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SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

THE SECULAR STAGNATION HYPOTHESIS IN ADVANCED ECONOMIES: LESSONS FROM ABENOMICS-ERA JAPAN

Ljubljana, November 2022   ŽIGA BUKOVEC

AUTHORSHIP STATEMENT

The undersigned Žiga Bukovec, a student at the University of Ljubljana, Faculty of Economics, (hereafter: SEB LU), author of this written final work of studies with the title The secular stagnation hypothesis in advanced economies: lessons from Abenomics-era Japan prepared under the supervision of Jože Damijan Ph.D

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TABLE OF CONTENTS

LIST OF FIGURES

ii

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AD – Aggregate Demand
AS – Aggregate Supply
BoJ – Bank of Japan
CB – Central Bank
CBO – Congressional Budget Office
CPI – Consumer Price Index
CPTPP – Comprehensive and Progressive Agreement for Trans-Pacific Partnership
EA – Euro Area
EAP – East Asia and Pacific
FTSE 100 – Financial Times Stock Exchange 100 index
FRED – Federal Reserve Economic Data
GDP – Gross Domestic Product
IMF – International Monetary Fund
IT – Information Technology
JRS - Japan Revitalization Strategy
LDP – Liberal Democratic Party
MFP – Multifactor Productivity
MENA – Middle East and North Africa
OECD – Organization for Economic Cooperation and Development
OPEC – Organisation of the Petroleum Exporting Countries
QE – Quantitative Easing

QQME – Quantitative and Qualitative Monetary Easing

R&D – Research and Development

R* – Natural rate of interest

SS – Secular Stagnation

S&P 500 – Standard & Poor's 500 index

US – United States

USMCA – United States-Mexico-Canada Agreement

TFP – Total Factor Productivity

TPP – Trans-Pacific Partnership

WIPO – World Intellectual Property Organization

ZLB – Zero Lower Bound

INTRODUCTION

Since the financial crisis of 2008 advanced economies are experiencing sluggish economic growth, low inflation rates, and large economic slack. Prolonged weakness in the aftermath of the financial crisis, as both household and corporate indebtedness remain high, resembles a historical era for the industrialized world. As renowned American economist, Larry Summers said at the 2013 International Monetary Fund (hereafter: IMF) conference: "The nature of macroeconomics has changed dramatically since the 2008 bubble burst. Now, instead of being concerned with minor adjustments to stabilize a given trend, the concern is focused on avoiding secular stagnation." (Summers, 2014a).

Since World War two, the pursuit of economic growth has been a priority for every country in the industrialized world. Not only economic growth, but also other growth narratives were observed, such as social, political, and secular. Growth obsession has often resulted in the unquestioned assumption that a country's economic expansion is essential good. Without it social progress and prosperity of an economy are impossible. However, in the last two decades, there has been a resurgence of interest in the growth critique (Jackson, 2018).

Economies are experiencing the lowest growth rates since the end of World War two, regardless of numerous fiscal and monetary stimulus. A turning point was in particular the 2013 IMF conference where Larry Summers reintroduced the term secular stagnation. The term originates from Alvin Hansen's economic review from 1938 and it resembles a decline in the rate of economic growth in advanced economies (Jackson, 2018) .

The main message of Summers's speech was that low and possibly declining growth rates may be here to stay for a longer period of time. He argued that a decline in growth rates in advanced economies is not a temporary phenomenon. Economic conditions which resulted from the financial crisis of 2008 are only partly to be blamed for low growth. Secular stagnation has its roots in factors that precede the crisis by at least several decades.

Up to this point, the US economy has been outperforming other advanced economies, however, even in the world's biggest economy, there is an ongoing discussion of the secular stagnation phenomenon. Fear and the possibility of Japan-like stagnation have been persistent in academic circles for most of the last decade. On the other hand, the Eurozone area member states have even less-favourable conditions, with the notable exception of Germany. They have been experiencing sluggish economic growth and an increasing threat of Japan-like stagnation. It is important to note that the Great Recession and Japan's Great Stagnation have similarities, however, there are also significant differences. Nevertheless, both present a prologue to a weak, secular economic environment. Even so, one must learn from another's failures and experiences. Namely, the world's most advanced economies can learn from Japan to avoid the so-called "Japanization", a period of prolonged stagnation accompanied by deflation (Wakatabe, 2015).

At the moment industrial economies are struggling to achieve simultaneous growth rates, capacity utilization, and financial stability. The problematic situation following a modern New Keynesian school of thought is most likely related to a substantial decline in the natural rate of interest in advanced economies. However, according to historical data analysis, only one country has reached the negative domain until now: Japan. To address challenges pressuring the declining natural rate of interest different policy approaches need to be taken.

The Japanese economy was one of the best performers in economic activity until the mid-1980s. However, strong economic growth was halted abruptly at the start of the 1990s. An era of stagnation shadowed past achievements of the high-income Asian economy. Subsequent decades are also known as the Lost Two Decades, Secular Stagnation, and The Great Stagnation. The stagnation of the Japanese economy is unique in its duration since it spans more than three decades, and it creates economic, political as well as social problems.

Between 1991 and 2012, the real gross domestic product (hereafter: GDP) growth averaged only 0.7 %. Prices had fallen most years since 1999 and conspicuous consumption which peaked in the 1980s has not returned to the pre-crisis years. Japanese companies, which dominated their industries from the 1950s to 1980s had to restructure and resign their leading roles. In 1989, 32 Japanese companies made the list of the world's top 50 companies by market capitalization. By 2018, most of them fall out, only Toyota Corporation remained at the top 50 list (Hausman & Wieland, 2014; Hausman & Wieland, 2015).

Many economists blamed the Japanese officials for an inappropriate and insufficiently aggressive response to the crisis and subsequent prolonged weakness. However, at the end of 2012, then-new prime minister Shinzo Abe vowed to end the economic stagnation of Japan with his economic program often in literature called Abenomics. The program consists of simultaneous approaches in different economic fields, such as expansionary monetary policy, large fiscal stimulus, and much-needed structural reforms for the Japanese economy. However, if one wants to understand the significance of Abenomics, it is vital to start several decades in the past and to understand Japan's Great Stagnation. Did Abenomics revive Japan's growth, and can other advanced economies learn from their approach as they close to the negative domain of natural rate of interest?

The purpose of this thesis is to analyse the secular stagnation hypothesis in industrialized economies. Furthermore, the thesis will aim to explore both the cause of low growth rates in advanced economies and attempts of reviving growth rates in Japan's economy. Data will focus on the economies of the United States, Eurozone member countries, and Japan. The primary interest of the thesis will be examining the rate of interest and its decline, what factors are exhibiting downward pressure on it, and if there exists a macroeconomic policy to upturn it back to a positive domain. Causes of the natural rate decline can be observed in multiple fields, such as demographics, a slowdown in productivity growth rates, factors affecting real interest rates, inflation, inequality, a slowdown in investment intensity by both households and corporates, etc.

The main research questions this master's thesis aims to answer are:

1. Are advanced economies headed towards Japan-type secular stagnation?
2. Amid secular stagnation, were policies of Abenomics successful in reviving growth?

To answer these questions, the study shall look at the dynamics of different economic fields and analyse patterns/trends that may indicate that the United States and/or the Eurozone member states are following Japan's fate of prolonged stagnation. Furthermore, the thesis will quantitatively analyse Japanese indicators if the policies of Abenomics reversed the trends. Time series analysis with tests of structural breaks will be observed in GDP growth, inflation, gross fixed capital formation, multifactor productivity, and any other relevant indicator. Moreover, analysing Japan's response to secular stagnation could give an insight into what policies are effective and which are not recommended in case of slipping into the long-term stagnation period. Limitations in analysing and modelling secular stagnation hypothesis and its causes are found in used econometric models. Furthermore, complexity of the topic and studied components further limit ability to answer certain research questions.

The structure of the thesis will go as follows: The second section of the thesis gives a historical overview of low growth and the evolution of the concept of secular stagnation. The third section explores evidence of secular stagnation in today's most developed economies. The fourth section focuses on a country that is already in the secular stagnation domain: Japan. This part will cover the analysis of the Japanese economy, mainly the period of the Great Stagnation. The focal point will be on assessing the new policy package initiated by Prime Minister Shinzo Abe. Has Abenomics ended the long-lasting stagnation in Japan? The last section summarizes the main findings and concludes the thesis.

1 SECULAR STAGNATION: HISTORY AND EVOLUTION OF THE CONCEPT

This chapter aims to encompass the theory of SS, its determinants, and its relevance in today's advanced economies. First, it covers an overview of economic growth, more specifically, how growth rates evolved in the past. Afterwards, the SS[1] hypothesis is explained and analysed on the economies of the United States, Euro area member countries, and Japan. There is an extensive number of publications dealing with the above-mentioned topics, however, only the most comprehensive and relevant ones will be considered in the thesis. This chapter proposes to overview both demand and supply side arguments in detail and refers the reader to seminal papers for any empirical models.

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[1] The term secular stagnation (SS), long-term stagnation, or simply stagnation is used interchangeably throughout this master's thesis. Unless specified differently, they refer to a longer period of stagnation and are not used to describe a short-term contraction or the through of a business cycle.

History of Secular Stagnation. Macroeconomics before the 2008 financial crisis, was different from what it presents today. In the early 2000s, macroeconomics was primarily about applying monetary policies to reduce the range of fluctuations in a given trend, while at the same time maintaining price stability in the economy. On the other hand, today we want to achieve minimum fluctuations around a satisfactory trend. The efficiency of monetary policy has become questionable, especially given that economies are closing on the zero lower bound on interest. With those remarks, Larry Summers started the 2013 IMF conference, where the term Secular Stagnation (SS) re-emerged (Summers, 2014a).

Analysis from the web of science shows an increased interest in the usage of the term after the conference. In 2013 there was one publication and 16 citations related to the term secular stagnation. However, publications and citations grew exponentially since the speech and peaked in 2019 when there were 46 publications and 306 citations on the topic. The two most cited works of literature are from L. Summers and R. Gordon who took different approaches to explain the SS. The former explains from a demand point of view, and the latter from a supply-side view.

In today's literature, we can find numerous mechanisms and definitions of secular stagnation. Some advocates such as Larry Summers and Paul Krugman emphasise the importance of inadequate demand. Prolonged demand weakness in the economy is undermining potential output and discourages private investments, all of which are largely affecting growth rates. They even go further and argue that monetary policy is unable to stimulate demand sufficiently enough to achieve adequate growth rates. On the other hand, others focus on the determinants of long-run growth. Robert J. Gordon for example argues that the potential growth rate of today's advanced economy is declining due to demographic shifts, lower returns on education and possibly even slower technological progress (Rawdanowicz, Bouis, Inaba & Christensen, 2014).

When the topic of SS is debated these days, Alvin Hansen and Larry Summers are the economists who typically come to mind. However, the issue is not limited to the two of them. In the past decades, various economists studying the history of economic thought have been involved in researching and debating on stagnation-related topics. Stagnation can be seen as a parallel question of economic growth theory, and it dates back to the beginnings of economic science. It even reaches back to Adam Smith and his classical peers. Indeed, there are several stagnation theories that have been adopted to prevailing economic circumstances over the past centuries, with each highlighting different causes and mechanisms at work (Anselmann, 2020; Jackson, 2018).

Although it may be assumed that the most frequently debated theories are superior to others and that they describe the economic circumstances most accurately, Heinz Kurz from the University of Graz notes that: "The selection process of ideas or theories in economic science is for various reasons, incomplete." New ideas, published at the wrong time may remain largely unnoticed. For example, the secular stagnation hypothesis developed by Josef Steindl

in the 1950s suffered a similar fate. The principal idea of his theory is a valuable addition to present-day stagnation debates, particularly his insights on the role of income distribution in the economy (Anselmann, 2020).

The thesis will focus on the secular stagnation hypothesis which was first coined by Alvin Hansen in his presidential address to the American Economic Association in the 1930s. At that time, many economists feared that the US economy will hardly recover from the devastating impact of the Great Depression. The prolonged recession which followed the 1929 financial crash was interpreted as a crisis of capitalism. During the 1940s and 1950s, many economists studied the historical, as well as theoretical causes of why capitalism generates scarcity, resource depletion, deflation, increased inequality, and economic shocks like asset bubbles, the banking crisis, and high levels of debt. However, discussions around the secular stagnation hypothesis quickly waned as the world entered a period of rapid economic growth after World War Two. Apart from a few enthusiasts in the field of history of economic thought, secular stagnation doctrine was no longer taught until the early 2010s (Dufrénot & Rhouzlane, n.d.; Jackson, 2018).

Since the topic of SS affects many economic fields, it has an interesting feature in economic science. It offers a wide diversity of arguments from different schools of thought. For example, Neo-Keynesian economists are interoperating long-term market failures through the diversification of savings and investment behaviour. Unbalance between them, e.g., excess savings and low investment rates are responsible for low long-term interest rates in the economy. On the other hand, the neo-classical school of thought argues that secular stagnation predominantly reflects a low long-term steady-state equilibrium. Lower equilibrium in industrialized countries can be explained by prolonged productivity gains and an ageing population. Economists within the Schumpeterian tradition claim that SS is a transitional state, which reflects a situation of creative destruction. Finally, the New-Keynesian approach argues that long-term stagnation comes from price rigidities and failures in the financial markets (Dufrénot & Rhouzlane, n.d.).

1.1 Historical Overview of Low Growth

Economic growth is an important indicator, that highly correlates with people's living standards. Namely, the higher the growth rates, the better welfare the population has in an observed economic system. However, the correlation between economic growth and individuals differs across the system as increased growth enables certain individuals to progress ahead of others. As a consequence, the financial gap between individuals increases which in turn drives not only economic growth further but also makes inequality among individuals more profound. Hence, growth rates describe the quantity and quality of economic goods and services that subject in an economic system produce and consume. On the other hand, some economists, such as Benjamin Morton Friedman (2005) described economic growth in his book The Moral Consequences of Economic Growth, as a tool that

fosters greater opportunity, tolerance of diversity, social mobility, and commitment to democracy and fairness. He, therefore, points more towards stimulating moral and social impact through economic growth. However, what do we know about the historical evolution of economic growth?

Economic history studies have shown that there was very little economic growth before the first industrial revolution. Before the second half of the eighteenth century, the average person lived in extreme poverty and societies achieved very little to noneconomic growth. For example, Broadberry, Campbell, Klein, Overton and van Leeuwen (2015) conducted extensive research on Britain's growth rates from the 13th century up to the turning point of the first industrial revolution in the late 18th century. Britain's per-capita income growth rate averaged only 0.2 percent per annum. Average incomes in Great Britain between 1250 and 1650 were £1,051 measured in today's prices (Broadberry, Campbell, Klein, Overton & van Leeuwen, 2015; Gordon, 2018; Roser, 2013).

It was only after the 1650s that the economies broke out of the Malthusian Trap. Consequently, incomes were not determined by the size of the population anymore. Malthus's concerns about population growth were proven wrong soon after his 1798 release of An Essay on the Principle of Population. Although he was wrong about his time and the future, he correctly identified the dynamics of the past. World characteristics before 1798 were Malthusian and population increases were correlated with declining incomes and consequently low growth economies. However, what Malthus did not anticipate was that increasing economic output will decouple from the population dynamics. New inventions gave birth to technologies, which transformed the dynamic of GDP growth (Roser, 2013).

Countries in the late eighteenth century started to transform from agrarian and handicraft economies to ones dominated by industry. Technological changes such as new materials, usage of new energy sources, machines, and novel organization of work known as the factory system transformed the economic, cultural, and technological landscape of Europe and other advanced economies. Consequently, increases in productivity and the produced output led to rapid changes in growth rates. Most advanced economies at the time increased growth rates from close to 0 % to a range of 1−1.5 % per year within 50 years from the start of the revolution. Not only the first industrial revolution (1750−1830), but also the second industrial revolution (1870−1910), and the IT revolution (1950-present) disrupted the growth rates of advanced economies. However, because economic historians generally define their research subject as economic behaviour prior to the most recent fifty or sixty years, they have neglected the gradual deceleration of economic growth in advanced economies that began in the late 1960s and has become more pronounced since the last financial crisis of 2008 (Gordon, 2018; Roser, 2013).

Industrialized economies witnessed a gradual rise in the pace of economic growth since the 1750s. The positive trend continued not only in subsequent decades but extended into the following centuries as well. Furthermore, the change in trend acceleration after World War

One is one of the most interesting occurrences before us. Solomon Fabricant, an American economist wrote in an introduction to Kendrick's (1961) magisterial compilation of data on output and inputs: "There is little question about it. The growth rate of productivity witnessed by the generation born after World War One has been substantially higher than the rate experienced in the decades before the war." (Kendrick, 1961)

In the 1960s, the decade when Kendrick's book was first published, advanced economies grew at a staggering pace. The United States' gross domestic product was expanding at close to 4% per year and labour productivity growth rates advanced by more than 3 % per year. Not only the US but also Western European countries experienced average annual real GDP growth rates close to 5 %. Japanese economy boomed even greater, reaching growth rates as high as 9 % per annum. Similar developments also hold for measures in GDP per capita growth rates in observed countries. However, the decade that Kendricks's book was published also appears to be the last of the five impressive decades in which advanced economies thrived in economic activities (Anselmann, 2020; Gordon, 2018; Kendrick, 1961).

A decline in growth rates has slowed in two phases. The first slowdown started after the 1970s energy crisis and the second one after 2007. When taken together, the two phases reduced the annual growth rates of GDP in the United States from 3.6 % from the period of 1920 until 1970, to a mere 2 % during 1980−2020. Similar trends can be observed in the economies of Japan, the UK, and the present Euro area member states. Comparing the post-second world war period from 1949−1971 and 1971−2006, the average annual real GDP growth rate in Western European countries more than halved. A slowdown in growth rates was even more profound in Japan, where the average annual real GDP growth rate diminished from 9.3 % (1949−1971) to a mere 3 % (1971−2007). Similar trends are observed in the average real GDP per capita indicator (Anselmann, 2020).

The slowdown in growth rates that have taken place during the past decades is also presented in Figure 1, which shows centred three-year moving averages of annual real GDP and real GDP per capita growth rates spanning from 1961 until the most recent year 2020. Setting apart the cyclical fluctuations, the economic growth rates have gradually decreased in all selected economies. For example, in Japan, the 1960s-decade three-year moving average annual real GDP growth amounted to more than 10 %, while in most recent years (the 2010s) it has reduced to 0.6 %. Although Japan is a unique example regarding the volume of growth rate reduction, similar trend intensities can be observed in the US and the Euro area economies. The United States three-years moving average annual real GDP growth rate in 1960s amounted to more than 4.5 %, while in 2010s it averaged less than 1.7 %. Equivalent developments can also be observed for the three-years moving average annual real GDP per capita growth rates.

As can be seen from Figure 1, economic growth decreased considerably during three occurrences:

- First, during the energy crisis of the 1970s, when the Western economies faced a short supply of petroleum as well as commodity's elevated prices. Japan's real GDP growth rate decreased by 56 % from 12.4 % in 1969 to 5.2 % in 1979.
- Second, after the Japanese asset price bubble of 1991 when the Japanese growth rate slipped below 1 % (the US and EA were not affected).
- And thirdly, after the 2008 financial crisis. The 2008 bursting of the real estate bubble in the United States had spill-over effects around the world, which means all observed economies shared the same fate and reached negative growth rates in 2009.

Although economic performances have been relatively strong in the past several years (excluding the Covid-19 pandemic), economic growth has remained low when compared with historical standards.

Figure 1: Average annual real GDP growth rates (left) and average annual real GDP per capita growth rates (right) – cantered three-year moving averages, 1961−2020
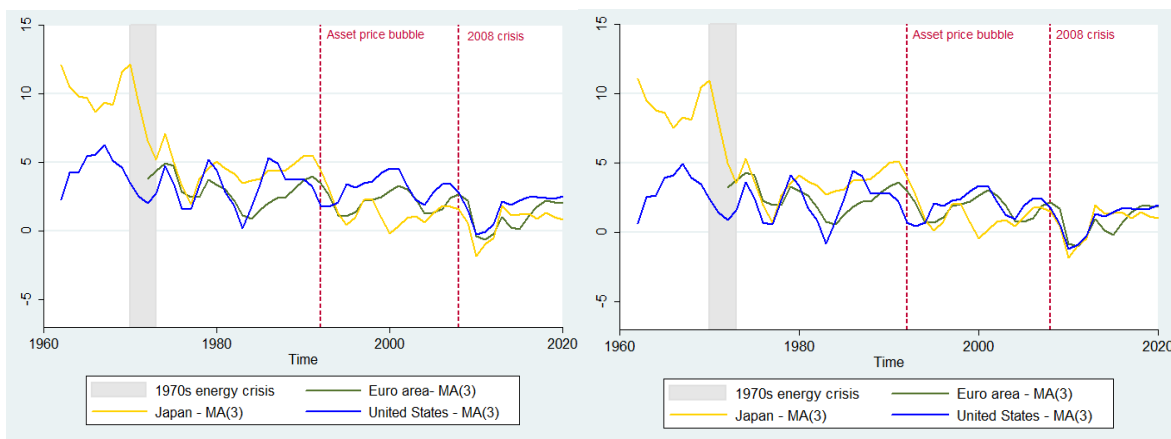
Adapted from World Bank (2022); OECD (2022).

Economies observed in Figure 1 have also been underachievers among the list of other advanced economies. On the left-hand side of Figure 2, there is a comparison of the centred five-year moving average annual real GDP growth rate between OECD countries (excluding Japan, the US, and the EA member states) and the five-year moving average growth rate of observed countries (Japan, Euro area member states, and the US). Let us assume that Economic system 1 consists of countries Japan, EA, and the US, and on the other hand Economic system 2 are remaining OECD countries.

As we can notice, the combined economic systems of Japan, the US, and the EA (Economic system 1) achieved lower growth rates in two occurrences. First, after the first oil shock in 1973, and second, after the Japanese asset price bubble burst in 1991. On average the economies of an Economic system 1 which includes Japan, the US, and the EA grew 40 % lower than their peers on the OECD list of advanced economies since the 2008 financial

meltdown. Figure 2 (left) indicates that the slowdown in economic advance can be more severe in some countries than in others even in high-income ecosystems, such as OECD.

Figure 2 is also providing us with a clear understanding of broader developments in the growth rates. The OECD countries are in a continuing downtrend since the 1970s, while MENA (the Middle East and North Africa) and EAP (East Asia Pacific) countries are in an uptrend regarding the annual growth rates. Data on MENA and EAP countries is excluding high-income countries in order to show how the state of development of an economy also affects the growth rates. Before Covid-19 both MENA and EAP countries achieved on average three times higher growth rates than advanced economies of the OECD.

With Figure 2 we have shown that not only are there differences in the growth rates between low and/or middle-income countries and high-income countries, but also considerable differences among high-income countries. Developments in some major advanced economies have therefore evoked various debates regarding secular stagnation or more commonly known as long-term stagnation. Economists studying stagnation and growth theories have been increasingly afraid that SS may become a real issue to some OECD countries, most notably the euro area member states, and on some occasions also the United States.

