



Universiteit
Leiden
The Netherlands

Too much of a good thing? Using tax incentives to stimulate dual-earner couples

Boer, H-W. de; Jongen, E.L.W.; Koot, P.

Citation

Boer, H. -W. de, Jongen, E. L. W., & Koot, P. (2025). Too much of a good thing?: Using tax incentives to stimulate dual-earner couples. *Journal Of Population Economics*, 38.
doi:10.1007/s00148-025-01126-y

Version: Publisher's Version
License: [Creative Commons CC BY 4.0 license](https://creativecommons.org/licenses/by/4.0/)
Downloaded from: <https://hdl.handle.net/1887/4261756>

Note: To cite this publication please use the final published version (if applicable).



Too much of a good thing? Using tax incentives to stimulate dual-earner couples

Henk-Wim de Boer¹ · Egbert Jongen^{2,3,4,5}  · Patrick Koot⁶

Received: 6 January 2024 / Accepted: 29 August 2025
© The Author(s) 2025

Abstract

Following major tax-benefit reforms over the past decades, the Netherlands is an international front-runner in stimulating dual-earner couples via the tax system. We consider whether or not these tax incentives have perhaps gone too far. Using the inverse optimal tax method, our results indicate that the reforms resulted in social welfare weights that are no longer monotonically declining in household income, which is hard to rationalize with social welfare weights based solely on household income. However, this could be rationalized by other factors like preference heterogeneity between households or “affirmative feminist” social preferences. More challenging is our finding that the social welfare weights have become negative for single-earner couples with children 0–3 years of age, which suggests that the system is no longer Pareto optimal.

Keywords Optimal taxation · Revealed social preferences · Couples

JEL Classification C63 · H21 · H31

Responsible editor: Gregory Ponthiere

The work was performed when Henk-Wim de Boer and Patrick Koot were employed at the CPB.

✉ Egbert Jongen
e.l.w.jongen@law.leidenuniv.nl
Henk-Wim de Boer
hwdeboer@gmail.com
Patrick Koot
pkoot@minszw.nl

- 1 Independent Researcher, The Hague, The Netherlands
- 2 Leiden University, Leiden, The Netherlands
- 3 CESifo, Munich, Germany
- 4 IFS, London, United Kingdom
- 5 IZA, Bonn, Germany
- 6 Dutch Ministry of Social Affairs and Employment, The Hague, The Netherlands

1 Introduction

The Netherlands is an international front-runner when it comes to the preferential tax treatment of dual-earner couples (where both partners work) relative to single-earner couples (where only one partner in a couple works). Figure 1 shows this for the EU-14 and the UK. Many OECD countries, including the Netherlands, have implemented tax-benefit reforms to promote dual-earner couples, i.e., stimulating potential secondary earners (mostly women) to take up formal work. Prominent examples are in-work tax credits and subsidies for childcare. As a result, participation tax rates and effective marginal tax rates for secondary earners have declined in many OECD countries (OECD 2014). However, at the same time, governments want to maintain an equitable distribution of disposable income over single- and dual-earner couples, using various benefits targeted at low-income families, in particular at low-income families with children.

The theory of optimal taxation, pioneered by Mirrlees (1971), studies this trade-off between equity and efficiency. Saez (2002) extends the optimal tax model of Mirrlees (1971) to include an extensive margin decision for labor supply. A number of recent papers invert the optimal tax model of Saez (2002), or a continuous version of it Jacobs et al. (2017), using the so-called inverse optimal tax method to reveal the implicit social

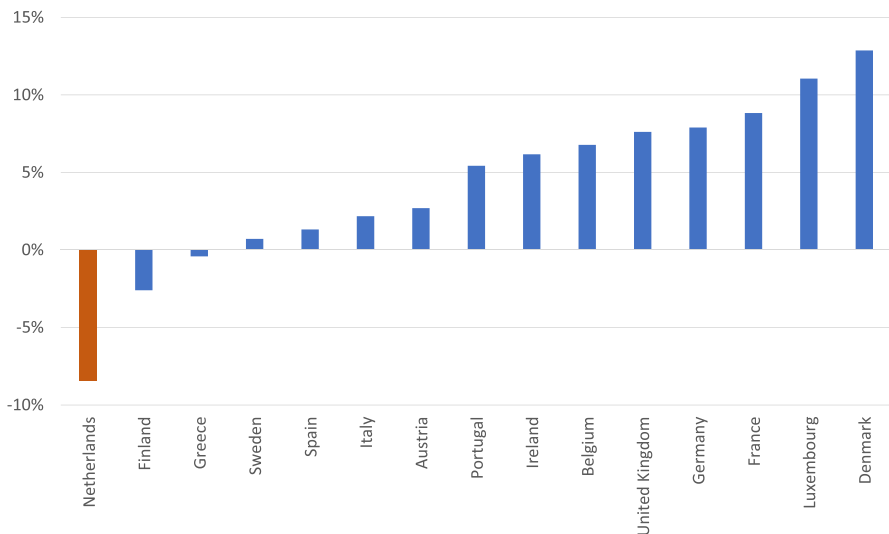


Fig. 1 Average tax rate dual-earner couple minus single-earner couple: 2020. *Notes:* Own calculations using the OECD tax-benefit calculator (<http://oe.cd/TaxBEN>). We calculate average tax rates for a single-earner and a dual-earner couple with two children. The single-earner household has a wage income of 100% of the average wage (approximately the mode of the income distribution of single-earner couples in the Netherlands). In the dual-earner couple, the primary earner has a wage income of 100% of the average wage and the secondary earner has a wage income of 50% of the average wage (approximately the mode of the income distribution of primary and secondary earners, respectively). The tax rates include income taxes (accounting for general and in-work tax credits) and social security contributions and transfers (related to children, health care, and housing). The tax-benefit calculator does not include the costs of and subsidies for childcare. A decomposition of the average tax rate is given in the Online Appendix

welfare weights for a given tax-benefit system (Haan and Navarro 2008; Blundell et al. 2009; Bargain and Keane 2011; Bourguignon and Spadaro 2012; Bargain et al. 2014a; Spadaro et al. 2015; Lockwood and Weinzierl 2016; Bastani and Lundberg 2017; Jacobs et al. 2017; Hendren 2020; De Boer and Jongen 2023a).¹ Anomalies in the implicit social welfare weights may indicate suboptimal elements in the tax-benefit system. In particular, negative social welfare weights suggest that Pareto-improving reforms are possible (Lorenz and Sachs 2016; Jacobs et al. 2017; Bierbrauer et al. 2023a), where lower tax rates may improve both household welfare and the government budget. Furthermore, social welfare weights that increase with household income may also indicate a suboptimal trade-off between equity and efficiency, as the social marginal value of an extra euro is typically considered to be higher for households with lower income levels, though there may be other considerations that can rationalize social welfare weights that increase with household income, as we will discuss below. By looking at these potential anomalies, the inverse optimal tax method can be a powerful tool to study the optimality of a given tax-benefit system and whether a given tax-benefit reform is likely to improve social welfare or not.

In this paper, we study the optimality of the tax-benefit system for single- and dual-earner couples in the Netherlands over time. Over the past decades, a series of reforms has reduced tax rates on dual-earner couples and increased tax rates on single-earner couples. Furthermore, policy proposals indicate that the intention is to further decrease tax rates on dual-earner couples relative to single-earner couples in the future. These reforms stimulate formal labor participation by secondary earners, but also increase the inequality in disposable household income between single- and dual-earner couples. We study how these reforms have affected the trade-off between equity and efficiency, using the inverse optimal tax method, and whether the reforms have moved the tax-benefit system closer to an “optimal” system or not.

To this end, we invert the optimal tax model of Saez (2002), where women in couples (typically secondary earners) can make both an extensive margin decision (participation) and an intensive margin decision (hours worked per week), while keeping the labor supply of men in couples (typically primary earners) fixed.² For this model, we need three inputs: (i) the income (ability) distribution, (ii) net taxes by income, and (iii) the behavioral responses to taxes at the extensive and the intensive margin. For the income distribution, we take data from the Labor Market Panel of Statistics Netherlands, a large representative administrative dataset. To calculate the net taxes by income in the different time periods, we use MIMOSI, the official tax-benefit calculator of the Dutch government. Finally, we determine the extensive and intensive

¹ Furthermore, Lorenz and Sachs (2016) use the optimal tax model of Saez (2002) to study whether a given tax system is second-best Pareto efficient. Bierbrauer et al. (2023a) further extend this analysis. Our paper is also closely related to the literature on optimal taxation of couples (see, e.g., Boskin and Sheshinski (1983); Kleven et al. (2009); Immervoll et al. (2011); Alesina et al. (2011); Cremer et al. (2012); Gayle and Shephard (2019); Golosov and Krasikov (2023); Bierbrauer et al. (2023b)) and more generally to the analysis of tax-benefit policies targeted at families (see, e.g., Aaberge and Colombino (2012); Casarico et al. (2015); Barigozzi et al. (2024)).

² Following Haan and Navarro (2008), this can be considered a reasonable approximation for the Netherlands, as most men in couples work full time and are relatively unresponsive to changes in financial incentives (see De Boer and Jongen (2023b)).

behavioral responses to changes in financial incentives by estimating a static, unitary discrete-choice model for labor supply and childcare use by (women in) couples in the Netherlands.³ We consider results for the whole group of couples, and for sub-groups of couples based on the age of the youngest child. We also present a number of robustness checks.

