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TAXING CONSUMPTION

An Analysis of the Distribution of the VAT Burden in Switzerland

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Abstract

This paper investigates the distribution of the tax burden of the value added tax, VAT, in Switzerland. The current Swiss VAT system overall is slightly progressive, putting a higher tax burden on the high-income households. The analysis of different household types yields similar results. The results depend crucially on the measurement base adopted. It is however argued that the tax ratio as a proportion of expenditure pictures the tax burden of households from a lifetime perspective most realistically. A simulation is performed in order to evaluate the impact of a uniform consumption tax rate. While the VAT system would still be somewhat progressive, the reform is regressive, imposing a greater change in tax burden on low-income households.

Keywords: *consumption tax, VAT burden, income distribution, uniform VAT, Switzerland*

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Abbreviation Index

CPI – Consumer Price Index

FDF – Federal Department of Finance

FSIO – Federal Social Insurance Office

FSO – Federal Statistical Office

HBS – Household Budget Survey

IFS – Institute for Fiscal Studies

IHS – Institute for Advanced Studies

OECD – Organisation for Economic Cooperation and Development

SCA – Swiss Customs Administration

SFC – Swiss Federal Council

STA – Swiss Tax Administration

VAT – Value Added Tax

1 Introduction

Raising tax revenue in order to finance activities of the public sector is an important task of the government, and it is a challenging one. The first question is probably what to tax. A variety of tax mixes can be observed across countries (OECD, 2014b). Many governments rely heavily on labour taxation, followed by taxes on consumption. Additionally, capital income, property or bequests are taxed in some countries (ibid.). Next the question arises how a government should tax individuals? Flat rates or increasing marginal tax rates can be applied. Furthermore the collection mechanism has to be specified. One distinguishes between direct taxes such as income taxes, which are collected directly from the bearer of the tax, and indirect taxes like consumption taxes, which are collected from an intermediate (Crawford et al., 2007). While deciding on these questions, governments should keep in mind that taxes generally affect the behaviour of individuals, which is in most cases not desired, since it leads to inefficiencies and can decrease the tax base (Sandmo, 1976).

Experiments show that individuals do not perceive income and consumption taxes equivalently. They adjust their behaviour more under an income tax scheme (Blumkin et al. 2010, p. 1210). This seems to be due to misperceptions of the different taxes. Even though individuals seem to care less about consumption taxes than about income taxes, the value added tax, VAT, is still perceived as a regressive tax, putting a higher burden on the poorer part of the society (OECD/KIPF 2014, p. 13). A recently published study by the Organisation for Economic Cooperation and Development (OECD) however shows that the existing VAT systems, when evaluated from a lifetime income perspective, are in most cases roughly proportional or even progressive, meaning that high-income households pay a higher share of their expenditure in VAT than low-income households (OECD/KIPF 2014, p. 13). The reduced rates for necessities in almost all OECD countries seem thus to have the desired effect of introducing progressivity in the value added tax system (OECD/KIPF 2014, p. 19). The question however is whether redistributive goals are reached efficiently through differentiated consumption taxes? Or would it be more efficient to use a uniform value added tax in order to achieve the main goal of consumption taxes, namely raising revenue?

In the OECD, one third of total tax revenue is nowadays collected through consumption taxes (OECD 2014, p. 16). This is only slightly less than what is generated through income and profit

taxation and hence is an important part of the tax system (ibid.). In Switzerland the VAT, which is collected on the federal level, accounted for 37% of total federal tax revenue in 2014 (FTA, 2015c). This is more than what was raised through the federal income tax. The share of VAT with respect to overall fiscal tax revenue was 20% in 2012 (OECD, 2014b). The value added tax constitutes a significant part of the tax system and it is therefore important to evaluate its impact and efficiency.

Switzerland has a rather complicated VAT system with three different tax rates and 29 exemptions (FDF 2015, pp. 15f). Suggestions to simplify the system with a uniform rate or only two different rates have been brought up regularly by various political actors, however, a reform has not been decided yet. An argument often mentioned is that a flat tax would hurt the poor relatively more and is therefore not just. Economists on the other hand argue that it would be optimal to broaden the tax base and levy an equal, but lower tax rate on all goods and services. The income tax system should then be used to pursue redistribution policies (Keschnigg, 2010). The underlying reasoning is that the value added tax is not efficient in achieving redistributive goals since it is not possible to satisfyingly distinguish the different income groups based on their consumption (ibid.).