Figure 2: Average annual real GDP growth rates for Economic systems 1&2 (left) and annual real GDP growth rates for OECD, MENA, and EAP − cantered five-year moving averages, 1961−2020
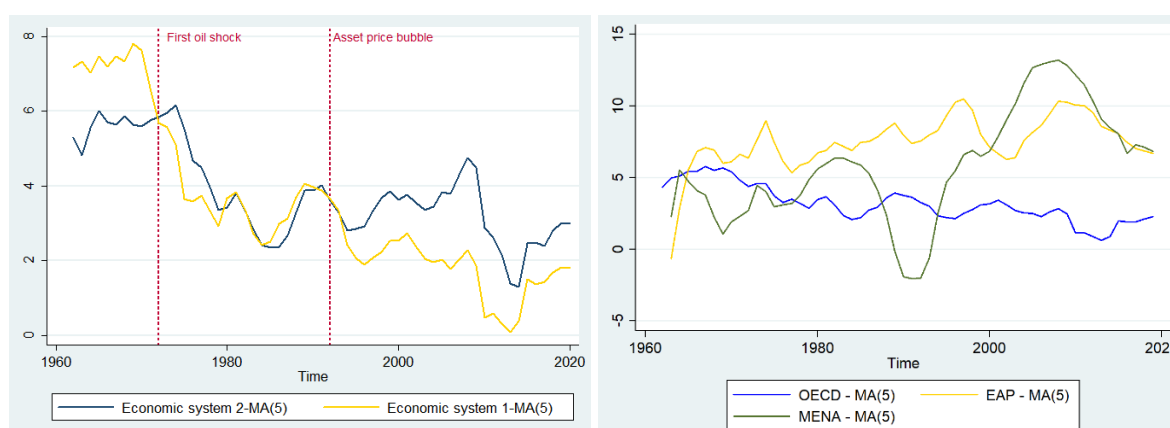
Adapted from World Bank (2022); OECD (2022).

Although economic performances across high-income countries have picked up since 2016 onwards, the critical question of whether secular stagnation is a threat to advanced economies is still relevant. A clear, precise, and universal definition of economic stagnation and consequently the secular stagnation phenomenon is a difficult endeavour even for experienced economists. In the next subchapter, we will dive deeper into the hypothesis and look for evidence of its existence.

1.2 Secular Stagnation Hypothesis

Stagnation hypotheses have long been present in economic science. From the beginnings of classical economics until today, there was an idea that advanced market-oriented economies might be prone to long-term (secular) stagnation which has a characteristic of going beyond a usual cyclical downturn. Many prominent economists tried to look for answers to both demand and supply side factors of the economy. However, the most common secular stagnation hypothesis was coined in 1939 by American economist Alvin Hansen. And although John Maynard Keynes researched the issue of secular stagnation for a brief time, it was primarily A. Hansen, often called American Keynes who took the idea to further advance in the late 1930s and early 1940s (Anselmann, 2020; Tomeczek, 2020).

Hansen developed the term secular stagnation and its underlying concept through several books and scientific papers; however, it was in an essay published in 1934 that the term was first mentioned. Presenting his presidential address Economic Progress and Declining Population Growth, which was inspired by the essay Some Economic Consequences of a Declining Population written by J.M. Keynes he stated that economic progress is mainly contingent on three exogenous factors. Namely, the technological change, the growth of population, and the availability and discovery of potential new territories and resources. He argued that during the 19th and early 20th centuries the prosperity of these exogenous factors provided the most advanced economies at a time with a wide range of opportunities for real capital investments (Anselmann, 2020).

At the heart of his arguments is the economic boom of the United States before the Great depression. The expansion into the western frontier in the late 19th and early 20th century and the following urbanization required large capital expenditures. In a similar way, strong population growth disproportionally raised the demand for both capital-intensive goods as well as housing. He suggested that the opening of new territory and the growth of population in the United States were mutually responsible for nearly half of the total volume of new capital formation in the second half of the 19th century. He made similar conclusions for foreign countries, such as England where ¼ of total capital accumulation was invested into new territories, and 1/7 in those of France. Not only population increases and new territory but also investments in technological advances stimulated economies at the time. Radical ideas in various areas gave rise to new industries, such as electricity, railroads, automobiles, advancement in logistics and shipping, etc. He concludes that due to the combined impact of all three exogenous factors, western economies saw a period of rapid growth and expansion in the late 19th and early 20th centuries (Hansen, 1939; Hansen, 1941).

Prior to 1929, the underemployment of productive resources had never presented a serious issue. Economies, apart from typical business fluctuations, had grown rapidly without any threat of prolonged stagnation. However, it is important to note that according to Hansen secular stagnation had already shown its existence in the late 19th century. For a brief time, from 1873 to 1896, the so-called Long Depression when strong growth in the railroad

industry was halted and European demand for American farm products significantly dropped resulted in a worldwide price and economic recession. Nonetheless, apart from some business cycle troughs, economies were booming and living standards in western economies improved considerably (Hansen, 1939).

Nevertheless, this favourable economic environment could not be taken for granted. Researching the secular stagnation phenomenon in the late 1930s, convinced Hansen that the United States and their advanced peers had already gone through deep structural changes. The second half of the nineteenth century witnessed a unique period characterized by thriving exogenous factors. Hence, massive opportunities for profitable capital investments were available. With the end of the First world war, however, these favourable economic conditions seemed to change. Factors Hansen was primarily concerned about the population growth and the future availability of new land and resources. He argued that these two exogenous factors were no longer able to stimulate sufficient investment ratios to maintain a booming environment. As the population stabilizes, the economy changes, and consequently output changes. When societies start to age, both consumption and investment rates stop growing. Furthermore, without new territory and resources, countries are unable to push their technological and consequently economic advances to new levels (Hansen, 1939; Hansen, 1941).

He believed that economic theory needs to adapt its perspective when studying the factors of long-run economic growth. In his book, he wrote: "Not only until the problem of full-employment of our productive resources from the long-run, but secular standpoint was also upon us, were we compelled to give serious considerations to those factors and forces in our economy which tend to make business recoveries weak and anaemic and which tend to prolong and deepen the course of depression. This is the essence of Secular Stagnation – sick recoveries that die in their infancy and depressions which feed on themselves and leave a hard and seemingly immovable core of unemployment." (Hansen, 1939)

Historical analyses have shown that the business cycle theory was ill-equipped to confront the effects of the Great Depression. The main solution advocated by both J.M. Keynes and A. Hansen to battle the effects of a prolonged depression was the highly active role of the state in order to sufficiently increase public expenditures. Hence, long-run, secular stagnation as a concept belongs to the demand side of economics. Nonetheless, not every economist agrees with such a concept. Some researchers point their attention towards the supply-side factors rather than demand-side. Therefore, to better understand the wider picture of SS, we will explain both concepts in the next subchapters.

1.2.1   Modern Demand-Side Hypothesis of Secular Stagnation

Most of the economists studying the SS theory have concluded that demand-side factors are causing prolonged weaknesses in the economies. The new secular stagnation hypothesis, which is based on Alvin Hansen's studies and most intensively analysed by L. Summers and

P. Krugman is positioned within a classical IS-LM framing, with the Wicksellian natural interest rate determined at the intersection (R*). Summers, therefore, argues that economies have experienced continuous downward pressure on the R* because of the downward pressure by both IS and LM curves. One presents the demand for investments and the other the supply of savings. Furthermore, the changing behaviour of major firms, which in modern times do not rely on vast amounts of physical capital anymore, in conjunction with the falling relative price of investment goods compared to consumption goods weaken the demand for investments. Overall, companies need a significantly lower amount of savings to support the desired aggregate amount of investments. On the other hand, demographics and income inequality boost the supply of savings. Elderly people and recipients of higher capital incomes have a higher marginal propensity to save than their peers. Such circumstances, therefore, increase the availability of savings in the economic system. The overall effect of higher savings supply and lower demand for investments puts remarkable pressure on the R* that eventually results in its fall below the zero line (Figure 3) (Bucchianico, n.d.; Tomeczek, 2020)

Figure 3: Negative natural interest rate (R) resulting from lowering the investment demand and increasing saving's supply*
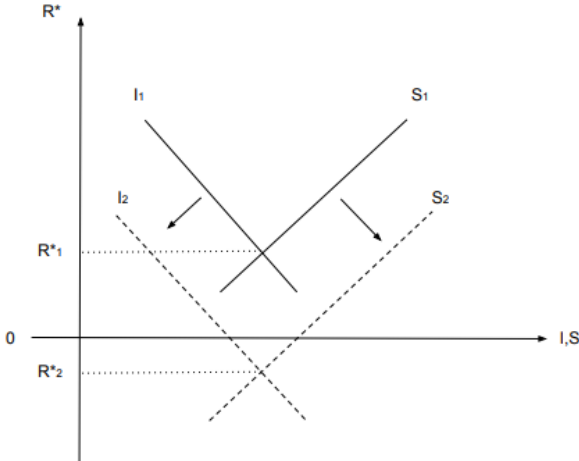
Source: Own work.

The new secular stagnation hypothesis was coined by L. Summers and build on the findings of A. Hansen focuses on the equilibrium of R*, deflation, and the demographic slowdown. A. Hansen's hypothesis from the 1930s focused particularly on fiscal policy, while its modern definition introduces important monetary policy elements. Summers argues that in an environment where R* becomes negative, the Central Bank's (CB) monetary policy loses its capability to react. The central bank can control the nominal interest rate, however, in the case of negative R*, the nominal rate is constrained by the zero lower bound (hereafter: ZLB). The normal agenda in CB's policy would be, given inflation expectations, to lower the nominal interest rate in order to balance the market real interest rate. The rigidity of the nominal interest rate, therefore, reduces the effectiveness of CB's policy. Hence, the

effective level of output will consistently be lower than its potential. To summarize in the words of Summers: "if one assumes that investments are a decreasing function of the interest rate and that savings, on the other hand, are an increasing function of the interest rate and that the level at which equilibrium with full employment takes place requires a negative nominal interest rate, then the adjustment will take place in the form of a lower level of output, and that lower level of output may continue indefinitely." (Summers, 2015b)

In the demand-side secular stagnation framework, the negative R* and the ZLB are responsible for a persistent shortage of aggregate demand, and thus weak economic environment. While A. Hansen argued that SS results from an ageing population, a decrease in new territories and resources, and the slowdown in technological progress, L. Summers and P. Krugman add several new forces at play. For example, additional secular forces being observed are the reduction of debt-financed investments and cheaper capital goods, which reduce the propensity to invest. Furthermore, income inequality increases the propensity to save among wealthier classes. Figure 4 presents a general reconstruction of the logic behind the demand-side secular stagnation theory (Bucchianico, n.d.):

Figure 4: Visual reconstruction of demand-side Secular Stagnation theory
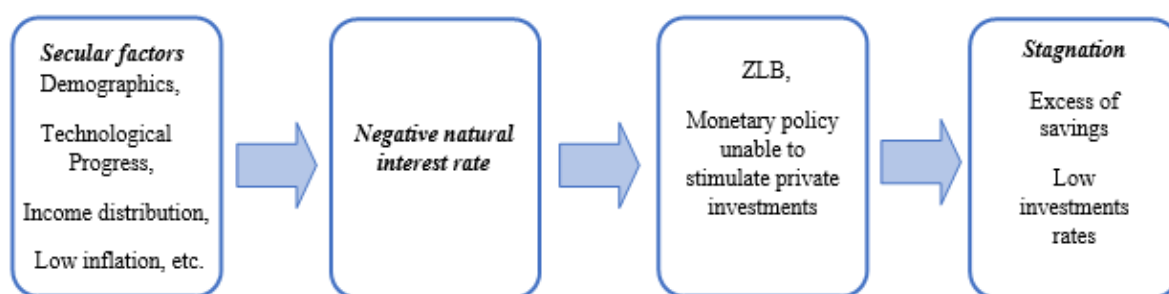
Adapted from Summers (2015).

Steps 3 and 4 in Figure 4 are essential in understanding modern demand-side SS hypothesis. While L. Summers identified the secular factors and the concept of negative R*, it was P. Krugman who extensively researched the theoretical ramifications of a liquidity trap and the ZLB. With increasing downward pressure on R*, CBs are soon forced to respond by lowering the real interest rate. However, sooner or later they will be unable to keep up because of zero lower bounds. Therefore, the only way to lower the real interest rate in an economy where the liquidity trap is a threat is to increase inflation. Although it sounds simple on paper it is a remarkably difficult challenge – as the monetary policy of Japan has shown us in the past decade. In the most well-known model of SS, Eggertsson, Mehrotra and Robins (2017) show that without the active role of government the economy is unable to escape the zero lower bound (Eggertsson, Mehrotra & Robins, 2017; Teulings & Baldwin, 2014; Tomeczek, 2020).

1.2.2   Supply-side Hypothesis of Secular Stagnation

I will conclude the theoretical section of the SS hypothesis by briefly presenting the supply-side hypothesis of secular stagnation. Opposite to the demand-side secular stagnation hypothesis, this version of the hypothesis focuses on the supply-side factors influencing the dynamics of the potential output. Supply-side economists agree there is no need to resort to the negative R* and the zero lower bound to explain forces of stagnation. They argue it is sufficient to analyse the demographic factors along with technological progress and human capital accumulation. The leading economist researching the supply-side SS theory is Robert J. Gordon. During modern debates around SS, he is the main counterpart to Summer's demand-side theory. However, equally, Summer's demand-side approach is based on historical theoretical concepts of A. Hansen, Gordon's supply-side stagnation approach has a much longer and wider tradition in the history of economic thought.

Supply-side stagnation hypotheses were already researched by classical economists such as Adam Smith, Thomas R. Malthus, John S. Mill, and David Ricardo. Moreover, in the 20th century Joseph A. Schumpeter, Jean Fourastie, and William J. Baumol appeared as leading critics of Hansen's demand-side stagnation hypothesis. They were not convinced that changes in the availability of new territories and resources, population growth, and the absence of radical technological progress contributed to the weak economic performance in the 1930s. While Schumpeter described the gradual disappearance of entrepreneurship as one of the leading factors for prolonged stagnation, Fourastie and Baumol addressed sectoral changes as a possible cause of weak economic growth. They categorized three different economic sectors, each based on differences in their technological progress and consequently their labour productivity growth. Both argued that stagnation tendencies appeared when a structural shift of output and employment moved towards sectors with low productivity growth (Anselmann, 2020).

Studying the theories of J.A. Schumpeter, J. Fourastie, et al. would without doubt be an interesting quest, however, outside the scope of this paper. This subchapter will therefore focus on the modern contemporary hypothesis of Robert J. Gordon. As a modern supply-side stagnationist he believes that the actual national output growth of advanced economies has been decreasing because of declining potential output. He argues that in the long run, the evolution of potential output is approximated by its actual developments in the economy. Moreover, such evolution can also be described by the following equation (Anselmann, 2020; Gordon, n.d.):

$$\hat{Y} = \widehat{Y/H} + \hat{H} \qquad (1)$$

Real output growth ($\hat{Y}$) is equal to the sum of the real output growth rate per hour ($\widehat{Y/H}$) and total hours worked ($\hat{H}$). The growth rate of real output per hour can also be described as the labour productivity in the economy. Furthermore, he addresses not only the developments of potential real output growth but also the average living standard measured

by real output per capita growth. If we divide the equation 1 by N the new equation reads: real output per capita growth $(\widehat{Y/N})$ is equal to the growth in labour productivity $(\widehat{Y/H})$ plus growth in hours worked per worker $(\widehat{H/N})$ (Gordon, n.d.; Gordon, 2014).

$$\widehat{Y/N} = \widehat{Y/H} + \widehat{H/N} \tag{2}$$

When analysing the dynamics of potential real output (per capita) growth during the last decades, Gordon argues that the most important indicator which changed is the labour productivity growth $(\widehat{Y/H})$. Although his studies are predominantly focused on the US, similar trends of declining labour productivity growth rates can be observed in other advanced economies. Declining trends have been a consequence of two factors. Firstly, the demographic trend, where the ageing population and slump in labour force participation rates affected the overall productivity rates in the economy. The ageing population tends to reduce the growth rates of working hours, thus putting downward pressure on real output per capita growth rates. And secondly, the total factor productivity (hereafter: TFP) growth slowdown. Within his analysis, he points out that average total productivity in the US grew at considerably higher rates between 1920 and 1970 than it has in the decades before and thereafter. Similar observations will be analysed in the next chapter, to see if this trend continues throughout the advanced world (Gordon, n.d.; Tomeczek, 2020).

Studying the economy of the US, he finds that average annual labour productivity growth from 1890 to 1920 equals 1.5 %. Similar growth rates can be found in the period between 1970−2015, where annual labour productivity amounted to 1.63 %. On the other hand, in the period in between, therefore the years from 1920−1970 productivity growth rates amounted to 2.83 %. Such circumstances can be traced back almost exclusively to higher growth rates in TFP in the middle period between 1920−1970. He argues that the slowdown in TFP was caused by the simultaneously weakening effect of technical progress on productivity growth rates and the diminishing return on education. Education plays an important role in productivity growth rates since increases both labour quality and the efficiency of hours worked. Large-scale transition to universally educated societies has been mostly completed by the end of the 1960s. Moreover, as pointed out by the OECD 2017 report, educational progress in advanced economies is missing educational development targets for years now. Human capital accumulation is therefore negatively affecting the real output growth rates (Anselmann, 2020; Gordon, n.d.; Tomeczek, 2020).

Supply-side stagnation theory does not recognize excess savings and low demand for investments as secular factors but is rather interested in the dynamics of potential output. Much slower growth of potential output is the cause of prolonged stagnation. Figure 5 presents a general reconstruction of the logic behind the supply-side secular stagnation theory:

Figure 5: Visual reconstruction of supply-side Secular Stagnation theory
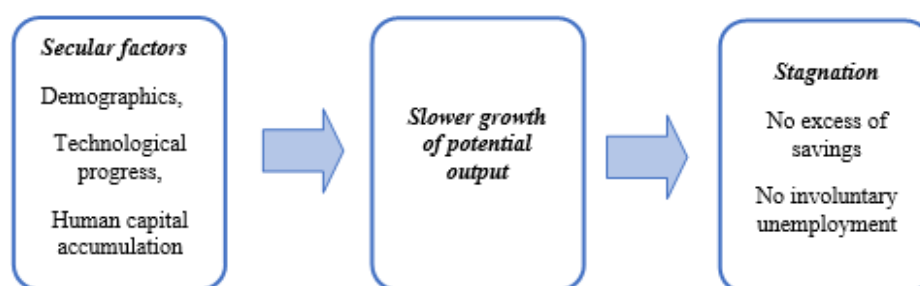
Adapted from Gordon (n.d.).

Secular stagnation is evident in both demand-side and supply-side measures of economic performance. Slower growth in potential output, which is attributed to the supply-side SS theory, originates not only from slower productivity growth but also from slower population growth and decreasing participation in the labour force. In turn, such circumstances reduce the need for capital formation in the real economy. Declining capital formation affects aggregate demand (demand-side theory), which strengthens the decline in productivity growth. Hence, secular stagnation is not only a one-sided phenomenon but combines demand and supply-side factors.

2   SECULAR STAGNATION: EVIDENCE FROM ADVANCED ECONOMIES

2.1   Analysis of Secular Stagnation in the United States, Eurozone Member States and Japan

The most frequently studied empirical case of the secular stagnation phenomenon is the economy of Japan after 1991. Prolonging economic weakness that Japan has been experiencing since 1991 could very well be the future of some advanced economies, namely the Eurozone member states and the US. Many studies, including the works from the OECD and European Central Bank (hereafter: ECB), are increasingly interested in researching the topic. For example, Rawdanowic, Bouis, Inaba, and Christensen from the OECD's economic department are only the latest to identify that Eurozone economies are especially vulnerable to SS. While traditional monetary policy is losing momentum, an increased inflation rate target has emerged as one of the leading solutions to the SS and its ZLB problem. Recent loose monetary policy by both ECB and the Federal Reserve Board (FED) therefore, indicate that SS is being treated as a serious and immediate problem on both sides of the Atlantic.

This subchapter will study the evidence of SS in the observed economies and look for origins in various economic indicators. Mainly, I will compare the economy of Japan with the US and EA economies to draw parallels regarding the potential economic weakness.

2.1.1   Evidence of Secular Stagnation

For the empirical analysis, I will look at the economies under the euro monetary system and the United States. In some cases, the EA will be additionally divided by the five biggest economies, namely Germany, France, Italy, Spain, and the Netherlands. Together these countries present more than 80 % of the EA population and its nominal GDP according to 2019 data. Furthermore, observed countries will be compared to the economy of Japan, in order to establish a similar characteristic that may suggest the threat of prolonged stagnation. The evidence of potential SS will be observed on three indicators. That is (1.) Declining growth rates, (2.) a persistently negative output gap, and (3.) a downward trending natural interest rate.

As already shown in Figure 1, all the observed economies have had a declining average annual GDP growth rate since the end of the 1960s. To form an even clearer picture, Table 1 quantitatively shows the average decline through three different periods. Period one consists of data from 1969 until 1989, period two spans from 1989 until the start of the financial breakdown in 2007, and lastly period three covers the time after the 2008 financial crisis until the beginning of the world pandemic in 2019. The decline in average growth rates through the periods is more than obvious and confirms the thesis of L. Summers that we are entering into the low growth territory. Moreover, looking at the historical trends, a booming economy with a high GDP growth rate and low unemployment would typically generate inflation in consumer products and wages. On the other hand, the economy closing on the SS environment has a combination of inflation below target (even risk of deflation), the presence of a negative output gap on a persistent basis, and interest rates close to zero. Analysing the CPI inflation data (Table 1) on observed economies shows declining inflation rates in all economies. The 2008 crisis has, therefore, clearly provoked deflationary pressures in the Eurozone and pushed inflation rates below the CB's targets. On the other hand, Japan already reached deflationary territory in the late 1990s. The US, however, maintained the rate close to the FED's objective rate. Hence, as observed economies are continuously experiencing downward pressure on inflation rates, we can also expect that they are experiencing a persistently negative output gap.

Table 1: Economic growth and inflation for three periods (%, average)

State	GDP growth (constant prices)			Inflation (CPI)		
	1. Period (1969-1989)	2. Period (1989-2007)	3. Period (2008-2019)	1. Period (1969-1989)	2. Period (1989-2007)	3. Period (2008-2019)
Japan	4.8	1.6	0.5	5.9	0.6	0.3
The US	3.1	3	1.7	6.3	3.1	1.9
Eurozone	2.9	2.3	1	7.4	3	1.7
Germany	2.5	2	1.4	3.8	2.2	1.4

Tables continues

Table 1: Economic growth and inflation for three periods (%, average) (cont.)

| State	GDP growth (constant prices)			Inflation (CPI)		
	1. Period (1969-1989)	2. Period (1989-2007)	3. Period (2008-2019)	1. Period (1969-1989)	2. Period (1989-2007)	3. Period (2008-2019)
France	3.4	2.2	1.1	8	1.9	1.2
Italy	3.4	1.6	−0.2	11.3	3.5	1.5
Spain	3.6	3.2	0.9	11.8	3.9	1.5
The Netherlands	2.8	2.9	1.33	5	2.3	1.7

Adapted from World Bank (2022).

When sluggish economic growth is accompanied by a negative output gap, the concern is said to be preliminary on the demand side of the economy. It means that economy has spare capacity due to weaker demand and has failed to create sufficient jobs for all those agents willing to work. Furthermore, the business environment becomes more hesitant, and companies are unveiling to increase spending, investments and/or production at full capacity. As a consequence, the economy is achieving lower growth rates. Analysing longer periods, however, a clear distinction of whether a negative output gap is a result of entirely demand-side theory is not applicable anymore, since both demand and supply-side stagnation theories are not mutually exclusive. An economy that suffers from a lack of AD may at the same time be vulnerable to slow growth of potential output and vice versa (Anselmann, 2020; Gordon, n.d.).