Our main findings are as follows. First, the implicit social welfare weights in the tax-benefit system of 2005 were broadly in line with a social welfare function based solely on household income for the group of couples as a whole: monotonically declining in income and positive. However, for couples with a youngest child 0–3 years of age, the social welfare weight for single-earner couples was already lower than the social welfare weight of dual-earner couples, despite single-earner couples having lower household income than dual-earner couples.

Second, after the reforms over the period 2005–2017, the social welfare weights were no longer monotonically declining in income and sometimes even negative. Indeed, following the reforms, the social welfare weight of single-earner couples drops below the social welfare weight of dual-earner couples. The drop in the social welfare weight is the most pronounced for single-earner couples with a youngest child 0–3 years of age, for which the social welfare weight becomes negative. Taken at face value, this implies that (at the margin) a reduction in taxes on single-earner couples with a youngest child 0–3 years of age is a Pareto improvement, increasing disposable income for these single-earner couples and the government budget.

Third, a simulation of proposed policy reforms shows that future policy changes will further reduce the social welfare weight of single-earner couples and further increase the social welfare weight of dual-earner couples.⁴ These findings are robust across a large number of robustness checks, in the context of our static, unitary household model. But we should interpret these results with the appropriate care. Allowing for preference heterogeneity between households, “affirmative feminist” social preferences or dynamic effects on secondary earners or their children may rationalize the lower social welfare weights for single-earner couples than dual-earner couples. However, it is more challenging to rationalize the negative social welfare weights of single-earner couples with a child 0–3 years of age with these additional factors.

Our main contribution to the literature is that we show that the inverse optimal tax method can be a powerful tool when considering tax reform targeted at single- and dual-earner couples, which is high on the policy agenda in many countries. Haan and Navarro (2008) already compared the implicit social welfare weights for single- and dual-earner couples under the joint taxation system to a counterfactual individual taxation system in Germany, and Bierbrauer et al. (2023b) have recently developed a more extensive model, applied to the tax-benefit system in the US. However, the Netherlands already moved from joint taxation to individual taxation starting in 1973

³ We discuss the potential implications of using a static instead of a dynamic (lifecycle) model or using a collective household model instead of a unitary household model in the “Discussion” section.

⁴ In the Online Appendix, we further show that an optimal tax analysis suggests that for a wide range of preferences for redistribution, it would actually be optimal to reverse some of the recent policy changes and lower taxes on single-earner households and increase taxes on dual-earner couples somewhat, when social welfare is based solely on household incomes.

(Hartog and Theeuwes 1985).⁵ We consider the optimality of further stimulating dual-earners via tax credits targeted at secondary earners and childcare subsidies. We also use high quality data, both on labor supply and earnings, but also on childcare, which plays an important role in adequately capturing the relevant changes in household budget constraints over time.

The outline of the paper is as follows. In Section 2, we outline the inverse optimal tax model we use to recover the social welfare weights. Section 3 then considers the changes in income support for single- and dual-earner couples in the Netherlands over time. Section 4 discusses the dataset used in the analysis, gives descriptive statistics and also considers the estimation of the behavioral elasticities used in the analysis. Next, Section 5 recovers the implicit social welfare weights for single- and dual-earner couples, as a whole and for subgroups by age of the youngest child, over time. Section 6 discusses a number of additional factors that potentially can help to rationalize our findings. Section 7 concludes. The Online Appendix contains supplementary material.

2 The inverse optimal tax model

We use the optimal tax model of Saez (2002), with both an extensive and intensive labor supply choice for females in couples. For simplicity, we assume that the labor supply of the males is fixed.⁶ Furthermore, also for simplicity, we assume that females in couples can only choose from a discrete set of labor supply options.⁷ Specifically, there are $I + 1$ occupations for females in couples on the labor market. Females that do not work are in “occupation” 0 and earn $w_0^f = 0$. Females that work in occupation i earn w_i^f , with $i \in \{1, \dots, I\}$ and $0 < w_i^f < \dots < w_I^f$. The salaries in each occupation are assumed fixed. Net taxes in occupation i are T_i (which can in principle be positive or negative). We do not allow for borrowing or saving, and hence, the consumption of the household is assumed to equal after-tax income:

$$c_i = w_i^f + \overline{w^m} - T(w_i^f, \overline{w^m}; q^h), \quad (1)$$

⁵ De Boer and Jongen (2023b) show that moving back from individual taxation to joint taxation would substantially reduce labor participation of secondary earners in the Netherlands, as secondary earners would then face the same, typically higher, marginal tax rate of primary earners.

⁶ We focus on the labor supply choice of females in couples, to prevent the complications of the multi-dimensional screening problem when considering the optimal taxation of couples where both partners have a labor supply choice (see, e.g., Kleven et al. (2009) and Bierbrauer et al. (2023b)). Immervoll et al. (2011) simplify the optimal tax problem of couples by considering a “double-extensive” model, where the primary and secondary earner both can (only) take an external margin decision (to work or not), and restricting the distribution of spousal work costs so that the primary earner is always the working spouse in a one-earner couple, while the secondary earner works only in a two-earner couple. In this paper, we simplify the optimal tax problem of couples by keeping the labor supply of the primary earner fixed, while allowing the secondary earner to make both an extensive margin and an intensive margin decision, because the intensive margin response of women in couples (many of which are secondary earners) is relatively large in the Netherlands compared to other countries (Bargain et al. 2014b).

⁷ To prevent complications of bunching due to, e.g., kinks and notches in the budget constraint of households.

where \overline{w}_m denote the fixed earnings of the male, $T(\cdot)$ denotes taxes (and employees' premiums), and q^h denotes individual and household characteristics (like the ages of the children).

The population of couples is normalized to one, and we denote the share of couples with a female in occupation i by h_i . Couples have heterogeneous (fixed and marginal) costs of work and the share of females in couples that choose occupation i depends on after-tax income in all occupations: $h_i = h_i(c_0, \dots, c_I)$. Specifically, female $k \in S$ chooses her optimal occupation i^* that maximizes the household utility function $u^k(c_i, i)$. For a given tax schedule (c_0, \dots, c_I) , we can then partition the share of S couples into subsets S_0, \dots, S_I that choose occupations h_0, \dots, h_I . As noted in Saez (2002), the aggregated functions h_i are a sufficient statistic for labor supply responses in the optimal tax analysis, and hence, the underlying structure of household utilities is not essential for the optimal tax analysis.^{8,9} However, we will assume that the household maximizes a quasi-linear unitary household utility function in total consumption of the household and costs of work of the secondary earner, so that only total consumption matters for household utility (not the distribution of consumption over the two partners) and there are no income effects.

The government then maximizes the following social welfare function:

$$W = \int_S \mu_i u^k(c_{i^*}, i^*) dv(s), \quad (2)$$

where μ_i is the Pareto weight of the social planner¹⁰ for households in occupation i and $v(s)$ is the measure of couples on S , subject to the budget constraint:

$$\sum_{i=0}^I h_i T_i = B, \quad (3)$$

where T_i are net taxes in occupation i and B is some exogenously fixed net tax on (or transfer to) couples by the government. The resulting expressions for the optimal level of net taxes in occupation i of females, relative to occupation $i - 1$, are as follows (see Saez 2002):

$$\frac{T_i - T_{i-1}}{c_i - c_{i-1}} = \frac{1}{\zeta_i h_i} \sum_{j=i}^I h_j \left[1 - g_j - \eta_j \frac{T_j - T_0}{c_j - c_0} \right], \quad (4)$$

⁸ However, in a robustness check, we also consider the social welfare weights when the extensive and intensive elasticities are endogenous (because the elasticities may depend on net income and hence taxes). The results are very similar to when we assume fixed extensive and intensive elasticities.

⁹ Even though the underlying structure of household utilities is not essential for the optimal tax analysis, we still need to ensure that tax rates are consistent with household maximizing behavior and that household utilities at different options fulfill the Spence-Mirrlees condition (see, e.g., Bourguignon and Spadaro (2012)). These conditions are satisfied in our inverse optimal tax and optimal tax analyses.

¹⁰ A Utilitarian social planner would have Pareto weights equal to one. For an extensive discussion of Pareto weights and examples of other applications, see, e.g., Saez and Stantcheva (2016).

where ζ_i is the intensive elasticity of labor supply at i , h_i is the share of individuals that chooses occupation i , η_j is the extensive elasticity at choice j , and g_j is the social welfare weight of couples with females at occupation j (the social value of one more euro for couples with females in occupation j). The intensive and extensive elasticity of labor supply are defined respectively as follows:

$$\zeta_i = \frac{c_i - c_{i-1}}{h_i} \frac{dh_i}{d(c_i - c_{i-1})}, \tag{5}$$

and

$$\eta_j = \frac{c_j - c_0}{h_j} \frac{dh_j}{d(c_j - c_0)}. \tag{6}$$

Finally, the social welfare weight for occupation j is defined as follows:

$$g_j = \frac{1}{p} \frac{1}{h_j} \int_S \mu_j \frac{\partial u^k(c_{j^*}, j^*)}{\partial c_j} dv(s), \tag{7}$$

where p is the multiplier on the government budget constraint. What is important to note is that the social welfare weight depends on the household’s marginal utility of consumption $\frac{\partial u^k(c_{j^*}, j^*)}{\partial c_j}$ and how much weight μ_j the social planner puts on this. Since the social welfare weights g_i have a more direct interpretation than the “primitive” weights μ_i (the g_i represents the euro equivalent social value of distributing an extra euro to individuals in occupation i), we focus on recovering the g_i ’s.

