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Shifting from Social Security Contributions to Consumption Taxes: The Impact on Low-Income Earner Work Incentives

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ABSTRACT/ RÉSUMÉ

Shifting from social security contributions to consumption taxes: the impact on low-income earner work incentives

This paper investigates the merits of increasing work incentives for low-income workers by shifting part of the tax burden from social security contributions (SSC) to consumption taxes (specifically VAT) in 13 European OECD countries. Simulation results based on household budget survey microdata show that such reforms will increase work incentives for low-income workers at both participation and hours-worked margins. However, these increases will generally be small as part of the VAT increase will still be borne by low-income workers. This, combined with difficulty targeting the reforms and potential equity concerns regarding increasing the tax burden on non-workers, suggests that alternate funding sources to a VAT increase should also be considered to fund SSC reductions.

JEL classification: H21, H23, H24, H55

Keywords: Social security contributions, consumption taxes, VAT, work incentives.

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Le remplacement des cotisations de sécurité sociale par des impôts sur la consommation : incidence sur l'incitation des salariés titulaires de faibles revenus à travailler

Ce document étudie le bien-fondé des mesures prises dans 13 pays européens de l'OCDE pour renforcer l'incitation au travail des salariés à faibles revenus par un transfert partiel de la charge fiscale des cotisations de sécurité sociale (CSS) vers les impôts sur la consommation (plus précisément la TVA). Les résultats de simulations fondées sur des données microéconomiques obtenues à la suite d'enquêtes sur les budgets des ménages montrent que ces réformes renforcent l'incitation des titulaires de faibles revenus à travailler, aussi bien pour ce qui est du choix d'accepter un emploi que du nombre d'heures ouvrées. Cependant, ce renforcement sera généralement faible, dans la mesure où une partie de l'augmentation de la TVA restera à la charge des salariés à faibles revenus. Ce fait, combiné à la difficulté de cibler les réformes et aux problèmes d'équité que risque de poser l'augmentation de la charge fiscale pesant sur des non-salariés, montre qu'il serait préférable de rechercher d'autres sources que la TVA pour financer des réductions des CSS.

Classification JEL : H21, H23, H24, H55

Mots-clés : cotisations de sécurité sociale, impôts sur la consommation, TVA, incitation à travailler.

SHIFTING FROM SOCIAL SECURITY CONTRIBUTIONS TO CONSUMPTION TAXES: THE IMPACT ON LOW-INCOME EARNER WORK INCENTIVES

Alastair Thomas and Fidel Picos-Sánchez[1]

Introduction

Social security contributions (SSC), rather than general taxation, are used to fund the majority of social expenditure in most European OECD countries (OECD, 2007). These contributions are generally charged at flat or even regressive rates, and often only up to a contribution ceiling, resulting in a proportionately larger SSC burden being borne by low-income workers compared to higher earning workers. Indeed, in many countries low-income workers pay little or no personal income tax but face substantial SSC burdens. This creates a significant problem for countries wishing to raise the relatively low labour force participation rates of low-income workers that exist in most OECD countries. This paper investigates the merits of increasing work incentives for low-income workers by shifting part of the tax burden from SSC towards consumption taxes in 13 European OECD countries.

Shifting part of the funding of social expenditure from SSC to consumption taxes has been proposed in a number of countries,[2] and was recently implemented in Germany in 2007 (where a 1.15 percentage point reduction in both employee and employer unemployment insurance rates was fully funded by an increase in the standard VAT rate), and in Hungary in 2009 (where a five percentage point reduction in the employer SSC rate was fully funded by an increase in the standard VAT rate).

Determining the overall effect of these reforms on work incentives is complicated by the fact that a reduction in SSC and an increase in consumption taxes will have conflicting effects on work incentives. Reducing the SSC burden will improve work incentives for low-income workers. A reduction in employee contributions will do this immediately by lifting net take-home pay. The immediate effect of a reduction in employer contributions will be to increase labour demand, but in the longer term it is also likely to have a positive effect on work incentives (as at least part of the SSC reduction will likely be recouped by the worker in the form of a higher gross wage). However, to the extent that workers are motivated by what their income can buy them, rather than the income itself, a consumption tax increase will discourage work by reducing the consumption value of workers' net take-home pay.[3] Nevertheless, as the consumption tax base is likely to be broader than the SSC base (as it includes non-wage earners such as pensioners,

[1] OECD Centre for Tax Policy and Administration, and University of Vigo, respectively. Thanks to Bert Brys, Stéphane Buydens, Steven Clark, David Holmes, Stephen Matthews, Michael Sharratt, and participants at a labour market seminar hosted by the European Commission in June 2011 for their useful comments and suggestions. The assistance of the National Statistical Offices of Austria, Finland, France, Germany, Greece, Hungary, Ireland, Luxembourg, the Netherlands, Poland, the Slovak Republic and Spain, and of Eurostat, in obtaining Household Budget Survey microdata is gratefully acknowledged. Particular thanks are due to Peter-Paul Borg of Eurostat. Funding from the European Commission is also gratefully acknowledged.

[2] See, for example, Besson (2007) for France.

[3] Note that it is possible that some degree of money illusion may exist reducing the impact of consumption taxes on labour supply behaviour.

beneficiaries and capital income earners), the overall effect of the reform on the work incentives of wage earners is likely to be positive. Furthermore, the reforms can be expected to have an additional positive effect on work incentives via the negative impact of an increase in consumption taxes on the consumption value of any non-labour income a worker may have.[4]

In addition to the potential improvement in work incentives, an employer SSC reduction funded by a VAT increase can act as a fiscal devaluation with positive effects on economic growth, at least in the shorter term (IMF, 2011). Meanwhile, an employer SSC reduction may lower unemployment in some countries, particularly amongst low-skilled workers at risk of being priced out of employment by the combination of high wage floors (due, e.g., to generous minimum wage levels or unionised bargaining) and substantial employer SSC (see OECD, 2011a).

However, such reforms may also have significant distributional consequences. First, consumption taxes are often considered to be regressive in nature. This may result in low-income workers bearing a disproportionate amount of the tax increase (potentially also reducing the work incentives of low-income workers). Secondly, increasing the tax burden on non-workers such as pensioners and beneficiaries, without compensatory increases in pension and benefit levels may be perceived as unfair. If compensatory adjustments were made, though, these would then reduce the incentives created for the unemployed to move into the workforce.

In order to analyse the overall effect of a shift from SSC to consumption taxes on the work incentives of low-income workers, and on income redistribution, we need to consider the effect of both SSC and consumption taxes on the tax burden faced by workers at different income levels. We do this by constructing average and marginal "combined" tax wedges, and comparing pre- and post-reform wedges. The average combined tax wedge measures the overall tax burden borne by a worker due to personal income taxes, SSC, and consumption taxes (as a proportion of total labour costs).[5] It provides a measure of the combined effect of the reforms on the incentive to participate in the workforce, as well as indicating the distributional impact of the reforms.[6] The marginal combined tax wedge measures the same tax burden, but in relation to a small increase in total labour costs. It provides a measure of the combined effect of the reforms on the incentive to work longer or harder (e.g. by working more hours each week) once already in employment. The tax wedge calculations are based on the OECD *Taxing Wages* models, augmented by a microsimulation model of consumption taxes.

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[4] However, with the exception of second earners, a low-income worker is unlikely to have substantial, if any, non-labour income.

[5] It should be noted that, unlike an income tax, payment of SSC generally entitles, or provides increased entitlement, to certain future benefits (e.g. pension payments, unemployment, health or disability insurance). Depending on the degree of the linkage between payment of SSC and the expected future benefits, SSC may, to some extent, induce a smaller behavioural response to that generated by an income tax. The analysis of the combined tax wedge abstracts away from this possibility.

[6] Where the average combined tax wedge decreases we can conclude that the reform has increased the incentive to participate in the workforce. Note, however, that even if the average combined tax wedge increases, it is still possible for the reform to encourage some non-workers to enter the workforce. For example, as noted by Picos-Sánchez (2009), consumption taxes may have little impact on the decision of someone chosing between working and claiming an unemployment benefit. What will likely matter most to them is how the reform alters the relative level of consumption in the two scenarios – which the consumption tax increase is unlikely to change (as it will have a similar proportional effect on consumption in either scenario). However, the reduction in SSC will increase the relative level of consumption available in-work compared to that available on the unemployment benefit, thereby encouraging participation.

The OECD *Taxing Wages* models calculate average and marginal income tax wedges (including personal income taxes and SSC, but not consumption taxes) faced by eight different hypothetical family types (defined by income level, marital status and number of children), in a common framework enabling cross country comparison. To extend these models to also include consumption taxes we develop a microsimulation model that uses expenditure microdata from household budget surveys to simulate consumption taxes for families with similar characteristics to the eight *Taxing Wages* family types. This develops further the approach taken by Picos-Sanchez (2009). These consumption tax results are then combined with the *Taxing Wages* results to produce the combined (income plus consumption) tax wedges. The use of microdata ensures that the heterogeneity of consumption patterns amongst different family types is accounted for.[7] However, it also limits the analysis to 13 European OECD countries for which expenditure microdata has been obtained.

We simulate two simple hypothetical reforms – a five percent reduction in all SSC rates fully funded by an increase in the standard VAT rate, and the same five percent SSC rate reduction funded by increasing the reduced rate (or super reduced rates, if applicable) of VAT. SSC thresholds are not adjusted, nor are VAT zero-rated or exempted goods and services.

While the simulation results vary significantly across countries, family types and income levels, both reforms will, in almost all cases, lead to a small increase in the work incentives of low-income workers at both the participation and hours-worked margins. However, the results also suggest that the simulated reforms are often not well targeted at low-income workers. Indeed, average combined tax wedges fall right across the income distribution in almost all cases – and sometimes to a greater extent for high-income workers than low-income workers. The results suggest little scope for targeting reforms using the VAT increase, however targeting can be improved by focusing the SSC reduction specifically at low-income workers. However, the small gain in work incentives, combined with difficulty targeting the reforms and potential equity concerns, suggest that alternate funding sources to VAT should also be considered to fund SSC reductions.

This paper proceeds as follows: section 1 outlines the consumption tax microsimulation model. Section 2 then explains how this model is incorporated into the *Taxing Wages* framework in order to calculate the combined (income plus consumption) tax wedges. Sections 3 and 4 present the combined tax wedge results for the two revenue-neutral reforms shifting from SSC to VAT. Section 5 provides some concluding comments.

1. The consumption tax microsimulation model

This section outlines the consumption tax microsimulation model, discussing first the data used, then the calculation of taxes, and finally the underlying assumptions and limitations of the model.

1.1. Data

The microsimulation model uses expenditure microdata from household budget surveys (HBSs) to model consumption taxes. The HBSs are sample surveys of households carried out periodically by National Statistical Offices. They provide detailed information on household consumption expenditure on goods and services, possession of durable goods and housing. They also offer demographic and socio-economic characteristics, including income (which enables the data to be linked with the *Taxing Wages* models).

[7] An alternative approach to calculate a combined tax wedge is to use macro data from national accounts. While useful to consider various issues, such measures are not ideal for considering labour supply decisions of workers. This is because of the heterogeneity of the workforce – that is, different taxpayers will face different tax burdens depending on their income and family circumstances, and this detail is lost in the aggregation process.

To enhance consistency across countries, we use standardised Eurostat-format HBS microdata.[8] This microdata is not generally publically available, however data has been provided specifically for this project by the respective statistical offices of 12 countries, either directly or with the assistance of Eurostat. Additionally, publically available data for the UK has been obtained and converted into Eurostat format. The Eurostat-format HBS microdata is provided to Eurostat on a five-year cycle, with the most recent provision being in 2005. The data in this cycle relates to various years from 2003 to 2006. The countries for which data have been obtained (with year in parenthesis) are: Finland, France (2006); Hungary, Luxembourg, Poland, Slovak Republic, Spain, the UK (2005); Austria, Greece, Ireland, the Netherlands (2004); and Germany (2003).

1.2. Calculation of taxes

Three types of taxes are simulated: VAT, ad-valorem excise duties, and ad-quantum excise duties. The model is constructed by matching expenditure from the HBS data to its corresponding tax rates (VAT and excise duties). A microsimulation program then calculates the amount of VAT and excise duties paid by each household by applying the tax rates to the corresponding expenditure amounts. Where excise duties are levied, the simulation order is: ad-quantum excises, then ad-valorem excises, and finally VAT. This is the approach taken by the countries covered in the paper and means that each tax base includes the tax amounts of the previous tax(es).

The model simulates two scenarios: one with the current tax rates,[9] and one with "new" rates enabling estimation of the effect of a tax change on the consumption tax burden, both on individual households and in aggregate.

To obtain the aggregate revenue figures, the taxes paid by each household are adjusted according to population weights and then aggregated. However, the consumption tax revenue simulated from the weighted household samples does not correspond exactly with the consumption tax revenue actually collected in the corresponding year (in general it is underestimated).

There are four main reasons for the inaccuracy of the microdata: first, the underlying quality of the microdata results in expenditure often being underestimated (and underestimated to different extents across expenditure types). Second, some inaccuracy arises from the imperfect application of VAT and excise rates to expenditure (this is discussed in more detail in section 1.3). Third, fraud is not simulated, resulting in some overestimation of revenue. Finally, only consumption taxes paid by households are simulated – meaning that VAT paid by the public sector, charities and businesses are not accounted for. As businesses will normally pass on VAT to the final consumer this is generally not a problem. However, annual revenue figures may include some VAT paid by businesses that has not yet been passed on to the consumer (and not yet claimed back by the business) and this VAT will not be simulated by the model. Additionally, the modelling of exemptions as zero rates (see also section 1.3) results in some tax that is 'imbedded" in exempt goods not being simulated in the model.

To obtain accurate aggregate revenue figures (necessary to simulate revenue neutral reforms), a two step correction procedure is undertaken. First, aggregated expenditure is adjusted to match expenditure figures

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[8] Additionally, this homogenised format enables a standard model to be developed and applied to each country, rather than requiring separate models to be developed for each country.

[9] Current tax rates have been taken from the OECD *Consumption tax trends* and EC *VAT Rates Applied in the Member States of the European Union* publications.

from OECD National Accounts data.[10] To account for variation across different types of expenditure, this correction is done separately for expenditure grouped at the 3-digit COICOP[11] code level, and before the relevant tax rates are applied to the grouped expenditure. Secondly, the final revenue figure calculated from the application of the relevant tax rates to the adjusted expenditure levels is itself adjusted to match total consumption tax revenue figures for the applicable year (as reported in OECD *Revenue Statistics*).[12] Note that these adjustments are only made to the aggregate figures, not to the individual household figures that are used to calculate the tax wedge results.

1.3. Assumptions and limitations

The calculations are based on a number of assumptions and have several limitations. These are discussed below.

1.3.1. Behavioural responses

The modelling of tax changes is static – that is, no behavioural responses are taken account of when modelling "new" taxes. Effectively, this assumes that demand for each product is perfectly inelastic, and so the entire burden of any tax increase is borne by the consumer. An implication of this is that consumers spend more money post-reform than pre-reform (they must either save less or borrow more).

This assumption means that the modelling of large changes in consumption tax rates (where significant responses in consumption behavior are likely) may produce inaccurate results. However, the static modelling can still be expected to be accurate when considering small changes in consumption tax rates where behavioural responses are more likely to be small. As such, we only use the modelling to consider small changes in SSC and consumption tax rates.

1.3.2. Excise duties

Excise duties pose a modelling difficulty as they are generally based on quantity rather than value (i.e. ad-quantum rather than ad-valorem). In the absence of quantity data, we use average prices (generally provided by National Statistics Offices) for each product to estimate quantities from the HBS expenditure data in order to simulate these taxes.[13] Assuming both average prices and expenditure information are accurate, aggregate tax figures will also be accurate. However, some inaccuracy may result at the individual level. Specifically, for households that consume products that are more (less) expensive than average we will simulate higher (lower) taxes than they actually pay because we will be assuming that they consume higher (lower) quantities than they actually do.[14]

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[10] See OECD (2009).

[11] Classification of Individual Consumption According to Purpose. For more detail, see: http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=5&Lg=1.

[12] This correction effectively assumes that all revenue not simulated by the microsimulation model is shared among the different rates in exactly the same way as in the microdata.

[13] Taking the monetary expenditure as a starting point, this is divided by the average price to obtain an estimate of the quantity purchased. The ad-quantum rate is then applied to this estimated quantity to estimate the tax paid.

[14] Note that due to a lack of data, excise duties on cigars and roll tobacco are not simulated for Germany. Similarly, excise duties on cigarettes in Hungary, and on cigars and "other tobacco" in the Slovak Republic are not simulated. For Finland, Ireland and the UK it was not possible to obtain average prices for the consumption category "other wine". In these countries the average price for "wine" is applied to "other wine" to estimate quantity.

1.3.3. Bars and restaurants

The HBS data does not differentiate between food and alcohol consumed in bars and restaurants. As a result, excise duties on alcohol consumed in bars and restaurants are not able to be simulated. This will result in an underestimation of total excise duty revenue as a significant amount of alcohol consumption is likely to occur in bars and restaurants.

1.3.4. VAT exemptions

Due to a lack of data, VAT exemptions are simulated as zero rates. However, as some revenue is collected through the VAT embedded in exempt goods and services (tax paid by sellers that is not refunded to them), this may also result in some underestimation of actual VAT revenue. That said, this is likely to have only a small impact on the simulation results as most exempted economic sectors are services (so limited VAT is paid as the main input is labour).

1.3.5. Existing savings

An increase (decrease) in VAT or excises can effectively act as a tax (subsidy) on the stock of existing savings by reducing (increasing) its consumption value. However, this effect will only be reflected in the HBS data for that part of existing savings that has funded current consumption, whereas the majority of many peoples' existing savings will fund future consumption instead. As such, the modelling will generally only partially account for this effect. That said, where a worker continuously funds a similar proportion of their consumption out of existing savings then the annual effect of a VAT or excise tax reform on the consumption value of existing savings will be reflected in the HBS data. Note also that, as higher income workers tend to save more than lower income workers, this effective tax (subsidy) on the stock of existing savings will tend to have a progressive (regressive) effect.

