

The background of the cover is a dark blue architectural blueprint. It features a complex network of white lines, including straight lines, arcs, and circles, representing a technical drawing or floor plan. The lines vary in thickness and are arranged in a way that suggests a detailed engineering or architectural design.

*Routledge Studies in Labour Economics*

# THE DIGITAL TRANSFORMATION OF LABOR

**AUTOMATION, THE GIG ECONOMY AND WELFARE**

Edited by  
Anthony Larsson and Robin Teigland



# Contents

<i>List of figures</i>	viii
<i>List of tables</i>	ix
<i>Contributors</i>	x
<i>Foreword: galaxy incognito</i>	xix
DR. KJELL A. NORDSTRÖM	
<i>Letter from the editors/acknowledgements</i>	xxi
<b>1 A journey of a thousand miles: an introduction to the digitalization of labor</b>	<b>1</b>
ANTHONY LARSSON	
<b>PART I</b>	
<b>Practical utilization of new technologies</b>	<b>13</b>
<b>2 Behind the history of labor: technology as the driving force</b>	<b>15</b>
ALEXANDER BARD, JAN SÖDERQVIST AND ANTHONY LARSSON	
<b>3 The substitution of labor: from technological feasibility to other factors influencing the potential of job automation</b>	<b>31</b>
JOCHEM VAN DER ZANDE, KAROLINE TEIGLAND, SHAHRYAR SIRI AND ROBIN TEIGLAND	
<b>4 Minimum wages for online labor platforms? Regulating the global gig economy</b>	<b>74</b>
ALEX J. WOOD, MARK GRAHAM AND MOHAMMAD AMIR ANWAR	
<b>5 The digital disruption of science: governments and scientists toward an “Open Science”</b>	<b>80</b>
ANTOINE MAIRE	

<b>6</b>	<b>Black boxes of cognitive computers and the impact on labor markets</b>	100
	VICTOR ERIK BERNHARDTZ	
<b>7</b>	<b>AI leadership and the future of corporate governance: changing demands for board competence</b>	116
	FERNANDA TORRE, ROBIN TEIGLAND AND LISELOTTE ENGSTAM	
<b>PART II</b>		
	<b>The role of the digital welfare state</b>	147
<b>8</b>	<b>Polarization, tax revenue and the welfare state: digital disruption or still standing strong?</b>	149
	MÅRTEN BLIX	
<b>9</b>	<b>Welfare states and digitalization</b>	163
	BENT GREVE	
<b>10</b>	<b>“Gig patients”: health and dental care in the gig economy</b>	174
	ANTHONY LARSSON AND DOMINIKA SABOLOVÁ	
<b>PART III</b>		
	<b>Digital disruption of status quo</b>	185
<b>11</b>	<b>GDPR: what are the risks and who benefits?</b>	187
	ANTHONY LARSSON AND PERNILLA LILJA	
<b>12</b>	<b>Players for hire: games and the future of low-skill work</b>	200
	EDWARD CASTRONOVA	
<b>13</b>	<b>The global gig economy: toward a planetary labor market</b>	213
	MARK GRAHAM AND MOHAMMAD AMIR ANWAR	
<b>14</b>	<b>Identifying the digital gender divide: how digitalization may affect the future working conditions for women</b>	235
	ANTHONY LARSSON AND YAMIT VIITAOJA	
<b>15</b>	<b>Consulting in the digital era? The role of tomorrow’s management consultants</b>	254
	ANTHONY LARSSON, NICOLE ANDERSSON, PETER MARKOWSKI, MALIN NILSSON AND IVY MAYOR	

<b>16 Digitalization, circular economy and the future of labor: how circular economy and digital transformation can affect labor</b>	280
ANTHONY LARSSON AND LINN LINDFRED	
<b>PART IV</b>	
<b>Conclusion</b>	317
<b>17 Conclusion: the digital transformation of labor – where do we go from here?</b>	319
ANTHONY LARSSON	
<b>Afterword: impact of digitalization on employment and working conditions</b>	334
JOHN ØVRETVEIT	
<i>Index</i>	337

# 8 Polarization, tax revenue and the welfare state

Digital disruption or still standing strong?<sup>1</sup>

*Mårten Blix*

## 1. Introduction

Some changes in society are significant enough to warrant a specific name. Digitalization is one of those and is sometimes described as the third industrial revolution. What can we learn from comparing the present situation to the state of society at the outset of the first Industrial Revolution, some two-and-half centuries ago?