Is the current system really regressive, thus putting a higher tax burden on low-income households than on high-income households? What effects would a uniform tax rate further have on these distributional aspects? So far studies concerned with the Swiss VAT system only mention redistribution in a side note and do not quantify the tax burden borne by different income groups and household type using different measurement techniques. It is hence not clear which distributional effects a reform would have. To shed light on this issue, this paper replicates the above-mentioned OECD study for Switzerland and assesses first, the burden of VAT for different income groups and how this has changed over time. The tax burden is measured both in relation to disposable income and total expenditure. This distinction turns out to be crucial for the interpretation of the results. It is argued that the measurement with respect to total expenditure pictures the tax burden in a lifetime context more realistically (OECD/KIPF 2014, pp. 30ff). Five different household types are analysed and the changes between two survey periods, 2006-2008 and 2009-2011, are laid out. In a second step it is calculated how high a uniform rate would need to be in order to be revenue neutral. With this estimated tax rate, assuming that households do not significantly alter their consumption behaviour, the tax burden in a system of a flat rate with only a few exemptions is calculated. Thereby this paper follows a reform proposal made by the Federal Council in 2008. Again the tax burden is estimated in relation to disposable income and total expenditure. The distributional effects of such a reform are analysed.

Despite the on-going policy debate and consensus that the system should be simplified, there is a surprising lack of evidence that founds the arguments of different parties (Amrein, 2014). This paper contributes to the debate by investigating the distribution of the tax burden and the effects of a uniform rate with respect to distributional aspects. It also discusses the important balance between equity and efficiency of a tax system. The desired features of a tax system are contradictory: The tax should be efficient, that means, not distort people's decisions, it should raise a certain amount of revenue and it should account for the society's aversion against inequality (Atkinson & Stiglitz, 1976). A tax system that promotes equity comes at the cost of efficiency and vice-versa. Therefore one should look for the most efficient solution to reach the desired level of redistribution. Discussing the tax system and its implications regarding income distribution or efficiency is important: everyone is affected by it, yet the topic is often either left to tax experts and specific interest groups, who want to increase their benefits from it, or it is discussed from an ideological perspective. While the question about the degree of redistribution is a normative one, the question of how to best reach this degree can be analysed from an economic perspective.

The remainder of this paper is structured as follows. Section 2 first gives an overview of consumption taxation. Furthermore the theory on optimal taxation, specifically with respect to consumption taxation, is introduced. The rationale and impact of reduced tax rates is discussed. After presenting results from empirical studies concerning the distributional aspects of the VAT, the research question is put into context; therefore the Swiss situation is shortly described. Section 3 lays out the research approach, the data and the method. In section 4 the results of the analysis are presented. The results are discussed and the approach used here is critically reflected on in section 5. The paper concludes with a policy recommendation and ideas for further research.

2 Review: Consumption Taxes

This section first gives an insight into consumption taxation. Next, it discusses the theory of optimal taxation with respect to consumption taxation. Subsequently the rationale and impact of VAT rate differentiation is evaluated. Furthermore the distributional effects of the VAT are discussed and empirical evidence is presented. Finally the Swiss situation is laid out.

2.1 General Overview

There are two sorts of consumption taxes, first general consumption taxes like the value added tax or retail sales taxes, and second, excise taxes on specific goods like tobacco, alcohol and fuels (OECD 2014, p. 14). While the amount of consumption taxes with respect to total tax revenue has been relatively stable during the last 45 years, the composition has changed significantly. Revenue from excise taxes dropped remarkably in the OECD countries and accounts today for a smaller share than in previous years. In 2012 total consumption tax revenue in the OECD consisted of one-third excise tax revenue and two thirds VAT revenue (OECD 2014, pp. 15f).