The next step is then to invert the optimality conditions for the optimal tax rates to “free” the social welfare weights (Bourguignon and Spadaro 2012). In our base model, we solve for six discrete occupations, $i \in (0, 1, 2, 3, 4, 5)$, where option $i = 0$ is the “occupation” where the potential secondary earner does not work. For the highest income group of dual-earners $i = I = 5$, we have a social welfare weight:

$$g_I = 1 - \zeta_I \frac{T_I - T_{I-1}}{c_I - c_{I-1}} - \eta_I \frac{T_I - T_0}{c_I - c_0}, \tag{8}$$

and for the income groups with less income but working, we have the following:

$$g_i = 1 - \zeta_i \frac{T_i - T_{i-1}}{c_i - c_{i-1}} - \eta_i \frac{T_i - T_0}{c_i - c_0} + \frac{1}{h_i} \sum_{j=i+1}^I h_j \left[1 - g_j - \eta_j \frac{T_j - T_0}{c_j - c_0} \right]. \tag{9}$$

The system of Eqs. 8 and 9 gives the solution for the work options T_1 – T_5 . The social welfare weight for single-earner couples, where the potential secondary earner does not work, follows from the normalization:

$$\sum_{i=0}^I h_i g_i = 1, \tag{10}$$

the weighted average of the g_i 's for the relevant group of couples equals one.¹¹

The system of Eqs. 8–10 gives the social welfare weights implicit in the tax system, given the elasticity parameters η_i and ζ_i , and the share of couples h_i in each option. A complication is that these shares are endogenous to the tax-benefit system. The h_i 's in the baseline correspond to averages for the data period (2006–2009, discussed below in the empirical analysis), and there is no need to adjust them. However, when calculating the social welfare weights in earlier or later periods, we need to take into account that the shares respond to the changes in financial incentives. Here, we follow Saez (2002) and assume that the density of options 1 to 5 (the options where the potential secondary earner works) change according to the following rule:

$$h_i = h_i^b \cdot \left(\frac{c_i - c_0}{c_i^b - c_0^b} \right)^{\eta_i}, \quad (11)$$

where the superscript b indicates baseline values. The share in the non-working option is then the residual.

Before we proceed with the empirical application, we want to be explicit about some of the limitations of the analysis. We only derive the social welfare weights, not the underlying “primitive” household utilities and the Pareto weights of the social planner for the households (Saez and Stantcheva 2016). Hence, the resulting implicit social welfare weights will reflect a mixture of both, and this calls for a careful discussion of the results, as we will see. In particular, although the model allows for preference heterogeneity, we will first interpret the results as if households have identical preferences, and only differ in earnings capacity and costs of work, and then consider how preference heterogeneity may affect the interpretation of the results. Furthermore, we use a static, unitary household model and hence ignore intra-household bargaining and potential dynamic effects that may affect household decision-making and social welfare. These dynamic effects may include career effects, where, e.g., working when the children are young may affect the career path of parents later on. We also ignore potential external effects of the labor supply decision (Stantcheva 2016), when, e.g., parents do not (fully) internalize the effects of labor participation on their children when they are young and when they are older, for example, by participating more in formal childcare.¹² We will return to these limitations in the “Discussion” section, where we consider how they may affect the results and their interpretation.

¹¹ In the absence of income effects, see Saez (2002). Following Saez (2002) and Blundell et al. (2009), we ignore income effects for simplicity. Empirical studies suggest that this is a good approximation (see, e.g., Bargain et al. (2014b)).

¹² We further assume that the tax-benefit system for couples is the result of a widely debated policy analysis subject to careful scrutiny and hence reflects societal preferences, policymakers that are knowledgeable of the behavioral elasticities and that respect household decision-making and households that make privately optimal decisions so that the envelope condition holds (Stantcheva 2016).

3 Tax-benefit reforms for couples

In this section, we consider the tax-benefit system for couples in the Netherlands in 2017, the changes in this system between 2005 and 2017, and the proposed changes between 2017 and the “long run,” where the long run is when the policy changes of the Rutte-III coalition are in full effect (some reforms have a time-to-build component).^{13,14} Furthermore, we consider how these changes have affected the budget constraint faced by couples.

The focus is on a number of large reforms. On the one hand, more generous in-work tax credits and childcare subsidies have benefited dual-earner couples. On the other hand, more generous child benefits and health care benefits targeted at low-income families have benefitted single-earner couples more. However, single-earner couples have suffered from the reduction in the transferability of the general tax credit between partners in couples. Below, we explain these reforms in more detail, after a brief general introduction to the Dutch tax-benefit system.

The Netherlands has a progressive individual tax system, with four tax brackets, but with targeted benefits that depend on household income.¹⁵ Figure 2a shows that the first bracket rate is higher in 2017 than in 2005, and the tax rates in the second and third bracket are also slightly higher in 2017 than in 2005. The top rate is the same in both years, although the third tax bracket is “longer” in 2017. In the long run, after the policy reforms of Rutte-III, statutory rates are reduced, and the number of tax brackets goes down from 4 to 2. The progressive individual tax system favors dual-earner couples over single-earner couples for the same level of household income.

The maximum general tax credit is 2254 euros in 2017. This “general” tax credit is phased out to zero at a rate of 4.79%, starting from an income of 19,982 euros. In 2005, the general tax credit was still independent of income, as illustrated in Fig. 2b. In the long run, the general tax credit will be higher for individuals with a lower income. In 2007, the government decided to limit the transferability of the general tax credit, to stimulate labor force participation. As a result, in 2017, a single-earner couple can claim only 40% of the general tax credit for the non-working partner. From 2023 onwards, the general tax credit is no longer transferable, reducing disposable income of single-earner couples.

¹³ The Rutte-IV coalition intended to make childcare nearly free for all parents and abolish the EITC for working parents (see below), but after substantial criticisms of various institutions, including the Netherlands Bureau for Economic Policy Analysis and the Social Cultural Office, these plans were abandoned. The Rutte-IV coalition resigned before it could draw up an alternative plan. The new Schoof coalition of 2024 has the intention to revive the plan of Rutte-IV.

¹⁴ Table B.1 in the Online Appendix gives a detailed overview of the parameters of the tax-benefit system for 2005, 2006–2009, 2017, and the long run. The earliest year we consider is 2005 because this is the year in which the Law on Childcare was introduced. Including childcare subsidies is potentially important for our analysis. Before 2005, the income support for childcare was different, and we cannot use the tax-benefit calculator to determine the childcare subsidy. We use the CPI to convert all income levels and tax credits to 2017 prices.

¹⁵ The statutory tax rate in the first tax bracket in 2017 is 36.55%, payable over a taxable income up to 19,982 euros. The second and third tax bracket rate is 40.8%; these brackets cover taxable income from 19,982 to 67,072 euros. The fourth (open) tax bracket has a statutory rate of 52%.

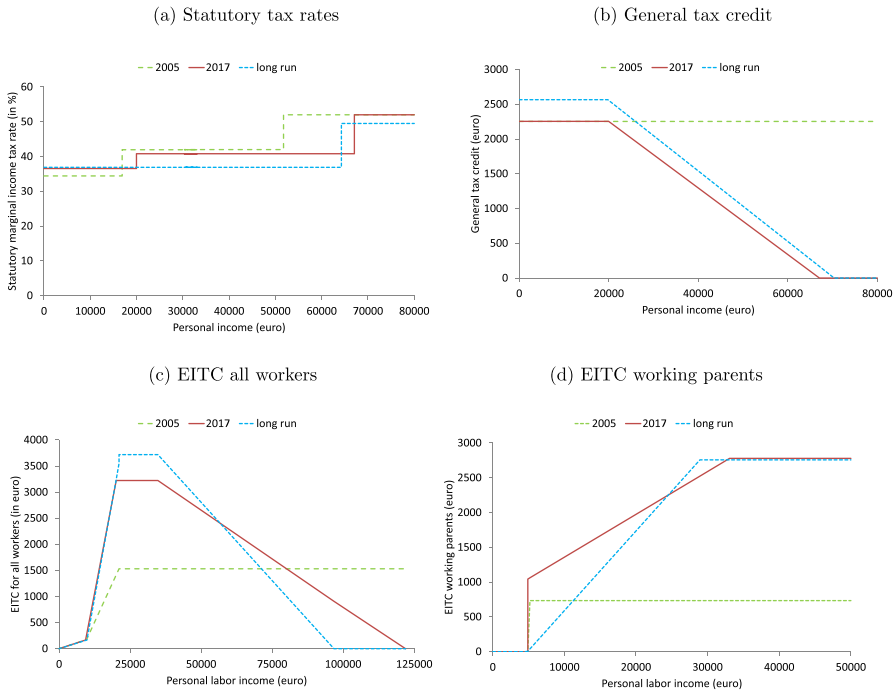


Fig. 2 Tax-benefit system 2005, 2017 and “long run” (1). *Notes:* Income-dependent taxes and benefits for the years 2005, 2017, and the “long run.” The “long run” refers to the period after which the policy reforms of the Rutte-III coalition come into full effect

The Netherlands also has a general individual in-work tax credit for all workers. In 2017, over the first 9309 euros, the phase-in rate is a modest 1.8%. However, between 9309 and 20,108 euros (approximately the full-time minimum wage), the phase-in rate is much higher: 28.3%. The maximum amount is 3223 euros. This amount then remains constant between 20,108 and 32,444 euros and is subsequently phased-out at a rate of 3.6%, until it reaches 0 at an income of 121,972 euros. The level and structure of this tax credit have changed substantially over the period 2005–2017 (see Fig. 2c). In 2005, both the level and phase-in were lower than in 2017, and the tax credit was not phased out in 2005. In the long run, the maximum increases to 3719 euros, but the phase-out becomes steeper with 6%. The changes in the general in-work tax credit are favorable for dual-earner couples.

