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## Dear readers,

This year's first edition of Sveriges Riksbank Economic Review contains articles written before the outbreak of the coronavirus pandemic in Europe. In some cases, this is of little importance, in other cases the pandemic would probably have affected the content of the article. However, it is too early to draw any far-reaching conclusions regarding how the pandemic will affect the economy in the long run, and the questions the articles raise will probably be topical for some time to come. We therefore believe there is good reason to publish these well-written articles. We hope that our readers will agree with us. Below you will find short descriptions of the articles.

- **Global warming from an economic perspective**

*Conny Olovsson* describes how economic theory can be used to understand the interaction between people and the climate, why global political measures are necessary to counteract global warming and which political measures can be expected to function. The most important results of his reasoning are summarised into four brief insights.

- **30 years of combating money laundering in Sweden and internationally – does the system function as intended?**

*Markus Forsman* describes how the regulatory framework for combating money laundering has developed over the years and how international agreement is reached in this context. After that, he describes in detail how the system for combating money laundering and terrorist financing functions in Sweden, and summarises how the effectiveness of the Swedish system has been assessed internationally. He concludes with a brief comment on the publicity in recent years regarding Danske Bank and Swedbank in particular.

- **The future isn't what it used to be – perspectives on changes in the Swedish economy**

This article, written by *Erik Frohm* and *Stefan Ingves*, is a summary of discussions in recent years, both internally at the Riksbank and in various international contexts, on how structural changes affect the economy. The authors begin by describing the structural transformation in the Swedish economy from the 19th century to the middle of the 1990s. After that, they discuss developments in recent decades, with the focus on the effects of globalisation, digitalisation and the shift towards services accounting for a growing share of the economy. The article does not deal with the coronavirus pandemic, but its main conclusion – that it is important to have a good capacity to adapt to comprehensive changes in the economy – has become even more relevant today.

- **The new macroeconomic landscape after the global financial crisis**

*Björn Andersson*, *Magnus Jonsson* and *Henrik Lundvall* provide an overview of some of the various structural changes that have impacted the macroeconomic environment since the global financial crisis in 2007–2009: the weaker productivity growth, the lower long-term real interest rate, the growing debts among households and states and the weakened correlation between unemployment and the rate of wage increase. They discuss factors behind these changes and what significance the changes may have for the conditions for conducting monetary policy going forward.

- **What is driving the global trend towards lower real interest rates?**

In a separate article, *Henrik Lundvall* goes into more depth in the analysis of why real interest rates have shown a falling trend in many countries, a question that is particularly important with regard to monetary policy's capacity to stabilise the economy. He reviews various structural explanations and examines which factors, according to the academic literature, can best explain why real interest rates have fallen.

Read and enjoy!

Marianne Nessén and Ulf Söderström

# Contents

**Global warming from an economic perspective 6**

Conny Olovsson

**30 years of combating money laundering in Sweden and internationally – does the system function as intended? 24**

Markus Forsman

**The future isn't what it used to be – perspectives on changes in the Swedish economy 56**

Erik Frohm and Stefan Ingves

**The new macroeconomic landscape after the global financial crisis 74**

Björn Andersson, Magnus Jonsson and Henrik Lundvall

**What is driving the global trend towards lower real interest rates? 105**

Henrik Lundvall

# Global warming from an economic perspective

Conny Olovsson\*

The author works in the Research Division of the Riksbank

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A global climate policy is necessary to reduce global warming sufficiently. With a smart and cost-efficient climate policy, it would not be expensive to limit increases in temperature to 2 degrees by the year 2100. Economists have important knowledge and tools in this area to evaluate which instruments that can be expected to be effective for this purpose. The most cost-efficient measure would be a carbon tax that is the same in every country. In addition, an ambitious climate policy would be a cheap form of insurance against future high and uncertain expenses, but only if it is cost-efficient. Otherwise, an ambitious policy would risk being very expensive and, in a worst-case scenario, also ineffective. The most important way of reducing warming is to reduce the use of coal. Measures that do not contribute to this will be ineffective.

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## 1 Introduction

In this article, I discuss how economic theory can be used to understand the interaction between human activity and the climate, why global political measures are necessary, and which political measures can be expected to be effective and which cannot. I formulate important results in a number of insights.

An initial question may be what economists have to say about a scientific problem such as global warming. When you think about it, it is actually obvious that the greenhouse gases emitted by people are a result of economic activity – of consumption, production and investment – and are affected by factors such as technological development, economic growth, natural resources and institutions. All of these things are exactly what economists have been studying and attempting to understand for a very long time.

But economists also study how economic instruments can counteract so-called market failures.<sup>1</sup> The Stern Review from 2007 described global warming as the greatest market failure in history.<sup>2</sup> To manage climate change, it is then necessary to make sure that households have economic incentives to take decisions that are less harmful to the climate and that companies have economic incentives to develop new technologies that can replace the need for fossil fuels.

There is no shortage of suggestions in the general debate for how we should manage global warming. These include everything from taking shorter showers, stopping travelling or stopping having children to, investing in sustainable companies and subsidising green energy. But how effective are these suggestions in actually reducing global warming? An economic analysis is also valuable here to evaluate which measures are good and which are too expensive, ineffective or both.

The proposals I discuss in this article include both policies such as taxes and the quantity regulation of carbon emissions, and measures such as subsidies for green energy, sustainable financing and green bonds. The conclusions and reasoning are based entirely on economic

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\* I would like to thank Mikael Apel, Tor Jacobson, Marianne Nessén and Ulf Söderström.

The interpretations in the essay are the author's own and shall not be perceived as the views or stances of the Riksbank.

1 A market failure occurs when free markets cannot be expected to allocate resources in an efficient manner.

2 See Stern (2007), p. viii.

research. The article also builds further on and deepens some of the reasoning I previously expressed in Olovsson (2018).

## 2 The economy and the climate affect each other

Before I start discussing various measures to reduce global warming, it is necessary to provide a short description of how the climate interacts with our economies. I have, however, kept this section brief, as several of these aspects are complex and could each be dealt with in its own paper.

### 2.1 The human impact on the climate

The Earth's temperature varies naturally for many reasons that are not connected with human behaviour. For example, the Earth's orbit around the sun varies according to a cyclical pattern. There are also variations in the tilt of the Earth's axis (known as Milankovitch cycles). These and other phenomena affect the Earth's climate entirely without the help of people. However, humans can also affect the climate, among other means by releasing greenhouse gases. Carbon dioxide is the dominant greenhouse gas with a human source and is responsible for about 75 per cent of total emissions.<sup>3</sup> Carbon dioxide is primarily emitted as a by-product from the burning of fossil fuels coal, oil and natural gas.

#### How the greenhouse effect works

For over 100 years, we have known that the amount of carbon dioxide in the atmosphere affects the Earth's energy budget, which is to say the difference between incoming energy – in the form of solar radiation – and outgoing energy – among other things, in the form of thermal radiation. This happens because carbon dioxide does not affect the incoming solar radiation, which goes straight through the carbon dioxide, at the same time as the carbon dioxide makes it more difficult for heat to radiate back into outer space. If the system is initially in balance, an increase in the amount of carbon dioxide in the atmosphere leads to a surplus in the energy budget, meaning that the temperature will rise until a balance is again reached. This is known as the *greenhouse effect*.

It is called this because it acts exactly like a greenhouse, where the sun's rays go straight through the greenhouse's glass, which simultaneously keeps the warmth in. This warms the greenhouse up. The greenhouse effect is not only a bad thing. Without greenhouse gases in the atmosphere, the Earth would be covered with ice and would have an average temperature of around –20 degrees instead of the approximately 15 degrees we have at present.

Carbon circulates in the form of carbon dioxide, among other things, in a constant flow between ground, air and sea in a process called the *carbon cycle*. What makes carbon dioxide particularly problematic is that it stays in the atmosphere significantly longer than other greenhouse gases. About 20–25 per cent of all carbon dioxide emitted stays in the atmosphere for a very long time – up to over a thousand years. About 50 per cent disappears in a few decades. The rest takes a few centuries to circulate onwards to the oceans, where it contributes to acidification. This means that the carbon dioxide emitted today will contribute towards global warming for a very long time to come. In comparison, methane stays in the atmosphere for about a decade, even if it is a stronger greenhouse gas while it is there.

The Swedish chemist and physicist Svante Arrhenius was the first to demonstrate, in 1896, that carbon dioxide in the atmosphere contributes to the increase of global temperatures. The *direct* effect is not controversial and can be replicated in simple laboratory experiments. However, the *total* effect of a change in the carbon dioxide content of the

<sup>3</sup> However, by far the most important cause of the greenhouse effect is water vapour, but water vapour does not derive directly from human activity.

atmosphere is significantly less certain. This is due to the large number of feedback effects, such as how water vapour, cloud formation and the reflective ability of the Earth's surface will be affected as the Earth warms up. These feedback effects could either strengthen (positive mechanisms) or weaken (negative mechanisms) the direct effect. At present, most indications are that the feedback effects will strengthen the direct effects and contribute towards more warming (IPCC 2013).

### Unclear how great the Earth's climate sensitivity is

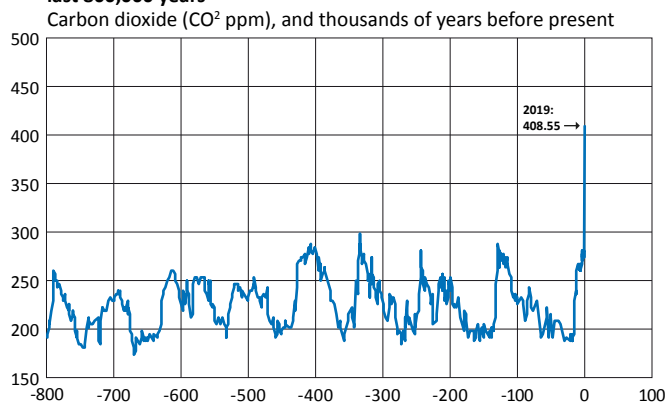
Due to the uncertainty about how great the total effect will be when the carbon dioxide content of the atmosphere changes, the UN Intergovernmental Panel on Climate Change (IPCC) has specified an interval for what is known as *climate sensitivity*, which specifies how much the average global temperature will rise in the event of a *doubling* of the carbon dioxide content of the atmosphere. From international research results, the IPCC concludes that climate sensitivity is between 1.5 and 4.5 degrees. This is a relatively broad interval. In plain language, this also means that it is very uncertain how serious the problem with global warming actually is.

The fact is that, if climate sensitivity were to turn out to be in the lower part of the interval given by the IPCC, global warming would not be a particularly great problem. So far, we have increased the carbon dioxide content of the atmosphere by just below 50 per cent and could therefore increase it by as much again and still meet the target of 1.5 degrees. On the other hand, if the climate sensitivity turns out to be in the middle or upper part of the interval, we are facing potentially very great challenges. The uncertainty regarding the climate sensitivity has not decreased over time either. About equal numbers of studies being published today find that climate sensitivity is in the lower interval as find that it is in the upper interval.<sup>4</sup> The fact is that the IPCC has even widened the interval recently.<sup>5</sup>

### Greater carbon dioxide emissions and higher temperatures over the last century

During the Industrial Revolution of the 19th Century, fossil fuels started to be used on a large scale. Since then, the concentration of carbon dioxide in the atmosphere has increased by almost 50 per cent. This means that the carbon dioxide content is completely unprecedented over the last 800,000 years, as Figure 1 illustrates.

**Figure 1. Carbon dioxide concentrations in the atmosphere over the last 800,000 years**



Sources: NOAA Climate.gov and CO<sub>2</sub>.earth

<sup>4</sup> See, for example, 'Explainer: How scientists estimate "climate sensitivity"', <https://www.carbonbrief.org/explainer-how-scientists-estimate-climate-sensitivity>.

<sup>5</sup> IPCC (2007) states that climate sensitivity is 'likely' to lie in the range 2–4.5°C, and is 'very likely' to be above 1.5°C. IPCC (2013) writes instead that climate sensitivity 'is likely in the range 1.5°C to 4.5°C (high confidence), extremely unlikely less than 1°C (high confidence), and very unlikely greater than 6°C'.



Even though a small number of countries are responsible for a relatively large share of emissions, their share of total emissions is nevertheless limited. For example, as can be seen in Table 1, the United States, China and the EU together are responsible for about 50 per cent of the world's emissions. The rest of the countries in the world are typically responsible for less than half of one per cent of total emissions. For example, Sweden is only responsible for a modest 0.15 per cent. This means that it will not be possible to solve global warming unless all countries – including emerging market economies – reduce their emissions significantly.

**Table 1. Greenhouse gas emissions for different regions**

Country	Share of global emissions (2012)
China	26.72
United States	13.52
EU28	9.86
India	6.99
Russia	5.04
Africa	3.84
Argentina+Brazil+Chile+Uruguay	3.51
Sweden	0.15

Source: EDGAR (Emission Database for Global Atmospheric Research), European Commission

The carbon dioxide content of the atmosphere has thus increased over the last century. At the same time, according to NASA scientists, the global temperature has increased by about 1 degree since 1880.<sup>6</sup> Climate scientists from the IPCC and other organisations have tried to weigh in all causes for this temperature growth. They have attempted to identify and weigh in the anthropogenic effect coming from human activity alongside all other effects, such as variations in solar radiation, the Earth's movements or volcanic eruptions. One of the conclusions of the fifth IPCC report is that human beings have affected the climate. In its report, IPCC (2013, p.17) states the following:

*It is extremely likely that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together.*

## 2.2 The effects of the climate on the economy

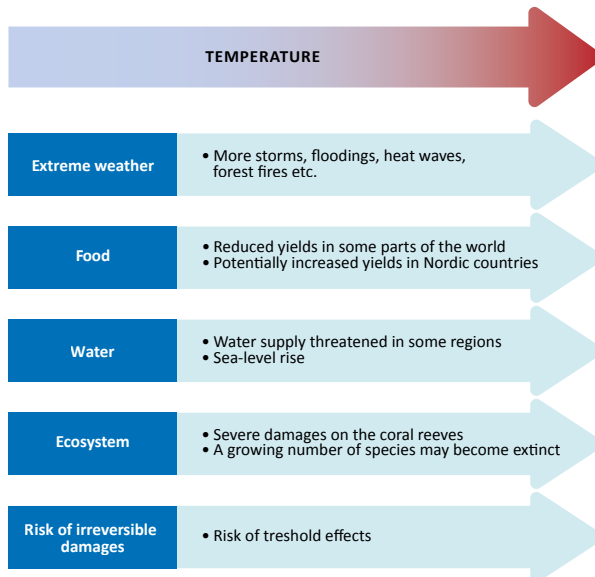
We know with certainty that changes in the climate have affected people and their economies throughout history and that they will continue to do so in the future. However, calculating the total costs of different temperature increases is a complicated task. Some of the most obvious costs of global warming are illustrated in Figure 2.

<sup>6</sup> <https://earthobservatory.nasa.gov/world-of-change/global-temperatures>

### Damage from extreme weather

Climate change is expected to lead to extreme weather becoming increasingly common, with more intensive storms, forest fires, rising sea levels and floods, for example. These will destroy property and capital, kill and injure people and may also lead to political unease and economic crises.

Figure 2. Effects of the global temperature on our economies.



Source: IPCC (2013)

### Dwindling water resources

Another effect of rising temperatures will be severe water shortages in many regions. Emerging market economies are expected to be hardest hit by this, as such countries tend to be warm already and to be strongly dependent on agriculture. Emerging market economies will probably also find it harder to adapt to climate change due to less efficient institutions and infrastructure and lower technological development. Dwindling water resources are not just something that affects poor countries, however. In recent years, both southern Australia and the western United States have been affected by severe droughts.

### Increased migration

Global sea levels are expected to rise by 0.26–0.77 metres by the year 2100 if temperatures rise by 1.5 degrees. This could potentially mean that millions of people will have to move.<sup>7</sup>

### Damaged ecosystems

A higher temperature may also have a widespread impact on ecosystems. With increased temperatures of only 1.5 degrees, 70–90 per cent of the world's coral reefs are expected to disappear. Some of these effects may be very long-term or even irrevocable. All of these problems will become worse the more temperatures rise, but we are already noticing more extreme weather and negative effects on ecosystems (IPCC 2018).

### Changes may be difficult or impossible to remedy

There is a risk that some of these changes will be irreversible. However, IPCC (2013) points out that there is no evidence of global 'tipping points' or threshold effects where

<sup>7</sup> Sea levels are expected to rise by a further 0.1 metres if the temperature increase instead reaches 2 degrees.

temperature increases would start to run out of control. On the other hand, there is evidence of threshold effects for certain specific aspects of the climate, such as ocean currents and ice cover. However, these phenomena act over time horizons of several hundred to a thousand years.

It is relatively simple to list a large number of potential consequences of a higher temperature. But to assess how serious the consequences will be and hold an objective discussion of how economic instruments can be designed, it must also be possible to set prices for all the effects in the figure (as well as all the conceivable effects that I have not listed). This is a complicated task requiring, among other things, a stance to be taken on how future generations are to be valued against those living today, as well as how much saving a human life is worth. Without taking a stance on things like this, we have no figures to compare with the costs of various measures. It would then become impossible to calculate how high a tax on carbon dioxide emissions should be, for example.

Calculating the total costs of various temperature increases is therefore a complicated task characterised by great uncertainty. The IPCC reports that it is reasonable to expect losses of 1 to 5 per cent of global GDP with an increase of global average temperatures of 4 degrees (IPCC 2007). In their study, Nordhaus and Moffat (2017) find that the calculated cost would be 2.04 per cent of global GDP with a temperature rise of 3 degrees Celsius and 8.06 per cent at 6 degrees.<sup>8</sup> However, the estimates from both of these studies are characterised by significant uncertainty. As a comparison, US GDP fell by just over 4 per cent during the financial crisis of 2008–09.

It is, however, important to understand that the costs may be devastating on a local level. For example, when Hurricane Katrina hit the US states of Florida and Louisiana in 2005, it led to costs of around USD 125 billion and more than 1,800 fatalities. However, seen as a proportion of the United States' GDP, this cost corresponded only to around 1 per cent.

### 3 Global political measures are necessary

So what solutions are there to the problem of global warming? Do we need to regulate or even ban carbon emissions? The obvious starting point when economists are considering whether a market needs to be regulated is the *first fundamental theorem of welfare economics*, which is discussed in the paragraph below.

#### 3.1 Global warming is a market failure

Put very simply, the first theorem of welfare economics says that, if property rights are well-defined and respected, there is a market for all goods, and households and companies can make free choices on markets with perfect competition, then outcomes on the markets will be efficient. This implies that there is no scope for taxes and subsidies to improve the outcome from an *efficiency point of view*. The fact is that, in this case, political measures will only lead to a less efficient outcome.<sup>9</sup> When markets function, it is thus most efficient to let the markets to allocate resources.

However, the theorem rests on a number of assumptions and, when it comes to global warming, it is clear that at least one of these has not been fulfilled: there lacks a market on which greenhouse gas emissions are priced. Since nobody owns the climate or atmosphere, there is nobody to take payment for emissions. It is thus free of charge to emit carbon

<sup>8</sup> See also Dell et al. (2012) and Colacito et al. (2018). The first of these studies finds that a temperature increase of 1 degree Celsius would reduce growth in poor countries by 1.3 percentage points. In rich countries, the authors find no effect on growth. The later study instead finds that the forecast temperature increase could also heavily reduce growth in the United States over the coming century.

<sup>9</sup> On the other hand, there may be reason to use policies to change the distribution of resources in an economy.

dioxide, even though it generates costs for households and companies around the world.<sup>10</sup> In addition, it does not matter where in the world the carbon dioxide is emitted. One unit of carbon dioxide has the same effect on the global temperature regardless of whether it is emitted in India, China, the United States or Sweden. This is because carbon dioxide rapidly spreads through the atmosphere.

Carbon dioxide emissions are an example of what economists call an *externality*. An externality involves a person or company impacting others without paying any compensation. Externalities can be positive or negative but they always constitute a market failure.<sup>11</sup> This market failure, in turn, implies that the first theorem of welfare economics does not hold. Instead, the conclusion is the opposite: the market cannot allocate the resources efficiently, but political measures are necessary to correct the market failure and allocate the resources. Without political measures, emissions will be far too high as it is, quite simply, too cheap to emit greenhouse gases.

We can summarise the reasoning above in our first insight.

**Insight 1:** *Global political measures that increase the price of greenhouse gas emissions are necessary if we are seriously to reduce global warming.*

Insight 1 actually contains two messages:

- 1) Political measures are needed to increase the price of carbon dioxide emissions.
- 2) These measures must be global.

Raising the price of emissions will work, as it will give households incentives to purchase products that are less harmful to the climate and companies incentives to develop new technologies that can contribute towards reducing emissions.<sup>12</sup>

The implication of the insight is also that it is not realistic to rely on voluntary measures and responsible behaviour when it comes to climate change. This may possibly have worked if only a few actors had been involved, but hardly in a global arena involving millions of companies and billions of people. It is exactly the scale of the problem that led Nicholas Stern to call climate change the greatest market failure in history (see footnote 2).

It will therefore probably not be enough to just appeal to people to do the right thing, change their behaviour and consume less. Neither is it likely a solution to moralise and make people feel guilty. There are, quite simply, too many people who can choose not to change their behaviour.

It is therefore decisive that the price of carbon dioxide emissions be raised worldwide. The problem cannot be solved on an individual level or even on a national level; instead, global warming is a global problem that requires global solutions. This is a direct consequence of no single country being responsible for the emissions. This may sound trivial but, at the same time, it sometimes seems to be overlooked in the general debate.

Today, such a global climate policy is still absent. It is true that the Paris Agreement, signed by 196 countries in 2016, establishes that a long-term goal is to ensure that global temperature increases stabilise well below 2 per cent. But this agreement is entirely based on the countries voluntarily taking measures to reduce their emissions. Nothing forces them to set specific targets. Even if the Paris Agreement can, in some ways, be seen as a diplomatic success, it cannot be expected, on the basis of economic theory and Insight 1, that it will

<sup>10</sup> In other words, we pay for the petrol we buy but not for the damage caused by the carbon dioxide released when we then drive our cars.

<sup>11</sup> Put simply, this market failure means that the resources could be reallocated in a way that would increase the welfare of at least one person without the welfare of others decreasing.

<sup>12</sup> Insight 1 does not imply that the measures must come from price regulations or taxes. For example, a quantity regulation would reduce the supply and thereby increase the price.

reduce global warming sufficiently. It is still far too cheap and tempting to continue to release carbon dioxide.

This forecast also corresponds with what has been observed so far. Most countries with large emissions have, in principle, made no efforts whatsoever. The fact is that carbon dioxide emissions reached a new record and became the highest ever in 2018.

### 3.2 Measures must be cost-effective

One way of reducing emissions could, quite simply, be to ban fossil fuels immediately. However, this would be far too costly, as it would more or less completely shut down our economies. This would cause a catastrophic global recession and would not be worth it. At the same time, we know that completely free emissions are leading to there being too much carbon dioxide in the atmosphere. This means we have to find a 'balanced' amount of emissions.

Not all suggestions claiming to lead to reduced global warming therefore have to be good suggestions. Some may be far too expensive. Some may also be ineffective and some may perhaps be based on unrealistic assumptions. Distinguishing between good and less good measures needs methods and models to evaluate how effective various measures are and also to estimate how large the costs will be if we fail to take any measures at all. This is referred to as a *cost-income analysis*. In one of these, all future costs of emitting a unit of carbon dioxide are weighted against the benefits associated generated by the emission. The revenues come from the production and consumption for which the fossil fuel is used. The costs are the climate-related damages we discussed above.

Making a cost-income analysis of global warming is a complicated task. It requires an understanding of how both the carbon cycle and the climate work, as well as our economies. We also have to be able to make forecasts for 50 to 100 years ahead, which takes both meticulousness and humility. To make analyses like this, William Nordhaus developed a framework of models, called integrated assessment models, at the start of the 1990s. These models consist of three connected submodels: an economy, a carbon cycle and a representation of the climate. There are many such models today, but most of them are based on Nordhaus's work, which has become standard for the analysis of various scenarios for global warming. In 2018, Nordhaus received the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel for his work in this area.

The point of cost-income analyses is to understand the measures that can best reduce temperature increases for the smallest possible cost. Cost-efficiency is an important goal in itself. Just as we should not squander resources, neither should we undertake unnecessarily expensive measures to reduce warming. Less costly measures will instead free up funds that can instead be used for other important purposes such as reducing poverty and water shortages or reducing the spread of various illnesses.

However, it is probably even more important that the measures be cost-effective if countries with ambitious climate goals, like Sweden, are to convince countries like India and China to reduce their emissions. This means it will be decisive that the measures are not too expensive. As we will see later, it would not be particularly expensive to limit global warming to 2 degrees, but only if we actually use cost-effective measures. Otherwise it will be significantly more expensive.

### 3.3 Taxes and quantity regulation

The two most obvious political measures to reduce global warming are the introduction either of a carbon dioxide tax or of what is known as quantity regulation for emissions where a limit is set for the quantity that may be emitted.

### Carbon tax

As I mentioned above, carbon dioxide emissions are a negative externality and the English economist Arthur Pigou demonstrated 100 years ago that a correctly set tax – a so-called Pigouvian tax – can solve the problem of externalities (Pigou 1920). As regards global warming, the tax per emitted unit of carbon dioxide should be set so that it is as large as the climate cost generated by that unit. The price of fossil fuel, including carbon dioxide tax, will then consist of the price charged by the producers plus the climate cost generated by the fuel. This allows the climate costs to be reflected by the price.

The advantages of a carbon dioxide tax are many, but its main strength lies in its simplicity: it is a *market-based* solution that implies that people do not need to think about how their behaviour exactly affects the climate. This effect has already been incorporated into the price, which automatically gives people the right incentive. This is a great advantage as it is very difficult for individual persons to evaluate their own climate impact. Another advantage is of a more technical nature. Efficiency demands that it costs the same to reduce emissions everywhere.<sup>13</sup> A global tax will achieve this directly, unlike, for example, the Paris Agreement, under which all countries decide themselves how much they will reduce their emissions.

A common misapprehension concerning carbon dioxide taxes is that they have to involve large redistributions of tax revenues among countries. This is not at all necessary. All countries can set the same tax and then use the revenue for whatever they like – it does not have to be redistributed internationally if this is not wanted. All that is needed is an agreement that every country will implement a carbon dioxide tax.

Another important thing to point out is that a tax on carbon dioxide is fundamentally different from most other taxes. This is because a tax on employment income, for example, *distorts* the incentive to work, which would normally lead to a welfare loss. A tax on carbon dioxide, in contrast, would *correct* the incentive to emit carbon dioxide, leading to a welfare gain.<sup>14</sup>

### Quantity regulation

The second obvious measure to reduce global warming is the introduction of quantity regulation, which restricts how much carbon dioxide may be emitted. Such a system is standard today to reduce global warming and has been used, for example, in the Kyoto Protocol and in the EU Emissions Trading System (ETS). It works by limiting total emissions by sharing or auctioning emission rights to companies and other actors. Those owning the rights can then sell them to other actors. The point of trading emission rights in this manner is to allow some companies to reduce their emissions for a lower cost than others. If it is very expensive for a company to reduce its emissions, it becomes more economically effective for that company to purchase emission rights from companies able to reduce their emissions at a lower cost.

### Both approaches have advantages and disadvantages

Taxation and quantity regulation can, theoretically, be completely equivalent, but, in practice, there are a few important differences. One is that they are associated with different kinds of uncertainty (Weitzman 1974). Under a carbon dioxide tax, the emitters know what the price is, but the legislator does not know, with certainty, how large emissions will actually be. Under quantity regulation, the legislator knows exactly how large emissions will be but the price of them is uncertain instead.

<sup>13</sup> The tax has to be the same everywhere as climate damage occurs independently of where the carbon dioxide is emitted.

<sup>14</sup> This follows directly from the above discussion of the first fundamental theorem of welfare economics. The labour supply is not clearly characterised by a market failure and a tax would then lead to a welfare loss.

Another potentially important difference regards with tax revenues. Like all taxes, a carbon dioxide tax generates greater costs for the private sector and greater revenues for the state. Emission caps and trade are more complicated. If the state auctions emission rights and collects revenues, this certainly acts like a tax. However, it is common for the state to allocate emission rights, in which case there are no tax revenues. Another difference, which is illustrated in Golosov et al. (2014), is that a carbon dioxide tax requires significantly less information to implement than quantity regulation.

Today, many economists are agreed that a global carbon dioxide tax would be the most direct and effective way of reducing global warming. In January 2019, about 40 highly reputable economists – over half of whom had been awarded the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel – signed a petition claiming that a carbon dioxide tax would be the most cost-effective way to reduce emissions fast enough.<sup>15</sup> Since then, more economists have signed the petition. At the time of writing, these economists number over 3,500.

Despite the academic unanimity, there are several problems with a carbon dioxide tax. For example, there is a traditionally strong opposition to taxes in the United States, which makes it difficult to see any tax receiving political support there.

Both taxes and quantity regulations suffer from an inherent free-rider problem: if all countries were to implement a carbon dioxide tax or quantity regulation, but one individual country did not, that country could cut its production costs in relation to everybody else, at the same time as the cost of the extra emissions generated by the country would be shared among all countries around the world. The problem is that all countries have the same incentive to deviate from taxation and quantity regulation. It may therefore be necessary for the countries to monitor one other's emissions and also penalise any countries deviating.

### 3.4 Coal is a larger problem than oil

Before we say anything about how an efficient policy can be designed to reduce global warming, it is necessary to discuss a few important differences between fossil fuels. Even though coal, oil and natural gas all form carbon dioxide when they are burned, there are still important differences between them.

Conventional oil is a highly efficient fuel and is very cheap to extract. But there is only a relatively small amount left. I am talking here about conventional oil and not oil sands or oil produced through hydraulic fracturing ('fracking').<sup>16</sup> In addition, oil is traded on a world market and there is an infrastructure in place to transport oil anywhere in the world.

The situation is completely different for coal. According to prevailing estimates, coal exists in very large amounts spread over basically the entire world.<sup>17</sup> Coal is also significantly more expensive to produce per unit of supplied energy. Due to the high transportation costs, coal is not traded between countries to any great extent.

These differences are important. The very low marginal cost of producing conventional oil in combination with international trade means that a tax on oil would be almost futile. There are two reasons for this.

The first is so-called carbon leakage. If some countries choose not to purchase oil, for example for climate reasons, the sellers can cut the price without this making it unprofitable. Then they can sell the oil more cheaply to countries that do not take the same consideration of global warming.

The other reason is that a tax will not substantially affect the supply of oil. Even if all countries join forces and introduce a tax on oil, the owners of the oil could just cut the

<sup>15</sup> Wall Street Journal, 16 January 2019.

<sup>16</sup> Such *unconventional* oil has several similarities with coal in the sense that it is significantly more expensive to extract.

<sup>17</sup> See, for example, Rogner (1998), who shows that, with technological development, the total stock of fossil fuel is 5,000 Gigatons of Oil Equivalent (GTOE). Most of these resources are formed of coal. With a global annual consumption of around 10 GTOE, this stock will thus last for about 500 years.

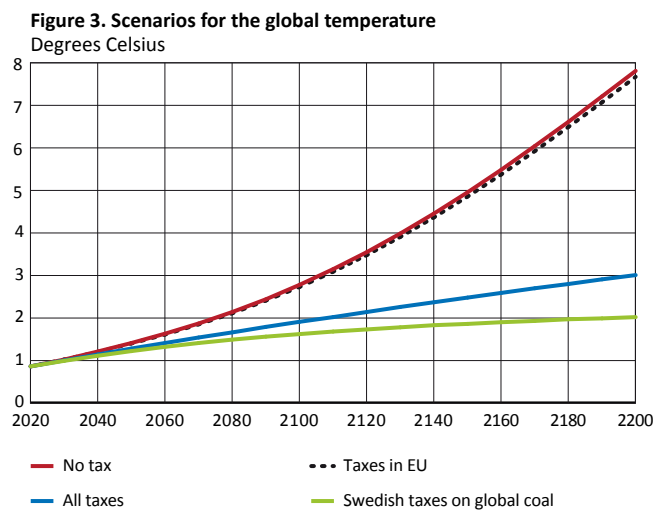
price until it is as low after tax. The profit margin on oil is quite simply too high. A tax would therefore mostly affect the price sellers can charge, not the supply of oil.

It may seem disheartening to find that a tax on oil would be almost futile, but the good news is that a carbon dioxide tax would be significantly more effective in reducing the production of coal. Even a relatively low tax would be enough to make a large part of the production of coal unprofitable. As we will see in the next section, the most important initiative that can be taken to reduce global warming is to reduce the production of coal.

### 3.5 How much would it cost to limit global warming?

Limiting the future costs of global warming means that we must take measures today. The most expensive scenario would be to ignore it completely. The problem is that there is an inherent conflict between the present and the future. Taking measures today will cost us today, but we will not be able to see the benefits – in the form of less warming – until the future. This means that the current generations must make sacrifices so that future generations can have better lives.

Hassler et al. (2020) analyses which temperature increases we will experience, depending on which policies we implement, above all various taxes. Among other things, they investigate what the temperature will be if we apply no taxation at all on greenhouse gases, and if only certain regions do so. The results show that, without political measures, we are facing comprehensive global warming.<sup>18</sup> The temperature will then rise by about 3 degrees during the current century, to increase by 9 degrees by 2200.<sup>19</sup> This is illustrated by the red line in Figure 3. Without saying exactly what costs such a scenario would entail, it is fairly obvious that, according to all reasonable calculations, they would be significant.



On the other hand, a relatively low global tax of USD 25 per ton of carbon dioxide, corresponding to roughly USD 0.25 per gallon gasoline, would be an effective way of holding the temperature increase below 2 degrees for the rest of this century. This is illustrated by the blue line in the diagram. However, it is entirely decisive that the tax be implemented globally. If, for example, only the EU were to implement the tax, we would be facing basically the same development of temperatures as we would be if nobody were to tax carbon dioxide, as illustrated by the broken line in the diagram.

<sup>18</sup> Climate sensitivity has been set at 3, which is to say in the middle of the interval calculated by the IPCC. Uncertainty over climate sensitivity is considered in the next section.

<sup>19</sup> These temperatures are expressed in relation to the temperature prior to the Industrial Revolution.



These results confirm what was stated in Insight 1 – that the price increase must be global. They also show that the EU's ETS system (see the section 'Taxes and quantity regulation') needs to be broadened and to include significantly more countries if the system is to have a chance of making an impact.

Finally, a global tax in line with the Swedish one of about SEK 1150 per ton of carbon dioxide, which corresponds to around USD 1 per gallon of gasoline, is enough to keep the temperature below 2 degrees until 2200, as illustrated by the green line.

The conclusions of these analyses bring us to Insight 2.

**Insight 2:** *Using a global tax to limit the increase in the global temperature to 2 degrees would not be particularly expensive as long as the tax is introduced on a global level.*

A relatively low tax would be enough for this purpose. Even if many voices in the general debate claim, at times, that a carbon dioxide tax would be completely devastating for the country's production and competitiveness, there is no empirical or theoretical evidence for this. After all, for almost 30 years, Sweden has had a tax about seven times as high as the tax that could limit temperature rises to 2 degrees this century. Sweden has even had better growth than many comparable countries since the tax was introduced. However, this again brings us back to the significance of implementing the tax globally so that competitiveness is not worsened for any particular country.

As coal can be found in such large amounts, it is precisely coal production that forms the greatest threat (see also IPCC 2018). It is coal that will push the temperature increase up to 9 degrees unless we tax it. The analysis in Hassler et al. (2020) also shows that it does not matter whether we tax conventional oil. Such a tax would have basically no effect on the supply of oil.

However, even if the tax is ineffective against oil use, the social costs of continuing to use up oil at the same rate are minor. The reason for this is that conventional oil is so cheap to produce, exists in such small amounts and is such an efficient fuel that it would actually be effective to use up all the oil – despite the negative effects on the climate.<sup>20</sup> This does not apply to unconventional oil such as oil shale, oil sands and the oil derived from fracking. This oil is significantly more like coal in the sense that it is significantly more expensive to produce and exists in very great quantities. Consequently, it should absolutely not be consumed at the same rate.

The difference between coal and oil is so important that it can be formulated as an insight.

**Insight 3:** *The absolutely most important initiative for reducing global warming is to restrict the use of coal.*

This is interesting considering that the general debate very much focuses on restricting the use of oil. For example, we are supposed to stop flying and driving cars. The current Swedish government has voiced the explicit ambition that Sweden should become fossil-free. As Sweden does not use coal to any major extent, this policy largely means that Sweden is to stop using oil. But, combined with the possibility of selling it to others, the profitability and efficiency of oil mean that such a policy can only be expected to lead to major carbon leakage in which the oil is sold to other countries instead.

<sup>20</sup> If the supply of conventional oil had been significantly greater, it is likely that this conclusion would have been changed.

A national climate policy seriously aimed at reducing global warming instead needs to focus on the effects the policy can be expected to have on global emissions. A stance needs to be taken on whether it will actually reduce global emissions or if it will just lead to production being moved abroad.

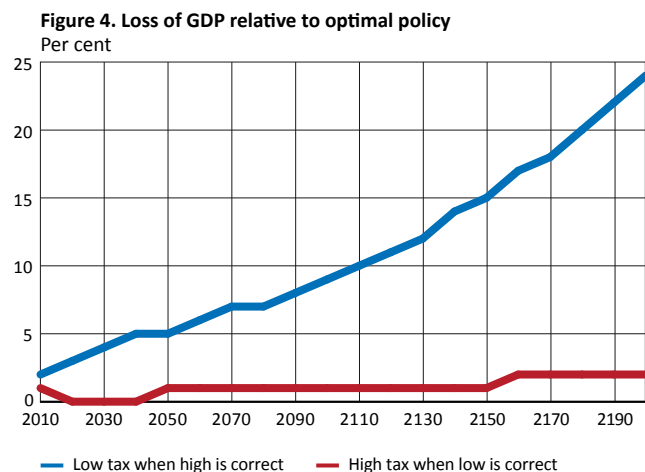
### 3.6 Should we take measures even if we are not certain that the climate costs will be high?

The fact that there is such great uncertainty over both climate sensitivity and the economic costs of climate change has led climate sceptics to argue for a very restrained climate policy, quite simply because there may not be any major effects. This is certainly true. We cannot rule out that the costs of global warming actually may not be so high. However, at the same time, we cannot rule out the possibility that they may be very high.

Climate policies must be designed in light of this great uncertainty.<sup>21</sup> This means that we have to decide what to believe right now and then design our policy to fit. It also means that the policy may be badly designed, for example if it later turns out that climate sensitivity is higher or lower than we had earlier expected.

Hassler et al. (2018) calculate the effects of two different policy errors. The first error concerns designing policy on the basis of low climate sensitivity and low costs that later turn out to be high. The second error is the inverse: assuming that climate sensitivity and costs will be high, but both of these later turning out to be low.

The results can be seen in Figure 4, where the red line shows that it is not at all expensive to overestimate climate change if it should later turn out to be mild. The reason for this is that a carbon dioxide tax is so cost-effective that being extra ambitious is not particularly expensive. In contrast, acting in line with the climate deniers risks being very expensive in the event that climate sensitivity and costs later turn out to be high. The blue line indicates that the costs of underestimating climate change are potentially very high. After 2150, consumption will be more than 15 per cent lower per year than it would be with an optimal policy. As a comparison, global GDP fell by about 15 per cent in the Great Depression between 1929 and 1932.



Source: Hassler et al. (2018)

An ambitious climate policy would thus be a cheap form of insurance against future high but uncertain expenses. However, this only applies if the policy is cost-efficient, otherwise it may be significantly more expensive. The conclusion of this analysis is that it would be highly

<sup>21</sup> See Weitzman (2009) for a discussion of potential problems with analyses of climate policy that can arise against the background of the great uncertainty prevailing over climate change.

justifiable to take out this insurance according to the motto ‘hope for the best but prepare for the worst’. It also means that it would not be sensible to commit to a policy that assumes small losses and low costs, even if such a scenario could be realised.

## 4 Alternative political measures

What alternative measures can we rely on if we fail to introduce a global carbon dioxide tax or a broad regulation of quantity? There are many suggestions. Some examples include subsidising green energy sources, sustainable financing and technology solutions such as carbon capture and storage (CCS).

If alternative measures are to succeed, they must be able to reduce global carbon dioxide emissions significantly. And to do this they must be able to resolve and manage the market failure that has led to emissions being cheap, and which is a fundamental reason for global warming.

### Subsidies to green technology

As the problem of global warming stems from coal production, a conceivable strategy would be to subsidise the development of energy sources such as sun, wind and water. They are called ‘green’, as they do not increase the amount of carbon dioxide in the atmosphere. But although technological advances have a spillover effect between countries, subsidies in an individual country will not have any major effect on global production. Just as for taxes, alternative sources of energy should preferably be subsidised at global level to be effective, even in theory.

I therefore state a point that is in many ways trivial, but which many people tend to miss in Insight 4.

