimes, including managerial abrogation of fiduciary responsibilities to corporate shareholders and stakeholders. While Adam Smith was aware of the problem, he has not emphasized it believing, perhaps, that competitive markets can diminish the

problem. Some of these imperfections can also contribute to the severity of business fluctuations, as in the present recession. What I was trying to argue in the preceding sections, however, is that the historical evidence of the last 150 years or so indicates that the system has performed reasonably well, not just in terms of material wealth, but also in terms of other welfare indicators. The demise of the socialist economies of the Soviet Block in the last century highlights this point. In a historical perspective an objective assessment might conclude that, as an economic system, capitalism has done more for humanity than any systems tried from time to time.

Whether capitalism is likely to lose its vitality, however, remains an issue, especially if some of the reforms espoused by current world leaders will severely weaken the principal social norm underlying capitalism: its acceptance as a fair system. Increased regulation, like excessive taxation, chips away at the profit motive that fuels entrepreneurship, and government bailouts of failing corporation create moral hazards that can destabilize the capitalistic system. But capitalism is not a static system. It has built-in adaptive attributes because markets, including the political market under democracy, find ways to overcome excessive interventions. American capitalism has survived increased levels of government intervention in the economy – from the introduction of personal and corporate income taxes, to the institution of Federal Commissions on Trade, Securities and Exchange, Transportation, Communication, and Environmental Protection, partly because at least some of these interventions have actually strengthened the efficiency of markets, and partly by abolishing the most inefficient ones, like the price controls of the Nixon Administration and the heavy regulation of airlines. So Figure 1, with which I started this short paper, may still be a good indicator of the future of the system.

References

Schumpeter, Joseph. 1942. Capitalism, Socialism and Democracy, New York: Harper, 1975. [orig. pub. 1942].

Stigler, G. J., 1971. The theory of economic regulation. Bell Journal of Economics and Management Science 2, 3 – 21.

Ehrlich, Isaac, and Yong Yin. 2005. Explaining Diversities in Age-Specific Life Expectancies and Values of Life Saving: A Numerical Analysis", with Yong Yin, Journal of Risk and Uncertainty, Springer, vol. 31(2), 129-162.

Ehrlich, Isaac, and Jinyoung Kim. 2007. The Evolution of Income and Fertility Inequalities over the Course of Economic Development: A Human Capital Perspective, Journal of Human Capital, Vol 1 (1) December 2007, 137-174.

Ehrlich, Isaac, and Jinyoung Kim. 2007. Social Security and Demographic trends: Theory and Evidence from the International Experience, with Jinyoung Kim, Review of Economic Dynamics , Vol. 10 (1) 2007, 55-77.

Isaac Ehrlich, 2008, The Mystery of Human Capital as Engine of Growth, NBER Working Paper No. 12868, published as a chapter in Smith, Mark and Ehrlich (2008), The Mystery of Capital and the Construction of Social Reality, Open Court, Chicago.

Footnotes:

[1] Taken from a House of Commons speech on November 11, 1947.

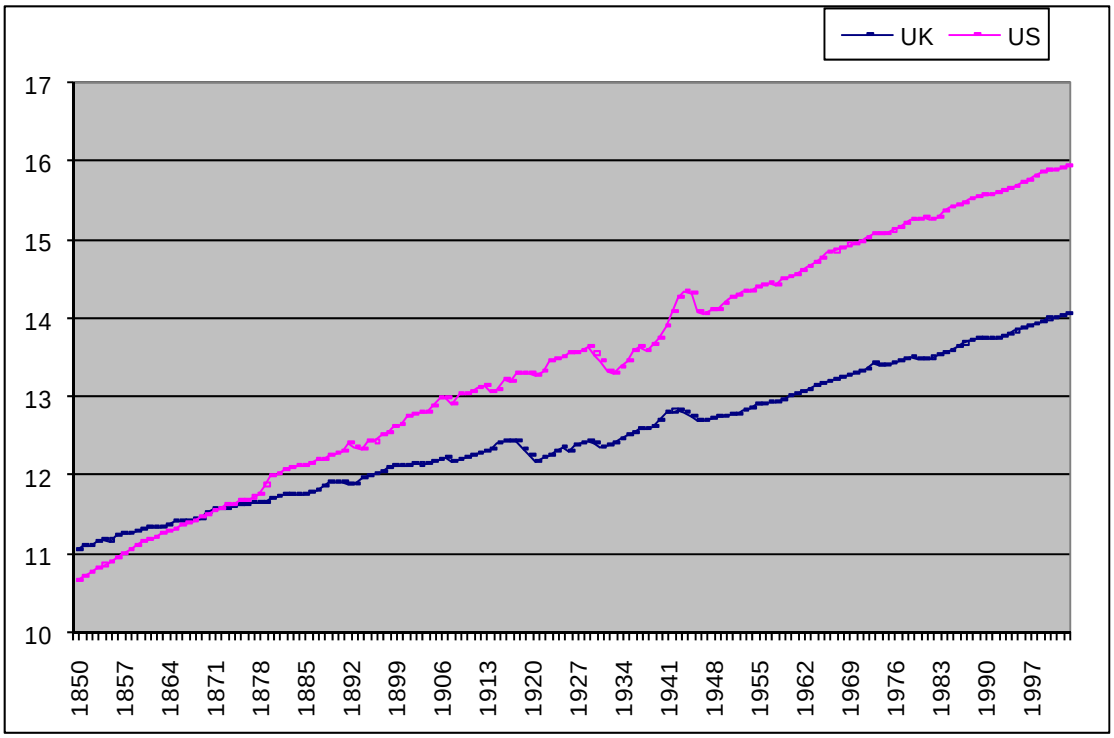
[2] "What has been, that will be; what has been done, that will be done. Nothing is new under the sun"; Ecclesiastics (1, 9).