While excise taxes have been used as a relatively easy way to collect revenue in the past, their main purpose nowadays is to discourage the use of certain goods because of health or environmental consequences (OECD 2014, p. 23). Negative externalities can be internalized through excise taxes. In this case the otherwise favoured neutrality principle is turned the opposite way: Knowing that consumers react to taxes the purpose of the tax is now to be distortionary and to induce or prevent certain behaviours (*ibid.*). The main goal with this kind of taxation is to eventually decrease the tax base. A general consumption tax on the other hand is an essential instrument to raise revenue and should not influence the tax base. Consumption taxes are also used for redistributive policies and the promotion of certain merit goods such as cultural goods, books and newspapers (OECD 2014, p. 51). It follows from their definition that excise taxes are inherently different from general consumption taxes and thus they are excluded from the analysis in this paper.

When it comes to consumption taxes the main distinction between the VAT and the retail sales tax is the fact that the VAT is levied on each level of the production process with the possibility to

deduct paid tax on purchases. This way it can be ensured that only the final consumer bears the tax burden (Keen & Lockwood 2010, p. 139). With an unbroken crediting chain and properly charged imports the tax incidence lies on the consumer (ibid.). In contrast, with a single-stage retail sales tax it is often difficult to determine the final consumer and hence possibilities for evasion open up (ibid.). A turnover tax on the other hand leads to production inefficiencies, since it is levied on the whole turnover, and thus also on intermediates. This induces firms to produce intermediate goods themselves, even though this might not be optimal (Bodin et al., 2001). It is these advantages that have resulted in the popularity of the VAT nowadays. If imposed properly, it is a tax on final consumption with very strong incentives for the tax collecting entity, the firms, to comply with the rules (OECD, 2014).

After having distinguished the different types of consumption taxes, we now turn to the theory of optimal taxation. Since this paper is concerned with consumption taxes, the focus of the next section lies on optimal taxation with respect to consumption taxes.

2.2 Optimal Taxation

In general a tax system is understood to be optimal when its deadweight loss, caused by distorting individuals' decisions, is minimised (Sandmo 1976, pp. 37f). It should thus be as neutral as possible. In specific, the Diamond-Mirrlees production efficiency theorem states that, under certain assumptions, a Pareto optimal tax system leaves production decisions undistorted (Crawford et al. 2007, p. 283). There is a widespread view that taxing consumption is superior to taxing income since the resulting distortions on the labour market are smaller than with an equivalent income tax (Bosch & van den Noord, 1990). Taxing labour is often understood as subsidising leisure. The distortions arising therefrom could be removed by taxing goods that are complements to leisure more heavily (ibid.).

Optimal taxation with respect to consumption taxes has long been discussed solely from an efficiency viewpoint (Atkinson & Stiglitz 1976, p. 59). From this perspective taxes are most effective if they are inversely proportional to demand elasticities because this results in the least distortional outcome (ibid. p. 62). Goods with a very inelastic demand, for instance food, should thus be taxed heavily. Individuals will not alter their behaviour and the deadweight loss of the tax is small. This general rule of taxation is named after the philosopher and economist Frank P. Ramsey who first proposed it in 1927.

$$\tau_i = \frac{\lambda}{1 + 2\lambda} \frac{1}{\eta_i}$$

Here, τ_i , is the tax per unit on good i . λ can be seen as the marginal deadweight loss of government spending. η_i is the magnitude of the demand elasticity of good i . The demand elasticity enters the formula inversely. The tax rate on good i thus depends on the inverse demand elasticity of the good in question, which means that the tax is higher the more inelastic the demand for good i is. Moreover the tax rate increases with the marginal deadweight loss of government spending. The formula is derived from the minimisation of the deadweight loss of a commodity tax with a certain revenue requirement (Atkinson & Stiglitz 1980, pp. 370ff).

If distributional considerations are taken into account the Ramsey-rule however changes and it becomes favourable to tax goods that are price elastic. To which extent this should be done depends on the preferences for equality in a society (Atkinson & Stiglitz 1976, p. 62). There is hence no general rule to follow.

Besides analysing the isolated case of consumption taxation Atkinson and Stiglitz (1976) also investigate the case of a combined tax system with an optimal linear income tax. It is straightforward that analysing only one component of a broad tax system does not allow for an overall assessment. The authors state that a progressive income tax influences equity aspects as well as the efficiency of the system and therefore impacts the setting of optimal consumption tax rates (Atkinson & Stiglitz 1976, p. 64). Their main result is that indirect taxation is not needed in case an optimal linear income tax exists. If consumption patterns do not depend on the pre-tax labour income and hence individuals have the same shares of spending regardless of their income, there is no additional information on the individual's ability to pay available in the expenditure pattern that could not be observed through the wage (Bodin et al. 2001, ch. 7). It follows that it is more efficient to tax exclusively labour income.