**Insight 4:** *Green energy is only viable to reduce global warming if it substantially reduces the use of coal.*

This is equally relevant when it comes to so-called sustainable investment and green bonds, which will be discussed further later on.

So how can green subsidies stop coal power? The idea is that the subsidies will lower the price of green energy. So far so good. However, one assumption is that this price cut will then lead to lower demand for fossil fuels. But this is far from evident. It all depends on the *substitutability* of green and fossil energy sources.

If two goods are highly substitutable, it means that the buyers are equally happy with the one as with the other. They therefore tend to buy only one of the two goods, namely the cheapest one. If the two goods are instead complementary, the buyers will want to buy both of them.<sup>22</sup>

If the energy sources have sufficient substitutability, then cheaper green energy could entirely drive out fossil fuels. The subsidies would then lead to a reduction in coal power, at the same time as they resolve the market failure – as all use of fossil fuels will cease. If, on the other hand, the energy sources are more *complementary*, the subsidies will not work. The fact is that green subsidies might then possibly lead to an increase in the use of fossil fuels, as both fossil and non-fossil fuels are used.

Unfortunately, the scientific studies available today do not support the idea of high substitutability between green and fossil energy sources. On the contrary, the relationship appears to be more complementary, at least in the medium term (see Stern 2012). One

<sup>22</sup> Examples of substitutable goods are whole litres and half litres of milk, and examples of complementary goods are butter and bread.

reason is that fossil fuels are stable energy sources that function regardless of whether the sun is shining or it is windy. They therefore tend to complement the green energy sources, which are less stable. Consequently, green subsidies cannot be expected to be effective against global warming. This is also verified by Hassler et al. (2020), who analyse how a more rapid technological development of green energy sources affects global warming. They find that subsidies are not effective in significantly reducing global warming. Even if the price of green energy is subsidised so that it falls 2 per cent faster per year than without subsidies, it will have no great effect on the global temperature. Just as in the case without a global tax, the temperature is then raised to 9 degrees in 2200.

One important reason why a lower price for green energy does not have sufficient effect is that there are also technological advances within coal mining. The green energy therefore does not become sufficiently cheaper to be able to knock out coal mining.

If, on the other hand, it were possible to stop technological advances in coal mining completely, the price of coal would rise sufficiently over time to be able to limit global warming to 2 degrees up to the year 2200. The price of coal would then rise because it would become relatively more expensive over time to mine coal, and the price increase would function in roughly the same way as a carbon tax. It would be the same solution as before: it is necessary to raise the price of coal to reduce global warming.<sup>23</sup>

### **Sustainable financing?**

Another measure that is often advocated today is so called *sustainable financing*. The idea is that companies, institutions and private individuals can themselves act in a moral way by refraining from investing in projects that do not meet certain ethical criteria. Specific criteria have been set up for this, so-called *ESG* criteria, where E stands for environmental, S for social, and G for governance. Companies can invest in line with the ESG criteria to signal that they are ethical and that their products contribute to sustainable development.

The ESG categories are very broad and all-inclusive. The E includes large, broad sub-categories such as climate change, greenhouse gases, environmental aspects, emissions, indicators related to land and water use, recycling, refuse and a further 50 factors. The S includes just as much and as many points on, for instance, human rights and issues related to gender and diversity. And finally, the G is at least as broad, and concerns, for instance, how companies treat their employees.

ESG investments have increased substantially over the past 20 years. In the year 2018, a good 12 trillion, that is to say 12 thousand billion dollars was put into so-called sustainable and responsible investment in the United States alone.<sup>24</sup> As the ESG criteria include very many different aspects, ratings institutes and various other methods have been developed to rate how well different companies live up to them.

It is, of course, positive that companies are endeavouring to act in a moral and ethical manner, but as the E includes many climate aspects, one can also ask to what extent ESG investments can help to limit global warming. There are three major problems in particular that mean there is good reason to be sceptical.

The first problem was described in Insight 4: green investment is only effective against global warming if it can stop coal mining. There is neither empirical nor theoretical evidence that this will be the case.

The second problem is that sustainable financing does not resolve the market failure that is an important part of the problem that contributes to global warming. There is no indication that enough people will voluntarily refrain from investing in potentially very profitable projects that are not good for the climate. Even if some companies refrain from a

<sup>23</sup> These conclusions could change if the future elasticity proved much greater. It would then need to be at least five times higher than the prevailing empirical estimates.

<sup>24</sup> US SIF Foundation (2018).

certain type of investment, it does not mean that these investments will not be made. There is probably a sufficient number of actors, or large enough actors on the financial markets that value the project from a purely financial perspective, rather than an ethical one. This will counteract the investments made from an ethical perspective.

The fact is that if many voluntarily refrain from investing in profitable projects that contribute to global warming, it will only mean that the price of these projects falls. They will therefore become even cheaper and even more profitable.

These types of *general equilibrium effects* are decisive when it comes to global warming. Ethical and moral behaviour by a company or country can be easily neutralised by others, and it is therefore necessary for governments around the world to agree to take political measures simultaneously.

The third problem is that the ESG criteria are so broad and extensive that they in practice mean everything and nothing. Different methods and different rating institutes therefore tend to give the same company completely different rankings. For instance, one rating institute ranked Tesla as the worst car manufacturer in the year 2018 from an ESG perspective, while another ranked it as the best.<sup>25</sup> It is not actually surprising, given that the ranking is based on trying to find the aggregate of a number of completely disparate areas and then distil it into a figure.

In their current form, there is a risk that the ESG criteria largely give a false feeling of security to investors, who do not really understand exactly what lies behind a particular rating, or what it entails in practice.

The Swedish Society for Natural Conservation evaluates in a report published in 2015 to what extent financial products marketed as ethical, green or sustainable can be used by households and asset managers to ‘make a difference’ and promote a better environment. They base their analysis on both theoretical and empirical studies. Their pessimistic conclusion is summarised in the following paragraph.

*It is normally very difficult for households and asset managers to act effectively to promote a better environment by avoiding environmentally damaging companies’ shares or bonds. This avoidance might possibly have a symbolic effect in the longer run, but it should not be overestimated in this context.<sup>26</sup>*

### **Green bonds**

Green bonds are actually only a specific form of sustainable financing. They are bonds that are earmarked for use in new or existing climate and environmental projects. Within this broad definition of green bonds, there are then many sub-areas, such as energy, transport, waste management, building and construction and land and water use. In the year 2018, green bonds to a value of around USD 180 billion were issued around the world, and this is a market that is expected to expand very rapidly going forward.

Green bonds have many potentially good qualities. Above all, they can help to fund environmental projects that are beneficial to society. But when it comes to their ability to reduce global warming, they unfortunately suffer the same problems as sustainable financing, for instance, that they do not necessarily lead to a reduction in use of carbon.

Another problem is that, as with the ESG criteria, the criteria regarding how green a bond needs to be are not sufficiently strict or clear. There are guidelines – the Green Bond Principles – but these are only guidelines.<sup>27</sup> As there is no global standard for the criteria, it is often unclear exactly how green a bond is. For this reason, one hears about light green bonds, medium green bonds and dark green bonds.

<sup>25</sup> See, for instance, the Financial Times, on 6 December 2018: ‘Lies, damned lies and ESG rating methodologies.’

<sup>26</sup> Swedish Society for Natural Conservation (2015), pp. 5–6.

<sup>27</sup> See, for example, ICMA (2018).

A third problem is that it is very unclear what an investment in a green bond actually entails. A financier may, for instance, think that it helps to fund solar panels. But if the issuer of the bond already has resources for these, the investment instead frees up funding for other, potentially non-green activities. It is not possible to rule out this type of effect. These problems mean it is also very difficult to make an empirical evaluation of how effective green bonds are in general.

The conclusion is that even if so-called sustainable investments may have many positive effects, their opportunities to limit global warming must be regarded as small. There is insufficient theoretical and empirical evidence to indicate that they are a possible way forward. The demand for green bonds has increased substantially in recent years, and sometimes there is even talk of a green bubble. There is also an evident risk here of *green washing*, that is, companies and institutions want to hold this type of asset to paint a picture of themselves as being environmentally and climate friendly. This could create a false security, in that we are led to believe we are moving in the right direction, even though this may not actually be the case.

## 5 Concluding remarks

In this article, I have discussed global warming from an economic perspective. I have summarised the most important results into a number of points I call *insights*.

**Insight 1:** *Global political measures that increase the price of greenhouse gas emissions are necessary if we are seriously to reduce global warming.*

**Insight 2:** *Using a global tax to limit the increase in the global temperature to 2 degrees would not be particularly expensive as long as the tax is introduced on a global level.*

**Insight 3:** *The absolutely most important initiative for reducing global warming is to restrict the use of coal.*

**Insight 4:** *Green energy is only viable to reduce global warming if it substantially reduces the use of coal.*

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# 30 years of combating money laundering in Sweden and internationally – does the system function as intended?

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During the course of 2019–2020, the issue of combating money laundering and terrorist financing has featured prominently in the public debate in Sweden. Since 1990, the UN has required the criminalisation of money laundering, and Sweden and other countries have gradually built up a relatively complex but also relatively unknown framework to prevent criminal abuse of the financial system.

In this article I provide a brief history of efforts to combat money laundering and of how international agreement is reached in this context. After that, I describe in detail how the system for combating money laundering and terrorist financing functions in Sweden and I summarise how the effectiveness of the Swedish system has been assessed internationally. Finally, I comment briefly on the effects of recent years' publicity regarding Danske Bank and Swedbank in particular, discuss what results the system can produce and discuss how it could be improved.

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## 1 From Al Capone to *Easy Money*, and why exactly is it called money laundering?

I often give talks on combating money laundering and terrorist financing, and I usually begin by describing what happened in Colombia between the late 1970s and early 1990s. At that time, Pablo Escobar had nearly taken over the Colombian state and had begun transporting large quantities of cocaine to the United States. The cocaine flows were of course of major concern to the American authorities. It was well known that the cocaine was transported north, but it was less well known what two flows were returning south: one consisted of arms and the other of money. The sale and export of weapons in the United States is a political issue in its own right, with its own inherent difficulties, but in the mid-1980s, American authorities began to wonder if they could do something about the flow of money. This money consisted of the profits from the cocaine sales that were returning to Escobar and others involved in the cocaine production.

Presented in October 1984, *The Cash Connection*, an interim report by a US public commission on organised crime, is in one way the starting point for the present system for combating money laundering and terrorist financing. The report concluded that at the time, provided that administrative requirements for record keeping and reporting transactions

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above certain amounts were met, a person laundering money through US banks could not be prosecuted for the money laundering alone.

Even if law enforcement authorities had not been particularly interested in this phenomenon, it was known that organised crime needed to launder its profits, i.e. create a seemingly legitimate explanation for where the money came from. An apocryphal story would have it that the term ‘money laundering’ comes from Chicago in the 1920s, where Al Capone and his cronies sold alcohol, which was prohibited at the time, and bought laundries. Then as now, the principle for cleaning dirty money is essentially simple: Say that the laundry has one hundred customers a day who all do laundry to the value of one dollar each. If, at the end of the day, two hundred imaginary customers who ‘pay’ with money earned from the alcohol sales are added to the books, two effects arise for the money launderer. On the one hand, taxes on the further ‘profit’ of two hundred dollars will need to be paid, unless avoidable through accounting tricks. But on the other hand, there is now a legitimate explanation for how the money was earned, and the money is now in the financial system ready to be freely used. The money has been laundered! In money laundering terminology, there are three main phases: *placement* (when the money is introduced into the financial system), *layering* (when the money is transferred to create confusion) and *integration* (when the money can finally be used).

The Swedish novel *Easy Money* describes a method of money laundering that follows the Capone model: Criminals buy video shops that in reality make around fifty thousand SEK per month, but on paper bring in three hundred thousand, which means that after deducting for overheads, around one hundred and fifty thousand SEK of drug money per month can be laundered (with a straw man as chairman of the board in order to hide who is controlling the company). But what do you do if you want to launder larger sums more securely? The main character in the book, JW, creates a number of companies in Sweden and on the Isle of Man, where it was possible, at least at the time the events in the book take place, to own companies and accompanying bank accounts secretly. JW claims that the companies are trading and marketing antique furniture and *places* cash in Swedish banks by convincing the staff behind the counter that trade in British antique furniture is a cash-intensive industry and that the money is payments. He can naturally produce the necessary fake invoices. Then the money is *layered* when it moves from the Swedish accounts to the anonymous accounts on the Isle of Man. Finally, the *integration* takes place when the companies on the Isle of Man ‘lend’ money to the Swedish companies, which inter alia buy a ‘company car’ for JW and pay him a large dividend so that he can buy an apartment. JW considers it all to be complicated, time-consuming and costly, but worth every penny. In the book, JW does not reach the big money before getting caught, but if he had been able to continue he would probably eventually have tried to safeguard his profits by investing in property in London or New York, which is usually considered an attractive investment for large-scale money launderers.<sup>1</sup>

Something that has long been a good help to money launderers and other economic criminals is the relatively strong bank secrecy, i.e. the national regulation that prevents banks from disclosing information on their customers and their customers’ dealings without authorisation. The extent of bank secrecy varies from one country to another. Nonetheless, an international trend in recent decades has been for this type of provision to be relaxed to some extent to enable authorities to combat crime and prevent tax evasion. Banks and other participants in the financial system have also to a corresponding extent faced increasing demands from the authorities in this regard.<sup>2</sup> In 1984, when *The Cash Connection* was published and bank secrecy was stronger than it is today, there was in the United States an

1 This behaviour and the structures that enable it is described in the book *Moneyland*, pages 218–232.

2 Examples of this would be the international regimes FATCA and CRS, which enable the exchange of such information between tax authorities in different countries, but also purely national initiatives such as the Swedish public inquiry that will in 2020 propose more effective forms for information exchange between banks and authorities (see section 4.5).

obligation of a rather mechanical nature to report transactions over a certain amount, and an obligation to retain documents so that the authorities could conduct investigations at a later stage. If these obligations were met, no one could be prosecuted for money laundering as long as no other violation of a federal statute could be proven, even if an investigation using this information naturally could lead to charges for other crimes. Money laundering in itself was not criminalised. The commission therefore recommended new legislation to criminalise money laundering, which heralded the beginning of the development of the present system.

I would like to point out at the start of this article that money laundering is harmful not just because it enables criminal elements in society to make use of their profits, but also because it jeopardises the integrity of the financial system. Money launderers have an interest in undermining the system's protection mechanisms and abusing the participants in the system. Large-scale money laundering also gives rise to financial flows that in turn have other potentially negative effects.<sup>3</sup> As we have seen in recent years, for instance in the case of Danske Bank, highly publicised money laundering scandals can have major effects, particularly on how the banks act and make business decisions, which may ultimately affect financial stability. This is a further reason for states to combat money laundering. A sustainable world requires a sustainable financial system that is resilient to abuse, and it has recently been made more clear that combating money laundering and terrorist financing is a sustainability issue, as the international community has made it a part of the 2030 Agenda for Sustainable Development adopted by UN member states in 2015.<sup>4</sup>

The proposal to criminalise money laundering became American law in 1986 – for the first time, the actual money laundering became a criminal offence. In connection, and as money laundering had been identified as a cross-border problem requiring a cross-border solution, American authorities began to take action at an international level so that other countries would do the same. In Sweden, for instance, money laundering was criminalised in 1991 through amendments to the existing provisions on receiving stolen goods. One way of making other countries criminalise money laundering was to go through the UN, whose narcotics trafficking convention which entered into force in 1990 *inter alia* requires ratifying states to criminalise money laundering resulting from narcotics crimes. Another way, which would come to have central importance in this context, was that the United States together with 15 other countries (including Sweden) formed the organisation FATF in 1989.

## 2 The FATF – ‘the most powerful organisation you have never heard of’

The FATF, which is an abbreviation for the Financial Action Task Force, has during its 30 years of operation become the central and in principle the only authoritative organisation in the field. If you have never heard of the FATF, you are certainly not alone. The FATF is not a treaty-based international organisation with legal personality, and it does not create binding international law. From its creation in 1989 until April 2019, the FATF was a task force working on temporary, regularly renewed mandates from ministers of member countries. Since April 2019, the FATF has an open-ended mandate. Those who are active in the field of combating money laundering and terrorist financing are usually familiar with the FATF, as the FATF's decisions and architecture form the basis for their operations, but beyond this

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3 These other effects may, for instance, include direct losses for the treasury through tax evasion. But they may also create problems for the economy in other ways, for instance through large financial flows causing imbalances in the exchange rate, which affects companies with foreign trade. It could also mean that the country's financial sector gains a bad reputation, which could increase transaction costs and have a negative effect on correspondent bank relations with the country's banks.

4 Combating money laundering and terrorist financing is central to Sustainable Development Goal 16.4: ‘By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime.’ See <https://sustainabledevelopment.un.org/>.

world, the organisation is more or less unheard of. The FATF has a mandate to protect the international financial system and the economy as a whole from money laundering, terrorist financing and the financing of proliferation of weapons of mass destruction, and it largely focuses on three different activities that I describe in the following sections.

## 2.1 Everything begins and ends with risk

The first thing the FATF does is to regularly gather the world's experts in the field to share information about the techniques used by criminals to abuse the financial system, which is necessary for the participants in the financial system to be aware of so that they know what risks they are exposed to. This information – which is a perishable product as the criminal techniques are constantly being refined – is communicated regularly in various types of publications issued by the FATF, most of which are available to the general public.

I will return to the concept of *risk* repeatedly in this article, as the system for combating money laundering and terrorist financing does not function if the actors in the financial system, such as banks, are not aware of the corresponding risks. The first thing you want to know when assessing your own risks is the *threats*: What crimes generate profits, and which criminals might be interested in laundering money or financing terrorism through my financial system, my government agency or my bank – and if so, how? After that, you need to investigate the *vulnerabilities*: Which protection mechanisms are missing, and which features of my financial system, my government agency or my bank (for instance, the products and services offered) could be abused? When you compile the threats and vulnerabilities, you obtain a picture of the *inherent risk*. From here, you (hopefully) take various types of structural risk-reduction measures to limit the inherent risk. After that, what remains to handle is the *residual risk*. On the basis of this residual risk, you take further measures to ensure that the available resources are spent where they will do the most good. This is the fundamental method for combating money laundering and terrorist financing based on risk. In section 3, I describe how this is done in practice in Sweden, and what requirements are placed on the various participants in the system – both in the public and private sectors – with regard to knowledge of their risks. When risk information is compiled, it is often communicated in the form of *typologies*, i.e. generalised descriptions of the different stages in a specific money laundering scheme, for instance.

During its 30 years of operation, the FATF has produced an impressive wealth of risk assessment reports that may be useful to public and private actors when assessing their own risks. Table 1 below illustrates the breadth of the analyses.

**Table 1. Examples of risk assessment reports from the FATF**

Title	Year
Financial Flows from Human Trafficking	2018
Financing of the Terrorist Organisation Islamic State in Iraq and the Levant	2015
Terrorist Financing in West Africa	2013
Specific Risk Factors in the Laundering of Proceeds of Corruption—Assistance to Reporting Institutions	2012
Money Laundering through the Football Sector	2009

Note. All the reports in the table are available on the FATF's website.  
Source: FATF

Risk awareness must permeate the entire system from start to finish. It is not possible to handle your risks until you have identified them, and when you have handled them, new ones will arise. That is what I mean when I write that everything starts and ends with risk, and why it is logical to first describe the FATF as a risk assessment factory.

## 2.2 The FATF Standards – ‘recommendations’ or binding law?

When you know your risks, the next step is to create a system to manage them. This is the second activity that the FATF focuses on. In 1990, the FATF adopted its first set of recommendations for how member countries should legislate to prevent and combat money laundering, on the basis of the risks that were known then. The recommendations have since been subject to constant refinement, which I will not detail here except for two instances of major revisions: when they were expanded to cover terrorist financing in 2001, and to the financing of proliferation of weapons of mass destruction in 2012.<sup>5</sup> At present, the FATF maintains 40 recommendations, with accompanying interpretive notes and a glossary, which can be divided up into seven themes as in Table 2 below.<sup>6</sup>

**Table 2. Themes in the FATF’s recommendations**

Theme	Recommendations
Risk assessment, policies and coordination	1–2
Money laundering and confiscation of the proceeds of crime	3–4
Terrorist financing and financing of proliferation of weapons of mass destruction	5–8
Preventive measures (for the private sector)	9–23
Transparency in beneficial ownership of legal persons and arrangements	24–25
Powers and responsibilities of competent authorities	26–35
International cooperation	36–40

Note. The recommendations in their entirety are available on the FATF’s website.  
Source: FATF

The recommendations are instructions for how the member countries should structure their regulation. They cover, inter alia, national risk assessment and coordination of competent authorities; the design of criminal law provisions regarding money laundering and terrorist financing with the accompanying investigative powers for authorities; modalities for implementing the UN Security Council’s targeted financial sanctions; regulation of the fundraising organisations of the civil sector; regulation of the financial sector and other sectors where customers can conduct transactions (including virtual currencies); transparency regarding legal ownership and beneficial ownership of legal persons and arrangements; the powers of supervisory authorities; the powers of financial intelligence units; regulation of cross-border cash transportation; statistics; and international cooperation (including mutual legal assistance, extradition of suspects, freezing and the confiscation of funds). It should not come as a surprise to anyone that many countries find it a challenge to implement these recommendations. In section 3, I describe how they have been implemented in Sweden.

Are the FATF recommendations binding or not? Is this ‘hard law’ or ‘soft law’? I have already mentioned that the FATF does not create binding international law.<sup>7</sup> Although the FATF’s mandate states that the members undertake to fully implement the FATF recommendations in their own legislation, this should be regarded as a political rather than a legal obligation. Moreover, the FATF only has 39 members, which means that large

<sup>5</sup> By ‘major revisions,’ I mean comprehensive reviews of the recommendations in their entirety. Around ten further amendments to the recommendations have been made since 2012, but these have been on a smaller scale, most often limited to adjustments of one recommendation at a time.

<sup>6</sup> The recommendations, their interpretive notes and the glossary together comprise *the FATF Standards*, which is a concept often used synonymously with the recommendations. To avoid confusion, I use the term *recommendations* in this article.

<sup>7</sup> However, on several occasions, the UN Security Council, whose resolutions are binding international law, has urged UN members to implement the FATF recommendations, for example in resolution 2462 which references the FATF no less than 15 times.

areas of the world would not be covered, at least not on paper.<sup>8</sup> The reason why the recommendations nevertheless are binding in practice is that the consequences for countries failing to implement them can be very serious. In the following section, I explain how such an invisible organisation can have such powerful means to ensure compliance with its own recommendations.

A final complicating factor in the question of the legal status of the recommendations is that the EU has implemented most of them by adopting several Directives and Regulations. This means that indirectly, the recommendations become internationally binding law for EU Member States and in certain cases also for the EEA members Iceland, Liechtenstein and Norway. In section 2.5 below, I describe this in somewhat greater detail.

### 2.3 The FATF's mutual evaluations, the global network and the feared lists

Any self-respecting international organisation that issues any form of standards that it expects its members to follow must have some way of checking that they actually do so. The FATF is no exception in this respect. What differentiates the FATF somewhat from many other organisations, however, is that countries that fail to follow the organisation's instructions may suffer comparatively far-reaching consequences. This is the third area of focus for the FATF.

Since 1989, the FATF's members have been subject to three rounds of *peer review*, in which members' experts have assessed each other's implementation of the recommendations. These three review rounds have been completed and the results are more or less a thing of the past given the passage of time. After the most recent comprehensive review of the FATF recommendations in 2012, the organisation set in motion a fourth round of *mutual evaluations* according to a similar model, in which members are assessed one by one during a period of approximately ten years, not just to see whether they have incorporated the FATF recommendations into their own legislation, but also to see whether their systems are effective in practice. These assessments are performed according to a detailed methodology which – just like the recommendations – has been negotiated among the members.

Even though the FATF only has 39 members, the recommendations essentially apply to all countries around the world. The way this is achieved is through the nine regional sub-organisations – the *FATF-style Regional Bodies*, or *FSRBs* – of which the very majority of all countries in the world are members.<sup>9</sup> Being a member of an FSRB means making the same political commitment as FATF members do with regard to implementing the FATF recommendations, and it also means that the country will be subjected to an assessment according to the same methodology, but with no direct possibility to influence the design of either. During approximately the same period as the FATF assesses its own members, the FSRBs also assess theirs.

Why do countries wish to subject themselves to this significant restriction of their political room for manoeuvre? The answer lies in the consequences that may arise from not being a member of the FATF or of an FSRB. The same consequences may arise if a member is assessed and found wanting, either in relation to how it has implemented the FATF recommendations or in relation to the effectiveness of its system. I describe these consequences in the following.

<sup>8</sup> The membership has increased from the original 16 member countries, but at a relatively slow pace. The present 39 members include two supranational bodies, namely the European Commission and the Gulf Cooperation Council.

<sup>9</sup> In total, more than 200 jurisdictions are members of the FATF and/or one (or more) FSRBs. Sweden is a member of the FATF but no FSRB. Were Sweden to join one, it would be MONEYVAL, whose membership corresponds approximately to the member countries of the Council of Europe that are not members of the FATF (with the exception of Israel and Russia, which are members of both at the same time). Even if the status of a jurisdiction as a country, state or nation is disputed, e.g. for the Palestinian Authority, that is not an obstacle to membership of an FSRB. The Palestinian Authority is a member of MENAFATF, which counts most of the countries in the Middle East and North Africa among its members.

When a country is assessed, the assessors (a team of volunteer experts from member countries accompanied by experts from the FATF's or the relevant FSRB's secretariat) first perform a thorough technical review of the country's legislation to see how, and to what extent, the FATF recommendations have been implemented. For each recommendation, the country receives a grade on a four-point scale, on which the two highest grades in principle signify a pass and the two lowest a fail. An on-site visit then takes place, normally lasting for several weeks, during which the assessors examine the work of the country's authorities in detail and form an opinion of the system's effectiveness on the basis of eleven outcomes specified in the FATF's methodology. The point of an effectiveness assessment is to be able to answer the following question: Does the system work only on paper, or does it also work in reality? The eleven effectiveness outcomes are also graded on a four-point scale. For Sweden, whose mutual evaluation report was published in 2017 and is described in greater detail in section 4, the assessment process including preparations took about two and a half years from start to finish. Merely to enable the assessment of technical compliance, Swedish authorities wrote a 334-page document that was submitted to the FATF together with hundreds of translations of acts, ordinances, instructions, strategies, process descriptions, decisions, written communications, brochures and so on. In other words, substantial requirements are imposed on assessed countries which also carry the burden of explanation, meaning that they are assumed to be deficient in their implementation of the recommendations and in their effectiveness until they have proved the opposite.

Depending on the ratings received in their mutual evaluation, countries enter one into of three follow-up processes. Countries that have shown that they have both successfully implemented the majority, and in any case the most central, of the FATF recommendations and have received a sufficiently high effectiveness rating on a sufficient number of outcomes are placed in the FATF's *regular follow-up*. That means that the FATF will not exert a great deal of pressure on them going forward. Countries that do not manage this because of technical deficiencies, effectiveness deficiencies or both are placed in *enhanced follow-up*, which as a starting point entails a requirement for more frequent reporting back to the FATF and a clearer expectation of rapid reforms. Countries receiving sufficiently poor ratings are furthermore put under *observation by the FATF's International Cooperation Review Group or ICRG*, which means that very specific reforms must be implemented within approximately 18 months. The majority of countries placed under such observation since the fourth round of mutual evaluations commenced have not managed to implement reforms at the pace and to the extent required by the FATF and have therefore become the subject of measures from the FATF.

At this point, countries normally make a high-level political commitment to cooperate with the FATF in order to implement the required reforms, and the FATF then decides to put them on the so-called *grey list*.<sup>10</sup> If they refuse to make such a political commitment or in some other way refuse to cooperate with the FATF, they are placed on the FATF's *black list*. Only Iran and North Korea have ever been placed on this list.<sup>11</sup> Being placed on the black list essentially means that it becomes much more difficult or impossible to carry out transactions

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10 There are two further situations that may lead to a decision on grey listing: either that a country is not a member of the FATF nor of an FSRB, or that a number of FATF members as a group propose that a country be listed because of acute deficiencies in its system. Following the risk-based approach, the FATF also normally does not take an interest in very small countries whose financial systems are not large enough to play a significant role in the global context (the benchmark is currently the *broad money* measure of money supply, which in most countries equals cash plus other liquid assets such as short-term deposits, with a threshold of USD 5 billion).

11 Iran is a special case. As a result of the nuclear deal (JCPOA), between June 2016 and February 2020, Iran was blacklisted but with an asterisk, which meant that the country had been temporarily removed from the list in exchange for the implementation of the FATF recommendations pursuant to an action plan which had previously been agreed with the country. Iran completed many relevant reforms during the period, but did not manage to fulfil all its commitments, including the ratification of certain central international conventions in the area. The question was naturally made more complicated when the United States announced its withdrawal from the deal during the period. At the time of writing in April 2020, Iran is back on the black list without an asterisk. There is also an action plan for North Korea, which has however shown minimal interest in reforms in this area.

with the country.<sup>12</sup> Being placed on the grey list is more ambiguous, because even though it definitely does not mean a ban on transactions – at most, enhanced customer due diligence measures which I describe in section 3.1.3 could be contemplated – there have nonetheless in several cases arisen problems for certain countries where some banks have refused to carry out any transactions at all with the country as a result of its grey listing. But even if not, it gives rise to concrete economic effects in the countries, which is why they take the FATF so seriously. This is essentially why the FATF can be described as the most powerful organisation you have never heard of.<sup>13</sup> The international community supports this model since there is a political interest in taking a firm stance against those who do not carry their weight – not least from the perspective that a chain is never stronger than its weakest link.

**Table 3. Results for FATF members assessed since 2012 (as of April 2020) including follow-up reports**

Regular follow-up	Enhanced follow-up	Not yet assessed
Greece	Australia	Argentina
Hong Kong	Austria	Brazil
Ireland	Belgium	France
Israel	Canada	Germany
Italy	China	India
Norway	Denmark	Japan
Portugal	Finland	Luxembourg
Russia	Iceland	Netherlands
Spain	Malaysia	New Zealand
<b>Sweden</b>	Mexico	South Africa
United Kingdom	Saudi Arabia	
	Singapore	
	South Korea	
	Switzerland	
	Turkey	
	United States	

Note. All completed mutual evaluation reports are available on the FATF's website. All the FSRBs' mutual evaluation reports (i.e. covering the majority of the world's countries) are also published on the FATF's website but not in this table because of space restrictions.

Source: FATF

Countries put on the FATF's grey list normally stay on it for one to two years. At the time of writing in April 2020, there are about a dozen countries on the list which I do not specify here as the information rapidly becomes obsolete.

<sup>12</sup> If a country is blacklisted, the FATF is probably not the only source of sanctions against the country, which makes it more difficult to identify the effect of the FATF's blacklisting in isolation. As regards e.g. North Korea, there are concurrent UN Security Council and EU sanctions, both of which make transactions with the country virtually impossible.

<sup>13</sup> The FATF could also be described as one of the cheaper organisations you have never heard of. Compared to other international organisations, the secretariat is small and its expenses low. The FATF's budget for 2020 is just under EUR 12 million, of which Sweden is expected to pay around EUR 77,000.

## 2.4 The FATF's interaction with unilateral American sanctions and sanctions from the UN Security Council

Another reason why the FATF's measures have such an effect is that they do not exist in a vacuum. I will not discuss all other global sanction regimes in detail here, but two nonetheless deserve a mention.

First, measures from the FATF need to be seen in the light of unilateral American sanctions issued by US authorities. These sanctions are normally managed by the US *Office of Foreign Assets Control (OFAC)*, and often prohibit natural and legal US persons from doing business with a designated natural or legal person (in some cases also ships, institutions or even entire countries).<sup>14</sup> OFAC's list of prohibited counterparties is long. What makes these sanctions so effective is that in certain cases, they are aimed at regulating operations conducted not just by natural and legal US persons, but also by natural and legal persons outside the jurisdiction of the United States. In other words, OFAC may decide that Americans must not do business with certain counterparties, nor with *those who do business with those counterparties*. In plain language, this gives everyone else in the world a clear choice: Either you can do business with the United States, or with the designated counterparties, but *not with both at the same time*. Especially for internationally active banks that need to be able to deal in US dollars, not complying with OFAC decisions is not an option, even though such sanctions, according to the EU, are in conflict with international law when they are applied outside US jurisdiction.

Second, the FATF's measures and recommendations also interplay with *targeted financial sanctions* issued by the UN Security Council.<sup>15</sup> These sanctions are often aimed at individuals in leading positions in countries where abuse against the population has taken place, but also against suspected terrorists or their financiers and in certain cases against individuals, companies or ships suspected of being involved in the proliferation of weapons of mass destruction (or its financing). The sanctions essentially mean that funds in accounts belonging to a person subject to sanctions are frozen, and that no transactions may be made to or from that person, on whom a travel ban is also often imposed.<sup>16</sup> The FATF has a special role in interpreting *how* countries should implement these targeted financial sanctions.

There are two reasons why I discuss these two sanction regimes in the FATF context. The first is that every individual sanction regime carries greater weight in interaction with others. The second is that the tools that countries place in the hands of their private sectors – and the corresponding demands that they impose – through the implementation of the FATF recommendations enable compliance with the sanction regimes to begin with. I describe these tools in detail in section 3 below.

## 2.5 Interaction between the FATF and the EU

As I mention in section 2.2 above, the FATF recommendations are generally incorporated into EU law. I will not provide a list of the rather large number of European legal instruments that contain different parts of the FATF recommendations, but I will focus on the *Fourth and Fifth Anti-Money Laundering Directives*, which contain the majority of the regulation in the administrative area.

<sup>14</sup> OFAC has a history that stretches much further back in time than the FATF. The FATF was founded in 1989, but OFAC was formed in 1950 in its modern form, and its predecessor as early as in 1940, after Germany invaded Norway. According to OFAC itself, American sanctions have existed since the early 19th century, when the US Treasury issued sanctions against Great Britain following the harassment of American seamen.

<sup>15</sup> Such targeted financial sanctions are generally implemented on the EU level. In some respects, the EU also goes further with its own sanctions using the same model. The EU's mechanism for the implementation of Security Council sanctions, which at best gives legal force to the sanctions two to three working days after they have been issued, has certain flaws and is the subject of criticism from the FATF. In the FATF's opinion, EU decisions take too long, in part because they need to be translated into all EU languages, and the EU has no regulation covering so-called EU-internal terrorists and terrorist organisations. Many EU Member States have therefore launched their own systems to complement the EU mechanism in this area.

<sup>16</sup> There are of course exemptions so that designated individuals can pay for food, accommodation, any legal representation they may need, and so on.



For quite a long time, the EU had a relatively reactive relationship to the FATF recommendations, which were incorporated into EU law after the completion of negotiation within the FATF. As the 14 EU Member States, plus the European Commission, Norway and Iceland (the latter EEA countries are subject to large parts of EU law) constitute almost half of the FATF's membership, one might think that the relationship would be the opposite, i.e. that the EU institutions would make the decisions and then try to export it to the rest of the world via their substantial representation in the FATF.<sup>17</sup>

The *Fourth Anti-Money Laundering Directive*, published in June 2015 with a deadline for Member States to transpose it into their own law within two years, contains most parts of the FATF's revised recommendations from 2012 and goes further than them in certain limited respects, for example through the provision that all Member States should establish registers of beneficial owners (while the FATF only requires that the information be available, not necessarily in the form of a register).<sup>18</sup> However, after the attacks in Paris and Brussels in 2015 and 2016 and the revelation of the Panama Papers in 2016, the Directive was again opened up for renegotiation during the summer of 2016, i.e. one year before the deadline for transposition in the Member States.<sup>19</sup> That renegotiation produced the *Fifth Anti-Money Laundering Directive*, for which the majority of provisions should have been transposed by the Member States in January 2020.<sup>20</sup> What is special about the Fifth Anti-Money Laundering Directive is that in many respects, it goes beyond the FATF recommendations that were in force when the Directive was adopted – for example, the Directive requires Member States to regulate providers of virtual currencies.<sup>21</sup> The FATF has subsequently followed the EU on this issue, has revised its recommendations and is since early 2020 assessing how the countries of the world have implemented these requirements.<sup>22</sup> It is too early to say whether this model will become the norm for the future, but there is no doubt that such a norm would be in the EU's and thus also in Sweden's interest.

### 3 Sweden's system for combating money laundering and terrorist financing

The FATF recommendations have to a great extent been implemented in EU law, which in turn has been transposed into Swedish law. In this section, I describe how the Swedish system works.

The Swedish system for combating money laundering and terrorist financing is primarily regulated in the *Act on Measures against Money Laundering and Terrorist Financing (the AML/CFT Act)*, to which a large number of actors are subject. The regulatory framework not only imposes requirements on tens of thousands of private companies in a number of different industries, but also requires sixteen authorities and the Swedish Bar Association in various ways to monitor compliance and to use the information produced by the system.<sup>23</sup> For this to work, there is also a coordination function at the Swedish Police Authority. Figure 1 below illustrates the system's participants and their possibilities to share information among themselves.

17 The 14 EU Member States do not include the United Kingdom, which had just left the EU when this article was written in April 2020.

18 The Fourth Anti-Money Laundering Directive was transposed into Swedish law mainly through Government Bill 2016/17:173.

19 Such a model is not commonplace, as it makes it difficult for Member States to know exactly what they should transpose – legislating according to a moving target, so to speak, is a major challenge.

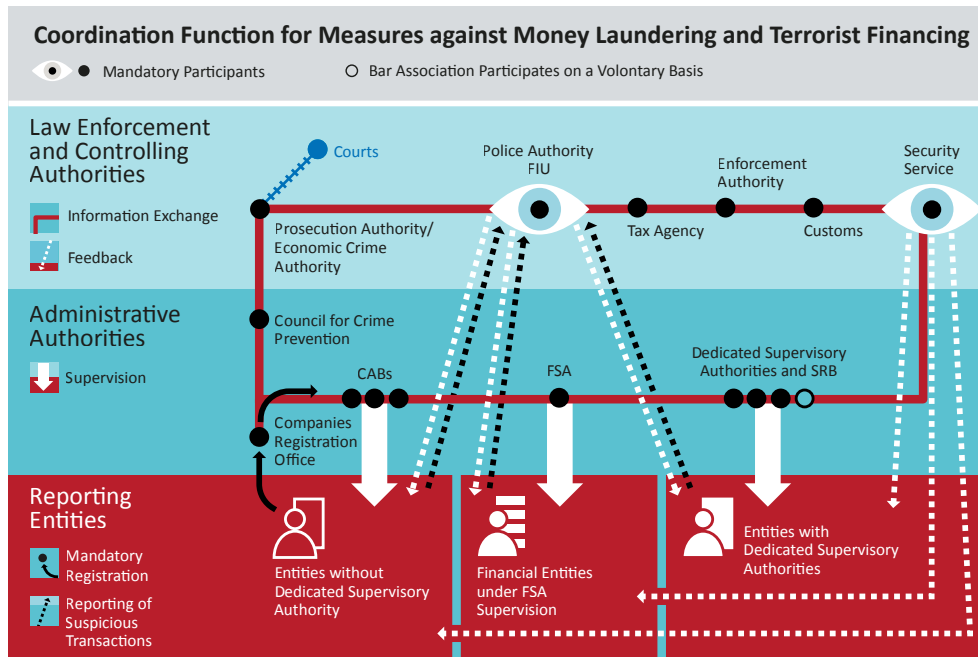
20 The Fifth Anti-Money Laundering Directive is technically an amendment to the Fourth Anti-Money Laundering Directive. It was transposed into Swedish law mainly through Government Bills 2018/19:150 and 2019/20:83.

21 In the meaning of the Directive, these are both exchange platforms and so-called hot wallets for virtual currencies, i.e. wallets managed by someone else who has access to the encryption keys required to carry out transactions.

22 The current FATF requirements in this area go somewhat further than the requirements in the Fifth Anti-Money Laundering Directive.

23 In this context, the Swedish Bar Association is a self-regulatory body (SRB). Technically, it is a private law association that has been assigned certain public authority tasks as regulated in the Swedish Code of Judicial Procedure. The Bar Association supervises lawyers and law firms in accordance with the AML/CFT Act.

Figure 1. Overview of Sweden's system for combating money laundering and terrorist financing



Source: Swedish Government Offices

### 3.1 Everything begins and ends with risk, part 2 – what private actors are covered by the regulatory framework and what it means

Perhaps what first comes to mind when imagining what private companies are covered by the regulatory framework for combating money laundering and terrorist financing is banks. In Figure 1 above, they can be found in the middle of the lower block together with all the other financial companies under the supervision of the Swedish Financial Supervisory Authority (FSA). It is perhaps less well known that a large number of other types of companies are also covered by the same regulatory framework.

