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An Empirical assessment of the U.S. growth from the Great Financial Crisis to the Post-COVID Era

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Abstract

This thesis takes an original look at the idea of secular stagnation (SS), first introduced by Alvin Hansen in 1939 and brought back by Lawrence Summers after the 2008 financial crisis. While Summers sees SS as the result of long-term underinvestment compared to rising savings, this work offers a different perspective: what looks like stagnation might be a sign of transformation. The U.S. economy, it argues, is shifting toward a new structure centered on intangible assets, things like software, intellectual property, and brand value, that are often overlooked or mismeasured in traditional data. Using both historical insights and recent models, the thesis shows that this mismeasurement explains much of the so-called "investment gap." It also explores how this shift affects financial markets, competition, and productivity. In the end, this isn't a story of economic decline, it's a story of transition. To understand and respond to it, we need new tools, new ideas, and a better way of capturing the real value created in today's economy.

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Introduction

The term "Secular Stagnation" (SS) was introduced by Alvin Hansen in his influential 1939 speech to describe the persistent economic crisis and high unemployment in the US: "This is the essence of secular stagnation-sick recoveries which die in their infancy and depressions which feed on themselves and leave a hard and seemingly immovable core of unemployment[1]". In 2014, amid the sluggish recovery from the Great Financial Crisis (2007–2008), Lawrence H. Summers revived the concept, positioning it as a central framework for interpreting weak post-crisis growth, emphasizing the need for fiscal policy interventions, given the limited effectiveness of monetary policy in the presence of the zero lower bound. This 'second wave' of secular stagnation gave rise to an intense debate, characterized by divergent hypotheses on causes and remedies, or by the denial of stagnation itself, seen as a simple physiological moment of economic slowdown. This thesis proposes a novel perspective: linking secular stagnation to a structural transformation that began in the early 2000s, characterized by an exponential growth in investments in intangible assets. This evolutionary interpretation, inspired by Schumpeter's "creative destruction" and Hansen's emphasis on technological progress, aims to overcome Summers' stagnationist view. It will show how the shift towards intangible assets offers convincing answers to the so-called investment gap and other indicators of stagnation identified by Summers. The first chapter traces the history of SS, from John Stuart Mill to Hansen, Keynes, Schumpeter and Steindl; it describes the evolution of the concept in the economic history of the 20th century. The second chapter analyses Summers' reintroduction of SS, delving into its causes and solutions. In the third chapter, discussing the concept of potential output, investment in the US after the Great Crisis is analyzed in detail. Finally, the fourth chapter, using data from the Global INTAN-Invest database and studies by Corrado and Hulten, explores the growing relevance of intangible investment, examining its effects on finance[2], sectoral industrial structure[3]and total factor productivity[4]. Finally, economic policies are proposed to support this new intangible economy, focusing on better accountability of intangible assets and a more flexible financial system. As Joel Mokyr aptly observes:

"Many of the new goods and services are expensive to design, but once they work, they can be copied at very low or zero costs. That means they tend to contribute little to measured output even if their

[1] Alvin Hansen, "*Economic Progress and Declining Population Growth*", *American Economic Review 29, no. 1* (1939), 4.
[2] *Ye Li (2025), "Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review, 115(4), 1100–1141.*
[3] Crouzet, Nicolas, and Janice C. Eberly. "*Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles*", *NBER Working Paper* No. 25869, National Bureau of Economic Research, May 2019; Lilas Demmou and Guido Franco, "*Mind the Financing Gap: Enhancing the Contribution of Intangible Assets to Productivity"*, *OECD Economics Department Working Paper* No. 1681 (Paris: OECD Publishing, 2021).
[4] Erik Brynjolfsson, Daniel Rock, and Chad Syverson, "*The Productivity J-Curve: How Intangibles Complement General Purpose Technologies*", *American Economic Journal: Macroeconomics* 13, no. 1 (2021), 333–372.

impact on consumer welfare is very large. Dealing with altogether new goods and services was not what these numbers were designed for, despite the heroic efforts by BLS statisticians. The aggregative statistics miss much of what is interesting[5]".

[5] Mokyr, Joel. "*Secular Stagnation? Not in Your Life*", in *Secular Stagnation: Facts, Causes and Cures*, edited by Coen Teulings and Richard Baldwin, 83–89. London: CEPR Press, 2014.

1. A Secular Concern

This chapter explores the historical origins of the Secular Stagnation (SS) hypothesis. While formally articulated by Alvin Hansen in the late 1930s, the core ideas can be traced back to earlier classical economic thinkers who pondered the long-term limits of growth. The chapter traces how Hansen systematized the concept and examines how other major economists, such as Keynes, Schumpeter, and Steindl, have responded to, refined, or contested the stagnationist narrative. The aim here is to frame SS not merely as a static economic condition, but as a hypothesis born in moments of profound crisis, such as the Great Depression, when traditional economic mechanisms appear to fail. Historically, the theory has resurfaced during periods marked by uncertainty and pessimism, yet these episodes have often been followed by renewal and transformation. Thus, the perception of stagnation may reflect not economic inertia, but the threshold of structural change. This historical context is essential for understanding how SS has evolved, and how it may be overcome again in a world that, despite recurring crises, continues to evolve rather than stagnate. The chapter proceeds in three parts: first, the classical precursors to Hansen's thesis; second, Hansen's synthesis and the responses of Keynes and Schumpeter; and finally, the mid-20th century critiques that relegated SS to the margins, until its unexpected revival in the 21st century. The concept of secular stagnation is difficult to frame because it has had different definitions over time. In general, we can define secular stagnation as a persistent reduction in the growth rate of per capita income, from a rate g to a lower rate g′, caused by a structural imbalance between desired savings and investment[6]. However, important questions remain open about the nature and causes of this phenomenon: is secular stagnation a pathology of the economy**,** which requires corrective interventions, or an endogenous phenomenon linked to long-term economic cycles, as explored by Schumpeter? Furthermore, should the search for the causes be limited to the analysis of GDP, or should the investigation also consider the socioeconomic, political, and cultural structures of society? Since the dawn of economic science, the greatest thinkers have questioned growth and its possible limits. The concept of a mature economy has generally been associated with the idea of stagnation, and classical authors emphasized the close interplay between economic, social, and political factors, which together could lead to either prosperity or stagnation. For example, John Stuart Mill approached the question by emphasizing demographic and technological factors as key determinants of sustained prosperity. In his *Principles of Political Economy* (1848), he argues that a

[6] Heinz D. Kurz, "*The Spectre of Secular Stagnation Then and Now*", in *Stagnations- und Deflationstheorien. Studien zur Entwicklung der ökonomischen Theorie XXXVIII*, ed. Volker Caspari (Berlin: Duncker & Humblot, 2021), 12.

society can maintain a steady level of well-being, if population growth remains stable and technological progress continues to drive economic development. Looking ahead, he writes: "Hitherto it is questionable whether all the mechanical inventions yet made have lightened the day's toil of any human being. They have enabled a greater population to live the same life of drudgery and imprisonment, and an increased number of manufacturers and others to make fortunes. They have increased the comforts of the middle classes. But they have not yet begun to effect those great changes in human destiny, which it is in their nature and in their to accomplish[7]".

Another notable standpoint comes from William Stanley Jevons, who expressed concern about the eventual exhaustion of natural resources, particularly coal, and its potential to bring British economic growth to a halt. In his *The Coal Question* (1865) he writes that*:*

"Coal in truth stands not beside but entirely above all other commodities. It is the material energy of the country – the universal aid – the factor in everything we do ... In the long run the British economy is doomed to stagnation and even decline[8]".

However, it was only after the Great Depression of 1929 that the debate around stagnation took real shape. Americans had to face a harsh reality: from a period of growth never seen in the history of humanity thanks to the technological boom of the industrial revolution to one characterized by unemployment, poverty and stagnation. Responding to these events, with one eye on the past and one on the imminent future, Alvin Hansen brings the SS to the forefront of the economic and political scene.

1.1 Alvin Hansen

Alvin Hansen was born on August 23, 1887, in Daneville, South Dakota, the youngest child of a family of Danish farmers of Baptist faith. Hansen's rural upbringing shaped his concern for practical economic problems and policy solutions. As Musgrave noted, he was committed to "Caring for the real problems[9]". By the late 1930s, Hansen began to speak more and more often about the possibility that the American economy might not recover from the recent crisis. What most captured Hansen's attention was the recurring nature of economic crises. The depressions

[7] Mill, John Stuart. "*Principles of Political Economy with Some of Their Applications to Social Philosophy*". Edited by J. M. Robson. Originally published 1848. Toronto: University of Toronto Press, 1965

[8] William Stanley Jevons, "*The Coal Question: An Inquiry Concerning the Progress of the Nation, and the Probable Exhaustion of Our Coal-Mines",* (London: Macmillan, 1865), 2.

[9] Richard A. Musgrave, "*Caring for the Real Problems*", *The Quarterly Journal of Economics* 90, no. 1 (February 1976), 1–7.

of 1930–33 and especially that of 1937-38[10] convinced him of the urgent need for action. Public interest in secular stagnation began to grow: *The New York Times*[11] described Hansen as "The specialist who considers economic problems from the long-run point of view" and as "An authority on economic therapeutics". Having witnessed America's prosperity, Hansen now saw a nation brought to its knees, lacking the drivers that once fueled its economic ascent. He wondered what the new drivers of economic development would be. As he wrote in a short introduction to a book on post-war demobilization: "Our productive power is at once a challenge and a hope for the future. Our vast productive capacity can, if we have the wit and wisdom to use it, lead us to undreamed levels of real income and standards of living; it can also result in frustration and mass unemployment[12]".

1.2 Hansen and the Secular Stagnation Hypothesis

Hansen's key contributions on secular stagnation are found in his essay *Full Recovery or Stagnation?* (1938) and his presidential address to the American Economic Association *Economic Progress and Declining Population Growth* (1939*)* delivered the same year, where he discusses secular stagnation in detail: "This is the essence of secular stagnation - sick recoveries which die in their infancy and depressions which feed on themselves and leave a hard and seemingly immovable core of unemployment[13]". At the core of Hansen's theory is the central role of investment. He believed that sustained investment levels are essential for long-term economic well-being. According to Hansen, Investment, depends on technological innovations, the discovery of new resources and markets, and population growth, all of which stimulate demand and trigger the accelerator[14] effect, causing investment to increase. Hansen distinguishes between two types of capital formation: "widening" and "deepening" of capital. Capital widening, he argues, "is a function of an increase in final output", which in turn depends on population growth and per capita productivity. In contrast, capital deepening "results partly from cost-reducing changes in technique", and to a lesser extent, from lower interest rates and shifts in the "character of the output[15]". This distinction was part of a rigorous effort to address what Hansen called "the main problem of our times, and particularly in the United States, is the problem of full employment[16]". He believed the solution lay in a continuous

[10] The impact of the 1937–38 downturn, often called Roosevelt's Recession, was a drop in real GDP of 10 percent and unemployment reaching 20 percent. See "*Recession of 1937–38*", *Federal Reserve History*, accessed May 27, 2025, https://www.federalreservehistory.org/essays/recession-of-1937-38.
[11] Louis Rich, review of *Full Recovery or Stagnation?*, by Alvin H. Hansen, *New York Times*, November 27, 1938, 122.
[12] Alvin Hansen, "*Postwar Economic Problems"*, ed. Seymour E. Harris (New York: McGraw-Hill, 1944), 4.
[13] Alvin Hansen, "*Economic Progress and Declining Population Growth*", *American Economic Review* 29, no. 1 (1939), 4.
[14]John Maurice Clark, in "*Studies in the Economics of Overhead Costs*" (1923), elaborated the accelerator principle which explains how changes in output influence investment. The basic formula for the accelerator model is:$I_t = \mathrm{v}(Y_t - Y_{t-1})$ where $I_t$is investment, v is the accelerator coefficient, and$Y_t - Y_{t-1}$ represents the change in output (income).
[15] Alvin Hansen, "*Economic Progress and Declining Population Growth*", *American Economic Review* 29, no. 1 (1939), 5-7.
[16] *Ibid.*, 4.

process of capital formation. However, despite ongoing technological progress in the early 20th century, population growth declined sharply. Hansen argued that "the advance of technique" failed to produce real capital deepening leading to an increase in output that exceeds the increase in capital[17]. This tendency, which he called the "the monopoly principle of obsolescence[18]", led to slower growth and fewer "outlets for new capital formation". In Hansen's view, population growth played a co-determinant role by shaping "the character of the output[19]" and stimulating capital formation[20]. The recipe prescribed by Hansen to overcome these deficits and to return to full employment included two key elements: technological innovation and active fiscal policy. Regarding innovation, Hansen expressed his view in the following terms:

"There can be no greater error in the analysis of the economic trends of our times than that which finds in the advance of technology, broadly conceived, a major cause of unemployment. we cannot afford to neglect that type of innovation which creates new industries, and which thereby opens new outlets for real investment. The problem of our generation is, above all, the problem of inadequate private investment outlet[21]".

In the absence of private innovation and new industries, Hansen argued that the state should take measures aimed at increasing consumer income and encouraging investment in various sectors of public interest. Yet he also acknowledged the temporary nature of public spending measures, warning of their potential risks to market functioning and public debt:

"How to do such a program, whether financed by taxation or by borrowing, can be carried out without adversely affecting the system of free enterprise is a problem with which economists, I predict, will have to wrestle in the future far more intensely than in the past. Can a rising public debt owned internally be serviced by a scheme of taxation which will not adversely affect the marginal return on new investment or the marginal cost of borrowing?[22]"

He adds:

[17] "Though the deepening process is all the while going on in certain areas, elsewhere capital-saving inventions are reducing the ratio of capital to output". *Ibid.*, 7.
[18] "New machines will not be introduced until the undepreciated value of the old machine will at least be covered by the economies of the new technique". *Ibid.*, 12.
[19] *Ibid.*, 6.
[20] *Ibid.*, 9.
[21] *Ibid.*, 10.
[22] *Ibid.*, 12.

"Public spending is the easiest of all recovery methods and therein lies its danger. If it is carried too far, we neglect to attack those specific maladjustments without the removal of which we cannot achieve a workable cost-price structure, and therefore we fail to achieve the otherwise available flow of private investment[23]."

Hansen concluded with a stark warning about the influence of organized interests on democratic institutions and market functioning:

"Democratic countries cannot in modern times escape from the influence exerted by organized groups upon the operation of the price system. From the standpoint of the workability of the system of free enterprise, there emerges the problem of sovereignty in democratic countries confronted in their internal economies with powerful groups-entrepreneurial and wage-earning-which have robbed the price system of that impersonal and non-political character idealized in the doctrine of laissez-faire[24]".

Hansen undoubtedly outlined the problem in clear terms, without offering a wide range of solutions, but rather issuing a challenge to fellow economists to address it. In *Full Recovery or Stagnation* (1938), he further elaborates on the concept of secular stagnation, reaffirming its core ideas and emphasizing the importance of applying new technologies to the labor market. In the book's final chapter, Hansen anticipates a future challenge that would become central decades later: stagflation:

"Scarcely do we know which to fear most, stagnation or inflation. Fantastic as it may seem, it is the case that the world economic situation is so uncertain that both these two diametrically opposite conditions stand us simultaneously in the face. Paradoxical though it be, the more we sink into deep stagnation with vast unemployment of labor and resources, the more imminent is the danger of inflation[25]."

1.3 Hansen and Keynes

Hansen's theory of secular stagnation evolved over time, influenced by historical developments and by other thinkers, most notably, J.M. Keynes. When Keynes published *The General Theory of Employment, Interest and Money*, Hansen was initially unenthusiastic primarily due to the static nature of Keynes's model. Nonetheless, Hansen acknowledged important similarities between his ideas and those of Keynes, particularly in relation to investment and underemployment equilibrium;

[23] *Ibid.*
[24] *Ibid.*, 13.
[25] Alvin Hansen, "*Full Recovery or Stagnation?",* (New York: W. W. Norton, 1938), 319.

in his 1936 review Hansen wrote: "The problem of structural, or secular, unemployment (altogether apart from the cyclical unemployment of ordinary industrial fluctuations) is almost certain to present itself for solution in the decades before us[26]". Over time, Hansen re-evaluated the General Theory and incorporated several Keynesian concepts into his own framework, including the concept of Marginal efficiency of capital[27], the principle that savings and investment are not automatically equal, the role of the multiplier [28]and a reduced emphasis on the interest rate as a driver of investment. Regarding the latter, Hansen stated in *Full Recovery or Stagnation?*: "I venture to assert that the role of the rate of interest as a determinant of investment has occupied a place larger than it deserves in our thinking[29]". He reiterated this point in his revised speech *Economic Progress and Declining Population Growth*, writing: "Thus under-employment equilibrium may be reached, given a fairly low consumption function, not merely because of an elastic liquidity preference schedule, but mainly because of limited investment opportunities combined with a marginal efficiency schedule which is not very highly elastic[30]". Despite incorporating several Keynesian ideas, Hansen remained primarily focused on the structural foundations of economic development, while still acknowledging the importance of demand-side factors, *In Full Recovery or Stagnation?*: "It is not enough that there shall be stability in the volume of consumption. It is not enough that there shall be no set-back in the accumulation of wealth. If capital formation proceeds by fits and starts, if the rate of progress is not uniform, there will be booms and depressions[31]". While many have misinterpreted Hansen's theory as a simple Keynesian extension, it contains both similarities and key differences. In particular, Hansen's concept of secular stagnation is not rooted in Keynes's idea that "rich people save proportionally more[32]" but rather in structural shifts, especially the growing dominance of services over goods production.

1.4 Other Theories of Secular Stagnation

Many other economists have addressed the issue of Secular Stagnation offering a wide range of interpretations. Among the most influential are the contributions of Schumpeter, Samuelson and Steindl.

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[26] Alvin Hansen, "*Mr. Keynes on Underemployment Equilibrium*," *Journal of Political Economy* 44, no. 5 (October 1936), 681.

[27] John Maynard Keynes introduced the concept of "marginal efficiency of capital" in "*The General Theory of Employment, Interest, and Money*" (1936). It refers to the expected profitability of an additional unit of capital, which influences investment decisions. Keynes defined it as the discount rate that equates the present value of expected future returns from an investment with its cost.

[28] The multiplier effect was developed by Richard Kahn in 1931 and later expanded by Keynes in "The General Theory" (1936). It describes how an initial increase in spending leads to a more than proportional increase in income and output, due to subsequent rounds of consumption. The formula for the simple Keynesian multiplier is: $multiplier = \frac{1}{1-MPC}$where MPC is the marginal propensity to consume.