[3] These figures are reproduced from my NBER paper "The Mystery of Human Capital" (2007), published as a chapter in Smith, Mark and Ehrlich (2007).

[4] 1 These statistics are taken from Maddison 2003. All figures are converted to 1990 U.S. dollars using the Geary Khamis Purchasing-Power-Parity (PPP) method. Similar graphs apply to other major European countries as well. For example the growth rates of GDP and GDP per capita (in parentheses) over the period 1850–2003—starting when the U.S. overtook other major European countries in per-capita GDP—were: 3.52 (1.83) for the U.S.; 1.98 (1.46) for the U.K.; 2.06 (1.72) for France; 2.31 (1.71) for Germany; 2.48 (1.75) for Italy; 2.18 (1.82) for Spain.

[5] The shorter-term trends have been uneven for other major European countries. Over the period 1961–2003 the per-capita GDP growth rate in France and Italy were 0.21% and 0.40% higher than in the U.S., respectively, while in Germany it was .14% lower. However, over 1976–2003, e.g., the U.S.'s per-capita GDP growth was 0.28% higher than France's, 0.47% higher than Germany's, and .06% higher than Italy's.

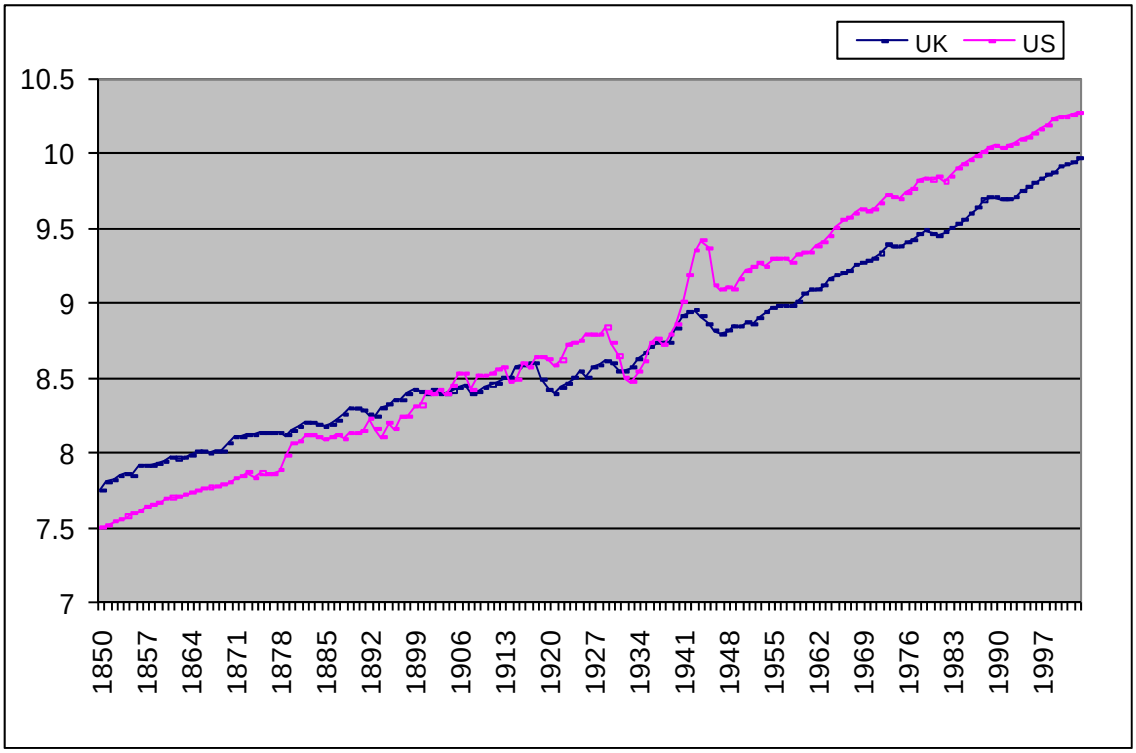
Figure 1: Comparison of the U.S. and the U.K. Real GDP in Log Terms (1850–2003)