1.3.6. Consumer durables and house purchases

The modelling excludes expenditure on consumer durables. Given the high cost and infrequent purchase of consumer durables, their inclusion may result in a misleadingly high level of expenditure in families that have undertaken such purchases during the survey period, as compared to families that have not. For example, a car is likely to be owned for several years before being replaced, so it would be relatively arbitrary whether or not a car was purchased in the survey period (and therefore was included as expenditure). While the apportionment of the cost of a car would reduce any overstatement of expenditure (or an understatement for families that made such purchases outside the survey period), it would require accurate information on length of ownership and expenditure on cars (both purchased within and outside the survey period), and is therefore not a feasible option.

A similar issue arises with the purchase of housing which is subject to VAT in some countries (for example, Spain). As data on the purchase of housing is not available, we also exclude housing from the modelling.

1.3.7. Fuel for cars

Finally, the HBS microdata only has one variable for fuel for cars, so expenditure on petrol and diesel cannot be differentiated. In order to simulate excise duties we therefore assume that the expenditure on each type of fuel is proportional to the share of each type of car sold in 2006.[15] For countries where this information is not available (Luxembourg and the Slovak Republic) we assume that all fuel is petrol.

[15] This is based on data obtained from: http://www.greencarcongress.com/2006/01/diesel_auto_sal.html.

2. Constructing a combined tax wedge within the OECD *Taxing Wages* framework.

This section explains how the consumption tax microsimulation model is incorporated within the OECD *Taxing Wages* framework in order to calculate the combined (income plus consumption) tax wedges. The approach taken broadly follows that of Picos-Sanchez (2009). We first outline the OECD *Taxing Wages* models, before discussing the calculation of the average and marginal combined tax wedges.

2.1. The OECD Taxing Wages models

The OECD *Taxing Wages* models use the parameters of tax systems in OECD countries to provide comparative information on average and marginal tax rates and tax wedges for eight different hypothetical family types. The *Taxing Wages* family types vary by income level, number of children, and marital status. To better enable international comparison, income levels are based on a percentage of the average wage in the particular country.[16] The eight family types are as follows:

1. Single individual with no children, earning 67% of the average wage;
2. Single individual with no children, earning 100% of the average wage;
3. Single individual with no children, earning 167% of the average wage;
4. Single parent with two children, earning 67% of the average wage;
5. One-earner married couple with two children, earning 100% of the average wage.
6. Two-earner married couple with two children, one partner earning 100% of the average wage and the other partner earning 33% of the average wage;
7. Two-earner married couple with two children, one partner earning 100% of the average wage and the other partner earning 67% of the average wage;
8. Two-earner married couple with no children, one partner earning 100% of the average wage and the other partner earning 33% of the average wage.

As noted earlier, the "average income tax wedge" measures the wedge created by personal income tax and SSC between the take home pay of a worker and the total labour costs faced by the employer. It is defined as follows:

$$\frac{\text{personal income tax + employee SSC + employer SSC – income/family-based cash transfers}}{\text{gross wage income + employer SSC}}$$

The "marginal income tax wedge" makes the same calculation, but in relation to a one currency unit increase in gross wage income.[17]

2.2. Constructing an average "combined" tax wedge

To construct the average combined (income plus consumption) tax wedge, the consumption tax microsimulation model is used to calculate an average consumption tax wedge faced by households closely matching the family type characteristics of each of the eight *Taxing Wages* family types.

[16] The average wage in each country is calculated for male and female adult full-time manual and non-manual workers in industry sectors B-N as defined in the International Standard Industrial Classification of All Economic Activities (ISIC), revision 4 (or the roughly equivalent sectors C-K of ISIC rev 3.1). For a detailed description of the *Taxing Wages* methodology see OECD (2011b).

[17] Note that this means the denominator in the marginal tax wedge calculation will be greater than one as it will also include the marginal increase in employer SSC resulting from a one currency unit increase in gross wage income.

This family type matching process requires a trading-off of the precision of the match (between the family types in the HBS data and each *Taxing Wages* hypothetical family type) and sample size. For example, restricting the sample to only taxpayers earning the exact same level of income as each *Taxing Wages* family type would result in a very small sample size, and less reliable estimates of consumption patterns and consumption tax burdens. As such, some criteria have been relaxed to ensure a reasonable sample size for each family type. Table 1 details the differences between the *Taxing Wages* definitions and the criteria applied to the HBS data. The most important of these is the use of income bands around the level of income specified for each family type.[18]

Table 1: Changes in family type definitions

Concept		**Types of family affected***	**Original *Taxing Wages* criteria**	**Criteria for the HBS households**
Non-monetary characteristics	Adults	5-8	Two married adults	Not necessarily married
	Children	4-7	Two children between but not including 5 and 12	Two children under 19
	Working status of reference person	All	Employee working in one of industry sectors B-N of ISIC rev. 4	Employee, employer or self-employed
	Working status of the spouse	5	No wage	Not working
		6-8	Employee working in one of industry sectors B-N of ISIC rev. 4	Employee, employer or self-employed
Monetary characteristics	Income type	All	Wages, assuming the household does not have other sources of income	All household income.
	Net income	All	Take-home pay	±25 percent around TW take-home pay
	Income share between spouses	5	100/0 of gross wage	Spouse not working
		6 and 8	100/33 of gross wage	Both spouses working, all income shares are admitted
		7	100/67 of gross wage	

*See Section 2.1. for family type definitions.

Once the microsimulation model has selected the appropriate family types, their tax burden is calculated and expressed as a percentage of total labour costs to give an average consumption tax wedge faced by each household.[19] These individual wedges are then averaged across the sample to provide an estimate of the average consumption tax wedge for the corresponding *Taxing Wages* family type. This average consumption tax wedge is then simply added to the average income tax wedge (as they have the same denominator) to calculate the average combined (income plus consumption) tax wedge.

2.3. Constructing a marginal "combined" tax wedge

Constructing a marginal combined (income plus consumption) tax wedge poses more difficulty than constructing an average wedge. As with the average income tax wedge, the marginal income tax wedge can

[18] While Picos-Sanchez (2009) used varying non-overlapping income bands, we use constant (and potentially overlapping) income bands. Gross income is not available in the HBS data, hence net income is used for this matching process. However, this ensures that each household has the same amount of income available for consumption (which may not occur if gross income was used as different households may face slightly different tax burdens, and hence have different net incomes). Results, however, are reported in terms of the level of gross income of the hypothetical *Taxing Wages* family type.

[19] As the HBS data does not provide sufficient information to calculate the total labour cost applicable to each household, the consumption tax burden is first expressed as a proportion of net income and then multiplied by the ratio between net income and total labour costs for the relevant *Taxing Wages* family type. The underlying assumption in this calculation is that the HBS households have the same relationship between net income and total labour costs as the *Taxing Wages* family types.

be calculated using the *Taxing Wages* models. However, because we have no data on marginal household expenditure, the microsimulation model can not be used to explicitly calculate a marginal consumption tax wedge. Instead, we use the average consumption tax wedge as a proxy for the marginal consumption tax wedge. The same matching process as outlined above is then followed to calculate the marginal combined tax wedge.

While imperfect, as long as the consumption preferences that determine total consumption are similar to consumption preferences for marginal consumption, then the average consumption tax wedge will be a reasonable proxy for a marginal consumption tax wedge. This appears plausable for low-income families who may spend the bulk of their income on necessities. However, for higher income earners a greater proportion of marginal income may be spent on luxury items, which may be subject to higher VAT or excise rates than items consumed on average. Additionally, marginal income is more likely to be saved than infra-marginal income. As such, the marginal wedge results should be considered with some caution, and as being indicative rather than definitive of the marginal tax wedge faced.

3. Combined tax wedge results

Before considering the two policy experiments, we first present the basic results from the tax microsimulation model. Table 2 presents the consumption tax wedge results for the eight *Taxing Wages* family types, while tables 3 and 4 present the average and marginal combined tax wedges respectively. (Additional results, including average and marginal income tax wedges, are presented in tables A1 and A2 in the annex). Recall that the results are for the following years: 2006 – Finland, France; 2005 – Hungary, Luxembourg, Poland, Slovak Republic, Spain, UK; 2004 – Austria, Greece, Ireland, Netherlands; 2003 – Germany.

Table 2 shows that consumption tax wedges vary considerably across countries and family types. For example, a single individual earning 67 percent of the average wage faces a consumption tax wedge ranging from just 5.95 percent in Luxembourg to 12.52 percent in the Netherlands. In general, consumption tax wedges tend to be lower for higher income families than poorer families. For example, the consumption tax wedge faced by a single individual decreases from an average of 8.89 percent at earnings equal to 67 percent of the average wage, to 7.45 percent at 100 percent of the average wage, and 6.04 percent at 167 percent of the average wage. This regressivity is largely due to the greater relative level of savings (and hence less consumption) undertaken by higher income families.[20] Consumption tax wedges also tend to be greater for families with children than for those without. For example, with children, the consumption tax wedge faced by a single individual earning 67 percent of the average wage increases from an average of 8.89 percent to 10.54 percent. This is driven by the increased consumption undertaken in families with children than without.

Table 2: Average consumption tax wedge

Famly type	AUT	DEU	ESP	FIN	FRA	GBR	GRC	HUN	IRL	LUX	NLD	POL	SVK
Single, 0 children, 67% AW	9.24	6.71	6.92	8.69	7.31	6.82	9.65	8.75	10.31	5.95	12.52	11.26	11.38
Single, 0 children, 100% AW	8.01	5.48	5.30	7.33	5.91	5.41	7.88	7.66	8.45	5.68	10.14	10.00	9.65
Single, 0 children, 167% AW	6.78	4.06	4.39	6.09	4.58	4.74	7.02	6.80	5.47	5.09	6.02	8.76	8.76
Single, 2 children, 67% AW	11.78	8.06	9.08	10.71	10.25	9.56	10.12	10.31	11.92	8.46	11.62	11.61	13.53
1 earner, 2 children, 100% AW	10.91	7.73	8.52	12.00	8.04	7.94	9.89	9.81	12.47	8.08	13.29	10.71	12.89
2 earner, 2 children, 100/33% AW	8.73	6.32	7.11	10.04	7.18	6.91	8.24	9.02	10.63	7.63	16.96	10.15	11.08
2 earner, 2 children, 100/67% AW	8.07	5.35	8.41	9.36	6.33	6.58	7.43	8.54	11.33	7.25	11.95	9.61	15.07
2 earner, 0 children, 100/33% AW	8.21	5.96	6.46	8.42	6.65	6.56	7.24	7.98	8.37	7.00	13.34	10.07	10.60

[20] Unless bequeathed at death, savings will be spent eventually and therefore be subject to consumption taxes.

When adding the consumption tax wedge to the income tax wedge, we see that the overall tax burden on labour tends to be substantial, even for low-income families. For example, a single individual (without children) earning 67 percent of the average wage faces an average combined tax wedge ranging from 33.02 percent in Ireland to 54.65 percent in Germany. Meanwhile, marginal combined tax wedges for the same worker range from 43.49 percent in Ireland to 70.99 percent in France. The progressivity built into most personal income tax schedules increases the tax burden at higher income levels, although this is moderated to an extent by the regressive nature of the consumption tax wedges. Meanwhile, the targeting of support to families with children can be seen, in particular, in the lower average tax wedges faced by single parents (though in some instances they face higher marginal tax wedges due to the withdrawal of income targeted support).

Table 3: Average combined (income plus consumption) tax wedge

Famly type	AUT	DEU	ESP	FIN	FRA	GBR	GRC	HUN	IRL	LUX	NLD	POL	SVK
Single, 0 children, 67% AW	53.20	54.65	42.14	47.60	53.21	37.39	45.52	51.89	33.02	34.71	53.38	48.80	46.66
Single, 0 children, 100% AW	56.12	58.68	44.04	51.35	56.08	39.36	48.82	58.77	39.17	40.42	48.96	48.69	47.94
Single, 0 children, 167% AW	57.17	61.74	46.73	55.96	57.80	42.47	54.55	63.48	44.16	47.03	48.49	48.39	49.09
Single, 2 children, 67% AW	38.28	40.76	38.63	37.41	47.51	23.28	45.22	36.44	13.55	13.52	34.21	46.73	35.60
1 earner, 2 children, 100% AW	47.32	43.59	41.42	49.95	49.91	35.84	52.09	50.49	25.18	18.97	42.82	47.78	36.00
2 earner, 2 children, 100/33% AW	46.11	47.73	42.23	46.42	46.91	32.86	48.49	49.05	26.18	23.18	49.18	47.67	40.02
2 earner, 2 children, 100/67% AW	48.38	50.92	44.10	47.66	50.64	36.51	47.82	50.18	32.93	28.04	48.13	47.84	46.70
2 earner, 0 children, 100/33% AW	53.22	53.83	42.59	49.36	51.08	37.08	47.45	55.77	29.77	34.11	50.10	47.60	46.33

Table 4: Marginal combined (income plus consumption) tax wedge

Famly type	AUT	DEU	ESP	FIN	FRA	GBR	GRC	HUN	IRL	LUX	NLD	POL	SVK
Single, 0 children, 67% AW	64.75	67.55	56.36	63.09	70.99	47.43	53.90	61.19	43.49	47.40	68.27	52.29	55.80
Single, 0 children, 100% AW	69.06	72.35	50.80	61.73	61.74	46.02	61.96	84.82	61.50	58.44	60.87	51.04	54.07
Single, 0 children, 167% AW	46.61	55.23	32.39	65.03	64.22	52.43	67.66	70.47	55.18	57.85	58.02	49.80	51.53
Single, 2 children, 67% AW	67.29	66.46	50.59	65.11	67.88	82.96	54.36	62.75	45.10	30.52	63.67	52.65	57.30
1 earner, 2 children, 100% AW	71.96	64.55	54.03	66.40	56.36	48.54	63.98	86.96	45.65	43.07	64.02	51.75	56.66
2 earner, 2 children, 100/33% AW	69.79	67.01	52.61	64.44	55.50	47.51	62.32	86.17	43.82	45.84	67.69	51.18	54.85
2 earner, 2 children, 100/67% AW	69.12	69.06	53.91	63.76	58.36	47.19	61.52	85.69	64.38	51.93	62.68	50.65	58.85
2 earner, 0 children, 100/33% AW	69.26	66.80	51.97	62.81	58.68	47.16	61.32	85.14	41.56	45.22	64.07	51.11	55.01

When comparing these results to those obtained by Picos-Sánchez (2009), we see some variation in consumption tax wedges and average combined tax wedges for individual family types, although the overall magnitudes and patterns are generally similar. (Picos-Sánchez did not estimate marginal wedges). These small variations are to be expected given differences in the methodologies, and particularly given that the HBS data relates to different years for four of the six countries covered by both studies. However, one surprisingly large difference is noteable in the Slovak Republic given that both studies use HBS data for 2005. Results are similar for most family types, but not for a two-earner couple with two children (earning 100 percent and 67 percent of the average wage, respectively), where we find a 4.37 percentage point higher consumption tax wedge than is found by Picos-Sánchez. The wider income band (and consequently far greater sample size) that we use for our calculation may largely explain this difference.

Overall, the substantial average and marginal tax burdens being imposed on low-income workers emphasise the significant disincentives imposed by tax systems to both participate in the workforce and to work longer or harder once in employment.

4. Hypothetical reforms from SSC to VAT

To examine the effect on the work incentives of low-income workers of a revenue neutral shift from SSC to consumption taxes, we simulate two tax reforms: first, a five percent reduction in all SSC rates fully funded by an increase in the standard VAT rate ("standard rate reform"); and second, a five percent reduction in all SSC rates funded by an increase in the reduced VAT rate ("reduced rate reform").[21]

The five percent reduction in SSC rates is applied to all employer, employee and self-employed SSC rates (although self-employed workers are not considered in the combined tax wedge calculations). SSC-free allowances, SSC thresholds and contribution ceilings (where present) are not altered. This means that a five percent SSC rate reduction will reduce total SSC revenue by five percent. As such, the resulting reduction in tax revenue can be calculated directly from aggregate SSC revenue figures as reported in OECD *Revenue Statistics*.[22]

The necessary increase in VAT rates (to ensure revenue neutrality) is determined on an iterative basis using the consumption tax microsimulation model. Regarding the reduced rate reform, if a country also imposes VAT on some goods and services at a super-reduced rate, then this rate is increased first before the reduced rate is itself increased. If sufficient revenue has not been generated from increasing the super-reduced and reduced VAT rates to the level of the standard rate, then all three rates are increased until revenue neutrality is achieved. Note that the hypothetical reforms do not affect zero-rated or exempted goods and services.

The combined tax wedges resulting from the new SSC and VAT rates are then compared with the tax wedges under the pre-reform SSC and VAT rates. However, in the Slovak Republic only the standard rate reform is simulated. This is because the Slovak Republic does not impose VAT at a reduced rate on any goods or services.[23]

The five percent reduction in SSC rates is chosen for two reasons. First, a larger reform would result in some inaccuracy in the static microsimulation model's estimation of the necessary VAT rate increase to provide revenue neutrality. This is because a large VAT increase would likely create a significant response in consumption behaviour. By limiting the size of the reform we limit the extent of any inaccuracy.[24] The second reason for choosing a marginal reform is that this is the likelier type of reform to occur in practice. As noted earlier, recent examples of marginal shifts from SSC to consumption taxes took place in Germany in 2007 and in Hungary in 2009. These reforms reduced the SSC burden on a single individual earning the average wage by approximately five and ten percent, respectively.[25] In contrast, larger shifts in countries' tax mixes are relatively rare.

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[21] For clarity: this is a five *percent* reduction in all SSC rates, not a five *percentage point* reduction.