[29] Alvin Hansen, "*Full Recovery or Stagnation?",* (New York: W. W. Norton, 1938), 5.

[30] Hansen, Alvin H. "*Keynes and the General Theory*", *The Review of Economics and Statistics* 28, no. 4 (1946), 185.

[31] Alvin Hansen, "*Full Recovery or Stagnation?",* (New York: W. W. Norton, 1938), 138.

[32] John Maynard Keynes, "*The General Theory of Employment, Interest, and Money",* (London: Macmillan, 1936), Ch. 8–9.

1.4.1 Schumpeter

Schumpeter (1942-1943), who was firmly convinced that capitalism evolves through cycles of "creative destruction[33]", rejected Hansen's argument, which he dismissed as a "theory of vanishing investment opportunity". Nonetheless, Schumpeter did acknowledge that "capitalist evolution tends to peter out – i.e., to settle into a condition that might as well be described as 'stagnation' [34]". However, Schumpeter's idea of capitalism's inevitable slowdown and eventual decline had been developed well before the Great Depression. Indeed, as early as 1928 he wrote:

"Capitalism, whilst economically stable, and even gaining in stability, creates, by rationalizing the human mind, a mentality and a style of life incompatible with its own fundamental conditions, motives and social institutions, and will be changed, although not by economic necessity and probably even at some sacrifice of economic welfare, into an order of things which it will be merely a matter of taste and terminology to call Socialism or not[35]".

Schumpeter's thesis was not based on the exhaustion of investment opportunities, but rather on a broader Weberian notion of rationalization, a process that, in his view, transformed both economic production and cultural life. According to Schumpeter, capitalist development contains a fundamental contradiction between its economic and political dimensions: The economic stability of capitalism demands constant innovation and expansion, yet this very process undermines its political stability, a tension that, for Schumpeter, makes the collapse of capitalism inevitable[36]; the entrepreneur, whom Schumpeter saw as the driving force of capitalist innovation, increasingly faced constraints: heavy taxation by the state, and the rise of large corporations threatening free competition through monopolistic or oligopolistic power. As a result, the entrepreneur risked disappearing from the economic stage[37].

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[33] The concept of creative destruction was introduced by Joseph Schumpeter in his seminal work, "*Capitalism, Socialism and Democracy"* (1942). Schumpeter argued that capitalism is inherently dynamic, driven by innovation and entrepreneurship. He described creative destruction as the process by which new technologies, products, and methods of production continuously replace old ones, leading to the destruction of existing economic structures (eg, industries, firms, jobs) and the creation of new ones. While this process generates economic progress and growth, it also causes disruption and instability, as outdated systems are dismantled. Schumpeter viewed creative destruction as essential to the vitality of capitalism, but he also warned that it could lead to social and political challenges, particularly as large corporations and bureaucracies increasingly dominate the innovation process.
[34]Joseph A. Schumpeter, "*History of Economic Analysis",* (New York: Oxford University Press, 1954), 1172.
[35] Joseph A. Schumpeter, *"The Instability of Capitalism", The Economic Journal* 38, no. 151 (1928), 361–386.
[36] Alessandro Roncaglia, "*The Wealth of Ideas: A History of Economic Thought",* (Cambridge: Cambridge University Press, 2009), 429.
[37] Joseph A. Schumpeter, "*Capitalism, Socialism and Democracy*", New York: Harper & Brothers, 1942.

1.4.2 Steindl

Josef Steindl[38]also made important contributions to the discussion. In a 1954[39] review of Steindl's work, Hansen outlined three distinct approaches to secular stagnation:

1. Exogenous factors, as proposed by Hansen.
1. Institutional and sociopolitical transformation, emphasized by Schumpeter, focusing on how evolving social institutions affect capitalism.
2. Microeconomic dynamics, as in Steindl's analysis of imperfect competition, oligopoly, income distribution, and underutilized productive capacity.

According to Steindl, several factors explain the weak growth in mature capitalist economies*:*

- The increasing use of cost-saving technologies, which reduced investment and led to excess productive capacity.
- A rise in national savings rates, resulting in weaker aggregate demand.
- The technological convergence of Europe with the United States, limiting catch-up growth potential.
- Environmental and energy constraints[40].

In such a stagnant environment, Steindl argued that firms, in order to maintain profit margins, were forced to reduce the degree of utilization of their productive capacity[41].

1.4.3 Samuelson and other critics

Paul Samuelson[42], who had a long-standing relationship with Hansen, first as a student, then as a collaborator, defined SS as "a decade of sluggish growth and rising unemployment" during which the unemployment rate increased at each successive cyclical peak[43]. He devoted considerable attention to the theory in the early editions of his textbook *Economics: An Introductory Analysis*. However, in later editions, the SS hypothesis was gradually removed and eventually treated by Samuelson as a marginal or secondary theoretical concern. Stagnationist theories also faced notable criticism;

[38] In his 1952 book, "*Maturity and Stagnation in American Capitalism*", he argued that the increasing dominance of large firms leads to excess productive capacity, lower investment, and slower growth. Years later in 1979 he expanded his theory by identifying other relevant factors such as the rise of capital-saving technologies, increasing savings rates, and shifts in political attitudes that deprioritized full employment and the welfare state.

[39] Alvin H. Hansen, "*Growth or Stagnation in the American Economy*", *The Review of Economics and Statistics* 36, no. 4 (November 1954): 409–414.

[40] Josef Steindl, "*The Maturity and Stagnation of American Capitalism"*, Oxford: Basil Blackwell, 1952.

[41] Heinz D. Kurz, "*The Spectre of Secular Stagnation Then and Now*", in *Stagnations- und Deflationstheorien. Studien zur Entwicklung der ökonomischen Theorie XXXVIII*, ed. Volker Caspari (Berlin: Duncker & Humblot, 2021), 39-41.

[42] One of Samuelson's most important theoretical contributions was his multiplier-accelerator model, first presented in 1939 and later refined in his 1988 work. Its model (1939) integrates Keynes' multiplier effect with the acceleration principle to explain business cycles and economic fluctuations. Economic output fluctuates due to the interaction between the multiplier, which amplifies initial spending shocks, and the accelerator, which links investment to changes in demand. Samuelson, P. A. "*Interactions between the Multiplier Analysis and the Principle of Acceleration*". *Review of Economics and Statistics 21, no. 2* (1939), 75–78.and Samuelson, P. A. (1988). "*The Keynes-Hansen-Samuelson Multiplier-Accelerator Model of Secular Stagnation*". *Japan and the World Economy, 1* (1988), pp. 3-19. Elsevier.

[43] Paul A. Samuelson, "*Economics: An Introductory Analysis*". 6th ed. New York: McGraw-Hill, 1964.

theoretical criticism of Hansen's ideas came in two contrasting forms: one line of critique came from Frank Knight[44] who rejected the very concept of a "stationary state", arguing that there is no inherent tendency toward diminishing returns to capital accumulation; The other from George Terborgh ,who, in *The Bogey of Economic Maturity*[45], presented an empirical criticism of the SS hypothesis. He argued that both the decline in population growth and the closing of the American frontier had occurred by the late 19th century, without triggering economic stagnation. Furthermore, Terborgh maintained that slower population growth alters the age structure and reduces overall savings, which in turn offsets any potential decline in investment. He also disputed the claim that a growing share of innovations were primarily capital-saving in nature[46].

1.5 The Myth of Secular Stagnation

In the end, the theory of Secular Stagnation did not hold up when compared to historical developments: following the post-war period, an unprecedented demographic boom and remarkable surge in GDP returned the global economy to a path of sustained growth and prosperity, reaching levels of well-being unprecedented in human history. Technological progress resumed, ushering in the Third Industrial Revolution and the invention of early computers in the 1980s. Governments appeared to have learned from past crises, while firms adapted by planning decisions more cautiously in an effort to reduce uncertainty. Moreover, governments took on a greater role in the economy, increasing public spending and debt, a trend that intensified during the Cold War and remains a source of concern today. In 1957 Hansen expressed lingering doubts about the sustainability of the recovery: "But as we left the nineteenth century behind, the forces making for extensive expansion began to decline; technology alone retained its undiminished vigor[47]". However, this outlook was ultimately contradicted by historical developments. As a result, secular stagnation was gradually forgotten and came to be regarded as a theory of a bygone era. However, as history often echoes itself, never the same, but with striking parallels, the global financial crisis of 2007–2008 revived interest in Hansen's thesis. Lawrence H. Summers brought the concept of secular stagnation back into the spotlight.

[44] Frank H. Knight, "*Diminishing Returns from Investment", Journal of Political Economy* 52, no. 1 (1944), 26–47; Frank H. Knight, "*The Quantity of Capital and the Rate of Interest*". *Journal of Political Economy 44, no. 4* (1936), 433–463; *no. 5*, 612–647.
[45] George Terborgh, "*The Bogey of Economic Maturity",* Chicago, IL: Machinery and Allied Products Institute, 1945.
[46] Marcello Messori and Giovanni Tasinato*, "Secular Stagnation: The History of a Macroeconomic Heresy", Cambridge Journal of Economics* 46, no. 5 (2022), 952-953.
[47] Alvin H. Hansen, "*Economic Issues of the 1950s",* (New York: McGraw-Hill, 1957), 31.

2. The Return of Secular Stagnation: Lawrence Summers and the Post-Crisis

In this chapter, we examine the revival of the secular stagnation (SS) hypothesis by Lawrence H. Summers in the aftermath of the 2008 financial crisis. Summers reintroduced the concept to explain the prolonged economic weakness observed in advanced economies, attributing it to secular forces that depress investment and elevate savings. These forces exert downward pressure on the natural interest rate, making the zero lower bound binding (ZLB[48]) and pushing the economy into a suboptimal equilibrium in which output chronically falls below potential. Unlike earlier cyclical downturns, this stagnation, he argued, was rooted in a chronic decline in the Full Employment Real Interest Rate (FERIR[49]), which monetary policy alone could no longer effectively address. The chapter is structured into three sections: first, we analyze Summers' diagnosis of the fall in FERIR and its implications; second, we explore the structural factors that made this condition persistent and finally, we review the policy solutions Summers proposed to overcome this macroeconomic trap. In the latter part of the chapter, we also set the stage for a broader evaluation by comparing the macroeconomic contexts in which the SS hypothesis was originally developed by Alvin Hansen in 1939 and revived by Summers post-2007. This comparative analysis highlights key differences in unemployment rates, GDP growth, total factor productivity (TFP), and the investment-to-GDP ratio, emphasizing that today's stagnation indicators reflect structural shifts rather than persistent demand-side weaknesses. Following the 2007–2008 financial crisis, which led to a deep global recession, widespread job losses, and a collapse in credit markets, Lawrence H. Summers, former U.S. Treasury Secretary under President Clinton, noted the slow recovery of the economy and the significant loss of potential output in the United States and other "mature" economies. In a 2013 speech to the National Association for Business Economics, he revived Alvin Hansen's theory of SS, which had largely faded from academic discourse following the sustained economic growth that began in the 1950s. Summers identifies SS as a situation in which desired investment falls short of desired saving, pushing the FERIR close to or even below zero. This makes the ZLB a binding constraint, limiting the effectiveness of monetary policy, particularly in low-inflation environments. He argues that the FERIR began to decline starting in the 1990s, a trend temporarily concealed by the dot-com bubble and later by the housing bubble of the early 2000s. Both contributed to economic growth but, especially the latter, in an unsustainable way, as it was fueled by an incessant accumulation of debt

[48] The Zero Lower Bound refers to the situation in which nominal interest rates are at or near zero, restricting central banks' ability to lower rates further to stimulate the economy. See: Ben S. Bernanke, "*The Federal Reserve and the Financial Crisis",* (Princeton: Princeton University Press, 2013), Lecture 2.

[49] Commonly referred to in the literature as the natural rate of interest or r^*, it is defined consistent with output equalling potential and stable inflation. Economic theory implies that the natural rate of interest varies over time and depends on the trend growth rate of output", Thomas Laubach and John C. Williams, "*Measuring the Natural Rate of Interest*", *Review of Economics and Statistics* 85, no. 4 (November 2003), 1063–1070.

and high-risk investments. While the U.S. economy resumed growth after 2009, with declining unemployment and stable output, interest rates remained abnormally low, evidenced by persistently low yields on long-term government bonds. According to Summers, the ZLB problem arises from the difficulty of reducing real interest rates below zero in a low-inflation environment. Two key constraints reinforce the ZLB:

1. Short-term safe interest rates cannot fall below zero because of the possibility of currency substitution.
2. Interest rates reflect term and credit premia, limiting further reductions.

Moreover, price flexibility is not a reliable safeguard and may, in fact, trigger deflationary spirals that increase real interest rate expectations and depress output[50]. Summers challenges the simplistic view that any negative interest rate would automatically stimulate investment. Referencing Samuelson's metaphor "can't you just flatten out hills[51]?" he argues that in the real world, market imperfections constrain investment demand. As he explains:

"Further, if relative prices are changing, real interest rates are not unambiguously defined. They can easily be negative measured relative to overall inflation yet positive relative to capital goods if the relative price of capital goods is declining. As an empirical matter, negative real rates are not uncommon. But real interest rates close to zero have been commonplace[52]".

In such conditions, the market alone cannot restore full employment or close output gaps, and the same average level of output and employment through time can change drastically following important shocks. This is shown by the sharp drop in potential output following the crisis[53] and seems to support the theories of hysteresis[54].

[50] Summers, L.H. (2015). "*Demand Side Secular Stagnation*", *American Economic Review*, 105(5), 60–65
[51] Ibid.
[52] Ibid.
[53] Lawrence Ball, "*Long-Term Damage from the Great Recession in OECD Countries", NBER Working Paper* No. 20185 (Cambridge, MA: National Bureau of Economic Research, 2014).
[54] In macroeconomics, hysteresis refers to the phenomenon where temporary shocks to output or employment can have persistent or even permanent effects on the economy's potential level of output. For example, prolonged unemployment during a recession may reduce workers' skills or lead to lower labor force participation, thereby lowering the economy's long-run productive capacity. See: Olivier Blanchard and Lawrence H. Summers, "*Hysteresis in Unemployment*", *European Economic Review* 31, no. 1–2 (1987), 288–295.

2.1 The Causes

Summers attributes the decline in the FERIR to a set of structural factors, which can be grouped into two broad categories: those that suppress investment demand and those that boost the supply of savings.

Factors reducing investment demand:

- Slowing population growth, which leads to a smaller labor force, combined with slower technological progress.
- Falling relative price of capital goods, reducing the amount of savings needed for a given level of investment and lowering the propensity to invest.
- A decline in debt-financed investment, driven by both the lingering effects of excessive pre-crisis leverage and the tightening of financial regulations in its aftermath.

Factors increasing savings:

- Rising inequality, both between labor and capital income, and between high- and low-wealth households, has increased the average propensity to save[55].
- Stricter capital and collateral requirements, which increase demand for safe assets.
- Accumulation of large reserves by central banks, particularly in emerging markets.
- As inflation declines, after-tax real interest rates tend to rise disproportionately relative to pre-tax rates, making nominal returns more attractive to savers.
- The rising costs of financial intermediation, which widen the spread between returns to savers and borrowing costs.

2.2 The Solutions

According to Summers, there are three possible responses to SS:

- Structural reforms aimed at increasing economic flexibility. However, Summers argues these are often ineffective when aggregate demand is weak and may risk exacerbating deflationary pressures.

[55] The average propensity to save (APS) is defined as the ratio of total savings to total income in an economy. It indicates the proportion of income that households save rather than spend on consumption. APS tends to vary with income levels, higher-income individuals typically have a higher APS. See: John Maynard Keynes, "*The General Theory of Employment, Interest and Money"* (London: Macmillan, 1936), Chapter 8.

- Lowering interest rates, while conventional, faces limits due to the ZLB. Persistently low rates may incentivize excessive risk-taking and delay the restructuring of inefficient or insolvent firms. Currency depreciation associated with lower interest rates may yield ambiguous results, merely shifting demand between countries rather than boosting global output. Furthermore, if the FERIR in advanced economies is sufficiently low, capital outflows toward higher-yielding emerging markets may occur. This could reduce domestic savings, increase external competitiveness, and raise export demand in the advanced economy. However, emerging markets are unlikely to accept sustained capital inflows passively. They may respond by imposing capital controls or intervening to manage exchange rates: "Their response is likely to be either resistance to capital inflows or efforts to manage currency values to maintain competitiveness. In either case the result will be further downward pressure on interest rates in industrial countries[56]". Additional monetary tools, such as quantitative easing, may reduce credit and term premia. Alternatively, central banks could consider raising inflation targets[57] to increase the room for real interest rate adjustments.
- Fiscal expansion, Summers' preferred solution, seeks to stimulate demand through public investment and supportive policies that encourage private investment, strengthen exports, and enhance household purchasing power while addressing inequality. This would also raise potential output, thereby increasing the equilibrium real interest rate. Summers states that the government could easily finance public investment thanks to low interest rates, promoting projects with high future rates of return. In a simulation using a Federal Reserve model, Summers shows that a sustained 1% increase in the budget deficit allocated to government spending over five years can reduce, rather than increase, the long-run debt-to-GDP ratio, especially if implemented before the economy reaches full employment[58].

Summers concludes that, unless specific external shocks occur, such as wars, that could raise the FERIR by increasing investment or reducing savings, the problem of secular stagnation is likely to persist indefinitely, given that most of the structural factors outlined in section 2.1 are expected to endure: "And there is no evidence that potential output forecasts are being increased, even in countries

[56] Lawrence H. Summers, "*Reflections on the 'New Secular Stagnation Hypothesis'*", in *Secular Stagnation: Facts, Causes and Cures*, ed. Coen Teulings and Richard Baldwin (London: CEPR Press, 2014), 37. See also Gauti B. Eggertsson, Neil R. Mehrotra, and Lawrence H. Summers, "*Secular Stagnation in the Open Economy", NBER* Working Paper No. 22172, National Bureau of Economic Research, April 2016.

[57] The Timidity Trap, as described by Krugman (2014), refers to a scenario in which a central bank promises higher inflation to stimulate demand at the zero lower bound, but the promised inflation is too low to generate the necessary economic boom. In such a case, even if the public believes the central bank's commitment, the inflation outcome falls short of the target, credibility erodes, and the stimulus effort fails. See: Paul Krugman, "*Four Observations on Secular Stagnation*", in *Secular Stagnation: Facts, Causes and Cures*, edited by Coen Teulings and Richard Baldwin (London: CEPR Press, 2014), 61–68.