Secondary earners with young children (0–11 years of age) also benefit from the income-dependent combination tax credit. In 2017, the base amount is 1043 euros. Figure 2d shows how this tax credit increases with income, at a phase-in rate of 6.159%, until a maximum of 2778 euros is reached. There is no phase-out. In 2005, this tax credit was still a fixed amount of 617 euros.¹⁶ In the long run, the base amount is abolished, and the phase-in becomes steeper (11.45%). The maximum amount will

¹⁶ In 2005, primary earners with young children also received a fixed (lower) tax credit of 228 euros. However, as of 2009, only secondary earners and single parents are entitled to the combination tax credit.

be 2939 euros. The changes in the combination tax credit have also been favorable to dual-earner couples.

Finally, dual-earner couples have also benefited from more generous childcare subsidies. To qualify for childcare subsidies, both partners in the household need to work. The subsidy makes a distinction between the first child and any subsequent children. In 2017, the maximum subsidy rate is 94.0% for the first child, and the minimum subsidy rate is 33.3%. Figure 3a shows the childcare subsidy rate for the first child. The childcare subsidy rate for the first child was lower in 2005 than in 2017, in particular for middle and higher incomes. In the long run, childcare subsidies rates for the first child will become more generous. The maximum subsidy rate for a second child is already higher, starting at 95%, and the phase-out of the subsidy is less steep than for the first child. The minimum subsidy rate for the second child is 64%.

However, there were also some reforms that favored single-earner couples. Single-earner couples are more likely to benefit from the income-dependent child benefit because they have a relatively low household income. Figure 3b shows the income-dependent child benefit for households with two children (8 years of age). In 2005, the maximum level of the income-dependent child benefit was much lower and was

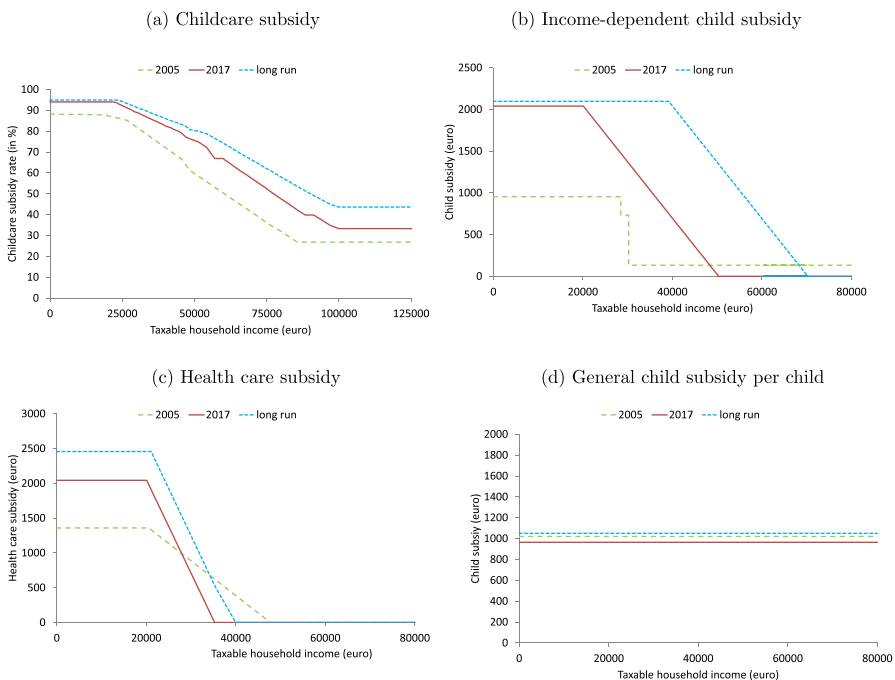


Fig. 3 Tax-benefit system 2005, 2017, and “long run” (2). *Notes:* Income-dependent taxes and benefits for the years 2005, 2017, and the “long run.” The “long run” refers to the period after which the policy reforms of the Rutte-III coalition come into full effect

phased out at three kink points. In 2017, it was much more generous, and in the long run, this subsidy will be increased further.¹⁷

Single-earner households are also more likely to benefit from the income-dependent health care benefit. In 2017, the maximum health care benefit is 2043 euros for couples. This benefit is phased out to zero at a rate of 13.4% to zero. Figure 3c highlights two major changes in the health care subsidy. The maximum level of the health care subsidy has increased since 2005. However, the phase-out rate has become steeper as well. In the long run, the maximum level of the health care benefit increases to 2457 euros.¹⁸

Figure 4 shows what all this means in terms of the budget constraint for couples in 2005, 2017, and the long run (all in prices 2017), separately for couples (a) without children and (b) with children. On the horizontal axis, we have the 6 income groups, where single-earner couples are in group 0 and groups 1 to 5 are the dual-earner couples, with household income increasing from group 1 to group 5. On the vertical axis, we have net income. For single-earner couples without children, net income decreases between 2005 and 2017 and between 2017 and the long run. For dual-earner couples without children, net income does not change much between 2005 and 2017, but increases between 2017 and the long run. Hence, for couples without children, the income gap between dual-earner couples and single-earner couples increases because of a decrease in the income of single-earner couples. For single-earner couples with children, net income drops between 2005 and 2017, but then returns to the 2005 level in the long run. For dual-earner couples with children, net income typically increases somewhat between 2005 and 2017, and then more substantially between 2017 and the long run. Hence, for couples with children, the income gap between dual-earner couples and single-earner couples increases because of an increase in the income of dual-earner couples.

4 Dataset, descriptive statistics, and estimating the behavioral elasticities

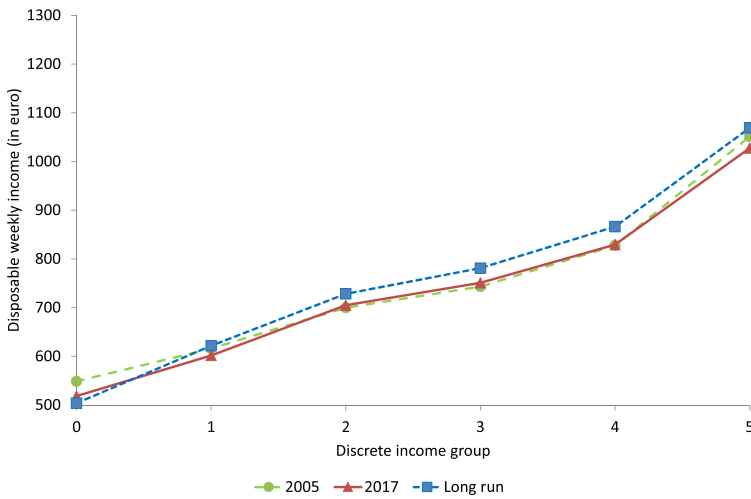
Next, we consider the dataset we use for the quantitative analysis, present some descriptive statistics, and briefly discuss how we estimate the extensive and intensive margin elasticities (further details are given in the Online Appendix).

For the data on the gross income distribution, employment rates, and household characteristics in the baseline, we use the Labor Market Panel (LMP) of Statistics Netherlands (2012). The LMP is a large administrative household panel data set. We use data for the period 2006–2009, because the childcare data are only available from 2006 onwards and 2009 is the last year in the dataset. The LMP contains a rich set of individual and household characteristics, including gender, year of birth, the highest completed level of education and ethnicity for all adult members of the household, the ages of the children, and the area of residence. The LMP also contains administrative data on hours worked and gross income from different sources.

¹⁷ Single-earner couples and dual-earner couples with children also receive the general child benefit, which has not changed much over time in real terms (see Fig. 3d).

¹⁸ We ignore the rent subsidy in our analysis, because we do not observe the rent level in our dataset.

(a) Couples without children



(b) Couples with children

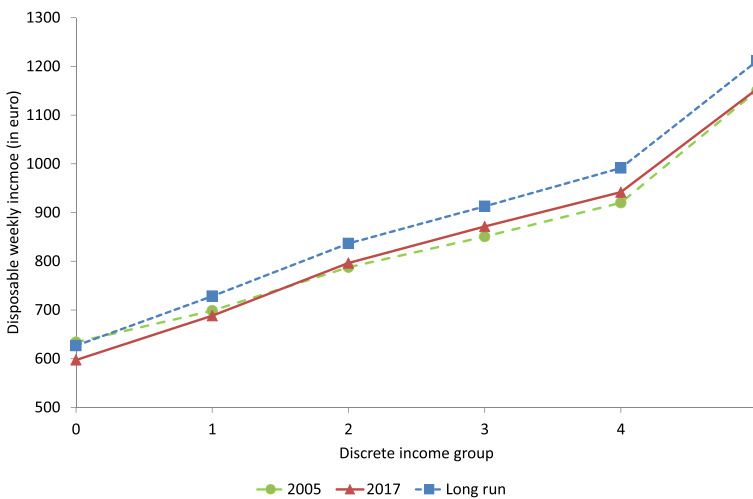


Fig. 4 Budget constraint 2005, 2017, and “long run.” *Notes:* Budget constraint at discrete points of the earnings distribution of secondary earners for the years 2005, 2017, and the “long run.” The “long run” refers to the period after which the policy reforms of the Rutte-III coalition come into full effect

Table 1 gives descriptive statistics of the 2006–2009 sample, which we use as the baseline and in the estimation of the extensive and intensive margin elasticities.¹⁹ We first consider the descriptive statistics for the whole group of couples. The first row of Table 1 shows that 73% of women in couples participate on the labor market, and

¹⁹ Appendix C gives descriptive statistics for the full set of demographic characteristics in the dataset.