In the bottom right-hand corner of Figure 1 above, there are a number of actors that can be described as gatekeepers to the financial system, such as lawyers, auditors, gambling companies and estate agents. All of these can perform transactions themselves or help their customers do so, and they all have their own supervisory authorities.<sup>24</sup> In the bottom left-hand corner of the figure, there are a number of more separate actors that have little in common apart from the fact that they too can perform transactions or help their customers do so. These include e.g. pawnbrokers, tax advisers, independent legal advisers, trust and company service providers, art dealers and anyone else who deals professionally in goods and accepts cash payments of the equivalent of EUR 5,000 or more. These actors must report to a register maintained by the Swedish Companies Registration Office, and are thereafter under the supervision of one of three specially designated County Administrative Boards.<sup>25</sup>

In total, tens of thousands of companies in Sweden are covered by the AML/CFT Act. In terms of the Act, they are *reporting entities*, which in principle means that they must do two things: know their risks and know their customers. Based on this knowledge, they

<sup>24</sup> These are the Swedish Bar Association, the Swedish Inspectorate of Auditors, the Swedish Gambling Authority and the Swedish Estate Agents Inspectorate respectively.

<sup>25</sup> This separate register for combating money laundering should not be confused with the register of beneficial owners which I describe in more detail in section 3.2.2. The County Administrative Boards of Skåne, Stockholm and Västra Götaland share the supervision (on a geographical basis) for reporting entities in the register.

are required to act in a certain way. What applies to customer relationships also applies to those who are not customers but who wish to make occasional transactions over certain threshold values. It is a challenge for the vast majority of countries, Sweden included, to ensure that everyone subject to the regulatory framework understands what it means and acts accordingly.

### 3.1.1 Knowledge of risks

All reporting entities must assess the risks of money laundering and terrorist financing for each customer and for each product. In what way could the customer use the entity's services for this kind of criminality and how likely is it? And how likely is it that the product (for example a savings account) could be abused for the same purpose? In order to be able to assess their own risks, an entity must have a good knowledge of their operations (vulnerability) and of the development of the criminality around them (threats). As I have already described, there is plenty of information available from the FATF in terms of risks and risk assessment, and the same is true in the European and Swedish context, which I describe in more detail in section 3.2.1 below.<sup>26</sup> As neither the criminality nor the development of society as a whole stand still, knowledge of risks quickly becomes outdated and therefore needs to be continuously reviewed. The reporting entities' awareness of their own risks is essential to ensuring that the system for combating money laundering and terrorist financing works as intended.

### 3.1.2 Knowledge of customers

Just as reporting entities must know their risks, they must also know their customers – they have to know with whom they are doing business and why. *Customer due diligence (CDD)* is the most fundamental component in the regulatory framework for combating money laundering and terrorist financing, and it is difficult to implement for many countries.<sup>27</sup> On a schematic level, there are four measures that a reporting entity should take to know their customer:

#### *Identify the customer and verify the customer's identity*

Using Sweden's centralised population registration database, it is often very easy to verify a customer's identity after the customer has been identified (at any rate for customers registered as Swedish residents).<sup>28</sup> However, in many other contexts, both identification and verification can be a challenge. The reason for this requirement is of course that in general, no anonymous transactions are allowed.

#### *Know and assess the nature and purpose of the business relationship*

Just as reporting entities must know with *whom* they are doing business, they must also know *why* the customer wishes to establish a business relationship. For example, if a bank has a customer wishing to open a normal checking account, it may not be very difficult to identify the typical transaction behaviour for this client. However, if the customer instead is a major company with operations in many countries, it may be a challenge. The reason that the reporting entity must have this knowledge is that it must be possible to determine which type of financial behaviour can be expected from the customer and what would characterise divergent behaviour.

<sup>26</sup> The availability of an array of products from the FATF and others of course does not mean that reporting entities can just use these products without adapting them to their own risk picture and operations.

<sup>27</sup> The terms *Customer Due Diligence (CDD)* and *Know Your Customer (KYC)* are often used interchangeably.

<sup>28</sup> One challenge in the Swedish context, as pointed out in the 2019 national risk assessment for money laundering and terrorist financing, is the use of straw men and others' identities, which elevates the requirements on identity control for authorities and reporting entities.

### *Identify the customer's beneficial owner*

If the customer is a natural person, it may be reasonable to expect that the customer is acting on their own behalf (assuming they are not acting as a straw man). However, if the customer is a legal person or arrangement, the question arises of who *controls* the customer.<sup>29</sup> It is not sufficient to merely find out who *owns* the customer – for example, the customer could be a company in Sweden owned by a foundation in another country, which in itself is not particularly interesting in this context – but the reporting entity must work upwards through the ownership structure to find out whether there is a person with a *controlling influence* in the customer. If there is such a person, that person is the customer's *beneficial owner*. There may not always be a beneficial owner. For example, in major exchange-traded companies, ownership is often so diversified that nobody has a controlling influence. On the other hand, it may then be that the CEO, for example, has such influence that this person could be considered an *alternative beneficial owner*. The reason for this requirement is once again that in general, no anonymous transactions are allowed. Hiding ownership or control of a legal person or arrangement via complicated ownership arrangements in principle corresponds with anonymity.<sup>30</sup>

### *Keep the information up-to-date*

It is not sufficient to conduct CDD measures when establishing a business relationship and then do nothing; rather, knowledge must be kept updated as the customer's circumstances change.

If the reporting entity cannot obtain sufficient information to manage the risks associated with the customer, it may neither establish a new customer relationship nor keep an existing customer. The reason for this is not surprising: If you do not know who the customer is, you cannot assess the risk, which means that you risk facilitating anonymous transactions.

### **3.1.3 What turns up when no stone is left unturned – enhanced due diligence and other measures**

In the CDD process, the reporting entity may make many discoveries. In some cases, the information discovered may result in a need to conduct *enhanced due diligence (EDD) measures*.

The customer may for example be a *politically exposed person (PEP)*, which is a way for countries to designate individuals at a higher risk of corruption. These individuals usually have some form of political influence which, at least in theory, means that they can make decisions on public procurements and other kinds of government or international organisations' expenditure. Therefore, they could be exposed to or involved in money laundering schemes. Regulation of PEPs is one of the few parts of the system for combating money laundering and terrorist financing that is not risk-based; instead, the regulation is based on profession.<sup>31</sup> If a person has a certain profession, they are politically exposed and thus by definition a high-risk customer requiring EDD measures. The Swedish AML/CFT Act includes a list of such professions.<sup>32</sup> It also applies to close relations and known associates. A number of EDD measures may be taken; an investigation into the source of the funds of PEPs, for example, must be carried out.

<sup>29</sup> In this context, the term legal arrangement refers to a trust or similar structure. I describe trusts in greater detail in Appendix A.

<sup>30</sup> The law firm Mossack Fonseca in Panama made a business of services for anonymity through various types of ownership arrangements, which leaked and gave rise to the Panama Papers scandal in the spring of 2016.

<sup>31</sup> A cynical way to explain this deviation from the otherwise thoroughly risk-based approach would be to suggest that high-risk countries would otherwise claim that they have no politically exposed persons at all.

<sup>32</sup> This list (in Chapter 1, section 9) includes the following (somewhat abbreviated): heads of state or government, ministers, members of parliament, members of the board of a political party, supreme court judges, higher officials at audit authorities, members of the governing bodies of central banks, ambassadors, senior officers and members of the management of state-owned companies or international organisations.

The customer may for example also feature on one of the many *sanctions lists* (see section 2.4). Normally, a customer subject to sanctions – as long as it is not a case of mistaken identity (for example if the customer has the same name as another person who is subject to sanctions) – will not trigger EDD measures, but will instead trigger an immediate freeze of funds and, when appropriate, reporting to the relevant UN committees.

Even if the customer is not included on a sanctions list, the customer may be active in or have links to a *high-risk country*. This may either be a country listed by the FATF or a country in an equivalent list maintained by the European Commission. The reporting entity may also have other sources of information on the strength of different countries' systems for combating money laundering and terrorist financing, not least based on its own business operations. Regardless of the source of the information, the point is that transactions from high-risk countries cannot be assumed to have been covered by the same preventive system, so they must therefore be examined in greater detail.<sup>33</sup>

Naturally, the above should not be seen as an exhaustive list of when EDD measures may need to be undertaken. Many other factors that come to light in the reporting entity's risk assessment or CDD process may lead to the determination that certain customers constitute a high risk of money laundering or terrorist financing.

If the reporting entity is a bank with correspondent bank relationships outside the EEA, these relationships should normally be considered high risk.<sup>34</sup> There is however no requirement to know your customer's customers; a thorough assessment of the correspondent or respondent bank's ability to manage its own risks, the quality of its procedures and checks, the reputation of its management and so on should be performed only on an aggregated basis.

### 3.1.4 Monitoring and reporting of suspicious transactions

Since reporting entities must know their risks and their customers, they are in a position to determine what is normal or at least not divergent financial behaviour for their customers. In some cases, it is easy to identify suspected money laundering or terrorist financing, and in other cases, it is more difficult, as made clear in the following two examples.

#### **Example: obviously suspicious behaviour**

*A bank has a customer with a checking account. Every month, the customer receives a salary and has expenditures covering rent, food, entertainment and so on. Suddenly, a transfer arrives in the amount of millions of SEK from overseas that the customer on the following day sends on to other countries in different transactions.*

#### **Example: not obviously suspicious behaviour**

*A bank has customers that withdraw cash, rent cars, buy items in outdoors shops and take out short-term loans.*

In the first example, something is obviously off in comparison to the customer's normal financial behaviour. In the second example, it is not as obvious, and everything that the customers do is in itself normal. But imagine that the bank during the spring of 2014 had a customer that did everything in the example. It is easy to build a story around how the customer first took out one or more short-term loans, bought outdoors equipment, rented a truck, withdrew cash – then took their truck, outdoors equipment and cash, drove to

<sup>33</sup> Business relationships with high-risk countries do not automatically have to lead to EDD measures, apart from relationships with countries that are on the European Commission's list, where there is an explicit requirement under EU law to do so.

<sup>34</sup> Technically, correspondent bank relationships are not considered high risk, but they are subject to a number of extra measures that are very similar to measures taken in relation to other high-risk relationships. The final result is more or less the same.

Syria and become a foreign terrorist fighter. The point is that behaviours that in isolation are normal, or fully legitimate, may nonetheless in combination give rise to suspicion in light of what is otherwise known about the development of criminality. Naturally, a prerequisite for such suspicion is good communication between reporting entities and public authorities, which are often the first to know about such phenomena.<sup>35</sup>

When a reporting entity discovers behaviour that is inconsistent with what they know about the customer, the entity should ask questions or in other ways find out more information about the behaviour until they understand it. If, during the course of such controls, the entity has reasonable grounds to suspect money laundering, terrorist financing or that property otherwise stems from criminal activities, the transaction and other relevant circumstances should without delay be reported to the Financial Intelligence Unit (FIU), which is in the centre of Figure 1 above.<sup>36</sup> The reporting threshold is thus fairly low. The reporting entity does not need to be entirely certain of money laundering or another crime; suspicious transaction reports are also subject to strong confidentiality. Individuals who are mentioned in such reports must not be informed about it.

### 3.2 Enter the authorities

When a suspicious transaction report reaches the FIU, which is housed within the Swedish Police Authority, the FIU makes an initial assessment of the contents. The information in the report may be combined with other intelligence information available within the Police Authority in order to create a more complete picture of what has happened. In some cases, the information in the report is sufficient for the opening of a criminal investigation straight away, and in these cases, other sections of the police or prosecutors normally take over. But usually this is not so. The information is not lost, but remains with the FIU for some time until destroyed. Based on the content and main focus of the report, it is sent after initial processing by the FIU to the most relevant authority; for instance, terrorist financing to the Swedish Security Service and tax crime-related reports to the Swedish Tax Agency.

Both the FIU and the Security Service may request a reporting entity to provide them with information in connection with ongoing inquiries regardless of whether a report on a suspicious transaction has been filed. Such requests may also be sent to those who raise funds for charity or other purposes, or who have done so during the past five years. This is done at the intelligence stage, and the information is subject to the same confidentiality as the information reported in relation to suspicious transactions.<sup>37</sup> In recent years, a number of reforms have been made to automate and as far as possible avoid manual processing of this type of information exchange. There has also been a gradual increase in the types of entities covered by the regulatory framework and which must therefore provide the authorities with information.

#### 3.2.1 The virtuous circle – the authorities' responsibility for coordination and dissemination of information

What is central to an effective system for combating money laundering and terrorist financing is a constant stream of refined information. In order for law enforcement authorities to be able to combat money laundering and terrorist financing, they need good intelligence information which often originates from reporting entities. If the reporting

<sup>35</sup> A further observation that may be made on the basis of these two examples is that whereas money laundering often involves large sums of money that the criminal wants to bring *into* the financial system to hide its *origins*, terrorist financing may involve the opposite: smaller sums of money destined to be taken *out of* the financial system to hide its *recipients*. Despite this difference, both phenomena can be detected using the same method.

<sup>36</sup> Such reports are often referred to as *STRs for Suspicious Transaction Reports* or *SARs for Suspicious Activity Reports*.

<sup>37</sup> In the Swedish context, there is a distinction between the intelligence and investigation stages. In the latter stage, it is of course also possible for a prosecutor or the leader of a criminal investigation to request the same type of information from a reporting entity to be used as evidence in court, unlike intelligence information which (at least unprocessed) does not leave the authorities.

entities in turn are to understand the patterns of criminality and know what to look for, they need feedback and guidance from the authorities. In the example with the not obviously suspicious behaviour above, I describe a situation where the reporting entities depend on such guidance to understand the context, distinguish known connections and ultimately provide the authorities with relevant information.

A number of different mechanisms for attaining this virtuous circle of information provision exist in Sweden. First, there are regular *national risk assessments*. In section 2.1, I describe the FATF's risk assessment products and the general risk assessment method. The FATF's risk assessments are supplemented with both supranational risk assessments from the European Commission every other year as well as with specific Swedish risk assessments. The first Swedish national risk assessment for money laundering was published in 2013. Since then, a number of different products with different focuses have been produced and published.<sup>38</sup> These help the reporting entities form an idea of what risks are relevant in Sweden. However, it is of course not sufficient for reporting entities to read the national risk assessment only and then claim that they understand all of their own risks.

Within the Police Authority, in the form of a permanent secretariat, there is a *coordination function for measures against money laundering and terrorist financing*. The coordination function is responsible for producing national risk assessments and for informing reporting entities to help them meet their obligations. It also works as a forum for exchange of information and dissemination of knowledge between supervisory authorities, and it finally also has a responsibility for compiling statistics in the field. As made clear in Figure 1 above, the coordination function brings together 17 different authorities with different types of responsibility.<sup>39</sup>

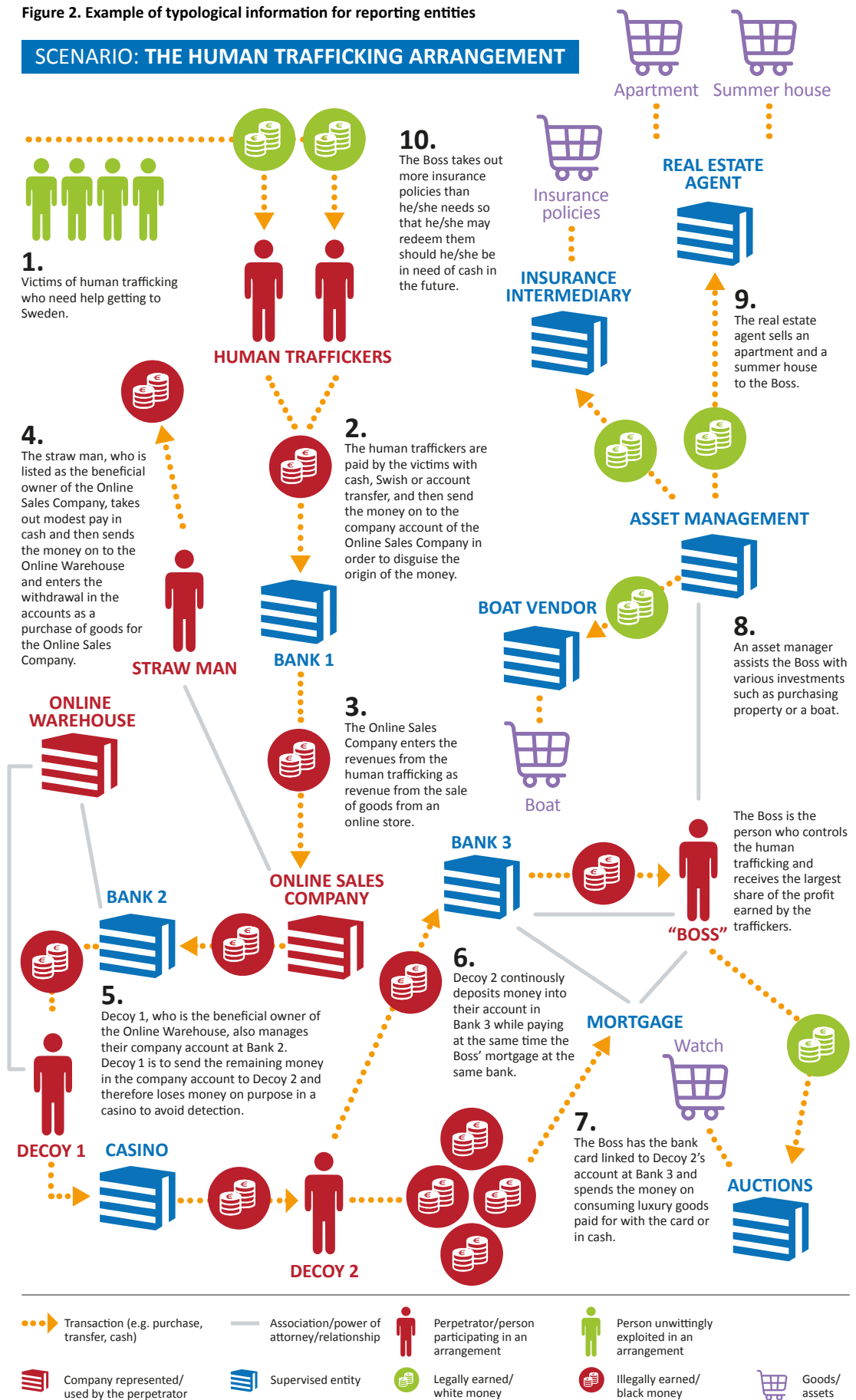
What does an *information campaign to reporting entities* look like? Figure 2 below is from the predecessor to the coordination function, which was housed within the FSA, and is an excerpt of an extensive material sent out to tens of thousands of reporting entities in several languages in January 2017. It is an example of typological information useful to reporting entities: a human trafficking scheme may look like the figure and give rise to similar financial flows. Based on this kind of typological information, reporting entities can calibrate their own systems for risk assessment, CDD and transaction monitoring, and the more they understand these kinds of schemes, the better the information that they report back to the authorities.

Reporting entities naturally want, in addition to national risk assessments, typological information and so on, *feedback on individual suspicious transaction reports* that they have sent to the FIU. The FIU has a considerable responsibility with regard to feedback and should provide it when possible, but there are many situations when feedback at an individual level is not possible.

<sup>38</sup> Risk assessments and other products are available on the government's website: see <https://www.government.se/amlcft>.

<sup>39</sup> Including the Bar Association (see footnote 23).

Figure 2. Example of typological information for reporting entities



Source: Swedish Financial Supervisory Authority



### 3.2.2 Which authorities do what?

The main dividing line with regards to the different authorities' tasks concerns whether or not they should focus on actual criminality in individual cases. Law enforcement, i.e. *investigating* suspected money laundering or terrorist financing, is the task of the authorities found at the top of Figure 1 above. In this context, these law enforcement authorities include the Swedish Tax Agency, whose tax crime investigation unit assists prosecutors in investigating suspected tax crimes and money laundering.

On the other hand, the supervisory authorities, which are administrative authorities and can be found in the middle of the figure, *control* in the first instance whether reporting entities comply with the requirements of the AML/CFT Act. Entities that comply with the law are also in a position to prevent money laundering and terrorist financing and to supply relevant information to the authorities, but to be able to comply with the law, the companies' management must take the question seriously and allocate sufficient resources. The supervisory authorities control (most often using a risk-based approach) that their respective objects of supervision comply with the law and that they have adequate systems in place. As part of supervision, the authorities may also, for instance, conduct on-site visits and carry out sample testing, which in some cases may provide an indication of suspected money laundering or terrorist financing in individual cases. If this happens, the supervisory authority, like the entities themselves, must report its suspicions to the FIU for further investigation. However, it is important to point out that it is not the task of the supervisory authorities to investigate actual money laundering or terrorist financing, just as it is not the FIU's responsibility to conduct supervision.<sup>40</sup> The large sanctions that have been issued against reporting entities by the supervisory authorities in recent years have been issued because the entities have not had adequate preventive systems, or because they have in some other way neglected their obligations under the AML/CFT Act.<sup>41</sup>

There are two further administrative authorities in the system that are not supervisory authorities, namely the Swedish National Council for Crime Prevention and the Swedish Companies Registration Office. The National Council for Crime Prevention mainly conducts criminological research and compiles related statistics, so its participation in the coordination function is self-evident. The Companies Registration Office, on the other hand, has a function that is perhaps less well-known in the system for combating money laundering and terrorist financing.

In section 3.1.2 above, I describe the four essential elements of customer due diligence, one of which is the identification of the customer's beneficial owner. Reporting entities may not enter into a customer relationship without that information. While it is often easy to find out who owns a legal entity on paper, for instance by initially consulting the Companies Registration Office's register of companies, it may be more difficult to determine the beneficial owner of the customer, i.e. who ultimately has a decisive influence in the customer, particularly if the ownership structure is constructed just in such a way as to hide the beneficial owner. Essentially, this is a question of transparency, and the Swedish system provides for three parallel requirements to facilitate the investigation into beneficial ownership.

The first requirement applies to all legal persons and to natural persons who manage trusts and other legal arrangements.<sup>42</sup> These must know *their own* beneficial ownership. The second requirement applies to all reporting entities in the definition of the AML/CFT Act, which must know *their customers'* beneficial ownership. The third requirement applies to

40 The FIU should of course disseminate its analyses and other relevant information to the supervisory authorities to provide a better basis for risk assessment. The supervisory authorities should in turn provide feedback to the FIU on how the information has been used and with what results.

41 For instance, the FSA against Nordea and Handelsbanken in 2015, the Gambling Authority against Casino Cosmopol in 2018 and above all the FSA against Swedbank in 2020.

42 I describe trusts in greater detail in Appendix A.

the same actors covered by the first requirement, plus most non-profit organisations, and is an obligation to *register* their own beneficial ownership in the *Companies Registration Office's register of beneficial owners*.<sup>43</sup> Around 800,000 companies and associations in Sweden are subject to this obligation. The idea behind these three requirements is to make it more difficult for those who use companies as tools for crime, which is often a necessity in the money laundering context. Furthermore, as the register is public, journalists and civil society among others can use it. The authenticity of the information reported to the register is normally not subject to verification, but reporting entities that investigate their customers' beneficial ownership and discover that the data in the register is incorrect must report the discrepancy to the Companies Registration Office. Authorities should do the same when using the register, and whereas there is no such requirement for civil society in the broad sense, nothing prevents it from doing so.

## 4 Is Sweden's system effective?

It is always a challenge to compare different countries' systems with each other on a holistic level, and this also applies to the systems for combating money laundering and terrorist financing. However, it is not impossible. As I outline in section 2.3, Sweden's system has been assessed by the FATF in a way that can be compared with the rest of the world. In the following, I summarise the conclusions reached by the FATF and what has been done in Sweden since then.

The FATF's mutual evaluation of Sweden was published in April 2017. It contains a thorough review of how Swedish law corresponded to the FATF recommendations as of June 2016, and an analysis of the effectiveness of the relevant authorities at the same point in time when a number of assessors from different countries conducted an on-site visit. The analysis of effectiveness is based on eleven different outcomes that can be divided into three groups. The first group assesses whether there is an understanding of the risks in the system, and whether policy, coordination, cooperation between the authorities and international cooperation mitigate these risks. The second group is about whether proceeds of crime and funds in support of terrorism are prevented from entering the financial system, and whether such flows can be detected and reported by reporting entities if they nonetheless make their way in. The third group examines whether money laundering and terrorist financing is detected, disrupted and prosecuted, whether the proceeds of crime are confiscated, whether terrorists are deprived of funds and whether sanctions from the UN Security Council are implemented. If all of this functions as it should, then countries attain a level of protection for the financial system and for the economy as a whole from the threats of money laundering, terrorist financing and the financing of proliferation of weapons of mass destruction. This protection strengthens the integrity of the financial system and the safety of society in general.

The FATF's mutual evaluation of Sweden is a relatively substantial work of 218 pages. It should be read together with the first follow-up report published the year after the mutual evaluation. The follow-up report is much smaller in scale and is limited to technical issues – mainly a summary and analysis of the reforms implemented in Sweden between June 2016 and January 2018.

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<sup>43</sup> The Companies Registration Office's register of beneficial owners is regulated in an act of its own which should be read in parallel with the AML/CFT Act. There is an exemption for non-profit organisations if registration would result in a person's political, cultural, religious or other similar views becoming known. In that case, the organisation should still register, but does not need to provide information on the beneficial owner.

Figure 3. The FATF's mutual evaluation report for Sweden (2017) and the first follow-up report (2018)



Source: FATF

#### 4.1 The FATF's assessment: risk understanding, coordination and cooperation<sup>44</sup>

On the whole, Sweden's risk understanding received approval from the FATF. At the time of the on-site visit, a number of different national risk assessment products had been produced, and the authorities had conducted their own more detailed analyses in several cases. The understanding of terrorist financing risks was considered somewhat better than the understanding of money laundering risks. On the other hand, Sweden was criticised for lacking formal coordination between all the relevant authorities, which was considered an obstacle to information sharing and joint priorities, and for deficiencies in statistics, particularly as regards confiscation of the proceeds of crime. With regard to Swedish authorities' cooperation with international counterparts, the assessors noted that there was little to criticise, and that Sweden could be regarded as a good example in this context.

##### 4.1.1 Reforms implemented since the assessment

As I describe in section 3.2.1, the main criticism from the FATF, namely that there was no formal coordination between the authorities, has been remedied through the establishment of the coordination function at the Police Authority which is also responsible for annual national risk assessments. This is also described in the follow-up report.<sup>45</sup> However, the deficiencies in the statistics on confiscation of the proceeds of crime still remain.

#### 4.2 The FATF's assessment: preventive measures, supervision and transparency<sup>46</sup>

The FATF considered that the Swedish reporting entities largely fulfilled their obligations under the AML/CFT Act, and that larger entities had a better perception of risk, which is neither unusual nor surprising. The majority of suspicious transaction reports in Sweden

<sup>44</sup> These outcomes are discussed in chapters 1, 2 and 8 of the FATF's mutual evaluation of Sweden.

<sup>45</sup> See recommendation 2, p. 3.

<sup>46</sup> These outcomes are discussed in chapters 5–7 of the FATF's mutual evaluation of Sweden.

comes from the financial sector, which the FATF argued could indicate that the non-financial sectors were not always aware of their risks. The FATF also noted that larger banks, especially those that had been subjected to sanctions from the FSA, had become much better at complying with regulations.

With regard to the supervisory authorities' effectiveness, the assessors concluded that all of the relevant sectors were under supervision, but that not all of the supervisory authorities fully used a risk-based method in their supervision, partly because they did not receive sufficient information on risks from other authorities. The FSA's and the County Administrative Boards' risk models were assessed to have a higher quality, and the FSA's sanctions (which are made public) were considered to have contributed to an improvement in market behaviour. The FATF considered that the supervisory authorities, in particular the FSA, needed more resources and needed to issue more guidance.

With regard to transparency of beneficial ownership, the FATF considered that the fundamental transparency in the Swedish system is helpful, e.g. as most registers in Sweden are available to the public, but that it was not clear that information on beneficial ownership was available in all cases. Further, the assessors considered that there was insufficient awareness in the private sector of the risks of straw men, that sanctions for incorrect data in registers were not sufficiently dissuasive, and that it was a problem that some non-profit organisations and foundations did not need to register.

#### 4.2.1 Reforms implemented since the assessment

Much has happened in these areas since the on-site visit in June 2016. The exchange of risk information between authorities has improved in several ways since the coordination function was established (for instance, the specific risk of straw men and misuse of identities was featured in the 2019 national risk assessment). In addition, several types of guidance have been issued (for instance, the product in Figure 2 above). Several supervisory authorities have in various instances received additional funding for their operations in this field since 2016, and new structures for cooperation have been created.<sup>47</sup> The level of transparency in the system has also improved considerably, not least through the register of beneficial owners I describe in section 3.2.2 and which is also described in the follow-up report.<sup>48</sup> During 2019–2020, the preventive elements of the regulatory framework and the private sector's observance of the same have received considerable attention in the media and in the general debate, which I return to in section 4.5 below.

### 4.3 The FATF's assessment: investigation, prosecution, confiscation of the proceeds of crime and sanctions<sup>49</sup>

The FATF considered that the part of the Swedish system that deals with intelligence and law enforcement was largely adequate, but that there were some central deficiencies. Swedish authorities were considered to use financial intelligence in a way that enables robust investigations of money laundering and terrorist financing, although the FIU was criticised for deficiencies in operational and strategic analysis largely as a result of inadequate IT systems and deficiencies in communication with other authorities. The assessors considered that Swedish prosecutors proactively prosecute money laundering, and that law enforcement authorities have access to good tools to confiscate the proceeds of crime which they make use of, but do not follow up statistically in an adequate way.

47 For instance, the FSA received an additional SEK 10 million, the County Administrative Boards together received a total of SEK 12 million and the Tax Agency received an additional SEK 20 million (the latter to build a national system for information on accounts and safe deposit boxes, which is not in itself a supervisory measure but which will improve the effectiveness of the system) in the state budget for 2020.

48 See recommendations 24–25, pp. 6–7.

49 These outcomes are discussed in chapters 3–4 of the FATF's mutual evaluation of Sweden.

With regard to the prosecution of terrorist financing, the FATF observed that there were not very many convictions for this particular crime, but that Swedish authorities had in several cases used other methods to take action against this behaviour, such as prosecution for other crimes, and that the issue was taken seriously. At the time of the on-site visit, a criminal justice reform had just entered into force, enabling prosecution for terrorist financing without needing to show that the money had been used for a specific deed, which the assessors felt established a good basis for future prosecutions. With regard to the management of targeted financial sanctions from the UN Security Council against terrorists, Sweden was strongly criticised for the lack of a national system in place to complement the EU's implementation of these sanctions, as the EU's system is considered to implement the sanctions neither in full nor sufficiently quickly. The implementation of similar sanctions for the proliferation of weapons of mass destruction was however considered to function better, mainly because of a more active EU stance on this issue coupled with Sweden's robust export control system.

#### 4.3.1 Reforms implemented since the assessment

Since the on-site visit, the FIU has launched a new IT system and improved its strategic analyses and its feedback to reporting entities in several ways. The deficiencies in statistics on confiscated proceeds of crime have not been remedied. With regard to the prosecution of terrorist financing, four individuals were sentenced for this crime in 2019, in line with the new legislation and the predictions of the assessors.<sup>50</sup> With regard to Sweden's inadequate implementation of the UN Security Council's targeted financial sanctions, a public inquiry was presented to the Minister for Foreign Affairs in August 2018 with proposals for how the issue could be resolved.<sup>51</sup> The inquiry's proposals had at the time of writing of this article been sent for public consultation but had not yet led to a draft legislative proposal.

### 4.4 The FATF's overall assessment and rating

As I show in Table 3 above, Sweden is subject to the FATF's *regular follow-up* – the least onerous follow-up process – as Sweden has both managed to implement the FATF's recommendations in a satisfactory manner and has demonstrated adequate effectiveness in its system as a whole.<sup>52</sup> To date, less than half of the FATF members that have been assessed have succeeded in this, and among the countries in the world that are not FATF members, the corresponding figure equates to roughly a tenth. Both on a holistic level and in a global comparison, it is therefore difficult to draw any conclusion other than that *Sweden's system for combating money laundering and terrorist financing is largely effective*, or in any case more effective than those of most other countries.

It can also be noted that Sweden has remedied most of the deficiencies pointed out by the FATF, with two important exceptions: the implementation of the UN Security Council's targeted financial sanctions against terrorists and the statistics on confiscated proceeds of crime.

It is not the case that an approval stamp on the implementation of the FATF recommendations means that no more money can be laundered nor terrorists financed through the Swedish financial system, but there is in this context no better provider of

50 Six individuals were prosecuted in the same case for terrorist financing; some of them also for other crimes. The case was appealed to the Court of Appeal and then to the Supreme Court, which did not take up the case.

51 See SOU 2018:27 *Ekonomiska sanktioner mot terrorism (State public inquiry on Economic sanctions against terrorism; a summary in English is available)*.

52 In technical terms, the results of the 2017 mutual evaluation placed Sweden in the FATF's *enhanced follow-up*, as the required effectiveness was present, but the technical implementation of the recommendations was inadequate. As an extensive reform then entered into force in August 2017, which included a new AML/CFT Act and the register of beneficial owners, Sweden could show that the recommendations had thus to a very large extent been implemented, which was also confirmed in Sweden's first follow-up report, published in July 2018. Sweden then entered into the FATF's *regular follow-up* (which is also why the first follow-up report is titled *1st enhanced follow-up report*). Sweden's *1st regular follow-up report* will be published later in 2020.

international standards accompanied by a factual, thorough and largely technical analysis. Of course, this does not mean that there is no room for improvement, or scope for future reforms, as I discuss in the following.

#### 4.5 If Sweden's system is so effective, why is money still being laundered in Sweden, and what happened at Swedbank?

I began this article by describing how money laundering is in many cases a cross-border crime. The same applies, for obvious reasons, to terrorist financing. In a world where criminality moves and makes transactions across international borders – and where moreover journalism has created cross-border networks that shed light on it – the national authorities fall behind if they focus solely on what is happening within their respective borders.<sup>53</sup> The same applies to the management of banking groups if they allow their branches or subsidiaries in other countries to act without sufficient control.

In recent years, it has come to light in the media that Nordic banks in the Baltic region (primarily Danske Bank and Swedbank) have been used to launder large sums of money from Russia and other parts of the former Soviet Union. According to the media, this money laundering took place between around 2007 and 2015. At the time of the writing of this article in April 2020, the Swedish FSA's investigation into Swedbank had just concluded, and other authorities in Sweden and in other countries were investigating the same bank.<sup>54</sup> Regardless of the conclusions of the authorities now or in the future, it is easy to observe that the accusations of money laundering have had very strong effects on the banks. Danske Bank and Swedbank have had to replace large parts of their management and have seen their market capitalisations plummet.

What happened? The common denominator both in the media reporting and as is evident in the FSA's investigation is that the banks did not take their preventive responsibilities seriously enough, which enabled money launderers to make use of them. There have been typical signs of money laundering, such as opaque ownership structures, companies with no operations and transactions that did not correspond to what the banks knew about the customers. In the case of Danske Bank, employees of the bank allegedly also assisted in the actual money laundering. A bank that allows itself to be misused in this way becomes a valuable tool for money launderers. In the case of Swedbank, which in March 2020 received a warning and a sanction fee of four billion SEK from the FSA, it is very clear from the authority's investigation that the bank's management had been receiving information about deficiencies in its operations for a long time, but had not managed to correct them. The bank had insufficient control of the risks in its subsidiaries in the Baltics and thereby let itself be misused for money laundering. This is no way to run a bank! It is important to point out that if the banks had had adequate preventive systems in place, they would not have found themselves in this situation to start with – money launderers are constantly looking for new routes and making use of those that work for them.

Just as the banks may have had structural or other problems that prevented their management from realising the gravity of the situation, it is also possible to question the adequacy of the cross-border institutional framework as it was during 2007–2015. Sweden and all the three Baltic countries are members of the EU, which means that banks in all four countries in are principle subject to the same regulatory framework but are subject to the supervision of separate national authorities. It has become clear that those authorities must engage in much closer cooperation to be able to see and assess the risks of money laundering and terrorist financing in a banking group as a whole, rather than focusing on the parent company or subsidiary in their own country. Previously, that was not done to a

<sup>53</sup> One example is the *International Consortium of Investigative Journalists* which published the Panama Papers.

<sup>54</sup> SEB is also under investigation by the FSA, to be concluded in June 2020.

sufficient extent.<sup>55</sup> During 2019, initiatives have therefore been taken to create permanent structures for regional supervisory cooperation in the field; the Swedbank case is an example of how such close cooperation has produced results. Together with the legislative amendments that have entered into force in recent years and a much stronger focus on measures against money laundering and terrorist financing in the banking sector, the conditions for an effective preventive system are far better now than they were between 2007 and 2015. But is this sufficient? Probably not. Eventually, we can expect a centralisation of supervision in this area on the EU level.<sup>56</sup> It is in many ways a reasonable idea that financial companies which operate seamlessly in the single market and face cross-border threats should also be subject to supervision by a cross-border authority. The importance of this subject is underscored by the observation that no political party in the Swedish Riksdag – not even those that are normally sceptical of increased centralisation on the EU level – has expressed opposition in principle to this idea.

It is more difficult to centralise law enforcement authorities. There is a new European Public Prosecutor's Office in which Sweden has currently chosen not to participate, but it is difficult to imagine a sufficient amount of political will to centralise FIUs and police authorities within the EU. This makes it even more important that these authorities engage in effective international cooperation on this issue – which may be one among many other priorities a police authority is assigned by the government.

On the national level, despite Sweden's good rating from the FATF and the many legislative amendments that have come into force in recent years, there are reasons to believe that there is still room for improvement. In December 2019, the National Council for Crime Prevention published a report indicating that Swedish law enforcement authorities are good at prosecuting 'simple' money laundering from fraud, such as fake advertisements on websites, but that above all the Police Authority needs to review the envelope of its financial competence so that more complex cases can be investigated.<sup>57</sup> These cases currently account for a relatively small share of the prosecutions, which is unfortunate, as one of the purposes of the modern criminalisation of money laundering was to enable the prosecution of multi-criminals who have accumulated proceeds over time.

Another part of the Swedish system that will be subject to inquiry in 2020, together with the FSA's powers and the supervisory structure in general, is the modalities for exchanging information between banks and authorities.<sup>58</sup> There is reason to believe that a simpler and more in-depth exchange of information, which would in a way be a further relaxation of bank secrecy that the banking sector has itself repeatedly requested, would enable a better and more precise supply of information to law enforcement authorities, which might also create greater interest at the Police Authority to improve their financial competence as recommended by the National Council for Crime Prevention.<sup>59</sup>

Despite the positive rating from the FATF, the Swedish system for combating money laundering and terrorist financing is far from perfect. This applies to all systems that have been given the green light from the FATF. There is a fundamental resilience in the form of

55 This observation is expressed for instance in the FSA's memorandum *Finansinspektionens work with anti-money laundering supervision* from 6 March 2019, which formed the basis for a hearing in the Riksdag Committee on Finance: see [https://www.fi.se/globalassets/media/dokument/diverse/2019/pm\\_penningtvattillsyn\\_20190306\\_eng.pdf](https://www.fi.se/globalassets/media/dokument/diverse/2019/pm_penningtvattillsyn_20190306_eng.pdf).

56 This aim was expressed for instance in the form of conclusions of the EU Ministers of Finance of 5 December 2019: see <https://www.consilium.europa.eu/en/press/press-releases/2019/12/05/money-laundering-council-sets-strategic-priorities-for-further-reforms/>.

57 See the Swedish National Council for Crime Prevention 2019:17 *Penningtvättsbrott – en uppföljning av lagens tillämpning (Money laundering offences – a follow-up of the application of the law; a summary in English is available)*. Despite this criticism, there were just over 1,000 legal proceedings for money laundering in 2018, which is a marked increase on the 200 in 2015.

58 See Committee Terms of Reference 2019:80 *Stärkta åtgärder mot penningtvätt och finansiering av terrorism (Reinforced measures against money laundering and terrorist financing)*.

59 One example of when the sector itself has expressed this need is the Swedish Bankers' Association's paper *Förslag om utökade möjligheter till informationsdelning i syfte att stärka arbetet mot penningtvätt och finansiering av terrorism (Proposal for increased possibilities for information sharing in order to strengthen the work against money laundering and terrorist financing)* from 29 October 2019: see <https://www.swedishbankers.se/media/4392/f191029f.pdf>.

a preventive system that has probably improved considerably during 2019–2020 in light of the debate in the media, events in the banking sector leading to action from authorities, state budget allocations to authorities and legislative amendments. Moreover, there is a law enforcement system that manages to investigate and prosecute both money laundering and terrorist financing. But just like JW in the novel *Easy Money*, inventive (or less inventive) criminals will still find ways to abuse the financial system in Sweden or internationally. Why, even though we have been trying for 30 years, have we not succeeded in putting a complete stop to money laundering?