[58] Lawrence H. Summers, "*U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound*", *Business Economics* 49, no. 2 (April 2014), 65–73.

like the US where there is some sign of growth acceleration. In the long run, as the economy's supply potential declines, the FERIR rises, restoring equilibrium – albeit not a very good one[59]". While Summers focused primarily on macroeconomic symptoms and policy solutions, later work, particularly the structural, microfounded model by Eggertsson[60], has aimed to formalize secular stagnation in a general equilibrium framework.

2.3 Hansen vs. Summers

Before moving to the empirical section, to better contextualize the macroeconomic backdrop against which the two waves of secular stagnation theory emerged, it is useful to contrast the economic environments of Hansen's era (1939) and Summers' post-crisis revival (post-2007):

Indicator	Hansen's Crisis (1939)	Summers' Crisis (Post-2015)
Unemployment Rate	~16.6% (deep economic distress)	~3.8% (near full employment)
Investment/GDP Ratio	<10% (severe underinvestment)	~15-18% (slightly below average)
TFP Growth	4.0 %	1.9 %
Core Economic Issue	Severe demand deficiency	Structural transformation

Table 1; compares the macroeconomic environments of Hansen's era and the post-2007 crisis, illustrating key structural differences. *Source*: Adapted from Valerie A. Ramey, "*Secular Stagnation or Technological Lull*?", *Journal of Policy Modeling*, Vol. 42, No. 4 (2020), 769-776. With updated data from the U.S. Bureau of Economic Analysis (BEA), Congressional Budget Office (CBO), and Bureau of Labor Statistics (BLS).

This comparison underscores two key divergences (Table1). First, the labor market context: in 1939, unemployment was exceptionally high, while today's figures since 2015, aside from temporary pandemic effects, reflect near-full employment. Second, the productivity landscape: total factor productivity (TFP) grew at twice the rate in Hansen's time compared to the 2008–2024 period, even though Hansen himself worried about a stagnation in innovation. Ironically, what he perceived as a lull was later recognized as a period of intense technological transformation. In contrast, the modern U.S. economy exhibits strong employment figures but slower GDP growth, suggesting that the core challenge is no longer demand deficiency, but a structural shift in the economy's productive base. This view is reinforced by Eggertsson et al.'s model of secular stagnation, which attributes the decline in real interest rates from 1970 to 2015 primarily to structural factors: "The reductions in fertility, mortality, and the rate of productivity growth play the largest role; each alone can account for a fall

[59] Lawrence H. Summers, "*Reflections on the 'New Secular Stagnation Hypothesis'", in Secular Stagnation: Facts, Causes and Cures*, ed. Coen Teulings and Richard Baldwin (London: CEPR Press, 2015), 37.
[60] Gauti B. Eggertsson, Neil R. Mehrotra, and Jacob A. Robbins, "*A Model of Secular Stagnation: Theory and Quantitative Evaluation*", *American Economic Journal*: Macroeconomics 11, no. 1 (2019), 1–48.

in the real interest rate of −1.84 percent, −1.92 percent, and −1.90 percent, respectively[61]". In the following chapters, we will empirically examine this structural transformation, challenging the claim that the U.S. economy has been characterized by chronically weak investment and stagnant TFP growth since the Great Financial Crisis. To assess whether current conditions reflect true stagnation or an ongoing economic evolution, we begin with a detailed analysis of potential output and investment dynamics, the two central pillars of Summers' secular stagnation hypothesis.

[61] Gauti B. Eggertsson, Neil R. Mehrotra, and Jacob A. Robbins, "*A Model of Secular Stagnation*", *American Economic Journal: Macroeconomics* 11, no. 1 (2019), 5.

3. Macroeconomic Variables in the Post-Crisis Period

In this chapter, we will closely examine two crucial components of Summers' hypothesis: potential output and investment dynamics While potential output remains a useful indicator of structural economic trends, it is subject to significant revisions and methodological changes. As such, it should be interpreted prudently, less as a precise metric and more as a flexible benchmark for understanding long-term economic capacity, to be weighed alongside demographic trends, capital accumulation, and productivity data. Furthermore, we will delve into the evolution of investment, revealing a significant sectoral transition. While residential investment has markedly declined, investment in intangible assets, particularly Intellectual Property Products (IPP), has sharply increased, emerging as a dominant component of private fixed investment. A detailed decomposition of the price and quantity dynamics across investment sectors will further clarify whether the observed sluggishness in aggregate investment represents widespread scarcity or concentrated, sector-specific adjustments. This discussion naturally transitions to the critical importance of intangible assets, an area we will explore extensively in the subsequent chapter, considering both its transformative implications and measurement challenges.

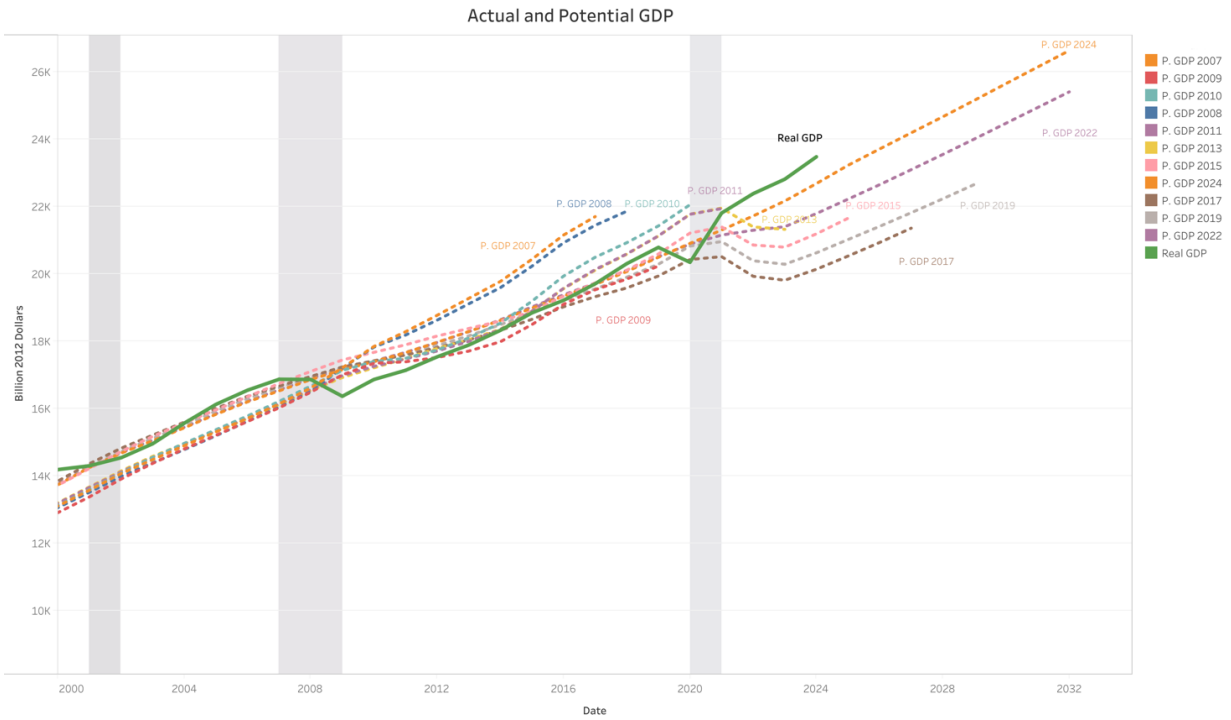


Figura 1. Based on data from the Congressional Budget Office (CBO) and the author's own calculations. Variables are adjusted to 2012 constant prices using data from the U.S. Bureau of Economic Analysis (BEA).

Figure 1 illustrates the evolution of estimates of U.S. potential output estimates (dashed lines), produced by the Congressional Budget Office (CBO) from 2007 onward, alongside the trajectory of real GDP (solid green line). All values are expressed in billions of 2012 dollars. Shaded regions denote recession periods such as the 2008 financial crisis and the COVID-19 pandemic. The graph

spans from 2000 to 2032, with the aim of analyzing output gap dynamics since 2007, revisiting Summers' thesis and assessing its alignment with the Secular Stagnation hypothesis. As Summers noted, while the U.S. economy partially recovered after the global financial crisis, potential output estimates were consistently revised downward between 2007 and 2017. This points to a potential permanent loss in productive capacity relative to pre-crisis trends, an outcome consistent with the secular stagnation view. However, since 2019, excluding the temporary disruption caused by the pandemic, potential output has recovered and has even been overtaken by real GDP in the post-pandemic period, potentially signaling the end of the most acute phase of stagnation, though this outcome is partly attributable to the $5.2 trillion fiscal stimulus, which, as Blanchard[62] notes, temporarily boosted demand but exacerbated public debt, raising questions about long-term sustainability. Nonetheless, potential output estimates are highly volatile and subject to significant revision. As shown in Figure 1, these estimates tend to adjust to prevailing economic conditions and are frequently influenced by market sentiment and methodological changes. The CBO updates its projections semiannually, based on:

- Data on capital, labor force, and total factor productivity (TFP).
- Statistical modeling of the business cycle and structural trends.
- Assessment of fiscal policy under current law, including the projected expiration of certain tax provisions (e.g., 2025), which could understate future potential growth if not renewed.

Therefore, while potential output remains a valuable indicator, it should not be interpreted deterministically, but rather as one of many analytical tools, to be evaluated carefully within the broader context of productive resources, demographic dynamics, capital accumulation, and TFP. Ultimately, this indicator is relevant because it represents the ceiling for an economy's sustainable medium-term growth: if real output deviates too far from potential, inflationary or deflationary pressures may arise, carrying significant implications for monetary and fiscal policy. Moreover, persistent gaps between actual and potential GDP may signal underlying structural weaknesses.

[62] Olivier Blanchard, "*Deciding When Debt Becomes Unsafe*", Finance & Development, March 2022, International Monetary Fund

3.1 Investment Dynamics and Secular Stagnation

As shown in Figure 2, investment declined sharply during the Great Recession and later stabilized at a level slightly above its post-1947 historical average. Following a recession as severe as the 2007–2008 financial crisis, a gradual rebound in aggregate investment was anticipated, and, over time, this recovery appears to have materialized.

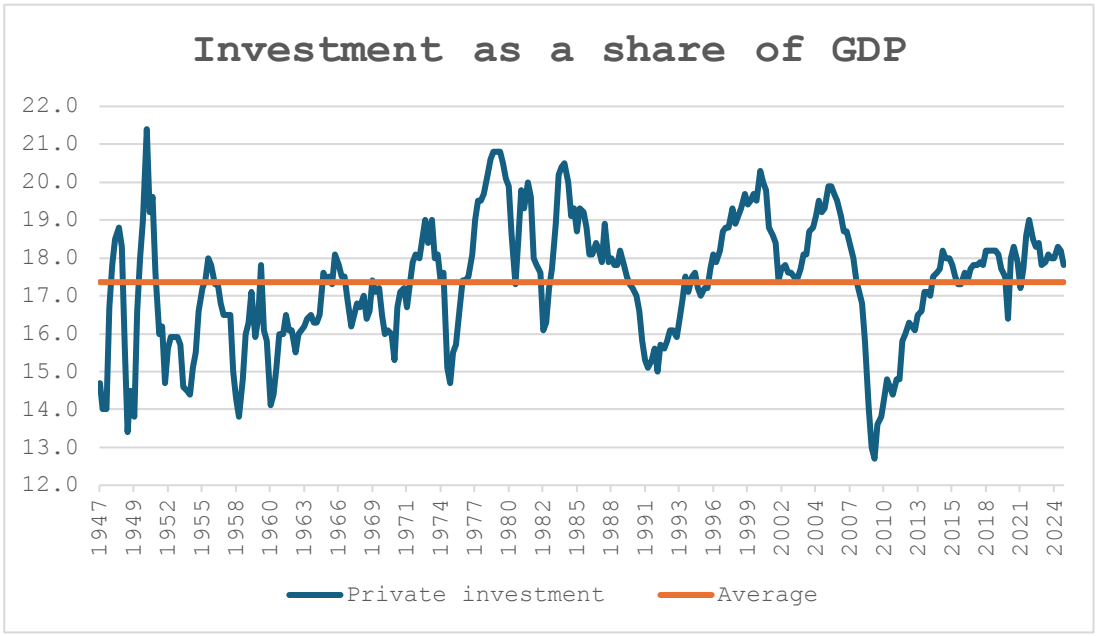


Figure 2. Shares of Gross Domestic Product: Gross Private Domestic Investment. Source: U.S. Bureau of Economic Analysis (BEA).

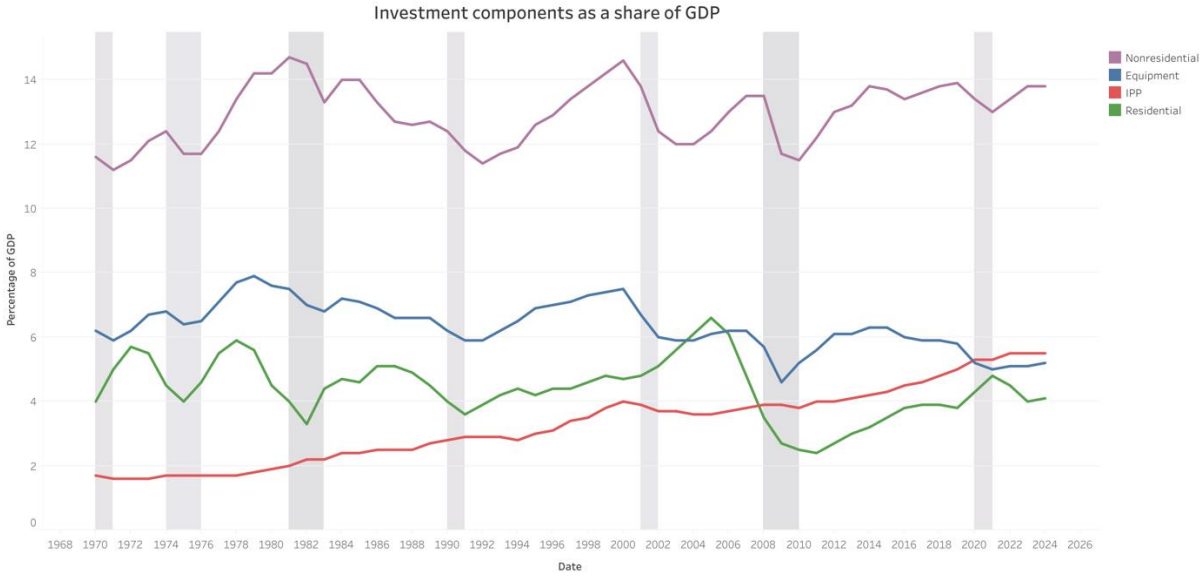


Figure 3. Investment components as a share of GDP. Source: U.S. Bureau of Economic Analysis (BEA). The chart excludes investment in structures, which remained relatively stable over the period and did not exhibit significant cyclical variation.

Figure 3 illustrates that the slow recovery of domestic private investment following the financial crisis was largely attributable to the collapse of residential construction investment. In contrast, non-residential investment recovered strongly, surpassing pre-crisis levels, largely driven by growth in

intellectual property product (IPP) investment. Since 2014, IPP has been the fastest-growing component of private fixed investment, increasing by approximately 60% in real terms between 2017 and 2023 (based on the 2017 quantity index). This breakdown of net investment suggests that the overall weak growth is primarily sectoral rather than aggregate, implying it does not reflect economy-wide stagnation. Notably, during the COVID-19 period, IPP investment surpassed equipment investment as a share of GDP, marking a structural shift in the U.S. economy toward intangible assets. Turning to the residential sector, the main causes behind the sharp decline in net residential investment are:

- A major shift in household credit behavior (Figure 4), driven by post-crisis deleveraging, led to a sharp decline in mortgage demand. Simultaneously, tighter lending standards further restricted mortgage credit, weakening residential construction activity financial institutions further curtailed the overall volume of mortgage lending.

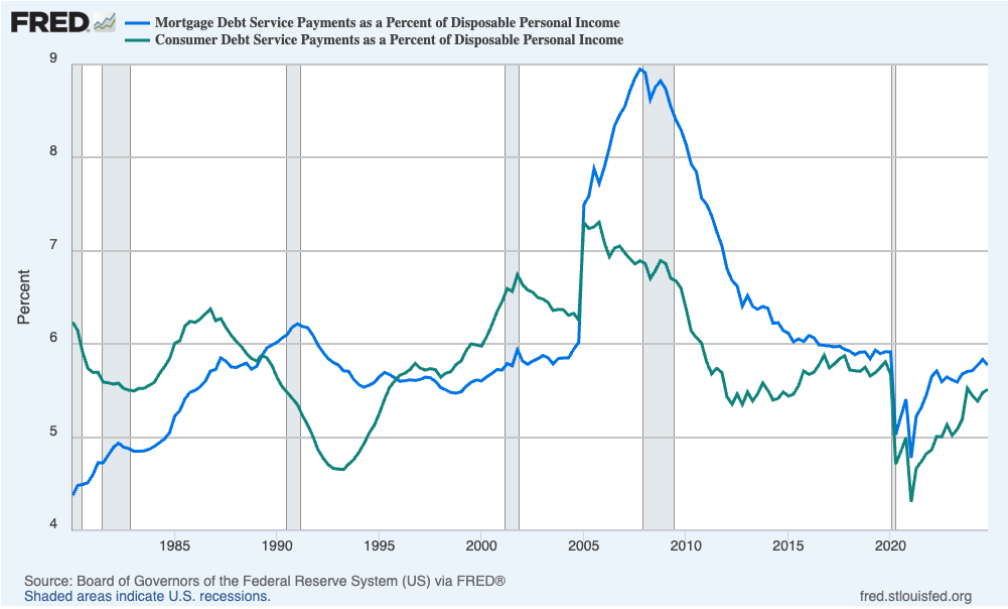


Figure 4. Board of Governors of the Federal Reserve System (US), Mortgage Debt Service Payments as a Percent of Disposable Personal Income [MDSP], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/MDSP, April 26, 2025.