[22] In the Netherlands, a small lump-sum SSC of EUR 308 is also payable. The simulated reforms reduce this payment by five percent along with SSC rates. In France, self-employed workers must also pay a small lump-sum amount of SSC, along with ordinary SSC. This is also assumed to be reduced by five percent.

[23] As with other countries, the Slovak Republic does impose zero rates on a number of goods and services. For consistency with the simulated reforms in the remaining countries these zero rates are not altered.

[24] The microsimulation model effectively simulates the short-run impact of a reform. However, with a marginal reform the short-run and long-run impacts are likely to be similar. A possible extension to this work would be to incorporate an estimated behavioural response (based on country-specific elasticity estimates) into the model, thereby enabling the analysis of larger shifts in the tax mix. This, however, is left to future work.

[25] In Germany, employee and employer SSC rates were reduced, in total, by 2.3 percentage points, which equates to approximately five percent of the total employee plus employer SSC due on a single individual earning the average wage. In Hungary, the five percentage point employer SSC reduction, which was initially targeted

The change in tax wedge results for the two reforms are presented in two parts. We first focus on the *Taxing Wages* family types, presenting results for all eight family types. Following this, the income restrictions imposed by the *Taxing Wages* family types are relaxed to analyse the effect on the combined tax wedges of the two simulated reforms across different income levels. This enables the degree of targeting of the reforms to be examined in more detail.

4.1. The Taxing Wages family types

Tables 5 and 6 present the changes in the average and marginal combined tax wedges for the eight *Taxing Wages* family types for both standard rate and reduced rate reforms. More detailed results including the pre- and post-reform combined tax wedges are presented in tables A3 and A4 in the annex.

For both standard and reduced rate reforms, the results show a reduction in both average and marginal tax wedges for most family types in all 13 countries. The main exceptions are Austria, Finland and the Netherlands – where, for a number of family types, the marginal combined tax wedge will increase under one or both reforms; and in Austria where, for two family types, the average combined tax wedge will increase under the reduced VAT rate reform. That said, in the Netherlands low-income workers still benefit from a reduction in the marginal combined tax wedge, even though middle- and high-income family types face an increase. High-income single individuals in Germany and Spain also face an increase in the marginal combined tax wedge. Overall, the results show an increase in work incentives at both participation and hours-worked margins for the majority of families, including almost all low-income families.[26] Note that, as well as showing an increase in incentives for non-workers to enter the workforce, the reduced average tax wedge results also point to an income effect that will discourage work effort by those already in employment. However, empirical evidence suggests that this negative income effect is likely to be small relative to the positive substitution effect created by the reduction in the marginal tax wedge.[27]

Nevertheless, the results imply some limitations regarding the simulated reforms. First, the size of the tax wedge reductions is, in general, quite small. This is because a large part of the original SSC burden is still borne by workers due to an increased VAT burden, so the extent of the improvement in work incentives from the reforms is likely to be relatively limited. Second, the reductions vary considerably across countries and family types. For example, a single individual earning 67 percent of the average wage will face a reduction in the average combined tax wedge of 1.55 percentage points under the reduced rate reform in the Netherlands, but a reduction of only 0.15 percentage points under the same reform in Finland.

Furthermore, despite the increases in some marginal tax wedges at higher income levels, the fact that average tax wedges fall for almost all family types in all countries suggests that the reforms are not well targeted at low-income workers. This also implies that the tax burden is being shifted from workers to non-

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specifically at low-income workers, amounted to approximately 3.5 percent of total employee plus employer SSC (including employer payroll tax) due on a single individual earning the average wage. However, in 2010 the cut was extended to all workers, increasing the reduction to approximately 10 percent of total SSC.

[26] Note that the results for single parents with two children should be regarded with some caution as, with the exception of France, Germany, Poland and the UK, consumption tax microsimulation results are based on samples of less than 30 families. The extreme case is the Netherlands (which shows the largest reduction in the tax wedge), where the simulation is based on a sample of just four families. For the other seven family types, sample sizes are generally over 100, and often in excess of 200.

[27] Studies estimating labour supply elasticities are numerous. See Meghir and Phillips (2010) for a recent review of the empirical literature.

workers, such as the unemployed and pensioners, as opposed to high-income workers. This may create significant equity concerns. Additionally, it is possible that some of the burden may be faced by workers not captured by the eight *Taxing Wages* family types (i.e. workers with different income levels or family characteristics).[28]

The next section considers targeting in more detail by presenting tax wedge changes for the two simulated reforms across different income levels. The drivers of the results are also explored further.

[28] That is, the results are derived from a subset of the HBS microdata matching the *Taxing Wages* family type characteristics, so it is possible that other households, such as those with different income levels or with three or more children may face an increase in their consumption tax burden. The following section partially addresses this by providing results across different income levels. However, to fully account for this possibility would require the entire microdata to be examined. The Taxing Wages framework could not be used for such an analysis. Instead, a possible approach would be to use the microdata to analyse the effect on VAT borne by different income deciles pre- and post-reform. Such analysis is left for future work.

Table 5: Change in average combined (income plus consumption) tax wedge

Percentage point change

Famly type	AUT		DEU		ESP		FIN		FRA		GBR		GRC		HUN		IRL		LUX		NLD		POL		SVK	
	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.
Single, 0 children, 67% AW	-0.40	-0.28	-0.95	-1.01	-0.45	-0.50	-0.17	-0.15	-0.89	-1.05	-0.48	-0.35	-0.65	-0.83	-0.66	-0.64	-0.36	-0.45	-0.51	-0.16	-1.52	-1.55	-0.46	-0.49	-0.94	-
Single, 0 children, 100% AW	-0.35	-0.41	-0.96	-1.02	-0.51	-0.57	-0.19	-0.20	-0.84	-0.98	-0.56	-0.49	-0.61	-0.74	-0.64	-0.67	-0.37	-0.47	-0.42	-0.20	-1.06	-1.04	-0.50	-0.57	-1.00	-
Single, 0 children, 167% AW	-0.32	-0.50	-0.85	-0.90	-0.52	-0.62	-0.19	-0.20	-0.84	-0.95	-0.44	-0.42	-0.50	-0.66	-0.62	-0.74	-0.36	-0.43	-0.35	-0.23	-0.62	-0.57	-0.52	-0.65	-1.06	-
Single, 2 children, 67% AW	-0.38	0.27	-0.96	-1.01	-0.38	-0.49	-0.18	-0.35	-0.82	-1.03	-0.45	-0.18	-0.65	-0.71	-0.79	-0.60	-0.38	-0.55	-0.65	-0.27	-1.27	-1.09	-0.46	-0.34	-0.90	-
1 earner, 2 children, 100% AW	-0.28	0.07	-0.99	-1.03	-0.39	-0.38	-0.03	-0.34	-0.86	-0.93	-0.49	-0.41	-0.48	-0.66	-0.71	-0.54	-0.35	-0.53	-0.55	-0.09	-0.81	-0.78	-0.50	-0.43	-1.00	-
2 earner, 2 children, 100/33% AW	-0.51	-0.17	-1.01	-1.05	-0.47	-0.51	-0.10	-0.33	-1.02	-1.05	-0.48	-0.41	-0.64	-0.80	-0.72	-0.65	-0.31	-0.43	-0.46	-0.20	-1.01	-0.92	-0.52	-0.51	-1.09	-
2 earner, 2 children, 100/67% AW	-0.48	-0.24	-1.03	-1.07	-0.32	-0.45	-0.12	-0.32	-0.96	-1.01	-0.51	-0.47	-0.63	-0.77	-0.73	-0.68	-0.32	-0.45	-0.42	-0.19	-0.98	-0.97	-0.53	-0.56	-0.77	-
2 earner, 0 children, 100/33% AW	-0.48	-0.44	-0.98	-1.06	-0.51	-0.57	-0.17	-0.31	-0.95	-1.07	-0.48	-0.45	-0.70	-0.86	-0.70	-0.68	-0.35	-0.43	-0.44	-0.23	-0.99	-1.03	-0.53	-0.58	-1.05	-

Std./Red. = Increase in the standard/reduced VAT rate

Table 6: Change in marginal combined (income plus consumption) tax wedge

Percentage point change

Famly type	AUT		DEU		ESP		FIN		FRA		GBR		GRC		HUN		IRL		LUX		NLD		POL		SVK	
	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.
Single, 0 children, 67% AW	-0.27	-0.15	-0.83	-0.89	-0.28	-0.34	-0.03	-0.01	-0.27	-0.43	-0.62	-0.49	-0.56	-0.74	-0.58	-0.55	-0.36	-0.45	-0.43	-0.09	-1.45	-1.49	-0.44	-0.46	-0.80	-
Single, 0 children, 100% AW	-0.21	-0.26	-0.84	-0.90	-0.43	-0.49	-0.10	-0.11	-0.72	-0.86	-0.65	-0.58	-0.46	-0.59	-0.34	-0.37	-0.29	-0.39	-0.30	-0.07	0.12	0.14	-0.48	-0.55	-0.90	-
Single, 0 children, 167% AW	0.37	0.18	0.25	0.20	0.34	0.24	-0.10	-0.12	-0.72	-0.83	-0.17	-0.15	-0.36	-0.51	-0.55	-0.67	-0.21	-0.28	-0.30	-0.18	0.37	0.41	-0.52	-0.65	-0.97	-
Single, 2 children, 67% AW	-0.05	0.60	-0.73	-0.78	-0.24	-0.34	0.08	-0.09	-0.11	-0.32	-0.33	-0.06	-0.55	-0.61	-0.50	-0.31	-0.27	-0.45	-0.54	-0.17	-1.23	-1.05	-0.42	-0.30	-0.55	-
1 earner, 2 children, 100% AW	0.00	0.35	-0.81	-0.84	-0.24	-0.23	0.12	-0.19	-0.72	-0.79	-0.55	-0.47	-0.35	-0.53	-0.28	-0.12	-0.29	-0.46	-0.40	0.07	0.36	0.40	-0.47	-0.40	-0.67	-
2 earner, 2 children, 100/33% AW	-0.17	0.17	-0.84	-0.88	-0.33	-0.37	0.17	-0.06	-0.80	-0.84	-0.59	-0.53	-0.44	-0.60	-0.30	-0.23	-0.33	-0.46	-0.33	-0.06	0.16	0.26	-0.49	-0.48	-0.81	-
2 earner, 2 children, 100/67% AW	-0.22	0.02	-0.87	-0.91	-0.21	-0.34	0.03	-0.17	-0.78	-0.83	-0.60	-0.56	-0.48	-0.62	-0.32	-0.28	-0.20	-0.34	-0.27	-0.04	0.45	0.45	-0.51	-0.54	-0.56	-
2 earner, 0 children, 100/33% AW	-0.22	-0.19	-0.86	-0.95	-0.39	-0.45	-0.05	-0.19	-0.76	-0.88	-0.62	-0.59	-0.50	-0.66	-0.37	-0.35	-0.41	-0.48	-0.37	-0.17	0.18	0.15	-0.51	-0.55	-0.87	-

Std./Red. = Increase in the standard/reduced VAT rate

4.2. Extending the Taxing Wages family types

In this section we move beyond the eight standard *Taxing Wages* family types by considering the combined tax wedge at different income levels for both a single individual, and a one-earner couple with two children. We consider the income range from 50 to 250 percent of the average wage.[29]

The same methodology is adopted for the calculations as for those in the preceding section. That is, the consumption tax burden is estimated as the average consumption tax burden faced by households in the HBS surveys that earn income in a band (25 percentage points either side) around each percentage of the average wage from 50 to 250 percent. This means that the bands will overlap, with some new higher income households included, and some lower income households excluded from the calculations as the income level increases. These are once again then matched with the corresponding average and marginal income tax wedges from the *Taxing Wages* models to construct the average and marginal combined tax wedges.

Graphical results for each country are presented in figures A1 to A13 in the annex. The graphs present both the changes in the average and marginal combined tax wedges, and a breakdown of these results into the changes in the income tax and consumption tax wedges. Looking at the results as a whole, they are consistent with the preceding results for the *Taxing Wages* family types. That is, marginal tax wedges fall in almost all countries at low income levels, and rise in a small number of countries at higher income levels, while average tax wedges generally fall at all income levels. However, the graphical results illustrate more clearly the large extent to which the change in average and marginal tax wedges vary across income levels, and how this variation is driven by the differing impacts of the SSC reduction and the VAT increase.

In almost all countries the SSC reduction has a progressive impact – i.e. the reduction in SSC rates reduces both average and marginal combined tax wedges more for lower income workers than for higher income workers. Similarly, in almost all countries, both the standard and reduced VAT rate reforms result in the VAT increase being regressive – i.e. the increase in VAT rates raises the combined tax wedge more for lower income workers than for higher income workers. However, the extent differs greatly between countries producing often vastly different outcomes. Nevertheless, the reforms can be broadly summarised as producing one of three types of outcome:

- Effective at increasing work incentives for low-income workers and well targeted at this group.
- Effective at increasing work incentives for low-income workers but poorly targeted at this group.
- Ineffective at increasing work incentives for low-income workers.

We discuss the country results in terms of these three broad types of outcome below.

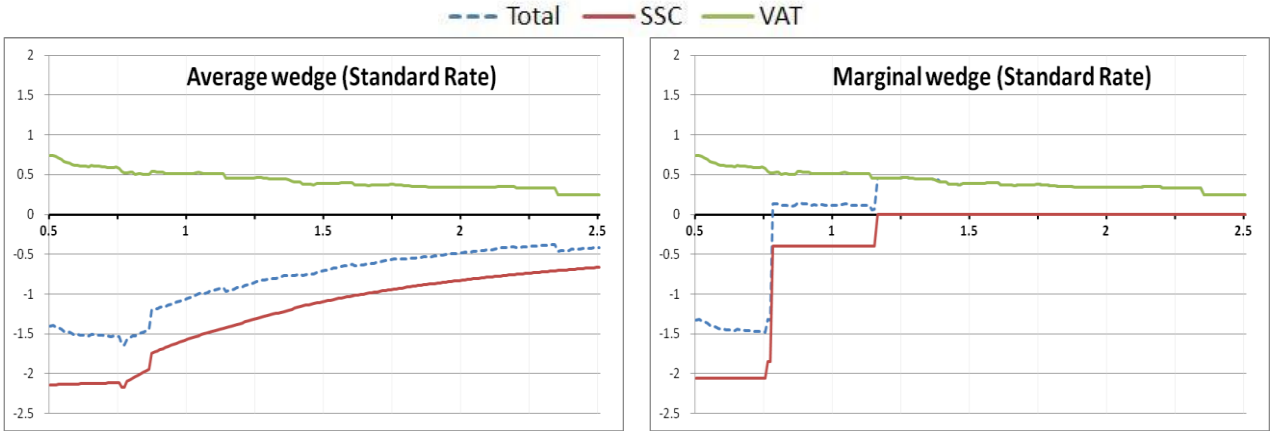
Effective and well targeted reforms

The Netherlands provides the clearest example of a reform that effectively increases work incentives for low-income workers, and does so in a relatively well targeted way. Other countries in this category are Germany, Luxembourg and Spain. In each of these countries, the reduction in SSC has a sufficiently progressive effect so as to reduce average and marginal tax wedges for low-income workers, but also to minimise the benefit to higher income workers. Figure 1 illustrates this result for the Netherlands. The figure presents the decomposition of the change in average and marginal tax wedges for a single individual without children under the standard rate reform.

[29] We set the lower income limit at 50 percent of the average wage because the *Taxing Wages* models may have some inaccuracy at lower income levels. See OECD (2011b) for more detail.

Figure 1: Decomposition of the change in combined tax wedge across income levels: Netherlands*

(Single individual, no children)



*Note: Horizontal axis measures income level in multiples of the average wage. Vertical axis measures the percentage point change in the tax wedge.

The highly progressive impact of the SSC reduction in the Netherlands is a result of the underlying regressive structure of SSC in the Netherlands. That is, because lower income workers face higher average and marginal SSC rates, our hypothetical five percent proportional SSC rate reduction will result in a greater reduction in the average and marginal income tax wedges for low-income workers than high-income workers. This regressivity is predominantly due to the low ceiling for employee and employer medical insurance contributions that substantially reduces the overall SSC rate (and hence the hypothetical reduction in SSC) at income levels above 86 percent of the average wage.[30] This can be clearly seen in the right hand panel of figure 1. Adding to this, the remaining SSC are subject to a ceiling at 116 percent of the average wage. Once above this ceiling, no SSC is paid at all, hence there is no reduction in the marginal income tax wedge above this point. Similarly, Germany, Luxembourg and Spain all impose upper ceilings on SSC that prevent any reduction in SSC at high income levels.

Given the corresponding increase in the consumption tax wedge, the result of these ceilings is to increase the combined marginal tax wedge for middle- and high-income workers. As such, the reform will increase work incentives for low-income workers (at both participation and hours-worked margins) partly at the expense of lowering work incentives for higher income workers (at the hours-worked margin). However, as empirical evidence tends to suggest that low-income workers are more responsive to work incentives than many middle and higher income workers (see, for example, Meghir and Phillips, 2010), such a reallocation of marginal tax burdens is still likely to increase overall employment.

Note also that, despite the marginal combined tax wedge increasing for workers earning above 116 percent of the average wage, the average combined tax wedge still falls at high income levels, albeit to a far smaller degree than at low income levels (see the left hand panel of figure 1). This is because high-income workers still benefit from the reduced SSC rates applied at low income levels.

While figure 1 focuses on the standard rate reform for a single individual, results are generally similar in all four countries for either reform and both family types. The main exception is Luxembourg, where the reduced rate reform is far less effective than the standard rate reform due to the far more regressive nature

[30] Additionally, both employee and employer SSC are due from the first euro earned – resulting in a higher SSC burden on low-income workers.

of the increase in the consumption tax wedge (see figure A8 in the annex). Additionally, in Spain both reforms are less effective for a one-earner couple with two children than for a single individual (see figure A12).