From the late eighteenth century and onwards, industrialization led to an upheaval of work and livelihoods at a time when there were little in terms of social safety nets. The rapid transformation of economies and societies became an impetus to create new social and political institutions to manage and reduce the social costs of change. Universal education, social security and pension systems were introduced along with universal suffrage. Spurred by hazardous and difficult work conditions as well as strife over low pay, labor organized into trade unions to become a counterweight to employers and owners of firms. Societies developed methods to handle change and devised ways to resolve conflict mainly through rules and negotiations rather than through force. In Sweden, a general pension system was introduced in 1913, although less generous than today (Blix, 2017). Notably, today people live about twenty years beyond the retirement age compared to at the inception of the pension system, when at least half the population were not expected to enjoy any pension at all.

There is no need to reinvent the institutions and safety nets thus established. Indeed, the modern welfare state has shown remarkable resilience over the years. Especially in the 1980s, industrial action in Sweden was a big concern, with many days lost in strikes. In 1997, the system was reformed through an agreement with industry-wide bargaining, allowing local flexibility and yet retaining elements of centralized wage bargaining with informal coordination with the manufacturing sector in the lead (Driffill, 2006). After the agreement, industrial action declined markedly and the most recent round of collective wage bargaining has resulted in mainly three-year agreements, signaling trust in the institutions. The relative calm, however, may be challenged in the years ahead. Digitalization is now affecting some of the fundamental building blocks, and unless institutions are reformed, the social contract holding society together could crack.

For the welfare state, the balance of protection against a potentially destructive change and the promotion of innovations have from the outset been a central but fragile state of affairs. On the one hand, too onerous rules in the economy can dent productivity growth and undermine rising prosperity. On the other, strained social cohesion can erode the legitimacy of institutions.

The modern welfare state has managed change, but some countries have at times veered off course. Take the example of Sweden. Its welfare state expanded rapidly during the 1970s and 80s but high marginal tax rates dented incentives to work, and fiscal profligacy gradually created an untenable economic situation. Interest payments on public debt began to squeeze out social spending. Trust in the stability of the Swedish economy declined and reached an absolute low in the fall of 1992 when the *Riksbank* (the Swedish central bank) unsuccessfully defended the krona by raising the interest rate to 500%. The deep crisis spurred structural reforms and set the stage for reforming the welfare state during the 1990s.

The effects of digitalization are not dramatic in the short-run, compared to a fiscal or financial crisis when GDP can fall abruptly, and many jobs are lost. Indeed, so far, there is no compelling evidence that employment levels in OECD countries are declining. One reason for this is that the modern labor market has a high capacity for change and continuously creates new jobs, especially in services, as old ones are shed. In Sweden, for example, about 17% of all jobs were destroyed and created during the period 1990–2009 (Heyman, Norbäck and Persson, 2013). In OECD countries as a whole, employment levels have not fallen, though unemployment – and especially youth unemployment – is a considerable concern after the fallout of the financial crisis.

And yet, although the modern welfare state does not face an imminent crisis, over the medium-to-long term the changes due to digitalization will put a strain on existing institutions and labor market arrangements. In addition, the welfare state has to cope with unprecedented high levels of immigration. As I have argued elsewhere, the labor market is changing to such an extent that the social contract could begin to crack (Blix, 2017).

Most descriptions of the Swedish welfare state will at least include the following elements:

- Comprehensive social welfare spending (health care, education and care of the elderly) financed by taxes
- Social inclusion through universal education, progressive tax systems and transfer payments to reduce income inequality
- A balance of power between trade unions and employers through rules to manage and resolve conflicts and a trade union policy to decrease wage disparities by pushing up the lowest wages

Digitalization affects all of these pillars in both direct and indirect ways. Most will acknowledge that consumer behavior has changed due to digitalization, but the most prominent changes are those that affect the labor market.