- A slowdown in population growth (Figure 5) reduced household formation and long-term housing demand, further suppressing residential investment

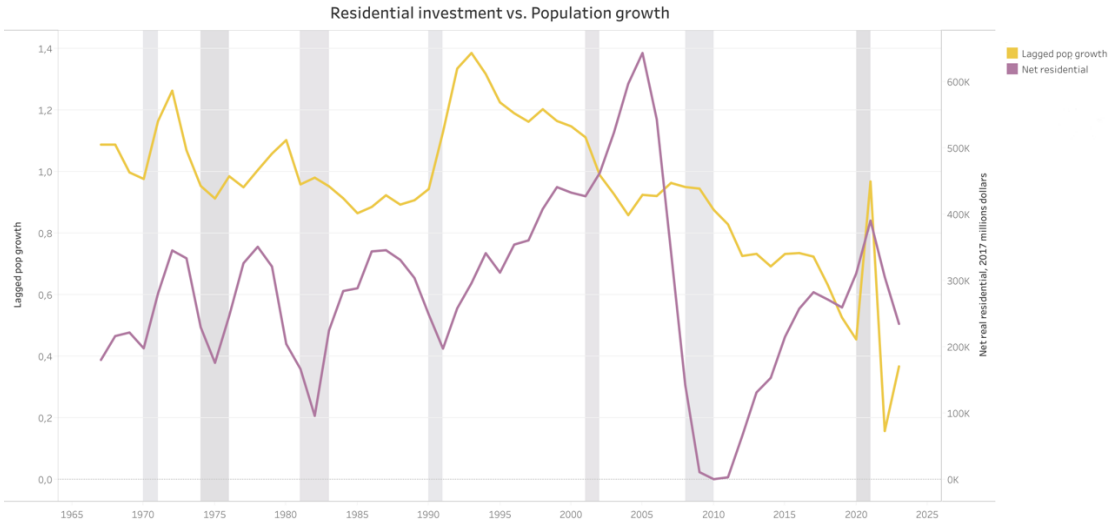


Figure 5. Investment data are sourced from the U.S. Bureau of Economic Analysis (BEA), and population growth data are from the World Bank. Population growth is treated as a lagged variable (shifted by +1 year) to reflect the typical delay in investment responses to demographic changes.

- The pre-crisis surges in residential investment, fueled by a speculative housing bubble, culminated in a dramatic collapse starting in 2007. As seen in Figure 5, investment increased unsustainably from 2001 before plummeting during the crisis.
- An additional critical factor has been the increase in housing prices (Figure 6), which have been steadily rising since 2014, driven by a rigid supply unable to meet sustained demand. This dynamic became particularly evident in the post-pandemic period, when the average U.S. 30-year fixed mortgage rate stabilized around 6%, compared to the historic lows of 2020–2021. This scenario created a lock-in effect: homeowners who had secured favorable mortgage rates (2–3%) were reluctant to sell, as they would have faced significantly higher rates for new purchases. As a result, the higher rates observed after 2022 compressed residential mobility, further exacerbating the structural shortages in housing supply, a true bottleneck for the recovery of investments in the sector.

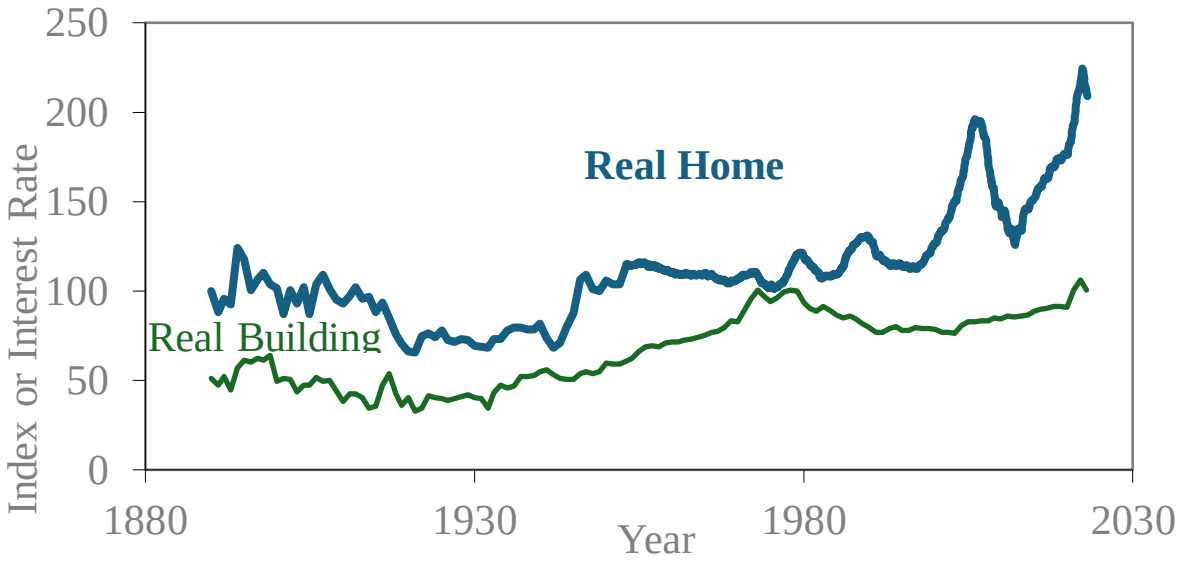


Figure 6. U.S. Home Price and Related data, for Figure 3.1 in Robert J. Shiller, Irrational Exuberance, 3rd. Edition, Princeton University Press, 2015, as updated by author

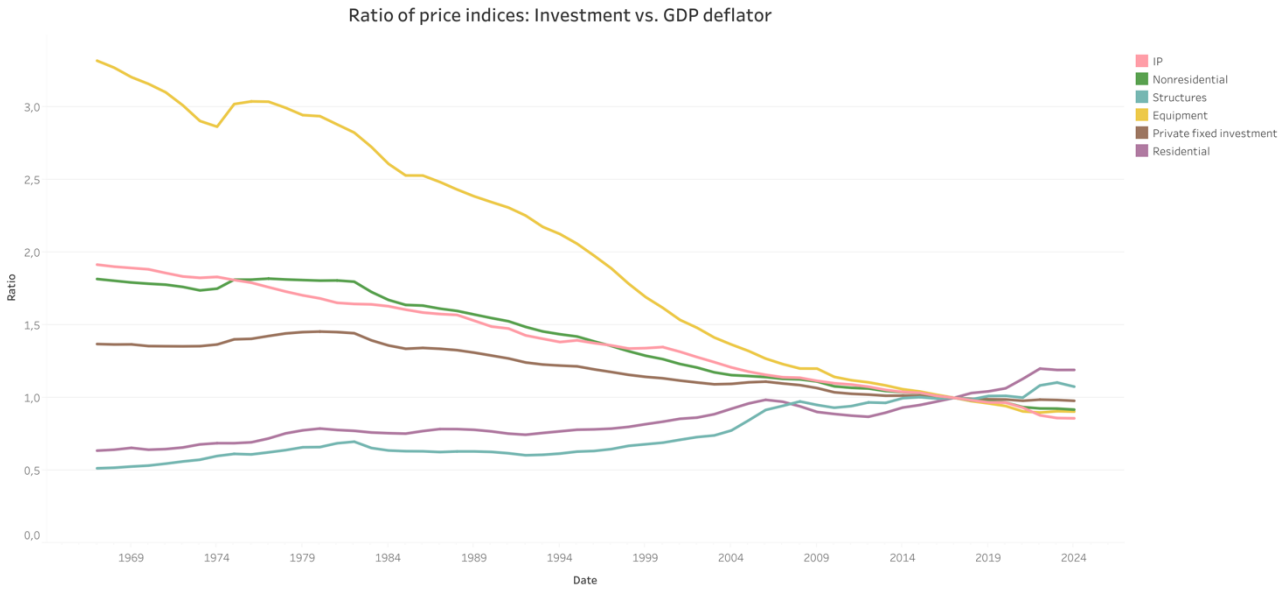


Figure 7. Relative Prices of Major Investment Components. Source: U.S. Bureau of Economic Analysis (BEA) and author's calculations. The reference base year is 2017. The chart displays the ratio of price indices for key investment components relative to the GDP deflator, highlighting long-term shifts in the relative cost of different types of investment.

Summers also emphasizes the marked decline in the relative price of equipment goods, as depicted in Figure 7. Using 2017 as the base year, a decomposition reveals that this trend is driven largely by falling prices in Information Processing Equipment especially Computers and Peripheral Equipment, whose price index has declined approximately 588-fold, from 60,098 in 1970 to just 102 in 2024. Crucially, the decline in prices has not led to a reduction in real investment in equipment goods; on the contrary, the volume of such investments has steadily increased since 2007 by about 58%, driven

precisely by technological investments[63]. This dynamic explains why, despite the real growth, the share of equipment investment relative to GDP has slightly decreased, overtaken by IPP investments. This marks a critical turning point: to fully understand today's macroeconomic dynamics, including persistently low interest rates, the sluggish recovery in investment (hereafter referred to as the "investment gap"), and the apparent slowdown in TFP growth, we must analyze the U.S. economy's structural transition toward intangible assets.

[63] Data from the U.S. Bureau of Economic Analysis (BEA), Price Indexes for Private Fixed Investment by Type and Quantity Indexes for Private Fixed Investment in Equipment, retrieved from the National Income and Product Accounts (NIPA) Tables, accessed April 2025.

4. A shift towards intangible

After analyzing potential output and investment from a broad perspective, in this chapter, we will describe the different types of intangible assets and their main characteristics. We will also show, through data, their steady rise in the United States. In Section 4.1, we will examine the effects of the rise in intangible assets, particularly the fact that they are not collateralizable, on the U.S. economy, leading to persistently low interest rates accompanied by increasing investment in intangibles. These dynamics challenge Summers' hypothesis that investment has not grown despite a favorable interest rate environment. In Section 4.2, we will show how, if correctly accounted for, intangible assets explain almost the entire "investment gap", another argument against the investment stagnation thesis. Section 4.3 will analyze the effects of intangible assets on competition between firms and on productivity at the sectoral level. This section highlights how the impact of intangibles is uneven across sectors and suggests that certain policies, beyond traditional fiscal interventions, are needed. In Section 4.4, we will examine how problems related to the poor measurement of intangible capital lead to an underestimation of Total Factor Productivity (TFP) growth and thus to a lower potential output. Finally, in Section 4.5, we will discuss which policies are better suited to address the structural shift toward an "intangible economy". This chapter aims to challenge the secular stagnation (SS) hypothesis, drawing on the work of Ye Li[64], Erik Brynjolfsson et al.[65], and others to argue that the U.S. economy is not stagnant but undergoing a structural transformation, shifting from a traditional industrial structure based on tangible assets to one increasingly driven by intangible capital. This hypothesis connects with the Schumpeterian evolutionary view and helps explain why the U.S. has experienced a prolonged period of low interest rates and an apparent slowdown in investment and TFP growth. This is due both to the financing characteristics of intangible assets, which tend to lower interest rates, and to measurement issues that significantly understate their contribution to TFP and investment levels. Throughout the chapter, we will present data on investment components, the influence of the Financial Crisis on their levels, the differences between tangible and intangible assets, and the importance of adapting national accounting standards to this new economic structure. We also note that, despite an apparent stagnation in aggregate investment, firm profitability, measured by proxies such as Tobin's Q, ROA, and others, has not declined, but has instead increased over time. Intangible assets possess several defining characteristics. According to the OECD[66], they are typically marked by uncertain returns, non-rivalry, substantial synergies, and low redeployability. Many

[64] Ye Li, "*Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability*", *American Economic Review* 115, no. 4 (2025), 1100–1141.
[65] Erik Brynjolfsson, Daniel Rock, and Chad Syverson, "*The Productivity J-Curve: How Intangibles Complement General Purpose Technologies*", *American Economic Journal: Macroeconomics* 13, no. 1 (2021), 333–372.
[66] Lilas Demmou and Guido Franco, "*Mind the Financing Gap: Enhancing the Contribution of Intangible Assets to Productivity"*, *OECD Economics Department Working Paper* No. 1681 (Paris: OECD Publishing, 2021).

intangible assets are also highly scalable, and benefit from legal protections such as patents, copyrights, and trademarks. In addition to own-account software, "intangible capital" broadly includes intellectual property (including R&D-related assets), brands, and innovative business processes. Figure 8 illustrates the composition of intangible assets: Organizational capital comprises the largest share (nearly 30%), followed by R&D (19%), software and data (16%), brands (14%), and design (10%).

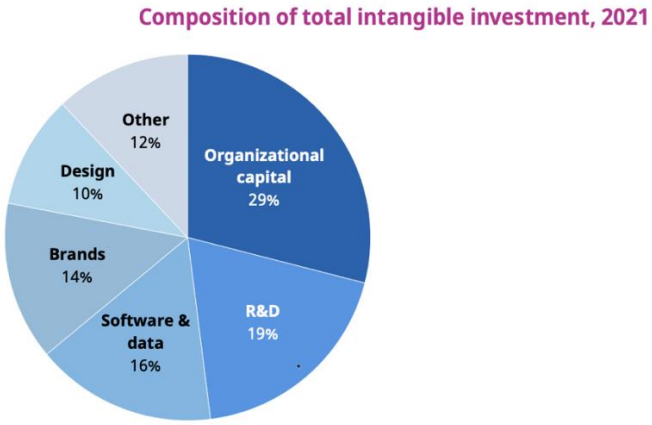


Figure 8. Composition of total intangible investment by asset type across EU-22, Japan, the UK, and the US, 2021. Source: WIPO and Luiss Business School, World Intangible Investment Highlights: June 2024 Edition (Geneva and Rome: World Intellectual Property Organization and Luiss Business School, 2024), 24.

In recent years, certain intangible elements have begun to be measured and included as capital in national income accounting. The U.S. Bureau of Economic Analysis (BEA) defines capital as any resource set aside today to produce output in the future. However, at the firm level, both the flow and stock of intangible assets remain difficult to quantify. This difficulty stems partly from corporate accounting practices, which generally do not capitalize intangible investments, except in the context of acquisitions or mergers, where identifiable intangible assets (e.g., proprietary platforms or systems) are recognized. Corrado et al.[67] classify business intangibles into three main categories:

1. Computerized information (e.g., software).
2. Innovative property (e.g., scientific R&D).
3. Economic competencies (e.g., brand value, organizational capital).

These types of capital differ fundamentally from traditional physical capital (plant, property, and equipment, or PPE). Their replicability makes ownership less concrete, and more reliant on legal protections like patents and copyrights. For example, software can be reproduced at negligible marginal cost compared to physical equipment. Additionally, investments in branding and business

[67] Corrado, C., C. Hulten, and D. Sichel. 2005. "*Measuring Capital and Technology: An Expanded Framework*", in *Measuring Capital in the New Economy*, 11–46. University of Chicago Press

processes, such as online platforms and supply chain systems, can scale rapidly while remaining protected by legal instruments such as trademarks. These distinct economic attributes allow intangible capital to affect firm performance in unique ways, particularly by supporting economies of scale and fostering market power through restricted access enforced by intellectual property rights.

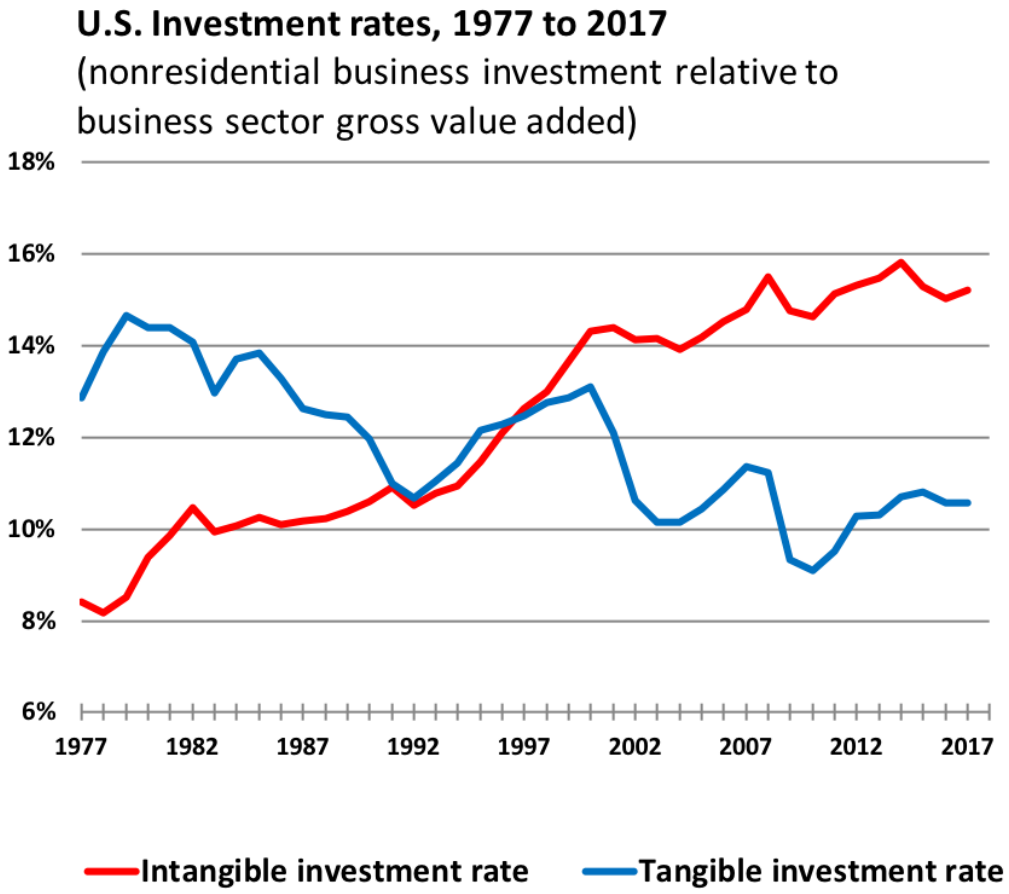


Figure 9. Source: Unpublished update to Corrado and Hulten (2010) using methods and sources developed in Corrado and Hao (2013) and in Corrado et al (2016) and Corrado et al (2017) for INTAN-Invest© and the SPINTAN project, respectively. The SPINTAN project was funded by the European Commission FP-7 grant agreement 612774. Notes: these U.S. estimates of intangible investment cover the business sector, similar to the coverage of the Bureau of Labor Statistics multi-factor productivity measures. They differ from the U.S. INTAN-Invest estimates, which are harmonized with estimates available for the EU. INTAN-Invest covers the total economy save NACE industry sectors O, P, Q, T and U. The U.S. National accounts data used to develop these estimates are as of August 31, 2018. Data: Intangible chart September 2018.

Figure 9 clearly illustrates this structural shift, highlighting the growing divergence between investment in tangible and intangible assets, a trend that has steadily intensified since the early 2000s. This suggests a fundamental transformation of the economic structure, with significant implications for macroeconomic indicators, some of which will be examined in subsequent sections. This trend is particularly pronounced in the United States (see Figures 10 and 11), where intangible investment rose from approximately USD 2.6 trillion in 2013 to nearly USD 4.5 trillion in 2023 and significantly

outpacing tangible investment, reflecting sustained growth in intangible capital formation over the past decade.