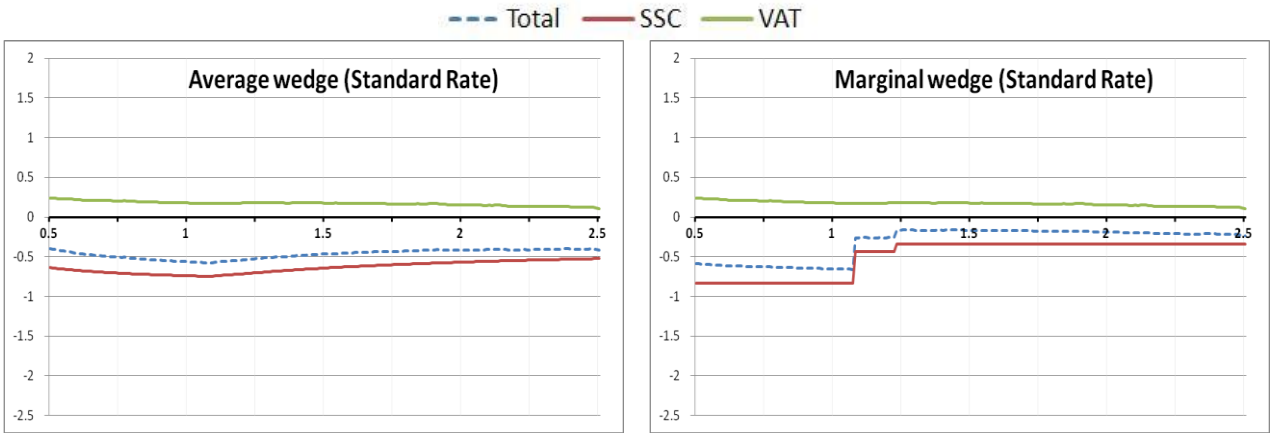
Effective but poorly targeted reforms

In a number of countries, low-income workers still benefit from the reforms but high-income workers also benefit significantly. These countries include: France, Greece, Hungary, Ireland, Poland, the Slovak Republic and the UK. In these countries, the generally progressive impact of the SSC reductions is not sufficient to outweigh the regressivity of the VAT increase.

Figure 2 illustrates the case for the UK (again for a single individual without children under the standard rate reform). The marginal tax wedge graph shows that the change in the marginal income tax wedge has a progressive effect, due to the employee SSC rate falling from 11 percent to 1 percent when earnings reach 108 percent of the average wage. However, unlike the Netherlands, there is no upper ceiling for employer SSC, so the marginal income tax wedge will still fall for higher income workers, and the VAT increase at high income levels is not enough to outweigh the SSC reduction. The impact on the average tax wedge is then to provide a relatively proportionate reduction for all workers, implying that some of this benefit gained by higher income workers could have been better targeted at low-income workers.

Figure 2: Decomposition of the change in combined tax wedge across income levels: UK*

(Single individual, no children)



*Note: Horizontal axis measures income level in multiples of the average wage. Vertical axis measures the percentage point change in the tax wedge.

While the results for the Netherlands did not vary significantly depending on VAT reform and family type, this is not the case for the UK. Low-income workers are worse off under the reduced rate reform than the standard rate reform. Under the reduced rate reform there is a larger VAT increase on low-income workers and this reduces the overall reduction in the average and marginal tax wedges for low-income workers. This is exacerbated even more for a one-earner couple with two children where an even greater VAT increase at low income levels roughly offsets the SSC reduction under the reduced rate reform (see figure A13 in the annex). A similar result occurs in Hungary and Poland, where the reduced rate reform has a far more significant effect on a one-earner couple with two children than on a single individual, reducing the benefit to the low-income worker to the extent that the reforms favour high-income workers over low-income workers in terms of both average and marginal wedge reductions (see figures A6 and A10). In

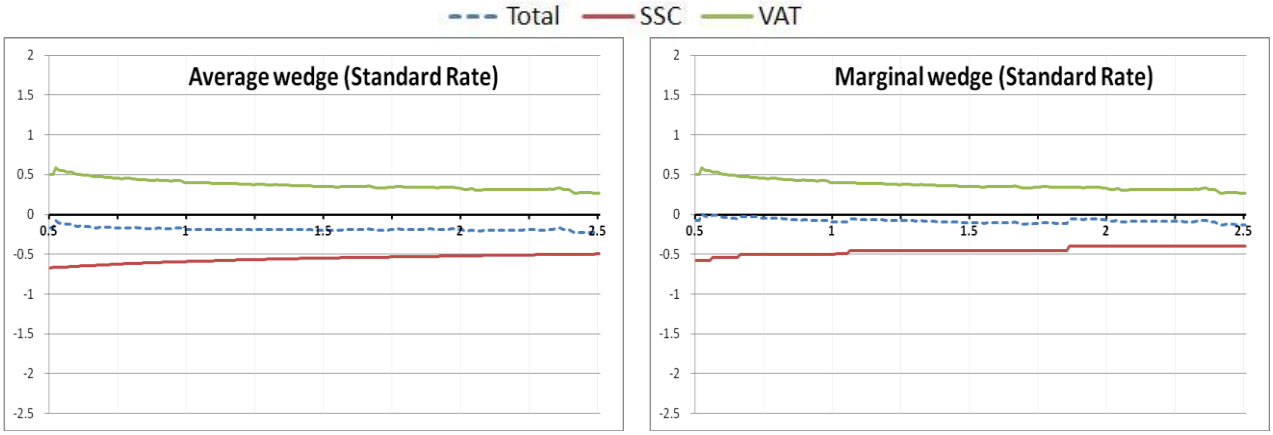
France (figure A3), high-income workers also tend to benefit as much or more than low-income workers, though this is largely driven by the lack of progressivity in the SSC reduction.[31]

Ineffective reforms

In the remaining two countries, Austria and Finland, low-income workers do not significantly benefit from either reform. Figure 3 illustrates this result for Finland. Here the progressivity of the SSC reduction largely cancels out the regressivity of the VAT increase resulting in almost no reduction in the marginal tax wedge at low income levels, and only a very small reduction in the wedge at higher income levels. The reduction in the average tax wedge is also small, increasing slightly at higher income levels. Results are even worse under the reduced rate reform and for a one-earner couple with two children where the larger increase in VAT at low income levels results in a slight increase in the marginal tax wedge for low-income workers (see figure A2 in the annex).[32]

Figure 3: Decomposition of the change in combined tax wedge across income levels: Finland*

(Single individual, no children)



*Note: Horizontal axis measures income level in multiples of the average wage. Vertical axis measures the percentage point change in the tax wedge.

Implications for designing reforms

While the above results are very mixed, they provide some useful insights regarding the design of any potential reform. One clear implication is that the success of a reform will largely depend on how well targeted the SSC reduction is at low-income workers – which, in part, depends also on the underlying design of the SSC system. In most cases, the simple across-the-board five percent rate reduction simulated here will poorly target low-income workers. However, in countries (such as the Netherlands) that already impose substantial SSC burdens on low-income workers compared to high-income workers, a proportional reform will better target low-income workers. That said, irrespective of the underlying design of the current SSC system, actively targeting low-income workers – for example, by only reducing SSC rates below a certain income level – will maximise the impact of the reform on the work incentives of low-income workers. In order to prevent high-income workers from benefiting from an SSC reduction, the tax

[31] Note that, in France, while the marginal combined tax wedge generally increases at 50 percent of the average wage, it generally decreases below 48 percent of the average wage, thereby still increasing marginal work incentives for many low-income workers.

[32] Note though that data limitations prevent calculations for a one-earner couple at very low income levels.

benefit from the reduced rate could even be phased-out as income increases. This would allow an even greater reduction in the average and marginal tax wedges faced by low-income workers for a given revenue cost. A negative consequence of this would, of course, be an increase in marginal SSC rates over the income region where the tax reduction is phased-out. And this would be in addition to the increase in VAT faced by these workers to fund the reform.

The second component affecting the success of the reforms is the degree of regressivity of the VAT increase – which also, to a small extent, depends on the design of the VAT system. The results show that the degree of regressivity varies across countries. In some cases, the increase in the consumption tax wedge is far greater for low-income workers than for higher income workers, substantially reducing the effectiveness of the reforms, while in other cases it is closer to proportional (e.g. the standard rate reform in Luxembourg).[33]

As suggested by the initial consumption tax wedge results, the reduced rate reform tends to be more regressive, over the whole income range, than the standard rate reform. That is, the size of the increase in the consumption tax wedge tends to fall to a greater extent as income rises under the reduced rate reform than under the standard rate reform. The main exceptions here are France and the Netherlands where the standard rate reform appears slightly more regressive, while there is no clear distinction between the reforms in Germany, Greece and Ireland.[34] Despite this trend, the size of the increase in the consumption tax wedge at low income levels is in some cases slightly greater under the standard rate reform than under the reduced rate reform. A possible reason for this is that non-workers may purchase a greater proportion of reduced rate goods and services than standard rate goods and services.

The greater regressivity of the reduced rate reform is not unexpected as low-income families are likely to spend a greater proportion of their income on reduced rate goods in most countries. For example, food is almost always subject to a reduced rate and low-income families can be expected to spend a larger proportion of their incomes on food than high-income families. But this is not always the case. For example, reduced rates are often also provided for such things as restaurant dining (e.g. France) which higher income workers may spend a greater proportion of their income on. In practice, of course, the result depends on actual consumption behaviour – which is captured in the HBS data.

The variation in these effects highlights the difficulty in using VAT to target low-income workers. Any government attempting to increase VAT rates with minimal effect on low-income workers will need to have a clear awareness of the consumption patterns of different workers, and even then some benefit will still accrue to the rich. For example, even if a VAT increase could be restricted to those goods consumed in greater proportion by the rich, poor workers would still consume some of these goods, and conversely the rich will also consume a significant amount of any reduced rate goods that are consumed in greater proportion by the poor. Indeed, the rich may consume a greater aggregate amount of reduced rate goods

[33] Recall, though, that this regressivity may be tempered to an extent by the progressive effect of the VAT increase on the consumption value of existing savings that is only partially captured by the microsimulation modelling (see section 1.3.5).

[34] One crude way to measure the regressivity of the VAT increase would be to calculate the ratio of the increase in the consumption tax wedge at 50 percent and 250 percent of the average wage. Calculations using this measure suggest that the reduced rate reform is more regressive than the standard rate reform in 10 of 12 countries for single individuals (France and the Netherlands being the exceptions), and in all countries for one-earner couples with two children. An alternative method would be to compare the absolute difference, rather than the ratio, between the two figures. Calculations using this measure suggest that the reduced rate reform is more regressive in 7 of 12 countries for single individuals (the exceptions being Belgium, France, Greece, Ireland and the Netherlands), and in 8 of 12 countries for one-earner couples with two children (France, Greece, Ireland and the Netherlands being the exceptions).

and therefore gain a greater aggregate tax saving, if not a proportionately greater saving. Removing reduced rates on goods consumed proportionately more by the rich (such as restaurant dining, as discussed above) would reduce the regressivity of the VAT. And the additional tax revenue could be used to further lower reduced rates targeted at the poor – but, again, the rich will still benefit to some extent from these reduced rates. Meanwhile, increasing rates on particular luxury goods may provide some degree of targeting, though would be unlikely to generate substantial revenue, and at the same time would increase the complexity and administrative difficulty of VAT systems already complicated by the presence of as many as three different VAT rates. As such, accurate targeting is not likely to be practicable via the VAT system, meaning that targeting should be focused predominantly on the SSC reductions if a reform was to be implemented.

5. Conclusions

This paper has investigated the merits of a revenue neutral shift in the funding of social expenditure from SSC to VAT as a means of increasing work incentives for low-income earners. To measure the overall impact of these reforms on both work incentives and income redistribution, we construct and compare combined (income plus consumption) tax wedges pre and post hypothetical revenue neutral reforms. The combined tax wedges are constructed using the OECD *Taxing Wages* models augmented with a consumption tax microsimulation model based on expenditure microdata for 13 European OECD countries.

Two simple reforms have been simulated – a reduction in all SSC rates by five percent fully funded by an increase in the standard VAT rate; and the same five percent reduction in all SSC rates fully funded by increasing reduced VAT rates. While the simulation results vary significantly across countries, family types and income levels, both reforms will, in almost all cases, lead to a small increase in the work incentives of low-income workers at both participation and hours-worked margins. However, the results also suggest that the simulated reforms are often not well targeted at low-income workers. Indeed, average combined tax wedges fall right across the income distribution in almost all cases – and sometimes to a greater extent for high-income workers than low-income workers. This also raises equity concerns, as it implies that the tax burden is being shifted from workers to non-workers, such as the unemployed and pensioners, as opposed to high-income workers. Compensatory measures targeted at low-income non-workers may therefore also need to accompany such reforms, limiting their effectiveness.

Nevertheless, the results do provide some insights as to how targeting could be improved. Increasing the standard rate of VAT, as expected, generally has a less regressive impact on the consumption tax wedge than increasing the reduced rate of VAT. However, at best, the standard VAT rate reform still has only a proportional effect, suggesting there is limited scope for any degree of targeting via the VAT increase. Instead, the success of any reform is more likely to depend on how well targeted the SSC reduction is at low-income workers. In most cases, the simple across-the-board SSC rate reduction simulated here will poorly target low-income workers. However, by actively targeting low-income workers – for example, by reducing SSC rates below an income threshold – a reform can maximise its impact on the work incentives of low-income workers. The SSC reduction could also be phased-out as income increases, allowing an even greater reduction in the SSC rate facing low-income workers for a given revenue cost. A negative consequence of such a reform would, of course, be an increase in marginal SSC rates over the income region where the tax reduction is phased out.

Where SSC reductions are targeted at employer rather than employee contributions, a short-term benefit may be to increase labour demand and reduce unemployment, rather than to boost labour supply. Indeed, in the recovery from the recent economic crisis, such a short-term boost to labour demand may be of more pressing importance in many countries than an immediate boost in labour supply. Nevertheless, as economies recover and as labour markets adjust, part of any employer contribution reduction is likely to be

passed on to employees in the form of higher gross wages, thereby increasing work incentives and labour supply. Such reforms, therefore, have the potential to meet both short-term and long-term priorities.

Overall, though, the small gain in work incentives, combined with difficulty targeting the reforms and potential equity concerns, suggest that alternate funding sources to VAT should also be considered to fund SSC reductions. In particular, funding SSC reductions in a way that would not impact, at least directly, on low-income workers would be more effective in increasing work incentives than through increasing VAT.

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ANNEX

Table A1 Average combined tax wedges

Family type		AUT	DEU	ESP	FIN	FRA	GBR	GRC	HUN	IRL	LUX	NLD	POL	SVK
Single,	Income tax wedge	43.96	47.93	35.23	38.91	45.90	30.57	35.87	43.13	22.71	28.76	40.85	37.54	35.28
no children,	Consumption tax wedge	9.24	6.71	6.92	8.69	7.31	6.82	9.65	8.75	10.31	5.95	12.52	11.26	11.38
67% AW	Total tax wedge	53.20	54.65	42.14	47.60	53.21	37.39	45.52	51.89	33.02	34.71	53.38	48.80	46.66
Single,	Income tax wedge	48.11	53.20	38.74	44.02	50.17	33.94	40.95	51.11	30.72	34.74	38.82	38.70	38.29
no children,	Consumption tax wedge	8.01	5.48	5.30	7.33	5.91	5.41	7.88	7.66	8.45	5.68	10.14	10.00	9.65
100% AW	Total tax wedge	56.12	58.68	44.04	51.35	56.08	39.36	48.82	58.77	39.17	40.42	48.96	48.69	47.94
Single,	Income tax wedge	50.39	57.68	42.33	49.87	53.21	37.73	47.53	56.68	38.70	41.94	42.47	39.64	40.33
no children,	Consumption tax wedge	6.78	4.06	4.39	6.09	4.58	4.74	7.02	6.80	5.47	5.09	6.02	8.76	8.76
167% AW	Total tax wedge	57.17	61.74	46.73	55.96	57.80	42.47	54.55	63.48	44.16	47.03	48.49	48.39	49.09
Single,	Income tax wedge	26.51	32.71	29.56	26.70	37.26	13.72	35.10	26.12	1.63	5.06	22.59	35.11	22.07
two children,	Consumption tax wedge	11.78	8.06	9.08	10.71	10.25	9.56	10.12	10.31	11.92	8.46	11.62	11.61	13.53
67% AW	Total tax wedge	38.28	40.76	38.63	37.41	47.51	23.28	45.22	36.44	13.55	13.52	34.21	46.73	35.60
One earner,	Income tax wedge	36.41	35.86	32.90	37.95	41.87	27.90	42.20	40.68	12.71	10.88	29.54	37.07	23.11
two children,	Consumption tax wedge	10.91	7.73	8.52	12.00	8.04	7.94	9.89	9.81	12.47	8.08	13.29	10.71	12.89
100% AW	Total tax wedge	47.32	43.59	41.42	49.95	49.91	35.84	52.09	50.49	25.18	18.97	42.82	47.78	36.00
Two earner,	Income tax wedge	37.37	41.41	35.12	36.38	39.73	25.95	40.25	40.03	15.54	15.56	32.21	37.52	28.94
two children,	Consumption tax wedge	8.73	6.32	7.11	10.04	7.18	6.91	8.24	9.02	10.63	7.63	16.96	10.15	11.08
100/33% AW	Total tax wedge	46.11	47.73	42.23	46.42	46.91	32.86	48.49	49.05	26.18	23.18	49.18	47.67	40.02
Two earner,	Income tax wedge	40.32	45.57	35.69	38.30	44.31	29.93	40.38	41.65	21.60	20.78	36.18	38.23	31.63
two children,	Consumption tax wedge	8.07	5.35	8.41	9.36	6.33	6.58	7.43	8.54	11.33	7.25	11.95	9.61	15.07
100/67% AW	Total tax wedge	48.38	50.92	44.10	47.66	50.64	36.51	47.82	50.18	32.93	28.04	48.13	47.84	46.70
Two earner,	Income tax wedge	45.02	47.87	36.13	40.94	44.43	30.52	40.21	47.79	21.39	27.11	36.76	37.52	35.73
no children,	Consumption tax wedge	8.21	5.96	6.46	8.42	6.65	6.56	7.24	7.98	8.37	7.00	13.34	10.07	10.60
100/33% AW	Total tax wedge	53.22	53.83	42.59	49.36	51.08	37.08	47.45	55.77	29.77	34.11	50.10	47.60	46.33