In Figure 6 we can see all observed economies have more often experienced negative output gaps in the long run. When we perform the test for the structural break, we find when the sudden, permanent changes occurred. Japan's economy experienced a change in the mean parameter in the third quarter of 1992, one year after the asset price bubble burst. To further analyse the trend change I performed the Markov-switching dynamic regression model to find the mean value of each state (before and after the break) and the probability of staying in each state (applied to quarterly data). Until Q3 1992 Japan's output gap mean value numbered 2.1 %. After the structural break, the mean value turned into negative territory at − 1 %. An output gap below zero indicates that the economy is suffering from the lack of demand for the goods and services it produces. Such demand shortage can lead employees and their companies to operate below their maximum efficiency levels, consequently pointing towards a sluggish economic environment and declining GDP growth rates. In addition, I perform the Markov-transition model, where the probability of regime change is calculated. The probability of the Japanese economy staying in state 1 in the long-term, around minus 1 % mean is 96 %. Transition to state 2 and consequently change in parameter mean is therefore not likely in the next period.

On the other hand, the US and EA economies witnessed structural breaks a decade before Japan. The first was in Q2 of 1981, and the letter in Q1 of 1982. The mean values of the

output gap after the structural break are at −2.1 % and −3 % respectively. The main difference between compared economies is that the US and EA are experiencing a more gradual trend towards a low growth environment, whereas Japan's economy reached a low growth environment in a relatively short time, as a consequence of a one-time shock. The probability to stay in the negative domain for European and US economies, in the long run, is high, at more than 90 %, although recent years have seen positive numbers. However, although it may seem that output gaps in observed economies are slowly closing and that actual output is catching up with its potential, the reason is largely based on downward revisions of potential output estimates. For example, Japan's real GDP in 2013 was more than 50 % lower than what FED, World Bank, or even IMF predicted it would be in 1993 (Summers, 2015a).

Figure 6: Output gap for the US, the EA (left), and Japan (right), % points, 1961−2020
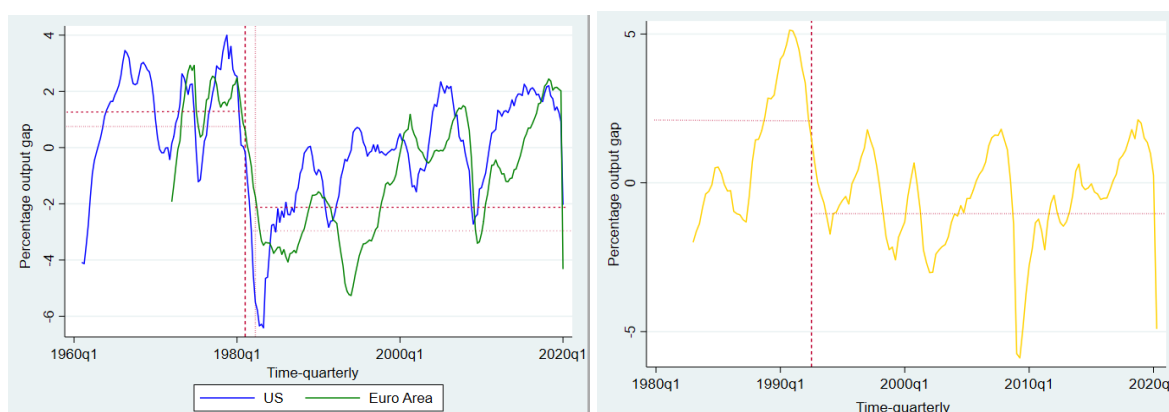
Adapted from FRED (2022); Bank of Japan (2022).

Furthermore, estimates of potential output were substantially revised downwards also on both sides of the Atlantic after the Great Recession that started in the late 2000s. The study by J. Dovern and C. Zuber from the Center for Economic Studies (CESifo) in München shows that even 10 years later, potential output still remains below its pre-crisis trends. In European countries, the potential output estimate for 2008 is, on average, revised by more than -3% in the long run. Furthermore, the 2012 forecast for the median potential output estimate for the year 2018 is revised downward by more than 10%. Many other studies found similar evidence for systematic downward revisions in potential output across the euro area, such as Klär (2013); Tereanu and Tuladhar (2014); Ball (2014); Palumbo (2015); Heimberger and Kapeller (2017) and the most recent study from Fatas (2019). Not only EA but also the US has persistently revised potential output to the downside. Prior to the financial crisis in 2007, the Congressional Budget Office (hereafter: CBO) was projecting that the US economy will generate appx. 12 % more than it did. Analysing historical estimates of potential output from CBO, I find that since the start of the Great Recession there has been persistent revising in its forecasts of potential output to the downside (Figure 7). L. Summers presented similar findings at his 2013 IMF conference, where the term SS was reintroduced. He showed that the economy was 10 % below what 2007 economists

predicted its potential would be in 2014. Figure 7 depicts downward revisions for both the US and EA. Since all three observed economies have a low probability of transit from state 2 to state 1, further downward revisions in potential output are expected in the long run to close the gap (Dovern & Zuber, 2019; Heimberger, 2020; Center on Budget and Policy Priorities, n.d.).

Figure 7: Actual and Potential GDP for the US (left) and Eurozone (right), 2007−2017
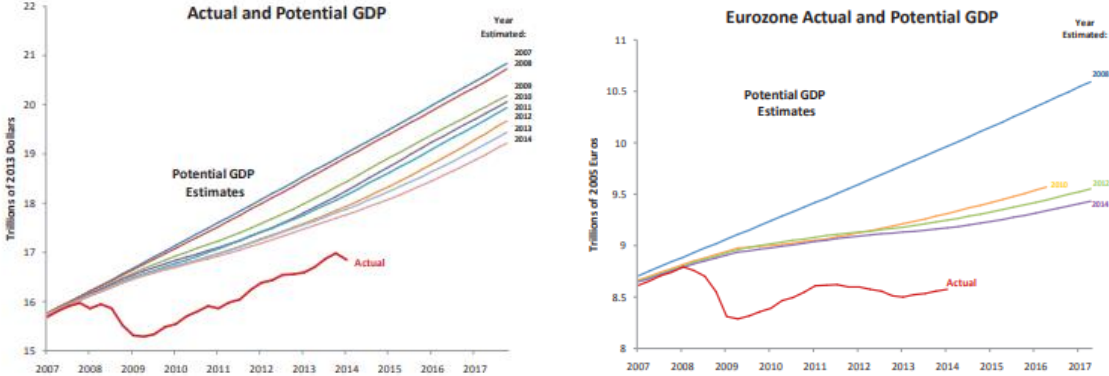
Adapted from Summers (2014); CBO budget and economic data (2022); IMF (2022).

Hence, all three economic systems may not widen the negative output gap further but will strive to slowly close it until it eventually disappears. Secular stagnation is a long-term occurrence, and a stagnant economy will typically be inclined to close the gap. However, it will achieve it with a fall of overall productive capacity below its pre-stagnation levels. Until now I have shown that all three observed economies have declining growth rates, long-term deflationary pressures which constrain the economic performances, and consequently a negative output gap on a permanent basis. Now I turn to the last indicator, the so-called natural interest rate, which presents the level of interest rate that is consistent with stable and non-inflationary growth. It is considered a forefront indicator of the new secular stagnation hypothesis, and according to L. Summers and P. Krugman tends to predict a prolonged period of sluggish economic performance. However, one of the main issues in any modern analysis of SS is its measurement (Anselmann, 2020; Tomeczek, 2020).

The concept of the so-called natural rate of interest dates back to the 19th-century Swedish economist Knut Wicksell. He defined the rate, firstly as the equilibrium interest rate, where a household's savings decisions are equated with the firms' investment decisions at the economy's full employment status. And secondly, the interest rate is consistent with price stability. Hence, the inflation rate is at the CB's target. In modern studies, therefore the Wicksellian natural rate of interest is frequently understood as a short-term risk-free real interest rate, which in the long run equates to investments and savings at full employment and stable inflation. However, the Wicksellian natural real interest rate is an entirely theoretical concept and therefore not empirically observable. Any measurement of it relies heavily on used econometric models and consequently leads to significant differences

between authors' results. Nonetheless, the observable changes, even if not precisely estimated provide an essential insight into the performance of a country's economy and its overall environment (Anselmann, 2020; Tomeczek, 2020).

The most influential modern working paper on the measurement of natural interest rate is Laubach and Williams (LW model), and the most recently updated version Holston, Laubach, and Williams (HLW model). The same version of the econometric model is used by the Federal Reserve Bank of New York, which quarterly reports data on R* estimate for the euro area and the US. Both observed economies have experienced a significant and prolonged decline in the natural rate of interest since the 1960s. Figure 8 depicts the three-year moving average of R*, in order to portray the negative downtrend more visibly. The 2008 financial crisis pushed the R* estimates to the lowest values in decades. Moreover, at the moment, the value of R* is close to zero, and it may reach a negative domain in the next decade or even earlier if economies experience an unexpected economic slump. Again, the exact estimated value is less important than the visible drop over the last 60 years. In addition, by dividing EA economies further, I noticed that some countries are more prone to SS than others. While France, Germany, and the Netherlands appear to be in a slightly better position, Italy on the other hand, is the country with the worst state of affairs. Moreover, it is the only county in the EA, where every study identified a negative R*. To make matters worse, inflation in the Eurozone economies is virtually identical, which further impedes possible monetary policy solutions for the south European economy. Table 2 presents the natural rate of interest estimates in selected countries from various recent working papers.

Figure 8: Natural rate of interest (R*) for the US and EA, centered three-year moving averages (in %), 1961−2020 and 2002Q3−2020Q3

Adapted from FRED (2022).

21
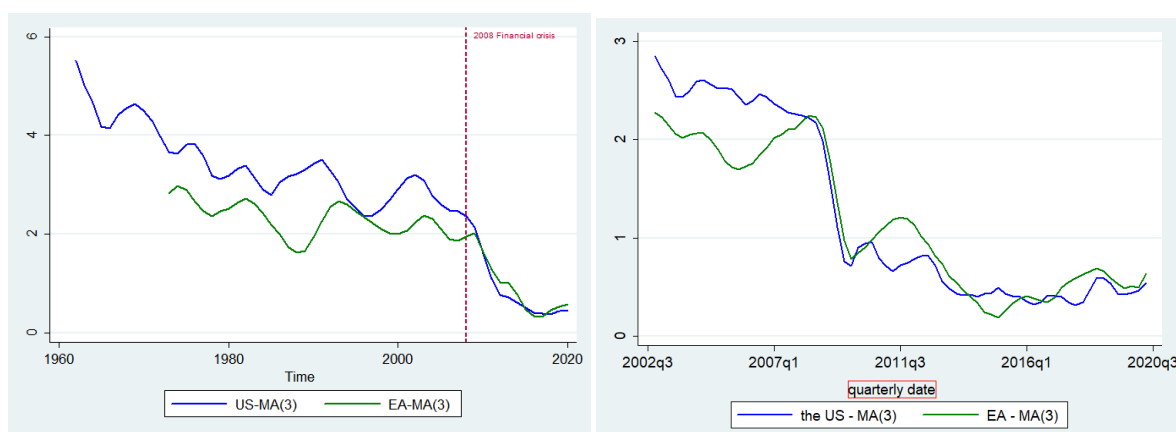
Table 2: Estimation results for Natural rate of interest

Economy	Estimated R*
Japan	Okazaki & Sudo (2018); Value +0.3 % Han (2019); Value −1%; Lee et al., 2020; Value –4 %
France	Brand, Bielecki & Penalver (2018); Value around 0.5 % Fries, Mesonnier, Mouabbi & Reme (2018); Negatirve value close to 0 % Belke, Angsar, K1ose, Jens (2017); Negative value, between −0.5 and 0 %
Germany	Brand, Bielecki & Penalver (2018); Value, between, 0.5 % and 1 % Fries, Mesonnier, Mouabbi & Reme (2018); Value close to 0 % Bystrov (2018); Value around 1 %
Italy	Brand, Bielecki & Penalver (2018); Negative value around −0.5 % Arena, Bella, Cueras, Gracia, Nguyen, Pienkowski (2020); Negative value around −1 %
The Netherlands	Brand, Bielecki & Penalver (2018); Value between, 0,5 % and 1 % Arena, Bella, Cueras, Gracia, Nguyen, Pienkowski (2020); Value between 0 % and 0.5 %
Spain	Brand, Bielecki & Penalver (2018); Value between, 0.5 % and 1 % Arena, Bella, Cueras, Gracia, Nguyen, Pienkowski (2020); Negative value around 0 % Fries, Mesonnier, Mouabbi & Reme (2018); Negative value, close to 0 %

Source: Own work.

On the other hand, according to Bank of Japan (hereafter: BoJ) official studies, the R* in the pacific economy plunged to the lowest levels on record after the 1991 bubble burst. Various estimation techniques (DSGE, OG models, etc.) suggest that the natural rate of interest in Japan declined continuously since the 1990s. Moreover, the most recent official study from BoJ by Okazaki and Sudo (2018) shows plummeting R* from close to 4% before 1991 to 0% in the early 2000s. Hence, Japan's economy reached negative R* ten to fifteen years after the internal economic shock which had devastating effects on the economy. The natural rate of interest stayed close to 0% since 2002, cyclically interchanging negative and positive values. An identical trend can be observed in the economies of EA and the US, where R* plummeted since the 2008 financial crisis. In less than a decade selected countries on both sides of the Atlantic reached the lowest values of R*, with some European countries already in negative territory. Figure 9 presents official Bank of Japan estimates of R* using different estimation techniques. Secular stagnation is a long-term occurrence with origins dating back several decades, however, there is always a strong catalyst (i.e. 1991 bubble burst in Japan or the 2008 financial crisis in Western economies) that impels an economy into its secular spiral (Okazaki, 2018; Bank of Japan, n.d.; Sudo & Takizuka, 2020).

Hence, analysing all three factors together, I noticed that Eurozone economies are closer to the SS environment than the US. Both are experiencing declining growth rates, persistent negative output gap (indicating the AD shortage), and immense pressure on the natural

interest rate. However, the EA economies have weaker performance indicators (lower GDP growth rates, on the average wider output gap, and with some countries R* closer to 0%), therefore are prone to enter the SS environment earlier than the US if existing trends continue.

Figure 9: Natural rate of interest (R) for Japan, 1985−2017*
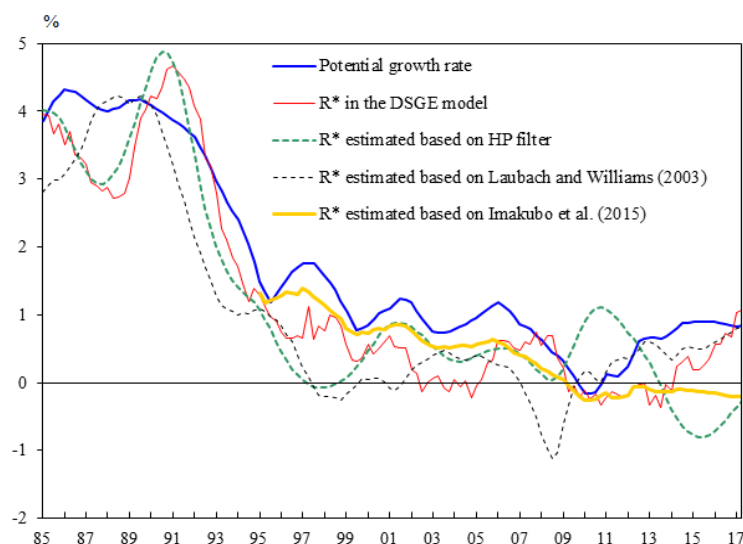
Adapted from Fujiwara, Iwasaki, Muto, Nishizaki & Sudo (2016); Imakubo & Kojima (2015); Okazaki & Sudo (2018); Bank of Japan (2022).

Assuming that R* in selected economies has fallen to such low levels that the market interest rates are unable to keep up, we may predict that a prolonged period of sluggish economic performance is here to stay. The cause of R* decline includes several medium- to long-run factors, which have on one hand affected the propensity to invest, and on the other boosted the propensity to save. Hence, from a long-term point of view, both adequate demand and supply are vital to stimulate economic growth. If AD and AS are gradually hindered by various factors mentioned by both Summers and Gordon, a period of economic stagnation could become a real threat to observed economies. In the next subchapter, I will take my analysis a step further to explore whether AD and AS are being hindered by various factors, which are consequently affecting the negative performances of selected countries (Anselmann, 2020).

2.1.2   Causes of Secular Stagnation in Selected Economies

In economic science there is a common agreement that the downward trend in natural real interest rates can be traced back decades, however, there were two economic shocks that accelerated the downward pressure on R* and plummeted the values to levels where macroeconomic policies that were used until now have to be reconsidered. Japan's asset bubble of 1991 marks the entry into the secular stagnation spiral for the pacific island

economy, and on the other hand financial crisis of 2008−09 is a parallel occurrence for the US and the Eurozone economies, although officially not yet in SS. Koo (2014), in particular, is advocating that increased pressure on the savings rate and downward pressure on planned investments was a result of these one-time economic shocks which had and still have devastating consequences even years afterwards. Debt deleveraging by both public and private sectors, high levels of uncertainty among companies, risk aversion, and higher barriers to financial intermediation all played a crucial role. Nevertheless, although crisis-related factors have important implications, economists studying secular stagnation preferably refer to deeper, more structural factors. Factors that evolved during the last 40-50 years and already had an influence prior to the 2008 crisis or the 1991 asset bubble burst. In table 3 I present the possible causes of SS tendencies and their implications towards the imbalance between savings and investments rates (Koo, 2014; Olsen, 2015; Teulings & Baldwin, 2014).

Table 3: SS tendencies and causes for negative trend in R*

Factors reducing investment rates	Factors increasing savings' supply	Other factors
Demographic changes	Demographic changes	Global imbalances
Slowdown in tehnological progress	Increased inequality	
Declining relative price of capital goods	Crisis-related factors	
Shift to less capital-intensive industries		
Crisis-related factors		

Adapted from Summers (2015a); Summers (2015b).

The most frequently associated indicator with SS theory is demographic change. Both Summers and Gordon regularly turn to this fundamental indicator which contributes, on one hand, to an increase in the supply of savings, and on the other to reduce the investment rates. During the past decades, all three observed economies have seen a slowdown in population growth rates, and, more importantly, slow to non-growth in the working-age population and labour force participation. Moreover, each observed country is experiencing the ageing of its population. However, the amplitude of the process varies. For example, the number of persons aged 65 or older (as % of the population) in Japan increased from 6.7 % in 1969 to 28 % in 2019. Similarly, the Eurozone follows closely by doubling the number of people aged 65 or older. An equal trend can be seen in other Western economies as shown in Table 4. Furthermore, the annual population growth rate follows a similar pattern, with some economies even experiencing negative growth rates in recent years (e.g., Japan and Italy). Such an environment will likely continue, which casts unfavourable consequences for growth rates. An ageing society and a slowdown in a population's increase affect both planned investments and desired savings through several counteracting channels. Investment rates may be reduced as there are fewer workers needed to equip with capital goods and the

return on investment becomes lower (Eichengreen, 2015; Summers, 2014b; Teulings & Baldwin, 2014).

On the other hand, aggregate savings change in line with the life-cycle hypothesis. The life-cycle hypothesis was jointly developed by Franco Modigliani and Richard Brumberg in the 1950s and proposes that aggregate savings are among the highest in economies with a relatively larger share of the population being either close or in the retirement period. Selected economies are experiencing an increasingly changing composition of the population, most notably the number of retirees (people aged 65 and older) outnumbering the working-age population. Furthermore, life expectancy, which has risen during the last decades (from 70 in 1960 to around 80 in 2020), combined with uncertainty about disposable income in the retiree period will likely lead to increased savings per capita. Summers argues that since the requirement for adequate old-age provision has increased (uncertainty about future pension benefits) savings rate among the working population increased. The German economist von Weizsäcker (2011) proves such a trend in the German population data. All other factors equal, these demographic trends (e.g. changing composition of the population, low population growth rates, low fertility rate, increasing life expectancy etc.) have led to an increased supply of savings in observed economies since workers have to save more in order to finance their consumption during the retirement time (European Central Bank, 2017; Summers, 2014b).

Figure 10 exhibits how the dependency burden for the working-age population increased since the 1990s. The overall economy and its working-age population are therefore under greater pressure to support the ageing cohort. Additionally, labour force participation has either declined or stagnated in selected economies, putting greater weight on public finances. Furthermore, Summers argues that considering the high levels of debt in today's advanced economies, together with uncertainty associated with the ability of government finances to meet pension obligations in the future, increases savings per capita in selected economies.

Table 4: Population ageing, selected years

State	Persons 65 and older (% of population)			Population growth rate (annual %)		
	1969	1999	2019	1969	1999	2019
Japan	6.7	16.4	28	1.2	0.2	-0.2
The US	9.9	12.4	16.2	1	1.15	0.4
Eurozone	11.7	16	20.9	0.7	0.3	0.09
Germany	13.4	16.2	21.6	0.8	0.4	0.2
France	12.7	16	20.4	0.75	0.5	0.2
Italy	11	17.9	23	0.6	0.01	-1.15
Spain	9.5	16.4	19.7	1	0.4	0.7
The Netherlands	10	13.5	19.6	1.15	1.15	0.6

Adapted from World Bank (2022); OECD (2022).

Empirical studies provide different estimates regarding the impact of demographic changes on the natural interest rate. Carvalho, Ferrero and Nechio (2016) developed a life-cycle model in order to capture the demographic features affecting the equilibrium rate. They found that demographic trends in advanced economies between 1990 and 2014 reduced, all other things being equal, the equilibrium natural real interest rate by around 1.5 percentage points. Similarly, Gagnon, Johannsen and Lopez-Salido (2016) find that demographic changes in the US reduced the real GDP growth and the equilibrium real rate by around 1 percentage point. For the Japanese economy, Ikeda and Saito (2014) developed a model, which showed how an exogenous decline in the ratio of workers to the total population caused a decline in the real interest rate. ECB working paper from A. Papetti (2020) showed that demographic change has a significant impact on R* in the euro area. His model predicted a decrease of about 1% in R* from 1990 to 2030. Furthermore, adjusting the set of sensitivity specifications in the model, estimated declines range from −1.7 % to −0.4 %. Although empirical analyses provide a wide range of estimated values, they all have in common that demographic factors negatively affect the R* (Anselmann, 2020; European Central Bank., 2017; Papetti, 2020).

Figure 10: Age-dependency ratio, % of working-age population (left) and labour force participation rate, % of total population ages 15+ (right), 1960−2020
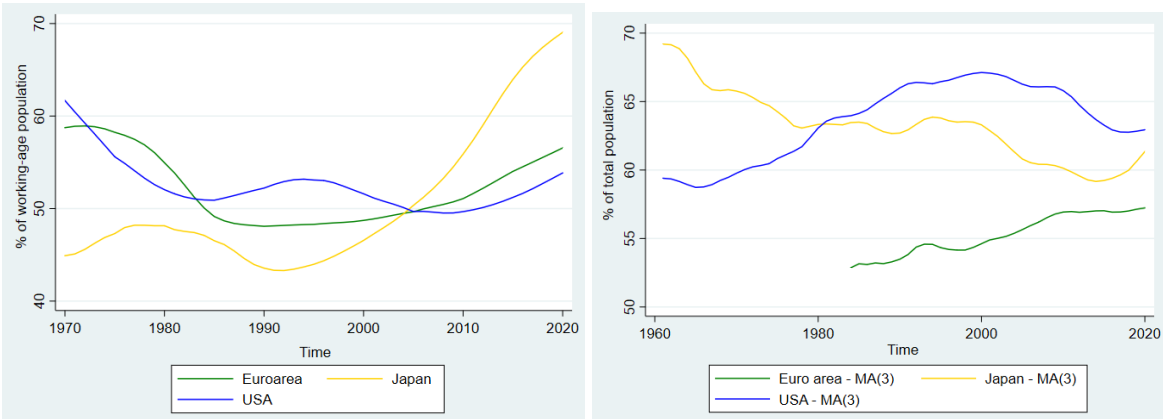
Adapted from World Bank (2022).