Note: GDP data are converted to 1990 U.S. dollars using the Geary-Khamis Purchasing-Power-Parity (PPP) method. Data for 1851–1859 and 1861–1869 are imputed.

Source: Data from Maddison 2003.

Figure 2: ***Comparison of the US and the UK Real GDP Per Capita in Log Terms (1850-2003)***



Note: Per Capita GDP Data are converted to 1990 US Dollars using the Geary-Khamis Purchasing-Power-Parity (PPP) method. Data for 1851-1859 and 1861-1869 are imputed.

Source: Maddison (2003)

Table 1-09. Life expectancy at birth by race and sex: United States, 1940, 1950, 1960, 1970 and 1975-2005

[Race categories are consistent with the 1977 Office of Management and Budget (OMB) standards]

	All races[1]			White[2]			Black[2]		
Year	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
2005	77.8	75.2	80.4	78.3	75.7	80.8	73.2	69.5	76.5
2004	77.8	75.2	80.4	78.3	75.7	80.8	73.1	69.5	76.3
2003	77.4	74.7	80.0	77.9	75.3	80.4	72.6	68.9	75.9
2002	77.3	74.5	79.9	77.7	75.1	80.3	72.3	68.8	75.6
2001	77.2	74.4	79.8	77.7	75.0	80.2	72.2	68.6	75.5
2000	77.0	74.3	79.7	77.6	74.9	80.1	71.9	68.3	75.2
1999	76.7	73.9	79.4	77.3	74.6	79.9	71.4	67.8	74.7
1998	76.7	73.8	79.5	77.3	74.5	80.0	71.3	67.6	74.8
1997	76.5	73.6	79.4	77.1	74.3	79.9	71.1	67.2	74.7
1996	76.1	73.1	79.1	76.8	73.9	79.7	70.2	66.1	74.2
1995	75.8	72.5	78.9	76.5	73.4	79.6	69.6	65.2	73.9
1994	75.7	72.4	79.0	76.5	73.3	79.6	69.5	64.9	73.9
1993	75.5	72.2	78.8	76.3	73.1	79.5	69.2	64.6	73.7
1992	75.8	72.3	79.1	76.5	73.2	79.8	69.6	65.0	73.9
1991	75.5	72.0	78.9	76.3	72.9	79.6	69.3	64.6	73.8
1990	75.4	71.8	78.8	76.1	72.7	79.4	69.1	64.5	73.6
1989	75.1	71.7	78.5	75.9	72.5	79.2	68.8	64.3	73.3
1988	74.9	71.4	78.3	75.6	72.2	78.9	68.9	64.4	73.2
1987	74.9	71.4	78.3	75.6	72.1	78.9	69.1	64.7	73.4
1986	74.7	71.2	78.2	75.4	71.9	78.8	69.1	64.8	73.4
1985	74.7	71.1	78.2	75.3	71.8	78.7	69.3	65.0	73.4
1984	74.7	71.1	78.2	75.3	71.8	78.7	69.5	65.3	73.6
1983	74.6	71.0	78.1	75.2	71.6	78.7	69.4	65.2	73.5
1982	74.5	70.8	78.1	75.1	71.5	78.7	69.4	65.1	73.6
1981	74.1	70.4	77.8	74.8	71.1	78.4	68.9	64.5	73.2
1980	73.7	70.0	77.4	74.4	70.7	78.1	68.1	63.8	72.5
1979	73.9	70.0	77.8	74.6	70.8	78.4	68.5	64.0	72.9
1978	73.5	69.6	77.3	74.1	70.4	78.0	68.1	63.7	72.4
1977	73.3	69.5	77.2	74.0	70.2	77.9	67.7	63.4	72.0
1976	72.9	69.1	76.8	73.6	69.9	77.5	67.2	62.9	71.6
1975	72.6	68.8	76.6	73.4	69.5	77.3	66.8	62.4	71.3
1970	70.8	67.1	74.7	71.7	68.0	75.6	64.1	60.0	68.3
1960	69.7	66.6	73.1	70.6	67.4	74.1	---	---	---
1950	68.2	65.6	71.1	69.1	66.5	72.2	---	---	---
1940	62.9	60.8	65.2	64.2	62.1	66.6	---	---	---

Source: National Vital Statistics Reports, Volume 56, Number 10, April 24, 2008

[1] Includes races other than white and black.

