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In-work benefits across Europe

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In-work benefits, often in the form of earned income tax credits (EITCs), have become increasingly popular over the last decades. Early versions of in-work benefits in the US, the UK and Ireland, primarily motivated as a poverty alleviation measure, have been followed by a large expansion of in-work benefits in other European countries, stressing employment goals rather than redistributive concerns. This review describes the in-work benefit schemes in a selection of countries across Europe and summarizes the evidence of these schemes. The selected countries are France, the Netherlands, Germany, Belgium, Denmark, Finland and Sweden.

Keywords: Earned income tax credit, EITC, Europe, tax and benefit system

JEL codes: H24, I38

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1. Introduction

The use of in-work benefits has become increasingly popular over the last decades, with the dual aim of reducing poverty and increasing incentives for work. Early versions of in-work benefits in the US, the UK and Ireland were closely targeted towards low-income families with children, and were primarily motivated as a poverty alleviation measure. The large expansion of in-work benefits in Europe since the early 2000s has been less targeted towards low-income earners and families, and has stressed employment goals rather than redistributive concerns.

The purpose of this review is to describe the in-work benefit schemes in a selection of countries across Europe and to summarize the evidence of these schemes. The selected countries are France, the Netherlands, Germany, Belgium, Denmark, Finland and Sweden. In-depth overviews of in-work benefit schemes in OECD countries and related policy design aspects have previously been presented in, e.g., Immervoll and Pearson (2009) and OECD (2011). Other reviews include Bargain and Orsini (2006), Brewer et al. (2009) and Cousins (2014). This review draws on these previous studies but documents policy changes over time in some more depth and includes more recent literature.

The characterization of in-work benefits follows Immervoll and Pearson (2009). The focus is on cash transfers or tax benefits paid to workers, conditional on employment, with the purpose to top-up net earnings. The main objectives of in-work benefits are to increase employment by altering the budget restriction, creating additional financial rewards for remaining in, or taking up, low paid work and to increase incomes of disadvantaged groups of workers and their families. Other types in-work benefits, such as subsidized child care, assistance with housing costs, food vouchers or help with medical expenses, are not included. The paper also does not cover other policy measures aiming to promote self-sufficiency, such as wage subsidies and minimum wages, nor means-tested welfare benefits and related earnings disregard policies.[1]

The paper proceeds as follows. Section 2 discusses design aspects, summarizes the theoretical predictions and reflects upon redistribution and cost-efficiency of in-work benefits. Section 3 describes the in-work benefits schemes in the selected European countries and summarizes existing evidence. Section 4 concludes the paper.

[1] The French *rSA* is an exception (see Section 3.1). It is included as part of the historical development of in-work benefits in France.

2. The design and potential effects of in-work benefits

In-work benefits have the twofold purpose of reducing in-work poverty and increasing work incentives. The design of in-work benefits varies across countries, depending on the relative weight put on these two goals and on country-specific factors such as the tax/benefit system, the income distribution and taxpayer characteristics. This chapter discusses design aspects and potential effects of in-work benefits.

2.1 Design aspects of in-work benefits

Based on the excellent overview of in-work benefits in OECD (2011), this section briefly discusses different design aspects of in-work benefits and relates them to the design of these policies in OECD countries in 2010. By that time, 17 OECD countries had introduced some form of in-work benefits. Table A1 in the Appendix is taken directly from OECD (2011) and summarizes the features of the permanent in-work tax credits and benefits that were in place in OECD countries in 2010. Figure A1 in the Appendix, also taken from OECD (2011), graphically illustrates the different policy designs in terms of the targeting of low-income workers. Chapter 3 will provide a more thorough description of in-work benefits in selected European countries over time.

Work contingent test

A key feature of in-work tax credits is to make them contingent on working. A few countries, such as Ireland, New Zealand and the UK, have achieved this by requiring a specific number of hours to be worked per week to qualify for the credit, to ensure that minimal or occasional work is not subsidized. A major drawback is the administrative burden of such tests. For simplicity reasons, a more common approach has been to use earned income as the eligibility criteria. To make sure not to subsidize occasional workers, in-work tax credits are often phased in. This is the case in Belgium, Canada, Denmark, Finland, France, Hungary, the Slovak Republic, Sweden and the US.

Family or individual targeting

The main targeting criteria for in-work tax credits are family status and income level. Countries focusing on poverty alleviation often target credits based on the presence of children and on family income. Ireland, Korea, New Zealand and the Slovak Republic requires the presence of children for eligibility to the tax credits, and in Ireland, New Zealand and the Slovak Republic credit payments increase with the number of children. The US and France do not require children for eligibility, but payments increase with the presence of children. Countries focusing on work incentives target credits simply based on individual income. This is the case in Belgium, Hungary,

the UK, Finland, Denmark and Sweden. In these countries, family related measures are typically implemented through the benefit system rather than the tax system. In Sweden, age is an additional targeting criterion as people above age 65 receive a larger tax credit.

Income targeting

OECD (2011) identifies two broad groups in terms of income targeting. The first group strongly targets their credits towards low income workers by phasing out the credit at low levels of income. This includes Belgium, Canada, France, the UK, Ireland, Korea, New Zealand and the US. In this group, most countries begin to phase out their credits at around 40 percent of the average wage or less, and have the credit fully phased out at less than 100 percent of average earnings. The second group provides their credits to a large proportion of workers by not phasing out the credit at all or by phasing out at a low rate. This includes Denmark, Finland, Hungary, Italy, the Netherlands and Sweden. Although high income workers receive a substantial tax credit in these countries, low-income workers are targeted in the sense that their tax credit relative to income is larger. Spain and the Slovak Republic have one tax credit in each category. See Figure A1 in the Appendix, taken from OECD (2011), for a graphical representation of the income targeting of in-work benefits in the two groups of countries.

Withdrawal regime, credit size, and fiscal cost

The withdrawal regime of an in-work tax credit poses important trade-offs. A withdrawal of the credit increases the targeting to low-income workers and reduces fiscal costs, but will also discourage work by increasing the marginal tax rate in the phase-out zone. The cost of phasing out the credit will be lower if there are few workers in the phase-out zone or if those workers are less responsive to financial incentives. OECD (2011) classifies countries into three broad categories with respect to the withdrawal of the credit.

The first group of countries, including Ireland, the UK, the US, New Zealand and Belgium, has chosen high withdrawal rates and generous credits. In these countries, the maximum credit payments are larger than five percent of the average wage, and the phase-out rates of the credit are twenty percent or higher. The second group, including Canada, France and one tax credit in Spain, has chosen low withdrawal rates and lower credits. Finally, the third group has chosen low-to-moderate withdrawal rates and still generous credits, but at a higher fiscal cost. Denmark, the Netherlands and Sweden do not phase out their tax credits or phase them out at a low rate and from a high level of income. The reasons are both that the marginal tax rates are already high for

these countries and that the income distributions are narrow, which implies that a phase-out of the credit would disincentivize many workers. Finland, one tax credit in Spain and Hungary have relatively large credits with a moderate phase-out rate.

Method and frequency of payments

In-work credits can be paid through the benefit or the tax system. Since payments through the benefit system is administratively more costly and may result in low take-up due to stigma effects and burdensome application procedures, tax credits are implemented through the income tax system in most countries. Ireland and France have permanent in-work benefits that are paid out through the benefit system, on a weekly basis in Ireland and on a monthly basis in France. For the remaining countries, who pays the benefit through the tax system, the frequency of payments is either annual or monthly. The tax credits in Korea, Finland, France and one tax credit in the Slovak Republic are paid out annually to minimize administrative costs.

In the other countries, preliminary tax credits are paid out regularly during the year while the assessment period remains a year. The tax credits in Sweden, Denmark, Hungary and the second tax credit in the Slovak Republic are incorporated in the regular, typically monthly, income tax withholding obligations of employers. This is optional for employers in the US. The tax credit in Belgium implies a reduction of employers' social security contributions on a monthly basis. Monthly payments can increase work incentives by making the tax credit visible, but come at greater administrative costs for employers. In the UK, New Zealand and Canada, preliminary payments are instead being made regularly by the revenue administrations. In the US, recipients can claim up to 60 per cent of the annual credit in advance from the employer, or receive the credit annually when filing their tax returns.

Reducing avoidance and fraud risk

Another administrative concern is how to minimize tax avoidance and fraud. The potential for this may be larger when in-work benefits are administered through the tax system and not the benefit system. Whereas benefit systems are typically set up to verify the need of each claimant, tax systems rely on voluntary compliance and the threat of audit. The fraud risk is a larger concern when in-work benefits are targeted towards specific groups, such as families with children or single parents. Countries such as Ireland and the UK have invested significant resources in verifying the claims of in-work benefits.

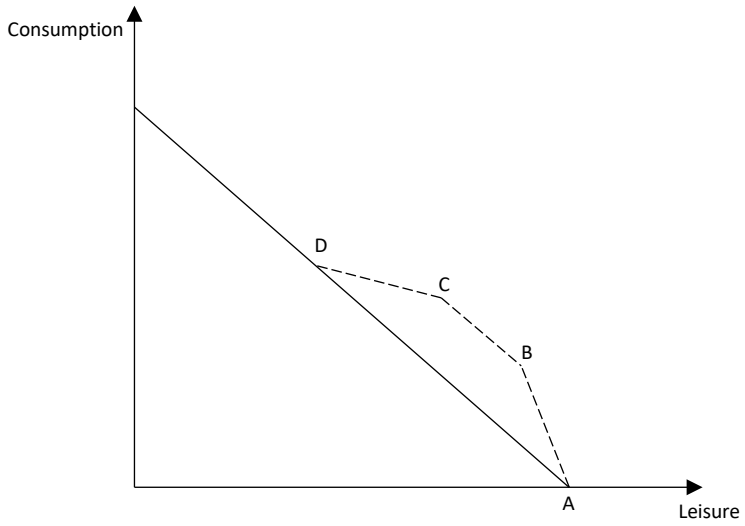
2.2 Potential effects of in-work benefits

A main objective of in-work benefits is to increase the incentives for work, but the impact may not only be limited to labor supply. This section reviews the theoretical predictions of in-work benefits.

The impact on labor supply

In-work benefits are introduced to promote work, but the incentives they create are complex and differ across individuals. For the decision to participate in the labor force, i.e., the extensive margin labor supply decision, in-work benefits unambiguously increase work incentives by increasing the difference between in-work and out-of-work income. For the decision of the extent of work among those already working, i.e., the intensive margin labor supply decision, the incentive structure is more complicated and depends on the region of the tax credit in which the individual is located. Figure 1 shows a stylized picture of how a typical in-work benefit scheme alters the individual budget constraint. The solid line is the original budget constraint, and the dashed line represents the new budget constraint after the introduction of an in-work benefit scheme.

Figure 1. The impact of an in-work benefit on the individual budget constraint



Individuals with earnings in the phase-in range of the in-work benefit, depicted by the distance A–B in Figure 1, are faced by counteracting income and substitution effects. Under the assumption that leisure is a normal good, the income effect implies that the individual can use the net income increase to afford more leisure, which reduces labor supply. On the other hand, the substitution effect implies that the individual receives a larger net income for an additional hour of work, which increases labor supply. The counteracting income and substitution effects make the change in work incentives during the phase in range of the credit ambiguous. It is often found that the substitution

effect dominates the income effect, which would lead to an increase in the amount of work in the phase-in region.

Individuals with earnings in the flat region of the in-work benefit, depicted by the distance B–C in Figure 1, face only an income effect but no substitution effect, which may negatively affect work incentives in this income range. For individuals with earnings in the phase-out range of the tax credit, depicted by the distance C–D in Figure 1, work incentives are reduced even more, since they face both an income effect and a negative substitution effect. This negative incentive effect higher up in the income distribution is the reason why some countries have chosen not to phase out the credit, or to phase it out at higher incomes where fewer individuals are located. Above the phase-out range, however, individuals have larger incentives for work than with no phase-out since they face no negative income effect of the in-work benefit.