Table 1 Descriptive statistics of women in couples in the dataset

	Share	Employment rate	Working hours (conditional on working)	Share low educated	Age
All couples	100.0	0.73	25.1	0.28	44.2
Subgroups:					
– Without children	43.8	0.69	28.6	0.34	47.2
– With children, youngest 0–3	14.5	0.81	22.5	0.15	34.6
– With children, youngest 4–11	21.3	0.76	21.2	0.22	41.1
– With children, youngest 12–17	17.0	0.74	24.0	0.28	46.7
– With children 18 years or older	3.5	0.64	24.3	0.40	52.7

Notes: Includes couples where the women are between 18 and 63 years of age. We exclude students, self-employed, and women who are on disability or unemployment benefits

the average number of hours worked (conditional on working) is 25 h per week. We next distinguish between subgroups based on the age of the youngest child: without children, pre-primary school age 0–3, primary school age 4–11, secondary school age 12–17 years of age, and adult children (living at the home of the parents). Couples without children are the largest group (44%), couples with adult children living at home are the smallest group (4%). The average age of women in couples increases with the age of the youngest child. However, the participation rate decreases with the age of the youngest child, which is due to a cohort effect. Cohorts of younger women are higher educated than their predecessors. Indeed, Table 1 shows that only 15% of the women with a youngest child 0–3 years of age have a low education level, whereas this share is much higher for women with adult children living at home (40%). Working mothers of young children prefer smaller part-time jobs than working mothers with older children.

To determine the extensive and intensive labor supply elasticities, we estimate preferences over consumption, leisure, and childcare using a structural discrete-choice model (Aaberge et al. 1995; Van Soest 1995; Keane and Moffitt 1998; Haan and Navarro 2008; Bargain et al. 2014b; De Boer and Jongen 2023b). Section D in the Online Appendix outlines the setup of the discrete-choice model and gives the estimated parameters of the utility function and the fit of the model. The corresponding extensive and intensive elasticities are discussed below.

5 Implicit social welfare weights over time

Using the inputs above, we derive the implicit social welfare weights for the tax-benefit system for couples over time. Specifically, we first calculate the implicit social welfare weights for the data period 2006–2009, using averages for this period, and subsequently for 2005, 2017 and the long run. Note that the shares of (potential) secondary earners in the six different options are endogenous; hence, we account for

Table 2 Implicit social welfare weights: 2006–2009

Group	Gross earnings	Net income	Net tax	Intensive elasticity	Extensive elasticity	Share	Social welfare weight
Panel A: All couples							
0	857	609	248	–	–	0.24	1.12
1	903	688	215	0.40	0.40	0.15	1.35
2	1017	785	231	0.13	0.53	0.15	1.11
3	1099	839	260	0.14	0.60	0.15	1.01
4	1203	889	315	0.11	0.55	0.15	1.01
5	1627	1110	518	0.28	0.75	0.15	0.34
Panel B: Couples without dependent children							
0	854	554	300	–	–	0.25	1.39
1	927	623	304	0.25	0.25	0.15	0.99
2	1031	708	323	0.11	0.38	0.15	0.96
3	1102	752	350	0.08	0.34	0.15	0.93
4	1254	837	417	0.07	0.32	0.15	0.97
5	1668	1060	607	0.20	0.54	0.15	0.51
Panel C: Couples with a child 0–17 years of age							
0	859	640	219	–	–	0.23	0.97
1	898	708	190	0.37	0.37	0.15	1.33
2	1000	801	199	0.11	0.49	0.15	1.09
3	1081	866	215	0.15	0.61	0.15	1.03
4	1191	940	251	0.11	0.57	0.15	1.10
5	1607	1175	432	0.28	0.70	0.15	0.50

Table 2 continued

Group	Gross earnings	Net income	Net tax	Intensive elasticity	Extensive elasticity	Share	Social welfare weight
Panel D: Couples with a youngest child 0–3 years of age							
0	804	623	181	–	–	0.21	0.07
1	831	713	117	0.59	0.59	0.16	1.82
2	938	839	99	0.13	0.68	0.16	1.33
3	1022	906	116	0.23	0.87	0.16	1.16
4	1127	1000	127	0.15	0.80	0.16	1.32
5	1569	1275	294	0.38	1.10	0.16	0.58
Panel E: Couples with a youngest child 4–11 years of age							
0	868	662	206	–	–	0.26	1.39
1	902	706	196	0.42	0.42	0.15	1.23
2	994	779	216	0.16	0.61	0.15	0.96
3	1076	840	236	0.17	0.73	0.15	0.91
4	1190	916	274	0.17	0.79	0.15	1.03
5	1584	1144	440	0.45	1.00	0.15	0.19
Panel F: Couples with a youngest child 12–17 years of age							
0	899	617	282	–	–	0.22	1.35
1	964	711	253	0.32	0.32	0.16	1.25
2	1083	793	290	0.10	0.40	0.16	0.99
3	1170	853	317	0.12	0.52	0.16	0.94
4	1269	909	360	0.09	0.57	0.16	1.05
5	1671	1116	555	0.28	0.83	0.16	0.28

Notes: Inputs for the inverse-optimal analysis and the resulting social welfare weights in the baseline using Eqs. 8–10

the change in the participation rate by secondary earners when simulating the 2005, 2017, and long-run tax-benefit systems using Eq. 11.^{20,21}

The inputs for the calculations of the social welfare weights for the tax-benefit system of 2006–2009 are given in Table 2. In the top panel, we have the inputs for all couples, and in the subsequent panels, we have the inputs for subgroups per age of the youngest child.²² For all groups, we observe that net income increases as gross income increases, as required for incentive compatibility. Furthermore, extensive elasticities are larger than intensive elasticities.²³ Also, elasticities are higher for couples with younger children and are the lowest for couples without children.

The last column in Table 2 gives the resulting implicit social welfare weights, using the system of Eqs. 8–10. We see that for couples without children and for couples with a youngest child 4–11 or 12–17 years of age, the social welfare weights are broadly in line with a well-behaved social welfare function based on household incomes, decreasing in net income and positive (although we observe a moderate increase going from group 3 to 4). This is consistent with an underlying “work cost” model (Kleven et al. 2009) where higher income households are better off because they have higher productivity on the formal labor market. However, for couples with a youngest child 0–3 years of age, the social welfare weights are not monotonically declining in net household income. In particular, social welfare weights increase when we go from single-earner couples (option 0) to dual-earner couples with a relatively low household income (option 1). This also shows up in the social welfare weights for the larger group with a youngest child 0–17 years of age and for all couples overall. This is not consistent with the “work cost” model where higher income households are better off (Kleven et al. 2009). However, in the “Discussion” section, we will consider a number of potential other factors that may explain lower social welfare weights for single-earner couples than dual-earner couples.

Figure 5 gives the changes in the social welfare weights implicit in the tax-benefit system over time.²⁴ The dashed green lines give the social welfare weights for 2005, the solid red lines give the results for 2017, and the dotted blue lines give the results for

²⁰ Table E.1 in the Online Appendix gives the shares of potential secondary earners in couples (using the proxy of women in couples) that are not working for 2005 and 2017. Statistics Netherlands does not have consistent data for these years, but we have consistent series for 2005–2014. These indicate that the share of all women in couples (15–65 years of age) not working has declined by 6 percentage points between 2005 and 2014. For the somewhat longer period in our model, 2005 to 2017, we have for all women in couples (for women 18–63 years of age) a decline in the share that does not work by 7 percentage points. For women in couples with children, the data indicate a decline of 10 percentage points between 2005 and 2014, whereas our model predicts a decline of 9 percentage points between 2005 and 2017, also quite close. Finally, for women in couples without children, the data indicate a decline of 7 percentage points between 2005 and 2014, whereas our model predicts a decline of 4 percentage points between 2005 and 2017, which is somewhat smaller.

²¹ The gross incomes for each option are averages for quintiles based on gross weekly earnings of secondary earners to which we add the respective gross income of their primary earners.

²² The method used in this paper does not readily allow us to study the optimal redistribution between these subgroups, or between couples and other groups on the labor market.

²³ Except for group 1, for which these elasticities are the same by definition, since option $i - 1$ is option 0 for $i = 1$.

²⁴ Table E.1 in the Online Appendix gives the numerical values.

