

# Research Memorandum

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**An Earned Income Tax Credit in the Netherlands:**  
Simulations with the MIMIC model

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## Contents

1	Introduction	5
2	The EITC: a survey of the literature	5
2.1	Design of the American EITC	6
2.2	Take up	8
2.3	Tax-transfer integration	10
2.4	Effect of the EITC on labour supply	11
2.5	Reform of the EITC	16
2.6	An EITC in the Netherlands	16
3	Simulations with MIMIC	17
3.1	The wage distribution in MIMIC	18
3.2	The EITC based on annual incomes	19
3.3	The EITC based on hourly wages	23
3.4	Sensitivity analysis	25
4	Conclusion	26
	Abstract	29
	References	30



## **1 Introduction**

The Netherlands suffer from a relatively high structural unemployment rate among low skilled workers. In 1996, the unemployment rate among the low-skilled was more than twice the unemployment rate of skilled workers. One explanation for this phenomenon is thought to be the poor labour-market incentives for the low skilled unemployed. Indeed, the replacement rate at the bottom of the labour market, defined as the net social benefit in terms of the net wage rate, is rather high in the Netherlands. This depresses the motivation for the low-skilled to search for work and makes them reluctant to accept a job. Therefore, recent tax proposals have focussed on reducing the replacement rate among the low skilled through the introduction of a so-called Earned Income Tax Credit (EITC). The recent white paper on taxes in the 21<sup>st</sup> century in the Netherlands contains a proposal for an EITC (Parliament, 1997).

The EITC already exists in the United States for over 20 years. The experience with the EITC in the US may yield important lessons for the discussion about the EITC in the Netherlands. Therefore, this paper starts by providing an overview of the literature on the EITC in the US. In the US, the EITC aims at reducing poverty among low-income workers, without adversely affecting the incentives for labour supply. In contrast, the proposals for an EITC in the Netherlands aim primarily at reducing the unemployment rate at the bottom of the labour market. Therefore, the design of the EITC that has been proposed in the Netherlands differs from the one that exists in the US. This paper adopts CPB's applied general equilibrium model for the Netherlands, MIMIC, to investigate the labour-market effects of different forms of an EITC.

## **2 The EITC: a survey of the literature**

The Earned Income Tax Credit (EITC) was first introduced in the United States in 1975. It is a credit on the federal income tax<sup>1</sup>, designed to aid poor working families. The credit started out as a small program aimed at offsetting the social payroll tax for poor working families with children. In 1986, 1990 and 1993 there have been major expansions of the program, making it one of the major instruments for anti-poverty policy in the United States. The 1993 expansion was initiated by President Clinton, who stated in his first State of the Union:

<sup>1</sup>Some states offer a supplement to the EITC at the state level, but we restrict our attention to the federal level.

*'The new direction I propose will make this solemn, simple commitment: by expanding the refundable earned income tax credit, we will make history; we will reward the work of millions of working poor Americans by realizing the principle that if you work 40 hours a week and you've got a child in the house, you will no longer be in poverty'. (Shapiro and Greenstein (1993))*

After the expansion of the program in 1993, a worker with 2 children working 40 hours per week at the minimum wage level was taken out of poverty (thereby taking into account the food benefits program as well).<sup>2</sup> By now, the EITC is the largest cash program directed at low-income households.<sup>3</sup>

## **2.1 Design of the American EITC**

To be eligible for the EITC, a family must meet three requirements. First, there must be positive earned income. Indeed, the EITC is a credit directed only at people who work; income from other sources than work is discounted from the income used to calculate the EITC.<sup>4</sup> Second, the earned income of a family should be smaller than a certain threshold. In 1996, the maximum income for a family with 2 children was \$28,495. Third, the family should care for a child younger than 19, a child younger than 24 who is a full time student, or a child who is disabled regardless of age. Since 1994, there is a small credit for workers without children.

The EITC contains three ranges. Figure 2.1 illustrates the credit in these ranges for a household with two children in relation to its total family income for 1996. First, in the phase-in range, represented by AB in figure 2.1, people receive a credit of 40% of their earned income. In 1996, the phase-in range runs up to a maximum income of \$8,890. The line BC in figure 2.1 represents the so-called flat range. In particular, households with an annual earned income between \$8,890 and \$11,610 receive a maximum credit of \$3,556. Finally, in the phase-out range, represented by the CD in figure 2.1, each additional dollar of earned income reduces the credit by 21 cents. Accordingly, people with an annual income above \$28,495 are no longer eligible to the credit. Table 2.1 summarizes the various EITC parameters also for other types of households (where figures are expressed in 1994 dollars). Scholz (1994) estimates

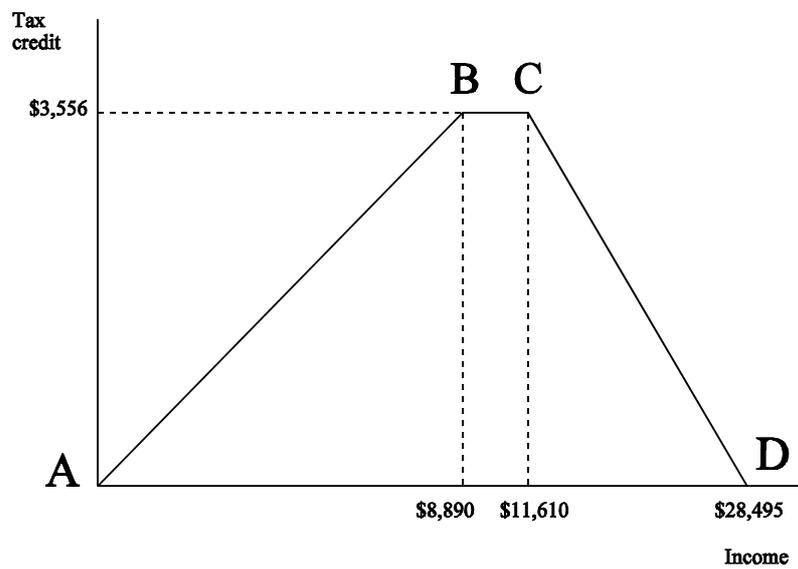
<sup>2</sup> The poverty line in 1994 was about \$ 15,000.

<sup>3</sup> Yin et al (1994) estimate the cost of the EITC at \$24.5 billion for 1998 while the Aid to Families with Dependent Children program (AFDC) costs about \$16 billion.

<sup>4</sup> There is a proposal to disallow EITC to people with earning from dividends and interest above some threshold. President Clinton proposed a threshold of \$2,500, the Congress proposed \$1,000.

that 61 percent of the EITC recipients is in the phase-out range, 23 percent of the recipients occupies the phase-in range, the rest is in the flat range.

*Figure 2.1 The Earned Income Tax Credit in the US (household with two children in 1996)*



*Table 2.1 EITC parameters for 1996*

	Phase-in region	Flat region		Maximum credit	Phase-out region	
	Credit rate				Phase-out rate	Income cutoff
1 child	34	\$6,330	\$11,610	\$2,155	15.98	\$25,075
2+ children	40	\$8,890	\$11,610	\$3,555	21.06	\$28,495
no child <sup>a</sup>	7.65	\$4,220	\$5,275	\$325	7.65	\$9,500

<sup>a</sup> Taxpayer must be between the ages of 25 and 65.