If the in-work benefit is based on household income, it may also affect work incentives of the second earner in a complex manner. For household income in the phase-out range, a non-working spouse will be discouraged to enter the labor market and a working spouse faces a negative income effect and a negative substitution effect. Thus, for a second earner, in-work benefits can affect both the extensive and the intensive margin labor supply in a negative direction.

To summarize, the overall effect of in-work benefits on labor supply is an empirical question. It depends on the specific design of the in-work benefit scheme, the number of workers affected by the changing work incentives at the different regions of the income distribution, and the behavioral responses to the changed incentives.

The impact on wages

Most focus of the incentives created by in-work benefits has been directed towards the impact on labor supply. In recent years, increased attention has been placed on the demand side of the labor market. Nichols and Rothstein (2015) discuss how in-work tax credits may affect wages and review the evidence on this topic. According to standard tax theory, the statutory incidence of taxation is not necessarily equal to the actual incidence. Although in-work benefits are typically directed towards the workers, employers may capture some of the gains of these policies through reductions in pre-tax wages. Lower wages may in turn increase the demand for labor. Since not only wages of subsidized workers, but also wages of unsubsidized workers competing for the same jobs, may be affected, it is empirically challenging to identify wage effects. Recent attempts by Leigh (2010) and

Rothstein (2008) for the US and Azmat (2016) for the UK suggest that employers do capture a substantial part of the tax credits in the form of reduced wages. Rothstein (2010) calibrates the potential distribution effects based on external estimates and reaches similar conclusions. This has led to proposals of combining in-work tax credits with binding minimum wages (e.g., Lee and Saez 2012).

The impact on non-labor market outcomes

In-work benefits can also affect other decisions than the amount of work. In-work benefits that are functions of marital status and the number of children may affect family structure. In the US, the Earned Income Tax Credit is claimed to be an important contributor to the so-called "marriage penalty" for dual-income married couples, who often has to pay higher taxes than if they were singles. The EITC may thus decrease the incentives for single parents to marry. Since the size of the EITC depends on the number of children, it may also affect the fertility decision of households. The same holds for in-work benefits in other countries that depend on marital status or the number of children. In-work benefits may also reduce the effective returns to education and thereby affect educational attainment. The payment structure of in-work tax credits may further have implications for savings and consumption. Non-labor market outcomes will not be covered by this review. The evidence on these aspects is summarized in Nichols and Rothstein (2015).

2.3 Redistribution and cost-efficiency

The other main objective of in-work benefits is redistribution. Immervoll and Pearson (2009) stress the importance of considering the redistributive impact when assessing the effectiveness of the policies. They argue that in-work benefits can be effective at raising employment among targeted groups, but that their total effect on employment is likely to be small. Nevertheless, when assessing in-work benefits as a distribution instrument, it is a cost-effective way to redistribute to the poor since the negative behavioral effects on labor supply are limited compared to out-of-work benefits. It is particularly well suited if in-work poverty is a concern.

Immervoll and Pearson (2009) further note that the redistributive role of in-work benefits is much smaller when the earnings distribution is compressed. That makes it much costlier to alter work incentives for a specific target group and to create a significant amount of redistribution, which makes policies either expensive or ineffective. This point has also been made in, e.g., de Mooij (2008), which shows that the cost of rapid phase-out of in-work benefits, in terms of reduced hours from higher marginal tax rates, is high when earnings are compressed since many people are located

in the phase-out region. This has motivated countries such as Sweden, Denmark and the Netherlands to not phase out the credit, or to phase it out at high levels of earnings.

Immervoll et al. (2007) compare traditional welfare programs to in-work benefits as poverty alleviation measures in 15 European countries. They use a labor supply model including both intensive and extensive margin responses together with the EUROMOD microsimulation model to quantify the equity-efficiency tradeoff for different labor supply elasticities. They consider the tax and benefit rules that were in place in 1998, before most European countries introduced in-work benefit policies, and simulate the introduction of a typical in-work benefit scheme. They find that expanding the generosity of traditional welfare is very costly in most countries, since it imposes large participation tax rates at the bottom of the income distribution. On the other hand, expanding redistribution to the working poor through in-work benefits is very cost effective, since it improves the incentives for labor force participation at the low end of the earnings distribution. It is also noted, however, that the equity-efficiency trade-off is less favorable in Finland and Sweden because of the extremely equal earnings distributions.

The introduction of in-work benefits is likely to involve a revenue cost that could be financed through a reduction of public expenditures or an increase in taxes. As noted by Immervoll and Pearson (2009), a proper evaluation of the cost-efficiency would require a trade-off between the employment gains from reduced labor taxation and the distributional and efficiency consequences of changing other tax bases or reducing public expenditures. Another possibility is to keep the overall labor taxation constant and redistribute the labor tax burden across different groups of workers. Lowering taxes for groups with a responsive labor supply while raising taxes for groups that are less responsive may increase overall employment and have a desirable distributional impact.

3. Empirical evidence of the employment effects of in-work benefits in a selection of European countries

A large part of the evidence of the effects of in-work benefits come from the Earned Income Tax Credit (EITC) in the US. Introduced in 1975 as a temporary work bonus, it has grown over the years to become the largest cash or near-cash anti-poverty program in the US. It was made permanent in 1978, and was expanded at several occasions during the following decades. Although childless taxpayers eventually became eligible for the EITC, the tax credit is larger for taxpayers with children and increases with the number of children. The long history of the EITC, the changes to the program over time and the eligibility criteria that result in there being non-affected groups,

have made the EITC a suitable policy to study to draw conclusions about the behavioral effects of in-work benefits. Many studies have exploited the expansions of the EITC over time to compare employment of affected and unaffected groups before and after these expansions using a so-called "difference-in-differences" approach, sometimes combined with structural models.

The historical overview and the evidence from the literature of the EITC in the US have been summarized in several literature reviews, including Hotz and Scholz (2003), Eissa and Hoynes (2006) and Nichols and Rothstein (2015). Therefore, this paper will not include an extensive review of the US EITC. A main finding from the literature is that the EITC has increased employment among single parents, who are the largest recipient group.[2] Studies of the EITC on the hours of work of those already working, i.e., intensive margin labor supply, typically find small, negative effects. Since eligibility is based on household income, the EITC affect work incentives among secondary earners in a negative direction. Findings do suggest that there are negative effects of the EITC on married women's labor force participation and hours, but the effects are modest. The overall assessment is that the small negative effects of the EITC on married women's labor supply and on hours worked in the phase-out region are outweighed by the positive effects on the labor supply of single parents (Nichols and Rothstein 2015).

Another early example of an in-work benefit scheme is the Family Credit, later replaced by the Working Families Tax Credit and its successors, in the UK. The UK evidence has been previously summarized in, e.g., Blundell and Hoynes (2004) and Blundell et al. (2011). They note that the employment effects of the UK scheme are smaller in size than the US EITC, which may be due to the coincident expansion of out-of-work benefits and interactions with other parts of the tax and benefit system.[3] The complexity and interactions with other benefits has led the UK government to gradually introduce the integrated system of benefits called Universal Credit (Cousins 2014). Also Ireland introduced an in-work benefit early on, the Family Income Supplement, which was implemented through the benefit system.

The in-work benefit schemes that have been introduced in Europe in the 2000s have typically been more focused on employment goals and less focused on poverty alleviation than the early versions of in-work benefits in the US, the UK and Ireland. The purpose of this chapter is to describe the in-work benefit schemes in a selection of countries across Europe in some depth, and to summarize

[2] Recently, however, this positive assessment of the EITC has been questioned by Kleven (2018), who suggests that the results are not robust.
[3] Also the positive employment effects of the UK WFTC have been questioned by Kleven (2018).

the existing evidence of these schemes. The included countries are France, the Netherlands, Germany, Belgium, Denmark, Finland and Sweden.

The existing evidence of in-work benefits can broadly be divided into two groups – ex-ante and ex-post evaluations. Ex-ante evaluations analyze the potential effects of the policy measures based on structural models and detailed country-specific data from before the implementation. Ex-post evaluations make use of design features of the implemented in-work benefit schemes to find identification strategies that makes it possible to evaluate the effects of the policy measures after the introduction or expansions. The specific approaches used vary substantially across studies within these two broad groups of methods.

3.1 France

The *Prime Pour l'Emploi* (PPE) was introduced in France in 2001. It was an in-work tax credit of relatively small size, amounting to a few hundred euros per recipient and year. The target group was full-time workers receiving the minimum wage, and the purpose was to increase the relative difference between labor income and out of work transfers for this group. The PPE was based on individual earnings but was also means-tested against household income. To be eligible, household income could not exceed €1,050 for a single person, €2,100 for a married couple and an additional 27.6% of the single amount for each child. There were also some family elements related to marital status and the presence of children, but their amounts were small.

The tax credit was initially phased in for full-time equivalent individual incomes between 0.3 and 1 times the minimum wage, and then phased out linearly until 1.4 times the minimum wage. The reference to the minimum wage was later abandoned. The maximum credit amounted to 2.2% of the annual minimum wage in 2001. It was doubled in 2002 and a 45% premium for part-time activity was introduced in 2003. In 2006, the tax credit was substantially increased to a maximum amount of €78 per month in 2007, amounting to 7.7% of the annual minimum wage, compared to €24 in 2002. The income thresholds were frozen in 2008 in response to the introduction of an in-work benefit in the welfare system (the *rSa*, described below). The credit was refundable and paid out annually in October the following year. Detailed descriptions of the PPE can be found in, e.g., Sterdyniak (2007), Bargain (2008) and Cousins (2014).

Sterdyniak (2007) summarizes the evidence on the implementation of the PPE, with all studies finding positive but small employment effects, amounting to less than 0.5 percentage points. A first

set of studies provides ex-ante estimates of the potential impact on labor supply. Fugazza et al. (2003) focus on women and analyze the potential impact of the PPE in 2003, finding that the effect on female employment would be positive but weak. Choné (2002) uses a model of joint decision making in couples and finds that the 2003 version of the PPE has a positive but small potential impact on male and female employment. Laroque and Salanié (2002) model the case of women aged 25 to 49 and compare the effects of the PPE with a work-incentive scheme in the welfare system. They find positive but small impacts of the PPE in 2003 on employment, and negative impacts in total of the alternative measure. Bargain (2004) uses a micro-simulation model to study the impact of the 2003 PPE and two alternative measures on labor supply decisions of women in couples. He finds a very weak effect of the PPE, especially on full-time employment. Bloemen and Stancanelli (2007) model simultaneously the employment probability and the determinants of programme eligibility while also allowing for hours responses. They find no significant impact of the tax credit on either employment or hours of French women. Anne and L'Horty (2012) show that the reforms to the PPE during the 2000s did not increase the financial incentives for work among recipients of means-tested benefits, due to offsetting effects of other measures in the welfare system.

A second set of studies provides ex-post estimates of the effects of the PPE on labor supply. Stancanelli (2008) uses a difference-in-differences approach to study the impact of the PPE in 2002 on female labor supply. She uses variation across groups due to the policy eligibility rules as well as household composition. The findings suggest a decline in the employment of married women of about three percentage points as a result of the tax credit, primarily due to the conditioning on total household resources. The employment of co-habiting women, that were not subject to the means-testing on household resources, was on the other hand found to be positive and amounting to 6–7 percentage points although only weakly significant. The effects for single mothers were not statistically significant. In total, the effect of the PPE on female employment was very small, in the order of about 2,000 new jobs. Arnaud et al. (2005) use a similar approach and studies the whole population, finding that the PPE had a small and hardly significant effect on activity. Lehmann et al. (2013) exploit the variation in income tax rates over time, largely depending on the introduction and expansions of the PPE, to compare the response to changes in the income tax and the payroll tax schedules. In line with the results in Stancanelli (2008), they find significant elasticities with respect to the net-of-income-tax rate, primarily driven by participation decisions of married women.