Not only changes in the composition of the population, but also changes in the distribution of income have acted to increase the savings rate. Changes between labour income and capital income have benefited more to agents with a higher propensity to save. Wage inequality widened in selected economies in the past 30 years. Moreover, empirical analyses showed that high-income households, who receive above-average wages together with increasing capital gains, have a clear bias to save more, consequently affecting the potential growth rates. Income is transferred from low-saving households, which present the middle and bottom share of the population to high-saving households at the top. All other factors equal, the redistribution from low to high-saving households diminishes consumption spending and consequently demands growth (Jackson, 2018).

Thomas Piketty and his colleagues analysed the post-tax income of the upper percentiles in the US who have gained a rising share of the national income since the 1970s. By 2015, the upper 10 % of the US received almost 40% of the national income. Furthermore, the post-tax income of the top 1% increased even faster. For example, the CBO estimated that post-tax income for the top 1% in the US more than tripled between the years 1980 and 2007. Similar trends can be observed in most of the advanced economies, including the Eurozone and Japan (Jackson, 2018).

On the other hand, factors that reduced the propensity to invest include a possible slowdown in technological progress. Although Summers and demand-side stagnationist do not express a clear opinion on the matter it is reasonable to say that even though scientific developments in the past few decades have been positive and creative, the modern world lacks the disruptive innovations which would raise the growth rates to new levels. Some argue that novel technological advances merely complement and improve the existing industry 3.0 (IT) products. Additionally, we cannot compare today's innovation to radically new technologies resulting from the first, second, or the beginnings of the IT revolution. For example, Apple Inc. launched the iPhone, an innovative new type of technology in June of 2007. However, this innovation combined several existing technologies into one unit. Moreover, new iPhones are merely improved versions of the 2007 model. The next wave of the industrial revolution must, therefore, define a complementary role between human capital and machinery to stimulate additional growth potential in advanced economies. Technological products from industry 5.0 might help industries in meeting demand and deliver personalized and customized products to the market. Hence, advance growth rates to new levels and perhaps revoke secular stagnation tendencies.

Analysing the patent-based statistics from WIPO, which reflects the inventive performance of selected countries we can notice a gradual slowdown in patent applications. Japan's patent applications by its residents peaked in 2000 when decade long trend reversed. In 2020 there were 36% fewer patent applications compared to the peak values. Similarly, calculations for the US and EA economies show entering the non-growth territory shortly after the 2008 crisis. A complete reversal of previous decades when patent applications grew on a yearly basis. Figure 11 presents both the growth rates (% annual) and the nominal values of patent applications by residents in selected economies. Innovation is considered a key driver of technological development in the economy and consequently its economic growth. It provides a means to meet the demand of the current market and the potential needs of the future market. Moreover, innovation is achieved through increased investments into more effective products, processes, services, or improvements of technologies already available to the current market. Decreases in patent applications can on the other hand point to a reduction in investment activities.

*Figure 11: Patent applications, residents (left) and patent applications growth rate, %
annual change (right) for Japan, the US and Euroarea, 1980−2020*
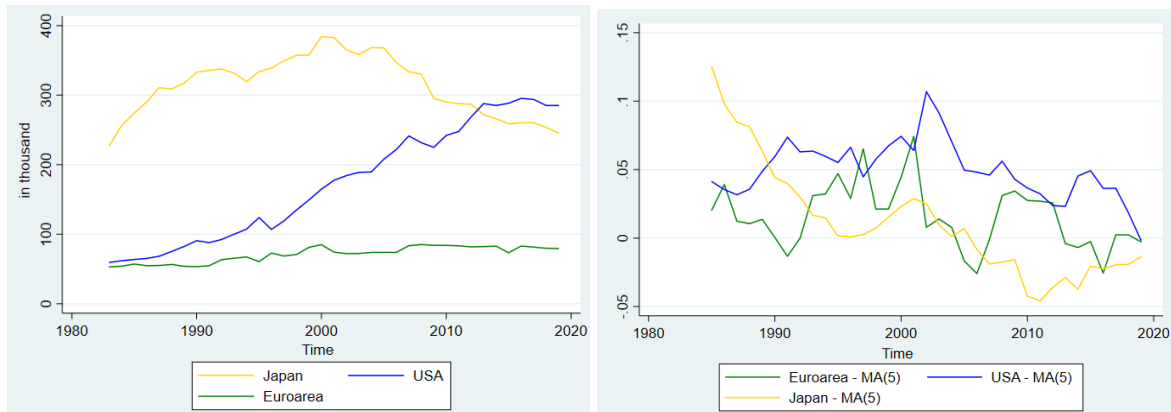
Adapted from World Bank (2022); WIPO (2022).

Furthermore, since the 1980s there is an ongoing shift in the relative price of capital goods. A lower cost of capital goods means that investment goods can be attained with a smaller amount of borrowing and spending, consequently bringing down the propensity to invest. Summers provides similar observations on consumer durables data. He points to a period from 1980 until 2010 in which median wages have been stagnant, while on the other hand median wages in terms of car prices have almost doubled. Major advanced economies, including the US, EA, and Japan had seen a continuous decline in public investments in infrastructure and human capital. Since the 1960s there has been a steady decline in government-financed R&D expenditure as a percentage of GDP and relative public real capital investment as a whole. For example, Eurozone's biggest economy Germany reduced the government fixed capital formation (% of GDP) by one percentage point between 1960 and 2017. Value, when capital depreciation is deducted, becomes even lower, and on some occasions even negative (Italy and Spain). Furthermore, the gross fixed capital formation which includes government, households, and business sector data shows an even steeper decline. Gross fixed capital formation (% of GDP) in the EA declined from 27 % in 1970 to 21 % in 2020. Pacific island rates fell even more from 37 % to 25%, while the US declined only one percentage point as shown in Figure 12 (Anselmann, 2020; Summers, 2014a).

Figure 12: Gross fixed capital formation – GFCF for the US, EA (left) and Japan(right), % of GDP, 1970−2020
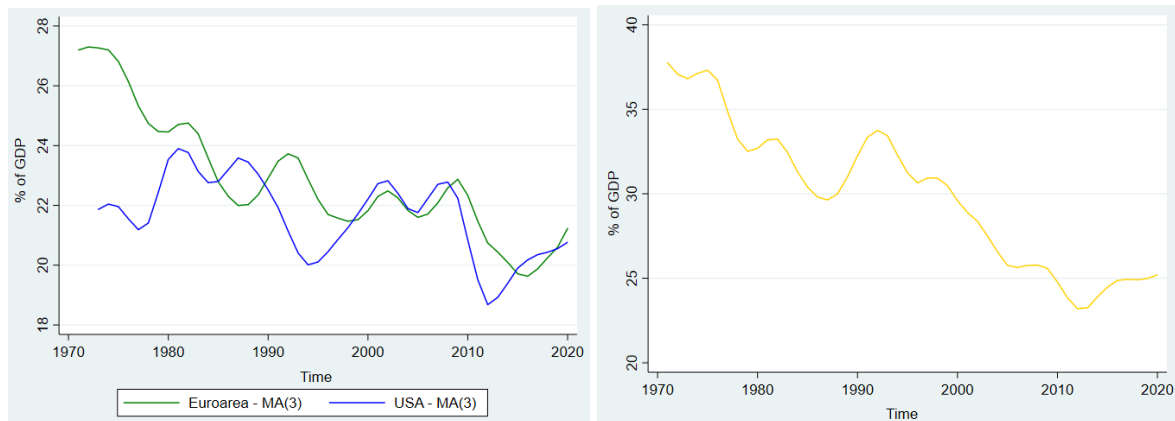
Adapted from World Bank (2022).

Public and private investments are an important component of the economy's aggregate demand, which in turn stimulate growth rates and positively affect the natural real interest rates. In addition, they also present valuable input from a supply-side perspective, especially in stimulating productivity growth rates. For example, investments into R&D and other government fixed capital formation such as physical and digital infrastructure (roads, public transport, digital literacy, broadband networks, etc.) present a vital part in the efficient functioning of an economy. Former senior economist at the Federal Reserve Bank of Chicago David Aschauer emphasizes the importance of public investments in the economy's infrastructure. He argues that roads, highways, airports, water systems, etc. have an important complementary relationship with private capital. Namely, by increasing the marginal productivity of private capital, public investment into infrastructure projects is able to crowd in private real capital investments. Therefore, a well-developed and effective public investment scheme is not only beneficial on its own merits but is instrumental in attracting a prosperous business sector and thus stimulating private investment (Anselmann, 2020; Aschauer, 1989).

In order to foster long-term growth in selected economies, it is thus necessary to reverse the declining trend in public real capital investments (as % of GDP) that has dominated since the 1970s. As I will describe later in the policy recommendation section, fiscal investments are not only important to stimulate growth rates and reduce the SS tendencies but can also contribute to inequality reduction. For instance, inclusive growth may be encouraged by systematic government investments in affordable housing construction, efficient local transportation systems, schools, and universities, particularly in lower-income and less developed regions (Anselmann, 2020; Aschauer, 1989).

### 2.1.3 Secular Stagnation and the Productivity Puzzle

The slowdown in productivity growth rates has attracted both demand and supply-side economists to explain the SS phenomenon. It is considered a flagship indicator in Gordon's supply-side view and at the same time an essential part of alternative demand-side theory. The Nobel Prize laureate in Economics P. Krugman once said on the matter: "Productivity isn't everything, but, in the long run, it is almost everything. A country's ability to improve its living standard over time depends almost entirely on its ability to raise its output per worker." Labour productivity is a leading indicator among the determinants of long-term economic growth. Furthermore, corporates' long-term growth is deeply influenced by sustained productivity growth, allowing them to pass the efficiency gains through increased investments. Lower investment demand in selected economies as shown in previous sections can therefore be attributed to persistent weak productivity performance (BSI Economics, n.d.; Teulings & Baldwin, 2014).

The steep economic losses resulting first from the 1991 asset bubble to the Japanese economy, and secondly from the financial crisis in the US and Eurozone, together with the subsequent sovereign debt crisis, influenced the productivity growth not only in the short but also in the long term. From Figure 13 we can notice that multifactor productivity (hereafter: MFP) – a key driver of labour productivity – reached negative values in Japan and Eurozone for the first time in 2009. Moreover, we can also observe a clear sign of structural influences in the decades before the economic shocks (i.e., the 1991 bubble burst in Japan and the global financial crisis in 2008). Growth in multifactor productivity had already declined decades before the crisis events. Such a downward trend can be attributed, amongst other things, to a decline in entrepreneurial innovation (as shown in Figure 11), continued demographic change (as shown in Figure 10), and decreasing allocative efficiency of productive factors in the economy. The downward trend in labour productivity was at best slowed down, however never entirely reversed. (Jackson, 2018; Deutsche Bundesbank, 2021).

Japanese multifactor productivity fell from an average of 2.8 % (1985-1990) to a mere 0.4 % (2014-2019). Not only Japan but also the US has reversed the trend in MFP after the 2008 financial crisis, with the average MFP after 2007 valued at 0.5% (2007-2019). The slowdown in the Eurozone productivity growth rates can also be observed in Figure 13. In addition, the right-hand side of Figure 13 presents labour productivity by hours of work, where we can observe the downward trend from the 1970s onwards. Japanese economy recorded the strongest decline in GDP per hour worked (% growth year). Its values plummeted from an average of 4.5 % growth in the 1970s to a mere 1.03 % in the 2010s. The Eurozone economies performed even worse, with the 2010s average at 0.83 %. On the other hand, the US had relatively stable growth rates from the 1980s until 2010, however, the average numbers in the aftermath of the financial crisis dropped to the lowest values since historically available data.

If multifactor productivity in the selected economies remains at such low levels, the number of profitable investment projects, even at favourable borrowing rates and low long-run real rates will not expand significantly. Furthermore, simultaneously considering the secular decline in the relative price of capital, such an environment would cause a decreasing trend in investment per capita. Hence, pressuring the equilibrium natural real interest rate into lower values and potentially even negative territory. The only way to stimulate economic growth in an economy with virtually no productivity growth is to increase the share of workforce participation or to increase the working hours of an existing cohort. As seen in the previous section, both indicators point to even more unfavourable environments, therefore I expect further downward pressure on productivity growth and consequently real GDP growth rates.

Figure 13: Multifactor productivity (left) and GDP per hour worked in selected economies, annual growth rate (%), 1970−2019
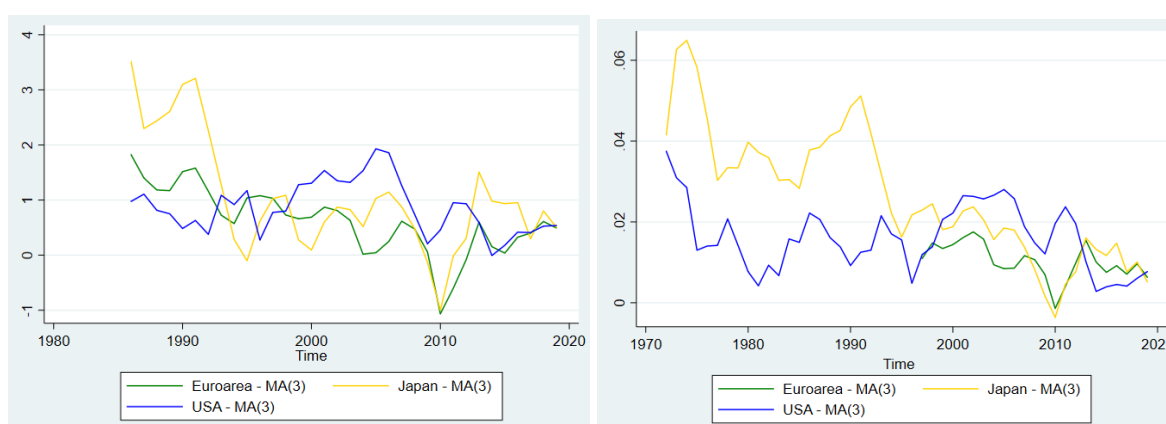
Adapted from World Bank (2022); OECD (2022).

2.1.4 Concluding Remarks: Evidence on Secular Stagnation Differ Across Selected Economies

The evidence studied in previous sections suggests that the Eurozone and the US are following Japan's period of prolonged weakness. Aggregate demand is being weakened continuously by factors such as ageing society, population decline, increased inequality, etc. Periods of weak growth rates and pronounced resource under-utilization with negative effects on potential output, together with the persistent downward trend in the natural rates of interest show that secular stagnation is not only a theoretical concept but a serious condition in selected market-based economies. However, the strength of these effects and consequently SS tendencies vary:

a. **Eurozone:** in the monetary union as a whole, the financial crisis hit the potential output has been significant. Moreover, evidence suggests structural shifts are present in the euro area, consequently applying downward pressure on the natural interest rate. A continuous

downward trend in R* implies that the decline in interest rates close to zero is not providing enough stimulus to the economy. Trend reversal is therefore unlikely in the near future, making the euro area prone to secular stagnation. Dynamics of actual and potential output growth had been mediocre, and slack remains large, particularly in the labour markets. Secular stagnation features have been particularly more evident in the southern euro area economies, especially Italy. Furthermore, the shortage of aggregate demand will continue to negatively affect the economies of the euro area since population and inequality forecasts point to further declines.

b. **United States:** secular stagnation tendencies gained influence after the Great Recession, however with a lesser degree than in the euro area and Japan. The natural rate of interest has been in a downtrend for a longer period of time, pointing towards a possible SS spiral in the future. Nevertheless, monetary policy has been successful in providing stimulus to the economy, particularly in increasing aggregate demand through unconventional measures. Structural shifts are less notable than in the other two economies, with GDP growth, inflation, and labour markets not far from historical averages.

c. **Japan:** structural shifts in the Japanese economy have been observed for a longer period of time. Sluggish GDP growth and low inflation tendencies are persistent even 3 decades after the 1991 asset bubble burst. Estimated R* rates have been well below actual rates continuously for almost two decades, reaching even negative territory. Zero-interest rate policy has not provided any support to aggregate demand, although there have been some positive developments since the start of quantitative and qualitative monetary easing (QQME).

2.2   Policy Recommendation

When meeting new challenges, it is important to recognise them. In line with this thesis, it means accepting the reality of SS and pointing the centre of attention towards policy debates able to confront the challenges it possesses. There are essentially three plausible scenarios of how to avert economies from SS tendencies. The most straightforward approach is focused on **increasing the aggregate demand** in the economy. Hence, macroeconomics in the SS environment has to adapt to fiscal policies prevailing over other narratives.

Economies closing on the SS environment will need to acknowledge that **fiscal policy** will have to play a greater role than in the last few decades. Therefore, stimulating the economy through considerable increases in public spending (R&D, infrastructure projects etc.), comprehensive social programs, reducing inequality, and promoting exports (trade agreements, relaxation of controls etc.). Furthermore, fiscal stimulus could also be considered a self-financed measure since a permanent rise in potential output would imply a permanent increase in taxes. However, as pointed out by DeLong and Summers (2012), such a strategy has its own risks. The cost of soaring debt levels may turn out to be higher due to reduced private investments and increased economic vulnerability (Summers & Bradford, 2012; Tomeczek, 2020).

On the other hand, today's **monetary policy** in selected economies is already expansionary. Policy interest rates have their values at their effective lower bounds. Therefore, providing additional stimulus to the economy would have to come from other unconventional measures (e.g., quantitative easing, forward guidance, or extra schemes for banks in order to provide further funding). However, there is empirical evidence that the efficacy of unconventional measures might not provide enough stimulus to the economy, especially in the SS environment. Extensive use of monetary measures also gives asset prices a boost, making economies vulnerable to potential price bubbles and consequently financial instability.

Another approach argued by Blanchard, Dell'ariccia and Mauro (2010) is raising the existing inflation target to higher values and consequently, reducing the probability of hitting the ZLB. Paul Krugman too argues that raising the inflation target above the current 2% is a straightforward way to increase the expected inflation and strengthen the CB's incentives to evade the low inflation trap. Furthermore, a higher inflation rate would give the monetary policy greater room in the face of possible negative shocks in the future. Speaking at the ECB conference Krugman said: "A relatively high inflation target can be regarded as a crucial form of insurance, a way of foreclosing the possibility of very bad outcomes in the future." (Tabellini, 2014).

Nevertheless, raising the inflation target bears a risk, especially since there is a positive correlation between the level of inflation and the level of its volatility. And as we know from a historical perspective, the course of increased inflation volatility comes at a great cost, arguably higher than the high level of inflation itself. Furthermore, an increase in inflation target might spiral the private sector reaction to wage and contract indexation. Hence, reducing part of high inflation benefits. (e.g., relative wage adjustments). Last but not least, records from the past indicate that bringing down inflation once it gets integrated into expectations and economic behaviour inside the real economy is very costly. Hence, raising the inflation target above the current 2% would be a non-starter with the Bundesbank (hyperinflation in the 1920s remains an agonizing experience) and consequently within the ECB (Krugman, 2013; Tabellini, 2014).

Since selected economies have a different state of affairs in both public finances and the availability of CB policies, a potential solution is monetary and fiscal coordination. In Japan, for example, there is little room for substantial fiscal stimulus (debt to GDP in 2022 accounted for more than 250%), therefore policy boost has to come through other channels. Unconventional measures such as QQE were adopted in 2014 to cope with insufficient past policies. Moreover, improvements in structural policy settings are an important complement to monetary and fiscal measures if the economy enters the SS environment. Structural reforms are an important boost to long-term prosperity, with the ability to increase the potential output and natural interest rates. Bouis, Causa, Demmou and Duval (2012) from OECD argue that some structural reforms can have instant positive effects on aggregate demand, especially those focusing on investment increases. Additionally, loosening the immigration policy can be a temporary solution to workforce shortages and ageing societies.

However, in both the EU and Japan this remains a hot topic in political circles. Governments in selected economies will have to carry out bolder and more aggressive reforms of product markets, flexible labour markets, and strive for greater international openness (Rawdanowicz, Bouis, Inaba & Christensen, 2014; Tomeczek, 2020).

Secular stagnation condition is complex, therefore resolving its challenges requires time and coordination between different economic policies. Nevertheless, the EA and the US are only at the beginning of the SS environment, whereas the Japanese economy has been confronted by it for the past three decades. A prudent approach by other advanced economies would therefore be to observe and learn which economic policies are effective. And perhaps the Japanese government found a solution to the SS problem, within its economic program often known in literature as Abenomics. In the second part of the master's thesis, I will analyse if Abenomics policies addressed the key challenges of SS and set the course of the Japanese economy to a sustained run of growth.

3   JAPAN'S LOST DECADES AND ABENOMICS

As the dismal economic conditions in the advanced economies remain persistent, economists and researchers are increasingly turning towards the Japanese example. The Japanese economy was one of the best macroeconomic performers until the end of the 1980s. However, from 1986 until 1991 Japan entered a period of greatly inflated real estate and stock prices, consequently leading to overheated economic activity. A rapid increase in asset prices together with uncontrolled money supply and credit expansion led to a major crisis in 1991. Moreover, the bursting of the asset price bubble plunged the pacific nation into a severe financial crisis and a three-decade-long spiral of deflation and stagnation.

In the previous chapter, I have shown that the Western economies, especially Eurozone and the US are closing in on secular stagnation. The Great Stagnation in Japan received considerable attention in the late 1990s and early 2000s, however never to an extent to consider it a plausible event in other advanced economies. Only after the 2008 financial crisis and subsequent Great Recession in Europe renewed interest in the topic. The first signs of possible prolonged stagnation in the US and euro area can be found in the late 2011 summer edition of The Economist. Article titled Turning Japanese featured then-US president Barrack Obama and German Chancellor Angela Merkel wearing Japanese kimonos. The impression the journal tried to convey was that the US and EU leaders are entering a period where economic and political conditions are similar to Japanese counterparts. Namely, a lack of leadership, incoherent policy action, and the threat of prolonged stagnation.

Nevertheless, in December 2012 everything suddenly changed. Economists and politicians alike shared renowned hope in ending prolonged stagnation in Japan. During the 2012 Japanese elections, Shinzo Abe, the Liberal Democratic Party (hereafter: LDP) leader won

the elections and become the prime minister of a depressed pacific nation. In his mandate, he initiated a new policy package, commonly known as Abenomics to end the secular stagnation which has crippled the economy for the past two decades. The IMF's official statement on the matter praised the new economic program and optimism to end the secular stagnation threat prevailed. Moreover, the new macroeconomic approach taken by Abe was not only beneficial to the Japanese people and their economy but also to other Western leaders facing a threat of prolonged stagnation. For Western leaders, Japan has become a playground of macroeconomic policies to counteract the stagnation tendencies. Therefore, in this chapter, I will look at Japan's response to secular stagnation and assess if the policies of Abenomics are the right way forward when the US and EA potentially enter a period of prolonged stagnation.