Table A2 Marginal combined tax wedges

Family type		AUT	DEU	ESP	FIN	FRA	GBR	GRC	HUN	IRL	LUX	NLD	POL	SVK
Single,	Income tax wedge	55.51	60.84	49.45	54.40	63.67	40.60	44.24	52.43	33.18	41.45	55.74	41.04	44.42
no children,	Consumption tax wedge	9.24	6.71	6.92	8.69	7.31	6.82	9.65	8.75	10.31	5.95	12.52	11.26	11.38
67% AW	Total tax wedge	64.75	67.55	56.36	63.09	70.99	47.43	53.90	61.19	43.49	47.40	68.27	52.29	55.80
Single,	Income tax wedge	61.05	66.87	45.50	54.40	55.84	40.60	54.08	77.15	53.05	52.76	50.73	41.04	44.42
no children,	Consumption tax wedge	8.01	5.48	5.30	7.33	5.91	5.41	7.88	7.66	8.45	5.68	10.14	10.00	9.65
100% AW	Total tax wedge	69.06	72.35	50.80	61.73	61.74	46.02	61.96	84.82	61.50	58.44	60.87	51.04	54.07
Single,	Income tax wedge	39.83	51.17	28.00	58.95	59.64	47.70	60.64	63.67	49.71	52.76	52.00	41.04	42.77
no children,	Consumption tax wedge	6.78	4.06	4.39	6.09	4.58	4.74	7.02	6.80	5.47	5.09	6.02	8.76	8.76
167% AW	Total tax wedge	46.61	55.23	32.39	65.03	64.22	52.43	67.66	70.47	55.18	57.85	58.02	49.80	51.53
Single,	Income tax wedge	55.51	58.40	41.51	54.40	57.63	73.40	44.24	52.43	33.18	22.06	52.05	41.04	43.77
two children,	Consumption tax wedge	11.78	8.06	9.08	10.71	10.25	9.56	10.12	10.31	11.92	8.46	11.62	11.61	13.53
67% AW	Total tax wedge	67.29	66.46	50.59	65.11	67.88	82.96	54.36	62.75	45.10	30.52	63.67	52.65	57.30
One earner,	Income tax wedge	61.05	56.82	45.50	54.40	48.32	40.60	54.08	77.15	33.18	34.98	50.73	41.04	43.77
two children,	Consumption tax wedge	10.91	7.73	8.52	12.00	8.04	7.94	9.89	9.81	12.47	8.08	13.29	10.71	12.89
100% AW	Total tax wedge	71.96	64.55	54.03	66.40	56.36	48.54	63.98	86.96	45.65	43.07	64.02	51.75	56.66
Two earner,	Income tax wedge	61.05	60.69	45.50	54.40	48.32	40.60	54.08	77.15	33.18	38.22	50.73	41.04	43.77
two children,	Consumption tax wedge	8.73	6.32	7.11	10.04	7.18	6.91	8.24	9.02	10.63	7.63	16.96	10.15	11.08
100/33% AW	Total tax wedge	69.79	67.01	52.61	64.44	55.50	47.51	62.32	86.17	43.82	45.84	67.69	51.18	54.85
Two earner,	Income tax wedge	61.05	63.71	45.50	54.40	52.03	40.60	54.08	77.15	53.05	44.68	50.73	41.04	43.77
two children,	Consumption tax wedge	8.07	5.35	8.41	9.36	6.33	6.58	7.43	8.54	11.33	7.25	11.95	9.61	15.07
100/67% AW	Total tax wedge	69.12	69.06	53.91	63.76	58.36	47.19	61.52	85.69	64.38	51.93	62.68	50.65	58.85
Two earner,	Income tax wedge	61.05	60.84	45.50	54.40	52.03	40.60	54.08	77.15	33.18	38.22	50.73	41.04	44.42
no children,	Consumption tax wedge	8.21	5.96	6.46	8.42	6.65	6.56	7.24	7.98	8.37	7.00	13.34	10.07	10.60
100/33% AW	Total tax wedge	69.26	66.80	51.97	62.81	58.68	47.16	61.32	85.14	41.56	45.22	64.07	51.11	55.01

Table A3: Change in average combined tax wedge for standard and reduced VAT rate reforms - results for the eight *Taxing Wages* family types

		AUT		DEU		ESP		FIN		FRA		GBR		GRC		HUN		IRL		LUX		NED		POL		SVK	
Family type		Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.
Single,	Current	53.20	53.20	54.65	54.65	42.14	42.14	47.60	47.60	53.21	53.21	37.39	37.39	45.52	45.52	51.89	51.89	33.02	33.02	34.71	34.71	53.38	53.38	48.80	48.80	46.66	-
no children,	New	52.80	52.92	53.70	53.64	41.70	41.64	47.44	47.46	52.32	52.17	36.91	37.04	44.87	44.69	51.22	51.25	32.66	32.56	34.20	34.55	51.86	51.82	48.34	48.31	45.72	-
67% AW	Change	**-0.40**	**-0.28**	**-0.95**	**-1.01**	**-0.45**	**-0.50**	**-0.17**	**-0.15**	**-0.89**	**-1.05**	**-0.48**	**-0.35**	**-0.65**	**-0.83**	**-0.66**	**-0.64**	**-0.36**	**-0.45**	**-0.51**	**-0.16**	**-1.52**	**-1.55**	**-0.46**	**-0.49**	**-0.94**	**-**
Single,	Current	56.12	56.12	58.68	58.68	44.04	44.04	51.35	51.35	56.08	56.08	39.36	39.36	48.82	48.82	58.77	58.77	39.17	39.17	40.42	40.42	48.96	48.96	48.69	48.69	47.94	-
no children,	New	55.76	55.71	57.72	57.66	43.52	43.46	51.16	51.15	55.24	55.10	38.79	38.87	48.21	48.09	58.13	58.11	38.80	38.70	39.99	40.22	47.90	47.92	48.20	48.12	46.95	-
100% AW	Change	**-0.35**	**-0.41**	**-0.96**	**-1.02**	**-0.51**	**-0.57**	**-0.19**	**-0.20**	**-0.84**	**-0.98**	**-0.56**	**-0.49**	**-0.61**	**-0.74**	**-0.64**	**-0.67**	**-0.37**	**-0.47**	**-0.42**	**-0.20**	**-1.06**	**-1.04**	**-0.50**	**-0.57**	**-1.00**	**-**
Single,	Current	57.17	57.17	61.74	61.74	46.73	46.73	55.96	55.96	57.80	57.80	42.47	42.47	54.55	54.55	63.48	63.48	44.16	44.16	47.03	47.03	48.49	48.49	48.39	48.39	49.09	-
no children,	New	56.85	56.66	60.89	60.84	46.21	46.11	55.77	55.76	56.96	56.85	42.03	42.05	54.05	53.90	62.86	62.74	43.80	43.73	46.68	46.80	47.88	47.92	47.87	47.74	48.03	-
167% AW	Change	**-0.32**	**-0.50**	**-0.85**	**-0.90**	**-0.52**	**-0.62**	**-0.19**	**-0.20**	**-0.84**	**-0.95**	**-0.44**	**-0.42**	**-0.50**	**-0.66**	**-0.62**	**-0.74**	**-0.36**	**-0.43**	**-0.35**	**-0.23**	**-0.62**	**-0.57**	**-0.52**	**-0.65**	**-1.06**	**-**
Single,	Current	38.28	38.28	40.76	40.76	38.63	38.63	37.41	37.41	47.51	47.51	23.28	23.28	45.22	45.22	36.44	36.44	13.55	13.55	13.52	13.52	52.47	52.47	46.73	46.73	35.60	-
two children,	New	37.91	38.56	39.80	39.75	38.25	38.15	37.23	37.06	46.69	46.48	22.82	23.09	44.57	44.51	35.64	35.84	13.17	12.99	12.88	13.25	51.21	51.38	46.27	46.38	34.70	-
67% AW	Change	**-0.38**	**0.27**	**-0.96**	**-1.01**	**-0.38**	**-0.49**	**-0.18**	**-0.35**	**-0.82**	**-1.03**	**-0.45**	**-0.18**	**-0.65**	**-0.71**	**-0.79**	**-0.60**	**-0.38**	**-0.55**	**-0.65**	**-0.27**	**-1.27**	**-1.09**	**-0.46**	**-0.34**	**-0.90**	**-**
One earner,	Current	47.32	47.32	43.59	43.59	41.42	41.42	49.95	49.95	49.91	49.91	35.84	35.84	52.09	52.09	50.49	50.49	25.18	25.18	18.97	18.97	52.10	52.10	47.78	47.78	36.00	-
two children,	New	47.05	47.40	42.60	42.56	41.03	41.04	49.92	49.61	49.05	48.98	35.35	35.43	51.61	51.43	49.78	49.95	24.82	24.65	18.42	18.88	51.29	51.33	47.28	47.34	35.00	-
100% AW	Change	**-0.28**	**0.07**	**-0.99**	**-1.03**	**-0.39**	**-0.38**	**-0.03**	**-0.34**	**-0.86**	**-0.93**	**-0.49**	**-0.41**	**-0.48**	**-0.66**	**-0.71**	**-0.54**	**-0.35**	**-0.53**	**-0.55**	**-0.09**	**-0.81**	**-0.78**	**-0.50**	**-0.43**	**-1.00**	**-**
Two earner,	Current	46.11	46.11	47.73	47.73	42.23	42.23	46.42	46.42	46.91	46.91	32.86	32.86	48.49	48.49	49.05	49.05	26.18	26.18	23.18	23.18	49.18	49.18	47.67	47.67	40.02	-
two children,	New	45.59	45.94	46.72	46.68	41.75	41.72	46.33	46.09	45.90	45.86	32.38	32.44	47.85	47.69	48.33	48.40	25.87	25.75	22.72	22.99	48.17	48.26	47.15	47.16	38.93	-
100/33% AW	Change	**-0.51**	**-0.17**	**-1.01**	**-1.05**	**-0.47**	**-0.51**	**-0.10**	**-0.33**	**-1.02**	**-1.05**	**-0.48**	**-0.41**	**-0.64**	**-0.80**	**-0.72**	**-0.65**	**-0.31**	**-0.43**	**-0.46**	**-0.20**	**-1.01**	**-0.92**	**-0.52**	**-0.51**	**-1.09**	**-**
Two earner,	Current	48.38	48.38	50.92	50.92	44.10	44.10	47.66	47.66	50.64	50.64	36.51	36.51	47.82	47.82	50.18	50.18	32.93	32.93	28.04	28.04	48.13	48.13	47.84	47.84	46.70	-
two children,	New	47.90	48.14	49.89	49.85	43.78	43.65	47.54	47.34	49.68	49.62	36.00	36.04	47.19	47.05	49.46	49.50	32.61	32.47	27.61	27.84	47.16	47.16	47.31	47.28	45.94	-
100/67% AW	Change	**-0.48**	**-0.24**	**-1.03**	**-1.07**	**-0.32**	**-0.45**	**-0.12**	**-0.32**	**-0.96**	**-1.01**	**-0.51**	**-0.47**	**-0.63**	**-0.77**	**-0.73**	**-0.68**	**-0.32**	**-0.45**	**-0.42**	**-0.19**	**-0.98**	**-0.97**	**-0.53**	**-0.56**	**-0.77**	**-**
Two earner,	Current	53.22	53.22	53.83	53.83	42.59	42.59	49.36	49.36	51.08	51.08	37.08	37.08	47.45	47.45	55.77	55.77	29.77	29.77	34.11	34.11	50.10	50.10	47.60	47.60	46.33	-
no children,	New	52.74	52.78	52.85	52.77	42.08	42.02	49.19	49.05	50.12	50.00	36.59	36.63	46.74	46.58	55.08	55.10	29.41	29.34	33.67	33.88	49.11	49.08	47.07	47.02	45.28	-
100/33% AW	Change	**-0.48**	**-0.44**	**-0.98**	**-1.06**	**-0.51**	**-0.57**	**-0.17**	**-0.31**	**-0.95**	**-1.07**	**-0.48**	**-0.45**	**-0.70**	**-0.86**	**-0.70**	**-0.68**	**-0.35**	**-0.43**	**-0.44**	**-0.23**	**-0.99**	**-1.03**	**-0.53**	**-0.58**	**-1.05**	**-**

Std./Red.= Increase in the standard/reduced VAT rate.
Change = Percentage point change.

Table A4: Change in marginal combined tax wedge for standard and reduced VAT rate reforms - results for the eight *Taxing Wages* family types

		AUT		DEU		ESP		FIN		FRA		GBR		GRC		HUN		IRL		LUX		NLD		POL		SVK	
Family type		Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.	Std.	Red.
Single,	Current	64.75	64.75	67.61	67.61	56.36	56.36	63.09	63.09	70.99	70.99	47.43	47.43	53.90	53.90	61.19	61.19	43.49	43.49	47.40	47.40	68.27	68.27	52.29	52.29	55.80	-
no children,	New	64.47	64.59	66.78	66.72	56.08	56.03	63.06	63.08	70.71	70.56	46.81	46.94	53.34	53.16	60.61	60.64	43.13	43.04	46.97	47.31	66.81	66.77	51.86	51.83	55.00	-
67% AW	Change	**-0.27**	**-0.15**	**-0.83**	**-0.89**	**-0.28**	**-0.34**	**-0.03**	**-0.01**	**-0.27**	**-0.43**	**-0.62**	**-0.49**	**-0.56**	**-0.74**	**-0.58**	**-0.55**	**-0.36**	**-0.45**	**-0.43**	**-0.09**	**-1.45**	**-1.49**	**-0.44**	**-0.46**	**-0.80**	-
Single,	Current	69.06	69.06	72.35	72.35	50.80	50.80	61.73	61.73	61.74	61.74	46.02	46.02	61.96	61.96	84.82	84.82	61.50	61.50	58.44	58.44	60.87	60.87	51.04	51.04	54.07	-
no children,	New	68.86	68.80	71.50	71.45	50.37	50.31	61.63	61.62	61.03	60.88	45.36	45.44	61.50	61.37	84.47	84.45	61.21	61.11	58.14	58.37	60.98	61.00	50.56	50.48	53.17	-
100% AW	Change	**-0.21**	**-0.26**	**-0.84**	**-0.90**	**-0.43**	**-0.49**	**-0.10**	**-0.11**	**-0.72**	**-0.86**	**-0.65**	**-0.58**	**-0.46**	**-0.59**	**-0.34**	**-0.37**	**-0.29**	**-0.39**	**-0.30**	**-0.07**	**0.12**	**0.14**	**-0.48**	**-0.55**	**-0.90**	-
Single,	Current	46.61	46.61	55.23	55.23	32.39	32.39	65.03	65.03	64.22	64.22	52.43	52.43	67.66	67.66	70.47	70.47	55.18	55.18	57.85	57.85	58.02	58.02	49.80	49.80	51.53	-
no children,	New	46.98	46.80	55.48	55.43	32.73	32.63	64.93	64.92	63.50	63.39	52.26	52.29	67.31	67.15	69.93	69.81	54.96	54.90	57.55	57.67	58.39	58.44	57.07	56.94	50.55	-
167% AW	Change	**0.37**	**0.18**	**0.25**	**0.20**	**0.34**	**0.24**	**-0.10**	**-0.12**	**-0.72**	**-0.83**	**-0.17**	**-0.15**	**-0.36**	**-0.51**	**-0.55**	**-0.67**	**-0.21**	**-0.28**	**-0.30**	**-0.18**	**0.37**	**0.41**	**-0.52**	**-0.65**	**-0.97**	-
Single,	Current	67.29	67.29	66.51	66.51	50.59	50.59	65.11	65.11	67.88	67.88	82.96	82.96	54.36	54.36	62.75	62.75	45.10	45.10	30.52	30.52	63.67	63.67	52.65	52.65	57.30	-
two children,	New	67.24	67.89	65.78	65.73	50.35	50.25	65.19	65.02	67.77	67.56	82.63	82.90	53.82	53.75	62.24	62.44	44.83	44.65	29.98	30.35	62.44	62.62	52.23	52.35	56.75	-
67% AW	Change	**-0.05**	**0.60**	**-0.73**	**-0.78**	**-0.24**	**-0.34**	**0.08**	**-0.09**	**-0.11**	**-0.32**	**-0.33**	**-0.06**	**-0.55**	**-0.61**	**-0.50**	**-0.31**	**-0.27**	**-0.45**	**-0.54**	**-0.17**	**-1.23**	**-1.05**	**-0.42**	**-0.30**	**-0.55**	-
One earner,	Current	71.96	71.96	64.55	64.55	54.03	54.03	66.40	66.40	56.36	56.36	48.54	48.54	63.98	63.98	86.96	86.96	45.65	45.65	43.07	43.07	64.02	64.02	51.75	51.75	56.66	-
two children,	New	71.97	72.32	63.74	63.70	53.79	53.79	66.52	66.21	55.64	55.57	47.99	48.07	63.63	63.45	86.68	86.84	45.36	45.18	42.67	43.13	64.38	64.41	51.27	51.34	55.99	-
100% AW	Change	**0.00**	**0.35**	**-0.81**	**-0.84**	**-0.24**	**-0.23**	**0.12**	**-0.19**	**-0.72**	**-0.79**	**-0.55**	**-0.47**	**-0.35**	**-0.53**	**-0.28**	**-0.12**	**-0.29**	**-0.46**	**-0.40**	**0.07**	**0.36**	**0.40**	**-0.47**	**-0.40**	**-0.67**	-
Two earner,	Current	69.79	69.79	67.01	67.01	52.61	52.61	64.44	64.44	55.50	55.50	47.51	47.51	62.32	62.32	86.17	86.17	43.82	43.82	45.84	45.84	61.09	61.09	51.18	51.18	54.85	-
two children,	New	69.61	69.96	66.17	66.13	52.28	52.24	64.61	64.37	54.70	54.67	46.92	46.98	61.89	61.73	85.87	85.94	43.48	43.36	45.52	45.78	61.25	61.34	50.69	50.70	54.05	-
100/33% AW	Change	**-0.17**	**0.17**	**-0.84**	**-0.88**	**-0.33**	**-0.37**	**0.17**	**-0.06**	**-0.80**	**-0.84**	**-0.59**	**-0.53**	**-0.44**	**-0.60**	**-0.30**	**-0.23**	**-0.33**	**-0.46**	**-0.33**	**-0.06**	**0.16**	**0.26**	**-0.49**	**-0.48**	**-0.81**	-
Two earner,	Current	69.09	69.09	69.06	69.06	53.91	53.91	63.76	63.76	58.36	58.36	47.28	47.28	61.52	61.52	85.69	85.69	64.38	64.38	51.93	51.93	62.68	62.68	50.65	50.65	58.85	-
two children,	New	68.87	69.11	68.19	68.14	53.70	53.57	63.78	63.58	57.59	57.53	46.68	46.72	61.04	60.90	85.37	85.41	64.17	64.04	51.66	51.89	63.13	63.13	50.14	50.12	58.29	-
100/67% AW	Change	**-0.22**	**0.02**	**-0.87**	**-0.91**	**-0.21**	**-0.34**	**0.03**	**-0.17**	**-0.78**	**-0.83**	**-0.60**	**-0.56**	**-0.48**	**-0.62**	**-0.32**	**-0.28**	**-0.20**	**-0.34**	**-0.27**	**-0.04**	**0.45**	**0.45**	**-0.51**	**-0.54**	**-0.56**	-
Two earner,	Current	69.26	69.26	66.80	66.80	51.97	51.97	62.81	62.81	58.68	58.68	47.16	47.16	61.32	61.32	85.14	85.14	41.56	41.56	45.22	45.22	62.01	62.01	51.11	51.11	55.01	-
no children,	New	69.04	69.07	65.94	65.85	51.58	51.52	62.77	62.63	57.92	57.80	46.54	46.57	60.82	60.66	84.77	84.79	41.15	41.08	44.84	45.05	62.19	62.16	50.60	50.56	54.14	-
100/33% AW	Change	**-0.22**	**-0.19**	**-0.86**	**-0.95**	**-0.39**	**-0.45**	**-0.05**	**-0.19**	**-0.76**	**-0.88**	**-0.62**	**-0.59**	**-0.50**	**-0.66**	**-0.37**	**-0.35**	**-0.41**	**-0.48**	**-0.37**	**-0.17**	**0.18**	**0.15**	**-0.51**	**-0.55**	**-0.87**	-