Overall, existing evidence points to limited employment effects of the PPE. It has been discussed that this may be due to the modest benefit amounts and difficult labor market conditions with high involuntary unemployment. Critics have also pointed out the complex rules of the PPE and the long delays of up to 18 months until the credit is paid out (see, e.g., Immervoll and Pearson 2009 and Cousins 2014).

The *revenue de Solidarité active* (rSa) was a reform to the French social assistance system implemented in June 2009. The aim was to combat poverty, but also to provide incentives for return to work and to support the social inclusion of social assistance claimants. The rSa replaced several previous welfare schemes, and was coordinated with the PPE. The rSa included a basic benefit that varied with marital status and the number of children, and was topped up with an in-work rSa supplement for those who work. The in-work rSa supplement implied that 62 percent of net earnings were exempted up to a level of the minimum wage (EUR 1,430 per month in 2014) for a single person. The rSa was hence reduced by only 38 percent of earned income when an rSa recipient returned to work. Whereas the PPE was paid at a low rate to many people, the rSa was paid at a much higher rate but to a small group of people. In 2014, the rSa was paid to 2.5 percent of the labor force at an average yearly payment of EUR 2,112 and with spending amounting to 0.08 percent of GDP. In the same year, the PPE was paid to 21.3 percent of the labor force at an average yearly payment of EUR 432 and with spending amounting to 0.12 percent of GDP (see, e.g., Cousins 2014).

A national evaluation committee was appointed to evaluate the introduction of the rSa, which presented its final report in 2011 (CNE 2011). They concluded that the take-up of the in-work supplement was only 32 percent of eligible persons, which was much lower than expected. 240,000 individuals received basic and in-work rSa and 490,000 individuals received the in-work rSa only, compared to the estimated take-up numbers before the introduction of 1.5 million individuals. Anne and L'Horty (2012) show that the theoretical predictions are that the rSa improves the financial incentives for work. However, evaluations by the CNE (2011) and Briard et al. (2012) did not find any significant impact of the reform on employment. According to Cousins (2014), problems of information, awareness and understanding as well as the level of bureaucracy in the administration of the rSa have been discussed as potential reasons for the lack of an impact on employment.

Since 2016, the PPE and the rSa have been merged into one single in-work benefit, the *Prime d'activité*. It is supposed to be better targeted than its predecessors at promoting a return to full-time

work among low-paid workers. The amount is calculated as the targeted income minus the maximum of resources and a lump sum. The targeted income is the sum of three components. First, a lump sum of EUR 524.68, increased by 50% for couple, by 30% for each child until two and 40% for each additional child, and by 128.412% for isolated parent and 42% for each child of isolated parent. Second, a linearly growing individual bonus for individuals with net earnings between 50 and 80% of the minimum wage, reaching a level of 12.782% of the lump sum. Third, 62% of the net professional income of the household. Resources are calculated as the sum of household income and family and housing benefits. Housing benefits are given by a lump sum depending on household composition and amounts to 12% of the basic lump sum for a single person, 16% for a couple and 16.5% for three persons or more (see, e.g., OECD (2017) for a description).

3.2 The Netherlands

In 2001, the Netherlands implemented a large tax reform. One important motivation was to increase the financial incentives for work among women. The tax reform reduced marginal tax rates and replaced tax allowances by tax credits. Both tax allowances and tax credits are transferrable between spouses, but while the value of transferring the tax allowance depends on the marginal tax rate of the spouse, the tax credit is a fixed amount. Therefore, the transformation of tax allowances to tax credits increased the incentives for work among non-working women with a high-income spouse, who previously benefitted from staying out of work and transferring the tax allowance to their partner. The transformation of tax allowances to tax credits in 2001 included a general tax allowance, a general earned income tax allowance and a single parent earned income tax allowance. In addition, an earned income tax credit for parents was introduced as part of the reform. In 2005, an additional parent earned income tax credit was being added. See Mastrogiacomo et al. (2017) for a detailed description of the reform and the different tax credits in the early 2000s. During 2009–2023, the possibility of transferring tax credits to the spouse are being entirely phased out in the Dutch tax system (OECD 2017).

The general earned income tax credit introduced in 2001, *Arbeidskorting*, is individual-based and available to everyone. Eligibility is based on the total earned income without taking hours worked into account. Initially, the tax credit was progressively phased in by about 1.7% up to 50% of the minimum wage and by about 11% beyond that income up to the level of the annual minimum wage. In 2005, the phase-in rate in the second interval was 11.8% and the maximum annual tax credit was €1,287. To avoid disincentive effects on the intensive margin, the tax credit was not

phased out. The tax credit is non-refundable, i.e., it cannot reduce the individual tax and national insurance contributions liability below zero.

The tax credit structure of the general earned income tax credit during 2001–2017 is presented in Table 1. Over the years, the phase-in rate in the second interval has been raised substantially from 10.751% in 2001 to 28.317% in 2017 and the maximum tax credit has more than tripled since the introduction from €920 in 2001 to €3,223 in 2017. Until 2011, larger tax credits applied to workers aged 57–64, to particularly encourage employment among older workers. The tax credit became increasingly generous over the age intervals 57–59, 60–62 and 62–64. Above age 65, the tax credit was less generous than the regular credit below age 57. In 2011, the maximum general earned income tax credit was €1,574 up to age 57, €1,838 for ages 57–59, €2,100 for ages 60–61, 2,362 for ages 62–64 and 1,081 above age 65. In 2009, a small phase-out of 1.25% was being introduced but the reduction for high incomes was less than €100. In 2013, the phase-out rate increased to 4% and applied to a larger income interval. Since 2016, the tax credit is fully phased out at high incomes. It should be noted, however, that the phase-out starts at relatively high levels of income. The phase-in rate and the maximum value of the credit were substantially increased in 2016, which was part of a new tax plan with the aim of creating more employment by reducing the tax burden on labor.

Table 1 The structure of the general earned income tax credit, Arbeidskorting, in the Netherlands, 2001–2017.

Year	*Phase-in rate band 1, percent*	*Income limit band 1, EUR*	*Phase-in rate band 2, percent*	*Max. amount, EUR*[a]	*Phase-out rate, percent*	*Phase-out starts at, EUR*	*Min. credit amount, EUR*
2001	1.751	11,898	10.751	920	-	-	-
2002				949	-	-	-
2003	1.725	8,001	10.700	1,104	-	-	-
2004				1,213	-	-	-
2005			11.800	1,287	-	-	-
2006	1.795	8,132	12.421	1,357	-	-	-
2007				1,392	-	-	-
2008				1,443	-	-	-
2009	1.738	8,859	12.381	1,504	1.25	42,509	1,480
2010	1.737	9,041	11.888	1,489	1.25	43,385	1,433
2011	1.716	9,209	12.152	1,574	1.25	44,126	1,497
2012	1.733	9,295	12.32	1,611	1.25	45,178	1,533
2013	1.827	8,816	16.115	1,723	4.0	40,248	550
2014	1.807	8,913	18.724	2,097	4.0	40,721	367
2015	1.810	9,010	19.679	2,220	4.0	49,770	184
2016	1.793	9,147	27.698	3,103	4.0	34,105	0
2017	1.772	9,309	28.317	3,223	3.6	32,444	0

[a] The maximum credit is the general credit for ages below 57 until 2011. During this period, higher tax credits for ages 57–64 were in place.
Note: Empty cells when information is missing, - when tax credit is not in place.
Source: Information collected from www.homefinance.nl, financieel.infonu.nl/belasting and from Euromod country reports at www.euromod.ac.uk/using-euromod/country-reports/f3-g4.

The single parent earned income tax credit, *Aanvullende Alleenstaande Ouderkorting*, was available for single parents with a child up to age 12 until 2001 and up to age 16 from 2002. It was phased in at a rate of 4.3% up to a maximum tax credit of €1,401 in 2005. The structure of the tax credit is presented in Table 2. It has remained relatively constant over the years, until it was removed in 2015. The removal was part of an effort to reduce the child arrangements from 10 measurements to 4 measurements and to increase the importance of cash transfers for this group.

Table 2 The structure of the single parent general earned income tax credit, Aanvullende Alleenstaande Ouderkorting, in the Netherlands, 2001–2017.

Year	*Phase-in rate, percent*	*Max. amount, EUR*	*Max. income, EUR*
2001	4.3	1,261	29,300
2002	4.3	1,301	30,300
2003	4.3	1,348	31,300
2004	4.3	1,381	32,100
2005	4.3	1,401	32,600
2006	4.3	1,414	32,900
2007	4.3	1,437	33,400
2008	4.3	1,459	33,900
2009	4.3	1,484	34,500
2010	4.3	1,513	35,200
2011	4.3	1,523	35,400
2012	4.3	1,319	30,700
2013	4.3	1,319	30,700
2014	4.3	1,319	30,700
2015	-	-	-
2016	-	-	-
2017	-	-	-

Note: - when tax credit is not in place.
Source: Information collected from www.homefinance.nl, financieel.infonu.nl/belasting and from Euromod country reports at www.euromod.ac.uk/using-euromod/country-reports/f3-g4.

The parent earned income tax credit that was introduced in 2001, *Combinatiekorting*, was a fixed tax credit of €228 in 2005. It was given to primary earners with a youngest child up to age 12, provided that the gross earned income exceeded about 25% of the annual minimum wage (€4,368 in 2005). The additional parent earned income tax credit introduced in 2005, *Aanvullende combinatiekorting*, was a fixed tax credit of €389. It was given to working secondary earners and single parents with a youngest child up to age 12, provided that the gross earned income exceeded about 25% of the annual minimum wage. This tax credit was raised during 2006–2008 to increase the incentives for labor force participation among secondary earners and single parents. The structure of these tax credits over time is presented in Table 3.

Table 3 The structure of the parent earned income tax credit, Combinatiekorting, and the additional parent earned income tax credits, Aanvullende combinatiekorting and Inkomensafhankelijke combinatiekorting, in the Netherlands, 2001–2017.

Year	*Earnings threshold*	*Parent earned income tax credit,* Combinatie-korting	*Additional parent earned income tax credit,* Aanvullende combinatie-korting	*Additional parent earned income tax credit,* Inkomensafhankelijke combinatiekorting			
		Tax credit, EUR	Tax credit, EUR	Min. tax credit, EUR	Phase-in rate, percent	Max. tax credit, EUR	Max. income, EUR
2001	3,938	138	-	-	-	-	-
2002		190	-	-	-	-	-
2003	4,206	214	-	-	-	-	-
2004		224	-	-	-	-	-
2005	4,368	228	389	-	-	-	-
2006	4,405	146	608	-	-	-	-
2007	4,475	149	700	-	-	-	-
2008	4,542	112	746	-	-	-	-
2009	4,619	-	-	770	3.8	1,765	30,803
2010	4,706	-	-	775	3.8	1,859	33,232
2011	4,734	-	-	780	3.8	1,871	33,444
2012	4,814	-	-	1,024	4.0	2,133	32,539
2013	4,814	-	-	1,024	4.0	2,133	32,539
2014	4,814	-	-	1,024	4.0	2,133	32,539
2015	4,857	-	-	1,034	4.0	2,152	32,832
2016	4,881	-	-	1,039	6.159	2,769	32,969
2017	4,895	-	-	1,043	6.159	2,778	33,049

Note: Empty cells when information is missing, - when tax credit is not in place.
Source: Information collected from www.homefinance.nl, financieel.infonu.nl/belasting and from Euromod country reports at www.euromod.ac.uk/using-euromod/country-reports/f3-g4.