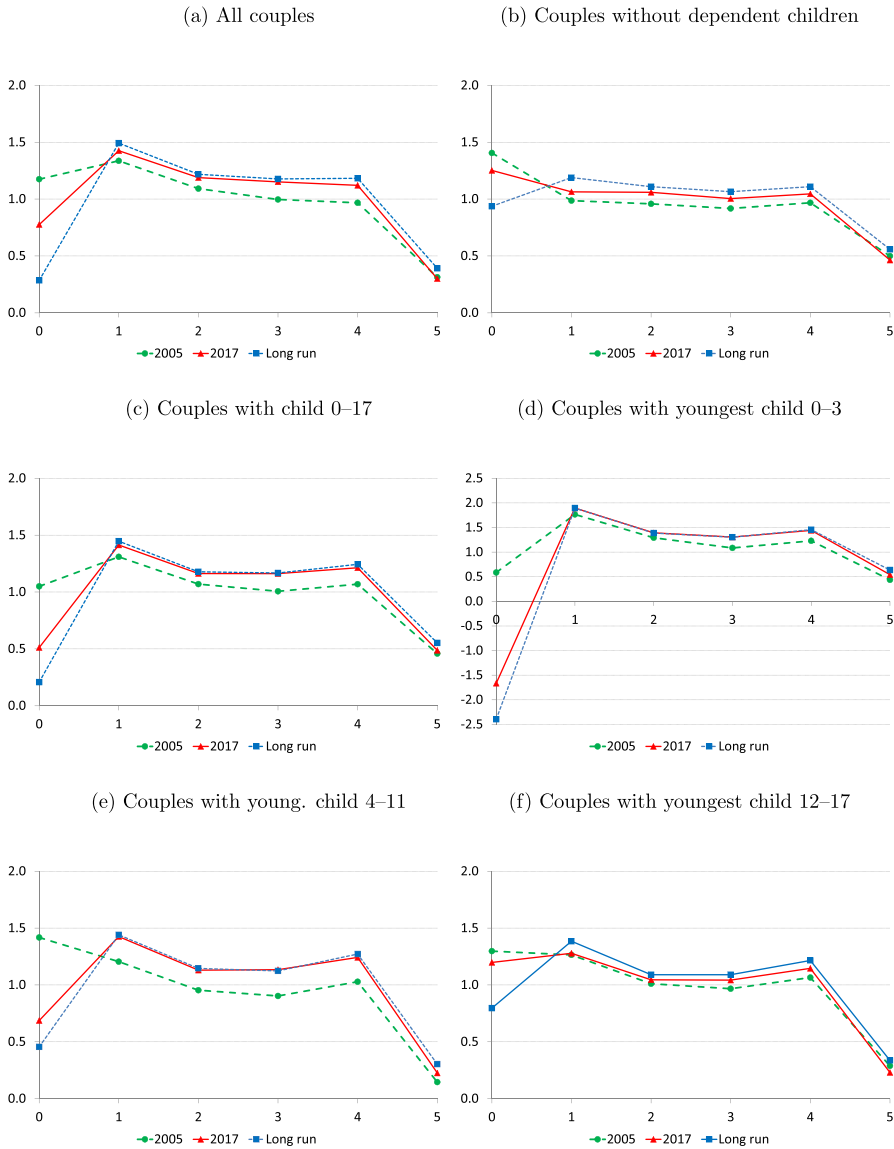


Fig. 5 Social welfare weights over time. *Notes:* The implicit social welfare weights for the years 2005, 2017, and the “long run,” using Eqs. 8–10 and 11 for the shares in the different choice options. The “long run” refers to the period after which the policy reforms of the Rutte-III coalition come into full effect

the long run.²⁵ The reforms, going from 2005 to the long run, stimulated formal labor participation of (potential) secondary earners (see Table E.1 in the Online Appendix), but also implied a drop in the social welfare weights of single-earner couples and a

²⁵ Note that the points on the horizontal axis are not evenly spaced in gross income (see Table E.1 for the gross incomes corresponding to points 0–5 in Fig. 5).

rise in the social welfare weights of dual-earner couples. Indeed, for many groups of couples, the implicit social welfare weight of single-earner couples is markedly lower than for most dual-earner couples (except at the top) in the long run (after the policies of the Rutte-III coalition have come into full effect). Hence, it has become harder over time to rationalize these social welfare weights with a “work cost” model where dual-earner couples are better off than single-earner couples.

The drop in the social welfare weight of single-earner couples is particularly strong for couples with children. In particular, for couples with a youngest child 0–3 years of age, the social welfare weights even turn negative. This suggests that, starting out of the tax system of 2017, a marginal reduction in taxes on single-earner couples with a youngest child 0–3 years of age leads to a Pareto improvement (Lorenz and Sachs 2016). This would make these single-earner couples better off, and it would also improve public finances, because the dual-earner couples that stop working on average pay more taxes as a single-earner couple than as a dual-earner couple (see net taxes for couples with a youngest child 0–3 years of age in the long run in Table E.1 in the Online Appendix), which could be distributed lump sum all couples.²⁶ Hence, single-earner couples are better off, and dual-earner couples are not worse off.²⁷ This suggests that, in the stylized model considered here, taxes on single-earners with a youngest child 0–3 years of age are too high.

In the Online Appendix, we present a number of (quantitative) robustness checks. Figure F.1 gives the social welfare weights when we allow for endogenous elasticities, e.g., extensive and intensive elasticities that depend on the tax-benefit system through net incomes. The results are qualitatively similar to the baseline with exogenous elasticities, although the changes in the social welfare weights become somewhat more pronounced. Figures F.2 and F.3 give the social welfare weights over time when the intensive and extensive margin elasticities are 50% lower and higher than the baseline, respectively. The changes in the social welfare weights become more (less) pronounced when the elasticities are higher (lower) (as indicated by Jacobs et al. 2017). Figure F.4 gives the social welfare weights when we include the costs of childcare in net taxes (in the baseline, we only include the childcare subsidy in net taxes). The results are qualitatively similar, although the social welfare weights of single-earner couples are then higher and the social welfare weights of dual-earner couples are then lower, as including childcare costs increases net taxes for dual-earner couples with young children in all periods. However, the social welfare weights for single-earner couples with a youngest child 0–3 years of age still turn negative in 2017 and the long run. Figure F.5 shows that we obtain qualitatively similar results when we use a discrete-choice model with 9 instead of 6 options. Finally, Fig. F.6 give the social welfare weights when we split the households into three groups by income of the male partner, to account for the heterogeneity in household income among single- and dual-earner couples due to

²⁶ By the envelope theorem, there is no direct effect of secondary earners that stop working on household utility and hence social welfare, provided that the labor supply choice by the secondary earner is privately efficient (Saez and Stantcheva 2016).

²⁷ This is also consistent with the formal analysis by Bierbrauer et al. (2023a, p. 1091) that negative welfare weights below some income level imply that a Pareto-improving reform is possible that increases marginal tax rates close to this income level, as reducing taxes on single-earner couples increases the marginal tax rate for the transition from single- to dual-earner couple when a potential secondary earner starts to work.

variation in the income of the male partner.²⁸ For all subgroups, we observe a decline in the social welfare weight of single-earner couples and an increase in the social welfare weight of dual-earner couples. The changes are the most pronounced for couples where the male partner has a relatively high income.

6 Discussion

We find that after the reforms that were favorable for dual-earner couples and unfavorable for (many) single-earner couples, social welfare weights are lower for single-earner couples than for (most) dual-earner couples. This seems at odds with a social welfare function based solely on (formal) household incomes, as single-earner couples have a lower net income than dual-earner couples, and the social value of an extra euro is typically considered to be higher for low-income households than for high-income households. Hence, efficiency considerations alone cannot rationalize the difference in net taxes between single-earner couples and dual-earner couples (anymore) in the Netherlands.

This finding is at odds with Immervoll et al. (2011), who find that a reduction in taxes on dual-earner couples financed by an increase in taxes on single-earner (and no-earner) couples is typically welfare improving, also for the Netherlands.²⁹ However, their analysis was based on a EUROMOD version for 1998, when taxes on single-earner couples were still lower and taxes on dual-earner couples much higher in the Netherlands than during the period we consider (2005 onwards). Furthermore, the EUROMOD 1998 version for the Netherlands did not take into account childcare subsidies (De Vos 2001), which in the Netherlands is an important subsidy for which dual-earner couples that use formal childcare qualify and single-earner couples that use formal childcare do not. The increased generosity of tax credits and subsidies for dual-earners and the inclusion of childcare subsidies may also explain why we find much lower participation tax rates for secondary earners than Immervoll et al. (2011). Indeed, Immervoll et al. (2011, Table 1) calculate an average participation tax rate of 44% for secondary earners in the Netherlands, whereas the average participation tax rate for secondary earners in our baseline period 2006–2009 is –5%.³⁰ The model of Immervoll et al. (2011) also suggests that a negative participation tax rate is only optimal if the social welfare weight of dual-earner couples is higher than the social welfare weight of single-earner couples,³¹ which seems at odds with a social welfare

²⁸ The model is the same as for the “pooled” model in the baseline, but now we do the analysis by income subgroups of men in couples.

²⁹ In their analysis, the efficiency gains outweigh the increase in household income inequality, provided that the social welfare weight on dual-earner couples is not very much lower than the social welfare weight of single- and no-earner couples (see the outcomes for Reform A in Immervoll et al. (2011, Table 2)).

³⁰ Calculated as the average difference between the net tax rate in the work options and the net tax rate in option 0 over the average difference between gross income in the work options and the gross income in option 0 from Table 2.

³¹ When the average social welfare weight of single-earner couples (and no-earner couples) and dual-earner couples is 1, the social welfare weight of dual-earner couples must be bigger than 1 if the participation tax rate is negative (see Immervoll et al. (2011), Eq. 25).

function based solely on formal income, as noted before.³² Below, we consider a number of other factors that can potentially rationalize a lower social welfare weight for single-earner couples than dual-earner couples.