The design of the EITC in the US implies that the credit is not only awarded to people below the poverty line. Indeed, eligibility for the EITC extends up to an earned income of \$28,495. Scholz (1994) estimated that about half of the credit payments flow to people below the poverty line. In particular, about 7.5 million of the recipients of the EITC have an income above the poverty line, 5.4 million people receive incomes below the poverty line, while 1.4 million people pass the poverty line due to the EITC.

The EITC is meant not only as income support for working families with low incomes, but also as an instrument to stimulate people with low incomes to increase their working hours. Indeed, the EITC is not withdrawn for people who pass the poverty line as this would substantially discourage labour supply of people around the poverty line. This makes the EITC less well targeted at workers under the poverty line than a program like the food stamps, which is solely meant as income support. This latter program has high withdrawal rates as it strongly discourages work effort on the margin. To limit the costs, however, the EITC needs to be phased out to ensure that households with high incomes do not receive a credit. Indeed, the phase-out range of the EITC in the US is postponed to household incomes just above the poverty line. Accordingly, also people above the poverty line are eligible to the credit.

The EITC is the only tax credit in the USA that is refundable. If the credit is larger than the income tax the taxpayer has to pay, the Internal Revenue Service (IRS) actually pays the taxpayer the difference. The EITC can be obtained either in one payment at the end of the year, or in regular payments during the year. This regular payment in advance takes the form of a negative withholding by the employer. This latter option is used by less than one percent of the workers who are eligible to the EITC.

## **2.2 Take up**

The EITC in the US is not received automatically: people have to apply for it by filing a tax return and completing a separate form for the EITC. This causes the take up rate to be lower than 100% as the US tax system is one of self assessment: potential taxpayers have to identify themselves to the IRS as taxpayers, instead of the IRS approaching them. People with an income lower than the income-tax threshold do not have to file a tax return. However, if these people are eligible for the EITC, they should file a tax return to receive the net payment they are entitled to.

Despite the problem of getting the EITC to people who are unaware of the credit, there is a remarkable high take up of the EITC compared to other social schemes. The take up can be measured by the so-called take-up rate which measures the number of people that apply for the EITC in terms of the number of people eligible for it. Using

data of the Survey of Income and Program Participation (SIPP), Scholz (1994) estimates the take up rate of the EITC in 1990 between 75 to 90 percent. Most other estimates fall in the range between 80 to 85 percent. This is high compared to estimates of the take up rate of the Aid to Families with Dependent Children program (AFDC) which range from 62 to 72 percent, or the food stamps which range from 54 to 66 percent. One of the reasons for the high take up rate could be that receiving the EITC involves less stigmatization than other programs. Indeed, the EITC is available only to people who work. Hence, even though the EITC operates as a sort of welfare benefit, it probably will not be considered as such. Another possible explanation for the high take up of the EITC may be that people are by definition working in the formal sector and can be expected to be better informed about such programs than jobless people or people who work in the informal sector.

Scholz investigates the characteristics of people who do not file for the EITC although they are eligible for it. First, he finds that education tends to have a negative effect on the take up. Second, the take up of the EITC is positively related to the EITC a taxpayer is entitled to. This suggests that people who do not claim the EITC, might do this rationally, for instance because the effort of filling in a tax return is greater than the gain from receiving the EITC. An alternative explanation for people not applying for an EITC is that they do not want to be known by the IRS as they have been involved in underground activities.

Besides people who do not claim the EITC, there are also people who claim the EITC without being eligible for it. Indeed, if the number of taxpayers claiming the EITC is divided by the number of people that is found to be eligible by Scholz, a take up rate of 122 to 131 percent results. Research conducted by the IRS over several years suggests that between 37 and 46 percent of the claimants of the EITC were claiming too high a credit. Between 28 and 39 percent of the claimants were not eligible to any credit at all. The amount inappropriately claimed credits was between the 29 and 37 percent. Hence, non-compliance is a problem within the EITC. Scholz estimated the characteristics of the people who apply for the EITC without being eligible. He finds that higher self-employment income has a positive effect on non-compliance. This self-employment income can be manipulated more easily than wage income and is therefore more open to fraud. Another reason for non-compliance could be the rules related to children. In particular, a child is not counted as a qualifying child for the EITC if less than 50% of the total costs of the child are paid by the taxpayer. With very low incomes, there is a reasonable chance that more than half of the income is paid by social security. Hence, the children in those households do not count as qualifying for the EITC. There is also evidence that there is a considerable amount of fraud in claiming the EITC. Indeed, when the number of children had to be reported on the tax return according to the social security forms, the number of reported children would decrease by 10 percent.

### **2.3 Tax-transfer integration**

The EITC may be considered as a social welfare transfer. However, in contrast to most welfare payments that are transferred through the social welfare system, the EITC is transferred via the tax system. Taxes and transfers can be seen as two components of the same system, with transfers being negative taxes. This notion has induced some economists to advocate in favour of an integration of the two systems. In particular, they argue that there is no justification for the different treatment of people with low incomes, who are paid by the welfare system, and people with high incomes, who pay taxes.

The advantages of providing transfers through the tax system are that traditional welfare administration is labour intensive and expensive. Recipients do not like the welfare system because of the stigma involved in receiving welfare benefits. Using the tax system could lower administrative costs, reduce stigma and use more objective rules. However, there are also disadvantages to the tax-transfer integration.

Alstott (1994) describes four problems related to tax-transfer integration. First, the measurement of income in the tax system differs from the welfare system. In the welfare system, wealth is taken into account which allows for a more accurate assessment of the needs of recipients. Second, the tax system uses a formal definition of family. In contrast, the welfare system explores whether there exists a dependency relationship, even if this relationship is not between formal family members. Third, the annual accounting interval of the tax system makes it impossible to adjust to the immediate needs of benefit recipients. When people use an advance payment option, they run the risk of having to pay back part of the benefit if their financial position changes during the year. Finally, it will be more difficult to check eligibility within the tax system. Receiving a benefit through the welfare system involves meetings with a welfare officer, whilst receiving a benefit through the tax system only involves filling in a form. This latter approach makes false applications easier.

In the US, the EITC is what comes closest to tax-transfer integration. When the EITC was first introduced it was almost entirely integrated into the tax system, besides some extra questions on the tax return. The expansions of the EITC changed it more in the direction of other social benefit schemes, which require additional information from the household. Indeed, after the 1990 reform, taxpayers who claim the EITC have to fill in a special form in addition to the normal tax return. This form raises additional questions, e.g. about their children. On the one hand, this additional information allows the EITC to be better targeted at needy people. On the other hand, the information undermines the tax-transfer integration and increases administrative costs.

## 2.4 Effect of the EITC on labour supply

Research on the economic effects of the EITC in the US focuses primarily on the effects on labour supply. In particular, standard economic theory suggests that the EITC affects both participation decisions and the number of hours worked. In particular, the reduction in the average tax burden on labour income stimulates participation of people who are currently (voluntarily) outside the labour force. The effect on hours worked operates through two different channels. First, the lower average tax burden for households who are eligible to the EITC adversely affects the incentives to supply labour in hours through the income effect. Second, the EITC may affect the marginal tax burden on households. In particular, the marginal tax burden declines for people in the phase-in range, remains constant for households in the flat range, and rises for those households with an earned income in the phase-out range. Whereas the lower marginal tax burden in the phase-in range raises the incentives for labour supply by inducing substitution from leisure to consumption, the higher marginal tax burden in the phase-out range reduces labour supply in hours. Table 2.2 summarizes these effects on labour supply in the different ranges of the EITC. On balance, the income effect and the two opposing substitution effects render the effect on aggregate labour supply in hours ambiguous. Indeed, the effect on aggregate labour supply is an empirical matter and will depend on the magnitude of labour-supply elasticities and the number of people in the different ranges of the EITC. A number of empirical studies have explored the effect of the EITC on aggregate labour in the US.