From 2009, the additional parent earned income tax credit became income dependent and was renamed to the *Inkomensafhankelijke Combinatiekorting*. It was still targeted to working secondary earners and single parents with a youngest child up to age 12 and gross income exceeding 25% of the annual minimum wage. In the same year, the parent earned income tax credit for primary earners, *Combinatiekorting*, was abolished. The new income dependent tax credit was equal to a minimum tax credit, plus 3.8% of income above the earnings threshold for being eligible for the credit, up to a maximum of €1,765 reached at a level of income of €30,803. The changes to the tax credit over time are presented in Table 3. The minimum tax credit was increased in later years and the phase-in-rate was increased to 4% in 2012 and to 6.159% in 2016. This led to an increase in

the maximum tax credit of about €1,000 between 2009 and 2017, to a maximum of €2,778 in 2017. The increase in the additional parent EITC in 2016 was also part of a new tax plan in 2016 with the goal of increasing employment by reducing labor tax rates.

Several ex-post evaluations of different changes to the Dutch income tax system have been pursued. Bosch and van der Klaauw (2012) perform an ex-post evaluation of the impact of the 2001 Dutch tax reform on the labor supply of married women. They use the tax reform as an instrument for changes to the after-tax marginal wage. They find a negative but insignificant uncompensated wage elasticity, suggesting minor effects of the reform on intensive margin labor supply. On the other hand, they find substantial positive effects on labor force participation of married women, amounting to 2.4 percentage points. The authors attribute this effect to the shift from tax allowances to tax credits. The effects are largest for the lowest-educated women and decrease with education. Simulations suggest that average working hours increased by 0.37 per week in the full population, amounting to 2% of average working hours in the population.

Bettendorf et al. (2014) study the change of the single parent general earned income tax credit, *Aanvullende Alleenstaande Ouderkorting* in 2002, extending eligibility from parents of children up to age 12 to parents of children up to age 16. This extension increased the gains from working for single parents with children aged 12–15 by 31%. The authors perform an ex-post evaluation using both a difference-in-differences approach and a regression discontinuity approach to analyze labor supply responses of single mothers. The DiD approach compares labor supply of single mothers with children aged 12–15 to that of single mothers with children aged 8–11 or 16–19. They find no significant impact of the extension on the labor supply of single mothers. The RD approach uses the cutoff in eligibility for children at age 16, and studies labor supply of women with children aged 14–17 during 2002–2008. They find no significant change in labor supply around this age cutoff. Overall, the conclusion is that the extension of the single parent general earned income tax credit to include older ages of the children had negligible effect on labor force participation, with precisely estimated zeros. The lack of an effect may be due to the fact that the treatment group were single mothers whose youngest child was relatively old, or that the reform was not salient.

Bettendorf et al. (2015) analyze the joint effect of the increases in the parent earned income tax credits over the period 2005–2009, as presented in Table 3, together with a 2005 reform that made childcare subsidies much more generous. They use a difference-in-differences strategy over the period 1995–2009 that compares parents 20 to 50 years old with a youngest child up to age 12 to

parents in the same age group with a youngest child aged 12 to 17. They find that the EITC and childcare subsidies expansions jointly increased the female participation rate in the treatment group by 2.3 percentage points (3%), and increased hours worked among women in the treatment group by 1.1 hour per week (6.2%). Men in the treatment group reduced their hours by 0.3 per week (0.8%). The authors refer to these effects as being relatively small. Since the reform was large and costly, each created job was estimated to cost 87 thousand euros. A large part of the costs was due to the mechanical costs of increasing the childcare subsidy for those already using formal childcare, as well as the cost of informal childcare shifting to become formal childcare – none of which impacted female labor supply.

There are also several papers analyzing changes or potential policy reforms to taxation in the Netherlands using structural approaches. De Mooij (2008) sets up an applied general equilibrium model for the Netherlands, including intensive and extensive margin responses as well as job acceptance decisions of the unemployed. Labor supply elasticities are calibrated based on existing empirical evidence. The model is used for simulations of several policy options to analyze the trade-off between equity and efficiency.

One policy measure that is being analyzed in de Mooij (2008) is an extension of the selective earned income tax credit for secondary earners with children. This refers to the *Aanvullende combinatie-korting*, which was in place when the analysis was being pursued. At that time, it amounted to about €600 and was given to single parents and secondary earners with earnings above €4,500. The proposed policy option extends this tax credit such that it is being linearly phased in for earnings between 0 and €12,000 to a maximum of €2,700 with no phase-out range. It is hence similar to the *Inkomensafhankelijke combinatiekorting* that came into place in 2009, although the proposed tax credit is even more targeted towards low incomes. The simulations suggest that the increased marginal tax rates for a large share of the workers reduces hours worked by primary earners and singles. On the other hand, the reduced tax burden at the extensive margin increases female labor force participation of secondary earners substantially, primarily due to increased part-time work. Female hours also increase. Furthermore, the credit improves efficiency of the job matching process and reduces unemployment. When accounting for all these effects, the simulations suggest that aggregate employment would rise by 0.4%.

Other policy simulations in de Mooij (2008) regard different types of extensions of the general earned income tax credit, *Arbeidskorting*. It amounted to about €1,350 at the time of the study and

was linearly phased in at the high rate for earnings between €8,000 and €16,000, with no phase-out range. The simulations compare the effects of different types of design in terms of fixed or progressive tax credits, flat ranges, phase-out ranges and rates and the level of targeting towards low incomes. The findings point to the trade-off between stimulating participation at the extensive margin and encouraging hours worked at the intensive margin, since the phase-out of the tax credit increases marginal tax rates and discourages longer hours. It appears that a phase-out range starting just above the minimum wage is counterproductive in the Netherlands because it distorts labor supply of singles, who often work part-time. Phasing out at higher levels of income is less distortionary, and can induce increases in aggregate labor supply.

De Boer (2016) uses a structural labor supply model for the Netherlands together with a large, rich data set used to calculate labor supply elasticities for different subgroups, and an advanced tax benefit calculator. He analyzes predicted effects of several different policy simulations, including a comparison of an earned income tax credit for all workers and an earned income tax credit targeted at working parents. He finds that the expansion of the additional parent EITC, *Inkomensafhankelijke combinatiekorting*, at the end of the 2000s is predicted to increase total labor supply by 0.5%. The largest part is due to extensive margin responses of secondary earners, but also intensive margin responses of secondary earners as well as extensive and intensive margin responses of single parents are important. When comparing the effectiveness of an increase in the additional parent EITC to an increase in the general EITC and an overall reduction in marginal tax rates, he finds that the working parents EITC is more effective in stimulating labor supply. The reason is that secondary earners and single parents are groups with a relatively elastic labor supply.

De Boer et al. (2015) use a structural model to perform an ex-ante analysis of the relative impacts of childcare subsidies and in-work benefits. This relates to the analysis in Bettendorf et al. (2014), described above. They find that in-work benefits for secondary earners that increases with earnings are potentially most effective in stimulating labor supply. Childcare subsidies appear to be less effective, and in-work benefits that target both primary and secondary earners appear to be much less effective due to the limited behavioral responses of primary earners.

Mastrogiacomo et al. (2017) use a large and rich household panel data set together with a structural discrete choice model to estimate heterogenous preferences for income and leisure along with labor supply elasticities across subgroups of the labor market in the Netherlands. They use the major tax reform in 2001 as a source of exogenous variation, including reduction in marginal tax rates,

increases in in-work benefits and a shift from tax allowances to tax credits. In total, these changes increased the financial incentives for work, both on the extensive and the intensive margin.

First, the authors find large differences in labor supply elasticities across subgroups and decision margins. Single men and women have a similar labor supply elasticity, but men in couples are much less responsive than women in couples. They find the highest labor supply elasticities for single parents, especially with preschool children, and they find much higher labor supply elasticities among low-skilled than among high-skilled workers. Immigrants also have higher elasticities than natives. Second, they find much larger differences in labor supply elasticities between households with and without children than has previously been found. Third, they find that targeted tax credits to the working poor, secondary earners or working single parents is potentially much more effective in raising labor participation than if targeted to all workers.

Overall, the ex-ante studies of the Dutch tax reform in 2001 and different versions of the in-work benefits in the Netherlands suggest that the potential employment effects are positive. They also indicate that in-work benefits targeted to secondary earners or single parents have the largest potential. However, the existing evidence from ex-post evaluations of different changes to the Dutch income tax system does not confirm these predictions. While the 2001 tax reform appears to have impacted employment, primarily by shifting from tax allowances to tax credits, evaluations of the different parent earned income tax credits find no or relatively small impacts on employment.

3.3 Germany

The Mini-Job Reform was introduced in Germany on April 1, 2003 as part of the so-called "Hartz Reforms" that were subsequently implemented during 2003–2005. The aim was to increase the incentives for work among low-income earners. Mini-Job earnings were exempted from individual social security contributions (21% on gross earnings) and personal income tax, but the employer had to pay social security contributions at a rate slightly above that corresponding to regular employment (25% on gross earnings for Mini-Jobs, compared to 21% for regular jobs). Tax exemptions applied at an individual basis to the entire workforce, not only to the unemployed, and were not dependent on family structure. Mini-Job workers were covered by health insurance, sick pay, parental leave and holiday pay, as well as many of the regulations and protections applying to regular workers.

Mini-Jobs existed already before the Mini-Job Reform in 2003, but were restricted to employments of up to 15 working hours per week and gross monthly earnings below €325, and the employment had to be the only income source for the individual. The Mini-Job Reform raised the earnings limit to €400 and eliminated the hours limit, while increasing the Employer SSC from 22% to 25%. Earnings from several Mini-Jobs could be added together and the total amount was exempted from income taxation. Mini-Jobs could also be held on top of a standard job, increasing the incentives for secondary employments. The administrative procedures for the Mini-Jobs were also simplified. In addition, a phase-out region was introduced, creating so-called *Midi*-Jobs, for gross monthly earnings between €400 and €800. In this region, the employer SSC was the same as for regular jobs, whereas the individual SSC increased linearly and income tax applied normally. For a detailed description of the Mini-Job Reform, see Steiner and Wrohlich (2005) and Galassi (2018a). Until 2015, Mini-Job wages could be below the collectively-bargained minimum. Thereafter, the statutory minimum wage of €8.50 per hour applied to most Mini-Jobs (Kenworthy 2015).

After the Hartz Reforms, Germany saw a sharp decline in unemployment and a boost in employment. It has been debated to what extent these changes were due to the different components of the Hartz Reforms, including the Mini-Jobs. The fact that tax exemptions are not dependent on family structure, apply homogenously nationwide, and were expanded during a period when many related measures were also altered as parts of the Hartz Reforms, makes impact evaluation of the Mini-Job Reform challenging (see, e.g., surveys by Akyol et al. 2013, Jacobi and Kluve 2007 and Eichhorst and Zimmermann 2007).

An early analysis by Fertig and Kluve (2006) applies fixed effects models to administrative panel data from the German Employment Agency and finds an increase in the share of Mini-Jobs by 2 percentage points and an increase in the share of Midi-Jobs by 0.3 percentage points following the reform. They do not find any evidence for Mini or Midi Jobs working as stepping stones to regular jobs. Caliendo and Wrohlich (2010) make use of the variation in the interview month of the German Socioeconomic Panel (SOEP) to evaluate the short-term impact of the Mini-Job Reform on the probability of having a marginal or secondary job. They compare the outcomes of individuals interviewed in April–October to individuals interviewed in January–March in 2003, while netting out the differences between these groups using the cross-section data in 2002 in a difference-in-differences analysis. They find no effect on the probability of holding marginal employments, but they find a significant increase in the probability of single men holding secondary

jobs. Their conclusion is that the rise in marginal employments cannot be causally linked to the Mini-Job Reform.