## 5 A cat-and-mouse game with serious stakes – concluding discussion

In Government Bill 1990/91:127 on Sweden's accession to the UN narcotics trafficking convention, where the criminalisation of money laundering was first proposed in Sweden, you can read the following:<sup>60</sup>

*Experiences from several countries show that, alongside the illegal trade in narcotics, there exist wide-ranging activities exclusively aimed at converting the profits into 'clean' money. This so-called 'money laundering' is often carried out by individuals with no other connection to drugs-related crime. In some cases, these operations take a more-or-less corporate form. The organisations involved often have worldwide contact networks. By making various transactions, it is possible to move money through several countries, for example via shell companies in areas with a lack of sufficient controls. Naturally, such transactions make it difficult to trace the origin of the money. It happens that these organisations also conduct legal businesses on the side to which money can be moved, or provide business advice on appropriate ways to transfer money to legal operations. In some cases, money laundering itself has become a highly profitable business operation.*

*This high profitability provides the actual motor for the illegal management of narcotics. Effective efforts on the international level to prevent or hinder perpetrators from using their gains therefore forms one decisive precondition for successfully combating drugs-related crime. Helping conceal that assets were acquired by criminal means has the effect of promoting crime.*

This description was valid 30 years ago and, unfortunately, remains valid today. There is no doubt that money laundering is a crime that is still committed using the same means and for the same interests as it was then. Anybody expecting that the system for combating money laundering and terrorist financing would completely put a stop to these crimes would have reason to be disappointed.

But that is also an excessively simplistic view of the matter. Just as we do not expect people to stop committing crimes because we have law enforcement authorities, we cannot expect a regulatory framework to make money laundering and terrorist financing impossible. As long as there are laws, people will break them. This does not mean that laws are unnecessary or useless. The more it costs to launder money, the less profitable it becomes to commit crimes.

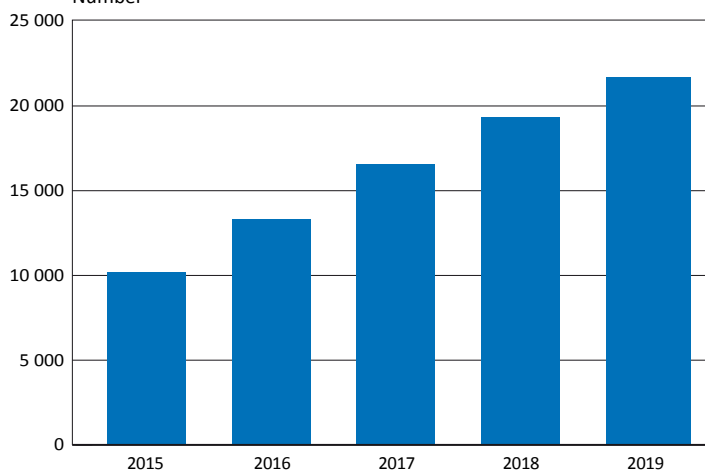
The regulatory framework for combating money laundering and terrorist financing imposes stringent requirements on reporting entities, authorities, and bizarrely enough also on criminals – anybody attempting to launder money using the simple means that worked in 1991, for example by going to a bank with a large bag of banknotes in small denominations

<sup>60</sup> The bill was submitted to the Riksdag in March 1991. The quotation can be found on page 15.



with no reasonable explanation, would probably be refused, reported and possibly also prosecuted for it. As a consequence of the technological developments of recent years, most people who live in Sweden manage entirely without cash, which means that more and more transactions are traceable. This is a problem for criminals who need to be able to conduct anonymous transactions. As is made clear in Diagram 1 below, it is beyond doubt that the regulatory framework produces large amounts of financial intelligence. However, it is worth pointing out that a small number of actors (mainly banks) are responsible for the majority of suspicious transaction reports and that many reporting entities have never submitted such a report. The potential access to financial intelligence is therefore even greater. It is a very valuable source of information, particularly for those in the business of ensuring that crime does not pay.

**Diagram 1. Suspicious transaction reports received by the FIU 2015–2019**  
Number



Source: Swedish Police Authority

The suspected money laundering in Nordic banks in the Baltics was, at least partly, of the nature I discuss in the introduction to this article, i.e. large-scale financial flows of a potentially systemic character with links to many people in many countries. Without the regulatory framework, it would have been much more difficult to discover financial flows of this kind and to react to them. In this respect, the framework is rather revolutionary in terms of what can be discovered, as was expressed concisely by the character Lester Freamon in the TV series *The Wire*.<sup>61</sup>

*You follow drugs, you get drug addicts and drug dealers. But you start to follow the money, and you don't know where the f\*\*\* it's gonna take you.*

In fact, the interesting question is not why the money was laundered through Nordic banks in particular. The answer is probably as I described in the previous section: *because it was possible*. If you follow Lester Freamon's instructions, you will instead ask yourself the question: *Where did the money go after it left the Baltics?* And, if it is no longer possible to launder equivalent amounts through Nordic banks in the Baltics, as the regulatory framework has been strengthened and the behaviour of the sector has changed, *how is this money being laundered today instead?*

The uncertainty and the surprises that can arise when you follow the money is also the reason why there may be resistance towards implementing the regulatory framework in countries with high levels of corruption. Just as there fundamentally exists a constant

<sup>61</sup> Season 1, episode 9. First broadcast on HBO in August 2002.

cat-and-mouse game between ‘normal’ criminals and law enforcement, those who commit crimes using the state as their tool also have to get smart if they want to keep their gains. The difference is that the stakes are much higher for the latter. It is therefore just as revolutionary that many countries with high levels of corruption now in practice have no choice: Either they introduce acceptable regulation, or they become subject to the measures from the FATF that I describe in section 2.3. This means that corrupt leaders will find it more difficult to hide their own criminal financial flows, particularly when they leave the country. Recently, we have seen several examples of such people being held to account.<sup>62</sup> From this perspective, it is difficult to see the regulatory framework as anything other than beneficial to the world.

A world-bettering regulatory framework requires the commitment of the countries that claim that they want to make the world a better place. It is therefore positive that Sweden on the whole has an acceptable and effective regulatory framework to combat money laundering and terrorist financing. On the other hand, it is difficult to explain why Sweden, which claims to put a great value on the UN system, has still not managed to implement the UN Security Council’s targeted financial sanctions in an acceptable manner. It is doubly hard to explain as this requirement has been in force since 2001 and as, during 2017–2018, Sweden held one of the Security Council’s 15 seats. Similarly, it is damaging for Sweden’s fight against money laundering in particular that the state conducts no comprehensive follow-up of how much of the proceeds of crime is confiscated every year, as this means that we are unable to measure our own effectiveness properly. Consequently, we are unable to prove that crime does not pay. The FATF has pointed out these two shortcomings, which should have led to a reaction. I hope that increased international and national pressure going forward can help the Swedish administration to carry out reforms in these two areas.

The regulatory framework for combating money laundering and terrorist financing does not only have positive consequences. One trend that has been observed, primarily among internationally active banks, is known as *de-risking* and means that the banks, referring to the regulatory framework, terminate their correspondent bank relationships with counterparties in poorer countries where there is insufficient regulation. This makes it more difficult for people in these countries to use the international financial system – or any financial system whatsoever – and the country’s economy suffers as a result. It is also negative for the regulatory framework itself, since more transactions are then made in cash or in other ways that cannot be traced. The FATF has been explicit as regards de-risking: Wholesale cancelling of correspondent bank relationships is not a consequence of the regulatory framework, which means that reporting entities should *identify and manage* the risks, rather than completely refuse them, which is a business decision that cannot be justified on the basis of regulatory requirements alone. This matter remains unresolved and illustrates one of the many complexities of the system. Another complex area on which legislators need to take a stance, and which can vary significantly from country to country, is the interplay with regulation on personal integrity and data protection. Unifying these two rapidly evolving issues with effective regulation for combating money laundering and terrorist financing is an important issue for the future.

In a world characterised by major technological, political and social change, it should come as no surprise that the regulatory framework for combating money laundering and terrorist financing is also developing rapidly. In Sweden, a comparatively very large number

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62 One example would be the action brought against Malaysia’s former prime minister and others, where the underlying fraud and money laundering was primarily enabled by Goldman Sachs, as described in the book *Billion Dollar Whale*.

of legislative bills were submitted to the Riksdag in this area in 2019.<sup>63</sup> Political and media interest in this matter remains urgent, not least on the EU level, where we will probably initiate discussions on major structural reforms for an even more effective international cooperation in the near future.

I have written this article to present the system as it looks in early 2020. It is not inconceivable that large parts of this information will be obsolete in only a few years. What is certain, however, is that the regulatory framework itself is here to stay, and that after about 30 years, it is delivering results – perhaps not quite the results intended when it was imagined, but results that on the whole give us, or at least those of us who take an interest, the tools to follow the money, combat serious crime, build a sustainable financial system and make a difference.

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63 On the administrative law side, during 2019, four bills were submitted to the Riksdag. In addition, a set of amendments to various laws from a bill submitted in 2018 and a set of amendments to ordinances entered into force, a draft legislative bill was presented to the Council on Legislation, two sets of material amendments to ordinances were issued and a public inquiry tasked with proposing further reforms was appointed. On the criminal law side, during 2019, two bills were submitted to the Riksdag. (The numbers of the administrative law bills are 2018/19:125, 2018/19:150, 2019/20:14 and 2019/20:55, and the criminal law bills are 2018/19:164 and 2019/20:36. Two further bills with minor, mainly non-material amendments to the administrative AML/CFT Act were also submitted to the Riksdag in 2019.)

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## Appendix A

What is a trust anyway? The Swedish *Nationalencyklopedin* encyclopaedia definition of 'English concept of a right to property or entitlement held by a party (trustee) on behalf of another party' demands a longer explanation to illustrate what kind of structures trusts are and why they are interesting in the money laundering context.

The best explanation of trusts I have ever heard goes back to England in the days of the Crusades. Imagine you are a prince with a castle who has raised an army to travel to the Holy Land in the hope of martyrdom. You leave your castle to your brother (because you are not planning on coming back again). But the crusade does not go quite as planned, you do not become a martyr and you come back again – but without access to your castle. Problem! By subsequent crusades, the crusaders had learnt of a legal arrangement under the Islamic legal system known as *waqf*, which may involve donating a building to be used for religious purposes along with instructions for how this is to proceed and how the building is to be managed. The English innovation that became the modern trust involved establishing a contract between three individuals – the crusader, the crusader's brother and the crusader's son – concerning the castle: The castle is transferred into the brother's management but on behalf of the son, for example so that the son will take over the castle when he comes of age. This then allows departing on a crusade in the knowledge that no matter the outcome, things at home will be in order.

A modern trust works more or less as in the example. There are three (or more) parties: there is always a person who initially owns the property to be placed in trust (the *settlor*); a person who is to manage the property pursuant to certain contractual terms (the *trustee*); and a person on whose behalf the property is to be managed and/or into whose ownership the property is to be transferred if certain conditions are fulfilled (the *beneficiary*).

What is special about trusts and makes them into a money laundering risk is that when property is placed in trust, it becomes much harder to trace, and it may no longer be taken from the settlor, as this person no longer owns it. A trust is not a legal person and therefore does not normally turn up in registers. It is a *legal arrangement*, which can be likened to a contract between (at least) three parties. Far from all countries in the world recognise trusts, which can lead to a limited understanding of the function of trusts, their areas of use and their risks in the countries that do not recognise them.

There are no provisions in Swedish law enabling the creation of trusts. Nonetheless, trustees acting in Sweden (for example on behalf of an English trust) must register themselves in the Swedish Companies Registration Office's register of beneficial owners and place themselves under the supervision of the County Administrative Boards for their business activities. The same applies to managers of other legal arrangements comparable to trusts.<sup>64</sup>

<sup>64</sup> The European Commission keeps a list of the legal arrangements permitted by Member States: see [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C\\_.2020.136.01.0005.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2020.136.01.0005.01.ENG).

# The future isn't what it used to be – perspectives on changes in the Swedish economy

Erik Frohm and Stefan Ingves\*

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*This article, which was written prior to the outbreak of the corona pandemic, can be regarded as a summary of the discussions conducted in recent years, both internally at the Riksbank and in various international contexts, on how structural changes affect the functioning of the economy.*

*The article does not address the corona pandemic, but its main conclusion – that it is important to be able to adapt to overall changes in the economy – has become even more topical now. It is too early to say exactly how the economy will change in the wake of the pandemic, but what is clear is that we must once again adapt our society to new conditions.*

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Today's rapid technological advances change the conditions for individuals, companies and decision-makers. The fact that society changes is nothing new, however, and in a historical perspective we in Sweden have adapted our skills, companies and institutions to the new reality, which has made us into a well-functioning and wealthy nation. There are, of course, new challenges resulting from globalisation, digitalisation and the general shift towards services, where production of services accounts for an increasingly large share of the economy. What is important is that we adapt in line with these trends and that we do not try to counteract them. Monetary policy may also need to be adapted to these changes, although it is not yet clear in what way. What we can note is that the inflation-targeting regime has been successful over the past 25 years: Inflation has been low and stable and growth has been solid. The monetary policy framework of the future should continue to put considerable emphasis on rules-based thinking and the long-term game rules that have characterised the inflation-targeting policy.

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## 1 Adaptability is essential for a well-functioning society

The world appears to be changing at an increasingly rapid pace. Many inventions, such as artificial intelligence, smart homes, driverless vehicles and 3D-printers, seemed like science fiction just a few years ago. Similarly, it was difficult to predict that the strong globalisation tendencies would lead to companies organising their production in global value chains.<sup>1</sup> This development raises questions that worry many people. Will my job still exist in the future, or will it be done by a robot or an algorithm? How can my company compete in this global

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1 A global value chain means that companies divide different stages of their production or operations between different countries.



world in times of rapid technological advances? How can economic policy take these changes into account?

When things appear to change, it may be a good idea to look beyond the developments of recent years to gain perspective. Major shifts in technology and changes in society are not new phenomena; they have been taking place ever since the industrial revolution, at least. From having been a country marked by poverty and starvation, Sweden has developed into a well-functioning, free and wealthy nation. A decisive factor is that we have embraced innovations, taken part in globalisation and accepted social changes, even when they have sometimes come as the result of major crises.

When one considers the current technological advances and their consequences, however, it is important to accept that the future rarely, if ever, turns out the way one expected. New inventions can drastically change the world, even if this is not evident when they are first put to use. For instance, the Nobel prizewinner Paul Krugman wrote in the late 1990s: ‘By 2005, it will become clear that the Internet’s impact on the economy has been no greater than the fax machine’s.’<sup>2</sup> Developments can also be much slower than one expected when new inventions begin to appear: ‘Machines will be capable, within twenty years, of doing any work a man can do’ said Nobel prizewinner Herbert Simon in 1965.<sup>3</sup>

Today’s economy is heavily dependent on the internet and has a high level of employment despite widespread use of machines, so it would be easy to look back and make fun of this type of statement. But they show us a few important things: it is difficult to make economic forecasts and it is almost impossible to understand where technology will take us and what consequences this will have for the economy as a whole. Over time, there have been major shifts in the Swedish economy, which have led to a rapid increase in welfare in Sweden. One decisive factor is that the Swedish economy has adapted to international developments and to technological advances. The best thing that individuals, companies and societal institutions can do to meet the current changes is to remain willing and prepared to adapt.

The purpose of this article is to describe how the Swedish economy has changed over time and to draw parallels to the current upheavals. We will begin by describing the conditions for shift in Sweden and how various structural transformations have changed the Swedish economy from the 19th century until the early 1990s. After that, we focus on developments over the past thirty years. In the following section, we describe how three now well-known trends have affected the Swedish economy in the current day: i) globalisation, ii) digitalisation and iii) the shift towards services accounting for an increasing share of the economy. We end with a summary and draw conclusions for the future.

## 2 Good conditions for change in the Swedish economy

Despite the fact that economic conditions have at times been uneven since the financial crisis, Sweden remains at the top of several international comparisons.<sup>4</sup> Sweden’s generally high position in various rankings gives a little perspective on where we are now in relation to other countries and our good conditions for benefiting from current technological advances. This does not mean there are no challenges. The growing mountain of debt in the Swedish household sector, the poor functioning of the housing market and the poor integration of

2 The complete quotation in English was: ‘The growth of the Internet will slow drastically, as the flaw in “Metcalfe’s law” becomes apparent: most people have nothing to say to each other! By 2005, it will become clear that the Internet’s impact on the economy has been no greater than the fax machine’s’, see Krugman (1998).

3 ‘Machines will be capable, within twenty years, of doing any work a man can do’, see Simon (1965).

4 Sweden holds first place on the European Commission’s ‘innovation scoreboard’, third place with regard to research and development as a percentage of value-added, fourth place on the Economist’s ‘Where-to-be-born-index’ and seventh place on the World Economic Forum’s ‘Global Competitiveness Index’.

those born abroad are issues that need to be addressed by decision-makers in Sweden. In addition, we in Sweden, like those in other countries, need to relate to new conditions – earlier achievements are no guarantee of future results.

History is fraught with episodes of turbulence, with major changes in Swedish society and the global economy. The changes have not been painless and there are human fates behind every statistical figure. Those who worked in professions that disappeared had to retrain and in many cases move from the countryside to the towns. Similarly, there can be difficult changes if software and algorithms take over more work tasks. The changes may happen faster now than before, which can mean that those with skills that are no longer in demand need to adapt more quickly than before. What is clear is that globalisation, the widespread digitalisation and the increase in services have had a fundamental effect on our economy, and will probably continue to do so for some time to come.

Another important factor significant to long-term economic developments is demographical developments, although we will not be discussing them in this article. Among others, Ingves (2019) has discussed the issue of how demographic developments can affect the labour market and monetary policy. See also Olli Segendorf and Theobald (2019) for a more in-depth discussion of the economic effects of immigration.

In the following, we will describe in brief economic developments in Sweden since the beginning of the 19th century. We are not historians, and our aim is not to cover all the details, but to highlight important events and the changes ensuing from them. The description that follows is largely based on the thorough work done by Edvinsson (2005), Edvinsson et al. (2010, 2014), Schön (2014) and Larsson et al. (2014).

## 2.1 Innovations and reforms – a breeding ground for economic growth

During large parts of the 19th and early 20th centuries, Sweden was still an agricultural economy and a significant percentage of the population lived in the countryside. Families produced most of what they needed themselves, with regard to food, clothing and tools. Despite relatively weak economic development, a couple of important changes occurred during this period. Agriculture, steel and forestry began to be commercialised because of new types of crops, more efficient ways of working and the expansion of the infrastructure in the form of railways. Separation of political power, stronger protection for ownership rights and the abolition of the guild system were important institutional reforms.<sup>5</sup> From the middle of the 19th century, these advances had created a stable breeding ground for economic growth in Sweden.<sup>6</sup>

### **Pioneering innovations and new technology driving growth**

Falling transport and communication costs as a result of new technology enabled foreign trade to increase steadily during the 19th century. As industrialisation picked up, demand for transport also increased, which led to pioneering innovations in boat construction, inland waterways and road transports. During the first half of the 19th century, steam engines were installed on boats and the electric telegraph was invented, which changed communication capacity by reducing the time it took to send messages around the world from weeks and months to just a few minutes.

Despite periods of poor growth and several crises, the increased international demand, combined with lower transport costs, meant that Swedish exports of steel, forestry and grain

5 In 1809 the principle of power sharing between the King and the Riksdag (the Swedish parliament) was adopted, during the 1840s the Riksdag decided on schooling for all, and in 1860 the obligation to carry domestic passports was abolished and freedom to conduct a business was introduced.

6 During large parts of the 19th century, Swedish GDP per capita was only around half of GDP in the United Kingdom and the United States. During the 21st century, GDP per capita in Sweden was higher than in the United Kingdom and 4/5 of that in the United States. At the same time, GDP per capita has grown rapidly in all three economies.

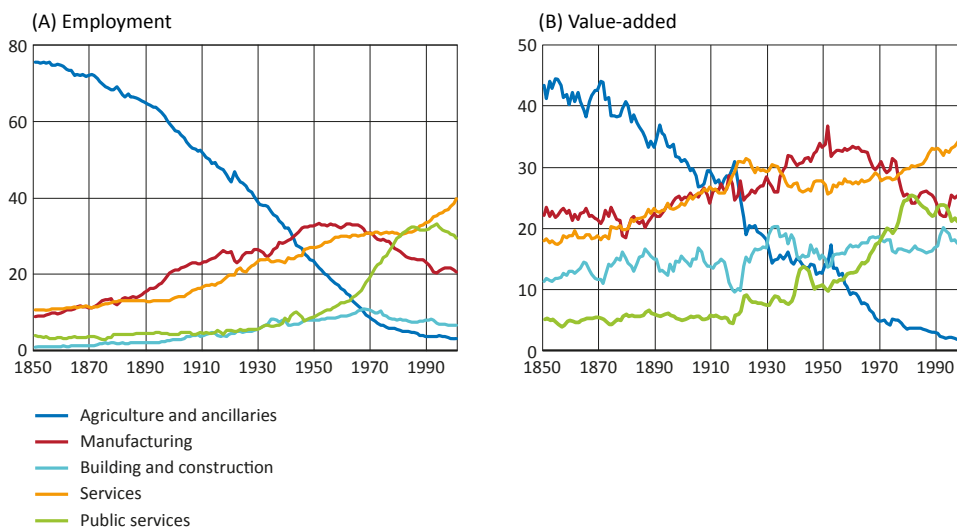
in particular increased rapidly. Imports of capital good increased, and the prominent role held by agriculture in the Swedish economy began to decline. At the same time, both the number of employees in the manufacturing sector and services became more important for the Swedish economy, both in terms of employment and value-added, see Figure 1.

Sweden's first act regarding public limited companies came into force in 1849 and was replaced in 1895 by a uniform act for all public limited companies. The new company forms made it easier to allocate both domestic capital and capital imports through new issues. New large corporations with a focus on engineering began to emerge and to drive technological advances in the manufacturing industry. These included AGA, ASEA (later known as ABB), Atlas Copco, Ericsson, Separator (later known as Alfa Laval) and SKF. Economic growth in Sweden rose steadily during this industrialisation process, see Figure 2.

But there were setbacks. From the middle of the 19th century, Sweden experienced several periods of low growth and falling production, crises and recessions. The years 1867–1869 were particularly notable, as they were unusually cold with poor harvests and led to mass starvation in Sweden. During this period, many people decided to leave the country and seek their fortune in other countries in Europe and in the United States.

**Figure 1. Employment and value-added, 1850–2000**

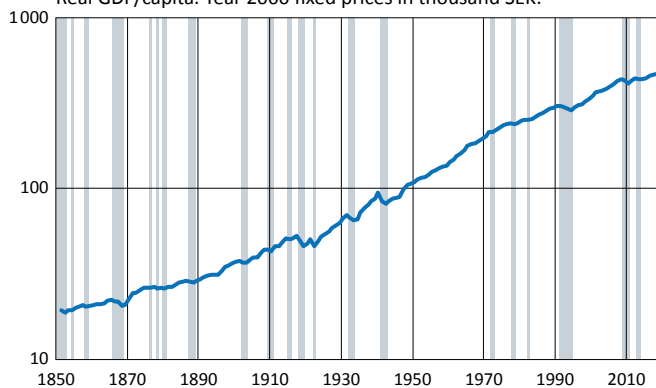
A: Percentage of employed. B: Percentage of value-added.



Sources: Edvinsson (2005) and Edvinsson et al. (2014)

**Figure 2. GDP per capita, 1850–2018**

Real GDP/capita. Year 2000 fixed prices in thousand SEK.



Note. The grey fields mark periods with negative growth in GDP/capita and the y axis is on a logarithmic scale.

Source: Edvinsson et al. (2014)

## 2.2 World war and global depression

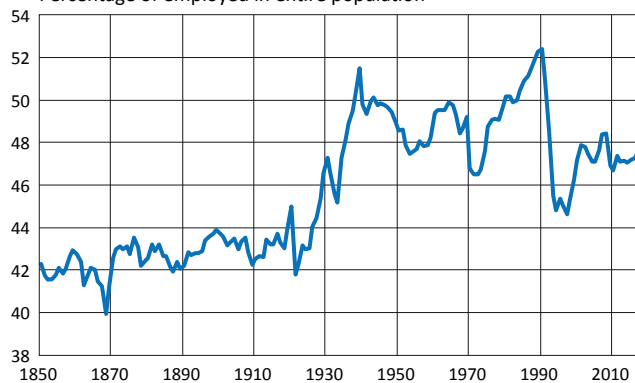
Even though Sweden faced large-scale emigration in the late 19th century and early 20th century, economic growth was good in relation to other countries. A favourable demographic development with a rising employment rate and higher incomes led to good economic development. Large areas of Europe were drawn into the First and Second World Wars, while Sweden was able to remain outside.

After the First World War, Sweden once again suffered an economic crisis. Production in countries competing with Swedish companies increased substantially in the post-war period, which put pressure on profitability in Swedish export companies, many of which went bankrupt. The Swedish economy recovered somewhat during the 1920s, but this came to an abrupt halt when the global Depression, which began in the United States in 1929, also reached Sweden. Clemens and Williamson (2004) show how tariffs increased globally, which sharply reduced world trade. Heightened trade barriers affected Swedish exports and led to a high level of unemployment. After the Depression, governments around the world decided to aim their economic policy to a greater degree towards stabilising economic cycles. Keynesian economic theory and the 'Swedish model' with a privately owned manufacturing sector, large public sector and a high level of trade union membership took hold in Sweden.

### High employment rate despite structural changes

As we saw in the first section, economists and decision-makers have long been concerned that major technological advances can create mass unemployment. The most well-known movement were the Luddites in the United Kingdom, who became famous during the early 19th century for destroying textile machinery out of fear of losing their jobs. However, the major changes to the Swedish economy in the 19th and 20th centuries were not followed by mass unemployment. On the contrary, the number of employed as a percentage of the population rose, see Figure 3.

**Figure 3. Employment rate, 1850–2018**  
Percentage of employed in entire population



Note. The employment rate is defined here as the number of employed as a percentage of the population to obtain the longest time series possible. Normally, the employment rate is defined as the number of employed as a percentage of the labour force rather than the entire population. For the whole year 2018, this number was 68.5 per cent in Sweden.  
Sources: Edvinsson (2005) and Statistics Sweden

From the middle of the 19th century until the 20th century, the employment rate did not show a trend fall as a result of technological advances. From the beginning of the 1920s until 1940, on the other hand, the employment rate rose rapidly, only to fall again during the Second World War. From the middle of the 1950s, it showed a rising trend again until the

Swedish financial crisis in 1991. After that, the employment rate has been lower, but has increased steadily.<sup>7</sup>

#### The Riksbank changes along with the rest of society

Since it was established in 1668, both the Riksbank's activities and the number of its employees have varied, see Barvell et al. (2019). Especially since the 1990s crisis, the number of employees has declined, as a process of streamlining began with the motto: 'The Riksbank shall not carry out tasks using public funds that other could do as well or better'. Banknote manufacturing was outsourced in 2002, in 2003 Statistics Sweden was given the task of producing financial market statistics and in 2007 it was also given the task of producing the balance of payments statistics. The streamlining during the 1990s and 2000s led to a large reduction in the number of employees and at present just over 350 people work at the Riksbank, compared with around 1,000 in 1980. It is also clear in our operations how the demand for different types of competence has changed along with developments in society and technology. During the early 1990s, only a small percentage of the staff at the Riksbank had a PhD or Master's degree, while in 2020 around one in five have these qualifications. The technological developments also require that operations have increasing skills in IT architecture, IT security, data science and data management.

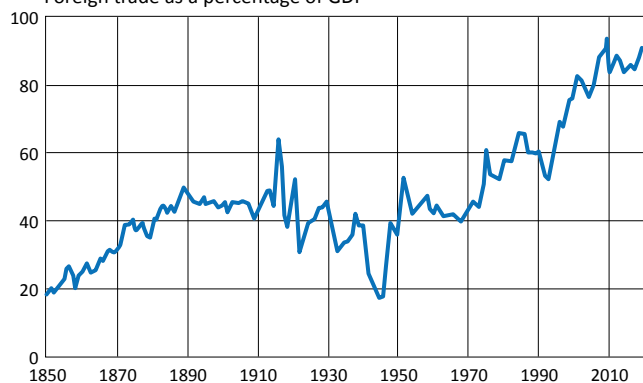
## 2.3 The strong society, crisis and structural change

The Second World War was followed by rapid economic growth. With the labour force intact and without any significant loss of capital, Swedish companies could benefit from the high demand that arose from the rebuilding of Europe. Trade liberalisation and economic growth went hand in hand, at the same time as international institutions gained a more prominent role in the global scene. The Swedish model and the 'strong society' appeared unthreatened during this period, and Sweden became one of the world's wealthiest nations. During the 1960s, industrialisation peaked in terms of employment and value-added, see Figure 1.

#### International dependence, devaluations and the path to the 1990s crisis

At the same time, the economy continued to change. The textile and clothing industries became less important for total employment. Services and the public sector expanded rapidly, but at the same time, the Swedish economy became increasingly dependent on demand from other countries. Swedish foreign trade rose from around 40 per cent of GDP during the first half of the 20th century to just over 90 per cent in 2018, see Figure 4.

**Figure 4. Swedish foreign trade in goods and services, 1850–2018**  
Foreign trade as a percentage of GDP



Note. Foreign trade refers to exports and imports of goods and services.  
Sources: Edvinsson et al. (2014) and the Riksbank

<sup>7</sup> The debate has not disappeared in modern times. Fölster (2014) replicated a study by Frey and Osborne (2017) using Swedish data and found that more than 50 per cent of all jobs could be replaced by digital and automated technology in the coming 20 years. A study by Nedelkoska and Quintini (2018) instead shows that around 35 per cent of Swedish professions have either a high or a significant risk of automation, which is much lower than most OECD countries.

However, this change was not without challenges. The large fall in international demand resulting from the oil crisis 1973–1974 affected several export-dependent companies in Sweden that were struggling with poorer international competitiveness. In an attempt to strengthen the export companies' competitiveness, the krona was devalued a total of five times between 1976 and 1982. This had a temporarily positive effect for the export companies, but at the cost of increasingly strong inflationary impulses. Wage earners negotiated higher wage increases to compensate for the rising inflation and the higher wage increases led to even greater inflationary pressures, which were followed by even higher wage increases and more inflation. It became clear that the model of that time, where the fixed exchange rate was to be the anchor for price-setting and wage formation, was not working.

On the technology front, new sectors emerged, such as the information and communications technology sector (ICT) and pharmaceuticals industries. At the same time, other branches declined in significance or disappeared entirely because of the tougher international competition, for instance, the textile and clothing industry. A number of deregulations were also implemented, for instance regarding the railway and electricity monopolies, and the credit markets. An important step for the latter was the abolition of the loan cap in 1985. This led to rapid growth in lending to households and companies. During this period, fiscal policy was overly expansionary and the objective for monetary policy was a fixed exchange rate. The combination of these two factors and irresponsible lending by the banks lay the foundations for the crisis at the beginning of the 1990s.

### 3 A domestic financial crisis and the Great Moderation

The reunification of Germany following the fall of the Berlin Wall in 1989 led to large public investments that resulted in high growth figures, which pushed up interest rates in Europe. At the time, the krona was pegged to the 'currency basket' and later to the euro's predecessor, the ecu. To maintain the fixed exchange rate, the Riksbank raised its policy rate in line with the higher interest rates in Germany. But with the Swedish history of devaluations to maintain international competitiveness, there were expectations of a new Swedish devaluation. In an attempt to convince the financial markets that Sweden had firmly decided to maintain the fixed exchange rate, the Riksbank raised its policy rate substantially; for a couple of days it was at 500 per cent. Finally, the situation became untenable and the fixed exchange rate was abandoned in November 1992.

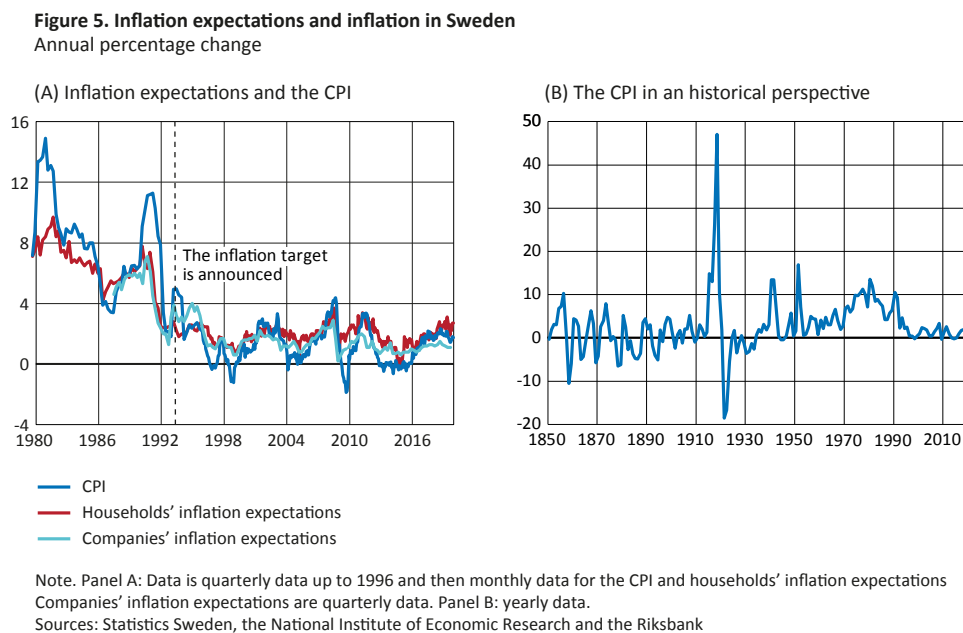
When the fixed exchange rate was abandoned, the krona depreciated substantially. However, international demand was not sufficient to counteract the weak domestic activity. Unemployment rose rapidly 1991–1993 and GDP fell, at the same time as public finances weakened because of high public expenditure and lower tax revenue. The 'tax reform of the century' in 1991 involved, among other measures, reducing the tax deductibility on interest expenditure, which was a well-needed reform but the higher policy rates and lower tax relief meant that households' real interest rates increased substantially. Property prices fell heavily and the banks began to experience large credit losses, particularly on loans to commercial property companies. The crisis that ensued became a financial meltdown. The Swedish Bank Support Authority (popularly known as the banking 'ER') was given the task of cleaning up in the banking system and finally the crisis was under control. It was certainly a wake-up call for many people in Sweden.

#### **Important reforms and inflation target to dampen inflation and keep it stable**

The 1990s became a period of many important structural reforms to attain long-run sustainable public finances, and initiatives that lay the foundations for a period of stable

economic growth. A consensus was reached with regard to the importance of rules-based thinking and to long-term game rules being decisive for stable economic conditions. The traditional Keynesian stabilisation policy was abandoned and the Riksbank's task was redefined from maintaining a fixed exchange rate to stabilising inflation and otherwise supporting economic developments in general.<sup>8</sup> From the mid-1990s, the fiscal policy framework was also reformed: caps on public expenditure were introduced, the surplus target was formulated and measures were taken to begin consolidation of Sweden's national debt to improve public finances.

The new inflation-targeting regimes in New Zealand, Canada and the United Kingdom also became the model used by Sweden. An inflation target was introduced in 1993 (to begin applying from 1995). The purpose was to curb the general public's expectations of high inflation that had become entrenched in the 1970s and 1980s, see Figure 5A.



Several factors probably played a role in changing the general public's expectations of high inflation, but one can note that the inflation target and the credible overall economic policy led to low and stable inflation in an historical perspective, see Figure 5B. The period prior to the global financial crisis was overall characterised by a stable and positive development in the economy, not only in Sweden, but also internationally. This period is often referred to as the Great Moderation.

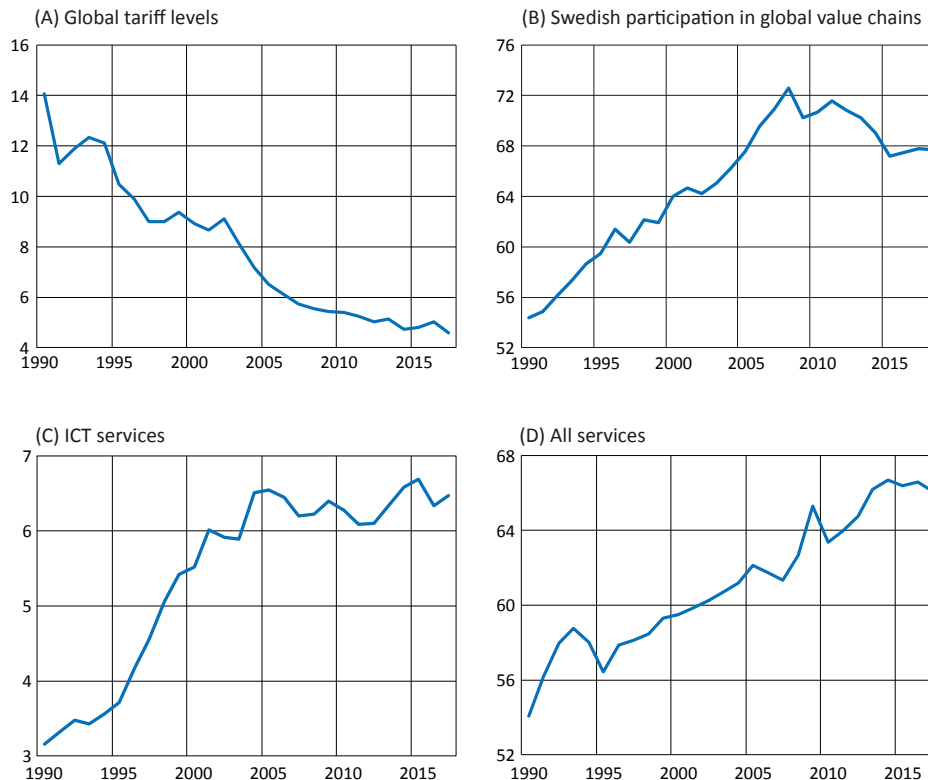
### An increasingly globalised and services-oriented world

In Europe, the European Community (EC) developed into the European Union (EU) during the 1990s, which was a continuation of decades of deepening economic and political cooperation between the European countries. The EU created the largest free trade area in the world, and Sweden joined the union in 1995, but refrained from joining the Economic and Monetary Union (EMU), which now consists of 19 EU member states. On a global level, in 1995 the General Agreement on Trade and Tariffs (GATT) became the World Trade Organisation (WTO). The newly started organisation was an expression of the international community's support for multilateral trade agreements, reduced trade barriers and a global open economy. Since then, the average tariff levels have shown a trend fall at global level, see Figure 6A.

<sup>8</sup> See Ingves (2015) for a more detailed discussion of the central bank's means and objectives in a longer term perspective.

**Figure 6. Globalisation, information and communications technology and services – a Swedish perspective**

A: Average tariff, per cent. B: Import content in exports, per cent. C and D: Percentage of Swedish value-added



Note. (A) are global tariff levels that are import-weighted averages of the tariffs applied. (B) is measured as the total of foreign value-added in Sweden's exports and exports of intermediate goods used for onward export. (C) ICT services are the branches J61 telecommunications and J62-J63 computer programming, computer consultants and information services. (D) all services are sectors G45-T98.

Sources: Statistics Sweden, UNCTAD Eora and WITS

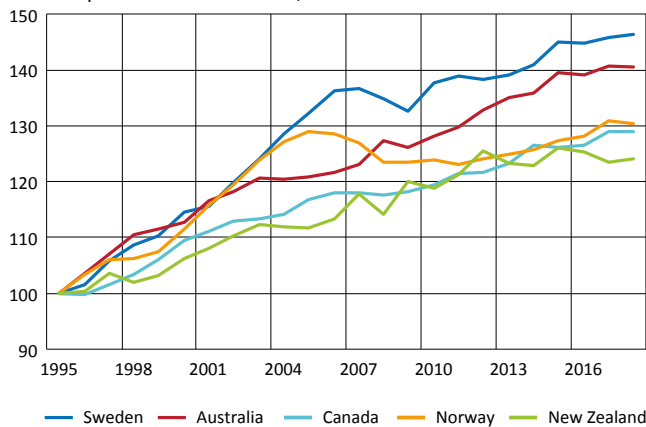
Trade liberalisation made it possible for Swedish companies to expand their production abroad in global value chains, an expansion that progressed quickly from the early 1990s to 2008, see Figure 6B. A global value chain involves companies dividing different stages of their production or operations between different countries. An important factor in this development was the rapid spread of new technology, such as information and communications technology (ICT), for instance, personal computers and the internet, see Figure 6C. At the same time as globalisation took off, the trend for the services sector to take on greater importance was strengthened in the 1990s and 2000s, see Figure 6D. The services content increased in exports, consumption and intermediate goods in production.

Some jobs moved from Sweden during this period. But additional jobs have been created in companies in Sweden. On the other hand, jobs in Sweden have changed in nature and make greater demands on experience and competence. Globalisation appears to have led in general to higher wages for most professional groups, but may have led to an increased wage spread between professions and types of work task (Heyman and Sjöholm, 2018). The fact that companies have invested in Sweden, what is known as foreign direct investment, also appears to have had positive effects on wages and employment in the Swedish companies that were bought up (Swedish Agency for Growth Policy Analysis, 2017). Digitalisation appears to have had similar effects to globalisation on the demand for labour. Primarily it would seem that routine-based and simple tasks are replaced to a higher degree by digitalisation and automation, rather than complicated tasks that are not routine. This can reinforce the wage spread between different types of competence and skills (Heyman et al., 2016).