Std./Red.= Increase in the standard/reduced VAT rate.
Change = Percentage point change.

Figure A1: Decomposition of the change in combined tax wedge across income levels: Austria*

Single individual, no children | One-earner couple, two children

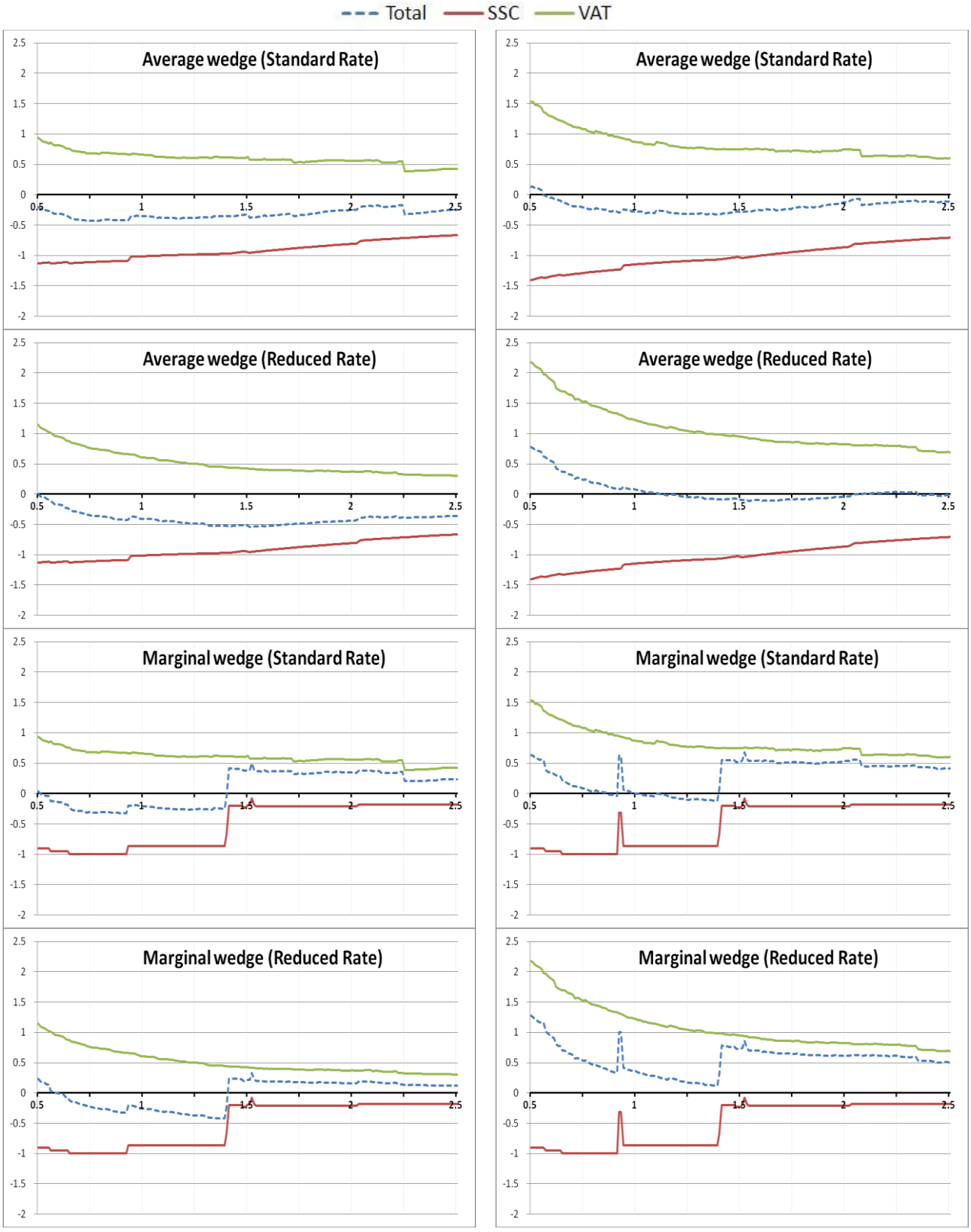


Figure A2: Decomposition of the change in combined tax wedge across income levels: Finland*

Single individual, no children | One-earner couple, two children

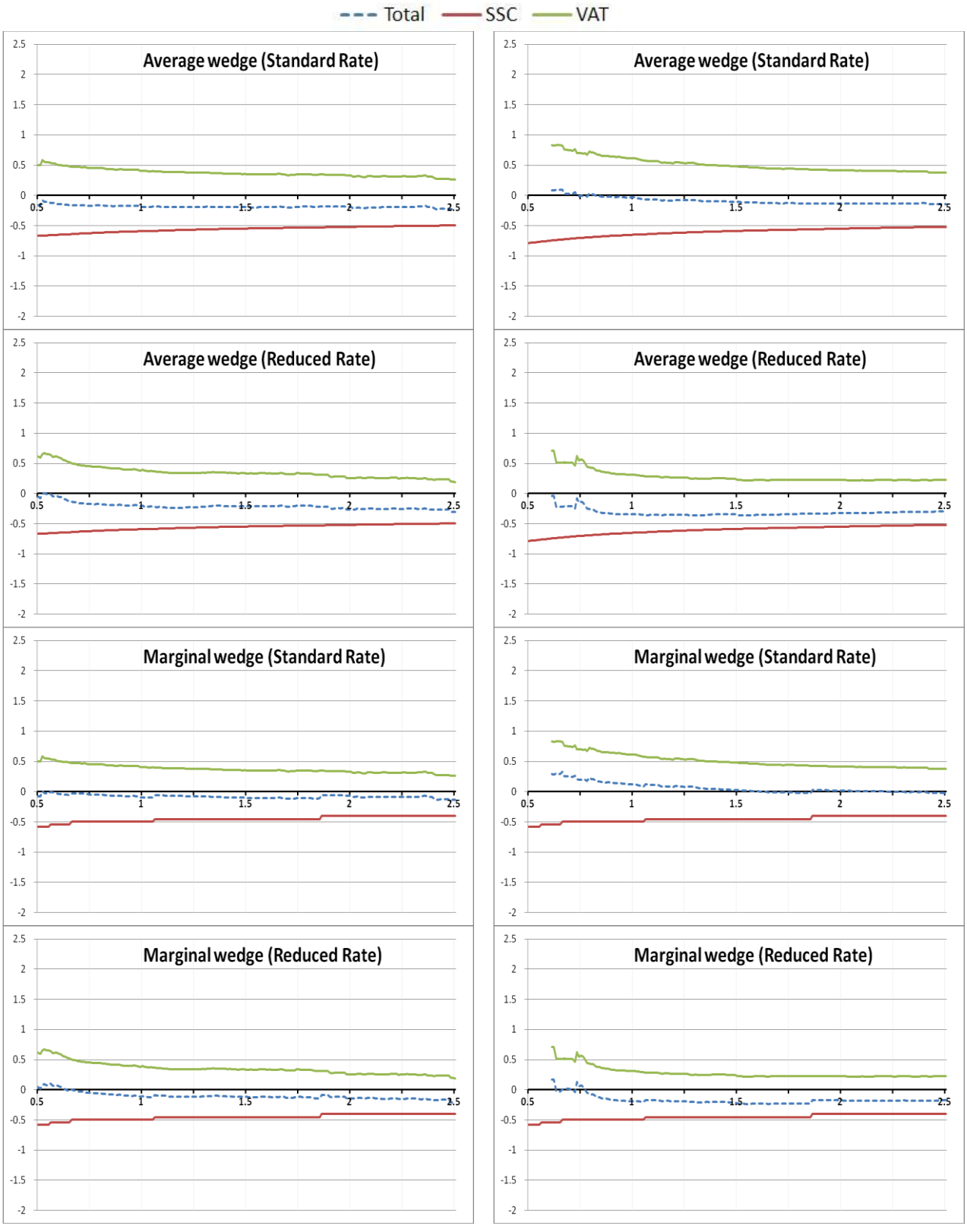


Figure A3: Decomposition of the change in combined tax wedge across income levels: France*

Single individual, no children | One-earner couple, two children

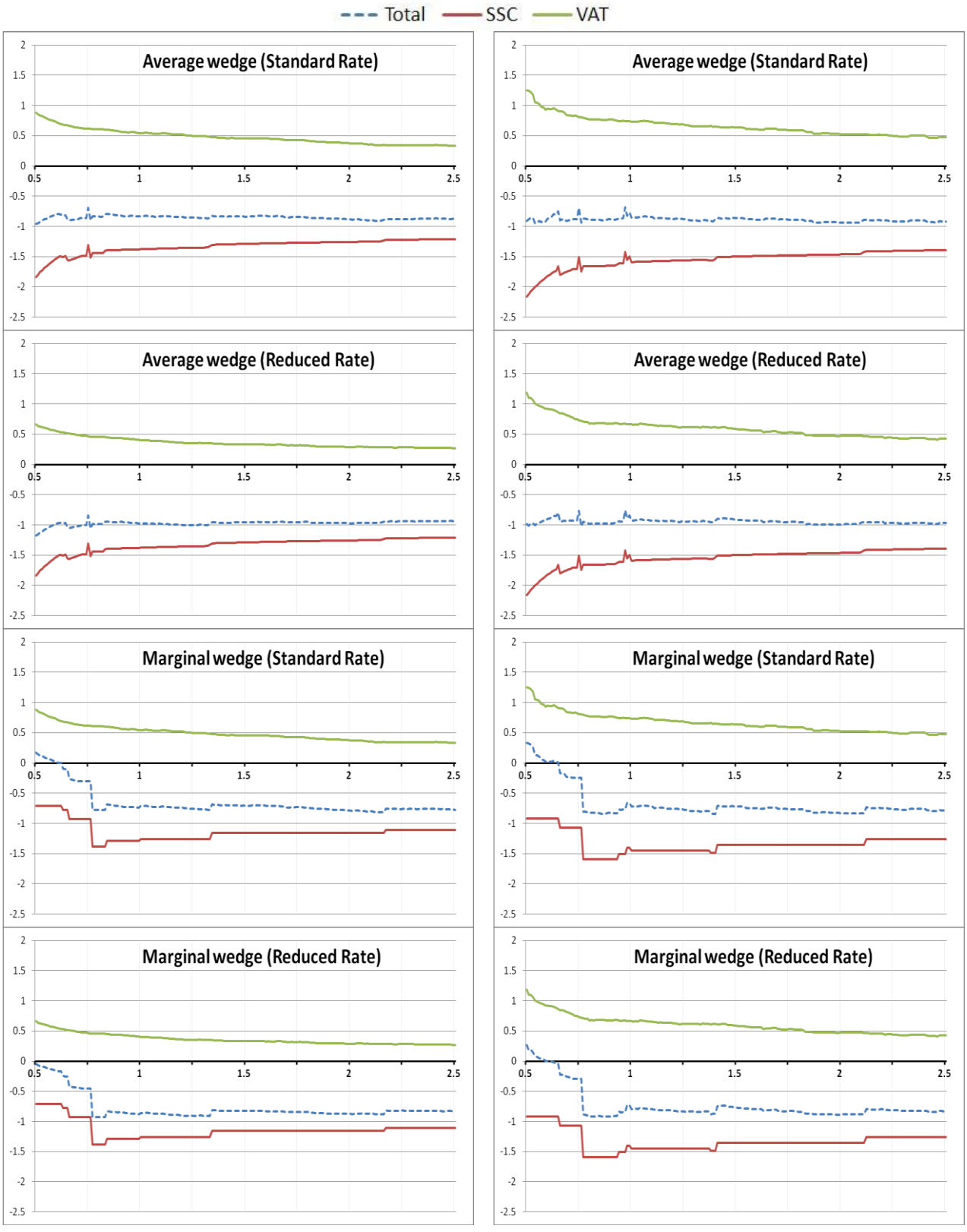


Figure A4: Decomposition of the change in combined tax wedge across income levels: Germany*

Single individual, no children | One-earner couple, two children

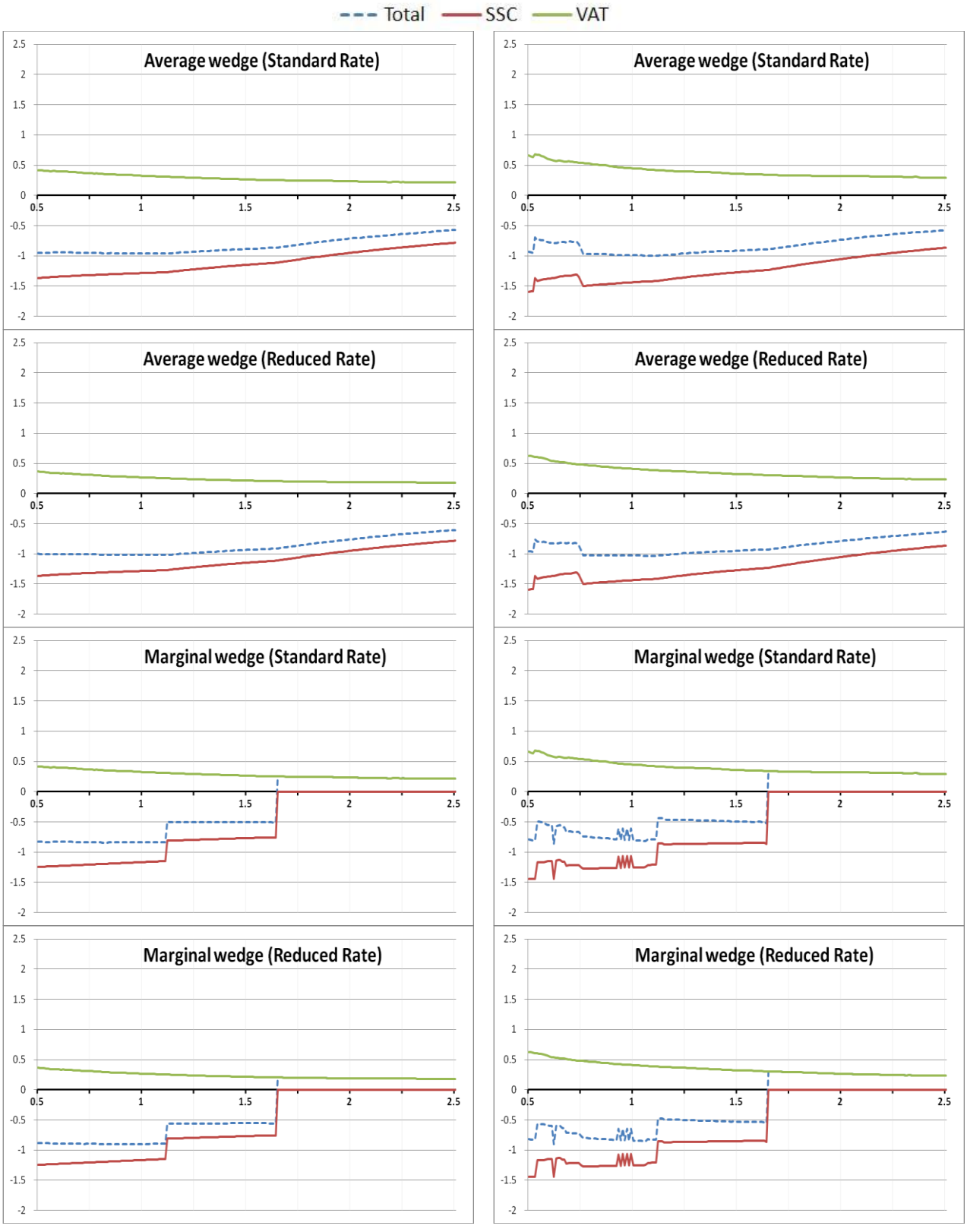


Figure A5: Decomposition of the change in combined tax wedge across income levels: Greece*