The main goal of Mini-Jobs was to increase the incentives for work among low-income workers. However, Steiner and Wrohlich (2005) show that the incentives for work for recipients of social transfers barely changed due to strict withdrawal of earnings. For individuals receiving unemployment benefits, the incentives to work were weak both before and after the reform, since earnings above €165 were fully withdrawn. The authors also point out that the lack of a minimum hours' requirement makes the reform less targeted towards the low-wage segment of the labor market, since low earnings could come from either low wages or short working hours. It may incentivize regularly employed people to reduce their working hours to qualify for the tax exemptions.

Steiner and Wrohlich (2005) perform an ex-ante evaluation based on a structural labor supply model embedded in a detailed tax-benefit microsimulation model. They find modest predicted participation effects, primarily from an increased inflow of secondary workers, and negative predicted effects on hours worked. The predicted net employment effect and the predicted net fiscal effect are both negative. Bargain et al (2010) apply a static structural labor supply framework that explicitly accounts for demand-side constraints to compare the predicted effects of policies that target low wages, such as the Belgian Work Bonus (see Section 3.4), to policies that target low earnings, such as the German Mini-Job Reform. Their results favor policies that try to distinguish between low effort and low productivity by targeting wages.

Concerns have also been raised that the Mini-Jobs displace regular jobs, increase in-work poverty, and lock in workers in low-quality jobs. The question of whether Mini-Jobs serve as stepping stones or dead ends has received some attention in the literature. As Caliendo et al. (2016) point out, the theoretical predictions are ambiguous. On the one hand, marginal employments taken up by unemployed workers may lower human capital deterioration, work as a screening device for employers or increase the individual's labor market network, and thereby induce stepping stone effects into regular employment. On the other hand, the additional income may increase the reservation wage and thereby prolong unemployment. In addition to unemployment duration, these factors may also affect job match quality.

Freier and Steiner (2008) investigate stepping stone or dead-end effects of Mini-Jobs in the period 1999–2003, prior to the extensions of the tax exemptions in the Mini-Job Reform. They apply propensity score matching based on recent employment history and unemployment duration, and compare unemployed workers who took up a Mini-Job during a risk period of 9 months to unemployed workers who did not take up a Mini-Job. The results show no effects on the probability of gaining regular employment, but a reduction in future unemployment and a slight increase in the cumulated future earnings. Caliendo et al. (2016) take dynamic selection of job seekers into marginal employment into account by estimating multivariate duration models for an inflow of unemployed male workers in 2001, and analyze the effects both on the unemployment duration and on the job match quality. They find an increased outflow probability of Mini-Job workers in the long run and improved job stability.

Galassi (2018a) also studies stepping stone or dead-end effects of Mini and Midi Jobs. In addition, she analyzes the performance of Mini-Jobs as an anti-poverty measure, i.e., to which degree the incidence of the tax exemptions falls on the worker in the form of increased earnings. She uses the incentives change induced by the Mini-Job Reform and compare earnings, wages and transition probabilities across groups in a difference-in-differences setting with fixed effects. She finds that earnings, employment and job stability improved for young workers and, to a smaller extent, for women following the reform. Earnings for single parents do not improve due to offsetting effects between increased working hours and reduced wages, and earnings for low-educated workers even decline. She also employs a matching approach on pre-treatment characteristics to compare workers in tax-advantaged jobs to those in non-tax advantaged jobs. The results show a reduction in net earnings for Mini-Jobbers due to decreased hours of work. Whereas before-tax wages decline, after-tax wages are unaffected, which suggests that the tax incidence fell to a larger extent on the employers, who then profit from the benefits given to workers. Related to stepping stone effects, she does find that Mini-Jobs increase the transition rates to employment after one year for people who were out of employment prior to the reform.

Carrillo-Tudela et al. (2018) study the combined effects of the Hartz Reforms through a detailed analysis of flows in and out of unemployment, non-participation, marginal employment, part-time employment and full-time employment. They show that the unemployment reduction in Germany did not happen through direct unemployment-employment flows. Whereas unemployment fell because a larger fraction of unemployed de-registered as jobseekers when unemployment benefits were reduced, non-participation declined due to unregistered-unemployed accepting low-wage

part-time work, induced by the Mini-Job Reform, when the attractiveness of welfare benefits declined. Mini-Jobs also induced a rise in part-time jobs as secondary employments. Initially, this was due to already employed individuals adding extra hours in the form of a Mini-Job, but eventually, the dominant form became that of Mini-Jobbers taking up a secondary, regular employment. Overall, the authors conclude that the main role of Mini-Jobs was to lift workers out of non-participation.

Galassi (2018b) analyzes firm responses to changes in wages for low-earning workers induced by the expansion of tax benefits for these workers by the Mini-Job Reform. She considers how these policies affect non-targeted, high-earnings workers through equilibrium effects, on top of low-earning workers. By exploring firm-level outcomes she can decompose firm responses into scale effects from lower labor costs and substitution effects from changes in the relative cost for low-earnings and high-earnings workers. She employs a difference-in-differences approach and show that establishments with a high intensity of low-earning workers prior to the reform expand relatively more than low intensity establishments. However, these expansions are biased towards high-earnings workers, not targeted by the reform. She also finds that establishments with initially lower intensity of low-earnings workers substitute employment towards this tax-advantaged worker category without expanding at the same pace.

On the one hand, the Mini-Job Reform does not appear to have been a successful antipoverty policy and may have been ineffective in moving long-term unemployed out of unemployment. On the other hand, it seems to have helped moving inactive workers into employment and may have induced additional employment through wage moderation.

3.4 Belgium

In August 2001, an earned income tax credit was introduced in Belgium, called the *Crédit d'impôt sur les bas revenus de l'activité profesionnelle* (CIBRAP). It applied at an individual basis and did not depend on family conditions such as the number of children or household income. The tax credit was phased in over annual earnings from €3,960 to €5,287 at a rate of 40.5% to a maximum of €532 per year and phased out from €13,226 to €17,186 at a rate of 13.5%. The minimum hours requirement for receiving the tax credit was 13 hours per week. The aim of the tax credit was to promote employment, in particular among young people and women, and to reduce poverty among low skilled workers.

In 2004, the CIBRAP was replaced by a similar program as the Mini-Jobs in Germany, the *Bonus à l'Emploi* or the Work Bonus, subsidizing employee social security contributions for low-skilled workers. This was thought to be more efficient in promoting work among the low-skilled. CIBRAP continued to be in place for the self-employed. Reductions of social security contributions for low-wage workers had been in place in Belgium since 2000. Prior to CIBRAP, the reduction was €81.8 per month for full time equivalent earnings between €877 and the minimum wage €1,147, and then phased out at a rate of 36.5% to €1,367. The full SSC reduction in the Work Bonus was €95 in 2004, phased in for full time equivalent monthly earnings of up to €1,210 and phased out at a rate of 17.8% to €2,000. In 2006, the full SSC reduction was €140. The full benefit amounted to about 7.2% of the monthly wage for minimum wage workers in 2001, and to 11.1% in 2006. In 2015, the phase-out rate was 20.8% and the maximum Work Bonus was €184. For a description of the CIBRAP and the Work Bonus, see, e.g., Orsini (2007), Bargain (2008) and Dagsvik et al. (2011).

The difference between the Work Bonus and the German Mini-Jobs is that eligibility and subsidy levels depend on full-time equivalent earnings, making it explicitly targeted towards workers with low wage and not generally towards workers with low earnings. Gross earnings were converted to full time equivalent earnings, and the maximum SSC reduction for this earnings level was then scaled by the hours worked. This avoids incentives to reduce hours on the intensive margin existent in the German Mini-Jobs as well as in many earned income tax credit policies in other countries. Compared to the earned income tax credit CIBRAP, that does not become fully effective until the final taxes are computed up to 2 years after the income has been earned, it was also seen as an advantage that the Work Bonus becomes effective immediately. The reduction is automatic for eligible workers and no application is required.

The Work Bonus was complemented by a fiscal work bonus in 2005. It is a refundable tax credit that is calculated as a fraction of the Work Bonus. Both work bonuses have expanded over the last years. From 1 Aug 2015, the fiscal work bonus amounted to 17.81% of the Work Bonus with a maximum amount of €235, in 2016 it was 28.05% up to €420 and in 2019 it will become 33.14% up to €500 (see, e.g., Decoster et al. 2015 and Hufkens et al. 2017).

Orsini (2007) uses a structural model to simulate the potential impacts of the CIBRAP tax reduction in 2001 and the implementation of the SSC rebate the Work Bonus up to 2006 on the labor supply of couples. The results show a positive but moderate reform effect on both participation and hours worked. The potential effects on aggregate labor supply was larger for the

Work Bonus, whereas the potential effects solely on labor force participation was larger for the earned income tax credit.

Dagsvik et al. (2011) come to similar conclusions. They use a structural labor supply model to simulate the potential labor supply effects of CIBRAP and the Work Bonus, based on individual data from 2001. The 2001 Work Bonus system is used as a baseline compared to the potential effects from three policy simulations: abolishing the Work Bonus, extending the Work Bonus to the 2006 system, and introducing a tax credit system such as CIBRAP at the level it would have been at in 2006. They find that the tax credit would have a larger participation effect than the extended Work Bonus system, but a smaller impact on aggregated labor supply due to negative labor supply incentives at the hours worked margin. Since the Work Bonus is conditional on hourly wage, it avoids this negative intensive margin effect. The results show that the extended Work Bonus is more cost-efficient per full-time equivalent worker precisely because it avoids the "part-time trap" inherited in the tax credit system. Removing the baseline Work Bonus system would reduce both participation and hours worked, and the fiscal effects would be negative.

In 2007, the Flemish government implemented an in-work tax credit called the *Jobkorting* to boost employment and increase the attractiveness of working in the Flemish region of Belgium. In 2007, workers with earnings between €5,500 and €21,00 per year received a €125 tax credit. After that earnings level, the tax credit was phased out at a rate of 10% and disappears at an earnings level of €22,250 per year. The credit amount increased to €200 in 2008. In 2009, the credit was raised to €300 for annual earnings between €5,500 and €22,000 and the phase-out range was removed. Instead, workers with annual earnings above €22,000 received a credit of €250. The phase-out range was introduced again in 2010, when the tax credit was lowered to €125 and phased out between annual earnings from €17,250 to €18,500. For a detailed description, see Decoster and Vanleenhove (2012).

Decoster and Vanleenhove (2012) use a structural model to evaluate the potential effects of the 2009 Jobkorting tax credit. They find positive labor supply effects of the tax rebates and larger responses among married women. However, the total labor supply effects are of minor size and hardly enough to compensate for the costs of the credit. Alternative policies with larger tax credits lead to substantially larger labor supply responses but at a higher fiscal cost.

3.5 Denmark

In 2004, a tax reform was implemented in Denmark with the purpose of lowering taxes on earned income. The two main elements were an increase in the threshold for the medium tax bracket and the introduction of an earned income tax credit. By reducing the distortions on the labor market and improving the incentives to work, the tax cuts were considered an important instrument to achieve the Danish government's general aim of increasing the level of structural employment by 2.25 percentage points to prepare for the public finance effects of future demographic changes.

The earned income tax credit was implemented in the form of an employment allowance, called *beskæftigelsesfradrag*. In 2004, it amounted to 2.5 percent of taxable income up to the new threshold for paying the medium tax bracket and a fixed amount of DKK 5,800 above that threshold, with no phase-out region. Since it was implemented in the form of an allowance, the value of the tax credit is about 1/3 of the allowance, after multiplying with the municipal, church and health tax rate. The maximum tax credit was therefore around DKK 1,900 in 2004. Further information about the 2004 tax reform is presented in Skatteministeriet (2018).