The changes to the labor market tend to occur more gradually than in consumption, depending on the dynamics of young people entering the labor market, with older persons retiring and others switching jobs. The impact of technology and digitalization on the labor market comes from the accumulated changes of such dynamics. The main impact of technological change and digitalization has been an increase in polarization where middle-level workers have been the most affected (Goos, Manning and Salomons, 2014). Income has become more volatile, and uncertainty in the labor market has been rising (OECD, 2015).

With gradual changes, in principle, there should be ample time to adjust and reform. In practice, reforms necessary to accommodate changes may be too slow – or not made at all. First, the political system often has difficulties in managing reform when the political costs of action tend to be up front and the potential economic benefits come much later. Second, the reform of existing institutions often meets resistance from special interest groups, all from employer organizations to the professions and even regulatory bodies. Changes typically imply a shift in power, resulting in winners and losers.

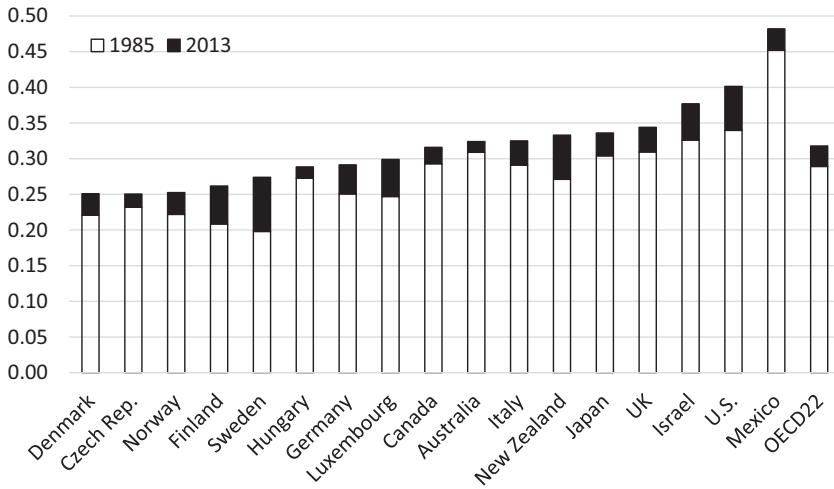
The risk of not responding to rising labor-market uncertainty and income volatility is that disenfranchisement will continue to expand. Institutional legitimacy risks being damaged and, indeed, in some OECD countries the rise of populist parties may be seen as a sign of declining trust in the establishment and the institutions that represent it.

## **2. Rising inequality also in the welfare state**

A standard measure of income inequality is the so-called Gini coefficient. As can be seen from Figure 8.1, the Gini coefficients have been trending upwards in many OECD countries since the 1980s. Although it is an established measure of income inequality, the Gini coefficient measure has some well-known drawbacks and can be measured in different ways (Blomquist, 1981; Yitzhaki, 1998). In the aftermath of the financial crisis, the relatively modest changes in relative incomes could mask more problematic absolute differences at low levels of income. In addition, the Gini coefficient does not account for publicly provided welfare services. For a country, such as Sweden with comprehensive benefits, this makes some – but not a huge – difference. Other measures such as the share of those earning below 60% of median incomes or measures of risk of absolute poverty can be better at capturing income inequality. However, notwithstanding the measure used, it is unequivocal that inequality has increased in most OECD countries.

Despite increases in income inequality, the Nordics and much of northern Europe (excluding the Anglo-Saxon countries) remain in the lower half in terms of Gini coefficients. But not all welfare states have fared the same. It is especially noteworthy that Sweden has experienced the most substantial increase in Gini coefficient since the 1980s. However, this is an increase from a suppressed low level that turned out to be unsustainable. Wages were compressed due to union priorities in wage-bargaining and due to strongly progressive taxation. Though income inequality was held low, economic incentives for entrepreneurship and





*Figure 8.1* Gini coefficients in selected OECD countries. Levels in 1985 and in 2013. Note: The Gini coefficient is zero when everyone has an identical income. The Gini coefficient is one when a single individual has all of the income.

Source: OECD (2015).

work were eroded (Lindbeck et al., 2003). In particular, the 1970s and 80s was a period of economic stagnation in Sweden with a long-lasting decline in GDP per capita growth rates compared to other OECD countries.