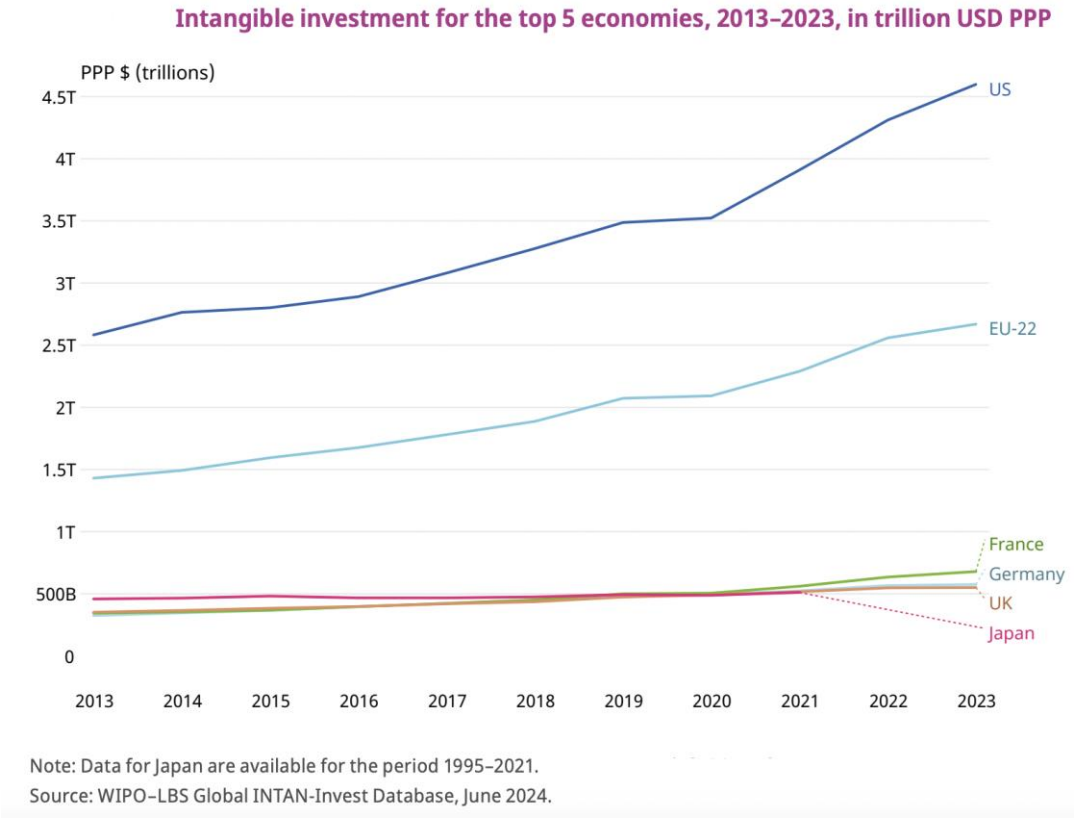


Figure 10. Intangible investment for the top five economies, 2013–2023 (in trillion USD PPP). Source: WIPO and Luiss Business School, World Intangible Investment Highlights: June 2024 Edition (Geneva and Rome: World Intellectual Property Organization and Luiss Business School, 2024), 24.

Another notable aspect is the remarkable resilience of intangible assets during periods of crisis, both during the Global Financial Crisis and the COVID-19 pandemic (Figure 11), in contrast to tangible investments, which exhibited far greater volatility. Indeed, intangible assets continued to grow steadily, likely due to their lower sensitivity to supply chain disruptions and broader economic shocks.

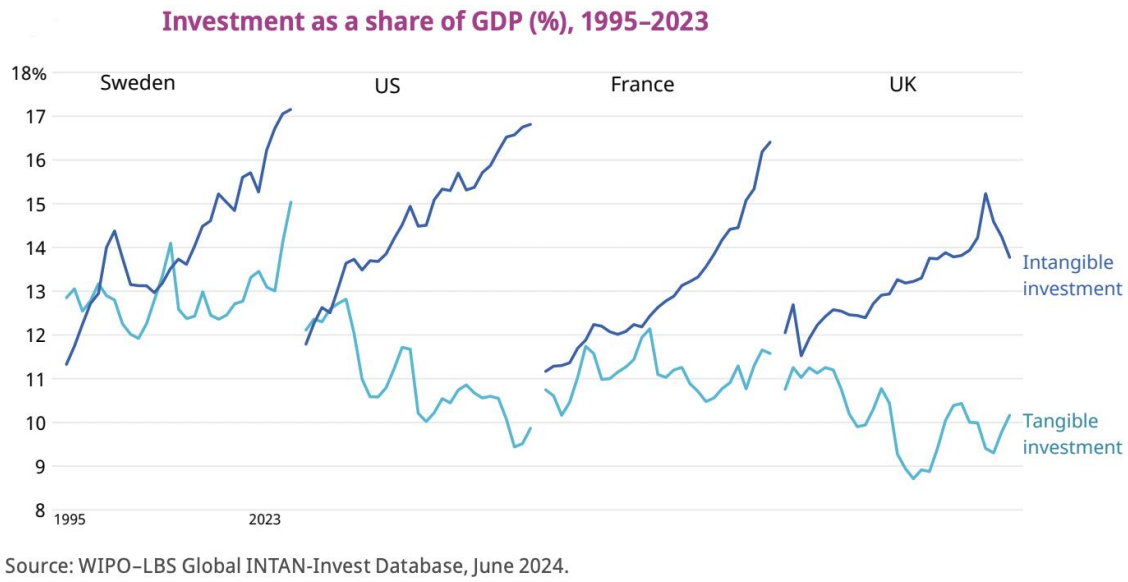


Figure 11. Investment as a share of GDP in Sweden, the United States, France, and the United Kingdom, 1995–2023, distinguishing between intangible and tangible investment. Source: WIPO and Luiss Business School, World Intangible Investment Highlights: June 2024 Edition (Geneva and Rome: World Intellectual Property Organization and Luiss Business School, 2024), 24.

Yet, despite their growing economic relevance and stability, intangible assets remain systematically undermeasured. Inadequate measurement can result in systematic undervaluation, leading to resource misallocation, underinvestment by both financial institutions and private investors, reduced competitiveness, and ultimately, job losses and weakened policy decisions. Figure 12 demonstrates that current accounting frameworks capture less than half of total intangible investment, primarily due to the non-physical nature of these assets. For example, brand value and design are often excluded from investment classifications under national accounting standards, contributing to a persistent misrepresentation of their economic significance.

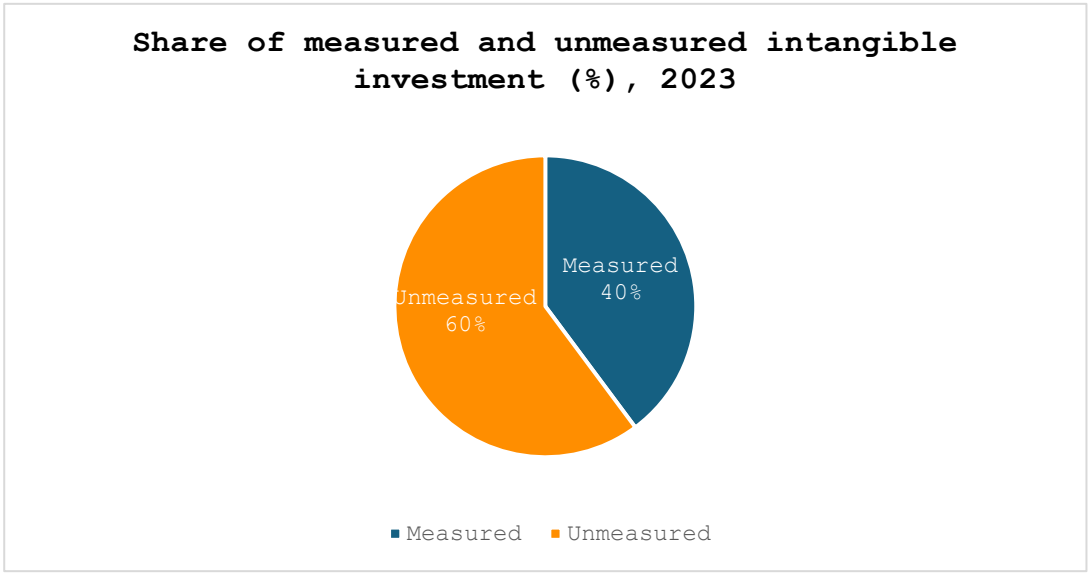


Figure 12. Share of Measured and Unmeasured Intangible Investment in the U.S. (%), *2023.*Author's calculations based on WIPO–LBS Global INTAN-Invest Database, June 2024.

4.1 The Rise in Intangibles and Its Macroeconomic Implications

Ye Li[68] provides crucial insights into the economic shift toward intangible investments. He argues that the rising importance of intangible assets, characterized by their limited collateralizability and high internal liquidity requirements, is a central factor behind the long-term decline in interest rates. This mechanism parallels Hansen's concept of capital deepening, but in this case, intangible assets have supplanted traditional physical capital, thereby amplifying the accumulation of corporate savings. Rather than Bernanke's widely cited global savings glut Li redirects attention to a corporate savings glut[69], which, he argues, has grown to a comparable magnitude. The mechanism works as a self-reinforcing cycle:

- Firms accumulate large cash buffers in the form of deposits and highly liquid debt instruments issued by financial intermediaries to fund their intangible investments.
- Financial intermediaries use these inflows to expand their asset portfolios, thereby enlarging their balance sheets.
- As corporate saving grows, deposit interest rates decline, boosting the market value of tangible assets held by intermediaries.
- The rising value of tangible assets allows firms to accumulate even more liquidity, financing further intangible investments.
- This cycle intensifies during economic expansions. The longer the boom persists, the greater the funding-cost wedge between financial intermediaries and households becomes.
- A negative shock that forces intermediaries to deleverage leads to a reallocation of tangible capital to households, triggering a decline in asset values. This collapse undermines firms' incentives to save, thereby exacerbating the deleveraging cycle.

Li's analysis illustrates how intangible investment has grown in tandem with the rise of financial intermediaries' liabilities. This parallel expansion, particularly visible in the development of shadow banking, was a key contributor to the conditions leading up to the Global Financial Crisis. Despite being less liquid, intangible assets are frequently more productive than physical capital, owing to technological advancements and evolving consumer demand for intangible-rich services. The empirical evidence strongly supports the thesis that the rise of intangible investment is transforming both corporate behavior and macroeconomic dynamics. Panel A of Figure 13 shows a steady increase

[68] Ye Li, "*Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability*", *American Economic Review* 115, no. 4 (2025), 1100–1141.

[69] The ratio of nonfinancial firms' liquidity holdings to foreigners' holdings has been stable since the 1990s, around 75 percent. Liquid assets include currency and deposits, open-market papers, and repurchase agreements held directly or indirectly via mutual funds (Board of Governors of the Federal Reserve System 2019).

in the average share of intangible investment[70] relative to assets since 1980, surpassing tangible investment by a wide margin. At the same time, Panel B highlights a secular rise in capital valuation (EV[71]/EBITDA), which reinforces firms' incentives to accumulate liquid assets. Similar results are obtained using Tobin's Q[72].

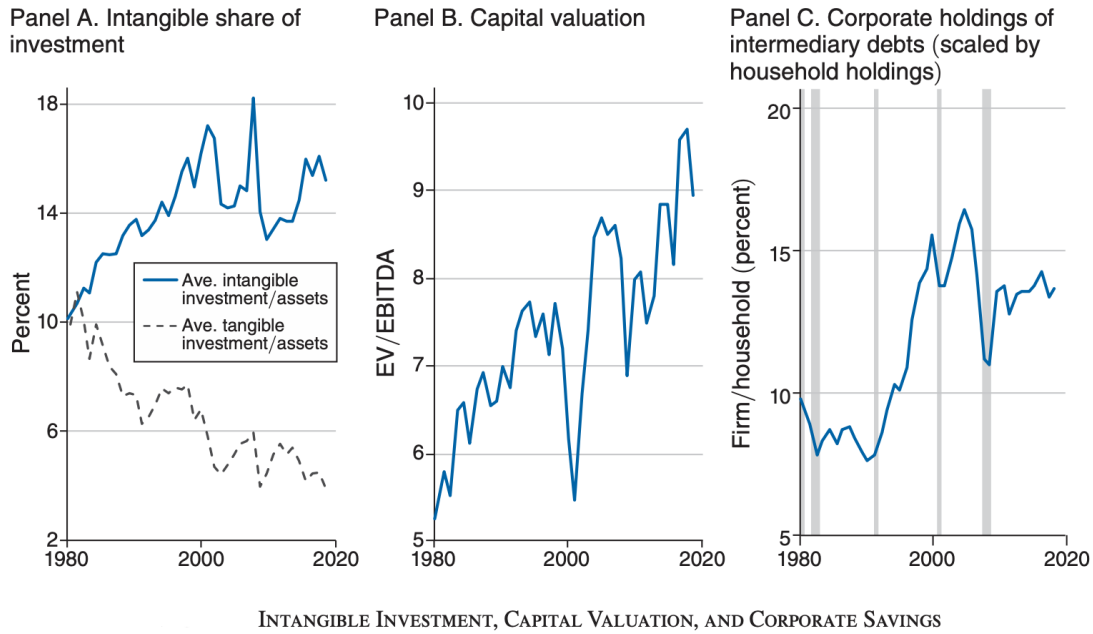


Figure 13. Intangible investment, capital valuation, and corporate savings. Source: Adapted from Ye Li (2025), *"Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review, 115(4), 1100–1141.*

This connection is particularly important considering Table 2, which shows that the positive relationship between intangibility and cash holdings strengthens when capital valuations are higher. Panel C adds a financial dimension, revealing that firms increasingly hold intermediary debt, especially during economic expansions, suggesting that corporate liquidity has become a crucial funding source for the financial system.

[70] While investment is a flow variable and total assets is a stock variable, Ye Li (2025) constructs the intangible intensity ratio by dividing intangible investment by average total assets over time within each firm. This averaging ensures a more consistent time dimension between numerator and denominator, making the ratio economically meaningful and comparable across firms.
[71] EV is the present value of a firm's capitalizable output, that is, the value of tangible capital in the model.
[72] Tobin's Q is the ratio of the market value of a firm's assets to the replacement cost of those assets, used as an indicator of investment incentives and market valuation.

INTANGIBLE INVESTMENT, CAPITAL VALUATION, AND CASH HOLDINGS

Cash / Assets	Intangibility = Intan./Assets (quintile)				Intangibility = Intan./Investment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Intangibility and corporate cash holdings								
Intangibility	6.600	6.493	5.277	5.009	0.207	0.196	0.186	0.170
	(0.440)	(0.455)	(0.320)	(0.335)	(0.015)	(0.016)	(0.010)	(0.010)
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	152,826	152,826	132,632	132,632	112,171	112,171	98,571	98,571
Adjusted R^2	0.1669	0.1903	0.2588	0.2757	0.0964	0.1185	0.2467	0.2585
Cash / Assets	Valuation = Ave. EV/EBITDA				Valuation = Tangible EV/EBITDA			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel B. Capital valuation and intangible-driven corporate cash holdings								
Intan./Assets	−2.427	−2.742	−1.484	−1.846	−1.039	−1.511	−0.277	−0.813
	(1.199)	(1.134)	(1.012)	(0.943)	(1.438)	(1.449)	(1.207)	(1.216)
Valuation	−0.731		−0.590		−0.789		−0.738	
	(0.097)		(0.066)		(0.131)		(0.082)	
Intan./Assets	0.849	0.881	0.638	0.661	0.833	0.884	0.612	0.649
× Valuation	(0.121)	(0.116)	(0.098)	(0.94)	(0.153)	(0.157)	(0.127)	(0.131)
Controls	No	No	Yes	Yes	No	No	Yes	Yes
Year fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	152,826	152,826	132,632	132,632	152,826	152,826	132,632	132,632
Adjusted R^2	0.2008	0.2128	0.2763	0.2883	0.1863	0.2044	0.2674	0.2832

Note: Firm-year clustered standard errors in parentheses.

Table 2. Intangible investment, capital valuation, and cash holdings. Source: Adapted from Ye Li (2025), "Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review, 115(4), 1100–1141.

Taken together with Figure 14, which breaks down corporate liquidity into intermediary-issued instruments, this evidence reinforces Li's (2025) mechanism. The rise in intangible investment, given its limited collateralizability, drives firms to self-finance through liquid asset accumulation. This behavior fuels a corporate savings glut that interacts with the financial sector, contributing to persistently low interest rates. Together, these dynamics support the argument that the U.S. economy is not in a state of uniform stagnation but is undergoing a structural transformation toward an intangible-dominated growth regime, marked by new risks and macro-financial dynamics.

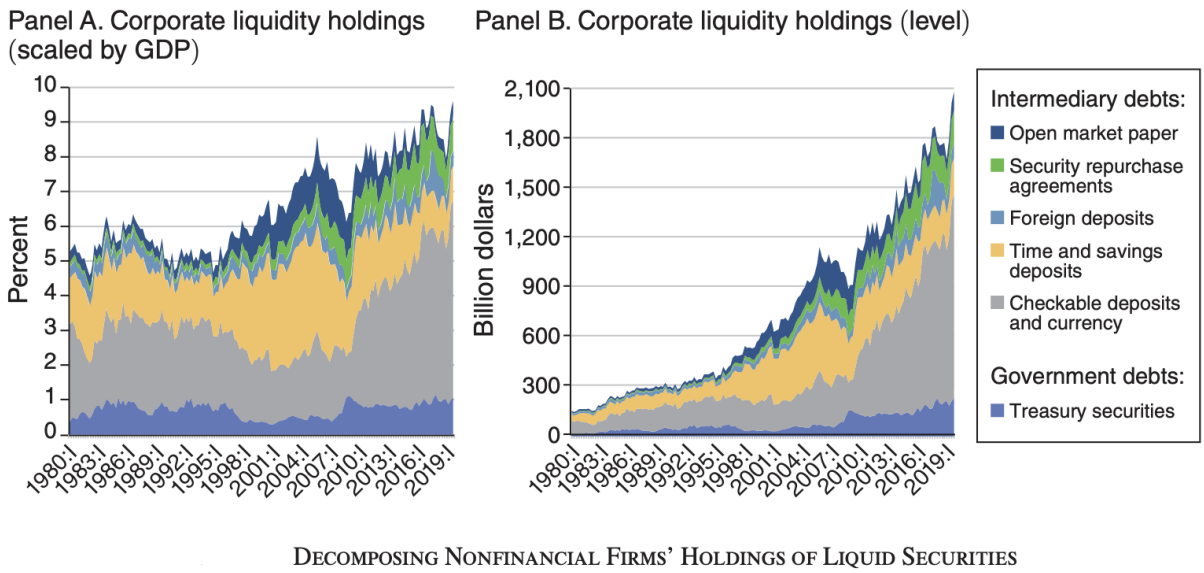


Figure 14; Decomposing nonfinancial firms' holdings of liquid securities. Source: Adapted from Ye Li (2025), "Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review, 115(4), 1100–1141.