In the mid-1990s, the aggregate effect of the structural reforms, globalisation and technological advances began to affect the Swedish economy, resulting in a rapid growth period with productivity growth faster than in other small open economies with floating exchange rates and inflation targets, see Figure 7. Calmfors et al. (2019) shows that the ICT sector in particular contributed to rapid growth in productivity from the mid-1990s to the mid-2000s.

**Figure 7. Productivity growth, 1995–2018**  
GDP per hours worked. Index, 1995=100



Source: OECD

### 3.1 The storm after the calm

In September 2008, the Lehman Brothers investment bank went bankrupt and the global financial crisis broke out, marking the end of the Great Moderation. GDP in Sweden fell between 2008 and 2009 by 4.2 per cent and exports and imports by just over 14 per cent.<sup>9</sup> This global storm followed almost two decades of calm. Unlike the crisis at the beginning of the 1990s, however, it was largely an international crisis. The Swedish economy nevertheless managed relatively well, thanks to several of the lessons learnt from the 1990s crisis. For instance, Sweden's public finances were in good shape before the crisis broke out. The Swedish banks were as a rule solvent, but needed liquidity, as the uncertainty on the global financial markets was so great that it had a drastic effect on their functioning. The 2008–2009 crisis was thus mainly a liquidity crisis for the Swedish banks, which could be resolved with support from the Riksbank in the form of short-term loans and other liquidity support.

But an obvious problem was that Sweden lacked an adequate financial regulatory framework, for example when it came to the management of financial institutions. The regulations protecting creditors and enabling the reconstruction of banks during the 1990s were temporary and had disappeared in the middle of the decade. There was thus little to lean on to manage the problems. The crisis work was therefore extensive.<sup>10</sup>

The Swedish economy has developed relatively well since the financial crisis, but in many other areas, particularly in the euro area, developments have been markedly weak. One reason was the debt crisis in Europe, which occurred a year or so after the financial crisis, and meant that the international recovery that had begun came to a halt. Another thing that characterised the period following the financial crisis was that inflation had been subdued and many countries had difficulty attaining their inflation targets, despite an expansionary monetary policy.

<sup>9</sup> See Baldwin (2009) for a discussion of the causes of the major collapse in trading.

<sup>10</sup> Since the crisis, the Riksbank's and other authorities' emergency preparedness has been reinforced. See Sveriges Riksbank (2020).

## 4 Globalisation, digitalisation and the shift towards services

### 4.1 Subdued globalisation and increased protectionism since 2009

Sweden experienced a rapid economic globalisation in the 1990s and 2000s supported by reduced trade barriers and the rapid spread of ICT technology and services. However, since the financial crisis 2008–2009, various measures of economic globalisation are showing a different trend. Foreign trade as a percentage of GDP has been more or less unchanged since 2009, foreign direct investment is lower than before the crisis as a percentage of GDP, and the use of global value chains appears to have slowed down. There are several explanations of why the globalisation trend is no longer pointing clearly upwards. One is that emerging market economies gradually became an increasingly important part of the global economy in the 2000s and 2010s. When demand in emerging markets rises, their imports do not increase as much as those in advanced economies, and when they become an increasingly important part of the global economy, world trade therefore grows more slowly in relation to the development in demand. The composition of demand has also changed within other countries. For example, large countries such as China have started to switch from an investment-driven economy to a more consumption-based model.<sup>11</sup>

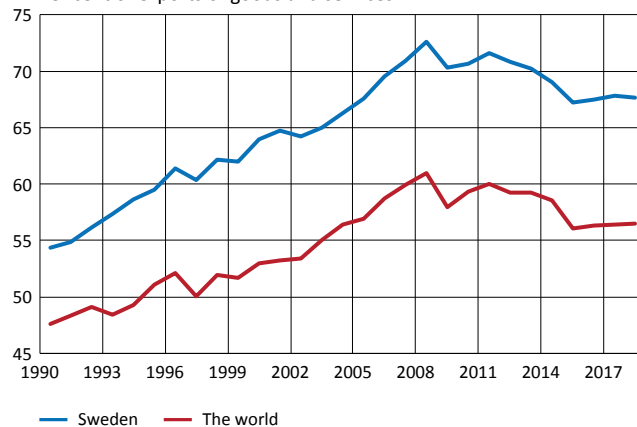
#### **Lower participation in global value chains**

Figure 8 shows the percentage of exports that can stem from global value chains for Sweden and the world. From 1990 to 2008, developments in Sweden moved faster than abroad and the level was much higher. But since 2008, trade in input goods and services in Sweden and our neighbouring countries has fallen. As a result of the regulations in the WTO, customs and tariffs are at historically low levels right now, but Evenett and Fritz (2019) show that other, non-tariff measures appear to have become increasingly common since 2009. Export subsidies, demands for a local content in production, delayed customs processing and other trade-limiting measures are not visible in the tariff statistics but can subdue trade in global value chains in particular. In addition, there is the more explicit protectionist rhetoric that has blossomed up in recent years. The escalated trade conflict in 2018–2019 between the United States and China is one such example.

However, there are those who say that the decline in global trade is a consequence of the changed digital economy and the greater role played by intellectual property rights. According to this reasoning, the weaker development in various globalisation indicators is a natural consequence of, for instance, digitalisation (Donnan and Leatherby, 2019).

<sup>11</sup> The ECB's IRC Trade Task Force (2016) and the IMF (2016) show that the import content is on the whole higher for investment goods than for consumption goods, which can mean that imports increase less when GDP rises.

**Figure 8. Participation in global value chains**  
Per cent of exports of goods and services



Note. Global value chains are foreign value-added in Swedish exports and Swedish value-added used by other countries to produce exports.  
Source: UNCTAD-EORA database on global value chains

### Less foreign trade negative for Sweden

Studies have shown that imports of intermediate inputs and services are in general linked to increased productivity, rising wages and higher GDP per capita. A subdued economic globalisation is therefore probably negative for the Swedish economy.<sup>12</sup> Swedish households have benefited from increased access to globally produced goods and services of high quality and at low prices. Companies have been able to expand their operations thanks to increased demand from abroad and they have benefited from the specialisation of work tasks in the global value chains.

However, trade in global value chains does not only benefit the export industry. Exporting companies often buy intermediate inputs and services from domestic small and medium-sized enterprises to produce export goods and services. For instance, the OECD (2019) estimates that around one fifth of multinational export companies' production consists of intermediate goods and services from small and medium-sized domestic enterprises. Individuals have also benefited from globalisation. Goods produced for global markets have become cheaper, led to a greater selection of high quality products, and given us access to a broader supply of culture and entertainment. According to the OECD's database 'Trade in Value Added', the import content in Swedish consumption has increased from 19 per cent in 1996 to 21 per cent in 2015, at the same time as goods prices in Sweden have fallen since the mid-1990s. Increased protectionism around the world indicates that the subdued development will continue for some time to come. This will affect developments in Sweden, as an important condition for growth in a small open economy like Sweden's is precisely global markets.

## 4.2 Widespread digitalisation

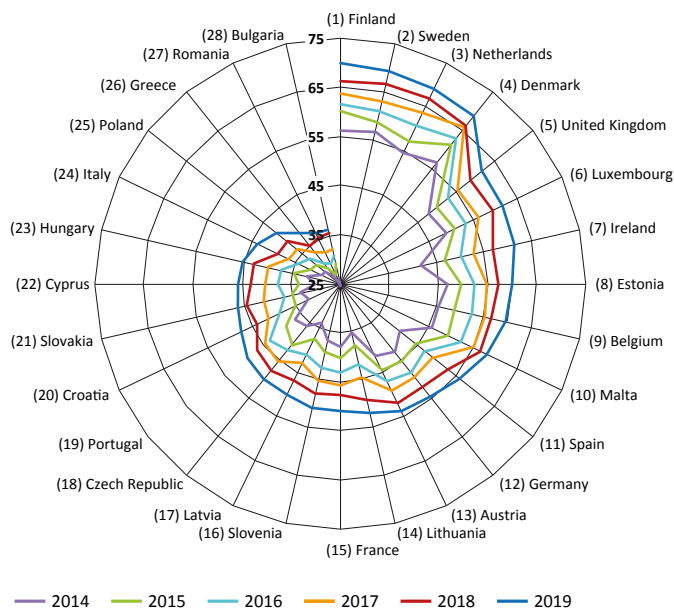
Digitalisation has gone hand in hand with globalisation and has increased rapidly.<sup>13</sup> Since 2007, for instance, e-commerce has become increasingly important in Sweden, and has increased from around 3 per cent of retail trade sales to 10 per cent in 2018 (Swedish Trade Federation 2018). Another way of looking at the spread of digitalisation is to compare Sweden with other EU countries. As of 2014, Eurostat publishes a 'Digital Economy and Society Index', DESI. This index summarises developments in around 30 indicators of the spread of digitalisation, which can be broadly summarised into five categories: connectivity,

<sup>12</sup> See, for instance, the ECB Working Group on global value chains (2019) and the World Bank (2020) for the positive effects of trade in global value chains.

<sup>13</sup> See the OECD's 'Key ICT-indicators' <https://www.oecd.org/sti/ieconomy/oecdkeyictindicators.htm>

human capital, use of internet services, integration of digital technology and digital public services (European Commission, 2019). Figure 9 shows developments in each EU member state during the years 2014–2019 and the ranking for 2019. All EU member states have come further in their digitalisation in 2019 in relation to 2014. Finland, Sweden, the Netherlands and Denmark have taken turns topping the list (which cannot directly be seen in the figure) and in 2019 Finland tops the list with Sweden in second place. Sweden's relatively widespread digitalisation can partly explain why the Swedish companies taking part in the Riksbank's Business Survey to a large extent regard digitalisation as a possibility rather than a threat and why they have to a large degree begun to adapt their operations to new digital techniques (Sveriges Riksbank 2018).

**Figure 9. Digital Economy and Society Index**  
Index



Note. The index is based on around 30 indicators, which together describe the spread of digitalisation in various parts of society.  
Source: Eurostat

### Productivity gains not yet visible in the statistics

Digitalisation could lead to major productivity gains, but despite the apparently broad spread, productivity growth has been weak since just before the crisis in 2008–2009, see Figure 7. Productivity growth has also been weaker in other developed countries since the financial crisis, which indicates that it is the result of a joint trend. However, economists disagree on the reasons for the decline and what this means for future developments. Some say that this development is due to inadequacies in the statistics and that the production value of a digitalised economy cannot currently be measured in a good way.<sup>14</sup> This applies in particular to the services that do not have any direct price, but which we nevertheless benefit from, such as watching videos on YouTube or looking things up on Google.

Others such as Gordon (2012) say that we are in a period of very low productivity growth that will continue. According to this point of view, a large share of the fruits of digitalisation have already been reaped. As early as 2005, for instance, several companies had adapted their business methods and models to the internet. Brynjolfsson and McAfee (2011) argue instead that the effects of digitalisation pass under the radar and that productivity growth will pick up when the new technologies are in broad use in the business sector. The impact of

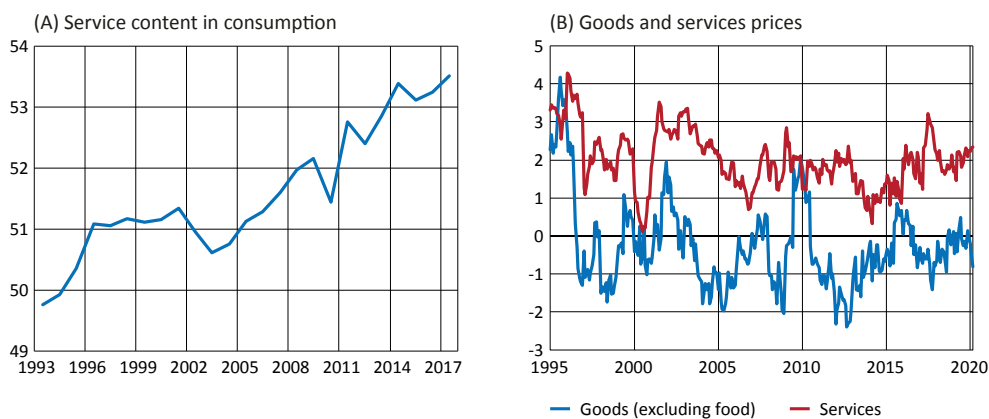
<sup>14</sup> Among others Brynjolfsson and Collis (2019) provide suggestions as to how one can measure the contribution of digital services to our material welfare.

digitalisation in productivity figures may also depend on where we are in the technological shift.

### 4.3 Intensification of ‘servification’

In addition to globalisation and digitalisation, services have become increasingly important in the Swedish economy, as in several other countries in recent decades. For instance, the services share of Swedish consumption has shown a rising trend since the beginning of the 1990s, see Figure 10A.<sup>15</sup> Similarly, services have become increasingly important as intermediate goods in manufacturing and the production of services, as well as Swedish foreign trade. In general, the rate of price increase is higher for services than for goods, and since the middle of the 1990s, service prices have increased by on average 2 per cent a year, while goods prices have fallen by 0.3 per cent a year, see Figure 10B.

**Figure 10. Service content in Swedes’ consumption and price developments in goods and services**  
A: Percentage of household consumption. B: Annual percentage change.



Sources: The OECD and Statistics Sweden

One important explanation for this is that productivity growth in the services sector is lower than in the goods sector and the services sector is more protected from global competition than is good production.<sup>16</sup> But there are of course major differences between different types of services. As technology advances progress, an increasing number of service industries are subjected to competition, and new solutions can challenge previously traditionally domestic professions. It is not difficult to imagine some tasks being outsourced via technology to other countries or being done by machines.

As a large share of the production costs in service industries consist of labour costs, unlike, for instance, manufacturing where other input goods play a larger role, service prices are more clearly linked to developments in wages. In terms of composition, a higher content of services in the consumer basket and as input in production means that inflation becomes higher than it would have been if services had the same significance as during the 1990s. And with a larger content of services in household consumption and company production, it is probable that consumer prices will be affected to a greater extent than before by wage developments.

### 4.4 Effects on inflation and implications for monetary policy

These trends can also affect the conditions for monetary policy. Here it should be pointed out, however, that the structural change that probably has the greatest implications for

<sup>15</sup> 45 per cent of the consumer price index currently consists of services, which is an increase of seven percentage points since 1995.

<sup>16</sup> The phenomenon with a situation whereby a particular service becomes more expensive to produce over time as labour productivity stagnates while wages are raised is often referred to as Baumol’s cost disease. See Baumol and Bowen (1966).

monetary policy is the global downturn in the long-term real interest rate over the past decades. If the low long-term real interest rate persists for a long time, which many people are assuming it will, it may become more difficult to counteract future recessions, and it may also lead to asset purchases and negative interest rates becoming more common in the future. This applies in particular if inflation becomes entrenched at very low levels, so that nominal interest rates also become very low. However, in this article we do not focus on the fall in the real interest rate and its implications. This question is instead discussed in detail by Lundvall (2020) and Andersson, Jonsson and Lundvall (2020) in this issue of Sveriges Riksbank Economic Review.

Globalisation and digitalisation can potentially also have effects on inflation. Globalisation and the increased international trade have led to stiffer competition and thereby downward pressure on global price levels and falling import prices in many countries. It is difficult to measure the effects of digitalisation, but even here there is most probably a dampening effect on inflation via other channels – for instance, falling prices on processors and other electronic components, by opening up new markets for companies and increasing options for consumers, and by replacing physical distribution with digital, for example in the music industry.

Although both digitalisation and globalisation are very long-lasting processes, their effects are essentially temporary, in the sense that they will not always have a dampening effect on inflation. As we noted above, there are also some signs that the trend towards increased globalisation has been broken. If services become an increasingly important part of the economy, it is also conceivable that domestic demand conditions will gradually gain greater significance. If the dampening effects on inflation can be estimated reasonably well, which is not an easy task, it should be possible to counteract them with a more expansionary monetary policy. One circumstance that makes it more difficult now, however, is as we noted before, that the low long-term real interest rates have reduced the scope to use the policy rate to stimulate the economy.

There are other ways of making monetary policy expansionary, such as asset purchase, but as it does not seem as though the policy rate can be used as effectively as in earlier periods, many central banks have begun to review their monetary policy frameworks. This applies, for instance, to both the European Central Bank, ECB, and the US Federal Reserve. One main task in this work is to investigate whether the monetary policy framework can be modified in a way that creates sufficient scope to cut the policy rate in future economic downturns. Here it is primarily a question of ensuring that inflation and inflation expectations do not become entrenched at overly low levels. The lower they are, the more difficult it is to make the real interest rate negative, which may sometimes be necessary to counteract a recession.

## 5 Adaptability essential to benefit from change

The current developments in technology and in society as a whole can appear revolutionary, but the fact is that major technology shifts are not something new, which we have endeavoured to point out in this article. Sweden's economy has changed fundamentally over time, and we have embraced new inventions, taken advantage of globalisation trends and adapted society accordingly, which has made us into a well-functioning and wealthy nation. From this perspective, it is important that employees, companies and society in general are prepared to change continuously. Sweden has become a successful nation exactly because of this capacity. In an international comparison, Sweden is well-equipped for today's widespread changes, even if there are always problem areas to deal with. These include the growing debts in the Swedish household sector, the poor functioning of the housing market and the inadequate integration of those born abroad.

It is clear that structural changes affect society, as well as the Riksbank's activities. Many countries have recently begun to review their monetary policy frameworks. One important reason is that the historically low long-term real interest rate has made it more difficult to use only the policy rate to counteract economic downturns. In Sweden, the Riksbank's monetary policy framework and the Sveriges Riksbank Act have recently been investigated by a commission of inquiry appointed by the Riksdag (the Swedish Parliament). The final report presented in November 2019 supports the Riksbank's current formulation of its objectives. But the Riksbank naturally takes part in the discussions taking place in central bank circles, follows the reviews made and continues to make its own analyses.

If history teaches us anything, it is probably that we will also see changes to the Riksbank's activities in the future. This is in the nature of things; when technology and society move forward, new and better ways of conducting operations arise. This also applies to monetary policy. What we can note here is that the inflation-targeting regime has been successful in reaching its objective: to bring inflation down from high to low levels and to prevent large fluctuations in the inflation rate. We do not wish to predict what new frameworks may appear in the future, but it would be naive not to believe that there will be changes in the future. What is important is that potentially new frameworks for economic policy put great emphasis on rules-based thinking and long-term game rules, something that has characterised the past 25 years of inflation targeting.

Far beyond the reasoning on monetary policy and in a broader sense, we show in this article that economic transformation creates and retains welfare in the long run. It is a necessary process, although the changeover contributes to concern among individuals and companies. Taking advantage of the opportunities that arise from globalisation, digitalisation and the shift towards a services society is decisive to ensure the Swedish economy continues to develop and flourish.

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# The new macroeconomic landscape after the global financial crisis

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In this article, we discuss some of the structural changes that have taken place in the macroeconomic environment after the global financial crisis that erupted with full power when the US investment bank Lehman Brothers went bankrupt in the autumn of 2008. The changes we address are the weaker productivity growth, the lower long-term real interest rate, the growing debts among households and states and the flattened Phillips curve. These changes have been important for monetary policy over the last ten years and will, in all likelihood, continue to be so in the period ahead.

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## 1 Introduction

The Riksbank and other central banks that conduct inflation targeting strive to stabilise inflation at a certain level and to stabilise resource utilisation so that it develops in a balanced manner. To do this, central banks use a number of monetary policy tools such as the policy rate or purchases of financial assets that influence the economy via what is usually called the monetary policy transmission mechanism. In practice, this mechanism has many different parts or 'channels' that affect, in different ways, which decisions economic agents take. Changes of central banks' policy rates and purchases of financial assets work their way through the economy via these different channels and ultimately influence macroeconomic quantities such as inflation and output. In this way, monetary policy can stabilise fluctuations in the economy so that recessions do not have as great negative effects and booms do not end in price and wage spirals. One way to describe this is that the state of the economy varies with the economic cycle and that monetary policy helps stabilise this development around a 'normal' or long-term trend (the target level for inflation).

But not all changes are cyclical. Over time, fundamental changes can take place that affect how the economy functions on a structural level. This can be illustrated with an example. Assume it becomes easier for labour to move from country to country. This could mean that inflation does not rise as much in economic upswings as in earlier periods, as labour shortages in individual countries become less common. It also reduces the probability of rapid wage and price increases. Similarly, it could mean that inflation does not fall as much in recessions as in earlier periods. If more workers choose to move abroad when economic activity slows down, unemployment will not rise as much in an individual country, which will reduce downward pressure on wage and price increases. In other words, a structural change – greater international mobility – has taken place and this has affected the functioning of the economy with consequences for prices, wages, output and other factors.

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This article was written before the outbreak of the coronavirus pandemic. The potential effects of the pandemic on long-term economic development have therefore not been considered. Several of the changes discussed in the article do, however, affect the prevailing conditions for conducting effective economic policy and will probably continue to be important going forward. These conditions include the global trend towards lower real interest rates and the fact that public indebtedness has increased in many countries over recent decades.

Monetary policy neither can nor should hinder such long-term structural changes. However, monetary policy needs to consider these changes, as they may affect prices and output. In other words, the structural changes affect the conditions for monetary policy, which is to say the environment in which monetary policy acts.

The aim of this article is to describe a number of structural changes that have characterised the macroeconomic environment over the last ten years and which are also highly likely to be important for monetary policy and other economic policy areas in the future, even if the top priority for economic policy in the immediate future will naturally be trying to mitigate the economic effects of the spread of the coronavirus. The structural changes we are focusing on are the weak productivity growth, a lower long-term real interest rate, growing debts among households and states and the flattening of the Phillips curve.

**Productivity** growth has been weak both internationally and in Sweden over the last decade, without clear tendencies towards improvement. Various explanations have been suggested for this, with some analysts focusing on structural changes, such as less efficient allocation of resources, reduced transfers of technology and poorer dynamics in industries, and others seeing links to the tighter credit conditions during the financial crisis and the low demand connected to the economic downturn.

The **long-term real interest rate** has fallen around the world over the last 30 years, often by several percentage points. The real interest rate on savings has fallen correspondingly. Several structural changes have contributed to this global trend, including demographic changes and a high level of saving in China and other emerging economies in Asia.

We have seen growing indebtedness among households and states. Several studies show that households' mortgage loans, and variables linked to these loans, are important for the strength of the monetary policy transmission mechanism. It is not apparent that **higher indebtedness in the household sector** automatically results in a stronger effect on household consumption from changes in the interest rate. However, several studies show that highly indebted households with limited access to credit are those who change their consumption most when the interest rate changes.

Fiscal policy has also gained an increasingly important role in stabilising the economy in several countries due to the relatively low interest rates following the financial crisis and the fact that monetary policy tools are limited in a number of countries. For fiscal policy to be effective, it is important that households and companies have high confidence in it. One important factor in this connection is the **sovereign debt**. In conjunction with the global financial crisis, sovereign debt in the euro area, United States, Japan and United Kingdom increased to relatively high levels, where it has remained since. Sweden has coped better: sovereign debt did not rise significantly during the financial crisis and, compared with many other countries, it is relatively low at present. However, Sweden has high private indebtedness among households.

The **Phillips curve**, i.e. the relationship between prices and resource utilisation, weakened in many countries following the financial crisis. Before the financial crisis, the correlation between nominal wage growth and unemployment was negative in most cases. Since the crisis, it has become weaker and even slightly positive in Sweden. For central banks, it is important to understand what this is due to, as it could affect how well monetary policy works. There are various hypotheses concerning what may have caused the weaker relationship but no consensus.

In the rest of this article, we provide a more detailed description of these structural changes in order and conclude by drawing some conclusions over what the changes may mean for monetary policy going forward.

## 2 Weak productivity growth

Both in Sweden and internationally, productivity growth has been slow over the last decade, with no clear tendencies towards improvement. Before we describe this development and conceivable reasons for it, we present a brief explanation of the term productivity, as it can be measured in several different ways.

A common measure of productivity is **labour productivity**, which, put simply, specifies how much output an amount of labour produces. This output is then most often measured as value-added in fixed prices, while the amount of labour is usually measured per hour worked or per employed person.<sup>1</sup> This means that, if labour productivity increases, more is produced with the same amount of labour. This can be achieved in several ways. One is that the quality of the actual labour input is improved. Another is that the labour performed is the same but that the input from machinery and other equipment increases, i.e. the contribution made by capital per hour worked becomes greater. Finally, technological progress, improvements in how operations are led and the like can make production more efficient. This latter is its own measure of productivity, known as **total factor productivity** (TFP).<sup>2</sup>

TFP is important because it is not affected by the *size* of the contributions made by labour, capital and other output factors, but only reflects how productive these contributions are when combined. As TFP is not directly observable, it is usually calculated as a residual item, which is to say the output increase that cannot be explained by contributions from labour, capital or any other factors. In practice, TFP therefore risks reflecting other factors, apart from technological progress and similar improvements. One example is capacity utilisation. Apart from adjusting the *amount* of labour and capital in production, companies can vary the degree to which labour and capital are *used*. Measures of both TFP and labour productivity will also reflect such variations, unless an active effort is made to consider them in the calculation of productivity.

### 2.1 Productivity growth up until 2005

To gain a perspective on developments over the last decade, we start by examining the historical background. Experiences naturally vary between individual economies, but it is possible to discern common trends that have characterised the general development of productivity.<sup>3</sup> To start with, productivity shifted downwards in the mid-1970s in conjunction with the first oil crisis and subsequent economic downturn. This slowdown meant the end of the golden age of strong productivity growth and high economic growth that started in the 1950s.<sup>4</sup> This is illustrated for a selection of OECD countries in the left-hand graph in Figure 1. On average, labour productivity increased significantly faster in 1955–1974 (the red marks) than in 1975–1994 (the blue bars). For many of the countries, the slowdown was significant and, in addition, the trend was negative – dividing the period 1975–1994 up further shows that productivity was weaker during the second half.

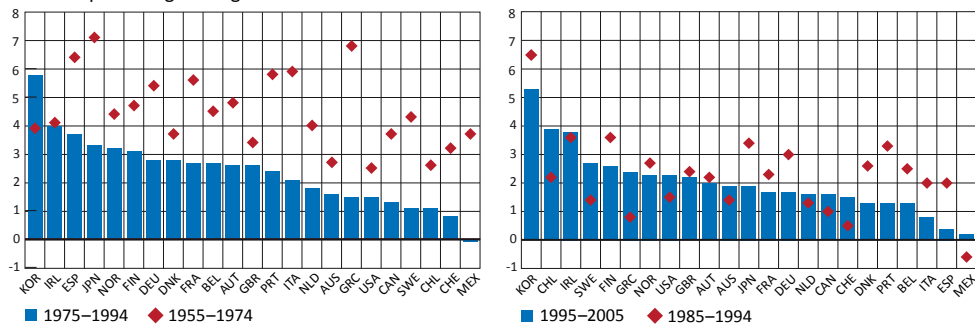
1 Value-added is the value of production with deductions for input goods and input services.

2 Sometimes also called multi-factor productivity (MFP). The concepts are used synonymously.

3 This description applies, above all, to OECD countries. Productivity growth in other parts of the world is not necessarily characterised by the same trends.

4 Crafts and Hjordshøj O'Rourke (2014).

**Figure 1. Labour productivity (GDP per hour worked)**  
Annual percentage change



Note. The mean value of the annual percentage change in GDP per hour worked during each period. GDP is measured in fixed prices, converted to US dollars to facilitate comparisons between countries.  
Source: Conference Board, Total Economy Database, April 2019

However, the following ten-year period, 1995–2005, differed from the previous decades. The right-hand graph in Figure 1 compares average productivity growth in 1985–1994 (red marks) with the average for 1995–2005 (blue bars) for the same OECD countries. The negative trend of falling productivity growth certainly continued in many countries, including several in southern Europe, and in other countries, the increase in productivity was approximately as large as previously. But in the United States and a couple of other countries, including Sweden, productivity growth shifted upwards, starting in the mid-1990s. This was remarkable, partly because it shifted up strikingly in the United States from the modest level seen over two decades, and partly because no equivalent upturn in productivity was seen in Europe, except for in isolated countries. Until then, the level of productivity in European countries had come closer and closer to the level of the United States, which is often assumed to reflect the technological frontier and the level towards which the productivity of other countries converges. It also meant that productivity in other countries had increased more rapidly than in the United States over a longer period. This changed in the 1990s.

The rapid improvement in labour productivity in the United States from the mid-1990s was largely linked to the arrival and diffusion of information and communication technology (ICT). Such technology had certainly started to spread significantly earlier – for example, computerisation had been in progress for a number of decades. But it was not until the mid-1990s that it seemed to affect productivity to any greater extent. Productivity in the United States then increased rapidly, partly as a result of technological progress in the production of ICT that led to a rapid upwards shift of TFP in the ICT manufacturing sector. This raised overall productivity growth in the entire economy. At the same time, prices for ICT products fell rapidly, which created an incentive for investment in the new technology. Companies in other sectors of the economy therefore invested in ICT on a broad front. This also contributed to labour productivity increasing more from the mid-1990s than in the decades before.<sup>5</sup> These two factors were some of the main explanations for the upward shift in productivity until 2000 when the so-called dot-com bubble burst.<sup>6</sup>

However, productivity also continued to increase rapidly in the United States after the start of the new millennium. Production of and investment in ICT contributed partly to this, but, above all, TFP increased rapidly in other sectors. One conceivable explanation for this is that the major investments in physical information and communication technology at the end of the 1990s required complementary investments in so-called intangible capital. For example, it became necessary to develop software, train staff and change organisational structures to take advantage of the new technology. For technology with broad areas of

<sup>5</sup> See, for example, Timmer and van Ark (2005), Oliner et al. (2007) and Jorgenson et al. (2008).

<sup>6</sup> Bosworth and Triplett (2007) point out that TFP growth also shifted upwards in several of the service sectors and that this was therefore a further important factor behind the rise in productivity in the United States in the second half of the 1990s – see below.

use, such as ICT, such investments can be particularly important.<sup>7</sup> The continued strong TFP growth after the start of the millennium could therefore be explained by delayed effects of the ICT investments in the 1990s. However, the results of studies investigating this are not unambiguous.<sup>8</sup> Other conceivable explanations for productivity growth holding up in the United States after the start of the millennium are that the competitive pressure for change was strong in individual industries and that there was a general shift of resources from low to highly productive industries.<sup>9</sup>

Productivity advances in Europe in 1995–2005 differed relatively substantially from country to country. In Sweden and Finland, labour productivity increased rapidly, and ICT production and ICT investments also developed in a similar manner to the United States. But many other countries had significantly weaker productivity gains. Comparisons show that ICT explained part of the differences, including lower ICT investments in some countries. But the greatest differences – both between individual EU countries and between the United States and the EU countries – were linked to TFP growth in other parts of industry, above all within private service sectors such as trade and transport and financial and businesses services.<sup>10</sup>

## 2.2 Weak productivity growth from the mid-2000s

Over the last decade, productivity gains in OECD countries have been weak in general. In the United States, where productivity increased rapidly in the years before and after the start of the millennium, growth has been significantly weaker since 2005. This also applies to other countries with a period of rapidly-increasing productivity, including Sweden. In economies where the rate of increase was previously more modest, productivity has continued to develop weakly over the last decade or has even shifted down further. Figure 2 illustrates how labour productivity and TFP have grown since 1995 in the United States, Sweden and the euro area and for the OECD as a whole. As the figure shows, the shift to lower average productivity growth largely coincided with the financial crisis of 2007–2009. The discussion of why productivity growth shifted down has partly focused on this connection. However, there are indications that productivity growth had already started to weaken in the years before the crisis, which suggests that the reasons may not necessarily be connected with the financial crisis.

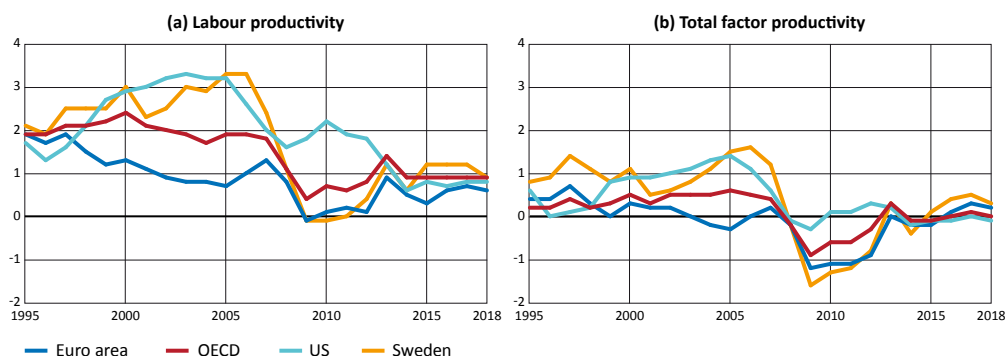
7 See, for example, Brynjolfsson et al. (2018). One frequently used expression for such technology is general purpose technology. In the national accounts, investments in intangible capital generally consist of expenditure for software and for research and development. However, other expenditure could also be considered as similar investments; see Corrado et al. (2005). Estimates indicate that investments in more broadly defined intangible capital may be significant; see, for example, Corrado et al. (2016).

8 Compare Basu and Fernald (2007) and Fernald (2015) with Bosworth and Triplett (2007) and Oliner et al. (2007).

9 Oliner et al. (2007)

10 van Ark et al. (2008). According to Inklaar et al. (2006), productivity growth in the service sector was generally stronger in Anglo-Saxon countries than in continental European countries.

**Figure 2. Labour productivity and total factor productivity 1995–2018**  
Annual percentage change



Note. Moving average of the annual percentage change of labour productivity and TFP, respectively, over the last four years. GDP is measured in fixed prices, converted to US dollars to facilitate comparisons between countries. For the euro area and OECD, the calculations are based on GDP per employee and, for the United States and Sweden, on GDP per hour worked. Source: Conference Board, Total Economy Database, April 2019

The problem of long-term weak productivity growth has received considerable attention in both international organisations and individual countries. Proposed measures to reverse the trend have also been put forward.<sup>11</sup> The reason for this concern is that productivity is one of the most important factors for the economy in the long term as it reflects how efficiently production is converting inputs to goods and services or, put differently, how many goods and services can be produced with the same amount of inputs. Seen over longer periods, the increase of GDP per capita can largely be determined by how much productivity has increased. How rapidly or slowly productivity increases thus determines how material prosperity in general changes. In addition, productivity affects how prosperity is distributed, as there is also a link between wage development and productivity growth on the company level.

For monetary policy, it is important how productivity develops, among other things as it determines how rapidly the economy grows in the longer term. This so-called potential growth rate may, in turn, affect the level of the real interest rate in the economy; see also section 3.2.1. There is also a link between productivity and companies' costs that could influence monetary policy in the shorter perspective. The stronger productivity grows, the faster output can increase without wage increases and inflation picking up.

## 2.3 Possible explanations for the weak development

Several possible explanations have been proposed for why productivity growth has been so weak over the last fifteen years.

### 2.3.1 Measurement problems

There are a number of measurement problems associated with productivity statistics. Measuring how real output, and thereby productivity, has changed requires price developments to be taken into account. One difficulty with this involves measuring how much of the price movements are due to improvements in the quality of various products. Another measurement problem is rooted in certain products having moved from costing money to basically being provided free of charge, which means that they no longer give rise to any transactions that can be measured and included in the statistics.

<sup>11</sup> See OECD (2015) among others. The EU has recommended all countries in the euro area to create national productivity boards to analyse productivity nationally and has urged other EU countries to do the same; see European Council (2016). Reports from such boards have also been published in many countries; see, for example, Conseil National de Productivité (2019) for France and De Økonomiske Råd (2019) for Denmark. In the United Kingdom, the focus has long been on the 'mystery' of the area's long-term weak productivity; see, among others, HM Treasury (2015), McKinsey Global Institute (2018) and Haldane (2018).

A further measurement problem is linked to the transactions in the different operations of multinational companies, and how, and in which countries, they report revenues and assets.

One conceivable reason why the measured productivity growth has been weaker over the last decade could be that measurement problems have been exacerbated. This would mean, therefore, that the downturn is largely illusory. Research has shown that the problems in measuring productivity are relatively substantial. For example, estimates of quality improvements are definitely a concern when calculating the production of ICT goods and services and investments in ICT. At the same time, however, analyses of US data indicate that this problem may have been greater before 2005 than afterwards. Similarly, analysis indicates that the value of products ‘absent’ from output statistics is not sufficiently large to explain the difference between the output that is measured and the output that would have been recorded if TFP growth in the United States had not shifted down in the mid-2000s. The conclusions of the research are therefore that productivity statistics are undeniably linked with relatively large measurement problems but that it is not obvious that these problems have worsened recently.<sup>12</sup>

### 2.3.2 Effects of low demand during the deep recession

Financial crises often have major negative consequences, as the deep recessions that usually follow in their wake substantially reduce activity in the economy and often for a longer period than ‘normal’ economic slowdowns. It is also possible that crises can have permanent effects on labour productivity, as they can cause major interruptions in investment, less activity conducive to innovation and long-term unemployment that damages the skills and know-how of the labour force, to give a few examples.<sup>13</sup> However, such factors should affect the long-term *level* of productivity, rather than the long-term *growth rate* of productivity. This does not mean that the rate of increase is entirely unaffected. During a transitional period, it will be lower than normal, as the economy is adjusting from a higher level of productivity to a lower one. This period of adjustment may, however, be prolonged. It is possible that the weak productivity growth after the financial crisis partly reflected such an adjustment.<sup>14</sup>

### 2.3.3 Tighter credit conditions and impaired allocation of capital

There may also be other links between the financial crisis and the weak productivity growth. Credit conditions were tightened in conjunction with the crisis. Even if central banks around the world acted to reduce the problem, many smaller and medium-sized companies found it difficult to gain access to credit, particularly in the euro area countries impacted most heavily by the crisis. There seems to be an empirical relationship in which companies with higher indebtedness and more short-term funding also had weaker TFP growth after the crisis. This could be an effect of them cutting back on investments in intangible capital and research and development to a greater extent.<sup>15</sup>

Not just capital formation in companies, but also the allocation of capital between companies may have been a factor behind the weak productivity growth. If capital cannot be moved from low-productivity to high-productivity companies in a sector, the resources as a

12 See, for example, Byrne et al. (2016), Syverson (2017) and Guvenen et al. (2017).

13 Using data for about 60 countries, Oulton and Sebastia-Barriel (2017) estimate that, historically, banking crises have cut the level of labour productivity, measured as GDP per employee, permanently by about 1 per cent per crisis year.

14 Reifschneider et al. (2015) argue that the effects of the crisis on long-term unemployment, the number and activity of newly started companies and investment in general have probably contributed to the weak productivity. Fernald et al. (2017), on the other hand, are more critical of the hypothesis that the fall in demand can explain the development of productivity in the United States and instead show that this is an effect of a shifting trend that began before rather than in conjunction with the crisis. Anzoategui et al. (2017) also find that the trend started to shift before the crisis, but that the development was exacerbated further after the crisis via mechanisms linked to the fall in demand. Referring to IMF studies, Obstfeld and Duval (2018) argue that the crisis had a long-term dampening effect on productivity, mainly in Europe, and discuss what role the expansionary monetary policy may have played. See also Jordà et al. (2020).

15 See Adler et al. (2017) and Duval et al. (2020).



whole will be used less efficiently in the sector, which affects productivity in total. Studies of companies and industries have shown that there is a relationship between such an increasing misallocation or low reallocation of capital and the weak development of TFP in certain countries, including in southern Europe. Different studies emphasise different conceivable mechanisms behind this relationship. Regulation on the product and labour markets is often pointed out as the reason for capital being reallocated more slowly in many European countries than in the United States. It may be one reason for why productivity was not lifted by ICT the same way in Europe as it was in the United States in the ten-year period around the start of the millennium. There also seem to be links between impaired reallocation and the strong credit growth ahead of the financial crisis, as well as the deep recession.<sup>16</sup>

#### **2.3.4 Reduced technology diffusion between companies and less business dynamism**

Studies of data on the company level have also noted other aspects of the allocation of resources between companies within sectors that may be significant for productivity growth on the aggregated level. The reallocation between companies and the sectoral productivity depend on the dynamism of the sector – whether new companies are established and what structure they have, which companies in the sector are expanding, which are shrinking and which are dropping out. Studies have shown that the differences in productivity between companies in a sector have become greater, and there are results that indicate that this mainly depends on widening differences between companies at the technological frontier, which is to say the companies with the highest productivity within each sector, and the other companies.<sup>17</sup> In the frontier companies, productivity does not seem to have shifted down, but increased at a healthy rate. In contrast, other companies have slipped further behind, which has increased the differences between companies within the sectors.