Single individual, no children | One-earner couple, two children

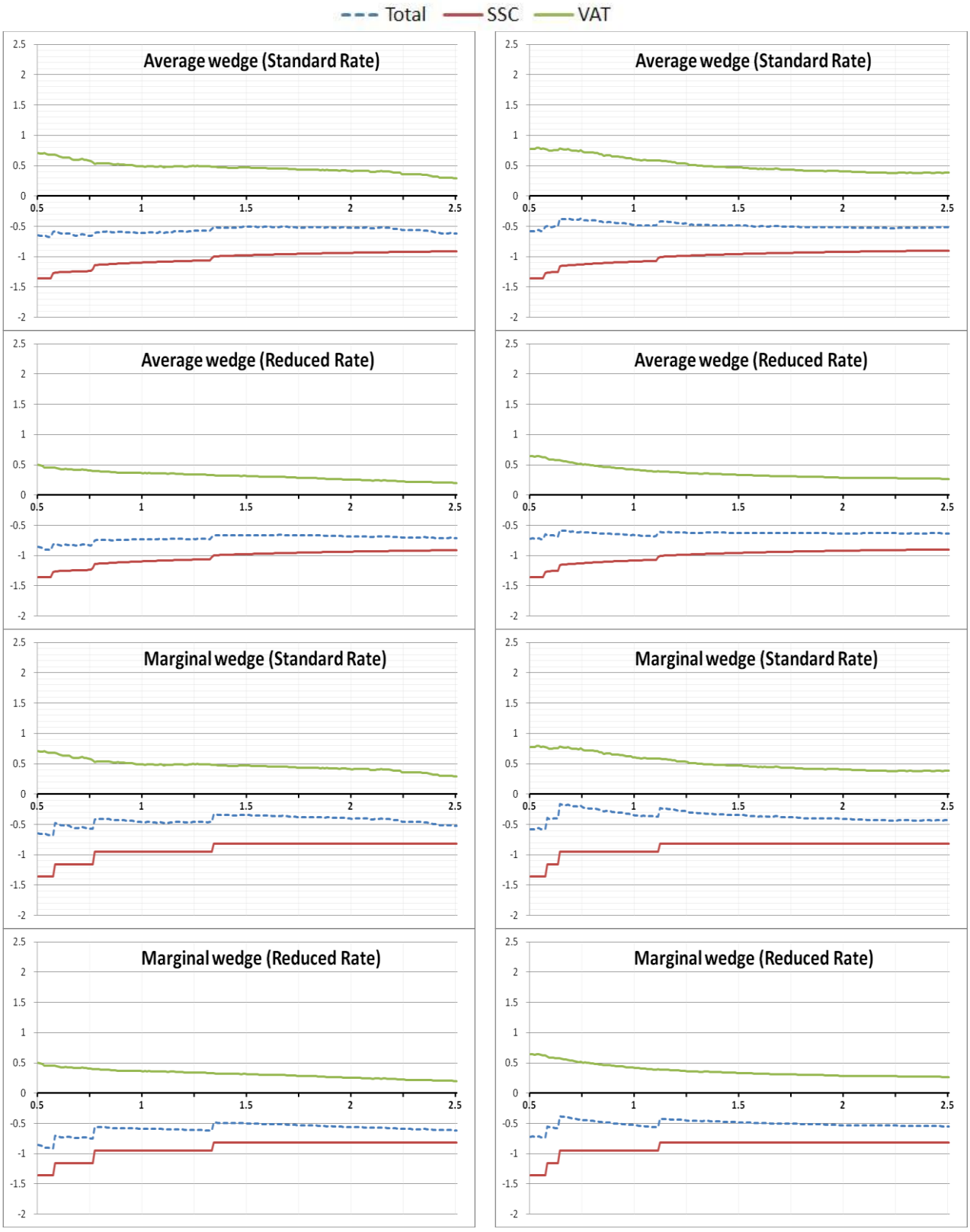


Figure A6: Decomposition of the change in combined tax wedge across income levels: Hungary*

Single individual, no children

One-earner couple, two children

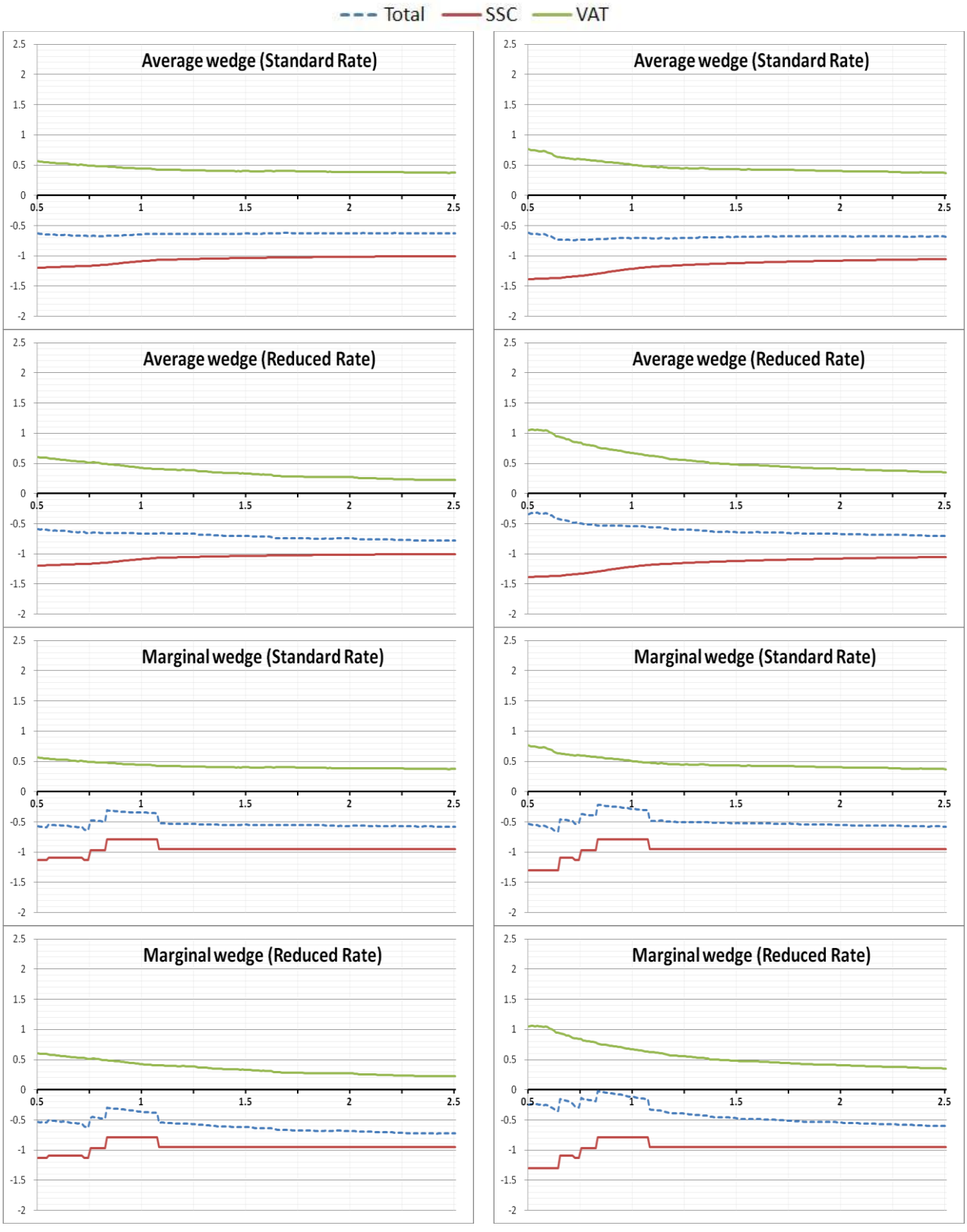


Figure A7: Decomposition of the change in combined tax wedge across income levels: Ireland*

Single individual, no children | One-earner couple, two children

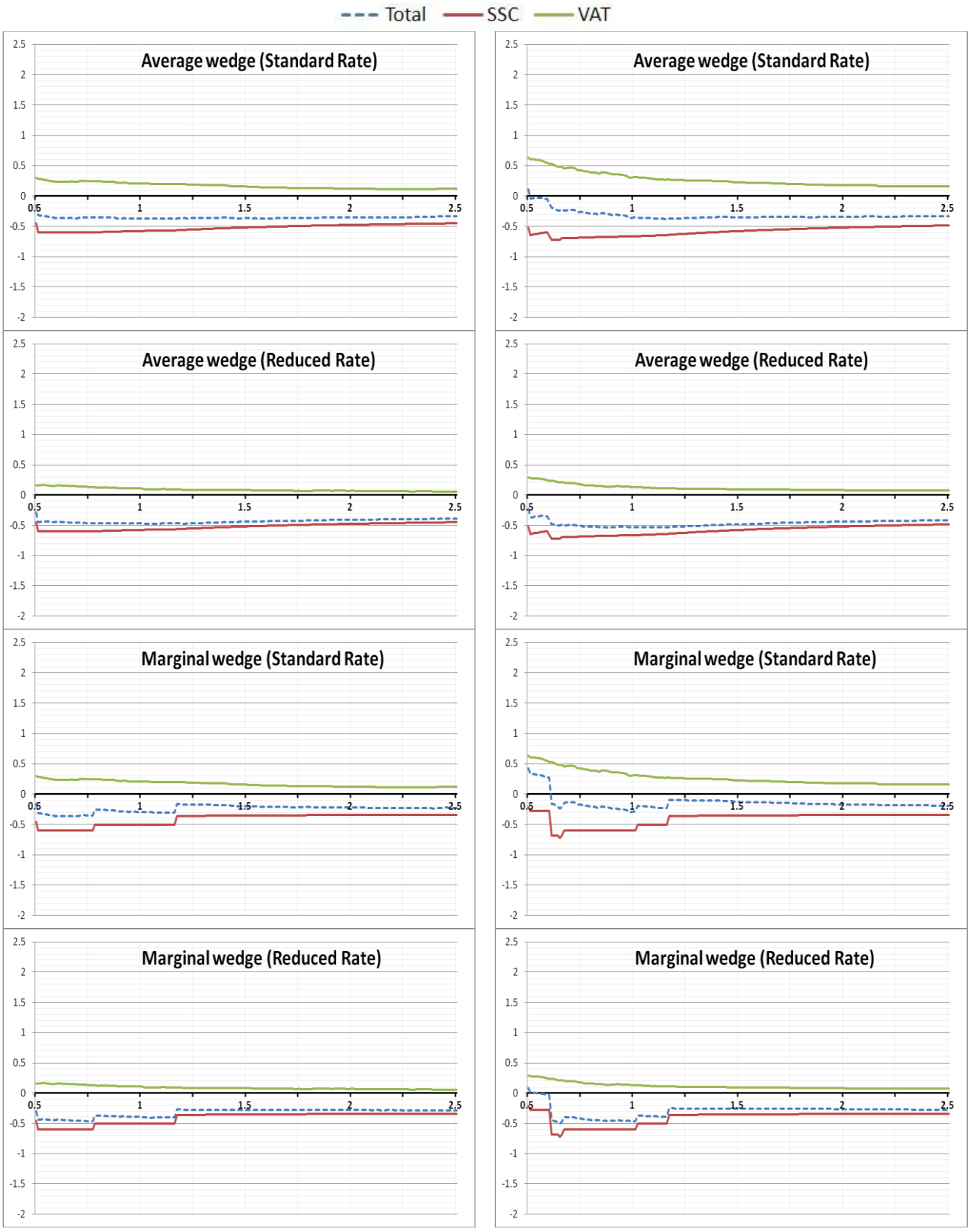


Figure A8: Decomposition of the change in combined tax wedge across income levels: Luxembourg*

Single individual, no children | One-earner couple, two children

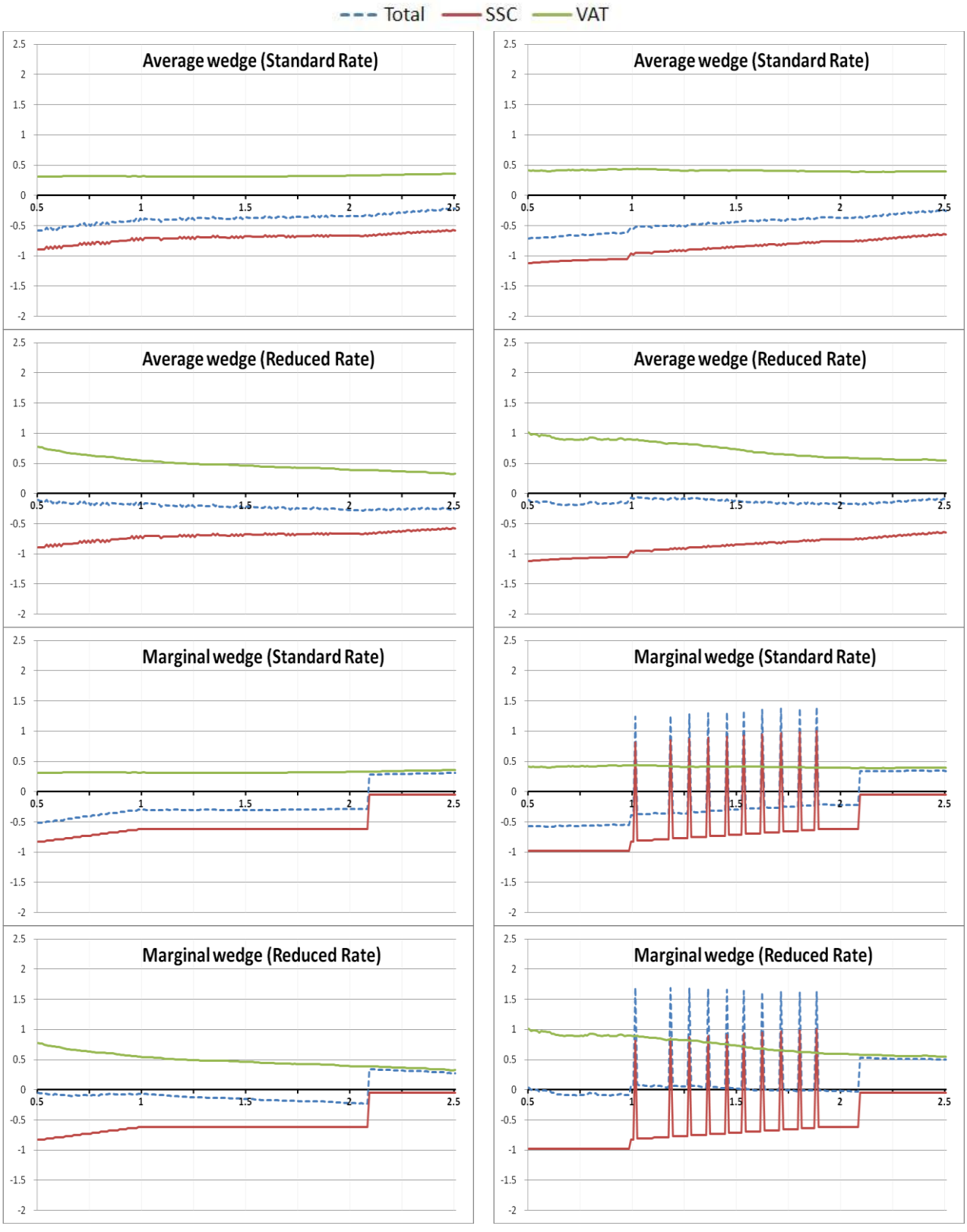


Figure A9: Decomposition of the change in combined tax wedge across income levels: Netherlands*