Trade and globalization have likely led to lower income inequality in the world as a whole, but most arguments indicate that income inequality *within* countries will continue to rise. Rapidly aging populations will accelerate changes, and new technologies will compete with humans in many new areas, notably also in advanced services and result in damped wage growth for those without special skills: the polarization of labor markets noted in the literature (Goos, Manning and Salomons, 2014). One interpretation is that digitalization results in a common shock that drives up income inequality in some countries. At the same time, other countries with high inequality (such as Chile and Mexico) have seen some reduction but this development is likely linked to other factors. The overall effect may appear as a form of convergence (OECD, 2015) but it is a bit early to make such an assessment. More urgently, however, countries with increasing inequality need to find ways to address these changes or risk see further deterioration in their institutional legitimacy and further populism.

The economist Andre Sapir presents a straightforward way to summarize different models of growth and social inclusion (Sapir, 2006). In Table 8.1, some countries and regions are divided into combinations of low-high equity and efficiency. A useful way to think about the different country models is to interpret the labels rather broadly. Efficiency can be thought of as productivity growth, per



Table 8.1 Combinations of efficiency and equity.

		Efficiency	
		Low	High
Equity	Low	Southern Europe	US, UK
	High	Northern Europe	Scandinavia

Source: Sapir (2006).

capita growth or capacity for innovation; Equity can be considered as measuring income inequality or, better yet, equality of opportunity.

The characterization is not meant to imply that there is a growth-equity trade-off. An IMF study finds no such pattern is supported by data (Ostry, Berg and Tsangarides, 2014). Also, the OECD (2017b) emphasizes that there are several policy levers that support both equity and growth, such as promotion of product market competition. Instead, a country may find it hard for political economy reasons to pursue the reforms that would lead to improvements in either long-term productivity growth or equity, not least when the social costs are often up-front.

Most of Table 8.1 capturing the state of affairs in 2005 stands the test of time, but not all. Several countries have been experiencing declining productivity growth. For the UK, the decline actually began before the financial crisis. Even with rising inequality, Sweden remains a country with one of the most favorable combinations of equity and growth. Will the Swedish welfare state be better at coping with technological change than other systems?

### 3. The social contract in the welfare state is threatened

The welfare state can be seen as a particular type of social contract between different groups: The young and the old; workers and owners of capital; cities and regions. Those in work and good health pay large shares of their income in tax to get social support when they are old or fall sick. Those living in the regions are often subsidized by more prosperous regions.

The challenge for all countries is that substantial relative changes in fortune for some groups or areas can lead to discontent and undermine the willingness to take part in intergenerational transfers or geographical redistribution. Arguably, political events during 2016–18 could be a sign of such developments. The list is becoming long: The election of President Donald Trump in the US, the Brexit-referendum in the UK, Catalonia's unilateral declaration of independence from Spain, Germany's procrastinated negotiations of forming a coalition government and Italy's continued drift toward yet more political fragmentation. Welfare states in the north of Europe are by no means immune, as evidenced by the recent upsurge of populism even in prosperous countries with medium-to-low inequality. This is evidenced by the contemporary developments in Sweden.

Most notably the case of the political fringe party, the *Sweden Democrats* (Swe: *Sverigedemokraterna*), which went from having failed to reach past the election threshold prior to 2010 to becoming the third largest party following the Swedish general election of 2014. Some pre-election opinion polls also anticipated that the Sweden Democrats would increase their mandate following the 2018 general election and become the second largest – or even the largest – political party in Sweden.

Resentment against the elites that are perceived to benefit from changes can, in turn, lead to undermining the social contract that holds the welfare state together. This is especially the case in countries with aging populations and significant immigration levels. Stagnant wages thus risks fanning the flames of disenfranchisement even further.

### 3.1. *The labor market and stagnant wages*

The labor market is essential to the welfare state. Without a well-functioning labor market prosperity cannot increase and support for the social contract may wane.