4.1.1. Li's Model

Li develops a model consisting of three types of agents:

- Financial Intermediaries (Bankers): These agents issue liquid assets, which entrepreneurs use as liquidity buffers.
- Firms (Entrepreneurs): Entrepreneurs choose between investing in tangible or intangible assets. Tangible assets are collateralizable, whereas intangible assets require significant liquidity. Investment levels are constrained by the tangible asset valuation due to intangibles' limited collateral value.
- Households: Their demand for deposits increases with higher interest rates, driven by deposits' utility as a means of payment. Households may also hold tangible capital directly but at higher costs due to the absence of liquidity premiums earned by bankers.

Entrepreneurs in Li's model accept lower returns on deposits because they value liquidity, which is needed frequently and arrives randomly according to a Poisson process[73]. This structure generates endogenous supply and demand for liquid assets, leading the real interest rate below zero, thus creating conditions analogous to a liquidity trap. Proposition 1 from Li's analysis states:

[73] A Poisson process is a mathematical model used to describe events that occur randomly and independently over time at a constant average rate. In Li's model, it captures the unpredictable timing of liquidity needs.

- The optimal intangible investment share increases with intangible investment productivity.
- Higher intangible productivity and tangible capital valuations increase the marginal value of liquidity, further reducing deposit rates below the discount rate.

The feedback mechanism (see 4.1) between declining interest rates and rising tangible asset valuations creates a self-reinforcing cycle. Lower interest rates reduce intermediaries' financing costs, increasing tangible asset values and enlarging entrepreneurs' investment capacities. Consequently, the corporate savings glut arises endogenously, differing from the exogenous global savings gluts highlighted in previous economic literature. Li acknowledges potential model limitations, particularly the absence of intangible capital risk premiums, which might reduce intangible valuations. However, he notes that technological innovation may offset these risks, given its potential to hedge against broad-based technological changes. Figure 15 illustrates the market structure in Li's model, linking real economic output, generated by labor, tangible, and intangible capital, to the financial sector's capacity to provide liquidity. Entrepreneurs' intangible investment is constrained by the liquidity provided by bankers, who back deposits with tangible assets. The model's core mechanism is intermediation intensity (η_t), the ratio of bankers' wealth to tangible capital, which, though not shown explicitly in Figure 15, drives fluctuations in both capital valuations and real interest rates.

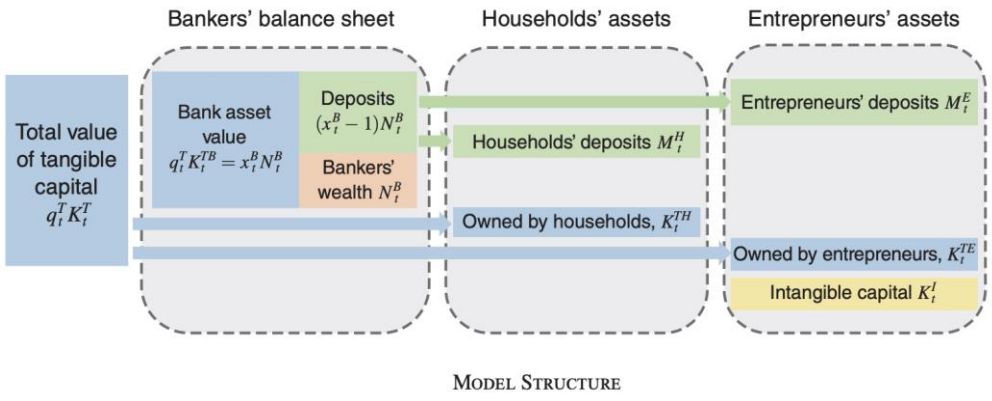


Figure 15: Model structure linking capital ownership and deposit flows among bankers, households, and entrepreneurs. Source: Adapted from Ye Li (2025), "*Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability*", *American Economic Review*, 115(4), 1100–1141.

By calibrating model parameters, Li shows that his framework closely aligns with macroeconomic trends. It confirms that the rise in intangible investment and the accumulation of corporate liquidity have fundamentally reshaped the macro-financial landscape. Parameter values are reported in Table 3. The model is solved over the time interval $t \in [0,20]$, corresponding approximately to the period from 1990 to 2019, with the average concentrated around 2010.

PARAMETER CALIBRATION

Parameters	Symbol	Value	Moment	Model	Data
(1) Intangible investment productivity: Intercept	κ_0^I	1.075	Average $\mathbb{E}^{\eta}\left[\theta(\eta,t)\right]$	63.9%	61.6%
(2) Intangible investment productivity: Time coefficient	κ_1^I	0.018	Average annual change of $\mathbb{E}^{\eta}\left[\theta(\eta,t)\tilde{I}(\eta,t)\right]$	1.6%	1.4%
(3) Tangible investment productivity	κ^T	0.011	Average annual change of $\mathbb{E}\left[\left(1-\theta(\eta,t)\right)\tilde{I}(\eta,t)\right]$	0.0%	−0.1%
(4) Investment cost $F(\theta) = \phi\theta_i^2/2$	ϕ	9.540	$\text{Average}\frac{\text{Vol.}^{\eta}\left[\theta(\eta,t)\tilde{I}(\eta,t)\right]}{\text{Vol.}^{\eta}\left[(1-\theta(\eta,t))\tilde{I}(\eta,t)\right]}$	1.84	2.06
(5) Investment project arrival rate	λ	0.050	$\frac{\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,20)}{q^T(\eta,20)}\right]-\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,0)}{q^T(\eta,0)}\right]}{\mathbb{E}^{\eta}\left[\theta(\eta,20)\right]-\mathbb{E}^{\eta}\left[\theta(\eta,0)\right]}$	0.162	0.170
(6) Household deposit demand elasticity to deposit rate	ξ	1.100	Average annual change of $\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,t)+\tilde{M}^H(\eta,t)}{q^T(\eta,t)}\right]$	0.0%	0.3%
(7) Household deposit utility scale: Intercept	β_0	0.196	$\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,t)}{\tilde{M}^H(\eta,t)}\right], t=0$	9.8%	9.6%
(8) Household deposit utility scale: Time coefficient ($\leq$ 1992)	β_1	0.019	Average annual change of $\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,t)}{\tilde{M}^H(\eta,t)}\right], t\leq 2$	0.32%	0.29%
(9) Household deposit utility scale: Time coeff. increase ($>$ 1992)	β_2	0.003	Average annual change of $\mathbb{E}^{\eta}\left[\frac{\tilde{M}^E(\eta,t)}{\tilde{M}^H(\eta,t)}\right], t>2$	0.19%	0.20%
(10) Capital depreciation rate: Vol.	σ	0.020	Vol. of bank asset return	2.9%	2.6%
(11) Agents' discount rate	ρ	0.062	$\mathbb{E}^{\eta}\left[r(\eta,t)\right], t=0$	3.2%	3.5%
(12) Capital depreciation rate: Mean	δ	0.088	$\mathbb{E}^{\eta}\left[q^T(\eta,t)\right], t=0$	6.6	6.8

Table 3: Parameter calibration in Li's model, showing estimated values, corresponding empirical moments, and model fit. Source: Adapted from Ye Li (2025), *"Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review,* 115(4), 1100–1141.

The simulation results (Table 4) closely match empirical data, providing further evidence of the structural shift toward an intangible-intensive economy. One deviation is that the model predicts slightly more negative interest rates than observed, primarily due to the exclusion of the Zero Lower Bound on nominal rates[74]. These findings are highly relevant: they confirm that rising intangible investment, falling interest rates, and corporate savings accumulation are interconnected features of a structural transformation. Contrary to Summers' view of secular stagnation as a shortfall in investment demand, Li proposes a different interpretation, one in which savings are rising and interest rates are declining, but investment is not stagnating.

[74] The interest rates are the real rates with CPI deflator from US Bureau of Labor Statistics (1947–2020). The securities include (i) jumbo and non-jumbo checking deposits, savings deposits, and certificate of deposits; (ii) three-month certificate of deposits; (iii) one-, two-, and three-month AA-rated financial commercial papers.

Time	Intangible inv. share $\mathbb{E}^{\eta}[\theta(\eta,t)]$	Firm deposits capital value $\mathbb{E}^{\eta}\left[\frac{\tilde{M}^{E}(\eta,t)}{q^{T}(\eta,t)}\right]$	Firm deposits HH deposits $\mathbb{E}^{\eta}\left[\frac{\tilde{M}^{E}(\eta,t)}{\tilde{M}^{H}(\eta,t)}\right]$	Interest rate $\mathbb{E}^{\eta}[r(\eta,t)]$	Capital valuation $\mathbb{E}^{\eta}[q^{T}(\eta,t)]$	Financial risk multiplier $\max_{\eta}\left\{\frac{\sigma^{T}(\eta,t)+\sigma}{\sigma}\right\}$
$t = 0$	55.2%	7.6%	9.8%	3.24%	6.6	2.7
Data '90	54.4%	6.3%	9.6%	3.45%	6.8	
$t = 4$	58.7%	8.5%	11.1%	2.11%	6.9	3.2
Data '94	58.2%	7.1%	10.8%	2.59%	6.9	
$t = 8$	62.2%	8.2%	10.7%	0.95%	7.3	3.6
Data '98	61.9%	7.9%	12.2%	1.77%	7.3	
$t = 12$	65.7%	9.2%	12.2%	−0.20%	7.6	4.0
Data '02	66.0%	8.4%	13.1%	0.97%	7.5	
$t = 16$	69.1%	10.2%	13.7%	−1.50%	7.8	4.4
Data '06	69.1%	9.1%	13.8%	0.46%	7.7	
$t = 20$	72.6%	10.4%	14.1%	−2.88%	7.9	4.7
Data '10	72.7%	9.7%	14.0%	−0.36%	8.0	

Table 4: Long-term trends and endogenous financial risk in Li's model, showing changes in investment composition, capital valuation, interest rates, and risk multipliers over time. Source: Adapted from Ye Li (2025), *"Fragile New Economy: Intangible Capital, Corporate Savings Glut, and Financial Instability", American Economic Review,* 115(4), 1100–1141.

4.2 Intangibles and the "Investment gap"

In the last chapter, we examined the rise of intangible assets and its effect on the financial sphere. We now explore how this growth has affected physical capital investment. Summers identifies several factors contributing to the decline in investment and the concurrent increase in savings (see 2.1). Indeed, despite a prolonged period of low interest rates and a continuous rise in corporate profitability (Figure 16), with the corporate sector becoming a net saver in the broader economy[75], investment has not responded with comparable strength. Capital return metrics, such as Tobin's Q, have increased significantly, while overall output growth has remained modest[76].

[75] Lewis Alexander and Janice C. Eberly, "*Investment Hollowing Out*", *IMF Economic Revi*ew 66, no. 1 (2018), 5–30.
[76] Fernald, J. G., R. E. Hall, J. H. Stock, and M. W. Watson (2017). "*The disappointing recovery of output after 2009", Brookings Papers on Economic Activity*, 1.

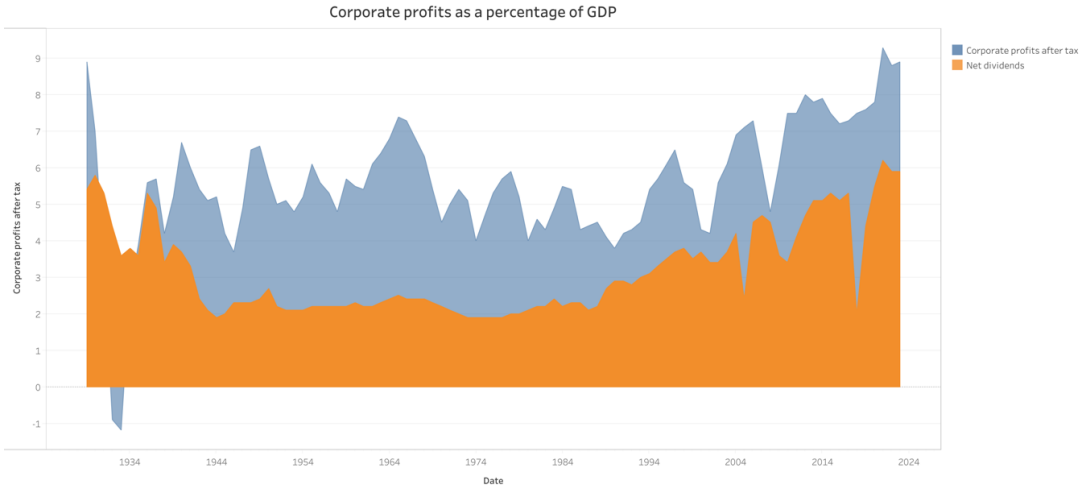


Figure 16. Corporate profits after tax and net dividends as a percentage of GDP. Source: Author's elaboration based on data from the U.S. Bureau of Economic Analysis (BEA)

This downward trend in investment began well before the crisis, around the early 2000s[77]. Only investment in structures remained relatively stable, likely because such assets are harder to substitute[78]. In the manufacturing sector, investment declined from the mid-1990s, paralleling the sector's shrinking share of economic value. In contrast, the high-tech sector made a substantial contribution to the rise in corporate profitability through strong gains in sales, earnings, and valuations, even though its investment share also stagnated. A similar pattern is evident in the retail sector. How, then, can we explain that despite robust performance, physical investment has not increased proportionally in these sectors? The work of Nicolas Crouzet and Janice C. Eberly[79] suggests that this is a strategic choice by firms, whose capital composition has shifted over time from physical capital (PPE: property, plant, and equipment) to growing reliance on intangible assets[80]. Due to the challenges in measuring intangible capital, an "investment gap" (Figure 17) emerges between expected and observed PPE investment: the greater the unaccounted share of intangible capital, the wider the gap. The authors empirically demonstrate a positive correlation between the size of the PPE investment gap and the share of intangible capital, both over time and across sectors. To investigate this relationship, they use sector-level measures of intangible capital from the BEA, which include accumulated expenditures on software, R&D, and intellectual property; they also employ a proxy for

[77] Gutiérrez, G. and T. Philippon (2017). "*Investmentless growth: An empirical investigation*", *Brookings Papers on Economic Activity* 2017 (2), 89–19.
[78] Lewis Alexander and Janice C. Eberly, "*Investment Hollowing Out*", *IMF Economic Revi*ew 66, no. 1 (2018), 5–30.
[79] Crouzet, Nicolas, and Janice C. Eberly. "*Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles*", *NBER Working Paper* No. 25869, National Bureau of Economic Research, May 2019.
[80] Corrado, C., C. Hulten, and D. Sichel (2005). "*Measuring capital and technology: an expanded framework*", in *Measuring capital in the new economy*, pp. 11–46. University of Chicago Press.

internally developed intangible assets proposed by Peters and Taylor[81], based on the capitalization of past SG&A (Selling, General and Administrative Expenses) and R&D expenses at the firm level.

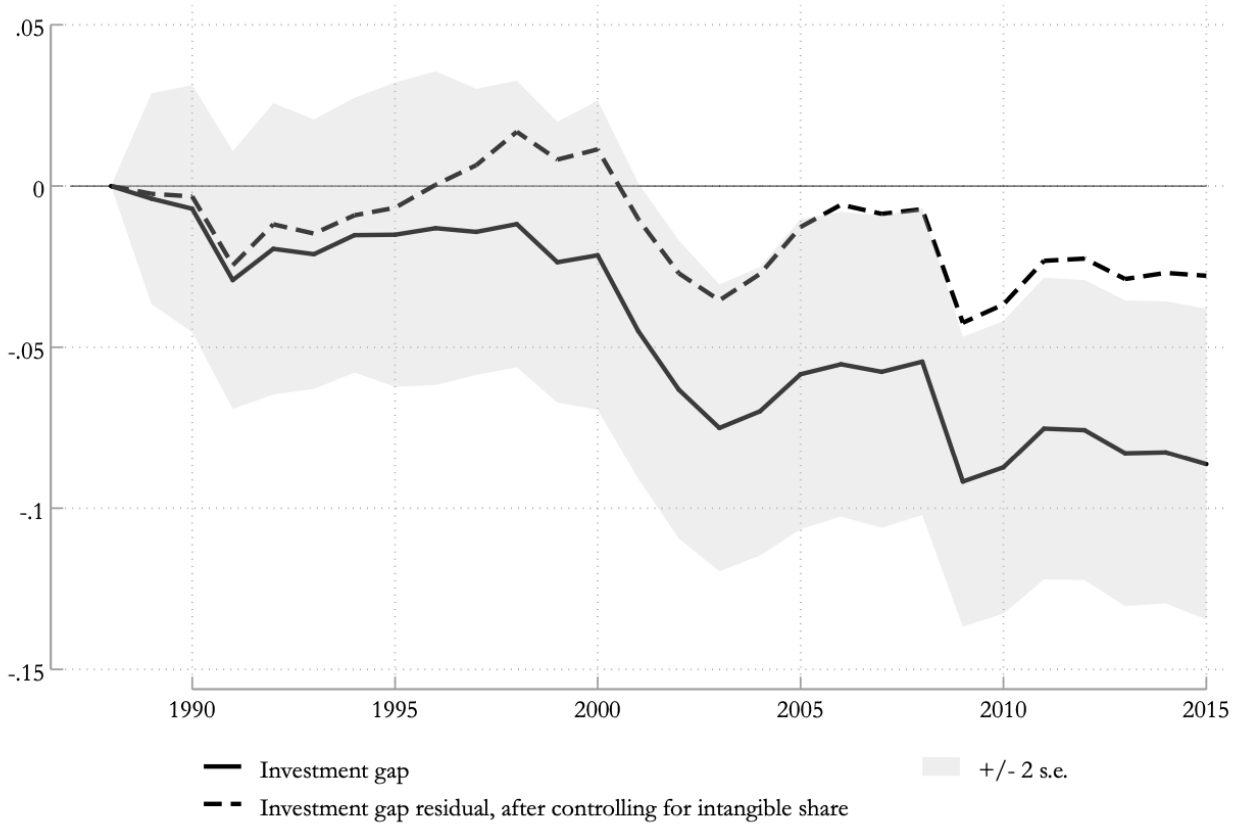


Figure 17. The chart shows the estimated investment gap over time, with and without controlling for firms' intangible capital shares. Shaded areas indicate the 95% confidence interval. Source: Adapted from Crouzet and Eberly (2019), "*Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles*", *NBER Working Paper* No. 25869.