Several reasons for this development, which has been in progress for some time, have been proposed. It could partly be an effect of it having become increasingly difficult for companies with lower productivity to incorporate the technology available to highly productive companies, which is to say that the diffusion of new technology between companies has decreased.<sup>18</sup> It could also partly be explained by decreased dynamism in the business sector, where weaker companies with lower productivity are finding it easier to survive and fewer new companies are being established. This could indirectly be reducing the pressure on existing companies to improve their productivity and profitability.<sup>19</sup>

#### **2.3.5 Unfavourable demographic development and increased production of services**

Another structural change that has been mentioned as an explanation for the restrained productivity growth concerns changes in the age composition of the population – something that is also mentioned as an explanation for the low real interest rate (see section 3.2). The knowledge and skills of the workforce – its human capital – naturally affect productivity and there is reason to believe that there is also a link to the age composition of the workforce, even if the form of this link is not obvious. As work experience grows with age, productivity can increase as the average age of the workforce increases. On the other hand, younger individuals will more recently have completed education and training that better reflects

16 According to Cetto et al. (2016) and Gopinath et al. (2017), the comparatively large capital inflows and falls in interest rate levels that followed the introduction of the euro in Italy and Spain amplified the problem with misallocations there, which impeded the countries' TFP growth. Gamberoni et al. (2016) show that the allocation of capital deteriorated in several large European countries before the financial crisis, above all in service sectors. They also find that the great uncertainty over the economic outlook during the deep recession impaired allocation. Corrado et al. (2019) also find that increased uncertainty has impeded the allocation of capital within and between sectors. However, in contrast to other studies, they find that low real interest rates can be linked with better allocation, rather than worse.

17 See Andrews et al. (2016) who study companies in about twenty countries between 2001 and 2013.

18 See, for example, Liu et al. (2019) who show that increasing differences between companies at the technological frontier and other companies may be due to the way an environment with low interest rates boosts incentives for leaders in a sector to increase their strategic advantage.

19 See, for example, Decker et al. (2014).

new knowledge and technology. Empirically, the results are mixed, but there are studies that indicate that an ageing population may have contributed to weaker productivity growth.<sup>20</sup>

Another structural change that may have contributed to holding back productivity over a longer period concerns the way in which the business sector has shifted its focus from the manufacturing industry to an increased focus on the production of services. This could mean that productivity in total has shifted downwards, as the manufacturing industry has historically had stronger productivity growth. However, the picture needs to be adjusted a little, for example as parts of the services industry had strong productivity growth in the United States and elsewhere at the start of the 2000s.<sup>21</sup> However, even if the changing composition of sectors may have affected productivity over a longer period, it is less probable that this has been the main explanation for the downward shift in productivity over the last decade.

### 2.3.6 Delayed or reduced effects on productivity of new technology

One conceivable reason for productivity not appearing to have been affected particularly much by ICT, except for during a limited period in some countries, and not by the ongoing technological advances, is that the substantial productivity gains of these innovations have not arrived yet. As we mentioned earlier, there are arguments indicating that it takes time for breakthrough technologies to make their mark on productivity – the technology improves later on and usage increases as prices fall, new areas of use are identified, complementary investments need to be carried out, organisational structures need to be changed and so on. There is support for this theory in studies that have investigated how productivity changed during previous technological advances, such as when steam engines and electrical technology were introduced.<sup>22</sup> According to this perspective, we should not expect periods of rapid technological development to be directly translated into periods of rapid productivity improvement and there is a lot to suggest that improvements will arrive as we go forward.<sup>23</sup>

In opposition to this optimistic picture, it has been argued that we should not expect any delayed effects on productivity growth from ICT and the innovations now being made, as the effects of this technological progress are quite simply not as great as the effects of electrification, the internal combustion engine, antibiotics or water and sewage treatment, for example, which fundamentally changed the conditions for companies and consumers in the first half of the 1900s. Computerisation and information and communication technologies have certainly also entailed major changes for parts of the business sector, but they have not been as revolutionary.<sup>24</sup> According to this more pessimistic view, the strong productivity growth around the turn of the millennium in the United States and other countries was the total effect of ICT – it was not just a period in which the very lowest-hanging fruits of the new technology were plucked. The subsequent downward shift of productivity reflects how the effects of the new innovations are now wearing off.

One link to the more pessimistic view of the possibilities for productivity to shift upwards noticeably going forward can be found in the observation that TFP growth was certainly strengthened temporarily around the turn of the millennium but that, seen over a longer period, it has been modest despite the simultaneous constantly increasing intensity of research and innovation efforts. One implication of this could be that the productivity of the

20 See Adler et al. (2017) and the studies to which they refer. However, the link between an ageing population and economic growth, via productivity effects, is questioned in a study by Acemoglu and Restrepo (2017).

21 See, for example, Duernecker et al. (2017).

22 See, for example, David (1990) and Crafts (2004). Brynjolfsson and Hitt (2003) investigate the computerisation of US companies in the late 1980s and early 1990s and find that the effects on TFP of investments in computers increased over time.

23 Brynjolfsson et al. (2018) show, in a model, how breakthrough technologies can involve measured productivity following a J-shaped curve over time. When the new technology is introduced, large follow-up investments are made in intangible capital, which is not measured properly in the official statistics, meaning that productivity is underestimated and seems to be falling. When the effects of the intangible investments later become visible, productivity rises and, in contrast, is overestimated in the statistics.

24 See Gordon (2015, 2018).

actual research is declining so that more and more innovation effort is needed to maintain a certain level of productivity growth.<sup>25</sup> However, this applies for a longer period and cannot be linked directly to the downward shift in productivity over the last decade.

### 3 Lower long-term real interest rate<sup>26</sup>

In most advanced economies, yields on treasury bills and government bond yields are currently considerably lower than they were at the start of the 1990s. In many countries, this means declines of 10–15 percentage points. A large part of this downturn in nominal interest rates can be explained by the transition from high to low-inflation regimes that took place in the 1980s and 1990s. But the interest rate has fallen, even after adjustment for expected or actual inflation. Real interest rates are currently lower than they were 30 years ago in almost all advanced economies and in many emerging market economies. However, the average, GDP-weighted decrease is smaller in the group of emerging market economies. The dispersion in returns among different countries is also greater in this group than it is in the group of advanced economies. Households and companies are also facing significantly lower real interest rates on loans and savings than they did 30 years ago.<sup>27</sup>

#### 3.1 Data and estimated trends

Figure 3 shows three measures of real interest rates for government borrowing with long maturities, based on two overlapping groups of advanced economies. The first measure (the blue line) shows the median of the real return on government bonds with long maturities in a group of 16 countries, including Sweden. The real return is calculated as the difference between the nominal return on each debt instrument minus the expected inflation measured using the GDP deflator.<sup>28</sup> The second measure (the turquoise line) was created by King and Low (2014). This uses the return on what are known as real government bonds from six major industrialised nations. According to both of these measures, the global real interest rate on government borrowing has fallen, by 6 and 4 percentage points respectively since 1990.<sup>29</sup>

Figure 3 also shows the expected real return on Swedish government bonds (red line). According to this measure, the real yield on Swedish government bonds reached its highest level in the early 1990s in conjunction with the defence of the fixed exchange rate. Following this, the real interest rate on the government's borrowing fell quite substantially in conjunction with the transition to a new monetary policy regime with inflation targeting and a variable exchange rate. If the return is compared, it can be noted that the real yield on Swedish government bonds in the 1980s and early 1990s was occasionally slightly higher,

25 Bloom et al. (2017) claim that it seems to be becoming increasingly difficult to come up with ideas in the sense that research productivity seems to have fallen broadly, seen over a longer period. Through case studies of different products and using data for companies and sectors, they find that increasingly large efforts seem to be needed in research to maintain a certain level of productivity growth.

26 This section forms a summary of the article 'What is driving the global trend towards lower real interest rates?', also published in this issue of Sveriges Riksbank Economic Review.

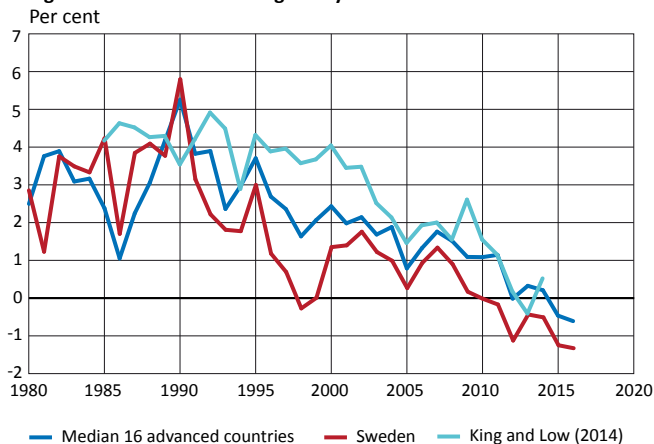
27 See Rachel and Smith (2015), sections A and D6.

28 Figure 3 shows three measures of real interest rates, two of which have been calculated by the authors using data for nominal return and inflation in various countries. The data has been taken from Jordà et al. (2019). The scientific literature often uses forecasts from simple autoregressive models as measures of expected inflation, and a variation of this approach has also been used here. For every year and country in the sample, an autoregressive model, AR(1), is estimated and forecasts from this model are then used to calculate the average expected inflation over the ten subsequent years. This forward-looking measure of expected inflation is combined here with a backward-looking measure (actual inflation during the 5 previous years) to calculate the expected real return on nominal government bonds. The two measures are given equal weight in the calculation. The 15 countries included in the calculation alongside Sweden are: Australia, Belgium, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Switzerland, the United Kingdom and the United States. The third measure shown in the figure has been calculated by King and Low (2014) and is based on the return on inflation-indexed (real) government bonds issued by Canada, France, Germany, Japan, the United Kingdom and the United States.

29 The median of the real return on government bonds in the group of 16 countries fell by about 6 percentage points between 1990 and 2015. According to the measure calculated by King and Low (2014), the real return fell by about 4 percentage points between 1990 and 2013.

occasionally slightly lower than it was abroad. Since 1992, the real interest rate in Sweden has constantly been lower than it has been abroad, according to these measures. Overall, however, a clear co-movement can be seen between the real rate of return that applies internationally and the one that applies in Sweden.

**Figure 3. Real interest rates globally and in Sweden**



Note. For an explanation of the different measures of real interest rates that are shown in the figure, see footnote 28.

Sources: Jordà et al. (2019), King and Low (2014) and the authors' own calculations

How much of the total downturn in the global real interest rate since the 1990s is due to structural reasons and how much has cyclical causes? This question is difficult to answer, among other reasons because of the two powerful shocks that have affected the global economy since the mid-2000s: the global financial crisis, with subsequent deep recession, and the European sovereign debt crisis. When a large number of countries are affected by such powerful shocks, whose effects have also worn off slowly, it becomes more difficult to distinguish precisely between trends, driven by structural changes, and cyclical developments. In addition, most studies estimating trends in real interest rates have focused on development in individual countries, without explicitly considering that the downturn had a significant global component. However, with today's internationally integrated capital markets, where assets can be moved between different countries and currency areas rapidly and at a low cost, there are strong tendencies for real interest rates in different countries to converge. The results of a smaller number of studies estimating global trends in real interest rates show a decline in recent decades of between 2 and 3 percentage points. According to these studies, the level of the global trend was close to zero in the middle or in the second half of the 2010s.<sup>30</sup>

### 3.2 Explanations for the downturn in real interest rates

Most studies attempting to explain the negative trend in real interest rates focus on structural changes that have affected the supply of or demand for savings. As regards supply, the focus has often been on household saving, but government saving has also been discussed and, in practice, the rate of saving in the corporate sector is also important. Demand refers to total demand for investment. The idea is that the supply of saving and demand for investment must be balanced at the prevailing real interest rate and that there is a long-term equilibrium level at which the economy is in a cyclical balance. This long-term equilibrium level defines a long-term equilibrium real interest rate.

<sup>30</sup> See Del Negro et al. (2019), Hamilton et al. (2016) and Kiley (2019).

The literature discusses about ten different structural changes that are conceivable driving forces behind the trend in real interest rates. Important examples are a presumed decline in potential growth, changes in the age composition and life expectancy of the population and a lasting increase in the premiums that investors are prepared to pay for safe assets. In addition, China and several other emerging market economies have increasingly been integrated into the global economy and have long had remarkably high levels of saving.<sup>31</sup>

### 3.2.1 Lower potential growth

Gordon (2015) is one example among several studies that argue that growth in the United States over the coming decades will probably be lower than the average growth rates experienced in the 1900s. According to macroeconomic theory, there is a close relationship between the level of expected growth and the level of the real interest rate. This is because lower expected growth dampens companies' willingness to invest, as future demand is expected to be lower. Demand for saved funds therefore becomes lower. However, worsened long-term growth prospects also make households more inclined to save. The supply of savings is therefore also affected.

The theoretical support for a link between the real interest rate and growth is very strong; it concerns a result that is key to pretty much all models with forward-looking households who take considered decisions on how much of their incomes to save. In recent years, a number of studies have been published that analyse the relationship in the data between trend or average growth and trends in the real interest rate. These studies generally indicate that the relationship is weak. Furthermore, the measured strength of the relationship can vary considerably, depending on which countries and periods are included in the data material.<sup>32</sup>

### 3.2.2 Demographics and high levels of saving in Asia

If the empirical support is weak concerning the relationship between trends in the real interest rate and potential growth, there is stronger support for such a relationship between the real interest rate and various demographic factors.<sup>33</sup> Changes in the age composition of the population are significant for a large number of macroeconomic variables, such as the labour supply and potential growth, companies' willingness to invest and households' average savings ratio, for example. Accordingly, there are several different channels through which demographic changes might affect the real equilibrium rate.

In US data, there is a fairly clear relationship between trends in the real interest rate and trend changes in the supply of labour. The real interest rate has often been comparatively high in periods when the trend increase in the number of hours worked has been high, and, conversely, low when the increase has been low. Something that has probably contributed to the real interest rate having fallen over recent decades is thus that the labour supply has grown comparatively slowly.

Another circumstance, often mentioned as a possible reason for low interest rates, is that an unusually large proportion of the population in recent decades has been in the age group 40 to 65, when saving tends to be high. According to one hypothesis, this should have led to an unusually high saving ratio, resulting in a greater supply of savings, with falling interest

31 Examples of other factors mentioned in the literature but not addressed here include falling relative prices for investment goods, a more uneven distribution of income among households and lower public investments. Rachel and Smith (2015) and Bean et al. (2015) provide non-technical overviews of the literature. Rachel and Smith's original study was published as a working paper by the Bank of England in 2015. A shorter version was published two years later in the *International Journal of Central Banking* (Rachel and Smith, 2017).

32 See Bosworth (2014), Goldman Sachs (2014), Hamilton et al. (2016) and Lunsford and West (2019).

33 Favero et al. (2016), Fiorentini (2018), Lunsford and West (2019), Poterba (2001) and Rachel and Smith (2015) are examples of studies that investigate the relationship in data between trends in real interest rates and various variables linked to the age composition of the population.

rates as a consequence. However, saving among G7 countries has shown a weak downward trend over the period in which real interest rates have had a falling trend. At the same time, these countries have reported significant deficits in the current account. A current account deficit means that total domestic saving is lower than total domestic investment and that saving in relation to the rest of the world is negative. The downward trend in saving and the current account deficit in G7 countries contradict the hypothesis that high levels of saving in these countries are an important force behind the global trend towards lower real rates.

However, over the same period, saving ratios have been remarkably high in China and several Asian emerging market economies, at the same time as they have reported large surpluses in international payments. A high level of saving in these countries, and in several petroleum-producing countries, has probably also helped push down the real required rates of return in the western world. Demographic changes are probably one of several factors that have contributed to the high level of saving in Asia. Other factors that have probably also contributed include the ambition among Asian public authorities to build up significant foreign exchange reserves, and the combination of high growth rates and relatively poorly-developed financial markets and collective insurance systems in Asia.<sup>34</sup>

### 3.2.3 Higher premiums on safe assets

So far, we have focused on trends in real government borrowing rates in advanced countries. This is a matter of interest rates on loans that are generally considered to be associated with low risk. Most investors consider bills and bonds issued by the governments of the United States and Germany, for example, to be safe assets, where the risk of payment suspensions is low. In recent years, increasing numbers of studies have analysed the difference between yields on such safe assets and the real return on higher-risk investments. Rachel and Smith (2015) analyse a large number of assets in several different countries and conclude that the average compensation for risk may have risen by as much as 1 percentage point since the 1980s. How then is the real interest rate for safe assets affected if the average compensation for risk rises?

Let us start with a simple example, where the difference in interest for two different loans depends on the probability of payment suspensions being greater for one of the loans. For example, this could be due to one borrower being a company with uncertain future prospects, and the other a state with well-functioning institutions. Assume now that a change takes place over time meaning that lenders, for some reason, become less willing to grant high-risk loans at each given interest rate level. Assume too that both the overall supply of savings and the overall demand for loans otherwise remain unchanged. At a given interest rate, both the state and the company wish to borrow as much as they did before the lenders changed their willingness to take on risk. Correspondingly, the lenders wish to lend as much money as before, even if they are now less willing to lend money to the company.

One reasonable consequence of such a change is that the interest rate for the state loan falls slightly and the interest rate for the corporate loan rises slightly. The reason is that the company must offer the lenders slightly greater compensation for the risk they run in providing the corporate loan. At the same time, the state, for its part, can borrow at a slightly lower interest rate than previously, as households value the security in the state loan more. In equilibrium, the interest rate on safe loans has thus fallen, at the same time as the return on high-risk assets has risen.

In the example, we assumed that the lenders had become less willing to bear risk, without specifying why. There are different hypotheses for the reasons that the compensation for risk has risen. One hypothesis concerns the chronic shortage of safe assets on the world's capital markets. The yield on a bond is partly determined by its price and becomes lower the higher the price is. According to the hypothesis, this chronic shortage

<sup>34</sup> Bean et al. (2015), Bernanke (2005) and Coeurdacier et al. (2015).

of safe assets is leading to a trend of rising prices for safe bonds, entailing a trend towards increasingly low interest rates. Another hypothesis concerns increased uncertainty over future economic development.<sup>35</sup>

## 4 Growing debts among households and states

In recent decades, there has been a rising trend in indebtedness, among both households and states, in many countries. In this section, we show how indebtedness has increased and what consequences this may have for monetary policy.

### 4.1 Household debts and consumption's interest-rate sensitivity

Over the last 40 years, indebtedness among households has increased substantially in most advanced economies. Figure 4 shows households' total debt as a proportion of GDP in a group of about twenty advanced economies. The median debt ratio among these countries, shown by the black line, more than doubled between the years 1980 and 2010. It increased from a level of just over 30 per cent in 1980 to 77 per cent in 2010. The debt ratio certainly decreased in the United States in conjunction with and following the global financial crisis, and, in Europe, it decreased in a number of countries in conjunction with the so-called European sovereign debt crisis.<sup>36</sup> But, despite indebtedness having thus decreased in many places since 2008, the ratios remain high in comparison with the levels from 1980.

There are probably several different reasons behind many households today taking on more debt than households did 30 to 40 years ago.<sup>37</sup> One important reason is probably the trend decrease of real interest rates that we discussed in section 3. Lower interest rates, of course, mean lower borrowing costs. It therefore becomes possible for a household to borrow a larger amount, for example when purchasing a house or flat, without needing to cut back on other expenditure. It is also therefore natural for prices for properties and other assets to rise when interest rates are comparatively low, at the same time as the average debt-to-income ratio among households is rising. Another reason that may have contributed to the higher indebtedness is that the banks, at least in some countries, were less restrictive in their credit assessments in the years before the outbreak of the financial crisis in 2007, compared with previously.<sup>38</sup>

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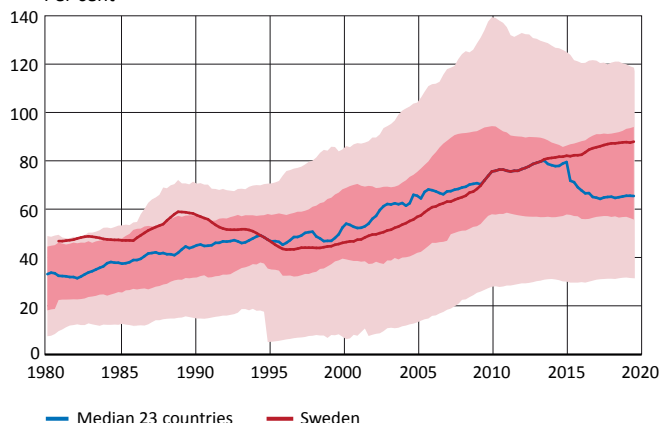
<sup>35</sup> Caballero et al. (2017) and Marx et al. (2018).

<sup>36</sup> In Greece, Portugal and Spain, the debt ratio decreased considerably in the years after the debt crisis broke out in 2010 and downturns also took place in some other European countries, for example the Netherlands and United Kingdom. Finland, Canada and Sweden are examples of countries where households' average debt ratio continued to increase, both during the financial crisis and in conjunction with the European sovereign debt crisis.

<sup>37</sup> Figure 4 compares households' total debt with GDP in each country. Seen over longer periods, households' average incomes tend to grow at the same rate as GDP. The ratio of total debt to GDP may therefore provide a good idea of how total debt has developed in relation to households' average incomes when trends last for several decades.

<sup>38</sup> See, for instance, ECB 2009.

**Figure 4. Households' total debt as a proportion of GDP in a group of about twenty advanced economies**  
Per cent



Note. The light pink field shows the highest and lowest debt ratios in all countries in the sample. The dark pink field shows the gap between the 25th and 75th percentiles. The solid blue line shows the median of these 23 ratios and the red line shows the debt-to-GDP ratio for Sweden.  
Sources: BIS and own calculations

#### 4.1.1 How does indebtedness affect households' consumption decisions?

Households' high indebtedness and its macroeconomic consequences have been much discussed over the years, both in the scientific literature and in the wider debate on economic policy. One question concerns whether household consumption would be affected more by a given change in the interest rate if households were more indebted. Intuitively, it is easy to imagine that highly indebted households would adapt their consumption more following an interest rate adjustment than households that have low or no debts. After all, their disposable incomes, which is to say incomes minus borrowing costs, would be affected more by an interest rate adjustment if they had large debts, particularly if their loans were at a variable interest rate. However, even if the disposable incomes of highly-indebted households are more sensitive to interest rates, this does not automatically mean that their consumption is also more sensitive to interest rates.

Most households prefer to keep their consumption fairly steady over time. This gives them reason, therefore, to plan their economies so that both expected and unexpected changes in disposable income have a limited effect on consumption. If disposable incomes in a household with a large mortgage loan decrease due to an unexpected interest rate rise, the household could possibly counter this with consumption loans or a buffer of savings. These arguments suggest that the individual household's consumption would not be affected more by a given change in the interest rate, if the household is highly indebted.

Furthermore, when analysing the interest rate sensitivity of consumption, a distinction must be made between interest-rate sensitivity in individual households, on the one hand, and interest-rate sensitivity in the entire household sector, on the other. The interest expenses of an individual household are often equalled out by interest income in another household. An interest rate adjustment primarily entails the reallocation of incomes between different households. Although high indebtedness may mean that consumption becomes more sensitive to interest rates in households with high levels of debt, it does not need to entail higher interest-rate sensitivity in households' total, aggregate consumption.

#### 4.1.2 Different households are reacting differently to changes in disposable income

For all that, there are mechanisms that suggest that households' total consumption could actually become more sensitive to interest rates if indebtedness is high. A couple of these mechanisms revolve around different households being able to adjust their consumption to differing extents following a given interest rate adjustment. For example, this could be



due to households with large debts finding it difficult to raise further loans. Such loan limits mean, in turn, that these households cannot maintain their consumption as evenly, as they are losing a way of countering changes in their disposable income. The consequences will be that the loan-limited households will, in practice be living 'hand to mouth', with their consumption being entirely determined by their disposable incomes. Every increase or decrease of these will entail a corresponding increase or decrease of consumption. If many households are highly indebted, the likelihood increases that more households will face loan limits and have to live hand to mouth. Households' total consumption could then become more sensitive to interest rate adjustments as fewer households would be able to even out their consumption effectively over time. This mechanism acts through the average household's ability to hold consumption steady, which could be limited if a large proportion of all households are living 'hand to mouth'.

Another mechanism that could make household's total consumption more sensitive to interest rates if indebtedness is high is what is known as the cashflow channel. In this case too, this basically means that highly-indebted households may have a poorer ability to keep their consumption steady, so that consumption among these households changes more when their disposable income changes. The cashflow channel acts through the redistribution of income between borrowers and lenders that arises when the interest rate changes. The higher the average indebtedness is and the more there are households that have loans at variable interest rates, the greater is the redistribution of incomes between households that borrow money and households that lend money. For example, if the interest rate is raised this will mean that greater amounts are redistributed from borrowing households to lending households. Given that, compared with non-indebted households, indebted households' consumption changes more when their disposable incomes change, the effects of the interest rate rise on total consumption will be greater when larger sums of money are redistributed.

#### **4.1.3 Households' mortgage loans and the value of housing**

Naturally, household consumption is also affected by the value of their assets. Two other mechanisms that can make household consumption more interest-rate sensitive act through housing. The first of these mechanisms, known as the loan collateral channel, is based on it often being the value of housing that determines the magnitude of loans that the household can raise in total. Most banks and other credit institutions set an upper limit, a ceiling, for the size of the loans they are prepared to grant individual households. The level of this ceiling generally depends on the size of the household's income and the value of its assets. As the most valuable asset a household owns is usually its home, it is often, in practice, precisely the value of the home that determines how high the ceiling is.

If a household is highly indebted, its ability to raise further loans may be limited by this loan ceiling, which is linked to the value of the home. Now, the thing is that interest rate adjustments affect the value of housing via the capital cost linked to home ownership. On an overall level, interest rate adjustments also affect the general level of demand in the economy, which can also affect housing prices. If many households are limited by the loan ceiling, adjustments of the interest rate may therefore have a greater effect on household consumption. This is because they affect the value of households' homes and thereby their chances of raising further loans.

Another mechanism, which is closely related to the loan collateral channel but still differs somewhat, concerns the relationship between the size of a household's mortgage loan and the value of the housing. If the housing is highly mortgaged, the household's net wealth will be affected more by a change in the housing price than if there is a small mortgage on it. One way of putting it is that a household with a higher loan-to-value ratio has more leverage against changes in the price of its home. Assume now that two different households have

mortgages of different sizes and that their economic situations are otherwise equivalent, so that the two households have about the same incomes and their respective homes are worth about the same amount. The net wealth of the more heavily indebted household will then change more, as a percentage, than the net wealth of the less heavily indebted household at each given change of housing prices. If consumption is proportional to net wealth, the leverage effect will mean that the more heavily indebted household will attempt to achieve a greater percentage change in its consumption than the less heavily indebted household. Even in this case, therefore, households' total consumption can increase more if the interest rate is adjusted when indebtedness among households is high.

#### **4.1.4 Household debt and effects of interest rate adjustments**

If high indebtedness among households makes consumption more sensitive to interest rate adjustments, this naturally has consequences for monetary policy. A given interest rate adjustment will then have a greater effect on household consumption in the short term, which could mean that monetary policy has a greater impact on total demand in the economy. Depending on the reasons for indebtedness being high, the risks inherent in large changes to household consumption may simultaneously be higher.

Studies investigating how households' indebtedness, and particularly their mortgages, affect monetary policy have identified certain effects, even if the conclusions are not clear-cut. Di Casola and Iversen (2019) show that households' average gross debt affects the pass-through of monetary policy in a modern macroeconomic model with indebted households and binding loan limits. One important assumption here is that different households adjust their consumption to different extents when the interest rate is adjusted: consumption among households with limited access to credit is more sensitive to changes in disposable income than that of other households. Another study by Calza et al. (2012) uses data from about twenty advanced economies to analyse how changes in the policy rate affect household consumption and other variables. They find that the effect of monetary policy on consumption is greater in countries where variable rates are common for mortgages and in countries where households can increase their borrowing when the value of their homes increases. In contrast, they do not find that the effect is greater in countries where total mortgage borrowing is large in relation to GDP, compared to countries with lower levels of indebtedness.

Flodén et al. (2017) analyse data over Swedish households' consumption and economic assets and find support for the cashflow channel. When the policy rate is raised, it is primarily highly-indebted households with mortgages at variable rates that cut back on consumption. These results indicate that the effects of monetary policy on consumption are strong if many households are highly indebted and have credit limits and if many households have variable rate mortgages. However, it should be pointed out that Flodén et al. (2017) do not study the total effect of adjustments to the policy rate on consumption; instead, their results concern the cashflow channel and how its effects on consumption vary between households with different types of characteristics.

Flodén et al. (2017) use an approach that, in many respects, resembles a previous study of US and UK data conducted by Cloyne et al. (2016). The authors of this study find that consumption expenditure is more sensitive to changes in the interest rate in those households with mortgages, as against households owning unmortgaged homes. However, they also find that the effects of a policy rate adjustment on household cashflows are small in comparison with the size of the change in their consumption expenditure. One interpretation of the results is that monetary policy primarily acts via household incomes and that the effect on consumption is greatest among households with limited access to credit.

There is reason to mention one more study, Walentin (2014), who uses Swedish data and a model in general equilibrium that includes a housing sector. Among other things, this

study investigates how the monetary policy transmission mechanism is affected by many households using their homes as collateral for their mortgages. Walentin (2014) finds that the effects of the policy rate on consumption and other variables become stronger if a household's loans are large in relation to the value of its home, as the leverage effect then affects the household's net wealth more.

Taken together, the results of these different studies thus indicate that it is highly indebted households with limited access to credit and households with variable mortgage rates that change their consumption the most when the policy rate is adjusted. It is not established, however, that a high average debt-to-income ratio would automatically involve households' total consumption becoming more sensitive to interest rate adjustments. It is also unclear how important the actual cashflow channel is. Monetary policy has an effect on household consumption via several other channels, for example via household incomes and via their net wealth. One reasonable conclusion is that the interest rate sensitivity of total consumption depends on several different factors that are linked to household indebtedness, in particular to mortgages. The matter of how many households have variable rate mortgages is apparently one of the most important of these factors. Another factor, which is also emphasised by Calza et al. (2012), concerns whether mortgage borrowers can increase the mortgage on an existing property when housing prices rise.

If indebtedness is high and many mortgages are at variable rates, there is thus reason to believe that total consumption will be affected more by changes to the policy rate than if debts are lower and most mortgages have fixed rates. Monetary policy can then be assumed to be more potent in the sense that an interest rate adjustment has a fairly large effect on resource utilisation. Under such circumstances, the central bank can stabilise resource utilisation and inflation by making comparatively small adjustments to the policy rate.

The combination of high indebtedness among households, credit limits and variable rates for mortgages can also entail greater risks. The results discussed here indicate that many households that are heavily indebted, and that have variable rate mortgages have relatively little scope to counter larger changes to disposable income. For example, if the central bank should need to raise the interest rate sharply to avoid a price and wage spiral, the most heavily indebted households will thus risk being forced to make large adjustments to their economies in a short time. This could involve them having to reduce their consumption abruptly or more or less being forced to sell their homes. If many households are forced to make large changes at the same time, there could also be additional negative consequences. For example, fluctuations in housing prices risk being greater if many households sell their homes approximately at the same time. In an adverse scenario, a significant number of households could encounter difficulties in meeting payments on their loans and, in such a situation, risks to financial stability will also arise.

## 4.2 High sovereign debt in many countries – Sweden being an exception

After the global financial crisis, government bond yields have fallen to historically low levels in several countries. The central banks' policy rates are also low and, in some cases, negative. In addition, the central banks have made comprehensive purchases of government bonds to hold interest rates down and have announced low policy rates in the period ahead. Taken together, the conditions for further monetary policy stimulation if economic activity declines may therefore be limited. This has brought fiscal policy's role in stabilising the economy into focus.<sup>39</sup>

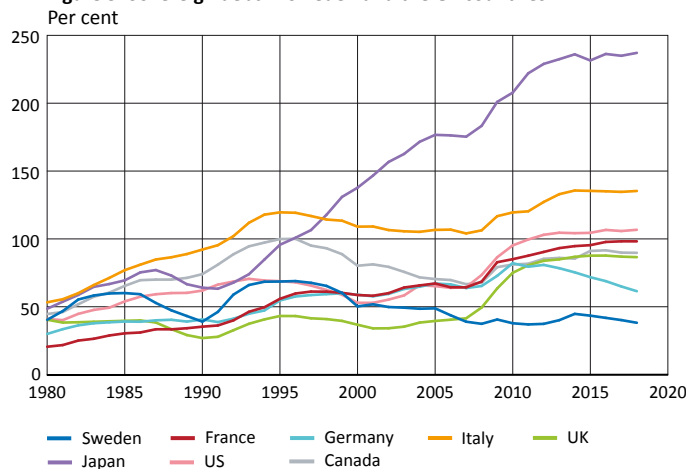
One important precondition for fiscal policy stimulation to be effective is that households and companies have a high level of confidence in fiscal policy. There are several factors that

<sup>39</sup> See, for example Jansson (2018) and Lagerwall (2019).

can increase confidence. One is a low and stable sovereign debt. Another is a low budget deficit. One reason that the euro area introduced restrictions on both the sovereign debt, no more than 60 per cent as a proportion of GDP, and the budget deficit, no more than 3 per cent as a proportion of GDP, is to prevent confidence in the countries’ fiscal policies from being undermined. These restrictions thus mean that the euro area as a whole can assure itself that fiscal policy in the various countries is being conducted responsibly. The fiscal policy framework in Sweden also includes a number of budget policy targets: a surplus target, a debt anchor, an expenditure ceiling and balanced local government finances. The debt anchor was introduced in the budget year 2019 and is set at 35 per cent of GDP. The debt anchor is a guideline for how large the consolidated gross debt can be over the medium term.

The sovereign debt can vary greatly from country to country. Sweden stands out currently by having a relatively low sovereign debt compared with many other countries. Figure 5 shows sovereign debt as a proportion of GDP in Sweden and the G7 countries since 1980. In Sweden, the debt-to-GDP ratio has fallen steadily since the mid-1990s and is currently just below 40 per cent as a proportion of GDP. Several other countries have experienced the opposite development. Developments in Japan are particularly striking. Since the start of the 1990s, the debt-to-GDP ratio has shown a rising trend, from just over 60 per cent to almost 250 per cent at present. The United States also has a relatively high sovereign debt of over 100 per cent as a proportion of GDP. Indebtedness in the euro area varies heavily from country to country. Greece and Italy in particular stand out with their high sovereign debts. Italy’s sovereign debt as a proportion of GDP is almost 140 per cent.

Figure 5. Sovereign debt in Sweden and the G7 countries



Note. Sovereign debt as a proportion of GDP.  
Source: IMF DataMapper, General Government Debt

4.2.1 Low government bond yields are increasing the scope for fiscal policy

Two factors that could affect fiscal policy’s room for manoeuvre are the interest rate that the government pays for its debt (the government bond yield) and the growth rate of the economy. This can be illustrated by the government’s budget constraint,

$$(1) \quad B_t = B_{t-1} + r_t B_{t-1} - S_t,$$

where  $B$  denotes the stock of nominal government bonds, the government’s primary surpluses, which is to say the difference between government expenditure and tax revenues, and the government bond yield. The current debt is thus equivalent to the previous period’s debt plus interest payments minus the primary surpluses. Dividing the budget constraint on both sides by GDP gives us an expression for the sovereign debt’s share of GDP,  $b$ ,

$$(2) \quad b_t = \frac{1+r_t}{1+\gamma_t} b_{t-1} - s_t,$$

where  $\gamma$  denotes GDP growth and  $s$  the primary surpluses' share of GDP. From this expression, we can derive an expression for the *long-term* primary surplus ratio as a function of the *long-term* debt-to-GDP ratio,

$$(3) \quad s^* = \frac{r^* - \gamma^*}{1 + \gamma^*} b^*,$$

where  $*$  denotes long-term values. The equation thus shows how the primary surpluses relate to the sovereign debt over the long term, given long-term levels of the real interest rate and the growth rate. Note that when the long-term real interest rate is lower than growth, a *positive* debt-to-GDP ratio is linked to a *negative* primary surplus ratio. In other words, the government can have a long-term deficit in its finances without the debt-to-GDP ratio increasing.

The relationship in equation (3) can be illustrated by a few mathematical examples. Assume that we have a long-term sovereign debt as a proportion of GDP in line with the debt anchor of 35 per cent. Let us also assume that we have a long-term GDP growth of 2 per cent and a long-term real interest rate close to the current level of around  $-2$  per cent. A debt-to-GDP ratio of 35 per cent would then be compatible with a primary deficit of 1.4 per cent as a proportion of GDP. If the long-term real interest rate is changed, this affects the level of the budget balance. Table 1 shows how an increase of the long-term real interest rate from  $-2$  to 3 per cent affects the primary budget balance. With a long-term real interest rate of 3 per cent, a primary surplus of 0.3 per cent as a percentage of GDP would be required to prevent the debt-to-GDP ratio rising above 35 per cent.

**Table 1. Primary budget balance for various real interest rates**  
Per cent

Long-term real interest rate	Primary budget balance
-2.0	-1.4
-1.0	-1.0
0.0	-0.7
1.0	-0.3
2.0	0.0
3.0	0.3

Note. Primary budget balance is calculated as a percentage of GDP.  
Source: The Riksbank

These examples provide a quantitative estimate of how changes in the long-term real interest rate can affect the primary budget balance as a proportion of GDP, as long as the debt-to-GDP ratio and long-term growth remain unchanged. In an environment in which the long-term real interest rate is lower than growth, the conditions exist for conducting an expansionary fiscal policy without the sovereign debt as a percentage of GDP rising. In itself, this could be an argument for using fiscal policy more actively to counteract economic slowdowns in a situation where monetary policy is restricted by the lower bound of the interest rate.<sup>40</sup> At the same time, however, it should be borne in mind that the examples above disregard various risks inherent in conducting an expansionary fiscal policy. For example, the long-term values of the real interest rate and growth may be affected by the level of indebtedness. Heavily rising debts may cause the long-term real interest rate to rise. High public debt can also restrain growth. These may therefore give reason to be cautious about conducting an excessively expansionary fiscal policy.

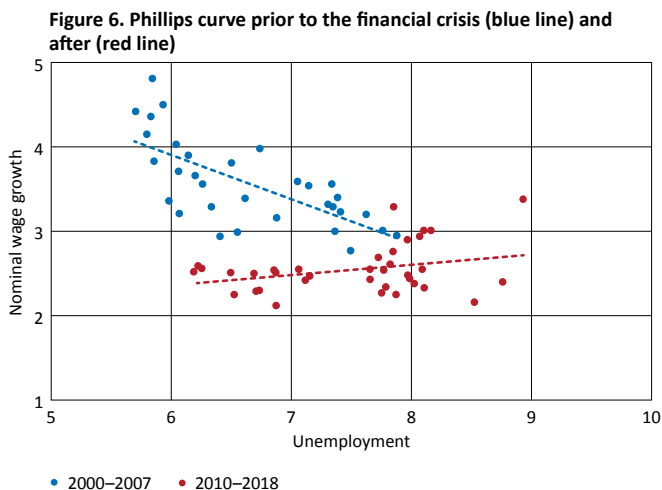
<sup>40</sup> See, for example, Blanchard (2019).

We have seen that household indebtedness has reached record levels in Sweden. This could be another reason to be cautious about an expansionary fiscal policy. If the government's indebtedness rises to excessively high levels when household indebtedness is also high, it could be particularly costly for households. Not only would the costs of households' own debts rise, but taxes could also rise and transfers fall when the government needs to fund a rising sovereign debt. There is thus reason to be particularly cautious with the government's finances in a situation when private indebtedness is high.<sup>41</sup>

## 5 The Phillips curve has flattened

The Phillips curve is a concept in economics that originally described the relationship between nominal wage growth and unemployment.<sup>42</sup> Subsequently, the term has been expanded and can now contain a number of different definitions. The relationship is often expressed in terms of inflation and some measure of resource utilisation, for example the deviation of output from its long-term trend (the output gap). The prevailing opinion is that the original relationship should be negative.<sup>43</sup> This can be explained as follows. Assume that unemployment falls. Companies then find it more difficult to recruit new employees, which tends to push wages up and thereby the companies' costs. The higher costs for companies lead to higher prices for consumers. Inflation therefore rises too. The relationship between inflation or nominal wage growth and unemployment therefore becomes negative.

Before the financial crisis, the correlation between nominal wage growth and unemployment was negative in Swedish data; see Figure 6.<sup>44</sup> However, this relationship changed in the period after the financial crisis. The negative correlation has not just become flatter but even positive. In other words, lower unemployment is linked to lower wage increases. The apparently weaker link between nominal wage growth and unemployment is not only a Swedish phenomenon. A flattening of the Phillips curve can also be seen in the euro area, the United States and the United Kingdom; see, for example, Cunliffe (2017).