Productivity growth and slack in labor markets are traditional explanations for understanding how wages develop. One reason for concern in recent years is that wage growth has been stagnant in much of the advanced economies. According to the International Monetary Fund (2017a), these can account for a significant share of the recent stagnant wages. As can be seen in Figure 8.2, wages in advanced

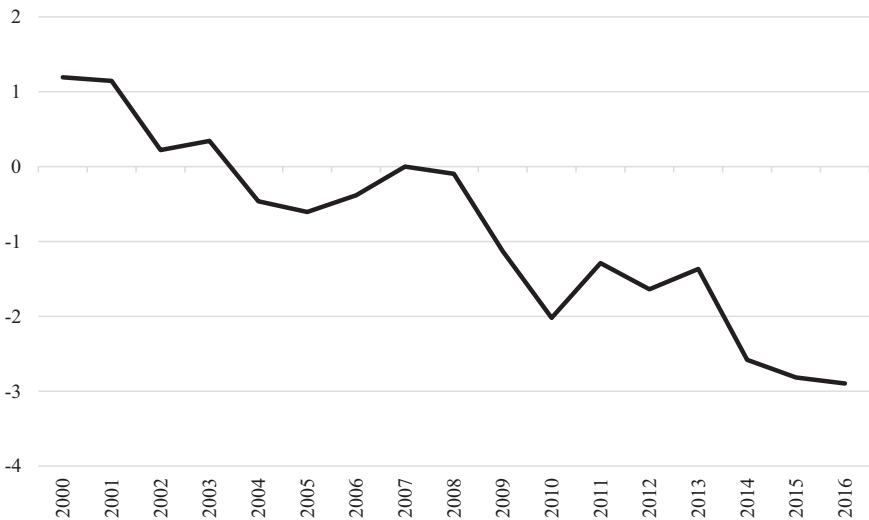


Figure 8.2 Nominal wage growth in advanced economies compared to the level of wage growth in 2007, percentage points. Note: Wage growth is normalized by subtracting the change in 2007.

Source: International Monetary Fund (2017a, p. 78).

economies have been in gradual decline; a process that started well before the financial crisis.

Though low productivity growth and the ample availability of workers can explain some of the stagnant wages, they cannot explain the full slowdown. Other explanations include advances in technology and automation that result in stronger competition between humans and machines (OECD, 2017a). Even if past technological advances have had far-reaching influence on work, advances in digitalization are being implemented faster than before (Comin and Ferrer, 2013, p. 14).

An overall effect of digitalization on the labor market is to reduce the bargaining power of workers. In many professions, the “middle man” is a function that is under pressure from robots. Such pressures are in evidence in banking, insurance and retail just to name a few. In banking, for example, the continued fallout from the financial crisis in combination with technology is leading many banks to reduce staff and automate a range of services. In Sweden, the Financial Supervisory Authority has granted licenses to financial institutions that provide automated advice. Back-office operations are especially prone to automation, as they are routine and occur on a regular basis. Such automation can also incorporate better risk-management as well as regulatory compliance. Some banks are testing so-called “Robo-branches” which are in effect local bank branches largely without professional staff. There are examples of insurance companies introducing completely automated claims-processes.

At the aggregate level, jobs are not disappearing. Rather, technology is creating additional downward pressure on wage growth. Other parts of the economy are also set to be affected. The increase in e-commerce is affecting many retail stores and boutiques. Semi-autonomous checkouts where customers scan their own goods have been available for many years and are growing more common. The next step is completely automated checkouts. Amazon has been experimenting with such technology for some time and opened its first such grocery store in Seattle, Washington in the beginning of 2018 (Wingfield, 2018). Though the technology is thus far in its infancy, it may ultimately obliterate the need for cashiers altogether.

Shopping for goods and clothes online has become large commerce. As the e-commerce companies become better at knowing their customers and can deliver goods quickly, the pressures on physical shops will grow. The company Zalando has plans to let their customers order tailor-made clothes from measures deduced by body scanning (Bränström, 2018), which could help reduce costly returns and make ordering online even more attractive. In other words, technology is set to further increase the push toward e-commerce.

Advances in technology have reignited the angst that automation will destroy jobs. For example, in an oft-quoted paper, Frey and Osborne (Frey and Osborne, 2017) argue that about half of US jobs can be automated within the next two decades. Others have used different methodology and found substantially lower estimates (Arntz, Gregory and Zierahn, 2016; Nedelkoska and Quintini, 2018). More generally, evidence for EU countries continues to point to the labor market’s

ability to adapt (Gregory, Salomons and Zierahn, 2016): Job losses in one area are compensated by demand spillovers in other areas so that the net effect is mostly stable employment levels. Overall, there is so far no support for the notion that human work is disappearing.