3.1   The broad Context of Japan's Great Stagnation

As I have mentioned continuously throughout the thesis, Japan's economy before the year 1991 thrived in many aspects. A war devastated pacific nation transformed itself into a leading player in both Asian and world economic stages. Furthermore, prosperous economic conditions were achieved in a relatively short time. For comparison, in the mid-1950s, the average US income counted for 9 times that of Japanese. However, only two decades later in the mid-1970s income gap narrowed to only 2.5 times. A rapid catch-up of the Japanese economy to other advanced economies took place in the environment of the high-growth period (1951−1971). According to Japanese economist Hirohisa Kohama, Japan's high growth period resembled a transition from a developing country to a developed economy (Grabowiecki, 2019).

Furthermore, in the early 1970s, the popular perception of Japan changed from that of a weak economy depending on the United States' economic support and protection to a flourishing economy capable of challenging the US and its competitiveness. At the time, Japan was reborn, and as written by H. Rosovsky and H. Patrick in their book, the pacific nation become "Asia's New Giant". However, the last 30 years are the exact opposite of a once successful Japanese economy. Since the 1990s Japan had experienced two speculative bubbles (i.e., stock market and real estate), a severe banking crisis with a system close to insolvency, a slowdown of annual growth rates, demographic changes, and persistent deflation. Additionally, the economy suffered from the global financial crisis of 2008, natural disasters (earthquakes and the 2011 tsunami disaster), and the Fukushima nuclear power plant breakdown. All things considered, Japan's nominal level before the Abenomics economic program in 2012 was about 6 % lower than it was in the mid-1990s. Moreover, the years between 2008 and 2012 can also be seen as a trough of a long-lasting stagnation cycle in Japan (Grabowiecki, 2019).

After the year 1991, Japan gradually spiralled into a period described as The Great Stagnation by Japanese economist and Bank of Japan deputy governor Masazumi Wakatabe.

My analysis of the Great Stagnation period, therefore, starts with the three most important figures in economics, namely the real GDP growth rate, the unemployment rate, and CPI inflation. The average real GDP growth rate of the Japanese economy in the 1970s and 1980s amounted to 4.5 %. However, the growth rate already plummeted to less than 2 % in the 1990s and consequently reached an average rate of 0.9 % during the first period of stagnation (1991−2011). Furthermore, during the first phase of the stagnation period multifactor productivity fell by two-thirds compared to the pre-stagnation times (1971−1990).

As already shown in Figure 6, the Japanese economy experienced a constant negative output gap, averaging at around −2 % GDP, except for several short positive intervals. On the other hand, the second period of stagnation (2012−2019) coincides with Shinzo Abe's term as prime minister of Japan and the beginning of Abenomics policies. Compared to the first interval, Abenomics increased the average real GDP growth to 1.1 %, and the average real GDP per capita to 1.2 %. Moreover, the negative output gap officially closed in November 2016 and remained around positive values until the Covid-19 pandemic. Japan is known to have a low unemployment rate compared to international standards since there are considerable cultural and labour market differences between the Japanese economy and other advanced economies. Nevertheless, in the first period of stagnation unemployment rate doubled to around 4 %. On the contrary, the period of Abenomics reversed the trend and reduced the average rate to 3.2 %. Tables 5 and 6 depict a macro-summary statistic between 3 periods: the pre-stagnation period (1971−1990), the first interval of stagnation (1991−2011), and the second part of the stagnation interval (2012−2019) which coincides with the Abenomics macroeconomic experiment to counter secular stagnation tendencies (Grabowiecki, 2019; Wakatabe, 2015).

Table 5: Macro Summary Statistics, Japan, 1971−2019

Period	Real GDP growth (% change)	Unemployment rate	CPI inflation	Money market interest rate
1971−1990 average	4.5	2.1	5.6	6.8
1991−2011 average	0.9	4	0.3	0.4
2012−2019 average	1.1	3.2	0.6	0

Adapted from World Bank (2022); IMF (2022); Japanese Cabinet office (2022); Japanese Statistics Bureau (2022).

Table 6: Macro Summary Statistics, Japan, 1971−2019

| Period	Real GDP growh per person (% change)	Multifactor productivity (% change)	Employment-to-population ratio (15+)
1971−1990 average	3.6	4.2	/
1991−2011 average	0.7	1.6	59.3
2012−2019 average	1.2	1.1	58.4

Adapted from World Bank (2022); IMF (2022); Japanese Cabinet office (2022); Japanese Statistics Bureau (2022).

One of the major characteristics of the Japanese secular stagnation period is the low inflation rate. Moreover, from 1999 until 2012 standard inflation measures (both CPI and GDP deflator) showed a constant downtrend, with average CPI inflation during the period valued at −0.29 %. Hence, the pacific nation experienced prolonged deflation in the majority of the first phase of the stagnation period. Since it is known that the CPI inflation measure has a 1% upward bias (basket of goods and services that make the CPI calculations are fixed), overall deflation was even more profound. Therefore, using the US methodology calculating the CPI index, Broda and Weinstein (2007) estimated that deflation averaged around −1.2 % in the period between 1999 and 2012. The second phase, on the other hand, experienced a rebound in inflation rates, with an average value for the second period at 0.6 %. Although the inflation rate is still considerably lower than BoJ's target, Japan managed to avoid deflationary pressures with the Abenomics policies (Wakatabe, 2015).

Another major characteristic of the Great Stagnation period is a persistent drop in stock and land prices (asset devaluation). After 1990, Japanese asset prices deflated continuously for more than two decades (in both stock and land prices). The Nikkei 225 stock index, which measures the 225 best-performing and publicly owned companies in Japan peaked in December 1989 with a valuation of 37 724 yen. However, three years later in August 1992, the value of the Nikkei 225 dropped by more than half to a mere 15 006 yen. Moreover, the stock market crash in 1990/91 had a profound and durable impact on the Japanese economy. The downtrend in Nikkei 225 asset devaluation increased in the 1990s and even further in the 2000s and reached a bottom in February of 2009 with a valuation of 7 173 yens. To say it differently, Nikkei 225 lost 82 % of its value in 18 years since the bubble burst.

Figure 14 depicts an index measure starting from the year 1984 until 2021. The left side figure shows Nikkei 225 outperformed both the S&P 500 and FTSE 100 until the year 1991. However, from 1991 onwards the slack behind them is more than obvious. The first phase of the stagnation period was therefore marked by continuous asset devaluation which had a great impact on the economy. The Japanese banks were left with bad loans and many once-successful companies became insolvent. Consequently, affected companies experienced a credit crunch as they were not able to extend their long-term financing. Furthermore, Japan's credit crunch which had a devastating impact, especially in the 1990s led to a substantial decline in domestic production and employment. Such behaviour also coincides with an overall downtrend in investment rates (deleveraging effect), which as mentioned in the previous chapter is one of the most important indicators in a secular stagnation spiral. Nevertheless, as seen in Figure 14 (right) the Japanese stock index rebounded in 2012. Shinzo Abe's office term was well received by market participants. Moreover, the Nikkei 225 reversed the trend and increased in value by more than 240 % from 2012 until 2021.

Figure 14: Stock prices: United States (S&P500), United Kingdom (FTSE100), and Japan (Nikkei225), Index measure unit (4th January 1984 = 100), January 1984–November 2021
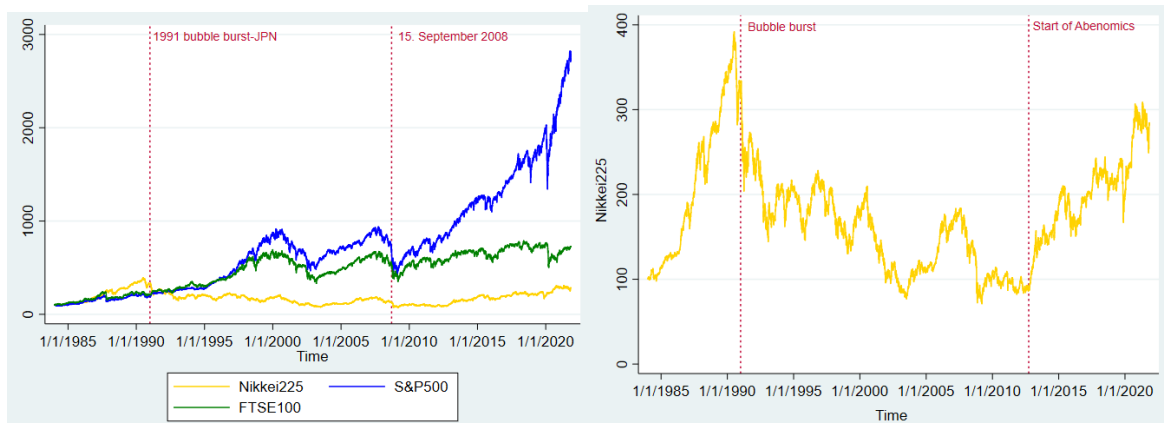
Adapted from Bloomberg (2022).

Not only the stock index but also house and land prices in Japan have bottomed in post-financial crisis years. Furthermore, from 2012 onwards we can observe a gradual trend reversal. Figure 15 depicts the house and land prices index (2000 = 100) for Japan, the UK, and the US. We can notice how the valuation of Japan's land was above both the UK and the US until 1991. However, since the 1991 bubble burst, Japanese households became poorer, at least in nominal terms, as their land assets were deflated continuously until 2010. In addition, renowned economists Carmen Reinhart and Kenneth Rogoff from Harvard University analysed various data on banking, currency, and economic meltdowns. They found that between World War two and the 2007/08 financial crisis there were five major economic meltdowns in the advanced economies. One of the "Big Five" major economic crises was also the Japanese asset price bubble in the early 1990s. However, the Japanese example stands out from the other four as persistent asset price decreases in terms of land, and stock prices lasted for nearly two decades. There is no other country, whether in Reinhart and Rogoff's research study (the Big Five) or among other developing economies that experienced such a long and persistent decrease in asset prices (Reinhart & Rogoff, 2009).

Similarly, to the stock index rebound after 2012, the Abenomics policies were also beneficial to house and land prices. As can be seen from Figure 15, the house and land price index bottomed in 2012 at 69.5 %. Two consecutive terms of Abe's government increased the index value by 14.9 %, therefore enabling Japanese households to regain some of the lost property, at least in nominal terms. Nonetheless, the land prices are still short in value from their peaks. In 2020 house and land prices were valued at 79.9 % of their initial value in the year 2000.

*Figure 15: House and Land prices: United States, United Kingdom, and Japan, Index
measure unit (January 2000 = 100), 1987−2020*
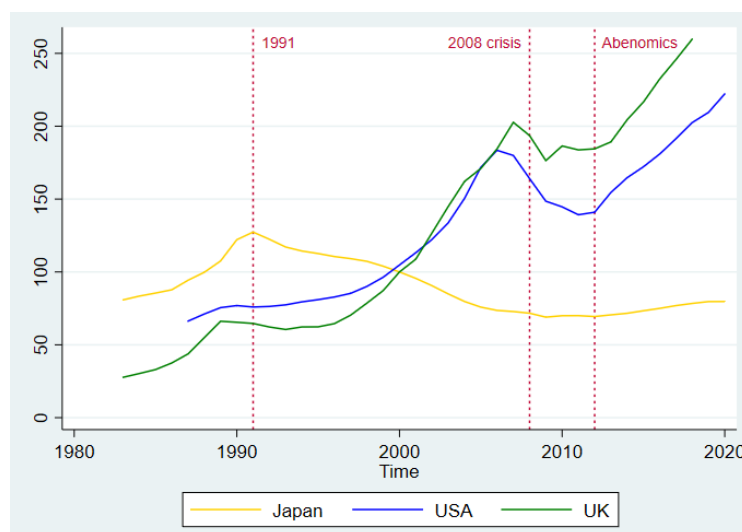
Adapted from FRED (2022).

In the previous chapter, I observed a gradual decrease in R* and what factors are responsible for its continuing downtrend. One might therefore ask, how did the Japanese transform their economy from a flourishing, rapidly expanding economy to one of the worst in the advanced world? Even if R* was in a downtrend, the trajectory to negative value would take years if not decades after the 1990s. Nevertheless, the roots of the great Japanese financial meltdown that pushed the economy into secular stagnation ahead of its time can be found in the G5 Plaza Accord, where the Japanese government agreed upon the appreciation of the yen to the dollar. In 1985 the Plaza Hotel in New York hosted various policymakers and government representatives from five most advanced economies at the time. The main objective was to reach an agreement on the possible movement of currencies between the participating nations (Grabowiecki, 2019; Wakatabe, 2015).

The Plaza Acord arrangement prompted the Japanese government to appreciate the yen against the dollar. In only two years since the gathering, the Japanese policymakers saw the rapid appreciation of the yen. Between February 1985 and December 1987 yen appreciated by more than 100 % to the dollar, from $1= ¥260.7 to $1= ¥121.4. At the time, Japan and the US had a bilateral trade dispute which presented increased political and economic issues on both sides of the Pacific. Although it is sufficient to say, that the US felt more endangered by the so-called "Japanese takeover". Japan's high-growth period and a rapid rise in purchasing power were increasingly felt in the US, as successful Japanese companies started to expand outwards. To name just a few, the Japanese conglomerates bought Rouge Steel corporation (formerly owned by Ford) in 1982, Firestone Tire & Rubber Co in 1988, film production studio Colombia Pictures and Rockefeller Center in 1989, and many more. Moreover, the Japanese expansion to the US domestic market became a trending topic all over the continent. The increased tension between both countries can be best depicted with

the 1983 picture of American autoworkers smashing the Toyota GM cars in front of the US capitol building (Wakatabe, 2015).

The rapid appreciation of the yen had a major implication for the domestic Japanese economy, as the pacific nation embarked on a "Yen appreciation recession". The real GDP growth plummeted to values not seen in Japan for most of the 1960s and 1970s. In 1986 the real GDP accounted for 1.9 %, a 69.8 % drop from the previous year. Furthermore, the unemployment rate increased from 2.7 % to 3.1 % year over year. For other advanced economies, such values would not present a drastic condition, however, in Japan, the unemployment rate above the 3 % threshold in 1986 and 1987 was the highest value since the unemployment statistics had been collected. Hence, as government institutions feared potential economic turbulence ahead, the Japanese policymakers changed their policy stance. From 1986 onwards Japan engaged in an expansionary macroeconomic policy stance. From the monetary policy standpoint, the Bank of Japan lowered the official discount rate from 4 % to 2.5 %. On the other hand, fiscal consolidation was suspended and the government drastically increased spending in order to improve domestic demand (Grabowiecki, 2019).

For a brief period of time, Japan's economy boomed again. The aggressive expansionary policies effectively resolved the yen appreciation recession. Moreover, the real GDP growth rate was valued at 6 % in 1987. Stock and land prices increased considerably, outperforming both the S&P 500 and FTSE 100 by a large margin. The Nikkei 225 index grew by more than 200% in less than 5 years. Additionally, the house and land prices appreciated by nearly 50% between 1985 and 1990. At the time it seemed that the Japanese policymakers managed to recreate the high-growth period. The flourishing economy was able to substantially increase government revenue, despite the expansionary fiscal policy. The rise in revenue was so large that the government almost achieved fiscal consolidation without tax increases. Japanese debt-to-GDP peaked in 1987 at 75 %, only to subsequently decrease in the following years to 68.7 % in 1991. Furthermore, the account balance reversed into positive values in 1988 (as % of GDP) and maintained a surplus until 1992. However, there were some in both government and BoJ who voiced concerns about the economy's overheating (Wakatabe, 2015).

The challenge Japan faced was to tighten the policy in order to stabilize the out-of-control asset valuations without tipping the economy into a recession. At the end of 1989, the BoJ's new governor reacted to the social and political problem of elevated asset prices by increasing the official discount rate from 2.5 % to 6 %. At the same time, the government imposed a 3 % consumption tax in 1989. As a result, asset prices plunged, consequently inflicting a great disturbance on banks' and firms' balance sheets. A period of deleveraging and sluggish economic performance was on the horizon. What started with one policy mistake in the aftermath of the Plaza Accord (appreciation of the yen), ended with a series of mistakes that held Japan's economy crippled for two consecutive decades (Wakatabe, 2015).

3.2   After the Bubble and Before Abenomics

In the previous chapter, I observed that secular stagnation tendencies are visible even before the actual sluggishness reaches the economy. Furthermore, the economic breakdowns only expedite the process of spiralling into a prolonged period of stagnation. Reacting with sufficient policy tools to counter the economic crisis is therefore necessary. However, with indicators pointing at the possible prolonged stagnation, countercyclical conventional policy tools need to be accompanied by structural reforms. Hence, secular stagnation can only be overcome with an interchangeable policy mix where structural reforms also play an important role.

The first part of Japan's Great Stagnation period can be characterized by its sequence of macroeconomic mistakes that followed the 1991 crash. If policy mistakes leading to the bubble conditions are side-lined, as in fact bubbles in various asset classes come and go through history, the policy mistakes in the aftermath of the bubble burst are crucial in understanding the prolonged slack in the Japanese economy. For example, in the late 1980s, many advanced economies, including the resilient Nordic countries experienced asset bubbles and consequently their collapse. However, what is distinctive about the Japanese bubble was the prolonged stagnation that followed, which apart from secular tendencies described in the SS part of the master's thesis can also be attributed to the insufficient and to some extent disordered reaction by the Japanese institutions. The institutional (both government and BoJ) policy responses can be described as "doing too little, too late" with a "stop and go" approach. Consequently, coordination between fiscal and monetary policy was often contradictory, reducing the effects of each policy stance.

With a combination of fiscal stimulus, monetary easing, and deregulation initiatives Japanese economy was able to bounce back from the initial shock that paralyzed the pacific nation in the early 1990s. Through the years 1995 and 1996, the economy grew by five per cent on yearly basis, the highest growth rate among the Group of Seven industrial economies. The expansionary fiscal and monetary policy was followed by an increase in consumption tax from 3 % to 5 % in 1997. Such a measure marked the first step toward fiscal consolidation, and according to economic forecasters (including those at the IMF) growth trajectory was presumed to resume shortly after, as is expected in a normal cyclical recovery. Nevertheless, the economic activity failed to revive and the period that followed was marked by unusual coordination of fiscal and monetary policies. Figure 16 shows the activity of fiscal and monetary policy in the period from 1995 until Abe's office term in 2012. Fiscal policy is presented by a % change from a previous period in public investment, while on the other hand monetary policy is defined as a % change from the previous period in the monetary base. In the years after the bubble monetary policy quickly became too tight since it hit the ZLB on interest rates. Furthermore, fiscal policy played an important role in alleviating the initial shock after 1991, however, from 1995 onwards it became consistently inconsistent. It expanded, contracted then again expanded with more than a usual pattern in a period from 1995 until 2000 (Bayoumi & Collyns, 2000).

Figure 16: Japanese Failed Macro Policy Mix, quarterly 1995−2012 (% change from previous period)
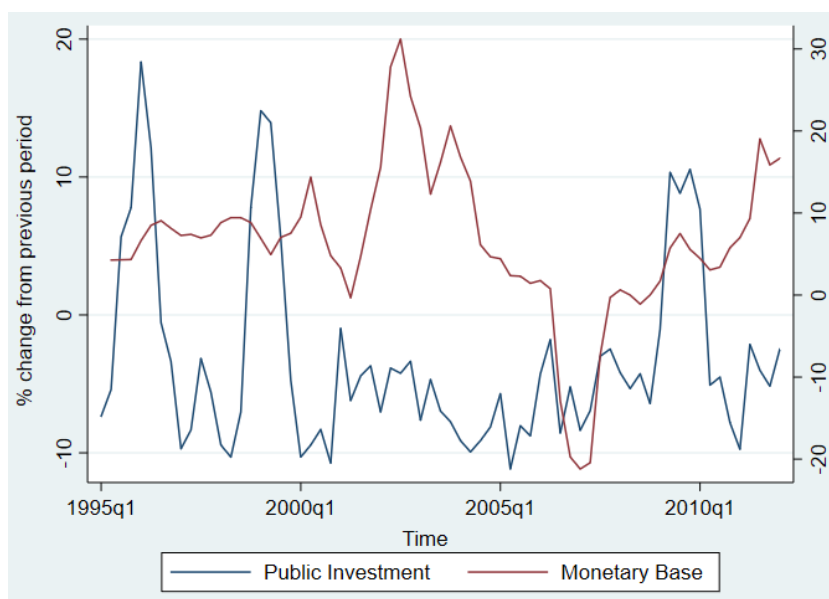
Adapted from FRED (2022); Bank of Japan (2022).

Even after the year 2000 during a conservative government leading recovery, fiscal policy played a contractionary role (quarterly change in public investment averaged −6.7 %), while on the other hand monetary policy was expansionary. Furthermore, after reaching the ZLB, BoJ first experimented with the zero-interest-rate policy (supplying low-cost borrowing to companies and individuals), however soon after introduced quantitative easing in early 2001. The period from 2001 to 2006 therefore, saw a contradictory policy stance, since monetary policy became extremely expansionary with QE, while fiscal policy was contractional. From 2001 to 2004 monetary base change averaged 17.8 % from quarter to quarter, only to subsequently decrease until 2006. From the third quarter of 2006 onwards, together with the post-Lehman shock period (2009 and 2010), monetary policy became contractionary, while on the other hand fiscal policy became expansionary for the first time since 1999. What figure 16 therefore depicts is that policymakers in Japan kept making problematic decisions through the first period of stagnation, up until the Abenomics era. Monetary and fiscal policies have rarely been coordinated in the period from 1995 until 2012. Their stance was either contractionary or expansionary but never coordinated. To some extend such behaviour of Japanese institutions led to prolonged stagnation of the Japanese economy. Hence, during the first period of stagnation, Japanese policymakers have not conducted a coordinated expansionary policy mix, consequently failing to revive economic activity (Fasano-Filho, Wang & Berkmen, 2012).

One positive acknowledgement from the first part of the Japanese stagnation is that monetary policy alone is not capable of overcoming secular stagnation tendencies. Although many academic types of research have yielded different results on the effectiveness of QE, most

of them point to a limited effect on economic activity. While numerous papers found evidence that QE helped to reduce long-term yields, its effects on economic activity and inflation in the period between 2001 and 2006 were small. Consumer prices did rise modestly to values closer to 0, however, the inflation period still averaged −0.3 %, far from the BoJ official target. Similarly, to inflation figures, GDP growth stalled without a significant move in either direction, averaging around 1.3 % on yearly basis. Reasons behind the inefficiency of QE can be found first (1) in a dysfunctional banking sector, which in turn weakened the credit channel, and second (2) in corporate weak demand for loans (deleveraging of Japanese companies). Structural reforms which would adapt the Japanese economy to a new normal and set conditions for the future revival of growth came too late, or they were not addressed at all (Fasano-Filho, Wang & Berkmen, 2012).

What contributed to Japan's Great Stagnation and its insufficiency in dealing with secular stagnation tendencies can be thus summarized by the following factors:

Demand Side

a. Consumption and investment remained stagnant throughout the period, indicating insufficient monetary policy (QE) and persistent deflationary expectations rooted in the Japanese society.
b. Consistent fall off in public expenditures through fiscal tightening. Moreover, together with expansionary monetary policy Japanese institutions conducted an uncoordinated policy mix. On the other hand, structural reforms were mainly unattended or poorly addressed.
c. Shortage of investments through the malfunctioning financial sector. Reforms in the banking and financial sector came too late, allowing systematic banking crises to further weaken the economy.