Kaplow (2004) shows that the theoretical results from Atkinson and Stiglitz do not only hold for an optimal income tax but for any sort of income tax and concludes further that a differentiated consumption tax is never favourable (2004, p. 1). He states that the reason for the introduction of differentiated consumption tax rates is to pursue redistribution policies that are less distorting than the ones through the personal income tax (ibid. p. 2). However, according to Kaplow, different rates of a consumption tax are not able to minimise these distortions, but rather introduce new ones by altering consumption choices (ibid.). Removing differentiated consumption taxes hence results in a Pareto improvement, even if only a partial reform is considered (ibid. p. 15). Additionally Kaplow employs an adjustment in the income tax system in order to simulate a

commodity tax reform, which is distributionally neutral (ibid.). By considering the tax system as a whole and holding the degree of redistribution constant this study is particularly valuable for policy discussions. The results by Atkinson & Stiglitz and Kaplow are however criticised by other economists because of the assumption that preferences are weakly separable between consumption and leisure, that is, spending patterns do not vary across income groups (Bodin et al. 2001, ch. 7). This assumption does not coincide with empirical results and is thus seen overly restrictive and unrealistic (ibid.).

Two papers, which do not make use of the assumption of weakly separable preferences, do nevertheless come to similar conclusions: Besely and Jewitt (1995) establish that a uniform consumer tax is favourable in a single consumer case while Deaton and Stern (1986) find that uniform consumption taxation is optimal in the presence of an optimal linear income tax.

A general conclusion is that the optimal consumption tax depends heavily on the other instruments available. When income taxation is not feasible, as it is the case in many developing countries, differentiated consumption tax rates might be the only way to achieve distributional goals. If however a wide range of well-functioning tax instruments through which redistribution can take place exists, a uniform consumption tax seems favourable (Bodin et al. 2001, ch. 7). This can also be explained by the fact that the scope for redistribution via different rates for goods is not large (ibid.).

Nonetheless in most cases VAT systems are in fact operated with different rates. The rationale and impact of this instrument is discussed in the subsequent section.

2.3 Rationale and Impact of Reduced or Zero Rates

What are the advantages of reduced rates on certain goods? While the theory of optimal taxation favours uniform consumption taxation, there are still various arguments raised for the case of differentiated rates. One group of arguments can be classified as the *efficiency* arguments, while the other belongs to the *equity* category. The former argues that reduced rates can increase total productivity by giving individuals an incentive to spend less time on low productive do-it-yourself work and more time on their jobs instead. A distortion caused by the income tax system should hence be minimised through differentiated consumption tax rates. Moreover reduced rates are said to lower the cost of low-skilled labour and hence decrease structural unemployment (Copenhagen Economics 2007, p. 12). Arguments falling within the equity category stress that reduced rates

can benefit low-income households and correct for rising income inequality. Furthermore they enlarge the demand for merit goods such as cultural goods and thereby broaden the access to them for everyone in society (ibid.). Reductions or exemptions are often applied to food, newspapers, pharmaceuticals, water supply and cultural goods (OECD/KIPF 2014, p. 19).

Nevertheless, equally important to note is that higher VAT rates might have the same effect as reduced rates – but in the opposite direction. When reduced rates are introduced usually the standard rate is increased in order to collect the revenue foregone. This increase in the standard rate can suppress demand for the respective goods and hence employment. Therefore, the effect of reduced rate might very likely be nullified (Copenhagen Economics 2007, p. 11). The report by Copenhagen Economics models the effects that reduced rates for efficiency purposes have. The effects tend to be mostly short-term (2007, p. 27). Taking into consideration the administrative costs related with reduced rates, it is questionable how efficient reduced rates are in achieving their objective of increasing productivity or reducing structural unemployment.