Single individual, no children | One-earner couple, two children

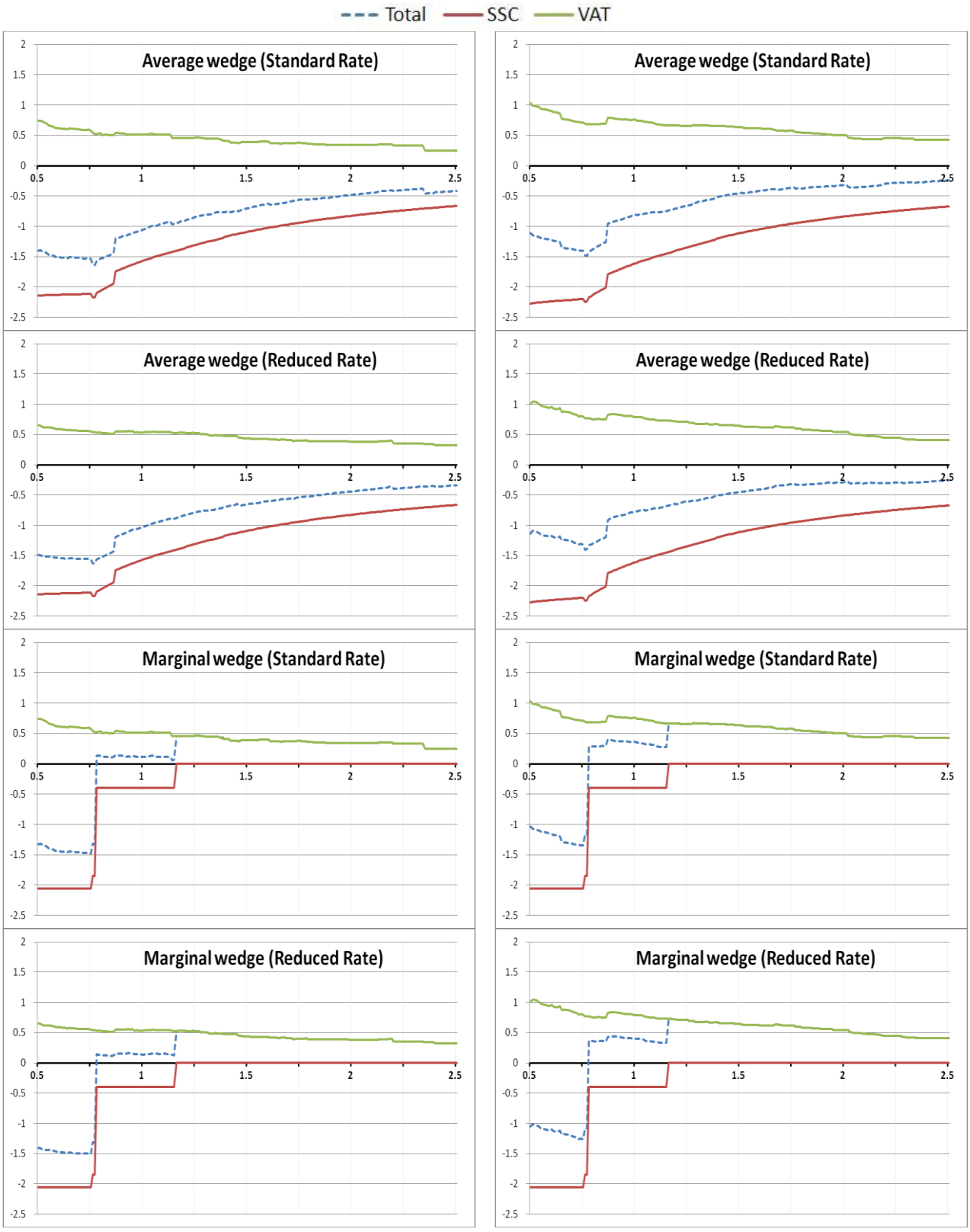


Figure A10: Decomposition of the change in combined tax wedge across income levels: Poland*

Single individual, no children | One-earner couple, two children

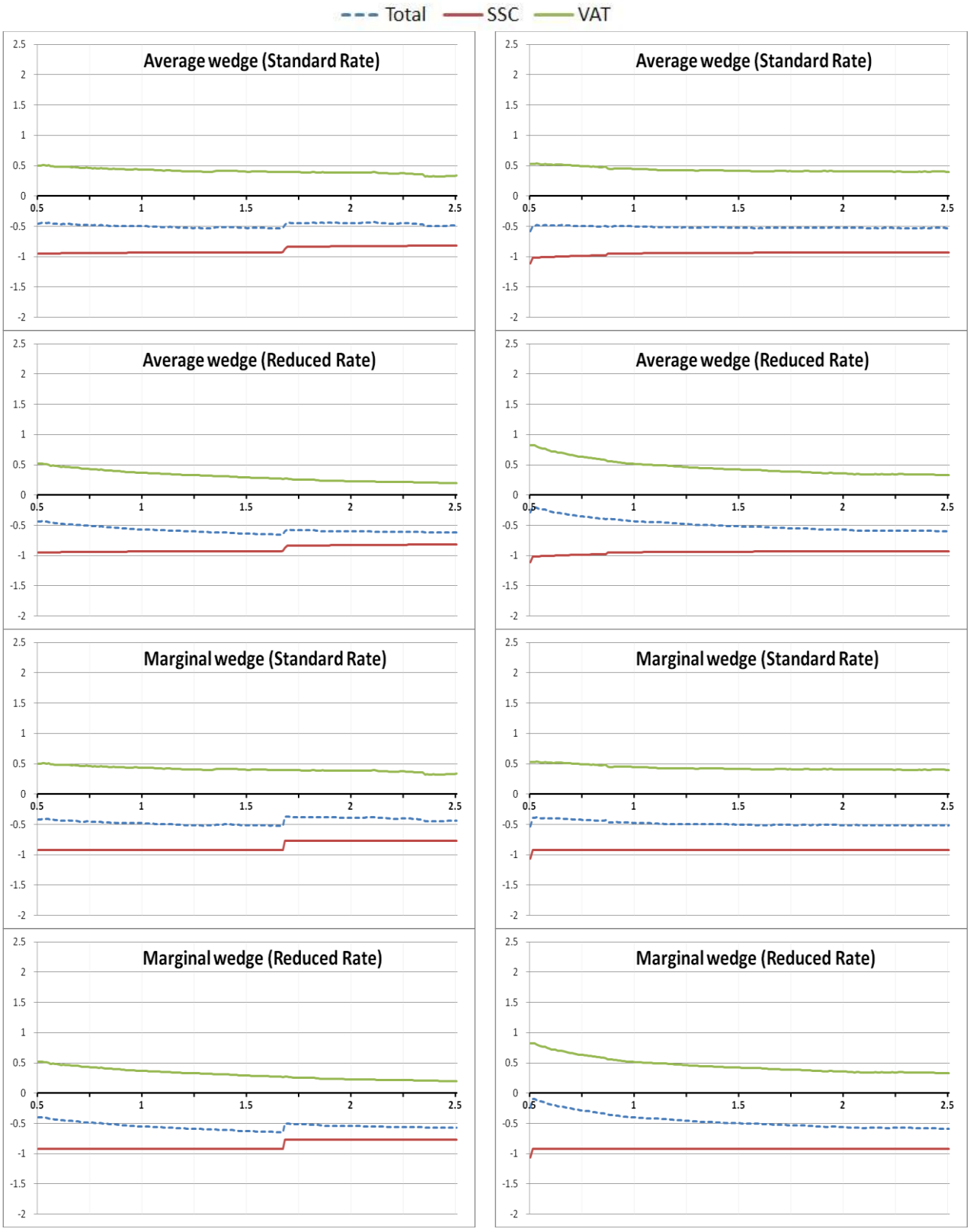


Figure A11: Decomposition of the change in combined tax wedge across income levels: Slovak Republic.*

Single individual, no children | One-earner couple, two children

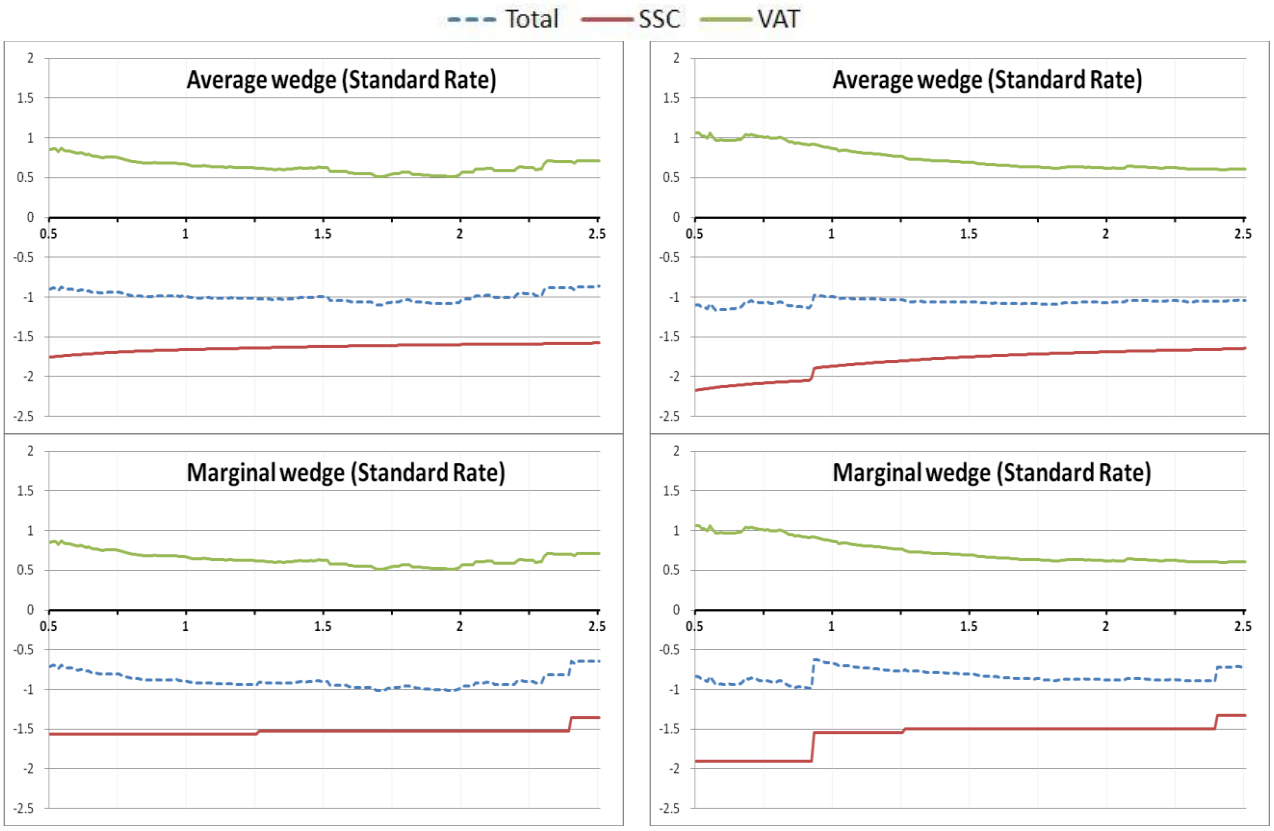


Figure A12: Decomposition of the change in combined tax wedge across income levels: Spain*

Single individual, no children

One-earner couple, two children

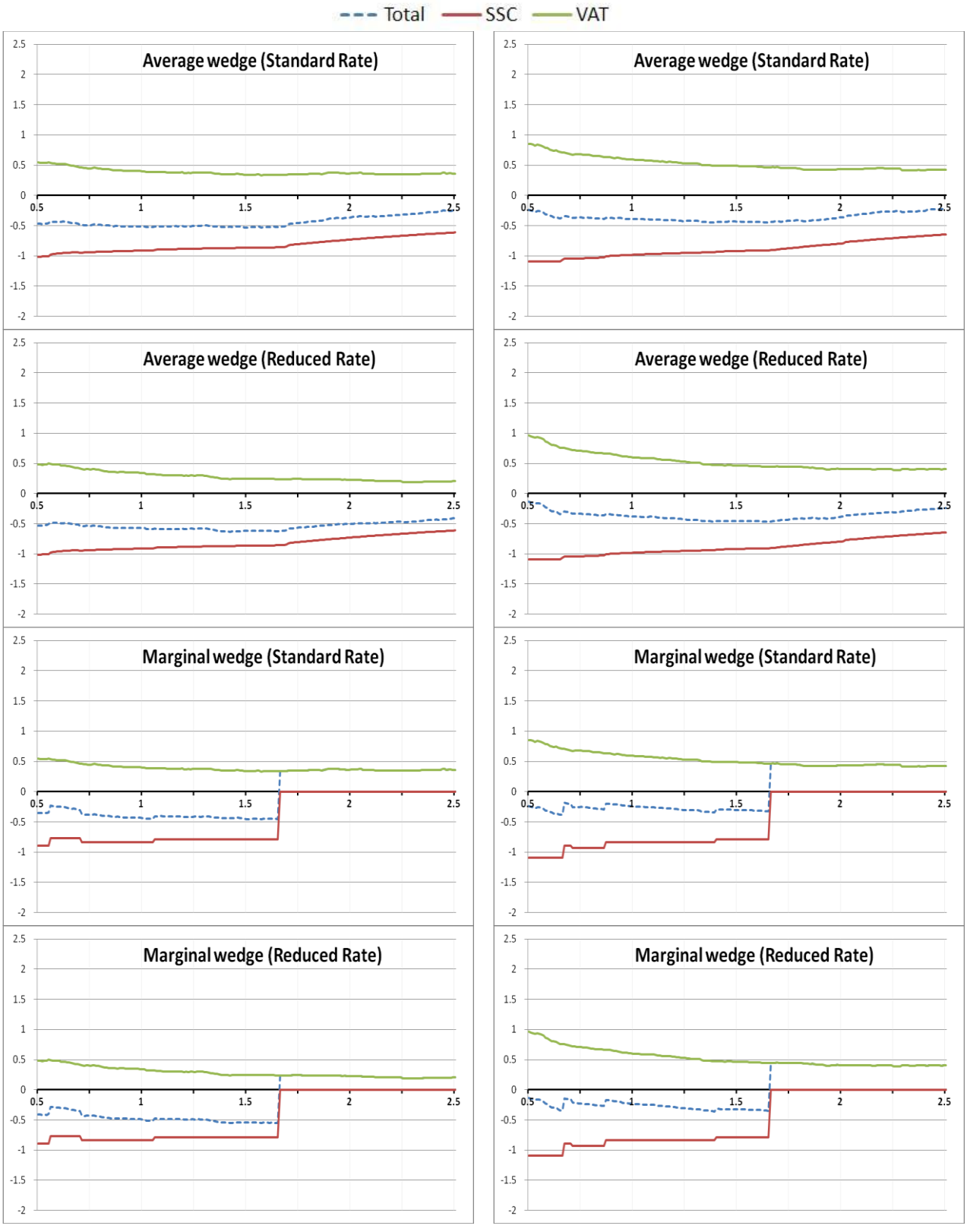
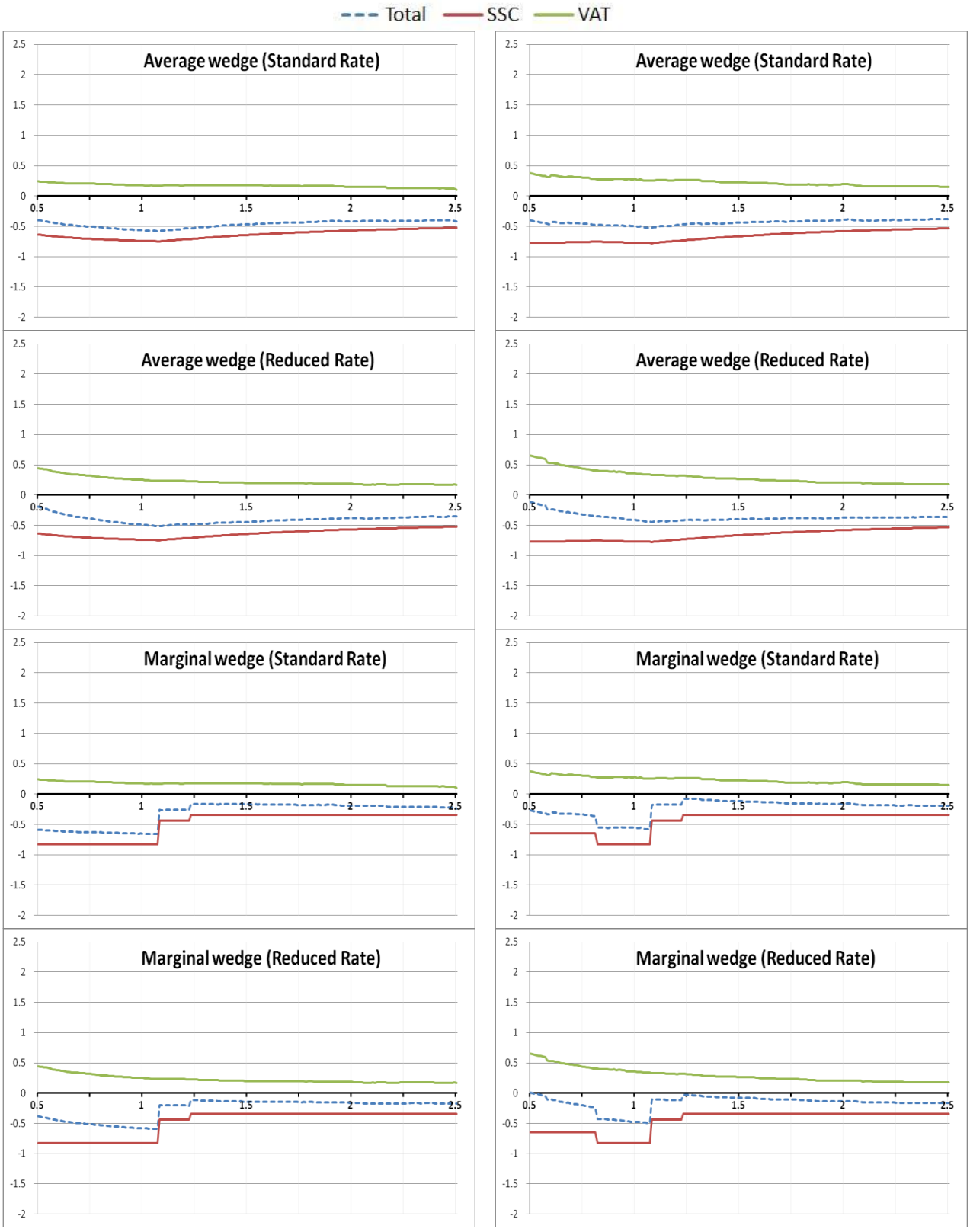


Figure A13: Decomposition of the change in combined tax wedge across income levels: UK*

Single individual, no children | One-earner couple, two children



[*]Note: Horizontal axis measures income level in multiples of the average wage in the particular country. Vertical axis measures the percentage point change in the tax wedge. The scale on the vertical axis for France, the Netherlands, and the Slovak Republic differs from that of the other countries. Outliers have been removed from the graphical results to aid exposition.

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