Supply Side

a. Productivity growth in Japanese firms stagnated or even declined. The lack of reforms that would tackle stagnating productivity rates is still present to this day. Weak companies have to be allowed to go bankrupt, in order to clear the economy of zombie firms. In addition, subsidies are still provided to companies to retain workers even if they are no longer needed.
b. Adjustment in the economy's industrial structure was slow, preventing firms to improve competitiveness and consequently raise productivity growth.
c. Bank's misallocation of capital. Many Japanese banks lent additional money to companies so that they would be able to meet interest payments, while others were left behind. For example, in 1994 lending rates increased to real estate and construction companies, while lending to other sectors declined (Hays, n.d.).

The list above can no doubt be extended as economists reach different conclusions when researching the Japanese Great stagnation. However, the consensus all can agree on is that

Abenomics did solve some of the above-mentioned failures. For starters, since 2012 Japan has conducted a coordinated policy mix for the first time in recent history. In the next subchapter, I will therefore explain the concept of Abenomics and asses if the proposed macroeconomic policies were effective in reviving economic conditions in Japan. Was Abenomics able to end the Great stagnation of the Japanese economy or at least set the guidelines on how to end it?

3.3 Theory and Assessment of Abenomics

The centre-right Liberal Democratic Party (LDP) is one of the oldest political parties in Japan. It governed the pacific nation continuously from 1955, with only two exceptions in 1993 and 1994. Shinzo Abe, a member of LDP first took the office of Prime Minister of Japan in 2006, however, resigned from the office in 2007. After his failed first term as head of the Japanese government, no one expected he would return to the political floor again. Nonetheless, he returned in 2012 with a strong and decisive message for both the domestic and international public: a policy package in literature commonly known as Abenomics (Grabowiecki, 2019; Roberts, 2020).

The main goal of Abenomics is to end the three decades of stagnation and deflationary pressures on the Japanese economy. Furthermore, when Abe in late 2012 campaigned for the seat of prime minister he decisively promoted Abenomics as a tool to end secular stagnation in Japan. Something his political peers have failed at for the last two decades. "I will break down any and all walls looming ahead of the Japanese economy and map out a new trajectory for growth." was the decisive massage from Abe to the Japanese people. Moreover, to break down walls in the Japanese economy he combined various policy proposals of mainstream economics into one, unexpectedly praised by both neoclassical and Keynesian schools of thought (Government of Japan, n.d.).

The concept of Abenomics, therefore, goes beyond Japanese politicians and economists. Both Ben Bernanke, a former head of FED, and Paul Krugman, the Nobel Prize winner and a leading advocate of Keynesian economics were invited to advise the Japanese cabinet office on how to address secular stagnation in Japan. Bernanke, a leading monetarist proposed that BoJ should reduce the interest rate and inject large sums of credit into the economy via QE. While on the other hand, Paul Krugman supported the idea of his colleague, he put forward increased government spending in order to stimulate AD. In great need of ending the Japanese Great stagnation, Abe adopted both policy recommendations of mainstream and Keynesian economics. Furthermore, to strengthen the future growth prospects, he added a parallel set of policies, structural reforms (Roberts, 2020).

3.3.1 Concept of Abenomics

When at the end of 2012 Abe's term started, he declared that the Abenomics policy mix will achieve an average 2% real GDP growth rate within the next decade. Furthermore, he agreed to support the private sector, increase the inflow of foreign direct investments (FDI), promote the export of Japanese goods, and resolve the labour market of its inefficiencies. Shinzo Abe's ambitious new economic program is constructed from three different sets of policies. Together they represent a macroeconomic experiment to end the secular stagnation tendencies crippling the Japanese economy. The approach to breaking from the past and forging a new, progressive future is based on the so-called three arrows strategy, which consists of (1) expansionary monetary policy, (2) flexible fiscal policy, and (3) growth strategy. Together the three arrows approach was and still is expected to raise the Japanese economy out of a deflationary bad equilibrium and on a path of sustainable growth (Grabowiecki, 2019).

Figure 17: Three Arrows Strategy
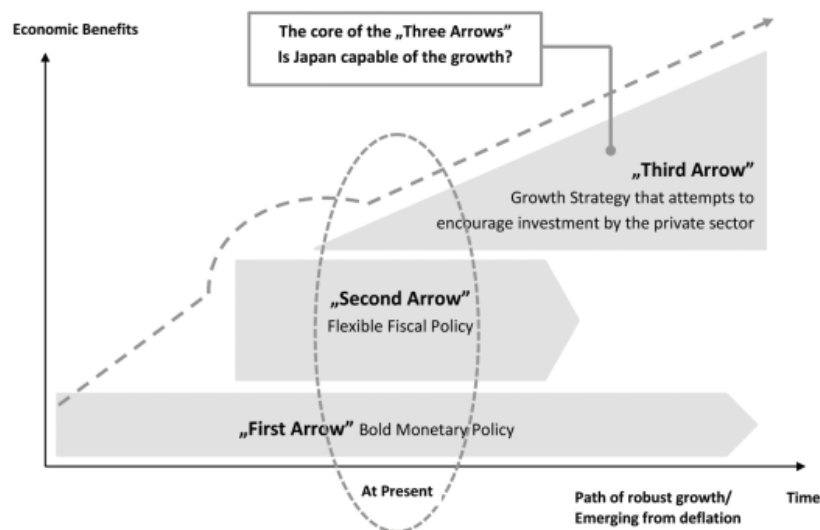
Adapted from Grabowiecki (2019).

To better understand the Japanese current economic model, we have to explain the preliminaries of Abenomics and how each arrow contributes to lifting the pacific nation's economy out of the stagnation environment, at least from a theoretical point of view. To succeed all three arrows, need to be synchronised to yield the best economic benefits. The logic behind the three arrows strategy can be summarized in Figure 17.

The first arrow: expansionary monetary policy

The first arrow of Abenomics was launched as soon as S. Abe became prime minister of Japan in early 2013. Both the government and the BoJ delivered a joint declaration to curb deflationary pressures and achieve robust economic growth. Abe directed the BoJ governor

H. Kuroda to increase its inflation target from 1 % to 2 % and engage in quantitative and qualitative easing (QQE) to achieve its goal. Such monetary policy is a result of Keynesian prescriptions often viewed as necessary in recession periods. The expansionary monetary policy inside the first arrow refers to an increase in the monetary base by the BoJ through its unconventional measures, i.e., QQE, forward guidance of interest rates, and/or future asset purchases. Hence, the Bank of Japan started buying long-term government bonds and consequently already increased the monetary base by 157% until mid-2015. Such an approach was, however, different from those in the past, as expansionary monetary policy in the period between 2001 and 2006 focused mainly on buying short-term government bonds. Moreover, there was a change in the quality of purchasing assets by BoJ. From 2012 onwards, BoJ started purchasing assets with higher risk profiles, e.g. private equities in exchange-traded funds and Japanese real estate investment trusts (Grabowiecki, 2019; Yoshino & Taghizadeh Hesary, 2014).

However, Japan's path to a sustainable growth trajectory first needs to address deflationary expectations in both household and corporate sectors. In order to face deflationary expectations in the economy, one may as Krugman described in his 1998 study of a liquidity trap (Krugman, Dominquez & Rogoff, 1998); (a) decrease the value of money in circulation by increasing the monetary base - approach implemented by BoJ, (b) increase the value of goods, services, and producers by temporarily purchase larger quantities, and/or (c) increase the value of goods, services, and the individuals who manufacture them by finding novel and better way to utilize them. The main objective of Abenomics is therefore to increase the expected inflation rate through an increase of the monetary base, which would consequently return the economy to inflation target equilibrium and sustained growth (Wakatabe, 2015).

In the first stage of reviving the Japanese economy, the first and the second arrows are considered catalysts of a greater domino game in the Abenomics transmission mechanism. Similar to a domino game, the first course of action is the key to success as it produces a chain reaction, and the rest follows in proportion with economic theory logic. The key starting point is increasing the expected inflation rate through the increase in the monetary base as can be observed in Figure 18. If the expansionary monetary policy (first arrow), with some help from the second arrow (fiscal policy), follows through in generating enough inflationary expectations, the real interest rate decreases. Furthermore, the decrease in real interest rates has implications on three fronts. First, it affects the value of asset prices, especially the stock market. Since the stock prices already incorporate information about the near future, lowering the real interest rate would translate into future improvements in the corporate earnings and consequently increase asset prices at present. Secondly, a decrease in the real interest rate would stimulate the correction in the exchange rate i.e., depreciating the yen. And thirdly, the reduction in real interest rates should increase the capital and housing investment rates. However, the extent of sensitivity between the two variables varies (Wakatabe, 2015).

These effects prompted by the first arrow, combined with an increase in government expenditures from the second arrow, would, in turn, increase AD, one of the main shortcomings in the secular stagnation phenomenon. Consequently, an increase in aggregate demand would improve the output gap, which leads employees and their companies to operate at their maximum efficiency levels. With the output gap closed, there are no spare capacities in the economy. Furthermore, demand for loans and labour should increase, which would in turn positively affect workers' wages. The economy in such an environment should be able to achieve strong growth rates and escape the deflationary bad equilibrium. The visual presentation of the Abenomics transmission channel is depicted in Figure 18 (Grabowiecki, 2019).

Figure 18: Transmission channel of Abenomics, first and second arrow (QQE)
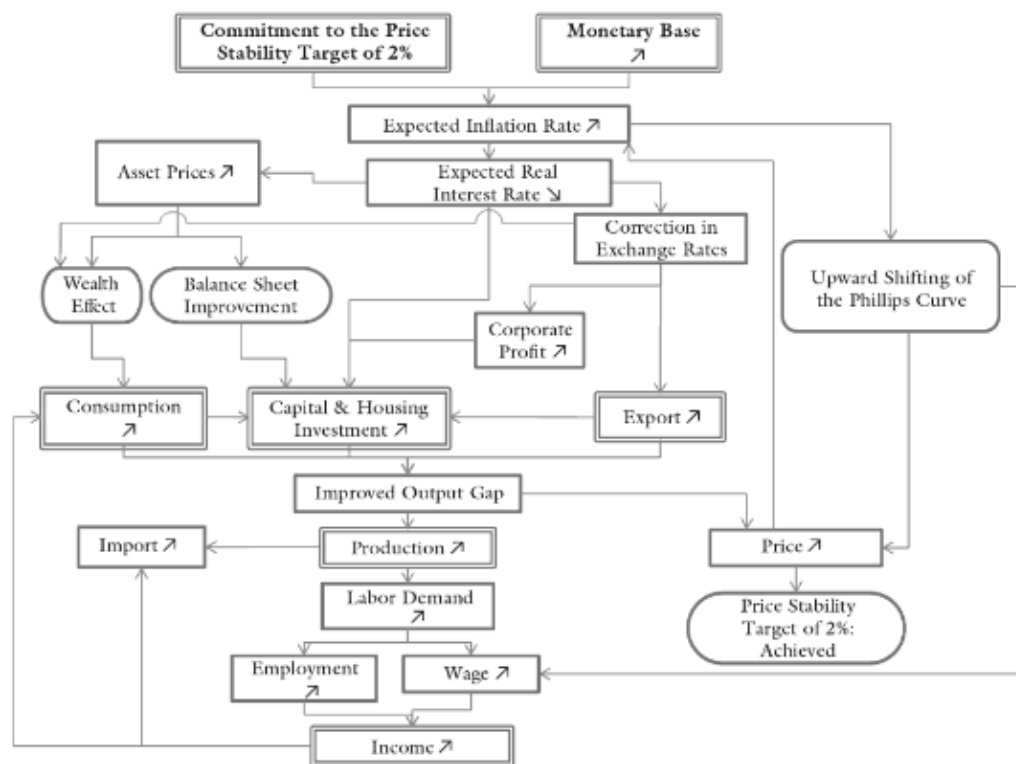
Adapted from Iwata (2014).

The second arrow: flexible fiscal policy

The effectiveness of fiscal policy has been questioned many times in Japan. Since the start of the stagnation period in the 1990s Japanese policymakers tried it intermittently. However, it never succeeded in getting Japan out of a prolonged stagnation environment. One explanation for inefficiency can be found in Figure 16, where the expansionary fiscal policy often occurred in more than a usual (inconsistent) pattern, sometimes even with large short-term bursts followed by a sharp drop.

Uncoordinated policy stance between monetary and fiscal policies diminished their effects and never provided the answer to ending the long stagnation. Nevertheless, Abe's program revived great interest in fiscal policy. Comparing the data from Figure 16 and Figure 19 shows how Abe's government and BoJ conducted a coordinated policy response for the first time since the end of the 1990s. Both monetary base (% change from the previous period) and public investment (% change from the previous period) increased substantially from 2012 until mid-2014. Even though the intensity of both policies decreased from mid-2014 onwards on average both stayed expansionary and coordinated. With it, Japan was able to record a 2 % GDP growth rate in 2013. A notable start to Abenomics program, although still in an unfavourable economic environment (the aftermath of the financial crisis, together with the earthquake and tsunami had a profound consequences). The average growth rate from 2012 until 2019 almost doubled compared to the average from the first period (1991−2011). Furthermore, inflation soared to 2.8% in 2013 and doubled its average period value to 0.6 %. Although it remained short of the BoJ target, Abenomics policies managed to raise the economy out of a deflationary bad equilibrium.

Figure 19: Japanese Coordinated Macro Policy Mix, quarterly 2012−2021 (% change from previous period)
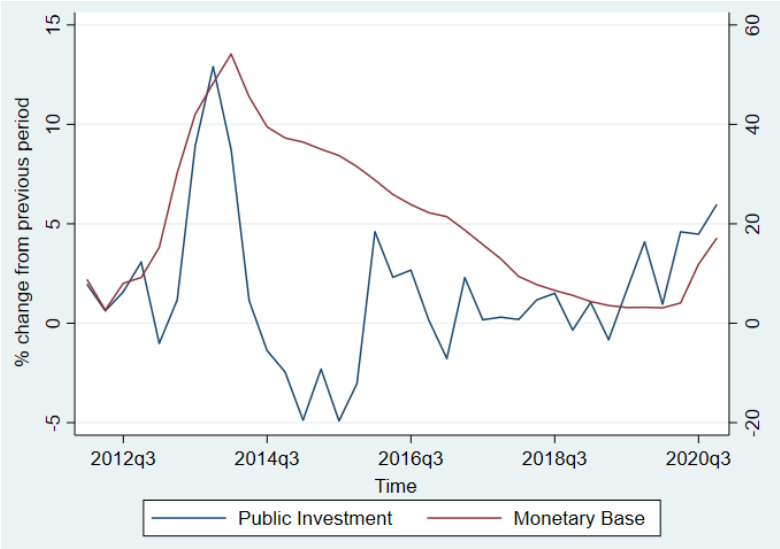
Adapted from FRED (2022); Bank of Japan (2022).

However, many recent empirical studies on the Japanese economy showed measures of initial fiscal policy became less effective during the prolonged stagnation. Department of Economy and Social Research Institute at the Cabinet Office, a governing body of Japan constructed a short-term macroeconomic model which shows that the fiscal multiplier declined in the last two decades. For example, a multiplier for public works has steadily declined from 1.33 at the start of the long stagnation to 1.07 in 2012. Similarly, studies by Japanese economists Kato (2002) and Watanabe. Ninomiya, Aoyama & Nonaka (2008) found negative trends in multipliers. Therefore, to increase the effectiveness of fiscal policy

in the post-Abe environment the Japanese government should use other measures available. Namely, tax cuts or direct payments to the general population (Wakatabe, 2015).

On the other hand, the Japanese debt-to-GDP ratio increased from 39.6 % in 1992 to 184 % in 2012 when Abe started his first mandate. Furthermore, the ratio increased with Abe's term and peaked in 2014 with a value surpassing the 200 % mark. The Japanese economy however managed to reduce the debt burden below 200 % in 2016 and remained there until the Covid-19 pandemic. Nonetheless, the gross government debt exceeded 10 trillion dollars in 2013. The political circles in Japan, therefore, voiced concerns over the growing debt burden, and as a consequence vocalized in favour of fiscal consolidation. The most frequent measure is the consumption tax hike which Japan already increased two times (in 1994 and 1997). Figure 20 shows how the consumption tax hike influenced real household consumption and overall GDP (in 2015 chained billion yen). Real household consumption in the Japanese economy fell by more than 8 000 billion yen after the 1997 consumption tax hike. Furthermore, the economy surpassed the before-hike consumption value in the third quarter of 2000, indicating that consumption growth stalled for roughly 4 years due to the tax hike. The consumption tax introduced during Abe's term had similar profound consequences. In particular, the growth of real household consumption which peaked in 2014 never reached comparable numbers again.

Consumption expenditure by households represents the largest component of gross domestic product (in Japan private consumption makes up roughly 60 % of the total GDP). Stagnating real household consumption since 2014 can therefore be one of the reasons why Abenomics missed its goals of reaching 2 % growth over subsequent years. Since the pacific island is suffering from a strong case of secular stagnation where AD is already low, stimulating consumption instead of discouraging it should be the right path forward. Furthermore, achieving the inflation target with fiscal spending should be a priority over fiscal consolidation in the case of the Japanese economy. Indeed, growing debt is an important segment of a healthy economy and needs to be acknowledged continuously, however, the Japanese economy was not ready to address the state of affairs (debt levels) at the time. Strong economic conditions need to be achieved before undertaking actions of fiscal consolidation. The Japanese economy did not achieve them in 2014 although the first two years of Abe's program pointed towards successful Japanese recovery and a potential end to secular stagnation. Moreover, real household consumption never reached pre-2014 levels when the economy was once again constrained by the 2019 tax hike. Although debt levels stabilized with cumulative tax hikes, it was Abe's economic experiment in the end that fall short of its potential.

Figure 20: Slower growth of Real household consumption (right) and Real Gross Domestic product (left), quarterly 1994−2021, Billions of Chained 2015 Yen
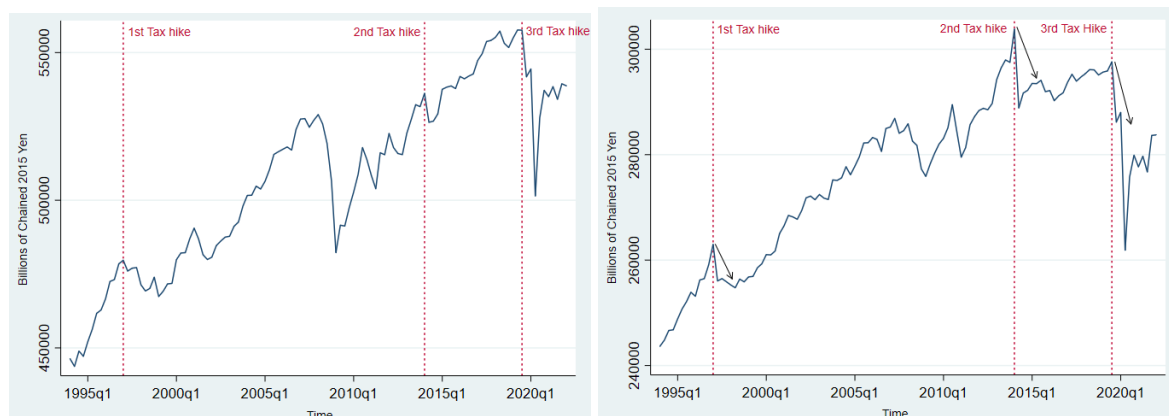
Adapted from FRED (2022); Japanese Statistics Bureau (2022).

To summarize, the second arrow with its large fiscal package effectively supplemented the first arrow until 2014. However, the first two successful years of Abenomics were interrupted by consumption tax which was arguably introduced too early. As a consequence, the Japanese economy edged back into a recession period at the end of 2014, as households were reluctant to increase consumption. The question which comes forward at such a point is, therefore, how close is the Japanese fiscal condition to a crisis. Was fiscal consolidation necessary at the time? After all the gross national debt in 2014, the year of consumption tax hike reached more than 11,435,842 million dollars. High numbers of Japanese debt could be labelled as critical on paper, but on the other hand, if those numbers indicate a potential Japanese default or rescheduling of its interest payments, the Japanese government is far from such a situation. I found the most straightforward answer by analysing the premium on the credit default swap of Japanese government bonds, a substitute term for default likelihood. Japanese 5 years credit default swaps (CDS) peaked in early 2012 at 155,77 basis points. However, declined continuously after 2012, reaching around 40 basis points in mid-2014. Namely, the value of 40 basis points reflects a probability of less than 1 % default of the Japanese government according to the financial markets platform Investing.com. For comparison, Spain's CDS was valued at 132 and Italy's at 172 basis points in 2014. Japan although with high debt-to-GDP ratio has a small default probability, hence the consumption tax hike of 2014 was economically a mistake which jeopardised the success of Abenomics as a whole. Fiscal consolidation in Japan should therefore come from robust economic growth, especially increasing nominal gross domestic product instead of tax hikes (Chandler, n.d.; Wakatabe, 2015).

The third arrow: growth strategy

While the first and second arrows are intended as short to medium-term policies to tackle secular stagnation, the third arrow is needed to promote the sustainable long-term growth of the Japanese economy. At the beginning of his term, the newly elected prime minister titled

the third arrow as Japanese Revitalization Strategy: Japan is Back. Since 2012, however, the official name of the growth strategy has been revised frequently, nonetheless, the goal remained unchained; to create a prosperous economic and business environment where increased investment activities are present and labour participants can realize their potential to the fullest. Moreover, the third arrow consists of much-needed structural reforms by which the governing body seeks to strengthen Japanese competitiveness, reduce energy constraints, and improve the domestic innovation ecosystem (Grabowiecki, 2019; Shibata, 2017).

Abe's initial plan in the Japan Revitalization Strategy (JRS) had largely depended on reforms on four fronts. Namely, (a) the promotion of investment, (b) the strengthened utilization of human resources (i.e., reverse the fall in productivity growth rates), (c) the creation of new markets (deregulation), and (d) global economic integration (Trans-Pacific Partnership). Overall, the third arrow is viewed by the Cabinet Office as the most influential part of Abenomics and the most important for the Japanese long-term economic growth.

However, the strategy lacks an in-depth analysis and discussion of which part of the strategy contributes to economic growth and most importantly how. The Abe administration soon started implementing the first reforms, which include corporate tax cuts (from 38 % in 2012 to 30.62 % in 2020), improving corporate governance, encouraging private equity through an increased role of venture capital, and stimulating novel innovation through R&D. As I identified in the first part of the study, secular stagnation has its roots in decreased investments rates. Hence, reducing the corporate tax to increase the investment rates is a necessary stimulus to the economy. Gross fixed capital formation reversed the trend for the first time since the crisis began in 1991, rising from 21 % of GDP to 26 %. Furthermore, the capital investment in the manufacturing industry increased from 11 trillion yen in 2012 to 15,2 trillion yen at the end of 2019. Hence, an increase of 38 % from the start of the Abenomics program.

In addition, the private non-residential investment which remained on average stagnant at around 75 trillion yen in the first period of the Great Stagnation, increased considerably during Abenomics' tenure. From 2012 until 2020 private non-residential investments increased by 16.2 trillion yen (from 71.9 to 88 trillion yen). Moreover, before Covid-19 had its effects on the industry in late 2019, private non-residential investments even surpassed the 90 trillion threshold for the first time in Japanese history (Shibata, 2017).