Turning to the category of equity arguments, many studies find that reduced rates benefit the poor proportionally more. An overview on this empirical work concerned with the distributional effects of the VAT is provided in the next section. Most countries apply VAT systems with reduced rates for necessities such as food. There is however some controversy over the effectiveness of this measure. Critics claim repeatedly that the distributional effects of the VAT are at most chaotic (Amrein, 2014). Calculations from the OECD show that in absolute, cash terms the rich profit more from reduced tax rates than the poor, however the poor benefit more with respect to their expenditure (OECD 2014, p. 52). This result holds for the reduced rate on food. From the reduced rates on books, museums and cultural events the rich even profit more proportionally (IFS 2011, p. 390 and OECD/KIPF 2014, p. 60). Similarly, in Switzerland for every Franc the poor profit from the reduced rate on food, the rich get a 2 Franc benefit (Swiss Federal Council 2010, p. 5406). Given this result it is reasonable to ask whether reduced rates are the best way to do distribution policy. If a separation between goods consumed by low-income and high-income households is not possible, because there are no specific goods consumed solely by a certain group, reduced consumption tax rates will necessarily lead to this so-called *mechanical revenue loss* (Copenhagen Economics 2007, p. 6). Even though the tax might fulfil its purpose of relieving the poor, it has the side effect of relieving the rich even more. Besides not efficiently achieving the equity goal, the reduced rates or exemptions, which lead to a hidden tax can moreover distort input choices and provide an incentive for self-supply (Bodin et al., 2001). Reduced rates and exemptions are also said to generally bias investment and production decisions (ibid.).

Another argument against reduced rates comes from a political economy perspective and states that a system with reduced rates and many exemptions usually leads to *exemption creep*. This term refers to a process in which one exemption gives rise to requests for another, both downstream and upstream in the production process (Bodin et al., 2001). If food is exempted from VAT, this enhances pressure for exemptions of agricultural input products. The same applies to the other direction: If a firm uses exempted input goods and produces goods that are taxable, there is an interest to obtain an exemption for the respective taxable good (ibid.).

Weighing the different arguments, the existence of reduced rates or exemptions can be better justified on equity than on efficiency grounds. Empirical studies on the equity effects of the VAT are discussed in the next section.

2.4 Distributional Effects: Empirical Evidence

Empirical studies on the distributional effect of the VAT have been conducted for different countries, mainly in Europe, and some of the results from this research are presented here. Talking about income distribution, it should be clarified that a tax is considered to be progressive if it hits high-income individuals proportionally harder than low-income individuals and regressive the other way round (IFS 2011, pp. 364f).

Leahy, Lyons and Tol (2011) analyse the impact of the VAT on income distribution in Ireland. The authors use a household survey and perform simulations for various tax rates (2011, p. 214). They find that the current VAT system is highly regressive, with a tax burden in respect to income of 16% for the lowest income decile and 6% for the highest income decile (ibid. p. 219). Single parents households pay the highest share of income in VAT while couples pay the lowest amount (ibid.). Exploring reform possibilities, the authors find a flat rate of 10.9% (compared to a standard rate of 21% and a reduced rate of 13,5% today) on all goods and services to be distributionally neutral and to raise almost the same amount of revenue (ibid. p. 220). Due to the fact that a uniform tax rate would lower administrative costs, the small revenue loss of 0.6% of total VAT revenue collected could possibly be offset (ibid.). Leahy, Lyons and Tol moreover discuss the implications of other possible reforms such as zero-rating all foods or introducing a reduced rate on fuels. They also examine the planned increase in the standard rate, which according to them will result in an even more regressive value added tax system (ibid. p. 228). In contrast to the OECD study on the distributional impact of the VAT, the study for Ireland always

measures the VAT burden as a percentage of disposable income, which might partly explain the high degree of regressivity.

Decoster et al. (2010) analyses the distributional impact of the consumption tax system in five European countries, namely the UK, Ireland, Belgium, Greece and Hungary, and find that taxing consumption is regressive in all countries when measured with respect to disposable income. They supply evidence that this result is due to the regressivity of both the excise tax and the value added tax system (Decoster et al. 2010, p. 347). However, taking total expenditure as a base they find a progressive consumption tax system (ibid.). Moreover, the authors use a micro simulation program for the European Union countries, EUROMOD, to perform an ex-ante evaluation of possible policy reforms that shift the tax burden from labour to consumption by lowering the social insurance contributions from employees by 25% and increasing the VAT such that the reform is revenue neutral (ibid. pp. 340ff). Such a substantial shift in the tax structure results in a more regressive tax system in all the studied countries (ibid. p. 342). According to Decoster et al. the reason for this is the indirect tax system being less progressive than the system of employee social insurance contributions (ibid. p. 346). Thus, the authors conclude that if a government wants to keep the current level of income redistribution, a shift from labour to consumption taxation has to be accompanied by an increase in progressivity in the personal income tax (ibid.).