The employment allowance was raised to 4 percent and the ceiling was raised to DKK 12,300 in 2008 and was further increased in 2009. In 2012, a large tax reform was passed, that included a step-wise increase of the employment allowance during 2013–2022 from 6.95 to 10.65 percent and a substantial raise of the ceiling. In addition, an extra employment allowance for single parents was introduced, amounting to 2.6 percent of earned income in 2014. It was also phased-in up to a ceiling with no phase-out range. In 2014, a decision was taken to increase the employment allowances during 2014–2017. Table 4 shows the levels of the employment allowance and the extra employment allowance as well as the levels of the ceilings during the period 2004–2022. The information has been collected from the Danish Treasury Department's online resources at www.skm.dk.

Table 4 The size of the employment allowance and the extra employment allowance for single parents in Denmark, 2004–2022.

Year	*Employment allowance,* Beskæftigelsesfradrag			*Extra employment allowance for single parent,* Beskæftigelsesfradrag for enlige forsørgere		
	Phase-in rate, percent	Max. amount, DKK	Approximate max. value, DKK[1]	Phase-in rate, percent	Max. amount, DKK	Approximate max. value, DKK[1]
2004	2.50	5,800	1,930	-	-	-
2005	2.50	6,100	2,030	-	-	-
2006	2.50	7,300	2,430	-	-	-
2007	2.50	7,500	2,500	-	-	-
2008	4.00	12,300	4,100	-	-	-
2009	4.25	13,600	4,530	-	-	-
2010	4.25	13,600	4,530	-	-	-
2011	4.25	13,600	4,530	-	-	-
2012	4.40	14,100	4,700	-	-	-
2013	6.95	22,300	7,430	-	-	-
2014	7.65	25,000	8,500	5.40	17,700	5,900
2015	8.05	26,800	8,930	5.40	17,900	5,970
2016	8.30	28,000	9,330	5.60	18,800	6,270
2017	8.75	30,000	10,000	5.75	19,800	6,600
2018	9.50	33,300	11,100	6.00	21,200	7,070
2019	10.10	35,400	11,800	6.25	21,900	7,300
2020	10.50	36,700	12,230	6.25	21,900	7,300
2021	10.60	37,000	12,330	6.25	21,900	7,300
2022	10.65	37,400	12,470	6.25	21,900	7,300

[1] Assuming a municipal, county and church tax rate of 33.33 percent.
Note: - when tax credit is not in place.
Source: Skatteministeriet, www.skm.dk

In 2018, it was decided to implement another earned income tax allowance, *jobfradrag*, that applied to the sum of earned income, pension and ATP. It is being introduced step-by-step and will amount to 4.5 percent of the income that exceeded DKK 187,500 in 2020. The maximum credit of DKK 2,500 is reached at a level of income of DKK 243,000. It is a tax allowance of the municipal and church tax, so the maximum tax credit amount is about DKK 650 for the average municipal and church tax rate of 25.78 percent. The tax allowance is not phased out, but will amount to a decreasing share of the salary for incomes above DKK 243,000. In the same agreement, the maximum employment allowance was proposed to increase by DKK 1,000 per year. The size of the proposed earned income tax allowance is presented in Table 5. See Finansministeriet (2018) for more information.

Table 5 The size of the proposed earned income tax allowance in Denmark, 2018–2022.

Earned income tax credit on earned income, pension and ATP, Jobfradrag			
Year	Phase-in rate, percent	Max. amount, DKK	For income above, DKK
2018	2.50	1,400	187,500
2019	3.50	2,000	187,500
2020	4.50	2,500	187,500
2021	4.50	2,500	187,500
2022	4.50	2,500	187,500

Source: Finansministeriet (2018).

There is surprisingly little research on the Danish employment allowance. The fact that it applies to all workers universally makes it difficult to find suitable control groups for ex-post evaluations. However, there also does not appear to exist any structural or microsimulation-based academic studies of the ex-ante impact of the employment allowance. According to the online brief by Skatteministeriet (2018), the tax cuts in the 2004 tax reform, including both the medium tax bracket raise and the introduction of the employment allowance at a level of 2.5 percent up to a ceiling of DKK 5,800, were estimated to increase employment by 10,000–12,000 full-time employees. This corresponded to 0.4 percent of the workforce. Approximately 2/3 of the effect was estimated to come from increased working hours (intensive margin responses) and 1/3 from increased employment (extensive margin responses). Government reports in Danish quantifying the potential employment gains include Danish Economic Council (2004) and Danish Government (2012).

The Danish Institute for Economic Modelling and Forecasting, DREAM (2012) has quantified the potential impact of the 2012 reform based on a general equilibrium dynamic macroeconomic model (the DREAM model), which is calibrated to the Danish economy. They find that an increase in the employment allowance by 3 percentage points has the potential to increase hours worked in the Danish economy by the equivalent of 5,000 full-time workers. Their estimates suggest a degree of self-financing of the reform of about 45 percent, when relating the gains from behavioral responses to the mechanical costs of the reform.

There also exists an ex-post evaluation of the extra employment allowance for single parents. It was ordered by the Danish government and performed by the consultancy firm Højbjerre Brauer Schultz (2016). In the evaluation, a comparison is being made of the employment of single parents

and a matched control group without children, who is not eligible for the extra employment allowance. The evaluation suggests that the extra employment allowance increased employment among single parents by 3–5 percentage points and yearly labor income by DKK 8,000–13,500 during the first two years. However, when the control group is replaced by married or cohabiting individuals with children, who are also not eligible for the extra employment allowance, the labor supply effects become insignificant. This suggests that there is some uncertainty about the results.

3.6 Finland

In Finland, there are two different in-work tax credits. The first is an earned income tax allowance (EITA), granted against the municipal income tax: *förvärvsinkomstavdrag vid kommunalbeskattningen*. It has been in place since the mid-1990s and was initially smaller. Since 2008, the structure and size has remained constant. The structure of the tax allowance for selected years between 1995 and 2018 is presented in Table 6. The value of the tax credit is equal to the allowance times the municipal tax rate, with an average of about 20 percent in 2018.

Table 6 Tax allowance in municipal income taxation, Förvärvsinkomstavdrag vid kommunalbeskattningen, in Finland, 2008–2018.

Year	*Phase-in rate 1, percent*	*Phase-in threshold 1, EUR*	*Phase-in rate 2, percent*	*Phase-in threshold 2, EUR*	*Phase-out rate, percent*	*Phase-out threshold, EUR*	*Max. allowance, EUR*
1995	5	3,364	-	-	5	13,455	336
1998	20	2,523	-	-	2	7,232	925
2001	35	2,523	-	-	3.5	12,614	1,648
2004	47	2,500	23	7,230	4	14,000	3,550
2007	49	2,500	26	7,230	4	14,000	3,250
2008–2018	51	2,500	28	7,230	4.5	14,000	3,570

Note: - when tax credit is not in place.
Source: Matikka (2018) and OECD (2017).

The second in-work tax credit in Finland is an earned income tax credit that is granted against the central government income tax: *arbetsinkomstavdrag*. It was introduced in 2006 and has expanded over time. The size of the tax credit during 2015–2018 is presented in Table 7. In 2016, the tax credit amounted to 11.8% of earned income exceeding EUR 2,500, until reaching the maximum of EUR 1,260. It is reduced by 1.46% of earned income exceeding EUR 33,000 and is fully phased out at an income level of about EUR 120,000. If the credit exceeds the central government income tax, it is deductible against the municipal income tax and health tax. (OECD, 2017)

Table 7 Earned income tax credit in central government income taxation, Arbetsinkomstavdrag, in Finland, 2015–2018.

Year	*Phase-in rate, percent*	*Phase-in threshold, EUR*	*Phase-out rate, percent*	*Phase-out threshold, EUR*	*Max. allowance, EUR*
2015	8.6	2,500	1.2	33,000	1,025
2016	11.8	2,500	1.46	33,000	1,260
2017	12.0	2,500	1.51	33,000	1,420
2018	12.0	2,500	1.65	33,000	1,540

Source: OECD (2017).

Although the two earned income tax credits have been in place for quite some time in Finland, there does not appear to exist any research on the impact of these policies. Matikka (2018) presents a brief discussion on the municipal earned income tax credit. However, in his analysis of the elasticity of taxable income in Finland, low-income individuals mostly affected by the municipal earned income tax credit are not included in the main sample. I have also not been able to find any government reports in English about the Finnish earned income tax credits. Bargain and Orsini (2006) simulate the potential effects of two types of in-work tax credits in Finland, France and Germany: one means-tested on family income and one purely individualized tax credit. They show that the individualized tax credit has larger potential in increasing labor supply since it does not discourage labor supply of secondary earners.

3.7 Sweden

The Swedish earned income tax credit was introduced on 1 January 2007, with the purpose of increasing the returns from working relative to collecting public transfers. Motivated by the importance of encouraging older workers to remain in the labor force, the tax credit was substantially larger for workers aged 65 or above at the beginning of the tax year.[4] Apart from age, the size of the tax credit is a function of the earned income, the standard deduction and the local government tax rate. It is a non-refundable credit that cannot reduce the local government tax liability below zero and it is deducted automatically on the monthly paycheck. The earned income tax credit was expanded in 2008, 2009, 2010 and 2014.[5] Unlike most earned income tax credits in other countries, there was no phase-out region of the credit when it was first introduced. This changed in 2016, when a phase-out region of the credit was being added. Tables 8 and 9 show the formulas for the earned income tax credits for workers below and above age 65, respectively, from 2007 until 2018.

[4] The Swedish tax year follows the calendar year.
[5] It was also expanded in 2019, but this time period is not covered in this review.

Table 8 Formula for the earned income tax credit below age 65 in Sweden, 2007–2018.

Income	*Earned income tax credit*
Year 2007	
$\leq 0.79\ pbb$	$(z - sd) \times t\ pbb$
$0.79 - 2.72\ pbb$	$(0.79 + (z - 0.79) \times 0.2 - sd) \times t\ pbb$
$> 2.72\ pbb$	$(1.176 - sd) \times t\ pbb$
Year 2008	
$\leq 0.91\ pbb$	$(z - sd) \times t\ pbb$
$0.91 - 2.72\ pbb$	$(0.91 + (z - 0.91) \times 0.2 - sd) \times t\ pbb$
$2.72 - 7\ pbb$	$(1.272 + (z - 2.72) \times 0.033 - sd) \times t\ pbb$
$> 7\ pbb$	$(1.413 - sd) \times t\ pbb$
Year 2009	
$\leq 0.91\ pbb$	$(z - sd) \times t\ pbb$
$0.91 - 2.72\ pbb$	$(0.91 + (z - 0.91) \times 0.25 - sd) \times t\ pbb$
$2.72 - 7\ pbb$	$(1.363 + (z - 2.72) \times 0.065 - sd) \times t\ pbb$
$> 7\ pbb$	$(1.642 - sd) \times t\ pbb$
Year 2010–2013	
$\leq 0.91\ pbb$	$(z - sd) \times t\ pbb$
$0.91 - 2.72\ pbb$	$(0.91 + (z - 0.91) \times 0.304 - sd) \times t\ pbb$
$2.72 - 7\ pbb$	$(1.461 + (z - 2.72) \times 0.095 - sd) \times t\ pbb$
$> 7\ pbb$	$(1.868 - sd) \times t\ pbb$
Year 2014–2015	
$\leq 0.91\ pbb$	$(z - sd) \times t\ pbb$
$0.91 - 2.94\ pbb$	$(0.91 + (z - 0.91) \times 0.332 - sd) \times t\ pbb$
$2.94 - 8.08\ pbb$	$(1.584 + (z - 2.94) \times 0.111 - sd) \times t\ pbb$
$> 8.08\ pbb$	$(2.155 - sd) \times t\ pbb$
Year 2016–2018	
$\leq 0.91\ pbb$	$(z - sd) \times t\ pbb$
$0.91 - 2.94\ pbb$	$(0.91 + (z - 0.91) \times 0.332 - sd) \times t\ pbb$
$2.94 - 8.08\ pbb$	$(1.584 + (z - 2.94) \times 0.111 - sd) \times t\ pbb$
$8.08 - 13.54\ pbb$	$(2.155 - sd) \times t\ pbb$
$> 13.54\ pbb$	$(2.155 - sd) \times t - (z - 13.54) \times 0.03\ pbb$

Note: *pbb* is the price base amount determined by the government each year, z is the taxable labor income in price base amounts, *sd* is the standard deduction in price base amounts and *t* is the local government tax rate.
Source: Inkomstskattelagen (1999:1229).