Favourable data indicating the success of the first part of the growth strategy or JRS can also be seen analysing the Global Innovation Index, where countries are ranked by their capacity for and successes in the field of innovation. When Abe started implementing Abenomics reforms to the Japanese economy, Japan was ranked 25th overall, the last in the group of G7 nations. Within Abe's tenure and with the promotion of investment in the innovation field, however, Japan steadily improved its position within the index. In 2015 it ranked 19th, and when Abe stepped down in late 2020 the pacific nation reached 13th place, its best position since the 1990s. Increased investments in innovation by both government and enterprises

have shown that new ideas are critical for overcoming stagnation tendencies and ensuring long-term growth. Furthermore, as an important component of aggregate demand, it positively affects the natural real interest rate, which downfall Japan desperately needs to reverse. Through an in-depth analysis of investment activities of the Japanese public and private sectors, I noticed that deleveraging effect which curbed the economy through the 1990s and early 2000s is mostly over. Furthermore, investment activities are no longer stagnant and have positively affected growth rates through the years of Abenomics.

The second package of the third arrow reforms focused on reversing the downward trend in productivity growth rates. It aimed at boosting productivity by cutting the red tape, reducing the corporate tax rate, and expanding the workforce by encouraging the participation of women, the elderly, and immigrants. However, the average productivity growth in the Japanese economy was still well below the OECD countries and the lowest among G7 nations. Data from the OECD database show that Japanese workers created on average 46.2 dollars in gross domestic product for every hour worked in 2017, while an average of G7 nations accounted for 61.7 dollars and the OECD averaged 51 dollars. While the gap between OECD and Japanese workers widened constantly through the Great Stagnation period, the Abenomics reforms halted the further drop in compared values. If the Japanese worker in 2001 produced 2,8 dollars per hour less (39.6 vs 42.4 dollars) than an average worker in the group of OECD countries, the gap widened to a 4.5 dollars difference in 2011. Moreover, at the start of Abe's tenure, the gap was at 4.7 dollars and steadily decreased to 3.9 dollars in 2016. Although reforms made some progress in hourly labour productivity convergence with the rest of the OECD countries in Abe's first term, the second term did not continue the trend, as labour productivity again stagnated until Covid-19. Furthermore, analysing the total factor productivity (percentage change from a year ago) for two periods, namely from 1993−2006 and 2012−2019 we can notice that on average growth rates remained stagnant at 0.7 %.

While the Japanese manufacturing industry remains a global productivity leader, the service and non-manufacturing sectors had fallen behind. Data for manufacturing and non-manufacturing sectors (value added per worker) reveal that while the manufacturing sector remained in a strong uptrend, reaching more than 80 thousand dollars per worker in 2018, the service sector remained stagnant since the early 2000s. Productivity growth in the service sector which presents more than 75 % of GDP decreased from 67 thousand dollars per worker in 2012 to 64 thousand dollars in 2019. To put it differently, the service sector value added per worker in 2019 was the same as in 1997 – labelling it a non-growth sector. These data indicate that low productivity growth rates come from the service sector rather than the manufacturing sector. Abe's reforms, therefore, had a beneficial effect on the manufacturing sector, although the marginal effect is lower since it already enjoys advanced technology and high productivity rates. On the other hand, Abenomics did not increase productivity in the service sector. Conventionally, Japanese industrial workers are working with the best machinery available (next-generation technology) while on the other hand, non-

manufacturing sector workers work with the last-generation technology. In addition, while the manufacturing sector at best, slowed investment activities in the Great Stagnation period, the service sector at first over-invested (consequently being paralyzed by the deleveraging effect) and under-invested afterwards.

Stagnant productivity growth in Japan's economy can also be found in inadequate competitive pressure (zombie firms are still present) and a rigid labour market. In a thriving market economy, competition fuels productivity, as the most innovative companies outperform the less efficient ones. On the other hand, Japan still has some highly indebted corporations and uncompetitive sectors that have often been kept alive because of overall market stability. Additionally, entry barriers are still present in the economy, making it difficult for new entities to challenge incumbents in certain industries. Studying Doing Business Report by World Bank indicates that Abe's reforms did not tackle inefficiencies in this field. In fact, analysing an Ease of Doing Business index which indicates better, simpler business regulation and the intensity of property rights protection, I noticed that during Abenomics Japan's rank deteriorated. In 2012 it ranked 20th, which is comparable to Germany (19th) and Latvia (21st). However, it deteriorated to the 39th position in 2019. The regulatory environment to conduct business activities, therefore, declined considerably during Abenomics. Consequently, failing to stimulate a competitive environment and with it continues to apply downward pressure to productivity growth rates.

While JRS reforms to establish a more flexible labour market have mostly stayed on paper, Abe's strategy successfully improved labour force participation by promoting the employment of women. The deteriorating labour force participation rate has been in a downtrend since the 1960s and during the Great Stagnation, the process was only expedited. Furthermore, declining labour force participation can slow the growth of gross domestic product since fewer people are contributing to the nation's overall output. The third arrow reforms increased the labour force participation rate from 59 % (of the total population ages 15+) in 2012 to 62 % in 2020. Moreover, the female labour participation rate increased from 41 % (of the total labour force) in 2012 to 44 % in 2020. An ageing population and low women participation (compared to other OECD countries) did in some part affect the low growth rates in GDP in the pre-Abe period. Abe's promotion of women into the labour market to some extent alleviated the demographic difficulties and converge Japan's female labour force participation rate to other OECD countries, with it stimulating the Japanese nominal GDP. Nevertheless, the female participation rates are still below most developed countries (i.e., the EU and USA), which means Japan has more upside potential on it.

While the Japanese policymakers acknowledged that the lifelong employment model needs to be averted to a more flexible employment model, changes remained limited. Inefficient bureaucracies still restrain workers to move quickly and easily through the labour market. Furthermore, many Japanese workers are reluctant to change their employers and potential careers. Consequently, limiting their incentives to develop new skills and increase productivity rates. The issue of a rigid labour market was therefore poorly addressed,

although the new legislation allowed companies to hire temporary workers. In 2013 more than 1/3 of the labour force were employed as non-regular workers, many of them being female workers whose participation rate increased. However, temporary workers tend to have a lower motivation to excel, and as consequence employers are reluctant to invest in their development. Hence, constraining the productivity rates further. The absence of results in terms of growth stimulation in the JRS can thus be attributed among other things to inefficient labour market reforms (Matsumoto, 2020).

The last two factors from JRS i.e., the creation of new markets and global economic integration, can be labelled as two successful Abenomics policies. At first, the Trans-Pacific Partnership (TPP), which according to Cabinet Office estimates would benefit Japanese economic growth by more than 2 % by 2030 and increase exports by more than 20 billion dollars annually seemed like an outright win to Abe's third arrow strategy. However, the trade agreement never came to force due to the United States' withdrawal. Nevertheless, Abe whose economic program was heavily dependent (through the third arrow) on TPP managed to convince the remaining partners to redraw the initial agreement. In March 2018 the remaining partners signed the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (hereafter: CPTPP), which came into force in early 2019. After the failed TPP ratification, Japan became the leader in negotiations of CPTPP and soon became the dominant power within the agreement. The agreement includes trade liberalization (abolition of tariffs), rulemaking and institution-building, and multilateral negotiations. Although trade liberalization will have the greatest effect on long-term GDP, rulemaking, and institution-building are also important since they restructure the trade flows from goods to services. Hence, the service sector which has been stagnant since the 1990s should be able to benefit the most from the increased competition (consequently also increasing sector productivity) and newly available markets. The economies participating in the trade agreement present more than 13 % of global GDP (in nominal terms more than 13,5 trillion US dollars). Furthermore, the CPTPP joined the group of the world's largest free-trade areas by gross domestic product, alongside the United States-Mexico-Canada Agreement (USMCA), the European Single Market, and the Regional Comprehensive Economic Partnership. Whether the ratification of CPTPP was beneficial to the Japanese economy and most importantly to what extent remains to be seen (Wakatabe, 2015).

3.3.2 The Assessment of Abenomics

Throughout the master's thesis, I have already indicated some of the achievements and failures of Abenomics policies. In this subchapter, on the other hand, I will quantitatively assess each category of the transmission channel, to confirm if and where the first and second arrows triggered the expected outcome and where the bottlenecks might have occurred and consequently reduce the Abenomics success rate. As described in the previous subchapter, the Abenomics transmission channel is similar to a domino game, where the performance of the next step is determined by its previous step. There are 17 categories in the channel, and

each one of them needs to perform according to estimates to yield the expected outcome. Hence, to achieve price stability and an inflation rate close to CB's target, which is close to but below 2 per cent.

I will analyse quarterly data of each category in the transmission channel (variable) and look for possible structural breaks at an unknown date. A structural break is when a time series suddenly changes at a point in time. Such a rapid change in data could involve a change in the mean or any other parameter observed in a time series. Moreover, structural break tests are beneficial in studying whether there are significant changes in our data, consequently pointing towards policy outcomes. If the structural break is not identified, the trend remained stagnant throughout the period, indicating policy failure. Performing tests will involve computing the Wald statistics for locating a break in trend. In order to decide whether to reject or accept the null hypothesis, the statistical significance will be observed on three different intervals. Namely, (1.) $\alpha = 0.1$ %, (2.) $\alpha = 1$ %, and (3.) $\alpha = 5$ %. A P-value lower than α will therefore indicate strong evidence against the null hypothesis (H_0: No structural break). All results of hypothesis testing are presented in Table 7.

Commitment to the price stability target of 2 per cent starts with an increase in the monetary base. The Bank of Japan increased the monetary base by 300 % from 2012 until 2020. An aggressive change in trend (structural break already identified in the first year of Abenomics), which remained without significant moves from 2003 onwards. Although trend intensity slowed in the second half of 2017, the commitment to aggressive monetary policy remained. On the other hand, expected inflation remained constant throughout Abe's period. Data from the BoJ database indicate an average of 3 % expected inflation in 1 year (based on household surveys) and 2 % expected inflation in 5 years. Moreover, there were no structural breaks found in Abe's 8-year tenure. However, researching the data beyond Abe's term shows a structural break in the fourth quarter of 2020 (one quarter after Abe's resignation). An increase in the monetary base, therefore, did not have any effect on expected inflation.

The next figure in the domino game is the expected real interest rate. The expected real interest rate had already been decreasing throughout the first period of the Great Stagnation. Furthermore, together with the actual real interest rate, which became negative for the first time in 2016, the BoJ attempted to encourage borrowing and spending in the economy. Both expected and actual real interest rates, therefore, reached zero lower bound in Abe's term. Hence, providing only a limited amount of stimulus to the economy. Nevertheless, the cheap money policy benefited Japanese stock prices. Abe's election was well-perceived by market participants and Nikkei 225 stock index increased by more than 170 % from 2012 until 2020. A long-lasting downtrend in Nikkei 225 index, which dragged from the 1990s had finally reversed within Abe's term. Another structural break and a change in trend can be observed in the exchange rate policy. Japanese Yen depreciated from ¥85 = $1 in 2012 to ¥110 = $1 in 2015. Moreover, at the end of 2015, the exchange rate peaked at more than ¥120 = $1, until settling at around ¥110 for $1 through the rest of the Abenomics period.

Reversing the long-term trend in yen appreciation led to increased export of goods and services. When the newly elected prime minister started with the Abenomics program, the Japanese economy exported roughly 18 trillion-yen worth of goods and services. Since the start of the economic restructuring in late 2012, the export values have risen continuously, reaching the highest values in Japanese history, which at its peak in 2018 accounted for more than 25 trillion yen. In the year of Abe's resignation, Japanese companies exported 30 % more goods and services than at the beginning of his term. Furthermore, increased trading activity and successful reforms in the corporate tax system prompted corporate profits. Analysing the data from BoJ showed that during Abenomics, operating profits of all industries together almost doubled from 100 to 190 billion yen. Additionally, the total ordinary profit of Japanese firms increased from 48 trillion yen in the fiscal year of 2012 to 83 trillion yen in 2018. In 2019, however, similar to operating profits, ordinary profits decreased and reached 71 trillion yen. Since the year 2020 was influenced by the Covid-19 pandemic (external shock) it will not be included in the analysis, although the values are usually always higher than the initial benchmark in 2012.

On the other side of the transmission channel, increased asset prices should have a beneficial effect on consumption, capital, and housing investments. While rising stock prices have a wealth effect on individuals, which in turn spurs consumption, higher-priced shares correlate with a company's earnings. Higher earnings usually indicate that companies are in better shape and can repay long-term debt more easily. As a consequence, such companies attract lower-interest-rate loans and strengthen their balance sheets. Spill-over effects of increased asset prices can therefore be seen in numerous indicators. Private property prices reversed the trend for the first time since 1991 in 2012. Increased demand due to a favourable economic environment saw the real estate sector in a long-lost upward trend again. Moreover, the residential property prices increased by 22 % from 2012 until 2020, demonstrating that the housing sector can again be viewed as an investment opportunity. Similar positive numbers can be observed in private non-residential investments and government R&D expenditures. The nominal gross capital formation also increased from 28 trillion yen in 2012 to more than 36 trillion yen in 2020. Investments as a percentage of GDP had finally reversed the downward trend which lasted from the 1970s onwards. Gross capital formation (as % of GDP) has continuously risen during Abenomics. Although the economy hasn't reached the pre-crisis numbers yet, the continuation of the existing trend could catch up with the lost territory from the last 30 years in the coming years.

Nevertheless, while the wealth effect and strengthened balance sheets had a beneficial impact on capital and housing investments, consumption stagnated and at some point, even decreased. The consumption tax hike had a devastating impact on general consumption, which could not be offset even by the positive spill-over effects of rising stock prices. In the first two years of Abe's government, consumption spiked to record heights. Real household consumption increased by roughly 10 % in only two years, boosting economic growth past 2 % in 2013. Yet consumption tax hike of 2 percentage points (from 8 % to 10 %) in late

2014 had profound consequences. In fact, all that has been gained in the first three years of Abenomics had been erased in 2015. Real household consumption stagnated and never increased to the values seen in 2014 again. Since final consumption presents more than 70 % of the gross domestic product in Japan, stagnation of it has serious implications for growth. Abenomics policies can be labelled as successful in the beginning, while, increasing the consumption tax in late 2014 and 2019 proved to be fatal for the growth narrative. Hence, weak economies should not implement tax hikes until economic growth has proven robust for an extended period of time. On the other hand, the output gap which had been negative since 2008 closed in early 2016. Moreover, it not only closed but also turned positive, and remained such for the rest of Abe's term. If the output gap is in positive territory, demand for products exceeds the capacity to supply them, consequently spurring higher inflation rates and lower unemployment.

Following the transmission channel further, the positive output gap should in theory indicate that production will increase since there is excess demand for products at a given market price. However, by analysing data for Japan we can notice that production remained stagnant through the Abenomics period. Indexing the total industrial production in Japan reveals that the production in 2012 was at the same level as in early 2020. A positive output gap, which should indicate an increased demand for products, therefore, did not stimulate production rates. In other words, the supply function did not react to increased demand. In addition, the import of goods and services in 2020 accounted for 20 trillion yen, the same as in 2012. Although we can observe two bursts in import values (in 2014 and 2018), the trend cannot be identified. Stagnant production rates together with yen depreciation, therefore, invalidated potential rise in import values.

Labour demand increased from 2012 until 2020, although such an increase was not a result of increased production but due to the ageing population. Cohorts entering the labour market are much smaller than cohorts exiting the market. Furthermore, an active opening rate which gives us an insight into corporate demand for labour continuously rose through Abe's term. Quarterly active openings outnumbered the quarterly number of applications for the first time in early 2013. At the end of Abe's term, the ratio already surpassed the 1,5-value indicating that there are 50 % more job openings than there are applications. Hence, if labour supply exceeds demand, finding a suitable job is less challenging, consequently increasing employment rates. While in 2012 roughly 70 % of persons aged 15-64 were employed, in 2020 the rate increased to more than 78 %. Moreover, the unemployment rate decreased from 4.4 % in 2012 to 2.4 % in early 2020. In normal economies, a shortage of labour should in theory cause inflationary pressures. Since companies are struggling to employ a sufficient labour force, workers are given an opportunity to demand higher wages. However, due to Japan's rigid labour market and lifelong employment model workers are not incentivised to ask for higher wages (corporate structure and career path are usually predetermined). And while such an environment could lead to wage inflation, consequently increasing the actual inflation rate, it failed to materialize in Japan.

Average annual real wages in Japan have been stagnant from 2012 until 2020. Stagnating wages are not only characteristic of Abe's term, the average annual real wage in 2016 was the same as in 2001, meaning wages are stagnating since the start of the Great Stagnation period. For Abenomics, it only means reforms and policy outcomes failed to stimulate wage growth. In 2012 average annual wage accounted for 4,35 million yen, dropping to 4,25 in 2014 and reaching 4,4 million yen in 2020. With real wages stagnant, wage inflation cannot occur. As a consequence, also average income remains unchanged. The average annual household income in Japan remained the same in 2020 as it was in 2012 (5,15 million yen in nominal terms). Stalled growth in income cannot stimulate additional consumption, which means the overall economy grows at a lower rate.

Although the transmission channel had some positive policy outcomes, the price target of 2 % was not achieved. Average CPI inflation from 2012 until 2020 reached 0.6 %. Despite the fact that Abenomics was able to lift the economy out of the deflationary bad equilibrium, it failed to reach the 2 % price target. Table 7 presents details of each category of the transmission channel and their policy outcome.

Table 7: Policy outcome of Transmission Channel - first and second arrow effect, 2012−2020

Variable	Sample period	Expected outcome	Wald statistics	p-Value	Policy outcome
Monetary Base	Q1-2012 until Q4-2019	Increase	2278.64	0.00	Succeeded
Expected Inflation Rate	Q1-2012 until Q4-2019	Increase	29.34	0.33	Failed
Expected Real Interest Rate	Q1-2012 until Q4-2019	Decrease	6.61	0.03	Succeeded
Asset Prices	Q1-2012 until Q4-2019	Increase	105.5	0.00	Succeeded
Correction In Exchange Rates	Q1-2012 until Q4-2019	Depreciation	76.07	0.00	Succeeded
Corporate Profits	Q1-2012 until Q4-2019	Increase	15.92	0.01	Succeeded
Export	Q1-2012 until Q4-2019	Increase	22.57	0.00	Succeeded
Consumption	Q1-2012 until Q4-2019	Increase	37.22	0.00	Failed
Capital & Housing Investment	Q1-2012 until Q4-2019	Increase	7.27	0.00	Succeeded
Output Gap	Q1-2012 until Q4-2019	Closed	13.2	0.03	Succeeded

Table continues

Table 7: Policy outcome of Transmission Channel - first and second arrow effect, 2012−2020 (cont.)

Variable	Sample period	Expected outcome	Wald statistics	p-Value	Policy outcome
Production	Q1-2012 until Q4-2019	Increase	67.96	0.00	Failed
Import	Q1-2012 until Q4-2019	Increase	53.31	0.00	Failed
Labour Demand	Q1-2012 until Q4-2019	Increase	307.71	0.00	Succeeded
Employment	Q1-2012 until Q4-2019	Increase	44.39	0.00	Succeeded
Wages	Q1-2012 until Q4-2019	Increase	1.54	1.00	Failed
Income	Q1-2012 until Q4-2019	Increase	2.86	0.90	Failed
Prices (CPI)	Q1-2012 until Q4-2019	Increase	58.16	0.00	Partially Succeeded

Adapted from FRED (2022); IMF (2020); Bank of Japan (2022); Japanese Statistics Bureau (2022).

Abenomics transmission channel is, therefore, incomplete with bottlenecks occurring in categories such as expected inflation rate, consumption, production, import, wages, and income. Moreover, from the transmission channel, we can observe that corporations benefited the most from Abe's experiment. However, without a sufficient rise in wages, the benefits of the novel economic approach were not shared with Japanese households, consequently failing to stimulate domestic demand. Even though the third arrow's policies are yet to be incorporated into data analysis for the coming years, the Abenomics policy experiment cannot be labelled as a solution to secular stagnation. In the appendix, I present some of the transmission channel variables in figures to better understand the dynamics and scope of the data presented.

The post-Abe Cabinet Office needs to remodel the three-arrow approach by tackling wage and income stagnation, which in turn increases aggregate demand. Japan especially needs to focus on the service rather than the manufacturing sector since productivity growth there is stagnant. The life-long employment model needs to be changed into a more flexible one, spurring competition among workers and corporations alike. Economic growth is after all derived from the combination of population growth and growth in productivity. Since the Japanese population is already decreasing, all the growth lifting will have to come from increased productivity. Third arrow remodelling hence needs to focus on transforming the Japanese professional culture from input-based to output-based, especially in the services sector which accounts for ¾ of the national gross domestic product. Generally, Abe's

economic restructuring, although not achieving its goal, benefited the Japanese economy. Abenomics can, therefore, be labelled as the last chapter in the Japanese Great Stagnation period. With it, the foundations for the Japanese revitalization were laid down, but in order to achieve the goals set in 2012 the three-arrow strategy needs to be reassessed. While Abe's successor F. Kishida vowed to resume Abe's work, a partial rethink of the three-arrow approach is recommendable.

3.4   Lessons Learned From the Great Stagnation and Abenomics

Lesson 1 – Beware of deflation

Most of Japan's Great Stagnation period was characterized by deflation. Moreover, it is also true that the degree to which negative growth in prices contributed to the stagnation environment is still debatable among economists today. Nevertheless, one conclusion to be drawn from the above analysis is that recovery in a deflationary environment can occur, however, it is weak and not sustainable for a longer period. Since the lack of aggregate demand is one of the main components of secular stagnation, a deflationary environment is not recommendable. On the contrary, it should be prevented at all costs. When prices fall, consumers postpone spending in hope of obtaining better deals in the future. Additionally, businesses fail to innovate and invest, consequently losing a competitive edge. Although some economists like to downplay the dangers of deflation, the Japanese prolonged stagnation showed that sustained growth is not possible without a sufficient inflation track.

Lesson 2 – Beware of uncoordinated policy regimes

Monetary and fiscal policies have rarely been coordinated in the period from 1995 until 2012. Their stance was either contractionary or expansionary but never coordinated. To some extent, such behaviour of Japanese institutions led to prolonged stagnation of the Japanese economy. Moreover, such uncoordinated measures brought both monetary and fiscal policies to the edge of the ability to act. On one hand, fiscal policy became constrained by high public debt and on the other, monetary policy by already low-interest rates and drained QE. Thus, when the Abe government took office, the options for pursuing an expansionary policy were limited. In addition, neither monetary nor fiscal policy can match the secular stagnation tendencies alone, no matter how aggressive the approach is used.

Lesson 3 – Weak economies cannot handle tax hikes

Since one of the main shortages in secular stagnation is aggregate demand, the centre of attention should be directed at increasing it. Economies with weak growth should prioritize tax cuts to tax increases to stimulate AD, at least in the short term. Furthermore, in today's market economies, consumption presents more than half of the gross domestic product. Hence, increasing a consumption tax, similar to Japan in 2014 and 2019, is not recommendable.

Lesson 4 – Support sustainable services sector growth

The Japanese experience showed us that, contrary to some beliefs, the services sector rather than the manufacturing sector needs improvements. While Japanese large corporations from the manufacturing sector had increased investments, productivity and profits, data shows that the services sector is still stagnant. Businesses in the service sector will have to adopt new technologies to strengthen production, increase speed and efficiency, and to some extent cut down the number of employees. The Japanese rigid labour market can teach us that input-based employment practices can repress the economy. After all the services sector presents more than 70 % of the gross domestic product in developed economies. Advanced economies, therefore, need to recognize that the service sector needs to be revived. Only then we will see a revival of productivity rates, and a possible definitive end to secular stagnation.