*Table 2.2 The effects of the EITC on labour supply in terms of hours worked (overall effect and effects through marginal and average tax burden)*

	Overall	Not working	Phase in	Flat range	Phase-out	Outside EITC range
Labour supply	?	+	+	-	-	0
Marginal tax	?	0	-	0	+	0
Average tax	-	0	-	-	-	0

*Dickert, Houser and Scholz (1995)*

Empirical evidence seems to support the above mentioned effects. Dickert, Houser and Scholz (1995) simulate the labour-supply effects of the changes in the EITC law from 1993 to 1996. In particular, they use data from the 1990 SIPP survey to calculate which families would receive the EITC in 1993 and 1996. Using a simulation model

calibrated with labour supply elasticities from Hausman (1981), MaCurdy et al. (1990) and Triest (1990), they calculate the effects of an EITC on labour supply.<sup>5</sup> The simulation results by Dickert et al. are presented in Table 2.3. It reveals that the effects on labour supply for people in the phase-in range is positive in all simulations, ranging from 1.88 to 13.46 percent. For people in the phase-out range and the flat range, the effect on labour supply is negative. In absolute figures, these adverse effects in the flat range and the phase-out range are substantially smaller, however. Indeed, the adverse effect of the EITC in the phase-out range lies between 0.53 and 4.73 percent. The reason for these smaller effects is that, compared to the other ranges, there are relatively more women in the phase-in range who feature a relatively high labour-supply elasticity. Furthermore, the reduction in the marginal tax rate in the phase-in range is larger than the increase in the marginal tax rate in the phase-out range. Nevertheless, irrespective of what labour-supply elasticities are taken, the effect on aggregate labour supply is always negative. This is because the flat range and the phase-out range is populated by more people than the phase-in range.

*Table 2.3 The results of the simulations by Dickert, Houser and Scholz*

	Estimated percent change in annual hours worked <sup>a</sup>		
	MaCurdy et al.	Triest	Hausman
Aggregate labour	-0.09	-0.54	-4.04
<i>By credit range</i>			
Phase in	1.88	3.92	13.46
Flat	-0.09	-0.19	-1.79
Phase-out	-0.53	-1.11	-4.73

NOTE: The estimates given are median percentage changes. (medians are presented instead of means because a small number of very low-income parents in the subsidy range have extremely high marginal rates and, therefore, extremely large simulated wage effect.

<sup>a</sup> The median monthly hours for the sample is 160.

Source: Dickert, Houser and Scholz (1995).

<sup>5</sup>Triest finds an uncompensated wage elasticity of 0.05 for men and 0.25 for women. The income elasticities are 0.0 for men and -0.15 for women. The elasticities of Hausman and MaCurdy et al. are higher and lower, respectively.

In the simulations by Dickert et al., the participation effect is ignored. As this effect on labour supply is strictly positive<sup>6</sup>, the negative effects of the EITC are likely to be smaller than suggested by these simulations.

*Eissa and Liebman (1996)*

Eissa and Liebman (1996) take both the participation effect and the hours-worked effect into account. In particular, they compare two groups of single women, namely those with and without children. Because the EITC is available only to people with children, only single women with children are expected to respond to the EITC. Single women with children make up almost fifty percent of the EITC eligible population. Eissa and Liebman examine the impact of the Tax Reform Act of 1986, which included an increase of the EITC besides other changes in the tax system. The other changes in the tax system are expected to affect single women with and without children in the same fashion. Therefore, the change in labour supply of women with children can be compared to the change in labour supply of women without children to estimate the effect of the EITC on labour supply. Eissa and Liebman also compare some alternative groups, such as women with children and low education versus women without children and low education. The data they use are taken from the March Current Population Surveys for the years 1985 to 1987 and 1989 to 1990. The data on labour market and income are derived for the year before the survey. The data thus cover 1984 to 1986 and 1988 to 1989. 1987 is left out, because people would need time to adjust to the new situation.

The participation effect of the EITC on single women with children is estimated at 2.5 percent. This suggests that the EITC does indeed increase participation. Eissa and Liebman also use probit regressions and try to avoid selection biases. In that case, the effects range from 1.4 percent for all single women with children to 3.7 for single women with children and low education. An explanation for the strong response of low-educated women is that women with lower education have a larger possibility of earning an income in the EITC range. This suggests that the participation response is indeed caused by the EITC. The authors also investigate whether prior trends in labour market participation, the business cycle or changes in the AFDC may be possible explanations of the higher rise in participation of women. It turns out that these explanations do not overturn the positive effect of the EITC on labour market participation.

<sup>6</sup>The only people who might stop participating because of the EITC are partners. If the primary earner is in the EITC range without the partners income, but out of the EITC range with the partners income, then this could be an incentive for the partner to give up working.

Eissa and Liebman also estimate the effect of the EITC on hours worked by people who are eligible for the EITC. In their regressions, the effects of the EITC on labour supply turn out to be positive, but not significantly different from zero. Accordingly, they argue that there is no evidence that the EITC decreases in the number of hours worked by women already in the labour force. This result is consistent with other empirical studies which typically find that the participation decision is more elastic than the decision about the number of hours worked. Another explanation given by Eissa and Liebman is that most recipients receive the credit as a lump sum payment and are therefore unaware of the high marginal tax rates in the phase-out range. Indeed, most people who receive the credit do not understand how the EITC works or do not even know that they receive the credit. Many of those people have their tax returns filled in by a financial adviser, and might view the payment they receive as the work of the adviser instead of the result of their own doing. If people consider the EITC as a lump sum payment, their response to the credit might not be as expected. Eissa and Liebman also cast doubts about the reliability of their regressions as they have low  $R^2$ s. Furthermore, the effect on labour supply was investigated in the two years after the change in the EITC. If one expects that behavioural responses to the EITC are a long term phenomenon, these figures do not adequately show the long-run effects of the EITC on labour supply. Their results should therefore be interpreted with caution.

*Scholz (1996)*

Scholz (1996) also estimates a participation effect by using a different methodology than Eissa and Liebman. In particular, instead of estimating the effect of the EITC directly, he investigates the effect of net wages on the probability of participating. Intuitively, people outside the labour force who would be eligible for EITC when working will be encouraged to participate if the EITC is expanded due to the higher after wages. The tax rate is calculated from the change in after tax earnings when going from 0 to 20 hours of work, divided by gross earnings. Probit regressions are run for three groups: single parents, principal wage earners and spouses. For all three groups, the parameter of the net wage is positive and significant. Hence, an increase in the after-tax average wage rate raises the participation rate. These estimates by Scholz suggest that an EITC may indeed have positive participation effects.