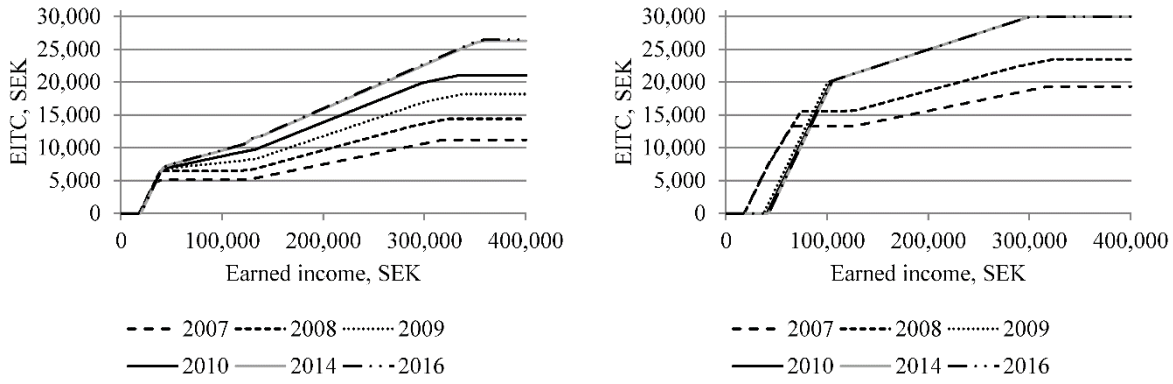
Table 9 Formula for the Swedish earned income tax credit above age 65 in Sweden, 2007–2018.

Income	*Earned income tax credit*
Year 2007	
$\leq 1.59\ pbb$	$(z - sd) \times t\ pbb$
$1.59 - 2.72\ pbb$	$(1.59 + (z - 1.59) \times 0.2 - sd) \times t\ pbb$
$> 2.72\ pbb$	$(1.816 - sd) \times t\ pbb$
Year 2008	
$\leq 1.79\ pbb$	$(z - sd) \times t\ pbb$
$1.79 - 2.72\ pbb$	$(1.79 + (z - 1.79) \times 0.2 - sd) \times t\ pbb$
$2.72 - 7\ pbb$	$(1.976 + (z - 2.72) \times 0.033 - sd) \times t\ pbb$
$> 7\ pbb$	$(2.117 - sd) \times t\ pbb$
Year 2009–2015	
$\leq 100{,}000\ SEK$	$z \times pbb \times 0.2\ SEK$
$100{,}000 - 300{,}000\ SEK$	$15{,}000 + z \times pbb \times 0.05\ SEK$
$> 300{,}000\ SEK$	$30{,}000\ SEK$
Year 2016–2018	
$\leq 100{,}000\ SEK$	$z \times pbb \times 0.2\ SEK$
$100{,}000 - 300{,}000\ SEK$	$15{,}000 + z \times pbb \times 0.05\ SEK$
$300{,}000 - 600{,}000\ SEK$	$30{,}000\ SEK$
$> 600{,}000\ SEK$	$30{,}000 - z \times pbb \times 0.03\ SEK$

Note: *pbb* is the price base amount determined by the government each year, z is the taxable labor income in price base amounts, *sd* is the standard deduction in price base amounts and *t* is the local government tax rate.
Source: Inkomstskattelagen (1999:1229).

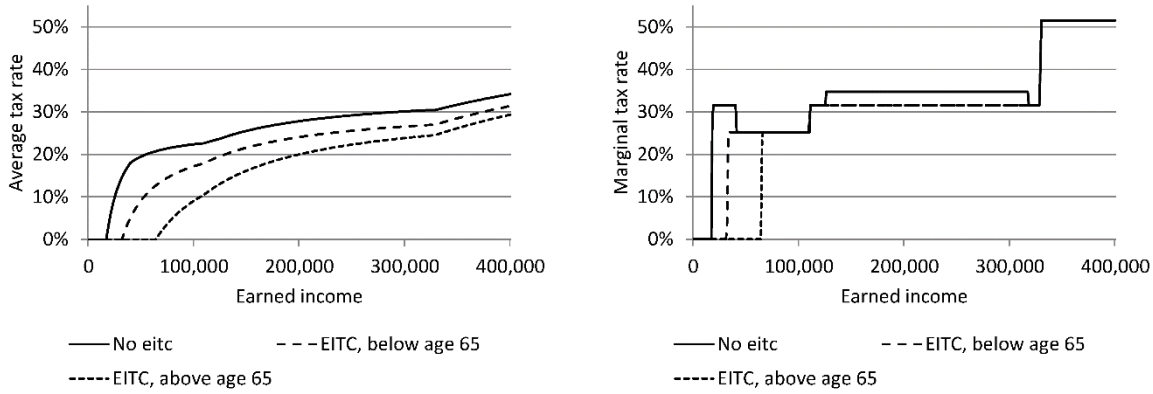
Figure 2 presents the structure of the earned income tax credit as a function of earned income during 2007–2016, assuming the average local tax rate and no taxable transfers. Figure 2a presents the tax credit schedule for workers below age 65, and figure 2b for workers above age 65. In 2007 and 2008, the shape of the tax credit schedule was the same for workers below and above age 65, but the initial phase-in range was longer for workers above age 65 which made the credit more generous for this group. In 2009, an additional standard deduction for workers above age 65 was introduced, applying to both transfer and labor income. The earned income tax credit was therefore made independent of the standard deduction for this group and the tax credit schedule changed. The size of the tax credit was substantially increased for workers above age 65 at this time, but has not changed since then. For workers below age 65, the tax credit increased both in 2010 and 2014. In 2016, a phase-out range was introduced at incomes above SEK 600,000 for workers both below and above age 65, but this income region is not covered by the graphs in Figure 2.

Figure 2 The Swedish earned income tax credit (EITC) for workers below and above age 65 at the beginning of the tax year, under the assumption of no taxable transfers and the average local tax rate.



(a) EITC below age 65 (b) EITC above age 65

Figure 3 The average and marginal income tax rates in Sweden in 2007, with and without the EITC.



(a) Average tax rate (b) Marginal tax rate

Figure 3 shows how the earned income tax credit affected the average and marginal income tax rates when it was introduced in 2007, again under the assumption of no taxable transfers. Figure 3a shows that the introduction of the EITC led to a substantial reduction in the average income tax rate, and that the reduction was almost twice as large for workers above age 65. This substantially increased the incentives for participating in the labor market. Figure 3b shows that the marginal tax rate was reduced for the bottom region of the income distribution and for a region in the middle of the income distribution. In these intervals, the EITC may lead to counteracting income and substitution effects on the hours of work margin. At the other intervals, there are no changes in the marginal tax rate. When the phase-out range was introduced in 2016 for income above SEK 600,000, however, the marginal tax rate increased by 3 percentage points from this

income until the end of the phase-out region at around SEK 1,5 million. This income region is, however, not covered by the graphs in Figure 3.

Edmark et al. (2016) present an ex-post evaluation of the impact of the introduction of the EITC for workers below age 65 in 2007. The authors analyze the period 2004–2008 and focus on extensive margin responses, i.e., changes in employment, for three reasons: The first-order policy importance of reducing unemployment; the unambiguously positive theoretical prediction of the reform effect on employment; and the fact that evaluations of EITC reforms in other countries suggest that labor-supply responses are concentrated in the extensive margin.

The challenge of evaluating the Swedish EITC is the lack of a nontreated comparison group, since all workers below age 65 were exposed to the same tax credit schedule. To identify the effects of the EITC, Edmark et al. (2016) instead exploit variation in treatment intensity, along two dimensions. First, since the size of the tax credit is a function of the local tax rate, an individual who lives in a high-tax municipality will ceteris paribus receive a higher tax credit than an individual who lives in a low-tax municipality. Second, the size of the tax credit, both in absolute terms and in relation to the annual wage income, varies across the income distribution. A low-wage income individual will ceteris paribus receive a larger reduction in the average tax rate. Using the variation of treatment intensity across municipalities, along the income distribution and over time, the authors estimate a triple-difference model to capture the effects of the EITC. Potential income if working is imputed based on a regression model including pre-reform demographic characteristics capturing age, level of education, type of education, country of origin and spousal income.

The results show quite large positive correlations between the EITC and employment, both in general and for different subgroups of the population. Unfortunately, however, also placebo analyses, analyzing the period 2004–2006 and pretending that the reform happened in 2005, find positive and statistically significant effects, even if they are smaller in size than the reform effect. The authors cannot rule out that the EITC had positive employment effects, but conclude that it is not possible to evaluate the Swedish EITC using quasi-experimental methods because of the lack of nontreated control groups. There appears to exist complex underlying trends in employment that are difficult to account for using quasi-experimental variation.

Laun (2017) analyzes the joint impact of the larger earned income tax credit for workers above age 65 and a decrease in the payroll tax rate for the same age group, both introduced in 2007. She

employs a difference-in-differences strategy and compares labor force participation of workers who turn 65 just before and just after the year-end, who faces different income tax rates due to the age-targeted tax credits at essentially the same age, before and after the reform was implemented in 2007. The results show significant increases in labor force participation of about 5% among the workers eligible for the larger credit, corresponding to a participation elasticity of 0.22. Since the control group will eventually be eligible for the tax credits, the estimates can be interpreted as the effect of receiving the age-targeted tax credits one year earlier. The results are due to individuals remaining with their employer rather than moving to a new employer and they are driven by low and medium income workers.

Although the responses are significant, they are relatively small compared to what has been found for other groups with a potentially large labor supply elasticity, such as single mothers. The cost of the age-targeted tax credits was large, in particular because of the substantial reduction in the payroll tax rate for these workers. Based on a rough calculation relating the employment gain to the cost of the reform, Laun (2012) finds a relatively low degree of self-financing of the age-targeted tax credits, of around 13 percent.

As discussed earlier, employment can be influenced by earned income tax credits both through supply side and demand side responses. If some of the tax incidence falls on the employer in the form of lower wages, firms may become more willing to employ workers. Kolm and Tonin (2011) set up a theoretical model and show that partial equilibrium studies that keep wages fixed may underestimate the beneficial effect of in-work benefits.

Bennmarker et al. (2014) examine the effects of the net replacement rate, i.e., the ratio between after-tax incomes of unemployed and employed workers, on wages. The authors analyze the period 2004–2009 and exploit both reductions in the generosity of unemployment benefits and the introduction and expansions of the EITC to capture changes in the net replacement rate across workers and over time. They employ a search-matching framework and use several different approaches to account for endogeneity or reverse causality, including using the individual's lagged wage corrected for average growth and using the predicted wage based on a Mincer-type wage equation on pre-reform individual characteristics. In most specifications, they find a significant and positive relationship between the net replacement rate and the wage. The sizes are large, implying that a one per cent decrease in the unemployment benefit level or a one per cent increase in the net-of-tax rate due to the EITC is associated with a wage fall of 0.1–0.2 percent. The results suggest

that wage reductions are likely an important channel for labor market effects of EITCs and decreases in unemployment benefits.