Lesson 5 – Beware of wage and income stagnation

One of the main reasons why Abenomics failed is because reforms poorly addressed wage and income stagnation. For decades, the economic textbooks lectured that in order to achieve stable growth in market economies, consumer demand and, therefore, labour income has to grow at a similar rate as output. Wages and incomes in Japan are still stagnating, with their values in 2020 being equal to levels in 2000. As a consequence, Abe's transmission channel failed to reach the 2 % price target and the pacific country had never truly pulled out of secular stagnation. Measures that stimulate wage and income growth should be the main factors when dealing with secular stagnation since with it, aggregate demand will increase. The Japanese institutions failed at dealing with the shortage of AD in the economy. Furthermore, their efforts at most were pointed towards short-term increases in AD but never with policies that stimulate aggregate demand on a yearly basis, such as sustainable wage and income growth.

4   REMARKS ON HIGH INFLATION IN 2022 AND ITS IMPLICATIONS ON SECULAR STAGNATION HYPOTHESIS

Economists and researchers focusing on the macroeconomic debates in advanced economies have likely noticed a great shift in external and internal economic factors in recent months. As shown within the in-depth economic analysis in the previous chapters, the FED, the ECB, and the BoJ have been constantly undershooting their 2 % inflation target since the last financial crisis of 2008. However, over the curse of the last 18 months, circumstances changed, and the undershooting of the targeted inflation rate was substituted with overshooting it. The consumer price index in the euro area rose by 9.1 % in August and 8.3 % on the other side of the Atlantic. Similarly, the Japanese economy recorded the highest inflation rate in over a decade (i.e., 2.8 %). Today's out-of-control inflation is therefore real and in recent months it has proved to be of great difficulty to observed economies. However,

present inflation to a greater extent is not the inflation we want to achieve in order to avoid or at some point even invalidate the secular stagnation hypothesis.

Studying high inflation rates in observed economies needs to start with analysing the causes of deviation from initial inflation targets. All three economies have inflation rates surpassing their long-term averages; however, the source, size, and potential persistence of such deviation are unique to each observed economy. Firstly, the 10 per cent euro area inflation rate is a result of two unprecedented shocks that fall upon the continent in the last 3 years. The pandemic (i.e., the first shock) and related supply chain disruptions caused a change in firms' behaviour. To avoid shortages, companies started to order more and earlier, consequently spurring higher prices along the entire supply chain. Furthermore, the relatively fast reopening of economies after the threat of Covid-19 weakened, additionally increased the demand for industrial goods and services.

Moreover, the initial response by both local and European governments at the start of the pandemic was primarily to succeed in protecting the nominal incomes of their population. Consequently, accumulated savings among workers during the pandemic were reflected in increased demand for services after the reopening of the economies. Data from the ECB show that the volatility of durable goods increased by more than ten-fold since the pandemic started compared to average data from the previous two decades. Data for services shows an even greater deviation from long-term averages – consumption in the services sector increased by close to 30-times the average of the previous two decades. Hence, the simultaneous effects of the global supply-chain bottlenecks and increased consumer demand after the lockdown period led inflation to expand through industrial goods and services. (ECB, 2022)

On the other hand, the second shock responsible for elevated prices is Russia's invasion of Ukraine. The energy crisis which brought havoc, especially to European economies is, however, composed of two consecutive events. Energy supply had already been constrained before February's invasion since the Organisation of the Petroleum Exporting Countries (OPEC) had cut production constantly through 2020 and 2021. Similarly, capital constraints on American shale producers added additional pressure to the global supply squeeze. Nonetheless, although these events were responsible for elevated energy prices their effects were not widely felt through the broader market. On the contrary, the effects of the invasion greatly aggravated the supply squeeze as imports from Russia, which in 2021 supplied almost 40 % of natural gas to EU countries together with a significant volume of crude oil, solid fossil fuels, and various materials either abruptly stopped due to imposed EU sanctions or were gradually halted (gas supplies) by Russia. Prices in European gas and electricity increased by more than 105 % and 75 % respectively, compared to January 2022. Even more profound is data comparing the first half of 2021 and September 2022, where European gas and electricity prices increased by 650 % and 450 % respectively. Such an out-of-control surge in energy prices directly contributes to more than 30 per cent of today's headline inflation rate. Moreover, the indirect effect of high energy prices is felt throughout the

economy. The ECB inflation model indicates that the indirect effects of elevated energy costs are responsible for around 1/3 of the core inflation rate (ECB, 2022).

All three observed economies are facing similar constraints (i.e., energy supply squeeze, supply-chain bottlenecks, increased demand after reopening of economies, etc.), however, each one of them is differently related to the core inflation rate. The present burst of inflation is therefore a combination of all the above-mentioned constraints. However, such a burst in prices is not what an economy in or close to secular stagnation is after.

Moreover, most western economies are facing **cost-push inflation**, which in theory indicates that there exists a decline in the supply of goods and services while simultaneously demand remains constant or even grows. Energy crisis and supply-chain disruptions reduced overall supply in the market, pushing prices higher. On the other hand, demand not only remained constant, but in 2022 it even grew since the general population had excess savings accumulated during the pandemic lockdowns. Hence, while companies raised their prices, society was able to maintain buying power due to the larger amount of savings. On the contrary, if demand for goods and services falls when companies increase their prices, inflation becomes subdued. In the end, the present inflation burst is not a consequence of efficient counter policy to invalidate the secular stagnation hypothesis, since inflation came first from prices, rather than wages (price-wage spiral).

The secular stagnation hypothesis is, therefore, still applicable to advanced economies. In the medium, to long term, there still exists a chronic shortfall of AD relative to the economy's productive capacity. At the moment, wage increases are driven by higher prices, however, such a mechanism is not sustainable in long run. When supply-side constraints ease and inflation again reaches the central banks' target, pressure on wages will also ease. Hence, the aggregate demand will stabilize.

What the Abenomics transmission channel teaches us about dealing with secular stagnation is that stagnant wages and incomes are a dominant source of overall stagnation in the economy. A potentially viable option to counter secular stagnation tendencies might therefore be a wage-price spiral, where increases in wage rates give rise to prices (opposite to the current price-wage spiral), consequently bringing the economy into the positive feedback loop. Harvard professor Greg Mankiw stated that a wage-price spiral might at some point in time slow down and in the long run, the economy will return to its initial state, where the AD curve crosses the long-term AS curve. Furthermore, the roots of SS are deep and will most likely outlast the energy shock and pandemic recession. Inequality in income distribution, decreasing productivity growth rates, limited propensity to invest (CBs are raising interest rates), demographic changes, and all other factors described in previous chapters have not faded away. Hence, secular stagnation is not only a phenomenon of a long depression that follows an unprecedented financial crisis or any other profound economic downturn. Its roots are entrenched deep in the economic systems of advanced economies. Consequently, policies that are known today might not do the job of averting the prolonged

slump in observed economies. Moreover, as the Japanese example showed us, the only possible solution to secular stagnation is an unusual and in terms of intensity unmatched increase in aggregate demand.

Therefore, although it seems that the general public lost sight of the secular stagnation phenomenon in the last two years or so, and the unprecedented price spiral dominates the headlines of major news channels and economic forums, we will likely emerge from the present crisis into a difficult economic landscape – one that we still don't have straightforward solutions for yet. The new normal will soon return us to a question we have known for years – how to avert secular stagnation?

CONCLUSIONS

There is evidence that both the United States and the Euro area are slowly but persistently following the Japanese steps to a secular stagnation environment. Aggregate demand is being hindered by low population growth, ageing societies, reduced investment activities, and even declining innovation rates. The secular stagnation hypothesis, therefore, remains more relevant than ever. After all, remarks by L. Summers that we are entering into a low-growth territory are becoming more realistic with every passing year. However, the critical question asked by politicians and economists alike remains the same. How to respond to the "new normal"?

Until now policy responses by both saltwater and freshwater macroeconomists have prevailed over potential downturns. However, secular stagnation requires new, reinvented policy measures. The crisis that Europe and the US are facing will, therefore, not be determined by mainstream macroeconomists but by the economists who had been paying attention to the Japanese example. And while the rest of the advanced economies are becoming ever more Japanese, the Japanese on the other hand are trying to move in the opposite direction. Soon after the launch of Abe's new economic program, C. Romer called Abenomics a "policy regime shift". Nevertheless, a decade has passed since the start of the most dramatic macroeconomic experiment in recent history. And although some improvements were made to the Japanese economy since 2012, secular stagnation is still rooted in Japanese society.

For starters, Abe's government reintroduced coordination between fiscal and monetary policies. Furthermore, its aggressive stance ended long-lasting deflationary pressures. But the economic growth remains low to historical averages and the inflation target has not been achieved. In the words of some commentators: "all the bold ideas of Abenomics look particularly similar to what Japan has been doing for the past 20 years. The only difference being that it is used on a larger scale and with a splashier marketing campaign". The effect of the consumption tax hike is particularly interesting. Without it, Abenomics might succeed in the short term. On the other hand, to truly exit the secular stagnation environment in the

long run, the Japanese will have to address wage and income stagnation. Overcoming secular stagnation without a permanent increase in aggregate demand is at the end of the day not possible.

Bold macroeconomic policies will play a crucial role also on both sides of the Atlantic. In particular, the Euro area needs to reverse the weaknesses in public investments. While the new de-globalization effect might prove to be an effective counterweight in the fight against secular stagnation (investments are coming back to regional economies), more European investments in public goods are needed. Furthermore, fiscal consolidation should not constrain already weak European economies. By studying the Japanese example, stagnation in other advanced economies need not be secular. On the contrary, it should be first prevented, and second if at some point we reach the negative domain of natural real interest made short-term. And although Abenomics failed at achieving its own goals, the three-arrow approach is far from obsolete. Like before we must assess the mistakes made by Abe and build on remodelling the strategy, only then we will have a definite answer on how to end secular stagnation.

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APPENDICES

**APPENDIX 1: POVZETEK (SUMMARY IN SLOVENE LANGUAGE)**

Od začetka finančne krize leta 2008 se razvita gospodarstva soočajo z upočasnjeno gospodarsko rastjo, nizko stopnjo inflacije, in globokim razkorakom med dejansko in potencialno gospodarsko aktivnostjo. Dolgotrajna krhkost ekonomskega okolja, ki je posledica tako strukturnih dejavnikov preteklih desetletji kot tudi globoke finančne krize predstavlja zgodovinsko obdobje za najrazvitejše države sveta. Gospodarstva ZDA, Japonske in Evrskega območja doživljajo najnižje stopnje rasti po koncu druge svetovne vojne, ne glede na številne fiskalne in monetarne spodbude njihovih institucij. Prelomnica je bila zlasti konferenca mednarodnega denarnega sklada leta 2013, kjer je znani ekonomist Larry Summers po skoraj stoletju zatišja ponovno uvedel izraz sekularna stagnacija. Izraz izvira iz ekonomskega pregleda Alvina Hansena iz leta 1938 in predstavlja obdobje upada gospodarske rasti, ki časovno presega interval običajnega poslovnega cikla.

Glavno sporočilo govora L. Summersa je bilo, da bodo razvite države deležne nizkih stopenj gospodarske rasti dlje časa. Trdil je namreč, da upad stopenj rasti v razvitih državah ni le začasen pojav. Gospodarske razmere, ki so posledica finančne krize iz leta 2008, so le delno krive za upočasnjeno rast. Sekularna stagnacija ima svoje korenine v dejavnikih, katerih začetki segajo v desetletja pred finančnim zlomom. Strah in zmožnost Japonskega tipa stagnacije sta tako vztrajno obstali v pogovorih znanih ekonomistov in njihovih akademskih krogov večino časa preteklega desetletja. Japonsko gospodarstvo je bilo do sredine osemdesetih let eno najuspešnejših, vendar se je močna gospodarska rast na začetku devetdesetih nenadoma ustavila. Obdobje stagnacije je zasenčilo pretekle dosežke azijskega gospodarstva. V letih med 1991 in 2012 je realna rast bruto domačega proizvoda v povprečju znašala le dobrih 0,7 %. Najuspešnejša japonska podjetja, ki so veljala za vodilne v svojih industrijah v letih med 1950 in 1980, pa so se bila primorana prestrukturirati in hkrati opustiti svoje vodilne položaje.

Številni ekonomisti so japonskim oblastem očitali neustrezen in premalo agresiven odziv na krizo in posledično dolgotrajno šibkost. Leta 2012 pa je takratni novi premier Shinzo Abe obljubil, da bo končal gospodarsko stagnacijo Japonske s svojim ekonomskim programom, ki je v literaturi bolje znan pod imenom Abenomika. Od začetka najbolj drznega makroekonomskega eksperimenta v zgodovini Japonske je minilo dobrih deset let in čeprav je opaziti nekaj napredka, je pojav sekularne stagnacije v japonski družbi še vedno močno zakoreninjen. S. Abe je s svojo agresivno držo končal dolgotrajne deflacijske pritiske in ponovno uvedel koordinacijo med fiskalno in monetarno politiko. Toda gospodarska rast Japonske ostaja nizka glede na zgodovinsko povprečje, ciljna inflacija (2%) pa ni bila dosežena. Abenomiki torej ni uspelo dokončno izkoreniniti sekularne stagnacije, saj le-te na dolgi rok ni mogoče eliminirati brez trajnega povečanja agregatnega povpraševanja. A čeprav Abenomiki ni uspelo doseči lastnih ciljev, njen pristop reševanja sekularne stagnacije še zdaleč ni zamerljiv ali zastarel.
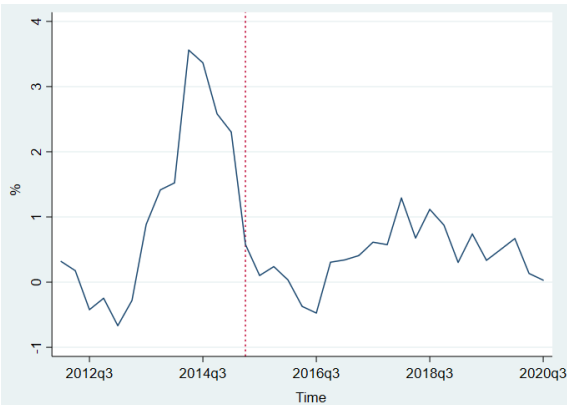
APPENDIX 2: FIGURES OF TRANSMISSION CHANNEL VARIABLES AND STRUCTURAL BREAK IDENTIFICATION

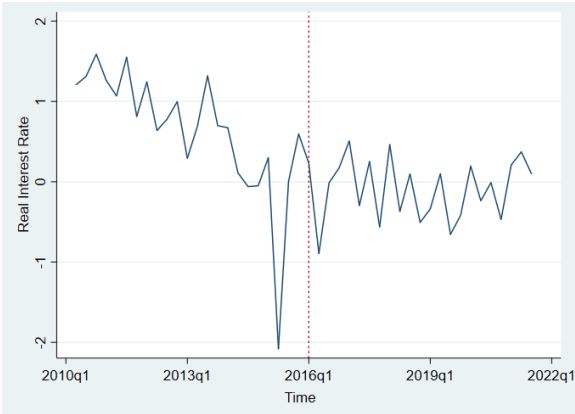*Figure 1: Monetary Base (in million yen), quarterly 1994−2021*
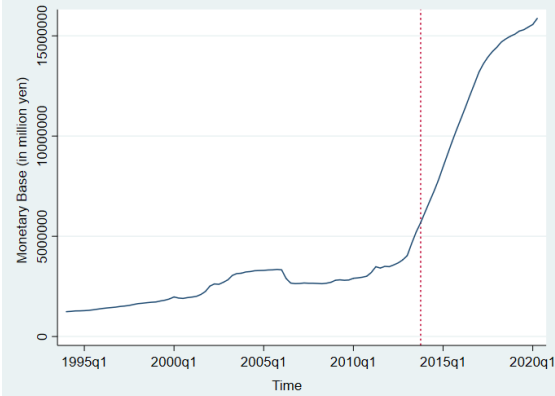
Adapted from FRED (2022).

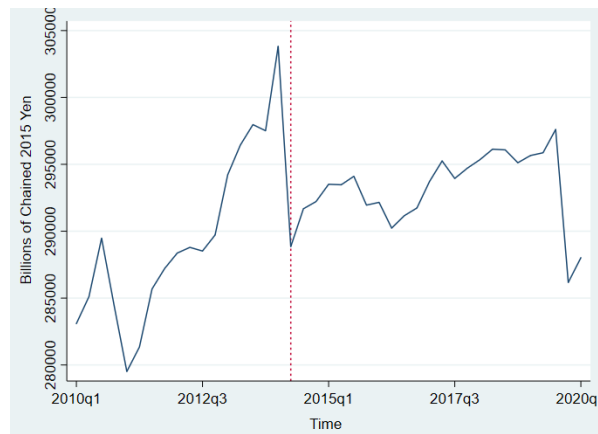*Figure 2: Consumer Price Index (in %), quarterly 2012−2021*

Adapted from FRED (2022).

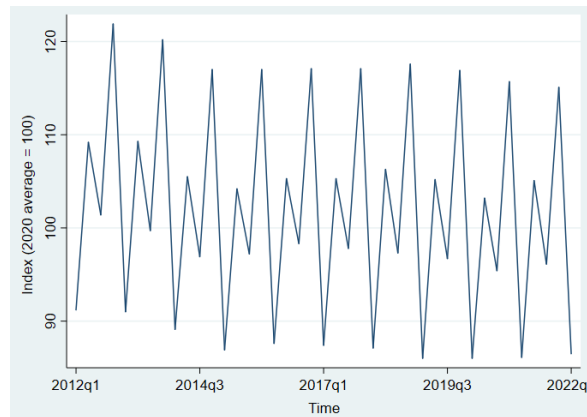*Figure 3: Real Interest Rate (in %), quarterly 2010−2022*

Adapted from Bank of Japan (2022).

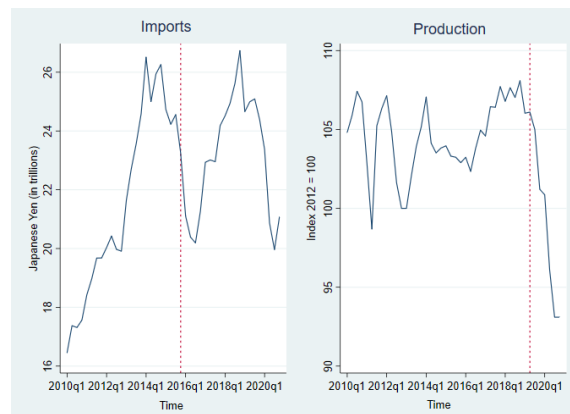*Figure 4: Consumption (in Billion of Chained 2015 Yen), quarterly 2010−2020*

Adapted from FRED (2022).

Figure 5:Wages (index 2020 average=100), quarterly 2012-2022

Adapted from FRED (2022).

Figure 6: Production (right, index 2012=100),and Imports (left, in trillion JPN Yen) quarterly 2010–2020
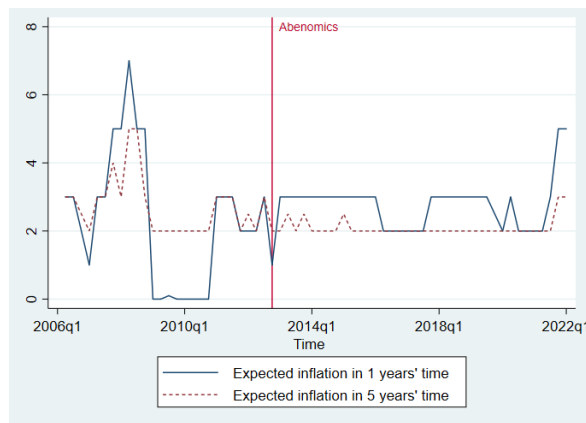

Adapted from FRED (2022).

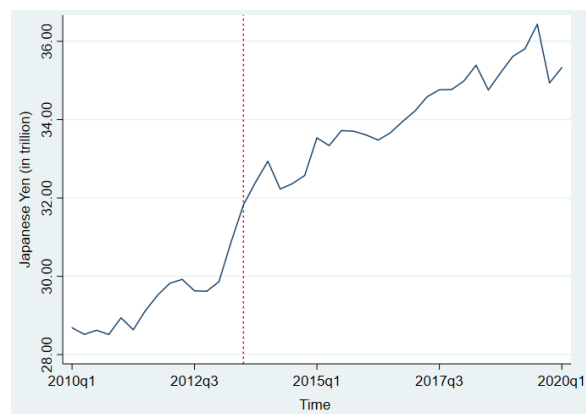*Figure 7:Japanese Yen to U.S. Dollar Exchange Rate, quarterly 2010–2021*
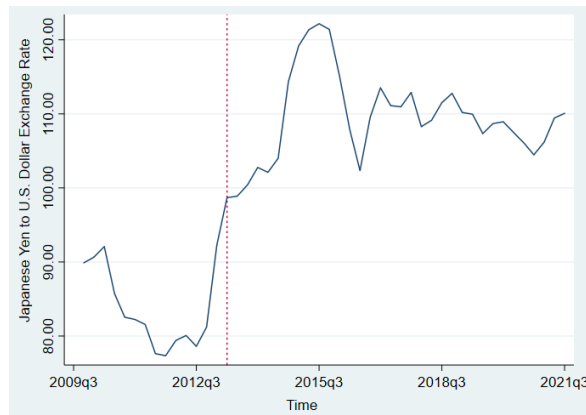
Adapted from FRED (2022).

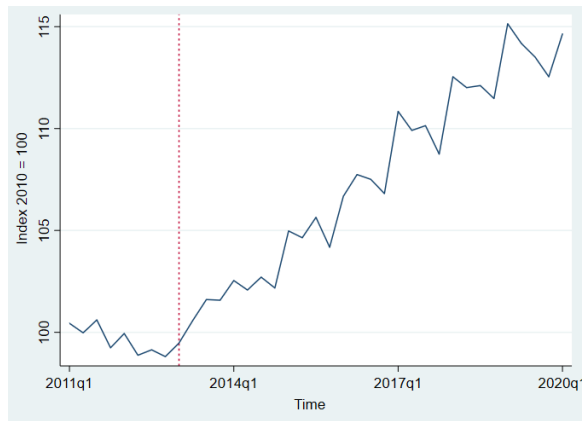*Figure 8:Expected inflation in 1 years' time and 5 years' time (household survey), quarterly 2006–2022*

Adapted from Bank of Japan (2022).

Figure 9:Gross Capital Formation (in trillion Yen), quarterly 2010–2020

Adapted from FRED (2022).

4

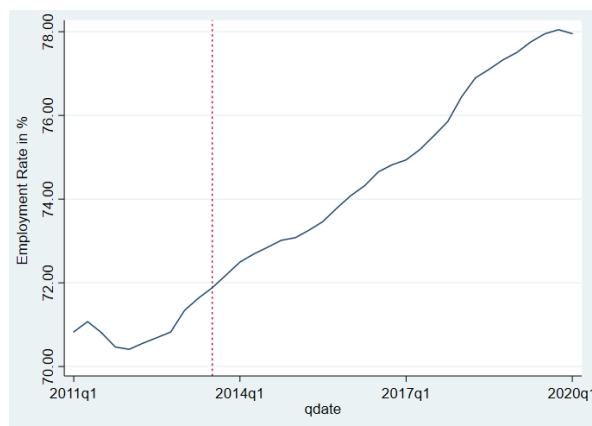*Figure 10: Housing Price Index (2010=100), quarterly 2010−2020*

Adapted from Bank of Japan (2022).

Figure 11: Stock prices: Japan (Nikkei225), Index average, quarterly 2010−2020

Adapted from FRED (2022).

Figure 12: Employment Rate – Aged 15-64 (in %), quarterly 2011−2020

Adapted from FRED (2022).