*Browning (1995)*

Compared to the previous studies, Browning (1995) is more pessimistic about the economic effects of an EITC. In particular, he argues that the positive effects on labour supply in the phase-in range are likely to be smaller than suggested by Dickert et al. This is because many people in the phase-in range during a given year have

higher expected earnings in the future, even without the EITC. As most labour supply decisions are long term decisions, the positive effect of the EITC will be diminished if a large share of the people is only temporary in the phase-in range. The most important effects are thus obtained from the behavioural responses in the phase-out range.

Browning also shows that the effect of the EITC on disposable income is ambiguous in the phase-out range. In particular, the high marginal tax rate in the phase-out range reduces the number of hours worked, thereby causing also a decline in disposable income. On balance, disposable income rises only if the EITC itself dominates the effect through the number of hours worked. For people with an income above \$20,500, Browning estimates that a higher EITC actually reduces disposable income. This outcomes is rather sensitive to the compensated wage elasticity, which is set at 0.3. However, even if the wage elasticity is reduced to 0.15, a large number of EITC recipients will experience a lower disposable income.

Browning also estimates the effects of the EITC on disposable income for people in the phase-in range and the flat range. For people in the phase-in range, disposable income increases by even more than the credit because people tend to raise the number of hours worked. However, as there are a lot more people in the phase-out range than in the phase-in range, Browning argues that the overall effect on labour supply is likely to be negative.

*Table 2.4 The estimated labour supply effects of the EITC in the different studies*

	Overall	Not Working	Phase in	Flat range	Phase-out	Disposable income
Eissa and Liebman	0	+	0	0	0	n.a.
Dickert et al.	-	n.a.	+	-	-	n.a.
Scholz	+	+	+	-	-	n.a.
Browning	-	0/+	+	-	-	+/-

Table 2.4 summarizes the main findings from the studies in the US. The research by Dickert, et al. and Browning confirm the theoretical effects of an EITC on labour supply. However, the underlying structure of these models already determines these expected behavioural responses. The research conducted by Eissa and Liebman estimates the effect of the EITC on labour supply directly. This study does not confirm the theoretical expectations, but estimates only short-run effects on labour supply. The evidence thus seems ambiguous.

## **2.5 Reform of the EITC**

The disadvantages of the EITC have induced some people to come up with alternative designs of the EITC. Yin et al. (1994) argue that the current design of the EITC in the US is an obstacle to achieve both compliance and participation in the program. They, therefore, suggest two alternatives for benefits for the working poor. The first proposal is to divide the EITC into two different benefits. The first credit would be a family allowance benefit. The easiest way to introduce such a benefit would be to provide a benefit for any family with children, similar to the Dutch system of child benefits. This favours both low and high income families. The credit would, however, benefit low income families relatively more if this proposal would be accompanied by the abolishment of the current dependency exemption. The second credit would be an implicit benefit for the working poor by introducing a tax exemption in the social security tax, coupled with a higher social security tax rate. The advantage of this proposal compared to the EITC is that it makes different objectives more transparent. Indeed, the separation into two credits recognizes that the EITC aims at two different goals, namely, providing income support for poor workers and providing income support for individuals with children. Another advantage is that the administrative burden may be reduced. A drawback of the separation into two credits is that it is ill targeted to the working poor with children. Indeed, the family credit would flow also to capital owners and high income workers with children. This would substantially raise the budgetary costs of the credit.

The second proposal by Yin et al. is to replace the EITC by indirect assistance to low income workers through a tax benefit directed to their employers. This is a subsidy comparable to the Dutch special tax allowance for low-paid workers (SPAK). This proposal assumes that there is no fundamental difference between paying a subsidy to the employer or paying a subsidy to the employee. Indeed, through equilibrium forces, the tax relief will ultimately fully benefit the low-paid workers. The advantage of this proposal is that the credit could be targeted at workers with a low hourly wage, rather than workers with a low annual incomes. Indeed, information about hourly wages may be available from the firm. Accordingly, high wage earners who work a limited number of hours can be excluded from the program. This brings us closer to the proposal suggested in the Dutch policy debate which is discussed below.

## **2.6 An EITC in the Netherlands**

An important institutional factor for the high unemployment rate among the low skilled is the replacement rate. This is the ratio between the net unemployment benefit

and the net income that could be earned by working. A high replacement rate affects the functioning of the labour market in different ways. First, it reduces search efforts by unemployed since the remuneration to these efforts is rather small. Second, a high replacement rate makes the unemployed more reluctant to accept a job offer. Finally, a high replacement rate involves an attractive fall-back position of unions in wage bargaining. Hence, it is associated with a strong bargaining position of the unions which may drive up wages and reduce employment.

There are two ways to reduce the replacement rate. The first is by making unemployment benefits lower. However, this solution is generally considered socially and politically unacceptable, as it would reduce real after-tax income of needy people. The second way to reduce the replacement rate is to increase after-tax wage income, while keeping benefit levels constant.<sup>7</sup> The government could establish this by targeting tax cuts at workers. To limit the budgetary costs, the tax reduction may be targeted at working people earning low incomes. This comes close to an EITC. Indeed, in December 1997 the Dutch cabinet presented a white paper 'Taxes in the 21<sup>st</sup> century: an investigation' which contains a number of tax proposals, including a proposal for the introduction of an EITC in the Netherlands.

The discussions about a possible EITC in the Netherlands focus on a different type than in the US. First of all, it is not primarily aimed at income support. Therefore, it does not depend on the number of children, while eligibility is related to individual income, rather than family income. Second, in contrast to the EITC in the US which is based on annual earned income, the EITC discussed in the Netherlands is based on hourly wages. Indeed, an EITC based on annual income accrues also to part-time workers with high hourly wages but low annual incomes. Since the Netherlands features the highest share of part-time work of all OECD countries, providing those people with an EITC makes the instrument ill targeted to the unskilled. For a given budget, each tax relief for part-time workers with high hourly wages crowds out the tax relief for low skilled workers with full-time jobs and low hourly wages. As the main objective of an EITC in the Netherlands is to reduce the unemployment rate among the low-skilled who collect unemployment benefits, a targeted EITC that depends on hourly wages, rather than annual incomes, seems more promising. Indeed, such an EITC has recently been proposed by the Dutch government in her white paper on a tax-reform proposal.

<sup>7</sup>As benefits are indexed to gross wages, the benefit level may change ex post.

### 3 Simulations

We have adopted the MIMIC model to explore the economic impact of an EITC in the Netherlands. MIMIC is an applied general equilibrium model for the Dutch economy that is designed to explore the effects of tax policies for the Dutch labour market. The model contains a disaggregated description of the household sector by distinguishing 40 types of households. For each type, the model adopts class-frequency income distributions based on micro data. This micro approach makes it possible to make a detailed assessment of the fraction of people in each household type that belongs to a specified income range. Accordingly, MIMIC is an appropriate tool to calculate the impact of an EITC on the labour market. For a more elaborate description of MIMIC, see Graafland and De Mooij (1998).