However, there is ample evidence for the notion that the content of work is changing (Acemoglu and Autor, 2011). Improvement in technology has led to a process favoring those with high-skills regarding cognitive or social abilities, so-called skilled-biased technological change. For such workers, wage developments have been positive, and the share of such work has increased in the economy (see Figure 8.3). By contrast, routine work has been in decline. The overall result has been an increased polarization of the labor market that has been occurring over an extended period (Goos, Manning and Salomons, 2014).

The polarization of work has occurred in most OECD countries. We can expect that automation of work will put further pressures on wages for those with middle-level skills. The tools and technology that are now available could accelerate polarization compared to previous periods. There is a risk that those who are slow to upgrade their skills will experience further wage stagnation. Admittedly, there are historical examples where new technology did not cause downgrading of skills. For example, when automated teller machines (ATMs) were introduced, bank cashiers often moved up the skill ladder by instead providing financial advice to customers (Bessen, 2015). But this is not an inevitable development. For instance, jobs that disappear in stores might instead become software programming jobs elsewhere and thus much less likely to occur.

At the overall level, a combination of developments could lead to a decline in the wage-bargaining power of labor. Apart from technology, both demography,

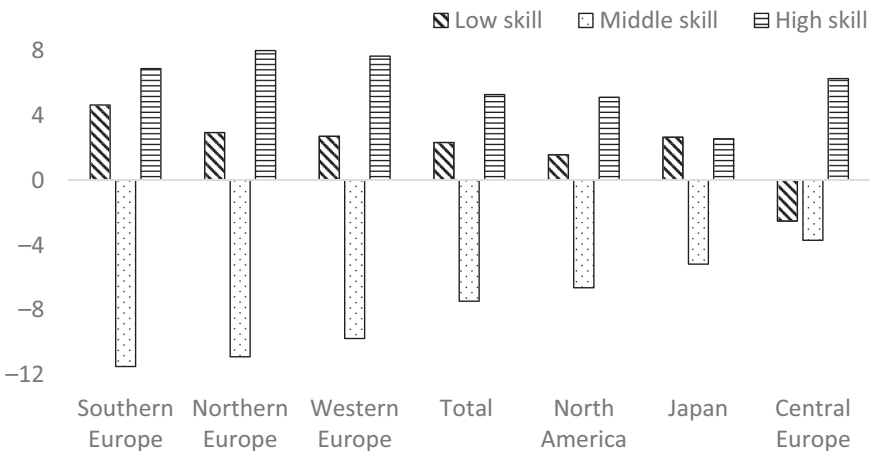


Figure 8.3 Percentage point change in share of total employment 1995–2015.

Source: OECD (2017c, p. 86).

and more flexible employment legislation protection serve to accelerate changes in the labor market. Aging populations imply fewer young compared to the old, and so in principle, the young could fill the jobs of those retiring. With large cohorts leaving the labor market, some areas will even experience scarcity of workers. In practice, young workers can only seldom directly replace older workers, especially not in positions where on-the-job experience is essential. What this means is that the incentive to automate work will be stronger due to aging populations, as firms find it hard to find workers with the right skills.

Technology is of course not the only thing that affects the bargaining power of labor (OECD, 2017a). In many OECD countries, protection for temporary or fixed-term contracts has been in decline since the 1990s. By contrast, permanent positions have remained mostly unchanged. As a result, the *duality* of labor markets has increased, and especially so in Sweden, for example (Cahuc, 2010, pp. 150–53). Young people are overrepresented among temporary workers, and their share has increased. OECD calculates that in 2015 about 40 million youth or 15% of those in the ages 15–24 are neither in education nor employment, so-called NEET (OECD, 2016).

Technology is not only changing the landscape of work through automation and robots. With so-called platform-based labor market, non-standard work is on the rise. Platform-based work has been given many names, such as the sharing economy or gig work. In what follows, I will use the term gig work to denote a situation where a worker performs tasks organized through the conduit of a digital platform and where the platform owner does not take employer responsibilities, such as paying payroll taxes and value-added tax (VAT).