Their IV regression results yield consistent and statistically significant estimates, confirming the relevance of intangible capital in understanding both weak physical investment and changing market structures. Finally, Gutiérrez and Philippon[82] (2017), along with Alexander and Eberly[83], use average Tobin's Q, the ratio of a firm's market value to the replacement cost of its physical assets, as a proxy for investment incentives. However, their work shows that this metric systematically overstates incentives for physical investment when other forms of capital, such as intangibles, are also contributing to output. Consequently, even when using a "total" Q measure (figure 18), the investment signal remains imprecise, as it depends on adjustment costs and the direction of the optimal intangible investment rate. Firm value jointly reflects both types of capital, but actual investment is determined

[81] Peters, R. H. and L. A. Taylor (2017). "*Intangible capital and the investment-q relation*", *Journal of Financial Economics* 123(2), 251–272.
[82] Gutiérrez, G. and T. Philippon (2017). "*Investmentless growth: An empirical investigation*", *Brookings Papers on Economic Activity* 2017 (2), 89–19.
[83] Lewis Alexander and Janice C. Eberly, "*Investment Hollowing Out*", *IMF Economic Revi*ew 66, no. 1 (2018), 5–30.

by their respective marginal q values, which linear combinations fail to disentangle effectively. Overall, the rising importance of intangible assets accounts for much of the observed gap between physical investment and Tobin's Q, aligning with the theoretical predictions of the model.

Figure 18. Source: GuruFocus, as of October 1, 2024. Tobin's Q is calculated as the ratio of market value to the replacement cost of physical assets. High Q values are traditionally interpreted as signals for strong investment incentives

4.3 Intangibles and Their Effect on Competition and Productivity Among Firms

After examining the role of intangible investments in explaining the investment gap, this section analyzes how intangibles influence competition and productivity at both the firm and industry levels. As discussed previously, medium and small firms often struggle to finance intangible assets internally, resulting in a "financing gap[84]". This gap tends to slow productivity growth and exacerbates market concentration. Additionally, the increased dominance of highly profitable intangible-intensive firms may widen wage disparities, contributing to the decline in labor share and further affecting economic outcomes The OECD provides robust evidence linking financial

[84] Bajgar, M., G. Berlingieri, S. Calligaris, C. Criscuolo and J. Timmis, (2019), "*Industry Concentration in Europe and North America*", *OECD Productivity Working Papers No. 18*.

conditions to productivity outcomes in intangible-intensive sectors[85]. A more detailed discussion of how improved financial conditions affect productivity in intangible-intensive sectors will be provided in Chapter 4.5

4.3.1 Market concentration

Intangible investments have a significant influence on the competitive dynamics between firms. Haskel and Westlake [86] emphasize that intangible capital, particularly software and intellectual property, is highly scalable, contributing to the expansion of large, intangible-intensive firms. This scalability often leads to increased market share for already dominant companies and, consequently, a rise in industry concentration. However, the implications of this trend are ambiguous. On the one hand, technological improvements may lead to higher productivity and greater incentives to invest, positively impacting economic performance. On the other hand, it may result in greater market power, reducing competitive pressure and welfare. Crouzet and Eberly[87] document (Table 5) a positive correlation between intangible intensity and market share at the firm level. Firms that increase their intangible assets also tend to expand their market share. Moreover, industries with higher average levels of intangible capital exhibit higher concentration, as measured by the Herfindahl index, which is consistently larger for firms operating in intangible-intensive sectors.

	Dependent variable : market share		
	(A)	(B)	(C)
Compustat intangible share	0.0131^{***}	0.0096^{***}	0.0073^{***}
	(17.69)	(5.40)	(4.91)
Observations	98520	97245	97245
Industry × year f.e.	Yes	No	No
Firm f.e.	No	Yes	Yes
Year f.e.	No	No	Yes

Table 5. Relationship between intangibles and market share. *Source: Adapted from Crouzet and Eberly (2019), "Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles", NBER Working PaperNo. 25869.*

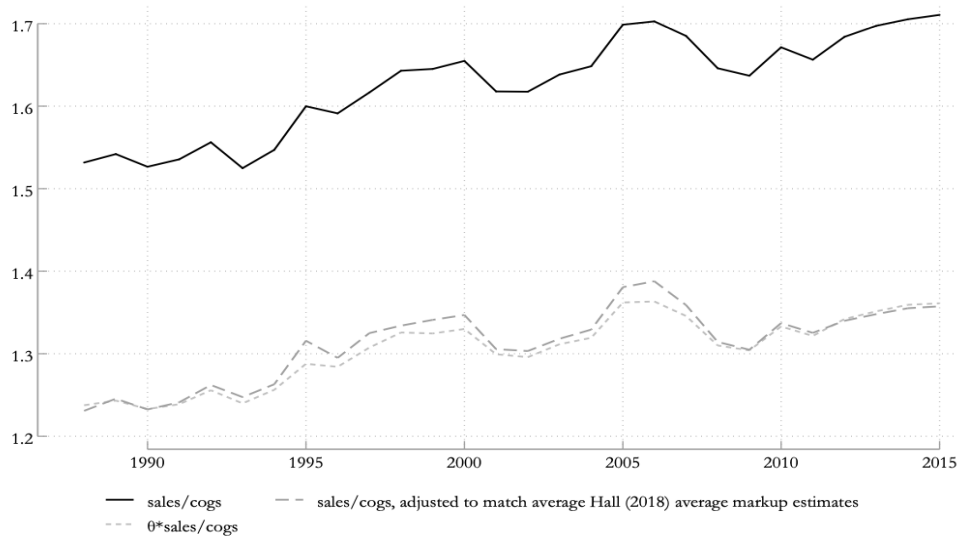
Their analysis, conducted both at the industry and firm levels, shows that these effects vary significantly across industries**.** Market power is measured by firm markups following the industry-

[85] Lilas Demmou and Guido Franco, "*Mind the Financing Gap: Enhancing the Contribution of Intangible Assets to Productivity", OECD Economics Department Working Paper* No. 1681 (Paris: OECD Publishing, 2021).
[86] Haskel, J. and S. Westlake (2017). "*Capitalism without capital: the rise of the intangible economy"*, Princeton University Press.
[87] Crouzet and Eberly (2019), "*Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles*", *NBER Working PaperNo. 25869.*

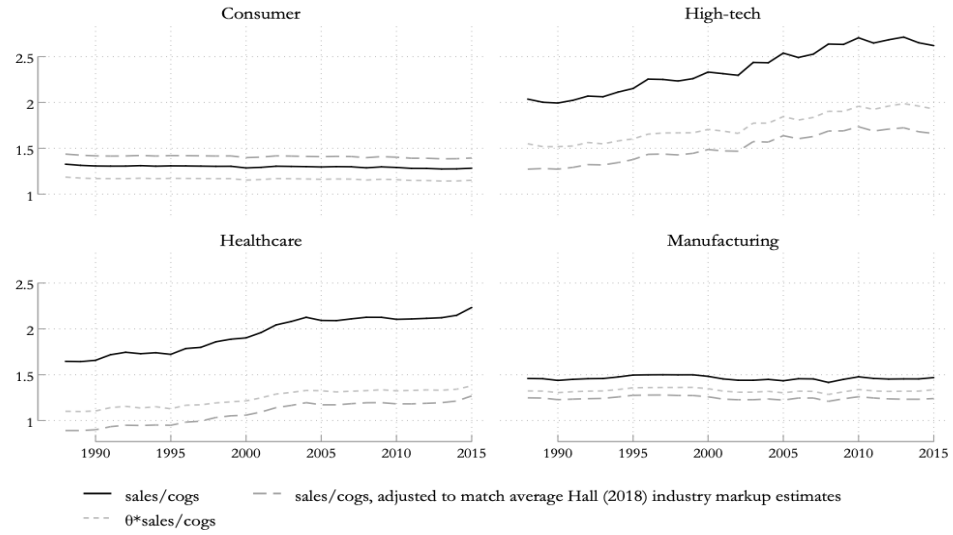
level approach of Hall[88] and the firm-level methodology of De Loecker and Eeckhout[89]. Markups are calculated as the elasticity of output with respect to total inputs, including quasi-fixed inputs such as capital. The ratio of revenue to the cost of goods sold serves as a practical proxy for firm-level markups, adjusted by an industry-specific constant. Figures 19a and 19b report the average markup estimates at both the aggregate and sectoral levels. At the industry level, average markups increased from approximately 1.2 to 1.4 between 1988 and 2015. At the firm level (excluding firm fixed effects), results again show sectoral heterogeneity:

- In healthcare, the impact of intangibles on markups is very strong (1.424).
- In high-tech, the effect remains statistically significant but slightly smaller (*0.498*).
- In manufacturing, the effect is close to unity and significant.
- In consumer industries, the effect is low (−0.157).

[88] Hall, R. E. (1988). "*The relation between price and marginal cost in us industry*", *Journal of political Economy* 96(5), 921–947. Hall, R. E. (2018). "*New evidence on the markup of prices over marginal costs and the role of mega-firms in the us economy*", *National Bureau of Economic Research working paper*.
[89] De Loecker, J. and J. Eeckhout (2017). "*The rise of market power and the macroeconomic implications", National Bureau of Economic Research working paper.*



(a)



(b)

Figure 19. Evolution of average firm markups. Source: Adapted from Crouzet and Eberly (2019), *"Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles", NBER Working Paper No. 25869.*

4.3.2 Productivity Enhancement

Regarding productivity, average labor productivity is measured at the firm level using sales per worker, which includes the effect of markups. To isolate the pure productivity component, the authors use sales per worker at cost (cost of goods sold divided by number of employees). Table 6 shows that productivity trends vary across industries:

- In manufacturing and healthcare, productivity growth has been weak.

- In consumer sectors, productivity has remained stable around the aggregate trend.
- In the high-tech sector, labor productivity increased nearly five-fold over a decade.

	Dependent variable : labor productivity (log)			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share s_t (OLS)	2.869^{***}	2.153^{***}	1.713^{***}	1.346^{***}
	(16.49)	(17.67)	(6.77)	(5.08)
Compustat intangible share s_t (IV)	3.386^{***}	-0.614	3.380^{***}	0.555^{***}
	(14.64)	(-0.45)	(4.76)	(3.99)
First-stage F-stat	214.98	10.01	116.16	1547.90
Observations	56	504	168	112
Industry f.e.	Yes	Yes	Yes	Yes

Table 6. Industry-level relationship between intangibles and labor productivity. Source: Adapted from Crouzet and Eberly (2019), *"Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles", NBER Working Paper No. 25869.*

OLS estimates are statistically significant across all sectors. However, in the second panel, where the Compustat intangible share is instrumented using BEA fixed asset tables, the results are less robust. For manufacturing, the relationship is no longer statistically significant, and in healthcare, the coefficient decreases by two-thirds. In contrast, for high-tech and consumer sectors, the correlation remains significant, and the effect strengthens. At the firm level (Table 7), the results are consistent:

- The healthcare sector shows a significant negative correlation between intangibles and productivity.
- The consumer sector exhibits a stronger relationship compared to the industry-level analysis.

In particular, rising concentration may result from technological changes in an otherwise competitive environment and thus be largely efficient. Alternatively, it may stem from increased market power, leading to wider wedges between price and marginal cost, and potentially inefficient allocations. Intangible investments could play a role in both scenarios, since intangible assets may simultaneously help establish market power and enhance productivity. For example, patents confer exclusivity and thus pricing power, yet they may also reflect productivity-enhancing research and innovation conducted by firms.

	Dependent variable : labor productivity (log)			
Panel A	**Cross-sectional (between) regressions**			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	0.561^{***}	0.123	0.082	-0.316^{***}
(OLS)	(2.98)	(1.62)	(1.45)	(−2.87)
Compustat intangible share $s_{j,t}$	0.593	0.428	0.840^{**}	-1.610^{***}
(IV)	(0.85)	(1.49)	(2.37)	(−2.85)
First-stage F stat	71.3	200.7	41.5	79.7
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes	Yes	Yes	Yes
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	No	No	No	No
Panel B	**Panel (within) regressions**			
	Consumer	Manufacturing	High-tech	Healthcare
Compustat intangible share $s_{j,t}$	0.247^{***}	−0.016	0.044	−0.033
(OLS)	(3.18)	(−0.24)	(1.25)	(−0.48)
Compustat intangible share $s_{j,t}$	2.736^{***}	0.854	0.834^{***}	-3.988^{**}
(IV)	(2.79)	(1.27)	(2.72)	(−2.49)
First-stage F stat	11.3	20.3	30.9	9.1
Observations	8027	24436	19730	10296
Firms	646	1726	1718	878
Firm-level controls	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)	Yes (excl. age)
Standard error clustering	Industry-year and firm	Industry-year and firm	Industry-year and firm	Industry-year and firm
Industry-year f.e.	Yes	Yes	Yes	Yes
Firm f.e.	Yes	Yes	Yes	Yes

Table 7. Firm-level relationship between intangibles and labor productivity. Source: Adapted from Crouzet and Eberly (2019), "*Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles*", *NBER Working Paper No. 25869.*

In this chapter, we have built a solid narrative based on the growing literature on intangibles, which challenges the core thesis of secular stagnation proposed by Summers. Many of the macro- and microeconomic dynamics highlighted by Summers are more persuasively explained by the structural transformation of the U.S. economy into one increasingly dominated by intangible assets. Low interest rates are the endogenous result of interactions between firms, which require liquidity to invest in intangibles, and financial institutions, which issue debt and acquire assets. The apparent shortfall in investment disappears once intangible assets are correctly accounted for; the decline in the relative price of equipment has led to a real increase in its quantity and signals higher productivity. The reduction in the number of listed companies in the U.S. can be traced back to the financing gap and the competitive and market power advantages of firms with high intangible intensity. This process is underway in most sectors, including healthcare, consumer, and high-tech. However, it remains limited in manufacturing, due to the sector's long-term employment decline and stagnant profitability, as well as in infrastructure, where highly specific physical capital is difficult to substitute with intangible assets. This evolutionary shift has significant implications for the productive and financial structure of the economy and requires new types of policies. While in this chapter we have shown that a proper measurement of intangibles closes more than half of the investment gap, the next chapter will delve into the measurement challenges of intangible assets and their implications for the underestimation of total factor productivity (TFP).

4.4 Measurement Problem with Intangibles and TFP

In this chapter, we will analyze how mismeasurement of intangible assets has a significant impact on Total Factor Productivity (TFP). We will begin by presenting the accounting method currently used by the Congressional Budget Office (CBO) and the results it produces, followed by a comparison with the findings of Erik Brynjolfsson, Daniel Rock, and Chad Syverson who apply more suitable measurement approaches for capturing the effects of intangibles on productivity, effects that we already demonstrated to be correlated in the previous chapter.

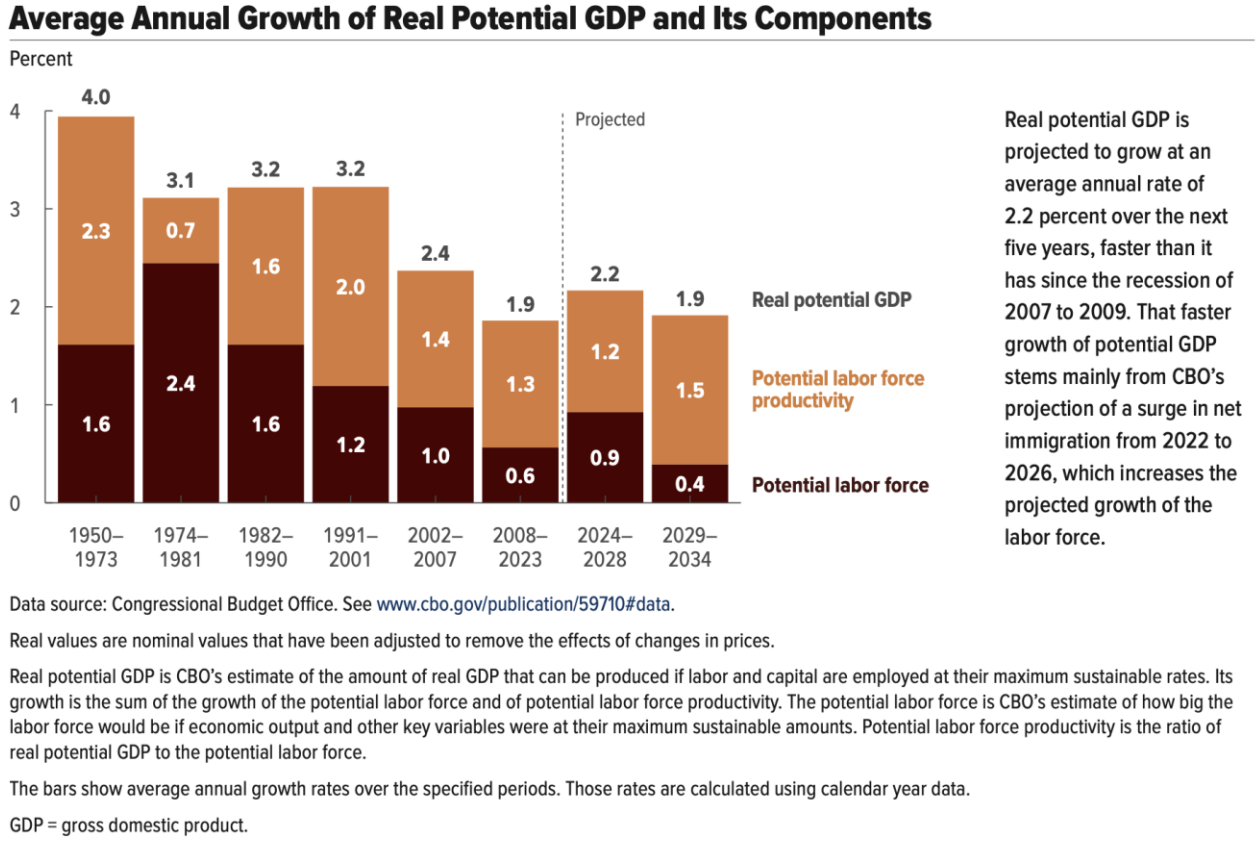


Figure 20. Average annual growth of real potential GDP and its components. Source: Congressional Budget Office (CBO), *The Budget and Economic Outlook: 2024 to 2034.*

As shown in the figure 20, beginning in the 1991–2001 period, TFP growth started to decelerate due to both productivity-related factors and a steadily aging population. The slowdown of TFP is attributable mainly to the following factors: 1) Feedback from slower growth of other economic factors, 2) Demographic effects, 3) Structural issues, 4) Slowdown in basic innovation.