O'Donoghue et al. (2004) analyses consumption taxes in Europe with respect to their redistributive effect. Twelve countries are evaluated using the EUROMOD tax-benefit model. In a first step the progressivity of indirect taxes is measured and then, in a second step their redistributive impact is assessed and compared to other policy instruments (ibid. p. 1). The authors consider VAT, excise taxes and ad valorem taxes, which are based on the value of the product (ibid. p. 2). They find VAT to be proportional or slightly progressive when measured as a proportion of total expenditure and regressive when measured as a share of disposable income (ibid. p. 10). Turning to the results of the redistribution analysis, O'Donoghue et al. states that, for all countries, consumption taxes put a higher burden on low-income households than on high-income households and are thus negatively redistributive (ibid. p. 13). Compared to the other policy instruments and components of the overall tax system, VAT and excise duties have a minor redistributive effect (ibid. p. 21). This supports the theoretical notion that the scope for redistribution through consumption taxes is limited (Bodin et al. 2001, ch. 7).

The OECD study mentioned before (OECD/KIPF, 2014) investigates, besides analysing a sample of OECD countries, the country-specific situation in Korea. The VAT accounts for the greatest share of tax revenue in Korea. Most of the resources are collected through a low single rate tax.

The tax burden from the value added tax is regressive, when measured as a proportion of income and progressive when measured as a share of expenditure across income deciles (OECD/KIPF 2014, pp. 77ff). The main result so far, that is, that the base of measurement is crucial for the interpretation of the distributional impact of the VAT, holds in this case as well. What distinguishes the study about Korea from other studies is the definition of expenditure, which takes *pre-tax* expenditure as the measure of expenditure. Hence, all tax paid in VAT or in excise duties is subtracted from total expenditure before calculating the VAT burden (ibid. p. 77). This can be criticised as it implies that the VAT burden depends on the excise tax burden. To illustrate, a household, which spends a substantial amount in excise taxes seems to bear a higher VAT burden than a household with equivalent total expenditure and equivalent VAT spending in cash but with a lower share of spending in excise tax. Even though these households are equivalent with respect to their VAT spending and with respect to their total expenditure, they appear to shoulder different VAT burdens.

What the empirical studies presented here have in common is their focus on the measurement of the tax burden. They stress the differences in results one obtains when changing the base of measurement and provide arguments for both alternatives. The pattern is clear: Taking expenditure as a base results in proportional or slightly progressive VAT systems, whereas the picture changes when the tax burden is calculated with respect to disposable income. The question hence is which measurement is more reasonable or realistic and should provide a guideline for how to design a tax system. This is discussed more comprehensively in section 3.3.2.

A factor that is not assessed in detail by the papers presented is the question of actual tax incidence. It is not clear whether the economic incidence always lies on the consumer, although this should be the case. There might be less-than-full pass-through as well as more-than-full pass-through of the value added tax. If a firm has monopolistic power, it will probably pass the tax fully on the consumer. In contrast, if a firm faces decreasing demand, it might decide to not fully pass-through the tax in order to lower the consumer prices. However, due to lack of data full tax shifting is commonly assumed. Warren (2008, p. 14) criticises this assumption and stresses that the main challenge consists of measuring the real tax burden on individuals or households even though this might be complicated and data requirements might be higher.

Since the aim of this paper is to perform an analysis of the distributional effects of the VAT in Switzerland, the Swiss taxation system is introduced before turning to the data.