Gig work has always existed, notably in entertainment, such as in music, art or television. Non-standard work without employment protection is also prevalent in journalism. Non-standard work contributes to rising inequality (OECD, 2015). For example, the self-employed enjoy fewer benefits in social security. Besides, the self-employed are also excluded from additional benefits in collective wage bargaining agreements, such as topped-up pensions, parental leave and sick leave.

Gig work is increasing on broad fronts (Sundararajan, 2017; Katz and Krueger, 2016). A common misconception is that gig work is only about simple tasks, such as driving taxis (for example Uber) or household services (such as TaskRabbit). The services are much broader, all from medical to legal professions. While it has increased sharply over the last few years, in terms of overall share of employment it remains small in Sweden. Despite its limited size, it could be set to affect the labor market in fundamental ways. By creating a situation where work is on permanent standby, 24 hours a day, seven days a week, it lessens the need for permanent workers. One of the largest platforms is Upwork. It has more than 12 million workers worldwide – doing tasks ranging from web design to data analysis (Sundararajan, 2017).

Consider the thought experiment that today's digital gig platforms had existed for as long as there have been firms. In such a world, would firms have hired workers to the extent reflected by today's medium and large size enterprises? Probably

not. Ronald Coase, recipient of the Nobel Memorial Prize in Economic Sciences in 1991, argued that the existence of the firm supersedes the price mechanism of hiring individual workers on an atomistic market (Coase and Coase, 1937). When the cost of individual contracts is higher than organizing work into employment, the existence of the firm can be explained. With gig platforms, the cost of hiring temporary staff on a needs-only basis is much smaller than in the past. Hence, it is likely that permanent works would be much fewer in numbers.

What are the possible implications? The main channel of change is through the regular churn of the labor market: retirement of older workers, hiring of new workers as well as voluntary or involuntary employment changes. These changes occur slowly and mostly without drama. In countries with collective wage agreements, bargaining over wages and benefits may occur over various yearly intervals. In Sweden, for example, some wage agreements cover two-to-three years.

Gig markets pose a direct threat to the Swedish labor market model where the trade unions and the employer organizations are responsible for setting wages (Blix, 2017). Gig contracts bypass entirely collective wage bargaining agreements and the transaction occurs in the cloud. Moreover, the buyer and seller of services can even be in different countries. As a consequence, the traditional trade union threat of a boycott is more difficult to use compared to a shop or a factory. Also, non-payment of taxes is an issue for the government. A tilted playing field in taxation can lead to unfair competition, where tax and regulatory differences have an outsized role in success compared to the efficiency of services.

So far, the changes are occurring gradually, but most of the incentives point to a clear direction of change toward work and jobs becoming more loosely tied to a single employer and with a shrinking share of permanent employment. Exactly how far this process will continue is hard to say. It will, among other things, depend on the policy responses of governments, employers and trade unions.

For the welfare state, it means more flexible labor markets and also that security through work will be lower than in the past. In Sweden, the collective wage bargaining agreements cover about 90% of the labor market today. A system of collective wage bargaining can likely survive a small share of gig work in the economy but begins to lose its legitimacy if gig work becomes large.

### ***3.2. Financing the social welfare state: tax base on labor becoming more mobile***

The mobility of capital has been a feature of world economies for a long time. Of course, workers have a long tradition of moving to jobs, even if not as readily as capital. But as outlined in the previous section, technology is now increasing the mobility of labor in ways that were not possible before. Technology makes it easy to outsource work with the simple press of a button to global gig markets. Moreover, the expanding possibilities of automating all from simple to advanced services will make it easier for firms to substitute away from labor to machines. This substitution has consequences for government revenue, as the tax on labor is one of the largest tax bases. On average, about 50% of government revenue

(in 2013) stems from tax on labor in OECD countries (Blix, 2017). The implications may be even more significant in countries with high tax rates on human work; most notably, of course, welfare states. It is not that governments will not be able to collect revenue. Instead, the challenge is that the distortions of a high tax on labor may increase further, which poses risks to productivity growth.

The threat to government revenue and the advent of rising distortions are not immediate. Instead, labor markets are likely to change over many years, but there are already some indications that the relation between machines and humans have shifted. As illustrated in Figure 8.4, the wage share of national income has fallen in most industrialized countries during the last three decades (Karabarbounis and Neiman, 2014; International Monetary Fund, 2017b). This result implies that as the GDP is expanding, humans are no longer keeping the same share of the pie.