In each EITC experiment, the ex-ante (i.e. before behavioural responses to the credit are taken into account) reduction in tax revenue is 0.35% of GDP (i.e. 2.5 billion guilders). The government budget is balanced ex-ante by an equivalent reduction in government consumption. If tax revenues increase due to behavioural responses, these are used to mitigate the reduction in public consumption. Hence, the ex-post effect on public consumption is the long-run budgetary cost of the EITC.<sup>8</sup>

The rest of this section is organized as follows. Subsection 3.1 deals with the wage distribution in the MIMIC model, based on micro data. These data are important to properly understand the effects of an EITC in MIMIC. Subsection 3.2 analyzes an EITC that is based on annual incomes. In subsection 3.3, we explore the effects of an EITC targeted at people with low hourly wages, rather than small annual incomes. Subsection 3.4 performs a sensitivity analysis on this latter form of the EITC.

#### 3.1 The wage distribution in MIMIC

The MIMIC model is calibrated on a data set for 1993. Micro data on income distributions allow for a detailed assessment of the fraction of people in each household type that belongs to a specified income range. This is important information to calculate how many people will be eligible to the EITC.

<sup>8</sup>The budget of the social security funds may change due to an EITC. In that case, we assume that the government balances the budget of the social security funds by means of a positive or negative transfer. This ensures that the social premium rates remain fixed ex-ante. If the budget of these funds is affected endogenously due to behavioural responses, the social premium rates may change ex-post, however.

Table 3.1 provides information on the wage distribution for workers of different skill. In particular, MIMIC distinguishes between three types of labour: unskilled, low skilled, and high skilled labour. For each of these skill types, the wage distribution is presented for two different categories of workers, namely, breadwinners and elderly (who feature a relatively small labour supply elasticity) and partners and singles (who feature a relatively high labour supply elasticity). Table 3.1 shows the fraction of workers of each category in a particular income range. It reveals that 87% of the unskilled breadwinners and elderly have an income below 115% of the statutory minimum wage. For the low-skilled this percentage is less than 3%. The fraction of the low skilled with an income between 150% and 180% of the minimum wage is relatively large. High-skilled workers typically earn an income above 180% of the minimum wage. For partners and single persons, the wage distribution is more or less similar to that of breadwinners and elderly, albeit that they tend to earn somewhat lower wages.

*Table 3.1 The wage distribution in MIMIC*

Percentages per type <sup>a</sup>	<115 <sup>b</sup>	115 <sup>b</sup> <x<130 <sup>b</sup>	130 <sup>b</sup> <x<150 <sup>b</sup>	150 <sup>b</sup> <x<180 <sup>b</sup>	>180 <sup>b</sup>
Breadwinners/elderly					
Unskilled	87.60	8.12	4.29	0.00	0.00
Low-skilled	2.70	11.59	21.86	26.45	37.40
High-skilled	0.00	0.02	4.97	14.82	80.18
Partners/singles					
Unskilled	93.11	5.00	1.89	0.01	0.00
Low-skilled	0.67	7.82	12.00	44.12	35.40
High-skilled	0.00	1.62	6.28	14.23	77.87

<sup>a</sup> Based on hourly wage.

<sup>b</sup> In percentages of the minimum wage.

### 3.2 The EITC based on annual incomes

This section discusses the simulation results with MIMIC of an EITC that is based on annual incomes. This EITC differs from the one implemented in the US tax system in two respects. First, it depends on individual income, rather than family income. Second, the EITC analyzed with MIMIC does not depend on the number of children. Although this alternative design of the EITC makes it difficult to compare the effects

of MIMIC with the US studies, it forms a benchmark for the simulations in the next section that involves an EITC based on hourly wages and which was recently proposed in the Netherlands.

In our experiment, the phase-in range of the EITC amounts to 4% of annual labour income in the phase-in range. The maximum credit is DFL 1,015 in a flat range between the statutory minimum wage (DFL 30,000) and 115% of the minimum wage (DFL 34,500). Subsequently, the EITC is phased out linearly up to 180% of the minimum wage (DFL 54,000). Accordingly, the marginal tax rate in the phase-out

*Table 3.2 Institutional changes due to an EITC in the Netherlands according to MIMIC<sup>a</sup>*

	(1)	(2)	(3)	(4)	(5)
Replacement ratio	-0.44	-0.94	-0.59	-1.21	-1.20
- unskilled	-2.12	-3.81	-1.14	-5.04	-5.16
- low skilled	-0.08	-0.23	-0.56	-0.19	0.03
- high skilled	-0.04	-0.29	-0.43	-0.37	-0.38
Average burden	-0.71	-0.66	-0.74	-0.67	-0.67
- unskilled	-2.68	-4.63	-1.47	-6.64	-8.22
- low skilled	-1.15	-0.95	-0.99	-0.73	-0.51
- high skilled	-0.55	-0.32	-0.71	-0.21	-0.14
Marginal burden <sup>b</sup>	0.81	1.24	-0.10	1.01	0.64
- unskilled	-1.08	-1.26	-0.83	-1.83	-2.38
- low skilled	1.96	4.18	-0.07	4.23	4.15
- high skilled	1.02	1.36	0.04	1.10	0.62

<sup>a</sup>Cumulated differences between simulation and base projection (effects in absolute changes).

<sup>b</sup>Marginal burden on hourly wages for employees, measured by a weighted average for different workers in the income distribution.

(1) EITC based on annual income of DFL 1.015 between 100-115% minimum wage, phased out at 180%

(2) EITC based on hourly wages of DFL 1.890 between 100-115% minimum wage, phased out at 180%

(3) EITC of DFL 500 not phased out

(4) EITC based on hourly wages of DFL 2.775 between 100-115% minimum wage, phased out at 150%

(5) EITC based on hourly wages of DFL 3.465 between 100-115% minimum wage, phased out at 130%

range rises by more than 5%-points. The effects of the EITC based on annual incomes on replacement rates, average tax burdens and marginal tax burdens for different household types are given in the first column of Table 3.2. The first column of Table 3.3 presents the economic effects of the EITC.

#### *Institutional changes*

Table 3.2 reveals that the EITC reduces the replacement rate for all skill types. In particular, the net income of workers in all skill types increases while unemployment benefits remain unchanged. The credit has the largest impact on the replacement rate of the unskilled since the credit is targeted at low annual incomes. The replacement rate for the other skill-types declines less because a smaller number of households in these types benefit from the EITC (see the wage distribution in Table 3.1). This is illustrated also by the effects on the average employee's tax burden: the average tax burden for unskilled workers falls more substantially than that of skilled workers.

The marginal tax rate for the unskilled falls because a number of them are in the phase-in range (where the marginal tax rate drops), or in the flat range (where the marginal tax rate is unchanged). The high-skilled and especially the low-skilled face, on average, a higher marginal tax rate as a number of them fall in the phase-out range of the EITC.

#### *Economic effects*

Table 3.3 reveals that an EITC in the Netherlands is an effective instrument to reduce the unemployment rate.<sup>9</sup> Indeed, the lower replacement rate induced by the EITC stimulates job search by the unemployed and reduces their reservation wage. Through both channels, the EITC facilitates job matching. Furthermore, the lower replacement rate weakens the bargaining position of the unions in collective bargaining. Hence, contractual wages fall. Through these channels, unemployment declines. Unemployment for the unskilled falls by 0.76 percentage points.<sup>10</sup>

<sup>9</sup>The effects on unemployment have been largely ignored in studies for the US since structural unemployment is typically a European phenomenon.