Note. Short-term wages. Annual percentage change and percentage of labour force, 15–74 years. Seasonally adjusted data.  
Source: Ingves (2019)

41 For further risks inherent in excessively high state indebtedness, see Boskin (2020) and Rogoff (2019).

42 See Phillips (1958), who, with the help of British data for the period 1861–1957, demonstrated a negative correlation between nominal wage growth and unemployment.

43 However, the relationship between inflation and the output gap should be positive, as the correlation between unemployment and the output gap is generally negative and the correlation between nominal wage growth and inflation is positive.

44 See Jonsson and Theobald (2019) for an in-depth discussion of the relationship between wages and unemployment in the Swedish data.

For central banks, it is important to understand why the Phillips curve has become flatter, as this could have implications for monetary policy. The economic literature has suggested several reasons, but there is no consensus on what lies behind the flattening.

## 5.1 A successful inflation targeting policy may have flattened the Phillips curve

It has long been known that changes in the Phillips curve as we measure it in the data may be due to monetary policy; see, for example, Lucas (1976). One common explanation for the rapid increase of inflation in the 1970s and 1980s is that monetary policy systematically tried to utilise the Phillips curve to reduce unemployment. It was believed that an expansionary monetary policy that caused inflation to rise would lead to lower unemployment in the long term. But these attempts failed – except possibly in the very short term – as inflation expectations were adjusted upwards. The expansionary monetary policy therefore only led to higher inflation, without unemployment falling significantly.

During the 1990s, many countries introduced inflation targeting. Sweden introduced an inflation target of 2 per cent that formally started to apply in 1995. The inflation target is intended to function as a guideline for household and corporate expectations of future inflation. It makes price setting and wage formation easier, along with other economic decisions.

In a recently published study, McLeay and Tenreyro (2018) show that it is not just deficient monetary policy – like that conducted in the 1970s and 1980s – that can lead to a flatter Phillips curve. Successful inflation targeting can also have this effect. In an economic model, they show that, if monetary policy succeeds in stabilising inflation so that it is constant at 2 per cent over time, the correlation between *inflation* and the *output gap* becomes zero, regardless of how the output gap develops.<sup>45</sup> It can also affect the relationship between nominal wage growth and unemployment. This relationship would probably also be weakened as the variations in nominal wages would only be due to variations in real wages.

## 5.2 The Phillips curve is affected by shocks to supply and demand

Another explanation for the flatter Phillips curve, which has some similarities to McLeay and Tenreyro (2018), has been put forward by Ingves (2019) and Jonsson and Theobald (2019). Just like McLeay and Tenreyro, they emphasise that the Phillips curve observed in the data is not a structural relationship but a correlation between two economic variables. However, unlike McLeay and Tenreyro, they emphasise that the reason for the flatter Phillips curve may lie in changes to the shocks to which the economy is exposed. In a dynamic and functioning market economy, changes of both short term and long term character occurs all the time. Technological development progresses, the demographic composition changes and households' preferences change, to give a few examples. These changes affect the correlation between economic variables such as that between nominal wage growth and unemployment. We can illustrate this with two simulations from an economic model. The first simulation shows how the Phillips curve is affected by shocks to labour force participation. The second shows how it is affected by shocks to productivity.<sup>46</sup>

### 5.2.1 Example 1: How labour force participation shocks affect the Phillips curve

When the labour force participation rate increases, it becomes easier and cheaper for companies to find new staff and vacancies are filled more quickly. But for those people

<sup>45</sup> See also Adolfson and Söderström (2003).

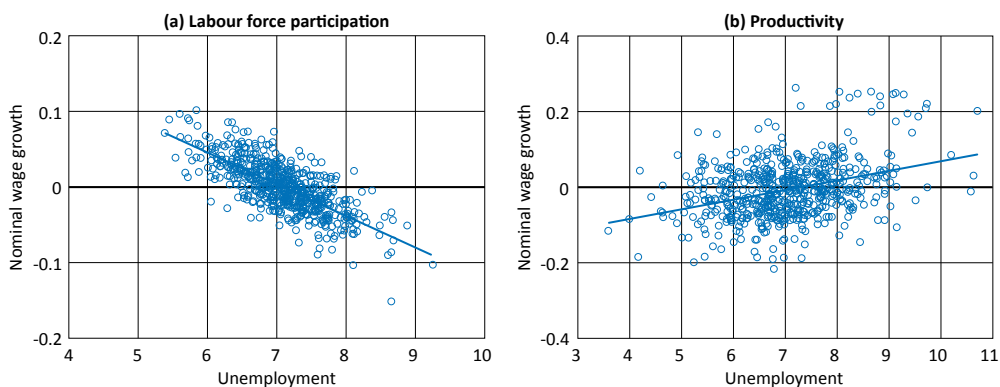
<sup>46</sup> These illustrative calculations are from Ingves (2019). See also Jonsson and Theobald (2019) for an in-depth description of the assumptions and models forming the basis of the results of the calculations.

entering the labour force, it will nevertheless take some time to seek and find a new job. Unemployment may therefore increase, at least initially. When more people participate in the labour force, competition for jobs also increases. This holds employees' wage demands and wages back. Increases in labour force participation thus mean that **nominal wages fall** and **unemployment rises**, at least in the short term. Changes in labour force participation are thus in line with the prevailing view that the relationship between nominal wage growth and unemployment should be negative; see Figure 7a.

### 5.2.2 Example 2: How productivity shocks affect the Phillips curve

When productivity falls, companies' production costs become higher. Companies are therefore forced to raise prices to retain their profit margins. This reduces both demand and output, which ultimately also increases unemployment. A fall in productivity leads to lower real wages but, if prices rise faster than real wages falls, nominal wages will rise anyway. Over the short term, falling productivity thus means that both **nominal wages and unemployment rise**. In other words, the correlation between nominal wage growth and unemployment is positive; see Figure 7b. This illustrates the importance of not making causal interpretations of correlations in the data. It is not the case that higher unemployment causes higher nominal wages, but rather that falling productivity causes both higher nominal wages and higher unemployment.

Figure 7. The Phillips curve when labour force participation and productivity changes



Note. Quarterly percentage change and share of labour force.  
Source: Ingves (2019)

## 5.3 Structural changes in the functioning of the economy

Another explanation of the flatter Phillips curve is based on structural changes in the functioning of the economy, which is to say that household or corporate behaviour has changed in some way.

### 5.3.1 Increasing globalisation and digitalisation

One common explanation for the flatter Phillips curve looks at the increasing globalisation and digitalisation. Developments in information and communication technologies have been very rapid in recent decades and have led to faster digitalisation in many sectors; see also section 2.1. More and more working tasks have been automated and can be carried out by smart robots. This applies to both routine tasks and more advanced ones. Digitalisation also affects globalisation by facilitating trade and labour mobility as increasing numbers of countries become more closely integrated.

**Globalisation** can affect the Phillips curve through several different channels. One channel concerns international trade. Over the last 30–40 years, the increase of trade has entailed better competition and thereby downward pressure on global price levels. Import prices have therefore fallen in many countries. This has a direct dampening effect



on consumer prices, as these prices also include prices for imported goods and services. But there are also indirect effects. If cheaper import goods can replace domestic ones, a substitution effect arises in which households consume cheaper import goods at the expense of domestic goods. This increases the import share in consumer prices, which dampens inflation even more. These effects are temporary, but globalisation should be seen as an ongoing process that can dampen inflationary pressures over longer periods. If these price-dampening effects are not then reflected in changed resource utilisation, it will have an effect on the Phillips curve.

When trade increases, the exchange rate's influence on consumer prices becomes greater via effects from import prices. The exchange rate can therefore have a greater impact on inflation. From a monetary policy perspective, this could create some problems, as the development of the exchange rate is difficult to predict. The exchange rate is often affected by factors that do not necessarily have to be related to domestic monetary policy. For example, these could include monetary policy abroad, the economic outlook of different competitor countries and the degree of impact from changes in the exchange rate on inflation.

Another channel through which globalisation can affect the Phillips curve is linked to the labour market. When the labour market becomes tighter, companies can respond by using labour abroad, rather than raising wages. This can make inflation less sensitive to domestic conditions; see Auer et al. (2017).

The increasing **digitalisation** can also affect inflation and the Phillips curve. Some sectors and prices are affected more or less directly by digitalisation. Prices for goods such as mobile telephones and computers are showing a falling trend as prices for processors and other electronic components fall. The transition from physical to digital distribution is another factor that is dampening prices, e.g., the music, film and newspaper industries.

The Internet and e-Commerce improve the matching between producers and consumers, which should have a price-dampening effect. When an increasing amount of trade takes place on the Internet, new markets also become opened up for companies, and consumers' possible choices become greater. This leads to increased competition and, in many cases, to lower prices. In addition, it becomes easier for customers to compare prices, which can push prices down. There has certainly been a steady increase in e-Commerce in the 21st century, but its share of the total retail trade is still relatively small in Sweden.

Like globalisation, digitalisation should only have temporary effects on inflation, which should be possible to counteract with a more expansionary monetary policy. The effect of digitalisation on inflation is difficult to measure and varies across different studies. According to a study from the European Central Bank, the effects of the increased e-Commerce on consumer prices has been small; see ECB (2015). The direct effect of cheaper information technology on inflation has been negligible according to Charbonneau et al. (2017). In addition, they show that digitalisation has not, as yet, made any impression on the development of productivity. However, these conclusions have partly been challenged by Glosbee and Klenow (2018), who show that price movements on the Internet are 1.3 per cent lower per year than they are for the same goods categories in the CPI.

### 5.3.2 The Phillips curve may be non-linear

Unemployment in the United States and other countries increased heavily in connection with the financial crisis. Unemployment also remained on high levels over a longer period, at the same time as the rate of inflation only fell temporarily. This development surprised many economists and the phenomenon has been given its own name in the literature: *the missing deflation*. Some economists say that this was due to the long-term level of unemployment also rising. The downward pressure on prices was thereby not as great as the fall in unemployment indicated. However, this explanation turned out to be problematic, as

unemployment eventually started to fall below what many economists deemed to be the long-term level, at the same time as inflation remained stable.

Another explanation for the missing deflation is that the Phillips curve is non-linear instead of linear, which is a common assumption. According to this explanatory model, high unemployment has less effect on inflation than low unemployment. In addition, this non-linearity does not become clear until inflation is very low. Note that, in his original article, William Phillips suggested a highly non-linear relationship; see Phillips (1958). In a recently published working paper, Gagnon and Collins (2019) show that wage rigidities may provide one reason for the Phillips curve possibly being non-linear when inflationary outcomes are low. The authors show that inflation and unemployment have probably been in the flat part of the relationship over the last 20 years.

Lindé and Trabandt (2019) attempt to explain the missing deflation and the lack of inflation after the financial crisis with a non-linear Phillips curve. They emphasise the importance of non-linearity when companies set prices and wages at the same time as the economy is being exposed to large shocks. They show that a non-linear macroeconomic model with price and wage rigidities can explain *the missing deflation*, while the linear version of the same model fails to do so. In addition, the non-linear model is in line with a number of other relationships between various macroeconomic variables observed in post-war US data.

#### 5.4 What are the monetary policy implications of the different explanatory models?

Empirical estimates indicate that the Phillips curve may have become flatter in Sweden and other countries after the financial crisis, even if the uncertainty of these estimates is high. Nominal wage growth, inflation and resource utilisation can be measured in different ways. The Phillips curve can also be specified in different ways as regards inflation expectations, the duration of inflation and the degree to which the relationship is linear. In addition, other factors apart from resource utilisation can affect wages and inflation. All of this makes it difficult to identify the relationship in the data. Bearing these reservations in mind – what are the implications for monetary policy of a flatter Phillips curve?

If the flatter Phillips curve is due to monetary policy having succeeded so well in stabilising inflation and inflation expectations that the relationship has disappeared in the data, this is good news. Monetary policy has been effective and has reached its goal: low and stable inflation. A similar conclusion can be reached if the flatter Phillips curve is due to various changes having taken place that cannot be affected by monetary policy. Such structural changes can affect the Phillips curve in different ways. As we have illustrated, some can give rise to a negative relationship, while others can give rise to a positive relationship. The changing relationship over time does not, therefore, itself have to be a sign that monetary policy is not functioning as intended.

A flatter Phillips curve does not, therefore, have to have any monetary policy consequences, but there are also arguments against such a conclusion. Monetary policy is assumed to have strong effects on demand and smaller effects on supply. A change in monetary policy would thus affect demand to a great extent, which, in turn, would affect inflation. If the relationship between demand – which can be measured with different measures of resource utilisation – and inflation or nominal wage growth has become weaker, it may become more difficult for monetary policy to affect inflation through that channel. Monetary policy would then have to create larger changes in demand to achieve the same change as previously. If the Phillips curve also changes over time, it may be more difficult to assess which effects monetary policy is actually having on inflation. One consequence could therefore be that monetary policy should place greater importance on stabilising various measures of resource utilisation, such as unemployment. Blanchard et al. (2015) show that

this is the case in a model in which monetary policy follows a simple policy rule, known as the Taylor rule. However, one consequence of placing greater importance on stabilising resource utilisation may be that inflation deviates from the target over longer periods that would otherwise have been the case.

## 6 Concluding remarks

In this article, we have described changes in a number of macroeconomic quantities and relationships occurring since the financial crisis that will probably be significant for the conditions for conducting monetary policy in the period ahead. We started by describing and discussing the slowdown of productivity that had taken place in the OECD. After this, we showed how the long-term real interest rate has fallen in advanced economies over a number of decades. The downturn in real interest rates has probably been a contributory reason behind the increase in both households' and states' indebtedness. However, Sweden differs here from many other countries, as its sovereign debt has, in contrast, showed a falling trend. Finally, we discussed the Phillips curve. In many parts of the world, this relationship has weakened, which, among other things, may mean that higher activity and rising resource utilisation in the economy may be linked to smaller than usual price increases.

Of all these changes in the macroeconomic environment, the downturn in the long-term real interest rate is probably the change that has had the greatest implications for monetary policy. This downturn has contributed to central bank policy rates being on historically low levels and, in some cases, even negative. In many cases, policy rates are thus close to the lower bound for how low they can be cut. This makes it more difficult to counteract future recessions and may lead to more and longer periods with negative interest rates and low inflation. In addition, since the financial crisis, several central banks have purchased large amounts of government bonds to make monetary policy even more expansionary. The balance sheets of these central banks are therefore at historically high levels.

The monetary policy tools may therefore be limited. However, scope remains to cut policy rates a little more before they reach the lower bound. There is also scope to increase government bond purchases. Central banks can also purchase other financial assets than government bonds, for example mortgage bonds and corporate bonds. However, these assets have higher risk than government securities and are normally only purchased when an individual market is exposed to shocks and the pass-through of monetary policy is not functioning normally. Another possibility for making monetary policy more expansionary is 'forward guidance', which is to say affecting expectations of future policy rates, for example through communication. For example, the central bank could promise that the policy rate will remain at the lower bound until economic activity stabilises and inflation reaches the target.

So there are still opportunities to make monetary policy more expansionary. However, in a deep economic downturn, it is possible that it will not be possible to make monetary policy sufficiently expansionary. In such a situation, fiscal policy may have to take greater responsibility for stabilisation policy – in addition to the effects of the automatic stabilisers. The scope for Swedish fiscal policy looks good: Our public finances are in good shape, interest rates on government borrowing are low and until recently, growth has been relatively stable. Nevertheless, there is reason for caution. If central government debt increases, it is households – which already have high debts of their own – that will have to pay for this through higher taxes, lower public consumption or lower public transfers.

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# What is driving the global trend towards lower real interest rates?

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In recent decades, real interest rates have fallen considerably in almost all advanced economies and in many emerging market economies. This downturn applies to interest rates on loans with both short and long maturities. Many studies find that structural changes can explain why real interest rates have shown a falling trend around the world. Such changes include the age and life expectancy of the population, the potential growth rate of the economy and the premiums that investors are prepared to pay for assets that are considered safe. In addition, China and several other emerging market economies have increasingly been integrated into the global economy and have long had remarkably high levels of saving. All of these structural changes may affect real interest rates. But there is disagreement over which of them are quantitatively significant for interest rate formation. For example, economic theory predicts a positive correlation between real interest rates and potential growth rate, but several empirical studies find that the correlation is weak. There is then stronger overall support for the hypothesis that real interest rates have been affected by demographic changes and a high level of saving in Asia.

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## 1 Introduction

In January 2020, both the federal government of the United States and US households and companies could take out loans at interest rates approximately 6 percentage points lower than the interest rates prevailing in February 1990. This gap indicates that, over the last three decades, it has become significantly cheaper to borrow and that returns on saving have fallen to a corresponding degree. However, the fact that inflation in the United States was higher in 1990 than it is today must also be taken into account, for the comparison to be fair. The general price level increases over time and anybody lending a sum of money must therefore bear in mind that the same sum, when it is repaid, will have lost value. *The real interest rate*, which is roughly equal to the interest rate minus average inflation over the loan's maturity period, is therefore a better measure of the cost of borrowing if comparisons are to be made over time. In January 1990, the annual rate of increase in the US consumer price index (CPI) was just over 5 per cent, compared with 2.5 per cent in January of this year. The real interest rate had then fallen by about 3.5 per cent, less than the nominal interest rate, but a considerable decrease nevertheless.

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This article was written before the outbreak of the coronavirus pandemic. The potential effects of the pandemic on rate-setting has therefore not been considered. However, the global trend towards lower real interest rates, observed in recent decades, affects the prevailing conditions for conducting effective economic policy and will probably continue to be important going forward.

In countries with inflation targeting policies, it is normal for the central bank to raise the interest rate during economic booms to prevent the economy from becoming overheated and inflation from becoming too high. Similarly, the policy rate is usually cut in recessions to stimulate demand and prevent inflation from falling too far below the inflation target. Over the last 30 years, the US policy rate has also been raised and cut in line with changes in the economic outlook and inflation prospects in a more or less predictable manner. However, at the same time, real interest rates – independently of the economic cycle – have shown a downward trend, so that the average real interest rate over a cycle has gradually become lower. This development is not specific to the United States: similar gradual downturns in real interest rates have taken place in almost all advanced economies and in many emerging markets and developing countries. Today, real interest rates and, in many cases, nominal interest rates are negative, so that borrowers get paid for borrowing money.

The aim of this article is to provide an overview and critical discussion of parts of the literature analysing global trends in real interest rates. The focus is on probable explanations for the negative trend that has been under way for a couple of decades and that is considered to be making a strong contribution to the current low level of interest rates. How did we end up in a situation in which many central governments and companies are being paid to borrow money, while many households are simultaneously prepared to save a significant proportion of their incomes even though the real interest rate is negative?

According to economic theory, the real interest rate is affected both by long-term, structural changes and by cyclical shocks. An example of a structural change affecting the real interest rate, which we will discuss in this article, is provided by shifts in the age structure of the population. Such demographic processes often take place over several decades and can give rise to slowly acting trends in the real interest rate. However, cyclical shocks also have effects on the real interest rate. Frequently, the most important channel for these effects is the central bank's decisions on the policy rate and expectations on the fixed-income markets concerning future policy rate decisions. We mentioned earlier that central banks conducting inflation targeting policies normally react to changes in the economic outlook by raising or cutting their policy rates. When this happens, the real interest rate on the market for loans with short maturities is often also affected. This is partly because the nominal interest rates for short-term borrowing usually follow the central bank's policy rate quite closely. But it is also because both inflation and inflation expectations tend to be more sluggish than nominal interest rates. As the real interest rate is approximately equivalent to the nominal interest rate minus inflation, the consequence becomes that the central bank also affects the real interest rate when reacting to changes in economic activity via the policy rate. Even if cyclical developments are mostly less long-lasting than demographic changes, for example, it can nevertheless take quite a lot of years for cyclical shocks to wear off completely.

The effect of cyclical shocks on real interest rates makes it difficult to determine exactly which changes in the real interest rate should be ascribed to trends and which ones are cyclical fluctuations. In addition, sometimes the world economy is affected by unusually severe and long-lasting recessions, and the effects on the real interest rate may then become both large and relatively prolonged. One relevant example concerns the period from the mid-2000s on, when the world economy was affected by two unusually heavy shocks: the global financial crisis, with the subsequent deep recession of 2009–2010, and the European sovereign debt crisis of 2010–2012. In conjunction with both of these crises, many central banks made unusually large cuts to their policy interest rates. In addition, several of them started purchasing bonds on the secondary markets to push market rates down further. In several earlier cases, the recovery from financial crises has been slow and it has taken many years before resource utilisation in the most badly affected economies has returned to normal levels. It is therefore particularly difficult at present to determine what forms a normal level for the policy rate in different countries and how the trend in the global real

interest rate has developed since the mid-2000s. The first section of the article therefore discusses the results of a number of different studies that have estimated global trends in real interest rates. Following this, it presents a simple conceptual framework for the various structural factors that can explain the global, negative trend. The conceptual framework, which has been used in other literature reviews, is primarily a tool to create an overview of various mechanisms and the probable effects they have on real interest rates, saving ratios and investment levels.

The following sections discuss four different factors raised in the literature as important structural driving forces behind the current low level of interest rates:

- low long-term growth prospects
- demographic changes
- high saving levels in Asian emerging market economies
- an upturn in the premiums that investors are willing to pay for safe assets

This list is not exhaustive. Several other structural changes have been put forward as possible explanations for the negative trend in real interest rates. The selection made here is primarily based on different assessments and estimates of the factors that have been quantitatively most important for developments in recent decades.<sup>1</sup> The article ends with a concluding discussion.

The results of three different estimates indicate that, in recent decades, there has been a global downward trend in real interest rates of between two and three percentage points. But there is considerable uncertainty in these estimates. The different studies also reach different results regarding both how large the downturn is and exactly when it started. On the other hand, they all indicate that the trend level of global interest rates has been close to zero in recent years.

According to standard macroeconomic models, there is a close relationship between a country's real interest rate and the growth rate of its economy. However, several empirical studies indicate a weak or non-existent correlation between trend changes in both variables. There are certainly reasons to interpret these results with caution. The body of data that can be used to study slowly acting, global trends is fairly small, for natural reasons.

Both economic theory and correlations in the data suggest instead that demographic changes, such as shifts in the age composition of the population, are significant for real interest rates. The mechanisms behind these correlations are certainly complex. Overall, however, there is comparatively strong empirical support for the existence of a correlation between trends in real interest rates and the age composition of the population as well as the supply of labour.

An analysis of the current accounts in different countries points fairly clearly towards there also being a correlation between falling real interest rates in the western world and the remarkably high levels of saving in China and other Asian emerging market economies from the end of the 1990s and on. Asia's exports of savings to the west can explain why saving has fallen in several advanced economies at the same time as real interest rates have fallen around the world.

A further factor that has probably contributed towards pushing real interest rates down is an increase in premiums for those assets considered safe. Higher premiums on safe assets,

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1 Examples of other factors mentioned in the literature include falling relative prices for investment goods, a more uneven distribution of income among households and lower public investment. Rachel and Smith (2015) and Bean et al. (2015) provide non-technical overviews of the literature. Rachel and Smith's original study was published as a working paper by the Bank of England in 2015 and a shorter version was published two years later (Rachel and Smith, 2017). Lunsford and West (2019) use a substantial amount of data and long historical time series to investigate the degree of covariation in the data between, on one hand, the real interest rate in the United States and, on the other, a large number of variables that have been linked in the literature to the trend in recent decades towards lower interest rates. The results of this study provide weak or no support for the hypothesis of a link between trend changes in the real interest rate and trend changes in the relative price of investment goods. The study also indicates that there is only weak support for the hypothesis of a link between the real interest rate and measures of inequality in income distribution.

such as government bonds, mean that the yields for these bonds are becoming lower. But the increase also has the consequence that the return on higher-risk assets, such as equities, is falling less than the downturn in government lending rates.

## 2 Data and estimations of trends

Yields on treasury bills and government bonds are significantly lower in most advanced economies today than they were at the start of the 1990s. In many countries, this means declines of 10–15 percentage points. A large part of this downturn in nominal interest rates can be explained by the transition from high to low-inflation regimes that took place in the 1980s and 1990s. But returns on loans have fallen, even after adjustment for expected or actual inflation. Real interest rates are currently significantly lower than they were 30 years ago in virtually all advanced economies and the same is true for many emerging market economies. However, the average (GDP-weighted) decrease is smaller in emerging market economies. The dispersion in real interest rates is also greater between countries in this group than it is between advanced economies. Households and companies are currently facing significantly lower real interest rates than they did 30 years ago, even if real interest rates in general have fallen less than interest rates on government loans.<sup>2</sup>

The upper graph in Figure 1 shows the median of the real interest rate on government borrowing with short maturities (corresponding to treasury bills) and the yield for government bonds with long maturities, respectively, in 16 advanced economies. The real interest rate is calculated as the difference between the nominal return on each debt instrument minus the expected inflation measured using the GDP deflator.<sup>3</sup> We can see a pattern in the graph in which real interest rates initially show a rising trend from the decades after the Second World War until the beginning of the 1990s. They subsequently fall in the period from the 1990s onwards. According to these two measures, the global real interest rate on government borrowing has fallen by between 6 and 7.5 percentage points since 1990.

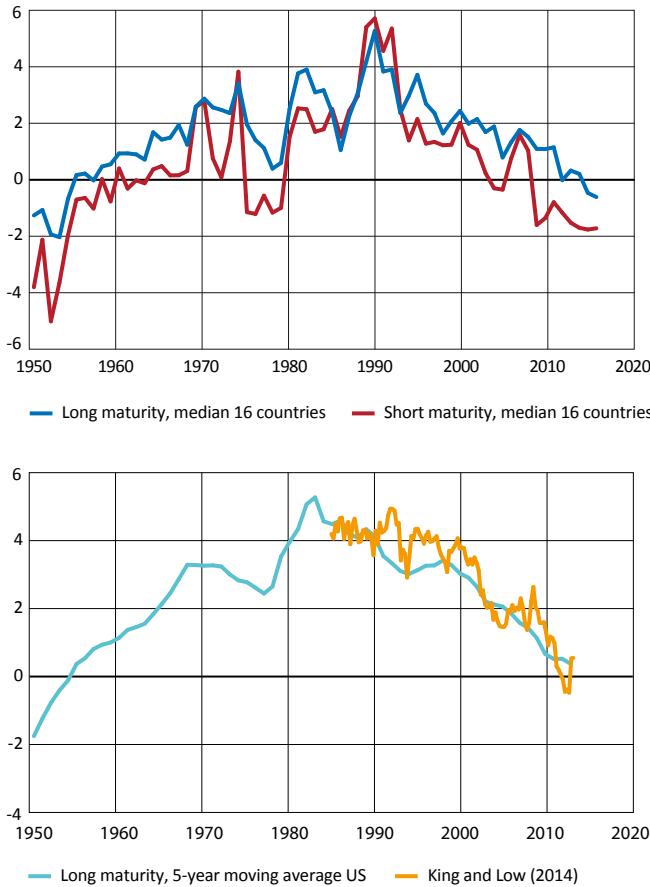
Exactly when the trend turns from rising to falling varies according to the country studied and the method used to calculate real interest rates. There is therefore reason to consider several different measures from different countries and groups of countries in order to obtain a fair picture of developments. In the lower graph in Figure 1, the turquoise line shows a five-year centred moving average of the real interest rate for US government bonds with long maturities. This shows that the real interest rate in the United States had already reached its highest level by the early 1980s. This peak coincides with the tightening of monetary policy by the US central bank to combat the high rates of price increase established in the 1970s. Following this, the real interest rate in the United States gradually started to fall and the downturn continued over the rest of the period covered by the graph.

King and Low (2014) report a measure of the global real interest rate that is interesting for a couple of different reasons. Firstly, they use data from trade in inflation-indexed (real) government bonds and they can therefore calculate a measure of expected inflation among the investors trading in the bonds. Secondly, King and Low (2014) only use data from countries with high credit ratings and they strive to calculate measures of the real interest rate that are comparable from country to country. King and Low's (2014) measure of the 'world' real interest rate is shown as the orange line in the lower graph in Figure 1. There, we can see that the downturn in the 'world' real interest rate is smaller than the downturn in

<sup>2</sup> See Rachel and Smith (2015), sections A and D6.

<sup>3</sup> Figure 1 presents four different measures of real interest rates in advanced economies. Three of these measures (the blue, red and turquoise lines) have been calculated using data for nominal interest rates and inflation in 16 countries taken from Jordà et al. (2019). In all three cases, an average of a forecast from a simple autoregressive model, AR(1), and inflation over the 5 previous years is used as a measure of expected inflation. The parameters of the AR(1) model are estimated separately for each country and year in the sample. King and Low (2014) use prices for inflation-indexed government bonds in Canada, France, Germany, Japan, the United Kingdom and United States to calculate a measure of the 'world' real interest rate.

**Figure 1. The real interest rate for government borrowing, 1950–2016**  
Per cent



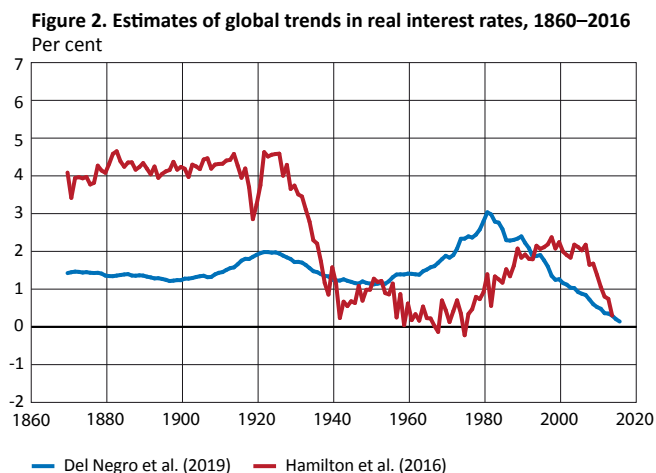
Note. For an explanation of the different measures of real interest rates shown in the figure, see the text of the article and footnote 3. Data in the lower part of the figure ends in 2013.  
Sources: Jordà et al. (2019), King and Low (2014) and own calculations

the measures based on the group of 16 countries shown in the upper graph. The figure also shows that a clear downturn in the global real interest rate, according to this way of calculating it, first started at the end of the 1990s or beginning of the 2000s, more than ten years after real interest rates in the United States had started to turn downwards. According to King and Low’s (2014) calculations, the global real interest rate has fallen from a level of around 4 per cent in the mid-1990s to a level of around zero in 2013.

Depending on the choice of calculation method and samples of countries, quite different conclusions can be reached concerning the size of the downturn in real interest rates. The different measures discussed here indicate a downturn since 1990 of between 4 and 7.5 percentage points in the real interest rate that governments pay for their borrowing.

### 2.1 How large is the global trend downturn?

In the previous section, we saw that the downturn in real interest rates was between 4 and 7.5 percentage points depending on the choice of calculation method and sample of countries. But how large a proportion of this downturn forms a trend change in real interest rates and how much can be ascribed to less long-lasting or cyclical factors? Over the last 15 years, a great many studies have been published which use various methods to estimate trend or equilibrium levels for real interest rates. Most focus on individual countries or groups of countries, where the equilibrium level in each individual country is estimated independently of developments in other countries. Here, we focus instead on three studies that estimate a global trend or a global time-varying equilibrium level.



Note. The blue line shows the estimate of the trend in the global real interest rate from Del Negro et al. (2019) and the red line shows the estimate of the long-run world real rate from Hamilton et al. (2018).

Sources: Hamilton et al. (2016) and Del Negro et al. (2019)

Three different types of method dominate the literature on trends and equilibrium levels for real interest rates.<sup>4</sup> The first of these uses comparatively simple statistical models to distinguish between trends and more cyclical or temporary changes in the real interest rate. In most cases, this means univariate statistical models, where only a single time series over the real interest rate is used as measurement data. As they use univariate models, these methods, strictly speaking, can only be used to estimate trends for one country at a time. Hamilton et al. (2016) use this kind of method, together with long, historical data series from 17 different advanced economies, to estimate 17 country-specific trends for the real interest rate on loans with short maturities. In several cases, the data and the estimated trends stretch all the way back to the 1860s. For each of the years in the sample, the authors then calculate the median of the trend level in the various countries and use it as a measure of a global trend level. The result, shown as the red line in Figure 2, indicates that the most recent global trend towards lower real interest rates first started in conjunction with the outbreak of the financial crisis in 2007. According to this estimate, the trend level falls from just over 2 per cent in 2007 to between 0 and 0.5 per cent in 2014.

One possible objection to the trend estimation in Hamilton et al. (2016) is that their method does not explicitly take account of how the interest rate in one country can be affected by interest rates in other countries. After all, in this case, the estimation is made for one country at a time. Del Negro et al. (2019) use a more advanced method in this respect and simultaneously estimate trends for seven different countries. They use data for nominal interest rates with different maturities together with inflation data from each of the countries, among other variables. Unlike the earlier trend estimation made by Hamilton et al. (2016), Del Negro et al. (2019) also use certain simple economic conditions of no-arbitrage between assets in various currencies when motivating their model specification. This study is an example of the second of the three types of method mentioned earlier: it uses information from interest rates of different maturities to estimate one or more common trends and the extraction of trend and cycle relies, to a certain extent, on conditions derived from economic theory. The blue line in Figure 2 shows the trend in the global real interest rate as estimated by Del Negro et al. (2019). This differs in several important respects from the trend estimated by Hamilton et al. (2016). For example, the trend from Del Negro et al. (2019) shows less variation over time, at the same time as the most recent negative trend starts earlier. Another striking result is that the current low trend level is the lowest for the

<sup>4</sup> The discussion in this section is partly based on Kiley (2019).

entire period, which runs from the second half of the 1800s until 2016. Between the years 1981 and 2016, the trend level falls from three per cent to close to zero.

An important difference between the estimation in Hamilton et al. (2016) and the one in Del Negro et al. (2019) is thus that the latter study assumes that the fixed-income markets in different countries are interlinked and that there is a global, common trend for the real interest rate. This seems to be a highly reasonable starting point from which to describe today's internationally integrated capital markets, in which assets can be moved rapidly and at a low cost between different countries and currency areas. Is this difference an argument for relying more on the estimate from Del Negro et al. (2019) than on that from Hamilton et al. (2016)?

The answer is not obvious. The reason for this is that the degree of international economic integration has varied considerably over the long period investigated in both studies. Put simply, it could be said that the capital markets in the world's advanced economies were deeply integrated from the final decades of the 1800s until the outbreak of the First World War. During this period, the leading industrialised countries used the gold standard as a basis for their monetary systems. The gold standard implied an arrangement with fixed exchange rates and comparatively free and rapid capital movements between different countries and currency areas. During this period, the international goods trade grew rapidly. This changed when transformative crises impacted the world economy between 1914 and 1945: the two World Wars, the Wall Street Crash of 1929 and the subsequent Great Depression. After the Second World War, a new international economic policy regime was created, based on the agreement made in Bretton Woods in the United States, with fixed but adjustable exchange rates and trade in goods that again started to grow rapidly. However, unlike the earlier period with the gold standard, the Bretton Woods system involved comparatively strict regulation of international, private capital movements. It was not until the end of the 1960s that this system gradually started to be liberalised. In some respects, it would take until the end of the 1990s or start of the 2000s for the world economy to reach the same high degree of globalisation as existed in the heyday of the gold standard 100 years previously.<sup>5</sup>

It is thus not obvious which of the two studies, Hamilton et al. (2016) and Del Negro et al. (2019), which makes the most appropriate assumptions when modelling trends in real interest rates. The assumption in Del Negro et al. (2019) of a common, global trend has its obvious advantages for those periods in which international capital movements have been deregulated and there have been clear tendencies towards convergence between real interest rates in different currency areas. But for estimations that cover the half century or so from 1914 until the 1970s, the method in Hamilton et al. (2016) may have its advantages, as the assumption of a common global trend is significantly harder to justify for this period.<sup>6</sup>

The third method of estimating trends or equilibrium levels utilises more guidance from economic theory than the other two. It uses data on interest rates, inflation, GDP and possibly other variables, together with equations from theoretical models. According to modern theory of monetary policy, there is a link between, on one hand, resource utilisation in the economy and, on the other, the difference between the actual real interest rate and the level for the real interest rate usually referred to as the natural interest rate. This link forms the core of a large number of studies that estimate a time-varying equilibrium level for

5 Obstfeld and Taylor (2003) analyse the long-term lines of this development and note that the world's leading capital markets were most tightly interlinked in two historical periods: the decades before the First World War and the most recent decades. Eichengreen (2019) describes in more detail how the international monetary system has developed over the last 150 years and explains how the different systems, such as the gold standard, functioned. Ahamed (2009) focuses on a period that is particularly interesting in this context – the interwar period – and on the central bank governors in France, Germany, the United Kingdom and the United States who took centre stage in efforts to revive the gold standard.

6 It should, however, be pointed out that free international capital movements are not a necessary condition for real interest rates in different countries to converge. Ohlin (1933) showed that the price of production factors in different countries tends to even out through trade in goods. See also Krugman and Obstfeld (2003), chapter 4.

the real interest rate. The best known of these is the specification that was introduced by Laubach and Williams (2003) in their estimation of the United States' natural interest rate. This specification has, in turn, inspired a large number of studies that use variations of it to estimate time series for the natural interest rate in different countries.

Laubach and Williams (2003) model the United States as a closed economy and this has also been the starting point for most of the subsequent studies.<sup>7</sup> The results of these studies generally show significant trend downturns. Kiley (2019) provides an interesting exception in the group of studies inspired by Laubach and Williams (2003). The reason for this is that Kiley (2019) expands the model to simultaneously estimate the natural interest rate in 13 advanced economies. It is assumed that the natural interest rate in each separate country is partly determined by a common, global trend.<sup>8</sup> For most of the countries in the sample, data stretches from the mid-1960s until 2019. The assumption of a common, global trend is therefore less problematic in this study than in the study by Del Negro et al. (2019). The results of the estimation in Kiley (2019) indicate that the median of the natural interest rate in the various countries fell from around two per cent in the mid-1990s to around zero in 2019.

The three studies cited here thus indicate that the estimated trend in the global real interest rate appears different depending on the method and data used. The results in Del Negro et al. (2019) indicate that a negative trend has affected the real interest rate ever since the 1980s but, according to Hamilton et al. (2016), the trend does not clearly change until the second half of the 2000s. The estimation in Kiley (2019) indicates that the global trend towards lower real interest rates started around the year 2000. The magnitude of the estimated downturn varies from almost two to three percentage points. At the same time, it is worth noting that all three studies conclude that the trend level of the global real interest rate has fallen significantly in recent decades. In addition, all three studies indicate that the level of the global trend, or alternatively the level of the global natural interest rate, is close to zero in the middle or in the second half of the 2010s.<sup>9</sup>

### 3 Possible explanations for the downturn in real interest rates

Most studies attempting to explain the negative trend in real interest rates concentrate on structural changes that have affected supply or demand for savings. When it comes to supply, there is often a focus on household saving, although central government saving is also discussed. In practice, saving in the corporate sector is also relevant. Demand refers to total demand for investment. The idea is that supply and demand must be balanced at the prevailing real interest rate and that there is a long-term equilibrium level at which the economy is in a cyclical balance that defines the real, long-term equilibrium interest rate.<sup>10</sup>

7 See Holston et al. (2017) for examples of this type of estimation and for references to other similar studies. Armelius et al (2018) estimate the neutral interest rate in Sweden with the help of a model that is similar to the one used in Laubach and Williams (2003) but that in some respects incorporate the fact that Sweden is a small, open economy.

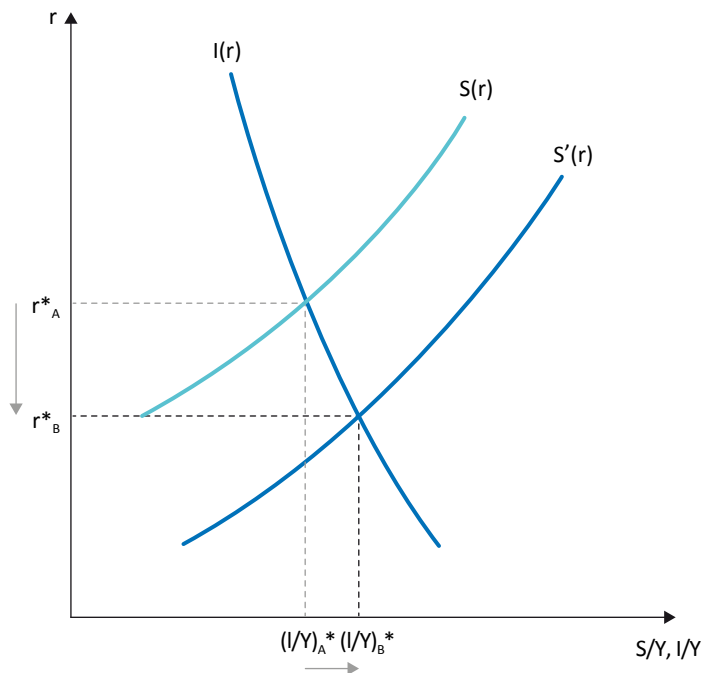
8 In Kiley (2019), the natural interest rate in each separate country is affected by shocks that are specific to that country and by a global shock that is common to all 13 economies in the sample. Correspondingly, resource utilisation in each individual country is affected both by cyclical shocks that are specific to that country and by a global cyclical shock. The 13 countries in the sample are Australia, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, South Korea, Spain, Switzerland, the United Kingdom and the United States.