Lower social welfare weights for single-earner couples than for dual-earner couples are hard to rationalize in a “work cost” model, where dual-earner couples are better off because they are more productive on the formal labor market (Kleven et al. 2009). However, they can potentially be rationalized in a “household production” model (Apps and Rees 2009; Kleven et al. 2009), where single-earner couples are better off than dual-earner couples because they are more productive at home than dual-earner couples. However, this would suggest that over the past two decades, the understanding of the economy has changed from a “work cost” model to a “household production” model, which seems doubtful.³³

Another potential explanation we may consider is our use of a unitary household model, which ignores intra-household bargaining.³⁴ However, Immervoll et al. (2011) show that a collective household model (typically)³⁵ results in similar expressions for optimal tax profiles as the unitary household model when household bargaining is efficient.³⁶ Furthermore, even when the social planner has different intra-family welfare weights than the household itself, the impact of this on optimal tax profiles depends on the third-order derivatives of the individual utility functions, of which we know very little empirically (Immervoll et al. 2011, p. 1491).

A factor that could more plausibly rationalize the lower social welfare weights for single-earner couples than for dual-earner couples is preference heterogeneity and the extent to which this preference heterogeneity is “respected” by the social planner/policymakers when setting the parameters of the tax-benefit system. With preference heterogeneity, we face the difficulty of how to define the objective of the social planner for heterogeneous utilities (Boadway et al. 2002; Fleurbaey and Maniquet 2006; Saez and Stantcheva 2016; Fleurbaey and Maniquet 2018). The approach we follow in this paper is to allow for preference heterogeneity in household utility functions u^k and also allow for different Pareto weights μ_i for households in each occupation group, using the cardinalization of household utilities given in Eq. 2, following,

³² Also relevant in this context is the observation by Immervoll et al. (2011, p. 1486) that “... in a setting with couples, a negative participation tax on the secondary earners requires that the social welfare weight on low-income two-earner couples is greater than the average social welfare weight in the population. In our model, because two-earner couples are better off than one-earner couples (for given spousal abilities), it is harder to justify a negative tax rate on low-income secondary earners than on low-income singles.”

³³ Indeed, Kleven et al. (2009) still deemed the “work cost” model the most realistic.

³⁴ The unitary model predicts that households pool income, where the source of the income is irrelevant. Several empirical studies reject the pooling hypothesis (Thomas 1990; Schultz 1990).

³⁵ The resulting expressions differ somewhat when there are income effects. Furthermore, the analysis might be different when the bargaining weights or outside options are affected by the changes in tax policy, or when the bargaining in the household is no longer Pareto efficient, as discussed in Immervoll et al. (2011, p. 1495).

³⁶ Modeling intra-household bargaining would also require data on consumption patterns, which we do not have.

e.g., Saez (2002).³⁷ This can also be helpful to think about the role of preference heterogeneity. So far, we have interpreted our results as if all differences in household incomes come from differences in earnings ability only. But with preference heterogeneity, differences in household incomes typically will also reflect differences in preferences for leisure. Specifically, single-earner households are likely to consist of households where the potential secondary earner has relatively low ability and of households where the potential secondary earner has a relatively strong preference for leisure (but not necessarily low ability). The latter group may have the same earnings capacity as dual-earner couples, but chooses to be a single-earner couple. Without being able to distinguish between the two types, the social planner may set a lower Pareto weight for single-earner couples to take into account that a disproportionate share of single-earners consists of households with a potential secondary earner that is not working because of a strong preference for leisure rather than because of low ability (the social planner may choose “not to respect” the differences in household incomes resulting from preference heterogeneity when it comes to redistribution in income).³⁸ This could provide a rationale for the relatively low social welfare weights for single-earners that we find (see also the expression for the social welfare weights, including the Pareto weights, in Eq. 7).³⁹ Furthermore, it could also provide a rationale for the declining social welfare weight of single-earner couples over time. If the social planner thinks that a decreasing share of single-earner couples consists of couples with a potential secondary earners with relatively low ability⁴⁰ and an increasing share of single-earner couples consists of couples with a potential secondary earner with a relatively strong preference for leisure, this could provide a rationale for the declining social welfare weight for single-earner couples over time. However, preference heterogeneity still does not provide a rationale for the negative social welfare weights we find for single-earner couples with a youngest child 0–3 years of age, as we would expect the Pareto weights and the marginal utility of income to be non-negative.

Furthermore, assuming an “affirmative feminist” social welfare function, where additional weight is put on the share of household income earned by women, can substantially affect optimal tax rates, as shown by Bierbrauer et al. (2023b). This could potentially rationalize social welfare weights that are higher for dual-earner couples than for single-earner couples, as the income of women is higher in dual-

³⁷ Fleurbaey and Maniquet (2006, 2018) show how one can still derive practical results for optimal tax-benefit policy in a model with heterogeneity in abilities and preferences without cardinalization of heterogeneous household utilities using principles of fairness. Applying their approach to the optimal taxation of single- and dual-earner couples is an interesting direction for future research.

³⁸ Following, e.g., the logic of the presence of “freeloaders” in Saez and Stantcheva (2016, Section II.B), though we do not think of single-earner couples as “freeloaders.” Indeed, potential secondary earners in single-earner couples may spend a considerable amount of their “leisure time” on care duties.

³⁹ This is also in the spirit of the conclusion in Fleurbaey and Maniquet (2006, p. 56) who note that “[T]his recent literature suggests, with double heterogeneity, negative marginal tax rates are more likely to be obtained than if agents differ with respect to one parameter only,” and the findings of Choné and Laroque (2010).

⁴⁰ Consistent with the decline in low-educated females, see, e.g., Jongen et al. (2024), Fig. 2.

earner couples.⁴¹ And when this additional weight increases over time, this could also explain the increasing social welfare weight of dual-earner couples over time.

Finally, our model ignores potential dynamic effects and externalities. Dynamic effects may also favor lower net taxes on dual-earner couples, *ceteris paribus*. About one third of relations ends in a separation in the Netherlands, which leads to an average drop in disposable income of 21% for women (SCP and CBS 2016). A more equal division of income from work in couples may reduce the changes in income following a separation, leading to a more equitable income distribution. Furthermore, a more equal division of income from work in couples may also give women more equal opportunities to reach better career paths (that require, e.g., a minimum number of days at work per week).⁴² There may also be external effects that our analysis ignores, that may affect the social welfare weights of single-earner couples vs. dual-earner couples. For example, labor participation by secondary earners may have effects on children that are not (fully) internalized by the parents. Many secondary earners use formal childcare, which may have important effects on children's outcomes later in life.⁴³ However, given that secondary earners are a pretty heterogeneous group, it is hard to determine whether this would call for lower or higher net taxes on dual-earner couples relative to single-earner couples.⁴⁴

Overall, we conclude that heterogeneity in household production and intra-household bargaining are unlikely to explain the lower social welfare weight of single-earner couples than dual-earner couples. However, preference heterogeneity at the household level, "affirmative feminist" social preferences, and dynamic effects for secondary earners (and perhaps externalities for children) may help explain the lower social welfare weight of single-earner couples than dual-earner couples. However, also with these additional factors, it is still hard to rationalize the negative social welfare weight of single-earner couples with children 0–3 years of age.

7 Conclusion

In this paper, we have studied how a series of reforms has affected the implicit social welfare weights of single- and dual-earner couples, using the inverse optimal tax

⁴¹ Of course, we should also consider the possibility that policymakers do not actually try to maximize a social welfare function and may be driven by other motives (Jacobs et al. 2017; Bierbrauer et al. 2021).

⁴² However, dynamic discrete lifecycle models are hard to solve (Keane 2011; Haan and Prowse 2013) and require data on consumption and savings, which are not in our dataset.

⁴³ For example, Havnes and Mogstad (2015) find that participation in formal childcare increases earnings later in life for children from low-income parents but not for children from high-income parents. Also, see Bastani et al. (2020) for an analysis of optimal taxation including taxes and subsidies on formal childcare.

⁴⁴ The factors considered above are not exhaustive. For example, "behavioral" (non-welfarist) motives may also play a role in social welfare weights, where households do not make privately optimal decisions (Kanbur et al. 2006). Gerritsen (2016) combines the theory of optimal taxation with empirical data for the UK on the well-being of individuals. A substantial share of the respondents declare that they prefer to work less hours, and this share is increasing with gross earnings. Gerritsen (2016) uses this information to estimate the determinants of overall well-being, with (among others) income and hours of work as explanatory variables. Next, he incorporates this information in a model of optimal taxation and concludes that low-income workers work too little, whereas high-income workers work too much. This too could offer a rationale for the social welfare weights we find after the reforms.

method, own estimates for extensive and intensive labor supply responses and a tax-benefit calculator. Our results suggest that for the initial tax-benefit system in 2005, the social welfare weight of single-earner couples is on average higher than the social welfare weight of dual-earner couples. After the reforms, in 2017, the social welfare weight of single-earner couples is typically lower than for dual-earner couples, in particular for single-earner couples with young children. Furthermore, single-earner couples with a youngest child 0–3 years of age even get a negative social welfare weight, which suggests that reducing net taxes for this group leads to a Pareto improvement. Due to proposed policy changes of the Rutte-III coalition, net taxes on single-earner couples will increase further, and as a result, the social welfare weight of single-earner couples will drop further.⁴⁵

However, our base analysis and the interpretation of the social welfare weights simply in terms of differences in household incomes ignores a number of factors that could potentially rationalize the lower social welfare weight for single-earner couples than for dual-earner couples. In particular, preference heterogeneity between households, “affirmative feminist” social preferences, dynamic effects, and externalities could potentially explain this (see the “Discussion” section above).