1. Slow growth in labor supply and a sluggish recovery in aggregate demand following the Financial Crisis have led to modest capital investment, resulting in slower capital turnover and a delayed introduction of new technologies.

2. The retirement of baby boomers has lowered the overall level of human capital. Meanwhile, the growth in educational attainment has slowed, partly because it was already at a historically high level.
3. Larger firms tend to exhibit higher productivity growth than smaller ones. At the same time, entry and exit rates for companies have declined, the share of employment and output attributable to young firms has dropped, and restrictive land-use regulations have increased housing costs, discouraging labor mobility toward more productive urban centers.
4. Innovation has slowed since the internet boom, partly due to rising research costs and a scarcity of economically transformative ideas. However, globalization has fostered innovation through better research tools and broader knowledge diffusion. Brynjolfsson, Rock, and Syverson[90] argue that the impact of general-purpose technologies, such as artificial intelligence, may be underestimated in early TFP measurements. By contrast, Philippon[91] (2022) contends that economists have wrongly assumed that innovation drives a constant growth rate in TFP. Instead, data suggest that innovation yields constant incremental gains over time. This linear contribution model implies a declining (though still positive) TFP growth rate, with new general-purpose technologies occasionally increasing the size of those increments.

The following section focuses on the work of Brynjolfsson et al.[92], which addresses the measurement challenges associated with intangible assets and their implications for productivity trends.

4.4.1 Brynjolfsson's J-Curve

Robert Solow famously observed in 1987 that "you can see the computer age everywhere but in the productivity statistics." This paradox highlighted the puzzling disconnect between visible technological advancements, particularly the widespread adoption of computing technology, and disappointing trends in measured productivity growth. Solow's observation presciently underscored the difficulty economists face in accurately capturing productivity impacts of new, revolutionary technologies in real-time. Indeed, Brynjolfsson et al.[93] make a significant contribution by challenging the perception of apparent productivity stagnation, arguing that it may largely reflect a measurement artifact related to intangible investments. Brynjolfsson's "Productivity J-Curve" (figure 21) framework clarifies why initial adoption of General Purpose Technologies (GPTs), such as Artificial

[90] Brynjolfsson, Rock, and Syverson (2021), *"The Productivity J-Curve", NBER Working Paper No. 25148*
[91] Philippon, Thomas. "*Additive Growth", NBER Working Paper No. 29950*, National Bureau of Economic Research, April 2022 (revised May 2022).
[92] Brynjolfsson, Rock, and Syverson (2021), *"The Productivity J-Curve," NBER Working Paper No. 25148*
[93] *Ibid.*

Intelligence (AI), can paradoxically reduce measured productivity before delivering significant long-term gains. Initially, implementing GPTs like AI involves substantial unmeasured investments in intangible assets such as workforce training, organizational restructuring, and process redesign. These activities typically incur substantial costs upfront without immediate measurable output increases, temporarily depressing standard productivity metrics. However, as these intangible investments mature and become embedded within business practices and organizational frameworks, they subsequently catalyze substantial productivity enhancements. Eventually, firms experience measurable efficiency gains, and productivity growth accelerates. This phenomenon, initial dip followed by a surge, is the characteristic shape of the "J-curve."

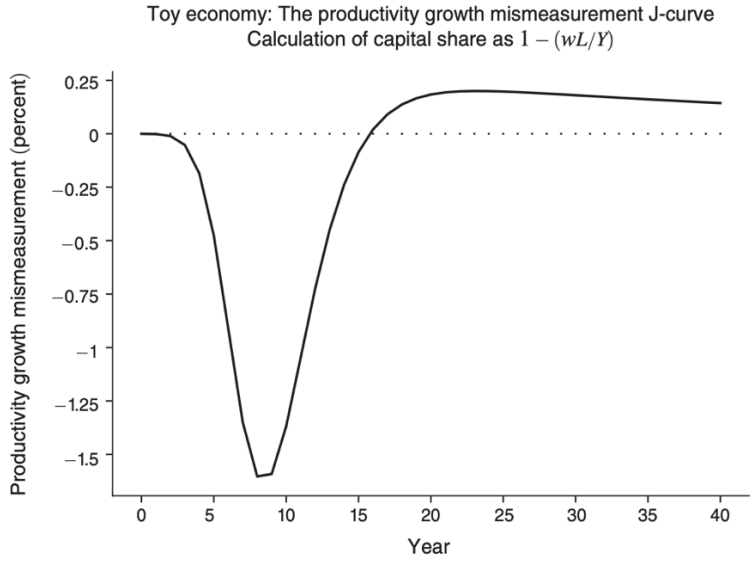


Figure 21. Productivity growth mismeasurement and the J-curve in a toy economy. Adapted from Brynjolfsson, Rock, and Syverson (2021), *"The Productivity J-Curve", NBER Working Paper No. 25148.*

The authors empirically demonstrate this J-curve phenomenon by adjusting traditional growth-accounting methods to explicitly account for intangible investments. Their analysis (figure 22) reveals that by 2017, measured TFP was approximately 15.9 percent higher when intangible capital investments were appropriately accounted for, compared to official estimates provided by the CBO and Bureau of Economic Analysis (BEA). This adjusted measure of TFP growth aligns with historical patterns observed in earlier GPTs such as electrification and Information Technology (IT). Initially, these technologies also witnessed sluggish productivity improvements, followed by rapid growth as complementary organizational changes and intangible investments matured.

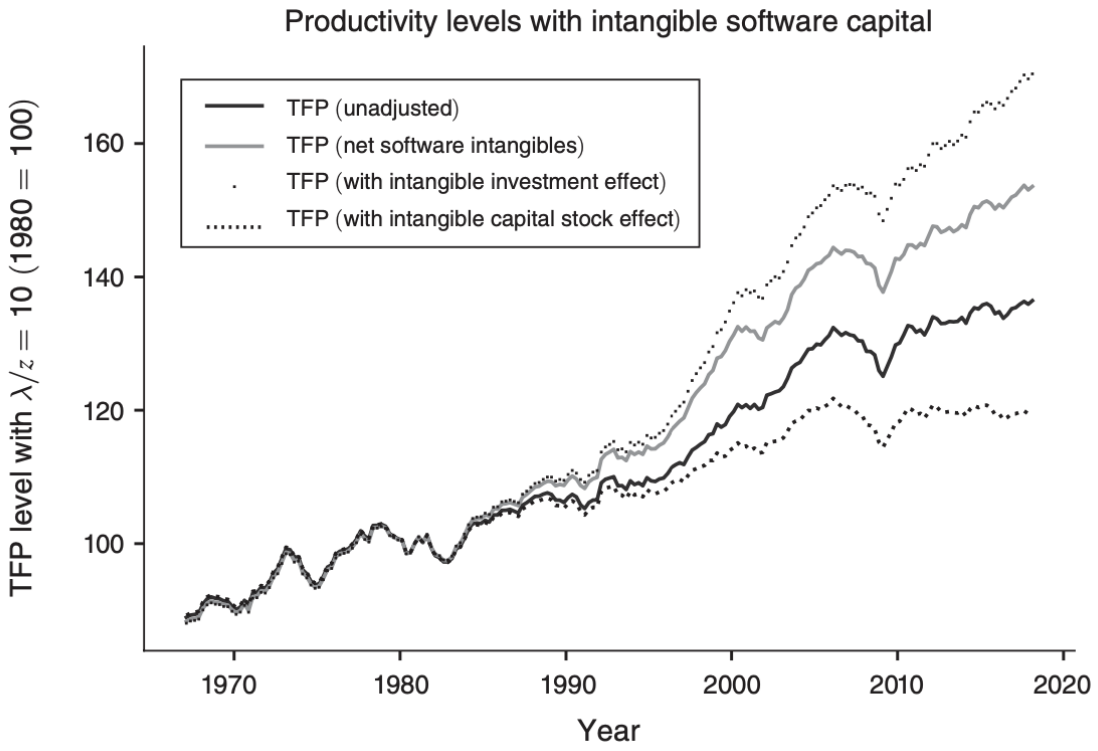


Figure 22. Productivity levels with intangible software capital. Adapted from Brynjolfsson, Rock, and Syverson (2021), *"The Productivity J-Curve", NBER Working Paper No. 25148*.

Their adjusted estimates underscore the significant gap between conventional and corrected TFP measures. Larry Summers's interpretation of persistent secular stagnation hinges heavily on observed trends of slowing productivity growth post-2000. However, Brynjolfsson et al. argue that much of this perceived stagnation does not reflect genuine structural economic decline but rather stems from a significant measurement lag. The slowdown is predominantly the downward leg of the J-curve, a period when substantial but unmeasured intangible investments obscure the true state of productivity growth. This misinterpretation implies Summers's stagnation is in part a statistical artifact rather than an enduring economic condition.

Metric	CBO Estimate	J-Curve Adjusted
TFP Growth (2004-2017)	Significantly Lower	~15.9% Higher by 2017
Potential GDP Growth	Reduced Estimates	Markedly Improved Growth

Table 8. Comparison of CBO and J-Curve Adjusted Estimates for TFP and Potential GDP Growth. Source: Adapted from Brynjolfsson, Rock, and Syverson (2021), *"The Productivity J-Curve", NBER Working Paper No. 25148*.

This contrast highlights how incorporating intangible investments significantly revises productivity and growth estimates upward, effectively undermining the foundations of the secular stagnation thesis. Recognizing productivity stagnation as primarily a measurement issue reshapes the macroeconomic policy debate significantly. Rather than resigning to persistent low growth and advocating exclusively for demand-side interventions (such as expansive monetary policy), policymakers should actively encourage investments in intangible assets, particularly R&D, training, and AI technologies. Such policy shifts can better exploit latent productivity potentials hidden by measurement lags. Consequently, targeted fiscal and structural policies facilitating intangible asset creation and diffusion emerge as powerful levers to sustain economic growth and resolve apparent stagnation, fundamentally reframing debates about low interest rates, technological progress, and long-term economic dynamism. The following chapter builds on these insights, outlining the key policy interventions required to unlock the full productivity potential of the intangible economy.

4.5 Policy Implications

In the previous chapters, we conducted a thorough and in-depth analysis of the American economy, focusing on the industrial and investment sectors, drawing on several papers that explore the topic in detail. We offered a new perspective of a dynamic economy, one that is alive, but undergoing a structural transition that requires tailored policy responses suited to the rise of intangible capital. In this chapter, we summarize our findings and propose a set of policy alternatives to Summers's singular recommendation of "more public debt and government investment" as a way to restore macroeconomic equilibrium. However, we have also seen how intangible investments respond ambiguously to monetary policy: on the one hand, their high depreciation rate reduces their sensitivity to changes in interest rates; on the other hand, low interest rates can trigger the loop illustrated in the chapter on Li (4.1). Consequently, we adopt the OECD[94]'s policy framework (see Figure 23), which emphasizes the need to adapt the financial system to an economy increasingly dominated by intangible capital, through interventions across three domains: public finance, equity markets, and bank lending. On the public side, it is essential to implement intangible-friendly stimulus programs, such as loan guarantees, targeted capital injections, and dedicated funding for startups, particularly in response to shocks like the COVID-19 pandemic. Equally important is the improvement of targeted R&D support through grants and tailored loans, well-designed tax incentives, and more effective management of tax reimbursements. Expanding support for skill upgrading through employment funds, targeted tax incentives, and managerial networks will further facilitate the transition. Access

[94] Lilas Demmou and Guido Franco, "*Mind the Financing Gap: Enhancing the Contribution of Intangible Assets to Productivity"*, *OECD Economics Department Working Paper* No. 1681 (Paris: OECD Publishing, 2021).

to finance plays a pivotal role in shaping productivity outcomes, particularly in intangible-intensive sectors. Easing financial frictions leads to disproportionately larger productivity gains where intangible assets are central. The OECD's sector-level analysis, building on Demmou, Stefanescu and Arquié[95], finds that a one-standard-deviation improvement in financial development results in a 3.5% greater productivity increase in intangible-intensive sectors compared to traditional sectors. In a well-functioning market, highly productive firms grow faster and gain market share. However, poor financial conditions can prevent this efficient reallocation, especially in intangible-intensive sectors. The OECD also finds that raising financial development from low (e.g., Latvia or Slovakia) to high (e.g., the United States) levels increases the contribution of firm-level productivity to employment growth by 60% in intangible sectors, compared to 40% in traditional ones. At the firm level, financing constraints limit the ability of companies to fund innovation projects, thereby weakening productivity growth. Regarding equity financing, it is necessary to expand venture capital markets through co-investment tools, tax incentives, cross-border facilitation, and innovative models like crowdfunding. Strengthening stock market capitalization should involve revising the tax treatment of debt, easing access to IPOs, and promoting financial literacy. On the banking side, reducing informational opacity through accounting rules and more effective financial disclosure can significantly improve credit access. Moreover, increasing the collateral usability of intangible assets, by strengthening IP rights, improving market liquidity for intangible assets, and reforming insolvency procedures, can help close the financing gap. Taken together, these policies strengthen the financial system, making it more aligned with the specific needs of an intangible-based economy. They also support both internal productivity within firms and more efficient resource allocation across firms, thereby sustaining long-term economic growth.

[95] Demmou, L., I. Stefanescu and A. Arquié, (2019), "*Productivity Growth and Finance: the Role of Intangible Assets - a Sector Level Analysis*", *OECD Economics Department Working Papers No. 1547*.

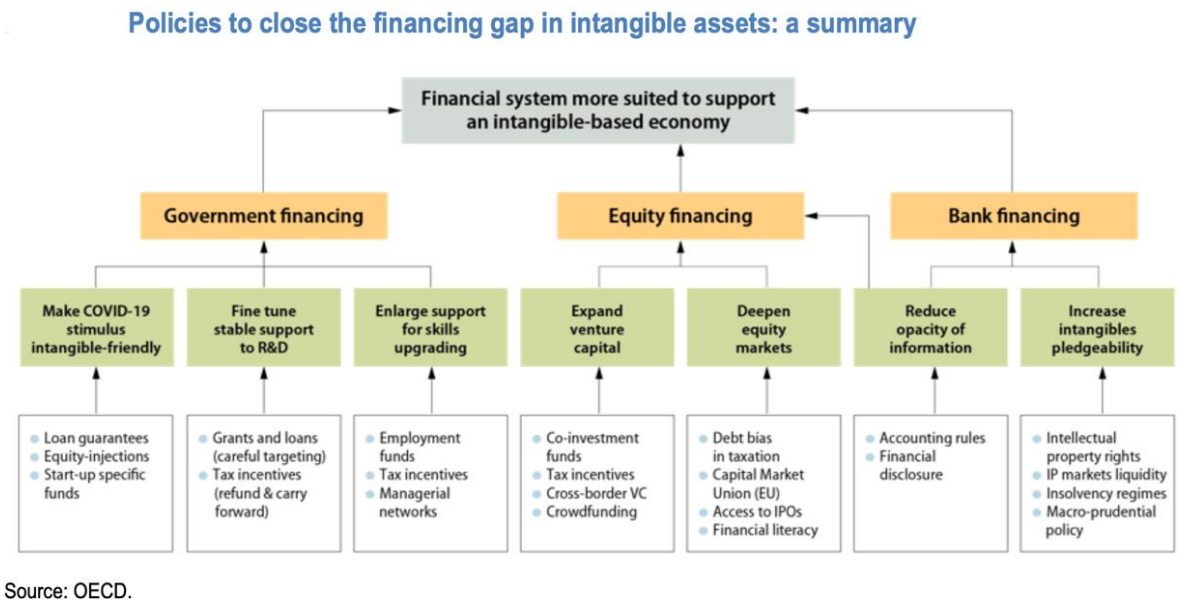


Figure 23. Policies to close the financing gap in intangible assets: a summary. Source*:* Lilas Demmou and Guido Franco, "*Mind the Financing Gap: Enhancing the Contribution of Intangible Assets to Productivity"*, *OECD Economics Department Working Paper* No. 1681 (Paris: OECD Publishing, 2021).

Conclusions

This thesis set out to examine the causes and consequences of the economic stagnation observed in the aftermath of the 2008 global financial crisis. By revisiting Summers' thesis, it has attempted to offer a broader and more articulated interpretation of the secular stagnation debate, comparing the original argument, which centers on a generalized shortfall of demand and investment alongside rising desired savings and chronically low interest rates, with an alternative explanation rooted in the profound transformations taking place in the productive structure of the U.S. economy. The analysis demonstrates that many of the stagnation indicators highlighted by Summers, such as low real interest rates, weak investment growth, declining productivity, and rising market concentration, can be reinterpreted through the lens of the rise of intangible capital. This perspective sheds light on a dynamic but structurally evolving economy, not one in terminal decline. Empirical evidence, both macro- and microeconomic, confirms this structural transition: investment has shifted from tangible to intangible assets; the relationship between interest rates and investment has partially weakened; firm behavior is increasingly shaped by liquidity constraints and financing frictions; and market concentration is growing in sectors with high intangible intensity. This new growth regime, centered on intangible capital, poses unique challenges. Many intangible assets are difficult to measure, cannot be easily used as collateral, and are highly scalable, creating new inequalities between firms and sectors. Consequently, traditional macroeconomic tools, such as monetary policy or public investments, may prove less effective, and new forms of intervention, particularly in financial regulation are needed. Addressing financing frictions, improving measurement standards, modernizing the tax system, and reforming financial institutions are all essential steps in aligning the economic system with the realities of a post-industrial, intangible-driven economy. To conclude, the words of Joel Mokyr offer a fitting reflection on the false choice between embracing innovation and fearing disruption:

"If the past is any guide, the future holds occupations that will look just as strange to us. This very human shortfall of imagination is largely responsible for much of today's pessimism…Technology is not our enemy; it is our best hope. It will never be painless, and there will always be those who draw the short straw in the vast lottery of creative destruction. But if you think rapid technological change is undesirable, try secular stagnation[96]".

[96] Mokyr, Joel. "*Secular Stagnation? Not in Your Life*". In *Secular Stagnation: Facts, Causes and Cures*, edited by Coen Teulings and Richard Baldwin, 83–89. London: CEPR Press, 2014.

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