9 Alongside the results that are discussed in the main text and which are based on a model inspired by Laubach and Williams (2003), Kiley (2019) also presents results from estimations based on simpler methods. Also in this case, the data comes from the group of 13 advanced economies (see the previous footnote). One of these estimations uses comparatively simple, univariate statistical methods resembling those used in Hamilton et al. 2016. Another uses a term structure model that has several similarities to the model used by Del Negro et al. (2019). The result of the approach using univariate models, which does not explicitly take account of the interconnection between countries, indicates a trend downturn in the median of real interest rates in the various countries of just over one percentage point from the mid-1990s to 2019. The corresponding results from the term structure model indicate a downturn of about two percentage points.

10 See Borio et al (2017) for an example of an alternative view on the driving forces of the trend towards lower real interest rates.



**Chart 1. Effects on the global real interest rate of a higher global supply of savings. A schematic illustration.**



Note. Schematic illustration of a global, long-term equilibrium in which the supply of savings,  $S(r)$ , and demand for investment,  $I(r)$ , become balanced at the interest rate  $r^*$ . The horizontal axis measures the world's total saving and investment as a proportion of the world's GDP, denoted as  $Y$ . The vertical axis measures the real return on saving and investment. The chart shows an increase of the global saving ratio which causes investment's share of GDP to increase and the long-term real interest rate to fall.

In the previous section, we discussed the fact that the degree of international economic integration has varied significantly over the last 150 years. However, at least from the 1990s and on, there is reason to talk about a global market for capital and a real interest rate that is determined on a global level. Chart 1 shows a schematic illustration of a global equilibrium in the supply and demand of savings. Total supply in the world,  $S(r)$ , is assumed to increase as the global interest rate,  $r$ , becomes higher. This is because a higher interest rate means a higher return on savings. Correspondingly, it is assumed that demand for investment,  $I(r)$ , is negatively dependent on  $r$ . The vertical axis shows the level of the real interest rate. The horizontal axis shows saving and investment as a proportion of the world's total GDP. For individual open economies that have deregulated their capital markets, there is no reason to expect domestic saving to correspond to total domestic investment. But for the world as a whole, total investment must correspond to total saving. Equilibrium is originally at the level of the real interest rate equivalent to  $r^*_A$ , where supply  $S(r)$  equals demand  $I(r)$ . The figure illustrates how supply shifts outwards, from  $S(r)$  to  $S'(r)$ . The higher supply leads to the equilibrium interest rate falling, from  $r^*_A$  to  $r^*_B$ .

Of course, this conceptual framework is very simple and is primarily intended to act as support for a structured discussion of which mechanisms may have contributed towards creating trends in the real interest rate. For the moment, we will disregard the fact that households and companies face other (often higher) interest rates than those that apply to central governments. We will return to this matter later; at present, we can imagine a simplified situation where these premiums are constant over time and thus are not of decisive importance for how equilibrium is determined.

### 3.1 Lower potential growth

What kind of structural changes could then lead to increasing global saving? One example that is often emphasised is that trend growth fell in the mid-2000s and that there is reason to expect growth to remain comparatively low in the coming decades.<sup>11</sup> According to standard macroeconomic models, expected growth is an important factor when households choose how much of their income to save. Several economists have also linked worsened growth prospects and persistent low interest rates (Fischer 2016 is an example that is often referred to). A large number of studies based on Laubach and Williams' (2003) method also find that lower potential growth forms an important driving force behind the negative trend in real interest rates.

Why then should the real interest rate be affected by a deterioration of long-term growth prospects? According to macroeconomic theory, there is, as already referred to, a close relationship between the level of expected growth and the level of the real interest rate. The assumption is that most households take careful, forward-looking decisions about consumption and saving and that they realise the importance of the real interest rate for these decisions. The higher the real interest rate is, the more households will be able to increase their purchasing power in the future if they save a little more now. One important assumption here is that most people try to avoid having the level of their consumption vary heavily over time. Households therefore make plans for their private economies, for example by saving for their pensions, when incomes usually become lower, and building up buffers for unexpected events.

But how is this trade-off between consumption and saving affected if growth prospects worsen? The answer depends on what lies behind the worsened growth prospects and how this affects variables important for households. One initial important distinction can be made between changes in GDP growth due to changes in the supply of labour, on one hand, and ones that are due to changes in labour productivity, on the other. In this section, we focus on changes in the trend, long-term growth of labour productivity.<sup>12</sup>

If productivity is expected to rise at a lower rate, average real wages will also increase more slowly and most households will thereby have lower expected real lifetime incomes. Young households, which often have fairly low or even negative savings, will then have reason to change their behaviour. For example, a mortgage of a given size will be more difficult to repay if real wages increase more slowly over a working life, and many households may perhaps decide to purchase less expensive homes if they expect lower real wage growth. Correspondingly, it can be imagined that a great many households will spend less money on car purchases and holidays. If many households change their behaviour in this way, aggregate consumption will be lower and the saving ratio higher. A higher saving ratio, due to lower long-term growth prospects, is an example of a structural change leading to an increased global supply of saving, as illustrated in Chart 1 above. Assume that households originally believe that growth prospects are fairly good and that the total supply of saving is given by  $S(r)$ . Demand for saving,  $I(r)$ , is in turn determined by the size of investment that households, companies and authorities decide to undertake, given that the real interest rate is  $r$ . Supply and demand are in balance at the original real equilibrium interest rate  $r_A^*$ . But when households realise that the long-term growth prospects are less favourable than they had originally believed, they increase their saving for each given level of the real interest rate.

11 Different economists have different opinions on the future, long-term growth prospects. According to the US economist Robert J Gordon, there are several factors indicating that growth in the United States in the coming decades will probably be lower than the average growth rates recorded during the 20<sup>th</sup> century. See, for example, Gordon (2015).

12 Several other accounts discuss the effects of lower growth on companies' willingness to invest and on demand for savings (Rachel and Smith 2015, Kiley 2019). Here, however, the focus is on household saving. In a macroeconomic model with forward-looking households, households' saving behaviour can formally be analysed via what is known as the Euler equation. The equation describes a relationship between the individual household's expected consumption growth, the real interest rate and other factors that affect saving behaviour. See Lundvall and Westermarck (2011) for a description of a simple macroeconomic model that includes long-term growth but that disregards capital and thus companies' willingness to invest.

The global supply of saving then shifts outwards, from  $S(r)$  to  $S'(r)$ . For the sake of simplicity, we assume that the change in households' expectations of future growth does not affect demand for saving. The result is that the real equilibrium interest rate falls, from  $r^*_A$  to  $r^*_B$ .

Rachel and Smith (2015) assess the effects of worsened growth prospects in the United States on the global real interest rate. This is because productivity growth in the United States is often seen as an indication of the level of productivity growth it may be possible for other countries to achieve, as the United States is seen as a leading country for innovation and development. Rachel and Smith (2015) note that average growth per capita was relatively stable from the 1980s until the financial crisis. It therefore seems difficult to point to worsened growth prospects as an explanation for the fall in real interest rates ahead of the financial crisis, based on measured, actual growth rates. After the financial crisis, however, growth per capita has been lower and several influential economists predict that future growth will probably also be lower than during the decades leading up to the financial crisis. Lower potential growth could thereby explain part of the downturn in real interest rates occurring during and after the financial crisis.<sup>13</sup>

The previous section discussed a method of estimating trends developed by Laubach and Williams (2003). A central equation in their model is derived from assumptions concerning the trade-off between consumption and saving made by households. The estimates of the model made by Holston et al. (2017) indicate that the potential annual growth rate in the United States was about 2 percentage points lower in 2015 than at the end of the 1990s. Based on theory, the model postulates a relationship between potential growth and equilibrium interest rate that entails a correspondingly large negative effect on the real interest rate of minus 2 percentage points.

Rachel and Smith (2015) and Holston et al. (2017) are thus examples of studies that find that worsened growth prospects have led to lower real interest rates. However, it is important to note that, in these studies, no empirical test has been carried out of the theory's prediction that lower growth leads to lower real interest rates.<sup>14</sup> Instead, this prediction forms a starting point for the conclusions. In recent years, however, a number of studies have been published that analyse the relationship in the data between trend or average growth and trend changes in real interest rates. These studies generally indicate that the relationship is weak and that the strength of the link can vary considerably, depending on which countries and periods are included in the data material. The conclusions apply to both the real interest rate's connection to GDP growth and to the growth in GDP per capita. As we are focusing on the relationship between the real interest rate and productivity growth in this section, we are concentrating on the results applicable to growth in GDP per capita.<sup>15</sup> This is because trend changes in growth in GDP per capita can be seen as a rough measure of trend changes in productivity growth.

Goldman Sachs (2014) calculates a measure of the real discount rate in a sample of 19 countries. In most cases, data goes back to the first half of the 1800s. For each of these 19 countries, the long period is divided into 13 time intervals and, for each time interval, the median of the real interest rate and growth in GDP per capita is calculated. These observations are then used in a simple regression analysis (in which the median for each period and country forms one observation), in order to estimate the correlation between

13 Based on a review of several studies, Rachel and Smith (2015) make the assessment that productivity growth over a fairly long time period can be expected to be about 0.5 percentage points lower than it was in the United States in the decades prior to the financial crisis. They argue that it is therefore reasonable to expect that the real interest rate will persistently be between 0.5 and 1 percentage point lower than prior to the crisis.

14 Rachel and Smith (2015), however, base their work on Havranek (2015), who conducts a metastudy of a large number of empirical studies estimating households' intertemporal consumption elasticity. According to economic theory, this elasticity is of decisive significance for the connection between expected growth and the real interest rate. However, the majority of the studies analysed by Havranek (2015) use either monthly or quarterly data. It is thus unclear whether the results from their studies can be used to draw any conclusions on the relationship between changes in long-term (trend) growth prospects and real interest rates.

15 Bosworth (2014) and Hamilton et al. (2016) analyse trend changes in real interest rates and GDP growth and both studies find that the relationship between the two variables is weak.

real interest rates and growth, among other variables of interest.<sup>16</sup> The results do not indicate any statistically significant relationship between the real interest rate and growth.<sup>17</sup>

Lunsford and West (2019) focus on the real policy rate in the United States and investigate the correlation between a large number of domestic and international variables that, according to economic theory, can affect the real interest rate. The authors use data that, in some cases, goes back to the 1890s and here they study the relationship over different periods. Lunsford and West (2019) investigate the relationship between the real interest rate and US growth per capita in both GDP and consumption, as well as growth in total factor productivity (TFP). In addition, they complement the investigation with an analysis of the real interest rate in the United States and growth per capita in about 20 other countries. The results indicate a weak correlation between the real interest rate and GDP growth and a comparatively clear, negative correlation between the real interest rate and US TFP growth.<sup>18</sup>

The findings of these two studies are based on comprehensive data and thus indicate a weak correlation between trends in the real interest rate and trend growth in GDP per capita. In addition, the study by Lunsford and West (2019) indicates a negative correlation between real interest rates and trend TFP growth. The results raise questions around assessments and model estimates that assume the existence of a relationship between real interest rates and productivity growth, and thereby also around the above-mentioned studies that give lower potential or trend growth as a reason for a lower real equilibrium interest rate.

At the same time, there are reasons to interpret these results with caution. One such reason is that individual trends often last for several decades. Consequently, there is only a limited amount of information on the relationship between trends in different variables, even in long historical time series. In the macroeconomic literature, it is therefore common to study covariations between factors in several different countries, to make use of experiences from each country. However, in the question being analysed here, and which concerns the determinants for the global real interest rate, this is hardly a possible way forward.<sup>19</sup>

Both average productivity growth and real interest rates have been low in many countries over the last ten years. However, based on the studies we have reviewed here, it is unclear whether the enduring downturn in real interest rates since the financial crisis can really be linked to the worsened growth prospects.

### 3.2 Demographic factors

Changes in the age composition of the population are significant for many macroeconomic variables, such as labour supply, potential growth, companies' willingness to invest and households' average saving ratio. Demographic changes could thereby conceivably affect the real equilibrium rate via several different channels.

One such channel, which is often discussed in the literature and the public debate on economic policy, is linked to how inclined households are to save. It has been well documented that there exists a clear correlation on the individual level between age and

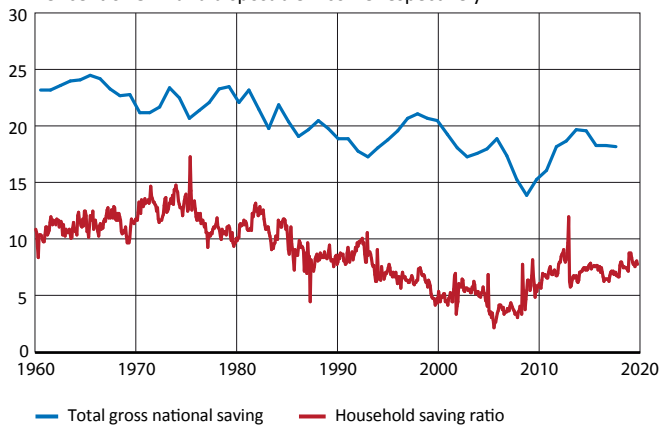
<sup>16</sup> The authors also allow for country-specific fixed effects and they control for the level of inflation, the public debt ratio, the occurrence of crises in the banking system and of war.

<sup>17</sup> The point estimate from the regression indicates the following relationship: if growth in GDP per capita falls by one percentage point, the real interest rate will fall by 0.10 percentage points.

<sup>18</sup> Another study that analyses the connection between trends in real interest rates and GDP growth is Leduc and Rudebusch (2014). The authors note that the US expert authority, the Congressional Budget Office, and some members of the Federal Reserve's monetary policy committee, the FOMC, made downward revisions of their forecasts for the long-run real interest rate in conjunction with their downward revisions of potential growth in 2014. Leduc and Rudebusch (2014) investigate corresponding forecasts from the private sector and find, perhaps surprisingly, that these forecasts do not show any discernible correlation between potential growth and the long-run real interest rate.

<sup>19</sup> In addition, Kiley (2019) points out that the downturn in global growth took place at the same time as we have observed slow changes in other possible explanatory factors, for example those linked to demographics. Under such circumstances, it may be difficult to distinguish which of these factors affect the real interest rate.

**Figure 3. Saving in the United States, 1960–2019**  
Per cent of GDP and disposable income respectively



Note. The blue line shows the United States' total national gross saving as a percentage of gross national income. The red line shows the average household saving ratio, expressed as a proportion of disposable income.

Source: NIPA table 5.6, Bureau of Economic Analysis

saving in most countries, where young people, for natural reasons, consume significantly more than they save, while middle-aged people usually save a significant proportion of their incomes. Older people often have relatively high consumption, as expenses for health and medical care are also counted as part of consumption in economic terms. Persons aged 65 or older also have comparatively low average employment incomes. Taking account of consumption taking place via public or private insurance systems (including expenses for health and medical care) it becomes clear that older people are contributing to restraining society's total saving.<sup>20</sup>

In many of the world's countries, significant changes have been occurring in the age composition of the population for several decades. The proportion of people in the ages 40–64 has increased quite rapidly and their share of the world's total population had increased to a good bit over 30 per cent by 2010. This can be compared with around 25 per cent in the 1950s. The percentage of older people in the population has also increased, albeit at a significantly slower pace. One important reason for this shift in the age composition is the unusually large number of children born after the Second World War (see Bean et al. 2015).

A high proportion of middle-aged people should lead to a high average saving ratio. As the share of middle-aged people in the population has increased, it could therefore be expected to lead to a gradual outward shift in the supply of savings (compare with Chart 1). Several studies have therefore indicated that changes in the age composition of the United States and other large economies can probably explain part of the downturn in interest rates. A related phenomenon, which should also contribute towards a high level of saving, is that life expectancy in recent decades has increased at a significantly faster pace than the average age at which people retire. Being a pensioner for a longer proportion of your life requires you to save more while you are working.

One problem with this reasoning, however, is that saving ratios have fallen in several western countries over the same decades as the real interest rate has shown a falling trend. For example, Figure 3 shows total gross saving in the United States, expressed as a percentage of gross national income. We can see that saving was comparatively high at the end of the 1960s and in the 1970s, when the trend in the US real interest rate was upward (compare with Figure 1). During the period when the real interest rate in the United States was showing a falling trend, from the start of the 1980s until 2010, the saving ratio in the

<sup>20</sup> See, for example Rachel and Smith (2015), section D.

United States instead showed a clear downward trend. A similar picture emerges from an examination of total saving in the G7 countries. Figure 3 also shows that the downward trend in total saving in the United States was partly due to households saving less.

The fact that the saving ratio has fallen in several large, advanced economies shows that the link between the age composition of the population and real interest rates is not as clear and intuitive as is sometimes claimed. So what other channels are there through which demographic changes can affect the equilibrium interest rate? We mentioned earlier that the supply of labour affects companies' incentive to invest. Demographic changes often affect the supply of labour and there is therefore reason to expect that such changes will affect demand for savings, via companies' investment decisions.

In periods of unusually low growth in the supply of labour, it is often optimal for companies to choose a lower rate of growth in the capital stock, for a given interest rate level. Chart 1 above provides a schematic illustration of the equilibrium on the market for saving and investment. A lasting downturn in the labour supply would lead to an inward shift of demand for investment for each given level of the real interest rate. In equilibrium, both the real interest rate and the investment ratio would thereby be lower.<sup>21</sup>

A conceivable explanation for the falling saving ratio in many countries is therefore that demographic changes have simultaneously led to a higher supply of savings and a lower demand for investment, and that this second effect has dominated. According to this hypothesis, the saving ratio should certainly have increased for each given level of the real interest rate (an outward shift in the supply curve  $S(r)$ ). At the same time, however, the lower willingness to invest should have led to an inward shift in demand for savings,  $I(r)$ . If the shift in the  $I(r)$  curve is large, the equilibrium interest rate may fall so far that the household saving ratio falls, even though the  $S(r)$  curve has shifted outwards. Once circumstance in favour of this hypothesis, alongside the falling saving ratio, is that the ratio of investment to GDP has also fallen in several advanced economies. Among the G7 countries, the ratio of total investment to GDP fell from a level close to 25 per cent at the end of the 1980s to a level around 20 per cent in 2010.<sup>22</sup>

To analyse and quantify the effects demographic changes have on interest rate formation, economists often use overlapping generation models (OLG models). These models allow economists to account for changes in the birth rate, life expectancy and other demographic variables and to use simulations to calculate the effect of these variables on the economy's general equilibrium. Gagnon et al. (2016) use an OLG model to analyse the macroeconomic effects of post-war demographic changes in the United States. As has already been mentioned, birth rates in the United States and several other western countries were high in the decades after the Second World War, the so-called baby boom. When these children reached adulthood, which happened between the years 1965 and 1985 in the United States, the labour force grew rapidly. The effect was reinforced by women in this generation having significantly fewer children and working to a greater extent than women in previous generations. Gagnon et al. (2016) carefully reconstruct these demographic trends in the OLG model and then carry out simulations to quantify the effects on the real interest rate, among other variables. The total effects of a lower birth rate, a higher employment rate and increasing longevity can explain a trend decrease in the real interest rate corresponding to about 1.25 percentage points.

21 A standard result from macroeconomic theory is that the marginal return on capital, and thereby the average company's incentive to invest, is closely linked to the average ratio between the number of hours worked and the amount of available capital. If the labour supply is unusually low over a period, the ratio of labour to capital will be low when the capital stock is adjusted to the new, lower level of the labour supply. In turn, such a development will push down the marginal return on capital, thereby dampening companies' incentive to invest in new capital.

22 This refers to gross capital formation as a share of GDP in the G7 countries, calculated as a GDP-weighted average of the shares of the individual countries. The weights refer to GDP at PPP. Own calculations based on data from the IMF's World Economic Outlook Database, October 2019.

In this and similar studies, one of the most important mechanisms seems to be companies' incentive to invest. According to the simulations, the higher labour supply from the baby boom generation led to the ratio of labour to capital rising in the 1960s and 1970s. This ratio then fell heavily from the mid-1980s on. In the models, the marginal return on capital is closely linked to the real return on savings, and the real interest rate therefore rises in the 1960s and 1970s, before falling markedly between 1985 and 2020.<sup>23</sup>

One interesting result from the simulations is that the household saving ratio is at its highest around 1980, when the real interest rate is also at its highest, and that it then falls significantly until 2020, at the same time as the real interest rate falls over the entire period. It therefore seems as though the effects of a reduced labour supply, and thereby lower demand for investment, on the equilibrium interest rate dominate the effects of a changed supply of saving. During the period from 1960 until 2020, the real interest rate is at its lowest in 2020, at the same time as the saving ratio, according to the simulations, also reaches its lowest level.<sup>24</sup>

Simulations from the OLG models thus seem to be able to explain why the saving ratio in the United States fell over the same period as the real interest rate showed a falling trend, from the mid-1980s until 2010. Unfortunately, criticism can also be levelled at this interpretation of the reasons behind the trend decline of real interest rates. This is because the real interest rate on savings is closely linked to the marginal return on capital in the OLG models: a low marginal return on capital means a low real return on savings and vice-versa. In turn, this means that the average return on capital is also closely linked to the real return on savings. If the interpretation of the OLG models is correct, the average return on capital in the United States should have fallen over the same period in which real interest rates fell. But studies calculating the return on capital in the United States do not indicate any such trend. These instead show that the real return on capital in the US private sector has been stable or has increased slightly since 1980.<sup>25</sup> All calculations of the average return on capital presume quite a lot of assumptions, each of which can be questioned, and the results reported in the literature should therefore be interpreted with some caution. But there is nothing to indicate that the return on capital in the United States should have fallen in the decades when the real interest rate was showing a falling trend.

Objections can thus be raised concerning the OLG models' predictions on the relationship between the real interest rate and demographic changes. However, despite these objections, there is quite strong empirical support for a relationship between the real interest rate and various demographic factors. For example, several studies find that the real interest rate in the United States has been comparatively low in periods when an unusually high proportion of the population have been in the ages of 40 to 65. Some studies also indicate a correlation between real interest rates and the proportion of the population which is either young or over 65, known as the dependency ratio.<sup>26</sup> In addition, one of the studies mentioned in the

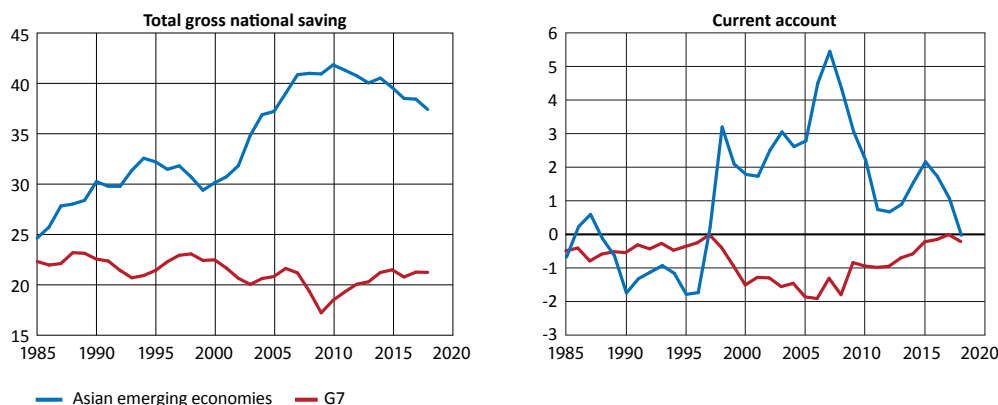
23 The households and companies in the model expect these effects on the marginal return on capital long before the effects actually arise. Gagnon et al. (2016), like most other studies of this kind, assume that households and companies are forward-looking, that they have correct expectations of how different variables affect the equilibrium of the economy and that there is no uncertainty over the future development of the economy.

24 Krueger and Ludwig (2007) provide another example of a model with overlapping generations, where a changed age composition leads to downturns in both the real interest rate and the saving ratio. In this case too, the effects on the equilibrium interest rate seem to be dominated by the supply of labour and its effects on the ratio of labour to capital. See also the related studies by Geppert et al. (2016) and by Lisack et al. (2017).

25 A common assumption in OLG models is that households only have access to one kind of asset for saving, namely capital. Simulations of the models are often made under the assumption of perfect foresight, meaning that future economic developments are known to all households and companies when they take their decisions. Consequently, there is no possibility in these models to distinguish between assets whose return is risk-free and assets whose return is associated with risk. For calculations of the return on capital in the United States, see Caballero et al. (2017b), Gomme et al. (2011) and Koh et al. (2018).

26 Favero et al. (2016), Fiorentini (2018), Lunsford and West (2019), Poterba (2001) and Rachel and Smith (2015) are examples of studies that investigate the correlation between trends in real interest rates and the age composition of the population. The proportion of the population between 40 and 64 years of age is closely related to, but not exactly the same as, the dependency ratio. Lunsford and West (2019) use both variables in their analysis. They define the dependency ratio as the proportion of the population that is either younger than 20 or older than 64 years.

**Figure 4. Saving and current accounts in G7 countries and in Asian emerging market economies 1985–2018**  
Per cent of GDP



Note. Within each group of countries, both total saving and the current account have been weighted with GDP at purchasing power parity (PPP).

Sources: IMF World Economic Outlook Database and own calculations

last section, Lunsford and West (2019), reports a remarkably clear, positive correlation between trends in the real interest rate and the trend growth in the number of hours worked in the United States.

To summarise, it can therefore be said that both economic theory and correlations in data suggest that demographic changes are important for real interest rates. The mechanisms behind these correlations are certainly complex. The macroeconomic models that include demographic variables often cannot explain why the return on different types of assets develops in different ways. Overall, however, there is nevertheless comparatively strong empirical support for the theory's prediction of a correlation between trends in real interest rates and the age composition of the population and supply of labour.

### 3.3 High levels of saving in Asian emerging market economies

Several studies of real interest rates focus on developments in the United States and other advanced economies in the western world. But as has already been pointed out, there are strong arguments suggesting that trend changes in interest rate levels must be understood from a global perspective. One compelling argument is that capital markets in several countries were deregulated in the 1970s and 1980s and that since then, it has been possible to move financial assets freely between countries and continents. In addition, a growing number of emerging market economies, especially in Asia, have become increasingly integrated with the advanced economies since the 1990s, partly as a result of increased trade.

In a speech in 2005, the US economist, and later chairman of the Federal Reserve, Ben Bernanke mooted the idea that the growing current account deficit of the United States must be seen in the light of a high level of saving among emerging economies, especially in Asia, and large current account surpluses among the world's oil-exporting countries. As an explanation to the high level of saving in Asia, Bernanke (2005) pointed to a desire among many Asian governments to build up substantial currency reserves and to promote export-led growth. Other economists have instead emphasised such factors as a rapidly ageing population and poorly developed financial markets as the most likely explanations for the high level of saving among Asian countries.



Figure 4 shows total gross national saving among Asian emerging market economies.<sup>27</sup> The corresponding saving ratios among G7 countries are shown as a comparison. We see that the average saving ratio among G7 countries fell by a few percentage points from the mid-1980s up until the outbreak of the global financial crisis in 2007. During the same period, the saving ratio rose sharply among Asian emerging market economies, from about 25 per cent in 1985 to around 40 per cent in 2007.

But to understand how the high level of saving in Asia has affected the global real interest rate, it is not enough just to study how saving has developed in different countries. The level of domestic investment must also be taken into account. From the definitions of the balance of payments and the national accounts, an identity is obtained according to which a country's total net foreign saving, the current account, is equal to the difference between total national saving and domestic investment:

$$(1) \quad \frac{\text{Current account}}{\text{GDP}} = \frac{S}{\text{GDP}} - \frac{I}{\text{GDP}}$$

Chart 2 shows the link between the global equilibrium for saving and investment, which we discussed previously, and the equilibrium in an individual country. To the right is an example of an individual country in which domestic investment is greater than the total national saving. The current account is therefore negative. In what is known as an autarchy equilibrium, in which no foreign trade is possible, the real interest rate would be higher with higher domestic saving and a lower investment ratio. However, to the extent that capital, goods and services can be moved freely across borders, the domestic equilibrium adapts to the interest rate that applies on international capital markets. At the global equilibrium rate, some countries will have a current account deficit, where investment exceeds saving, and others will have a surplus on the current account.

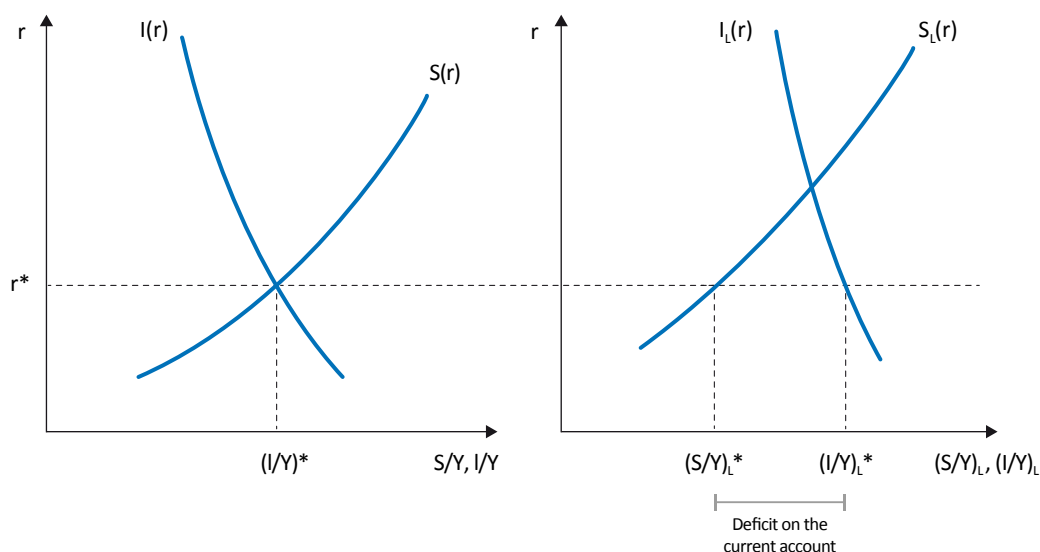
How then have the current accounts in the G7 countries and the Asian emerging market economies developed over the period in which saving in Asia increased sharply? The right-hand graph in Figure 4 shows the GDP-weighted current account in both groups of countries. At the start of the 1990s, the rapidly growing countries in Asia had an overall deficit in their payments vis-à-vis the rest of the world. These relatively small deficits coincided with the period when China, through growing trade, became more and more integrated with Japan and the advanced economies in the West.

But this deficit changed rapidly into a surplus in conjunction with the financial and currency crises that affected many Asian countries in the second half of the 1990s. This fairly abrupt development is one of the circumstances that Bernanke (2005) pointed to and that has been linked to a changed attitude to the need for public saving. After the financial and currency crises, many countries in Asia started to compile significant foreign exchange reserves, partly so that they would be able to dampen the effects of an unexpected and sudden flight of capital.

At approximately the same time, fairly large current account deficits were created in several advanced economies. From the end of the 1990s until the outbreak of the financial crisis in 2007, the GDP-weighted current account of the G7 countries fell by the equivalent of almost two per cent of GDP. The United States was one of the G7 countries where the deficit became large – in 2006, the US current account deficit was equivalent to almost 6 per cent of

27 Saving is expressed here as the GDP-weighted average of the saving ratios in the different countries (China, India, Indonesia, Malaysia, Pakistan, the Philippines, South Korea, Taiwan and Thailand). The saving ratio of each individual country is in turn calculated as the ratio between total gross national saving and GDP.

Chart 2. Supply and demand for saving in an open economy. A schematic illustration.



Note. Schematic illustration of a global, long-term equilibrium in which the supply of savings,  $S(r)$ , and demand for investment,  $I(r)$ , balance at the interest rate  $r^*$ . On the left-hand side of the illustration, the horizontal axis shows the world's total investment and saving as a proportion of the world's GDP, denoted  $Y$ , and the vertical axis measures the real return on saving. The right-hand side of the illustration shows the corresponding equilibrium in an individual country, denoted  $L$ , with capital and product markets that are open for trade with the rest of the world. In an open economy, there is no reason to expect domestic saving,  $(S/Y)_L$ , to balance domestic investment,  $(I/Y)_L$ . The illustration shows an example where investment in the individual country is greater than the level of saving and where the current account is therefore negative.

the country's GDP. These large capital flows from emerging to advanced economies must chiefly be understood in the light of changes in saving.<sup>28</sup>

Chart 2 illustrates the situation that prevailed in the G7 countries from the end of the 1990s until very recently, if these countries are seen as a consolidated economy. During these years, the GDP-weighted current account in the G7 countries was negative. But it is difficult to assess which effects these international capital flows have had on the real interest rate. Bean et al. (2015) point out that the downturn in the G7 countries' real interest rates started in the second half of the 1990s and coincided with the emergence of significant global imbalances in saving and investment, with large current account surpluses in emerging market economies and correspondingly large deficits in the advanced economies (compare Figure 1, lower graph, and Figure 4, right graph). Coeurdacier et al. (2015) show, in model simulations that include China and the United States, that the combination of high growth and extensive loan restrictions in China can explain both why saving increased in China and why the return on saving decreased by several percentage points. According to these model simulations, the downturn in the interest rate simultaneously led to saving falling in the United States.

### 3.4 Higher premiums on risk-free assets

Most of the studies we have cited so far focus either explicitly or implicitly on trends in real policy interest rates and in government borrowing rates in the United States and other advanced economies. This is thus a matter of interest rates on loans that are generally considered to be associated with very low risk. Most investors consider bills and bonds

<sup>28</sup> The pattern in these capital flows are otherwise the exact opposite of what could be expected, based on classic economic theory on international trade. Households in emerging economies with rapid growth should, according to standard theory, save less when their countries are opened up for trade with more advanced countries, that grow at a comparatively slower pace. The high growth rates in emerging countries should, at the same time, push up the real interest rate on the global market and lead to a capital flow from advanced countries to emerging countries. But this did not happen. See Gourinchas and Jeanne (2013).

issued by the governments of the United States and Germany, for example, to be safe assets, where the risk of default is very low. In recent years, increasing numbers of studies have analysed the spread between yields on such safe assets and the real return on higher-risk investments. Rachel and Smith (2015) analyse a large number of assets in several different countries and conclude that the average compensation for risk may have risen by as much as 1 percentage point since the 1980s.

The conceptual framework illustrated in Charts 1 and 2 does not explicitly take into account that both lenders and most borrowers, as a rule, face different interest rates than those central governments face. If the spreads between different interest rates were constant over time, they would not affect the analysis to any significant extent either. But if the spreads in return vary over time, they will affect the real equilibrium interest rate, even for so-called safe assets. It is relatively easy to extend the simple conceptual framework so that it includes interest rate differentials on different types of loan. The intuition behind the results is straightforward, however, and we therefore confine ourselves to describing it verbally.

Let us assume that the difference in interest for two different loans depends on the probability of default being greater for one of the loans. For example, this could be due to one borrower being a government with well-functioning institutions, and the other a company with uncertain future prospects. Assume now that a change takes place over time meaning that lenders, for some reason, become less willing to grant high-risk loans at each given interest rate level.<sup>29</sup> Assume too that both the overall supply of savings and the overall demand for loans otherwise remain unchanged. At a given interest rate, both the state and the company wish to borrow as much as they did before the lenders changed their willingness to take on risk.

One reasonable consequence of such a change is that the interest rate for the government loan falls slightly and the interest rate for the corporate loan rises slightly. The reason is that the company must offer the lenders slightly greater compensation for the risk they run in providing the corporate loan. At the same time, the government, for its part, can borrow at a slightly lower interest rate than previously, as households value the security in the government loan more. In equilibrium, the interest rate on safe loans has thus fallen, at the same time as the return on high-risk assets has risen.

In the example, we assumed that households had become less willing to take on risk, without specifying why. However, one hypothesis that has gained great attention in the research literature in recent years focuses on a specific reason for greater spreads in returns between higher and lower risk loans. In a number of studies, Ricardo Caballero, Emmanuel Farhi and Pierre-Olivier Gourinchas have highlighted and attempted to explain why the return on capital has fallen significantly less than return on loans with comparatively low risk, such as the yield on US government bonds. It is worth pointing out that Caballero et al. (2017a) and Caballero et al. (2017b), for example, focus on the estimated return on capital and on the return on equities, respectively. Consequently, this is not a matter of comparing the interest rate on different types of loan, such as the difference in rate between a government bond and a corporate bond or a bank loan. Instead, the discussion focuses on comparing the safe yield with a return that is wholly or partly linked with ownership.<sup>30</sup> Put very simply, one starting point for the hypothesis is that global demand for so-called

29 Such a changed attitude toward risk may be due to many different causes. One example is that the average saver has become older and that the remaining time to pension, when savings will be used, has become shorter. The shorter the time horizon a saver has for their saving, the stronger reasons that saver will have, in general, to save in safe assets.

30 The hypothesis of a shortage of safe assets is one of several possible explanations for the phenomenon of larger differences in return between more and less safe assets. Marx et al (2018) put forward another possible explanation, namely that uncertainty over future economic developments may have increased. Marx et al (2018) use a model with overlapping generations in which the risk premium, which constitutes the difference between the return on capital and the real interest rate for risk-free loans, is a variable that is determined in equilibrium. Simulations of the model indicate that recent years' increases in risk premiums are due to increased uncertainty over future, aggregate productivity growth. However, the results are based on the assumption of remarkably high risk aversion in the household sector.

safe assets with low perceived risk grows at a rate that is approximately proportional to the growth rate of the world's total GDP. At the same time, it is assumed that only a limited number of countries and organisations have the institutional credibility and underlying financial strength needed to create safe assets, such as government bonds with low risk. Examples of such institutions are the western states considered to have the highest credit ratings and legal systems characterised by a high degree of independence and professionalism, for example the United States. According to the theory, the problem is that most of these states and organisations can be found in economies that, on average, are growing more slowly than the global economy. As these institutions have reason to increase their borrowing at approximately the same rate as their own economies are growing, a chronic shortage of safe assets is created. In turn, this shortage implies that the price of safe assets shows faster trend growth than the price for higher-risk assets. As the return on a bond, for example, is partly determined by its price and becomes lower as the price gets higher, this chronic shortage of safe assets entails a negative trend in the return on those same assets.

## 4 Concluding discussion

Real interest rates for government borrowing have fallen by several percentage points over the last 30 years, in advanced economies. Today, households and companies can also generally borrow at a significantly lower real cost than in the 1990s. The results of three different estimates indicate that, in recent decades, there has been a global downward trend in real interest rates of between 2 and 3 percentage points. But there is considerable uncertainty in these estimates. Different studies also reach different results regarding both how large the decline is and exactly when it started. They all indicate, however, that the trend level of global interest rates has been close to zero in recent years.

According to standard macroeconomic models, there is a close relationship between a country's real interest rate and the growth rate of its economy. But several empirical studies indicate a weak or non-existent correlation between trend changes in both variables. One such study even points to a negative correlation between trends in real interest rates and trends in productivity growth in the United States.

There are certainly reasons to interpret these results cautiously. The body of data that can be used to study slowly acting, global trends is fairly small, for natural reasons. A reasonable assessment is that we have observed only two such global trends in real interest rates in the post-war period. It is therefore uncertain if researchers will be able to draw any firm conclusions on the driving forces of the trends, based on this material.

To gain access to a larger body of data, some studies use time series stretching all the way back to the 19th century. But the interpretation of such data is made more difficult by the fact that at several times over the last 150 years, the world's leading industrial nations have radically changed the conditions for international trade in goods, services and capital. Periods of more or less free international capital movements, for example during the halcyon days of the gold standard at the end of the 19th century up until 1914, have been interrupted by periods of strictly regulated capital movements. Can such revolutionary changes explain the absence of a clear correlation between growth and real interest rates? Or does the negative result instead depend on macroeconomic theory simply giving too much weight to the real interest rate in households' choice between saving and consumption?

Both economic theory and correlations in the data suggest instead that demographic changes, such as shifts in the age composition of the population, are important for real interest rates. The mechanisms behind these correlations are certainly complex. The macroeconomic models that include demographic variables often cannot explain why the return on different types of assets develops in different ways. Overall, however, there is

nevertheless comparatively strong empirical support for the theory's prediction of a correlation between trends in real interest rates and the age composition of the population and supply of labour.

An analysis of the current accounts in different countries points fairly clearly towards there also being a connection between falling real interest rates in the western world and the remarkably high levels of saving in China and other Asian emerging market economies from the end of the 1990s and on. Asia's exports of savings to the west can explain why saving has fallen in several advanced economies at the same time as real interest rates have fallen around the world.

One further factor that has probably contributed towards pushing real interest rates down is an increase in premiums for those assets considered safe. Higher premiums on safe assets, such as government bonds, imply that the yields for these bonds are becoming lower. But the increase also has the consequence that the return on higher-risk assets, such as equities, is falling less than the downturn in government lending rates.

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