[2] Multiple-race data were reported by 21 states and the District of Columbia in 2005, by 15 states in 2004, and by 7 states in 2003; see "Technical Notes." The multiple-race data

Table 2

US Life Expectancy Trends by Age and Sex, 1900-2000

Age

	0	5	10	20	30	40	50	60	70	80	90	100
	Males											
Differences, 2000-1900	26.22	15.58	14.51	13.17	11.14	9.05	7.2	5.57	3.98	2.49	1.24	0.85
Annual Growth Rate (%)												
1900-2000	0.44	0.26	0.26	0.28	0.28	0.29	0.30	0.33	0.37	0.40	0.36	0.44
1900-1950	0.64	0.31	0.30	0.31	0.28	0.22	0.18	0.18	0.23	0.31	0.29	0.44
1950-2000	0.25	0.21	0.22	0.25	0.29	0.36	0.43	0.49	0.51	0.50	0.44	0.46
	Females											
Differences, 2000-1900	28.8	19.3	18.16	16.7	14.3	11.92	9.96	7.89	5.91	3.59	1.76	1.09
Annual Growth Rate (%)												
1900-2000	0.46	0.30	0.30	0.33	0.34	0.35	0.38	0.42	0.49	0.51	0.46	0.52
1900-1950	0.69	0.41	0.41	0.43	0.41	0.38	0.39	0.40	0.41	0.39	0.31	0.37
1950-2000	0.23	0.20	0.21	0.24	0.27	0.32	0.38	0.45	0.57	0.64	0.62	0.69

Source: Table 11 pp31: *National Vital Statistics Reports, Vol.51, No. 3, December 19, 2002*

[Alaska and Hawaii included beginning in 1959. For decennial periods prior to 1929–31, data are for groups of registration States as follows: 1900–1902 and 1909–11, 10 States and the District of Columbia; 1919–21, 34 States and the District of Columbia. Beginning 1970 excludes deaths of nonresidents of the United States; see Technical Notes]

Table 4. Calibrated simulations of selected life-cycle variables by education groups (1996 data), using imputed biological mortality risks[a].

	Age 30	Peak of $v^*(t)$		Age 65	Variable at attained life expectancy age	
Education group	Variable value	Age	Variable value	Variable value	Age	Variable value
4a. Remaining projected life expectancy using benchmark biological risks[b]						
High school	44.48	37	38.25	15.72	74	10.32
Bachelor	45.90	38	38.34	15.85	76	9.32
More than bachelor	47.46	39	38.48	15.99	77	8.84
Doctorate	47.80	40	37.81	16.05	78	8.35
4b. Value of life saving (in $M)						
High school	1.320	37	1.348	0.930	74	0.696
Bachelor	2.240	38	2.298	1.623	76	1.123
More than bachelor	2.863	39	3.343	2.397	77	1.582
Doctorate	2.863	40	3.562	2.725	78	1.676
4c. Impact of life protection on life expectancy (years)						
High school	1.888	37	1.371	0.172	74	0.063
Bachelor	3.307	38	2.282	0.301	76	0.084
More than bachelor	4.863	39	3.232	0.446	77	0.107
Doctorate	5.203	40	3.370	0.507	78	0.100
4d. Impact of life protection on life expectancy (%)						
High school	4.433	37	3.718	1.107	74	0.611
Bachelor	7.764	38	6.329	1.935	76	0.905
More than bachelor	11.418	39	9.170	2.868	77	1.223
Doctorate	12.215	40	9.787	3.261	78	1.212
4e. Estimated remaining life expectancies based on death certificates data (RB 1990)[b]						
High school	44.4	37	38.2	15.5	74	10.1
Some college	44.9	38	37.7	15.6	76	N/A
Bachelor	47.4	39	39.0	16.6	77	N/A
More than bachelor	49.1	40	39.5	17.9	78	N/A

[a] See notes to Table 1. The benchmark group here is all US males. Money values are in $1996.
[b] Estimated life expectancies in RB, thus in our simulations, are for males.