Several ex-ante evaluations of the potential impacts of the Swedish earned income tax credit have been performed by different authorities, organizations and researchers, as summarized by Swedish Fiscal Policy Council (2010) and The Swedish Government (2011). The studies have used microsimulation models or elasticities from empirical studies combined with data from several different data sources to estimate the potential long-term effects of the different expansions of the earned income tax credit. Despite different data sources and methods, the results are quite aligned across studies. According to the survey by The Swedish Government (2011), the different studies estimated that the introduction of the earned income tax credit in 2007 had the potential to increase hours worked in the economy by 1.3–2 percent, and the number of full-time equivalent workers by 55,000–83,000. In total, the first four steps of the earned income tax credit during 2007–2010 were estimated to increase hours worked in the economy by 1.7–2.9 percent and the number of full-time equivalent workers by 72,000–121,000. Among others, the studies include the Swedish Ministry of Finance (2009, 2011), the Swedish National Audit Office (2009), Swedish Fiscal Policy Council (2008) and the National Institute of Economic Research (2011).

The role of information has been highlighted by the Swedish National Audit Office (2009) and Andersson and Antelius (2010). They show that only about 40 percent of recipients had knowledge about the earned income tax credit in 2009. Individuals who were unemployed, out of the labor force or foreign born, i.e., groups with the largest potential to respond to the changed incentives, had even less knowledge about the earned income tax credit. Although the tax credit is deducted automatically at the monthly paycheck, responses are likely to be larger when there is good information about the existence and structure of the earned income tax credit.

4. Conclusion

In-work benefits have become a standard policy measure to increase employment among low-income workers while simultaneously redistributing income to the poor. Based on the evidence from the early policy schemes, primarily in the US and the UK, in-work benefits have been regarded a successful measure to achieve both of these goals. This led many European countries to introduce in-work benefits in the 2000s. These schemes were often less targeted towards families with children and low-income workers compared to the original in-work benefits schemes, and have typically stressed employment goals rather than poverty reduction.

This paper has discussed the design aspects of in-work benefits and summarized the evidence of in-work benefits in a selection of countries across Europe. The included countries are France, the Netherlands, Germany, Belgium, Denmark, Finland and Sweden. It has become apparent that we still know relatively little about the impacts of these policy schemes. Since some of these in-work benefits were not targeted at specific groups, such as families with children, they tend to be difficult to evaluate. Overall, the combined knowledge from the studies covered in this review suggests that in-work benefits *can* have a positive impact on employment. It is worth noting that none of the countries covered by the review has revoked their in-work benefits. Even in cases when the results have appeared unsatisfactory, the strategy has been to reform and expand these policy schemes rather than to pull back the in-work benefit reforms.

It appears that the effectiveness of in-work benefits comes down to the details. There are several pitfalls in the design of in-work benefit schemes. One lesson is the importance of truly understanding the incentives these benefits create. We have seen that in several cases when the effects of in-work benefits are absent or go in an undesirable direction, this can be explained by the incentives structure. First, it is important to consider the joint incentives created by the in-work benefits in combination with all the other features of the tax and benefit system. In particular, the degree to which other social benefits are withdrawn as earnings increase appears to be important. Second, a complicated issue is the level of targeting of in-work benefits. While behavioral responses will be larger among groups of workers with elastic labor supply, especially at the extensive margin, family targeting or means-testing based on household income may impose costly disincentives effects on secondary earners. Universal tax credits with low phase-out rates have less distortionary effects but come at a larger fiscal cost.

Another lesson is that small benefit amounts; lack of information, awareness and understanding about the policy design; and a high level of bureaucracy may dampen the impact of in-work benefits. The role of information has recently been highlighted also for the US EITC, in Chetty et al. (2013) and Nichols and Rothstein (2015). If individuals do not know or understand the in-work benefits schemes, these reforms will induce mechanical costs without gaining from behavioral responses. Finally, wage moderation can be an additional driver of employment effects, although the distributional consequences of this channel may be undesirable. For a full account of the impact of in-work benefits, both supply and demand side responses should be considered.

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Appendix

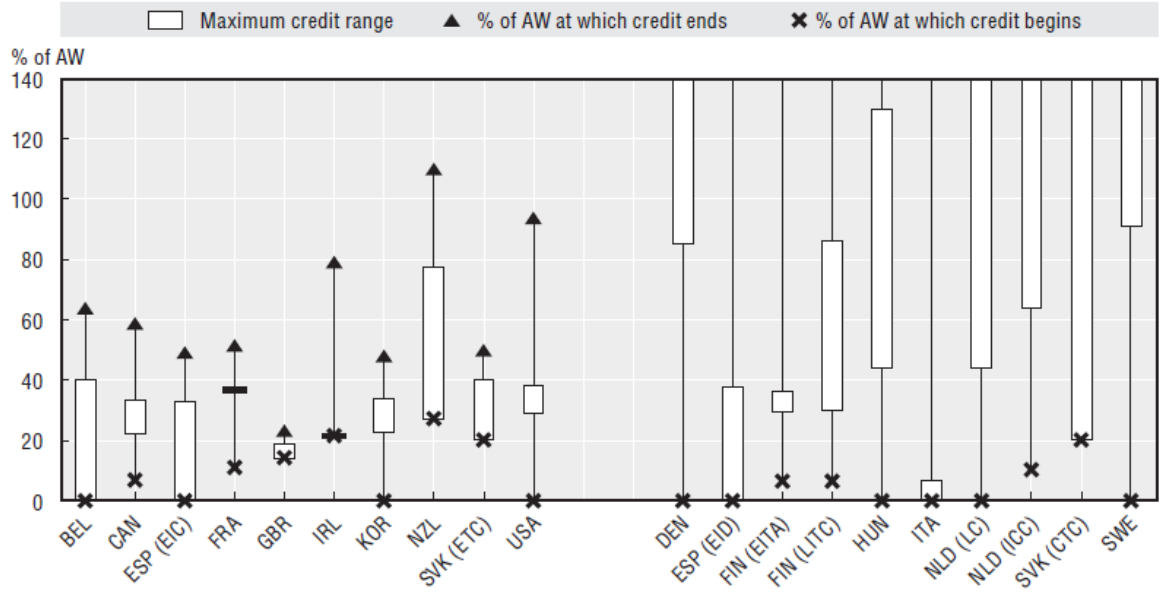
Table A1. Permanent in-work tax credits (and equivalent benefit schemes) in OECD countries, 2010.

	Name of programme	Beneficiaries	Work criterion	Children required for eligibility	Credit size increases with number of children	Phase-in rate	Phase-out rate	Phase-out starts at	Maximum credit
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Belgium	Reduced social security contributions		Income from work	No	No	-	18%	40% of AW	Max. value of SSC allowance is EUR 1,716 (4% of AW)
Canada	Working Income Tax Benefit	Working individuals with low income	Income from work at least CAD 3,000 (6.9% of AW)	No	No	25%	15%	24% of AW; 33% of AW in case of couples or lone parents	CAD 925 for single individuals (2.1% of AW); CAD 1,680 for families (3.8% of AW)
Denmark	Earned Income Tax Credit (operated as an allowance)	Working individuals	Income from work	No	No	-	No phase-out	-	Max. value of tax allowance is EUR 3,570 (9% of AW)
Finland	Earned Income Tax Allowance (municipal income taxation)	Working individuals	Income from work at least EUR 2,500 (6.5% of AW)	No	No	51%, then 28%	4.5%	36% of AW	Max. value of tax allowance is EUR 3,570 (9% of AW)
	Labour Income Tax Credit (central income taxation)					5.2%	1.2%	86% of AW	Max. value of tax credit is EUR 600 (1.5% of AW)
France	Prime pour l'emploi	Working individuals	Income from work at least EUR 3,695 (10.9% of AW)	No	Yes	4-5%	9%	66% of AW	EUR 948 (3% of AW)
Hungary	Employee Tax Credit	Working individuals	Income from work	No	No	17%	12%	130% of AW	HUF 181,200 (8.5% of AW)
Ireland	Family Income Supplement (FIS)	Working families with children and low earnings	19 hours per week	Yes	Yes (through earnings limit)	-	60%	-	60% of difference between net family earnings and earnings limit
Italy	Labour Income Tax Credit	Working individuals	Income from work	No	No	-	7%/3%[1]	6.7% of AW	EUR 1,840 (6.6% of AW)
Korea	Earned Income Tax Credit	Low-income working families	Income from work	No	No	15%	24%	34.6% of AW	KRW 1,200,000 (3.4% of AW)
Luxembourg	Employee Tax Credit	Working individuals	Income from work	No	No	-	-	-	EUR 300 (0.6% of AW)
Netherlands	Labour Credit	Working families with children aged under 12	Income from work	Yes	No	1.7%/12.4%	No phase-out	-	EUR 1,489 (3.3% of AW)
	Income Dependent Combination Credit	Same as above and must be a single parent or the lower-earning partner	Minimum income from work of EUR 4,706 (10.5% of AW)			3.8%			EUR 1,859 (4.1% of AW)
New Zealand	In-work Tax Credit	Working families with children and	20/30 hours per week (combined)	Yes	Yes	-	20%	Once family tax credit is	NZD 3,120 (7% of AW) plus NZD

		not receiving a main out-of-work benefit	for one/two-parent families					fully withdrawn	780 for fourth and subsequent children
Slovak Republic	Child tax credit	Working families	Income from work equal to at least 6 times the monthly minimum wage	Yes	Yes	-	-	-	EUR 240 *per child* (2.7% of AW)
	Employee Tax Credit	Working individuals		No	No		19%	40% of AW	EUR 181.03 (2% of AW)
Spain	Earned income deduction	Working individuals	Income from work	No	No	-	35%	37.6% of AW	Max deduction of EUR 4,080 (16.7% of AW)
	Earned income credit						10%	32.8% of AW	Max credit of EUR 400 (1.6% of AW)
Sweden	Earned Income Tax Credit	Working individuals	Income from work	No	No	Value initially increases up to the point where the credit fully offsets (local) tax liability	No phase-out	-	SEK 11,000 (5% of AW)
United Kingdom	Working Tax Credit	Working individuals	16 hours per week; 30 hours per week if aged 25+ and no children	No (but lone parents get more)	No (unless under 25)	-	39%	19% of AW	Maximum GBP 4,630 (13.9% of AW)
United States	Earned Income Tax Credit	Working families with children and individuals with low income	Income from work	No	Yes	8-40% depending on family type	8-21% depending on family type	17-42% of AW depending on family type	USD 457 without children, USD 3,050 with one child, USD 5,036 with 2 children (12.8% of AW)

[1] The effective withdrawal rate is 7.17% from EUR 8 000 to EUR 15 000. Above this amount the effective withdrawal rate varies between 3.345% and 3.445%.
Source: Replica of Table 2.11 in OECD (2011), which in turn was adapted from OECD (2005); and Immervoll and Pearson (2009); and updated based on responses to a questionnaire issued to Country Delegates to Working Party No. 2 of the OECD Committee on Fiscal Affairs. The questionnaire sought information as of 1 January 2010.

Figure A1. Targeting of in-work credits in the OECD countries (for single parent with two children), 2010[1]



1. EIC: Earned Income Credit; ETC: Employee Tax Credit; EID: Earned Income Deduction; EITA: Earned Income Tax Allowance; LITC: Labour Income Tax Credit; LC: Labour Credit; ICC: Income Dependent Combination Credit; CTC: Child Tax Credit.

Source: OECD calculations based on responses to *tax and employment study* questionnaire.

StatLink http://dx.doi.org/10.1787/888932482897

Source: Figure 2.7 in OECD (2011).