The IMF calculates that about half the decline in the wage share of labor can be explained by technology (International Monetary Fund, 2017b). Notably, this development has been observed years before smartphones became ubiquitous and before the so-called “Frightful Five” of big tech, i.e., Amazon, Apple, Facebook, Google and Microsoft, gained dominance in global markets (Manjoo, 2016). Since the capacity of software has significantly expanded, it stands to reason that the wage share of labor is set to fall further. The result could be an even more significant shift away from human labor to machines. Evidence from other areas shows that high tax rates can give rise to significant shifts. High tax rates can lead to a sizeable substitution between the legal and the shadow economy as well as between unpaid household production and market production (Davis and Henrekson, 2005). The effects of automation could be even more substantial.

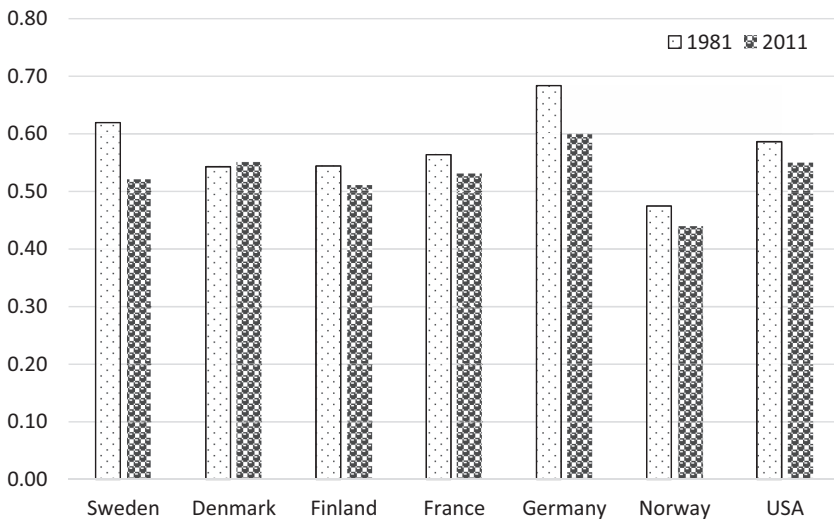


Figure 8.4 Wage share of national income. Percent.

Source: Karabarbounis and Neiman (2014).



#### 4. Conclusions

As labor markets are becoming more polarized, inequality increases, and income uncertainty becomes more pronounced. What happens to the legitimacy of institutions when a large number of persons get fewer of the benefits of growth and when the share of labor market outsiders grows?

Welfare states may be more resilient to these changes than other countries. Notably, they have more well-developed and comprehensive social safety nets. They are geared toward providing social security and support workers to find new jobs through retraining and education.

But the welfare state also carries some weaknesses: The high level of taxes supporting the welfare spending creates even stronger incentives for firms to automate work or to buy services on global *gig* markets. This results in the bypassing of the high taxes and collective wage agreements that are vital pillars of the Nordic labor markets.

The outcome of the welfare state depends on policy responses of governments, trade unions and employer organizations. Trade unions that adapt and provide new forms of support and safety to its members could remain relevant to workers and serve as a counterweight to some of the increases in income uncertainty. Governments may also try to broaden tax bases to support welfare ambitions, especially for the self-employed.

It is hard to say how likely institutions are to step up to the challenge. One political difficulty is that the changes tend to be gradual and it may be tempting to postpone reforms rather than address the hard choices early on. Reform of institutions may also be hampered by special interest groups and lobbyists that act to protect the status quo.

Low inequality is core to the welfare state, yet it is set to rise even further in the years ahead. Without judicious reforms, the welfare state will not be immune from cracks in the social contract. One way or another, the outcome for the welfare states hangs in the balance in the years ahead. Will the welfare state be able to reinvent itself once again?

#### Acknowledgments

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#### Note

- 1 This chapter draws upon an earlier iteration originally published under the title “The Effects of Digitalisation on Labour Market Polarisation and Tax Revenue” in *CESifo Forum 2017–4*, vol. 18 no. 4, pp. 9–14. Permission for reprint has been granted by the copyright holder.

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