<sup>10</sup>Ex-ante, the after-tax income of workers increases due to the EITC, while the after-tax benefit level remains unchanged. As social benefits are indexed to gross wages, however, wage moderation causes a decline in the benefit level ex-post. Hence, the price for the positive employment effects is a reduction in the income of those relying on social benefits. This illustrates the trade-off between equity and efficiency: tax reductions that are most favourable in raising employment typically harm equity.

*Table 3.3 Economic Effects of different forms of an EITC according to the MIMIC model<sup>a</sup>*

	(1)	(2)	(3)	(4)	(5)
	<i>percentage changes</i>				
Wage rate	-0.39	-0.61	-0.44	-0.68	-0.70
Private consumption	0.66	0.74	0.89	0.74	0.73
Labour supply (pers.)	0.72	0.15	0.30	0.19	0.25
– unskilled	0.74	1.19	0.30	1.75	2.17
– low skilled	1.14	0.04	0.48	-0.09	-0.10
– high skilled	0.60	-0.01	0.26	-0.01	0.00
Labour supply (hours)	-0.20	0.00	0.05	0.02	0.04
– unskilled	0.63	1.17	0.60	1.58	1.61
– low skilled	-0.12	-0.24	-0.10	-0.42	-0.43
– high skilled	-0.35	-0.12	-0.11	-0.11	-0.08
of which through human capital effect					
– unskilled	0.15	0.30	0.04	0.41	0.42
– low skilled	-0.05	-0.07	0.00	-0.10	-0.13
– high skilled	-0.01	-0.03	-0.01	-0.04	-0.03
Employment	0.48	0.83	0.67	0.91	0.92
– unskilled	1.74	2.84	1.25	3.63	3.90
– low skilled	0.64	0.64	0.79	0.47	0.38
– high skilled	0.22	0.54	0.54	0.58	0.57
Black labour supply	0.90	1.51	0.32	1.88	2.21
	<i>absolute changes</i>				
Unemployment rate	-0.47	-0.56	-0.41	-0.60	-0.58
– unskilled	-0.76	-1.13	-0.66	-1.37	-1.51
– low skilled	-0.54	-0.63	-0.48	-0.65	-0.59
– high skilled	-0.42	-0.46	-0.37	-0.48	-0.44
Employment <sup>c</sup>	28	49	40	54	54
– unskilled	12	19	9	25	27
– low skilled	7	7	9	5	4
– high skilled	9	22	22	24	23
Government consumption <sup>b</sup>	-0.16	-0.04	-0.13	-0.01	-0.01

<sup>a</sup> Cumulated differences between simulation and base projection.

<sup>b</sup> In percentage of GDP.

<sup>c</sup> In 1000 labour years

(1) EITC based on annual income of DFL 1.015 between 100-115% minimum wage, phased out at 180%.

(2) EITC based on hourly wages of DFL 1.890 between 100-115% minimum wage, phased out at 180%.

(3) EITC of DFL 500 not phased out

(4) EITC based on hourly wages of DFL 2.775 between 100-115% minimum wage, phased out at 150%.

(5) EITC based on hourly wages of DFL 3.465 between 100-115% minimum wage, phased out at 130%.

Table 3.3 reveals also that the EITC increases the participation rate. Indeed, the lower average tax burden on small part-time jobs encourages partners, who were previously voluntarily unemployed, to join the labour force. In contrast to this, the average length of the work week falls. This reduction in labour supply in hours is the result of two opposing forces. On the one hand, secondary earners with small part-time jobs falling in the phase-in range raise their average labour supply in hours since their marginal tax burden declines. On the other hand, primary earners and single persons reduce their labour supply because of a positive income effect and, to the extent that they fall in the phase-out range, a negative substitution effect associated with a higher marginal tax rate. On balance, labour supply in hours drops.

According to MIMIC, the high marginal tax rate in the phase-out range reduces also the incentives for training. This is illustrated by the effect on the upgrading of skills through human capital accumulation. In particular, through adversely affecting training, the EITC raises unskilled labour supply at the expense of skilled labour supply. The underlying reason for the adverse effects on training is that a larger part of wage increases due to productivity gains accrue to the government in the form of a lower EITC, rather than to the worker. Accordingly, workers find it less attractive to enroll in on-the-job training. This adversely affects human capital and hampers the upgrading of skills across households.<sup>11</sup> Through adverse productivity effects, this mitigates the positive effects on consumption. The higher marginal tax burden also induces substitution from labour supply in the formal sector towards the hidden economy. Hence, the informal sector expands at the expense of formal activities.

The favourable economic consequences of the EITC render the ex-post reduction in government consumption smaller than the ex-ante reduction of 0.35% of GDP. Indeed, in the long run the budgetary cost of the EITC is about half of the ex-ante cost.

### **3.3 An EITC based on hourly wages**

This section explores the implications of the EITC that depends on hourly wages, rather than on annual incomes. In particular, in this experiment only workers who hold a full-time job and earn an hourly wage between the minimum and 115% of the minimum wage are eligible for the maximum EITC. The credit is reduced proportionally for workers who work less than a full-time job. Furthermore, it gradually drops with the level of the hourly wage rate between 115% and 180% of the minimum wage. This alternative form of the EITC is better targeted at the low skilled

<sup>11</sup>Compared to Graafland and De Mooij (1998), the model used in this paper contains an alternative framework for on and off-the-job training that is described by De Mooij (1999).

than the EITC based on annual incomes. Indeed, with the same ex-ante budget of 0.35% of GDP, the maximum credit that can be provided to low-skilled workers with a full-time job almost doubles to DFL 1,890. The effects of this form of the EITC according to MIMIC are presented by the second column of Tables 3.2 and 3.3.<sup>12</sup>

#### *Institutional variables*

Replacement rates are calculated on the basis of a full-time job. A full time worker within the EITC range benefits more from this credit than from the EITC based on annual incomes because of the higher maximum credit. This holds especially for unskilled workers. Hence, the average tax burden and the replacement rate for the unskilled fall more substantially than in the previous experiment. However, the average tax for skilled workers drops less because skilled part-time workers who earn high hourly wages are no longer eligible to the credit.

The high marginal tax rates in the phase-out range apply only to hourly wages. Indeed, additional hours worked do not reduce the credit. The effects on the marginal tax rates on higher hourly wages for the different skill types have the same signs as in the previous experiment. The higher maximum credit makes this increase more pronounced, especially for the low skilled who fall primarily in the phase-out range of the EITC (see Table 3.1).

#### *Economic effects*

The second column of Tables 3.2 and 3.3 reveal that the EITC based on hourly wages reduces the average tax burden and the replacement rate for unskilled workers more substantially than the EITC based on annual income. Through skill-specific wage formation, the lower average tax and the lower replacement rate for unskilled work reduces gross unskilled wages, thereby boosting demand for unskilled labour. Moreover, the lower replacement rate stimulates the search intensity and lowers the reservation wage of the low skilled, thereby facilitating the matching process for unskilled labour. Accordingly, the unemployment rate for the unskilled and the low skilled drops more substantially than under the EITC based on annual income.