Future research could consider a number of the factors of the “Discussion” section in the formal analysis, which in part would require the use of additional data on consumption, home production, and/or preferences. Another interesting direction would be to jointly model the decision of both partners and recover the social welfare weights of both primary and secondary earners (as in, e.g., Kleven et al. 2009; Immervoll et al. 2011; Golosov and Krasikov 2023; Bierbrauer et al. 2023b). It would also be interesting to study the social welfare weights and optimal income support across rather than within household types, by, e.g., the number of children (Cremer et al. 2003).

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s00148-025-01126-y>.

Acknowledgements We have benefitted from comments and suggestions by the editor Grégory Ponthière, three anonymous referees, Tommy Andersson, Leon Bettendorf, Peter Haan, Bas Jacobs, Arjan Lejour, Daniël van Vuuren, and numerous conference and seminar participants. Large parts of the work were performed when the authors were employed at the Netherlands Bureau for Economic Policy Analysis (CPB). The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the official policy or position of the CPB, the Dutch Ministry of Social Affairs and Employment, or Leiden University.

Availability of data and material The data sets are available via remote access at Statistics Netherlands.

Code availability All codes used in the analysis are available on request.

Declarations

Conflict of interest The authors declare no competing interests.

⁴⁵ The optimal tax analysis in the Online Appendix further suggests that, for a wide range of preferences for redistribution, it would actually be optimal to reduce rather than increase net taxes for single-earner couples relative to dual-earner couples, when the social welfare function is based solely on household incomes.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Aaberge R, Colombino U (2012) Accounting for family background when designing optimal income taxes: a microeconomic simulation analysis. *J Popul Econ* 25(2):741–761
- Aaberge R, Dagsvik J, Strom S (1995) Labor supply responses and welfare effects of tax reforms. *Scand J Econ* 97(4):635–659
- Alesina A, Ichino A, Karabarbounis L (2011) Gender-based taxation and the division of family chores. *Am Econ J Econ Pol* 3(2):1–40
- Apps P, Rees R (2009) *Public economics and the household*. Cambridge University Press
- Bargain O, Keane C (2011) Tax-benefit-revealed redistributive preferences over time: Ireland 1987–2005. *Labour* 24:141–167
- Bargain O, Dolls M, Immervoll H, Neumann D, Peichl A, Pestel N, Siegloch S (2014a) Tax policy and income inequality in the United States, 1979–2007. *Econ Inq* 53(2):1061–1085
- Bargain O, Orsini K, Peichl A (2014b) Comparing labor supply elasticities in Europe and the United States: new results. *J Hum Resour* 49(3):723–838
- Barigozzi F, Cremer H, Thibault E (2024) The motherhood wage and income traps. *J Popul Econ* 37(4):1–26
- Bastani S, Blomquist S, Micheletto L (2020) Child care subsidies, quality, and optimal income taxation. *Am Econ J Econ Pol* 12(4):1–37
- Bastani S, Lundberg J (2017) Political preferences for redistribution in Sweden. *J Econ Inequal* 15:345–367
- Bierbrauer F, Boyer P, Peichl A (2021) Politically feasible reforms of nonlinear tax systems. *Am Econ Rev* 111(1):153–191
- Bierbrauer F, Boyer P, Hansen E (2023a) Pareto-improving tax reforms and the Earned Income Tax Credit. *Econometrica* 91(3):1077–1103
- Bierbrauer F, Boyer P, Peichl A, Weishaar D (2023b) The taxation of couples. CEPR Discussion Paper 18138, Paris
- Blundell R, Brewer M, Haan P, Shephard A (2009) Optimal income taxation of lone mothers: an empirical comparison of the UK and Germany. *Econ J* 119(535):F101–F121
- Boadway R, Marchand M, Pestieau P, del Mar Racionero M (2002) Optimal redistribution with heterogeneous preferences for leisure. *J Public Econ Theory* 4(4):475–498
- Boskin MJ, Sheshinski E (1983) Optimal tax treatment of the family: married couples. *J Public Econ* 20(3):281–297
- Bourguignon F, Spadaro A (2012) Tax-benefit revealed social preferences. *J Econ Inequal* 10(1):75–108
- Casarico A, Micheletto L, Sommacal A (2015) Intergenerational transmission of skills during childhood and optimal public policy. *J Popul Econ* 28(2):353–372
- Choné P, Laroque G (2010) Negative marginal tax rates and heterogeneity. *Am Econ Rev* 100(5):2532–2547
- Cremer H, Dellis A, Pestieau P (2003) Family size and optimal income taxation. *J Popul Econ* 16(1):37–54
- Cremer H, Lozachmeur J-M, Pestieau P (2012) Income taxation of couples and the tax unit choice. *J Popul Econ* 25(2):763–778
- De Boer H-W, Jongen E (2023a) Analysing tax-benefit reforms in the Netherlands using structural models and natural experiments. *J Popul Econ* 36(1):179–209
- De Boer H-W, Jongen E (2023b) Optimal income support for lone parents in the Netherlands: are we there yet? *J Econ Inequal* 21:573–589
- De Vos K (2001) EUROMOD Country Report The Netherlands. Technical report, CentER Applied Research, Tilburg University
- Fleurbaey M, Maniquet F (2006) Fair income tax. *Rev Econ Stud* 73(1):55–83

- Fleurbaey M, Maniquet F (2018) Optimal income taxation theory and principles of fairness. *J Econ Lit* 56(3):1029–1079
- Gayle G-L, Shephard A (2019) Optimal taxation, marriage, home production, and family labor supply. *Econometrica* 87(1):291–326
- Gerritsen A (2016) Optimal taxation when people do not maximize well-being. *J Public Econ* 144:122–139
- Golosov M, Krasikov I (2023) The optimal taxation of couples. NBER Working Paper 31140, Cambridge
- Haan P, Navarro D (2008) Optimal income taxation of married couples: an empirical analysis of joint and individual taxation. IZA Discussion Paper 3819, Bonn: IZA
- Haan P, Prowse V (2013) Longevity, life-cycle behavior and pension reform. *J Econom* 178(3):582–601
- Hartog J, Theeuwes J (1985) The emergence of the working wife in Holland. *J Law Econ* 178(1):S235–S255
- Havnes T, Mogstad M (2015) Is universal childcare leveling the playing field? *J Public Econ* 127:100–114
- Hendren N (2020) Measuring economic efficiency using inverse-optimum weights. *J Public Econ* 187
- Immervoll H, Kleven H, Kreiner C, Verdelin N (2011) Optimal tax and transfer programs for couples with extensive labor supply responses. *J Public Econ* 95:1485–1500
- Jacobs B, Jongen E, Zoutman F (2017) Redistributive preferences of Dutch political parties. *J Public Econ* 156:181–200
- Jongen E, Been J, Caminada K, Vethaak H (2024) Labour market and income inequalities in the Netherlands, 1977–2022. *Fisc Stud* 45(3):343–357
- Kanbur R, Tuomala M, Pirttilä J (2006) Non-welfarist optimal taxation and behavioral economics. *J Econ Surv* 20(5):849–868
- Keane M (2011) Labor supply and taxes: a survey. *J Econ Lit* 49(4):961–1075
- Keane M, Moffitt R (1998) A structural model of multiple welfare program participation and labor supply. *Int Econ Rev* 39(3):553–589
- Kleven H, Kreiner C, Saez E (2009) The optimal income taxation of couples. *Econometrica* 77(2):537–560
- Lockwood B, Weinzierl M (2016) Positive and normative judgments implicit in U.S. tax policy, and the costs of unequal growth and recessions. *J Monet Econ* 77:30–47
- Lorenz N, Sachs D (2016) Identifying Laffer bounds: a sufficient statistics approach with an application to Germany. *Scand J Econ* 118(4):646–665
- Mirrlees J (1971) An exploration in the theory of optimum income taxation. *Rev Econ Stud* 38(2):175–208
- OECD (2014) Neutrality of tax benefit systems. OECD, Paris
- Saez E (2002) Optimal income transfer programs: intensive versus extensive labor supply responses. *Quart J Econ* 117(3):1039–1073
- Saez E, Stantcheva S (2016) Generalized social marginal welfare weights for optimal tax theory. *Am Econ Rev* 106(1):24–45
- Schultz T (1990) Testing the neoclassical model of family labor supply and fertility. *J Hum Resour* 25(4):599–634
- SCP and CBS (2016) Emancipatiemonitor 2016 (in Dutch). Social and Cultural Office and Statistics Netherlands, The Hague
- Spadaro A, Piccoli L, Mangiavacchi L (2015) Optimal taxation, social preferences and the four worlds of welfare capitalism in Europe. *Economica* 83(327):448–485
- Stantcheva S (2016) Comment on “Positive and normative judgments implicit in U.S. tax policy and the costs of unequal growth and recessions” by Benjamin Lockwood and Matthew Weinzierl. *J Monet Econ* 77:48–52
- Statistics Netherlands (2012) Documentatierapport Arbeidsmarktpanel 1999–2009V1 (in Dutch). Statistics Netherlands, The Hague
- Thomas D (1990) Intra-household resource allocation: an inferential approach. *J Hum Resour* 25(4):635–664
- Van Soest A (1995) Structural models of family labor supply: a discrete choice approach. *J Hum Resour* 30(1):63–88

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.