The rise in the participation rate is smaller than in the previous experiment and more concentrated among the unskilled. This is because the EITC reduces the average tax burden only on part-time jobs with low hourly wages. Indeed, Table 3.3 reveals

<sup>12</sup>Note that the minimum wage for people younger than 23 in the Netherlands is below the official minimum wage for regular workers. As MIMIC does not incorporate these minimum wages for young workers, a number of people in the income distribution receive wages below the official minimum wage. As the EITC proposals account for the minimum wage for youngsters, MIMIC thus overestimates the number of people in the phase-in range of the EITC.

that the participation rate of unskilled persons increases substantially. However, as high-skilled persons are no longer eligible to the EITC, the participation rate of these persons falls. This latter effect partly reflects the lower transition of initially low-skilled workers into high-skilled jobs since on-the-job training is discouraged by the EITC (see below).

The negative effect on labour supply in hours is much smaller if the EITC is based on hourly wages. Indeed, the increase in the marginal tax rate in the phase-out range applies only to higher hourly wages and not to higher labour incomes on account of more hours worked. Accordingly, labour supply in hours drops only on account of the income effect. Both the effects on participation and labour supply in hours are thus smaller (in absolute value) than in the previous experiment.

The marginal tax rate on higher hourly wages in the phase-out range is higher than in the previous experiment because the maximum credit is almost twice as large. This harms the incentives to accumulate human capital. Hence, although an EITC that depends on hourly wages does less harm to the quantity of labour supply it still harms the quality of labour supply. This adverse effect on the quality of labour supply is reflected in a smaller transition of workers into higher skill levels. Indeed, less training reduces the transition of low-skilled workers into high-skilled jobs so that labour supply of high-skilled labour falls relative to the base line and labour supply of unskilled rises. Employment growth on account of the EITC is thus concentrated among unskilled jobs.

Table 3.3 reveals also that the higher marginal tax burden boosts the size of the underground economy because employers and workers have more incentives to pay part of the wage bill in an informal way, i.e. without reporting it to the tax authority.

### **3.4 Sensitivity analysis**

This section employs sensitivity analysis on the EITC based on hourly wages discussed in the previous section (i.e. the EITC presented in the second columns of Tables 3.2 and 3.3). That form of the EITC is referred to as the benchmark EITC. In particular, we explore the following three variations regarding the phase-out range of the EITC.<sup>13</sup>

<sup>13</sup>Van Oers (1998) also employs sensitivity analysis on different phase-in ranges and flat ranges. The results tend to be rather robust with respect to this ranges, as compared to differences in the phase-out range.

- 1.No phase-out range with a maximum credit of DFL 500
- 2.Phase-out range between 115% and 150% of the minimum wage with a maximum credit of DFL 2775
3. Phase-out range between 115% and 130% of the minimum wage with a maximum credit of DFL 3465

The results of these simulations are given in the last three columns of Tables 3.2 and 3.3.

*No phase-out range*

If the EITC is not phased out, each worker with an hourly wage above the minimum wage who holds a full-time job receives a fixed credit of DFL 500. For part-time workers the credit is reduced proportionally. In this experiment, the maximum credit for an unskilled worker is smaller than in the benchmark case, but more people receive a credit. Accordingly, the replacement rate for the unskilled declines less than in the benchmark, but the replacement rate for the high- and low-skilled drops more. Furthermore, without phasing out the EITC, the marginal tax rate does not increase.

The lower replacement rate increases the search effort of the unemployed, reduces their reservation wage, and reduces gross wages as it undermines the threat-point of employees. As the replacement rate drops less than in the benchmark, the reduction in unemployment is smaller.

The participation effect for unskilled partners is smaller than in the benchmark since the credit for the unskilled is smaller. However, the credit also stimulates participation of low and high skilled partners on the labour market. Although labour supply in hours may drop slightly due to the income effect, this effect is dominated by the positive effect on total labour supply due to an increase in the participation rate.

The marginal tax rate does not rise if the EITC is not phased out. Indeed, Table 3.2 reveals that the marginal tax burden even falls because part-time workers face a lower marginal tax burden on hours worked. This raises their labour supply, stimulates investments in human capital and reduces black labour supply compared to the benchmark. Accordingly, this design of the EITC yields more favourable effects on productivity and consumption, but is less effective in reducing unemployment.

Compared to the benchmark case, the effects on employment are less concentrated among the unskilled. Indeed, the fixed EITC does not seriously discourage training and does not hamper the upgrading of skills. The small decline in human capital is caused by the lower average tax burden. In particular, as for most people the marginal tax burden remains unchanged, lower incomes benefit relatively more from the credit than higher incomes. As training efforts are determined by relative income

differentials between jobs with different skill levels, this slightly reduces the incentives for training.

#### *Shorter phase-out range*

In the benchmark case, the EITC is phased out between 115% and 180% of the minimum wage. The last two columns of Tables 3.2 and 3.3 show the effects of two EITC's with an alternative more rapid phase-out range, namely, between 115% and 150% of the minimum wage or between 115% and 130% of the minimum wage. The advantage of more targeting is that the maximum credit for people who earn the minimum wage rate can be larger, thereby cutting the replacement rate of the unskilled more substantially. Indeed, the maximum credit rises to DFL 2775 if the EITC is phased out at 150% of the minimum wage and to DFL 3465 if it is phased out at 130% of the minimum wage. More targeting also implies, however, that less people are eligible to the EITC.

The larger reduction in the replacement rate for the unskilled implies a stronger decline in the unemployment rate among the unskilled. As the unemployment rate is highest among the unskilled, targeting is also effective in cutting the aggregate unemployment rate. Indeed, compared to the benchmark EITC, the moderately targeted EITC is more effective in reducing the aggregate unemployment rate. However, there tends to be decreasing returns with respect to targeting. In particular, a moderately targeted version of the EITC is slightly more effective in reducing the aggregate unemployment rate than the most targeted EITC. This suggests that an inverse U-shaped curve describes how the effectiveness of the EITC in cutting unemployment varies with the degree of targeting. Hence, moderately targeting the EITC seems the most effective way to reduce the overall unemployment rate.

In case of a more targeted version of the EITC, less people fall in the phase-out range where the marginal tax rate increases. However, those who do fall in the phase-out range feature an extremely high marginal tax rate since a higher credit is to be phased out over a smaller income range. The adverse effects on training are thus concentrated among a smaller group, namely the unskilled. This is reflected by the stronger increase in unskilled labour supply, which reflects the decline in the transition of workers from unskilled to low-skilled jobs and from low-skilled into high-skilled jobs. Indeed, the reduced incentives for on-the-job training hamper the upgrading of skills. Accordingly, the boost in employment due to the targeted EITC's is concentrated among unskilled jobs while skilled employment expands only slightly.

## 4 Conclusions

This paper discusses the economic effects of an Earned Income Tax Credit. It starts with a survey of the literature on the EITC, which mainly originates from the United States. In the US, the EITC primarily aims at reducing poverty among low-income workers. Indeed, the EITC depends on the number of children in the household of the worker and annual family income. The literature suggests that the EITC is likely to have important effects on labour supply behaviour. In particular, people who do not participate on the labour market before an EITC is introduced, may be encouraged to start working as the average tax burden drops. Empirical studies suggest that this participation effect is indeed important. The effect of the EITC on labour supply in hours, however, is ambiguous. On the one hand, theory suggests that labour supply falls due to the income effect induced by the EITC. On the other hand, the EITC causes a positive substitution effect on labour supply in the phase-in range, but a negative substitution effect in the phase-out range. On balance, studies yield mixed results regarding the effect on aggregate labour supply in hours.

In the Netherlands the introduction of an EITC would aim at reducing the unemployment rate among low-skilled workers, rather than providing income support to poor working families. Indeed, unemployment among the unskilled is still a structural problem in the Netherlands. The proposals for an EITC in the Netherlands are based on individual hourly wages, rather than annual family incomes. Furthermore, the credit does not depend on the number of children. These modifications make an EITC more effective as an instrument to reduce the replacement rate for low skilled full-time workers. Indeed, our MIMIC simulations reveal that this targeting principle makes the EITC based on hourly wages more effective in reducing the unemployment rate, although there tends to be decreasing returns with respect to the targeting concept. Furthermore, the EITC based on hourly wages does not suffer from adverse incentive effects on the quantity of labour supply.

Apart from these positive effects, an EITC based on hourly wages also has some drawbacks. First of all, MIMIC reveals that the high marginal tax burden on hourly wages may have adverse effects on the incentives for training. This has negative effects on labour productivity. Furthermore, less training may slow-down the upgrading of skills of those low-skilled people currently in the labour force, thereby reducing the opportunities for low-skilled unemployed to find a job.

A second drawback of the EITC is that it relies on additional information of a worker, namely the number of hours worked in the formal sector. This information is currently not available to the tax authority in the Netherlands and seems rather vulnerable to fraud. MIMIC indeed reveals that the high marginal tax burden due to the EITC stimulates workers to report smaller incomes to the tax authority than they

actually earn. However, MIMIC does not include fraud related to the number of hours worked. As suggested by Van Koesveld (1998), one way out of this problem is to provide the EITC to firms that employ workers with low hourly wages, instead of providing it to workers through the tax bill. Firms are then obliged to transfer the EITC to their employees. The advantage of this is that the Dutch government has already introduced a special relief for social security contributions for those employers who employ workers with low hourly wages, the so-called SPAK. Hence, information about the number of hours worked is already available from firms that are eligible to the SPAK. Another advantage of the link between the EITC and the SPAK is that take up is automatic: if the employer applies for the SPAK, the EITC is automatically paid to the worker for whom the SPAK is applied for. This link also means that payment may occur throughout the year instead of a lump sum payment at the end of the year. A drawback of linking the SPAK and the EITC is that it might be especially vulnerable to fraud. Indeed, both the employer and the employee face an incentive to report more hours worked and lower hourly wages than is actually the case. Therefore, the combination of a SPAK and an EITC based on hourly wages is unlikely to be a permanent policy measure. Furthermore, it is not obvious that the incidence of the EITC is fully reaped by unskilled workers if it is provided to the employer. Indeed, the EITC may become subject to a bargaining game between the employer and the employee. In that case, the EITC may not add much compared to the existing SPAK.

A final drawback of the EITC is that most people receiving low hourly wages are young single persons or secondary earners who currently do not collect unemployment benefits (see CPB, 1997). This makes the EITC ill-targeted at the low-skilled primary earners who are looking for a full-time job. Indeed, most of primary earners with low skills receive wages above 130% of the minimum wage.

These problems in the design of an EITC based on hourly wages have made the Dutch cabinet reluctant to actually introduce it. Indeed, in her recent coalition agreement it has decided upon the introduction of a fixed earned income tax credit of DFL 1,000 that does not contain a phase-out range. Part-time workers who receive an annual income below 70% of the minimum wage will receive a percentage tax credit, rather than the full credit. This makes the credit better targeted at workers with a full-time job. Furthermore, it avoids problems associated with a high marginal tax rate in the phase-out range of the EITC. Indeed, our calculations with MIMIC suggest that this policy is somewhat less effective in reducing unemployment among the unskilled, but also less harmful for the quality of labour supply.

**Abstract**

In recent policy discussions in the Netherlands, the Earned Income Tax Credit (EITC) has been put forward as an instrument to reduce the unemployment rate among low-skilled workers. Using MIMIC, CPB's applied general equilibrium model for the Netherlands, this article discusses the economic impact of different forms of the EITC. The analysis reveals that moderately targeting the EITC to the unskilled makes the instrument more effective in reducing unemployment. The targeting concept features decreasing returns, however. Indeed, it may be counterproductive if the EITC is targeted at a very small income range. Furthermore, targeting the EITC to the low skilled induces adverse effects on the quality and quantity of labour supply because it raises the marginal tax burden on medium-income workers.

## References

Alstott, A.L., 'The Earned Income Tax Credit and Some Fundamental Institutional Dilemmas of Tax-Transfer Integration', *National Tax Journal*, 1994, nr. 47, p. 609-619.

Browning, E.K., 'Effects of the Earned Income Tax Credit on Income and Welfare', *National Tax Journal*, 1995, nr. 48, p. 23-43.

CPB, Economische verkenning voor de volgende kabinetsperiode, 1997.

Dickert, S.; S. Houser and J.K. Scholz, 'The Earned Income Tax Credit and Transfer programs: A Study of Labor market and Program Participation' in *Tax Policy and the Economy (Vol 9)* by J.M. Poterba (ed.), 1995, p. 1-50.

Eissa, N. and J.B. Liebman, 'Labor Supply Response to the Earned Income Tax Credit', *Quarterly Journal of Economics* 111 (2), 1996, p. 605-637.

Graafland, J.J. and R.A. de Mooij, 'Analyzing Fiscal Policy in the Netherlands: Simulations with a Revised MIMIC', *Research Memorandum* 140, 1998, CPB.

Hausman, J.A., 'Labour Supply', in *How Taxes Affect Economic Behavior (ed. J.T. Poterba)*, 1981, p. 27-72, The Brookings Institution, Washington D.C.

Koesveld, E.B.K. van, 'Lastenverlichting met de Earned Income Tax Credit', *ESB*, 1998, nr. 4146, p. 264-268.

MaCurdy, T, D. Green and H. Paarsch, 'Assessing Empirical Approaches for Analyzing Taxes and Labour Supply', *Journal of Human Resources*, 1990, nr. 25, p. 415-490.

Mooij, R.A. de, 'Endogenizing (employ)ability in MIMIC', Internal Memo, no. I/99/06, 1999, CPB, The Hague.

Oers, F.M. van, 'In search of an optimal EITC', Internal Memo no. I/98/11, 1998, CPB, The Hague.

Parliament, 'Taxes in the 21<sup>st</sup> Century: An investigation (in Dutch), The Hague.

Scholz, J.K., 'The Earned Income Tax Credit: Participation, Compliance, and Antipoverty Effectiveness', *National Tax Journal*, 1994, nr. 47, p. 63-85.

Scholz, J.K., 'In-Work Benefits in the United States: The Earned Income Tax Credit', *The Economic Journal*, 1996, nr. 106, p. 156-169.

Shapiro, I. and R. Greenstein, '*Making Work Pay: The Unfinished Agenda*', 1993, Center on Budget and Policy Priorities, Washington D.C.

Triest, R.K., 'The Effect of Income Taxation on Labour Supply in the United States', 1990, *Journal of Human Resources*, nr. 25-3, p. 491-516.

Yin, G.K.; J.K. Scholz; J.B. Forman and M.J. Mazur, 'Improving the Delivery of Benefits to the Working Poor: Proposals to Reform the Earned Income Tax Credit Program', *The American Journal of Tax Policy*, 1994, nr. 11, p. 225-298.