2.5 Consumption Taxes in Switzerland

The Swiss taxation system is organised according to a principle of subsidiarity. Taxes are hence levied on a federal, regional and communal level. The value added tax, which was introduced 1995 in order to replace a sales tax on goods, is levied at the federal level (FDF 2015, p. 15). The VAT (in the Swiss context called MwSt, Mehrwertsteuer) is a general consumption tax that is collected on all levels of production, trade and the service sector within Switzerland, on the purchase of services from companies abroad and on the import of goods (ibid.). Every business has to be registered and pay VAT if the turnover is above a certain threshold. In 2010 this threshold was raised from 75,000 CHF to 100,000 CHF (FTA, 2015b).

While the base of taxation is the consumer, businesses collect and pay the tax. Taxes on inputs purchased for production can be deducted. This so-called pre-tax-deduction prevents that the same good is taxed more than once. Thus, even though the tax is levied at every stage of the production process, the tax burden is borne by the final consumer (OECD 2014, p. 18). With the possibility to credit the tax, distortions in production or investment decisions should be prevented (ibid.). It also introduces significant costs for tax avoidance. A firm who wants to avoid the tax is not able to credit the tax paid on purchases and therefore has higher input costs than its competitors. Together with the risk of detection and the expected punishment the drawbacks of tax avoidance soon become larger than its profits.

Three different tax rates exist in Switzerland and there are several goods and services, which are either free from the tax or exempted. This difference is important: Companies producing goods and services, which are free from VAT can make use of pre-tax-deduction and get money back paid on purchases, while those producing goods and services that are exempted from the tax cannot do this (FDF 2015, p. 16). When the deduction of taxes on purchased goods is not possible, the tax burden is not fully borne by the consumer but stays partly within the production process. This so-called *taxe occulte*, hidden tax, is said to be inefficient and to hinder investment (Schaltegger et al., 2005). Reduced tax rates can create such effects as well. The extent to which exemptions distort decision-making within a firm depends on the stage of the production process where the tax applies. It is not very problematic if the hidden tax occurs at the last stage of the production process, in this case firms might just pass the tax through to the consumer via higher prices. If the hidden tax however applies to intermediate goods, cascading price effects can be

observed, which produce incentives for vertical integration, that means firms decide to produce the inputs themselves (OECD 2014, p. 47).

Since the 1st of January 2011 the applied rates are:

- 8.0% as the standard rate (7.6% prior to 2011)
- 2.5% as a reduced rate on: food; cattle, poultry and fish; cut flowers, living plants and seeds; wheat; feedstuff and fertiliser; medication; newspapers, magazines and books; services and goods from public radio and television stations (previously 2.4%)
- 3.8% as a special rate on accommodation services, hotel business and rental services for holiday homes (previously 3.6%)

In the category of exempted goods belong services in the health sector, within social help, education, childcare, cultural services, insurance services as well as turnovers in the financial sector, long-term rental services, bets and the lottery. Insurance services and turnover in the financial sector are mainly exempted because of their difficulty to be taxed. The other services are exempted for social reasons or because of economic conditions (FTA, 2015d). Free from VAT and therefore applicable for pre-tax-deductions are all goods produced for export, transportation services across the border as well as services, which are used abroad (FDF 2015, p. 16).

The history of the reduced rates goes back until 1941 when a turnover tax was introduced in Switzerland (economiesuisse 2013, p. 9). Goods classified as necessities were taxed with a lower rate, because especially poor households allocated a substantial share of their income to such goods. For instance the amount spent on food accounted for more than 35% of a household's income in 1941, while today this share is approximately 7% (ibid.). Besides distributional aspects, the reduced rates are also used to induce the consumption of goods, which are seen as merit goods such as cultural goods, books and newspapers (OECD 2014, p. 51).

The personal income tax is the most important source of fiscal revenue in Switzerland (OECD, 2014b). It is followed by the VAT, which accounts for 20% of total tax revenue (ibid.). The revenue from the VAT was 22,561 billion Swiss francs in 2013 (FTA, 2015a). Other taxes and fees levied are excise taxes on beer, spirits, tobacco, petroleum, a tax on automobiles, a fee for heavy vehicles, a CO² tax and a fee on volatile organic compounds (SCA, 2015b). As these taxes serve another purpose they are not going to be considered further.

The VAT system is viewed as complicated and the reduced rates inefficient when it comes to their purpose (Keschnigg, 2010). A simplification of the system would therefore include the

elimination of at least some exemptions. In 2008 the Federal Council suggested a reform of the VAT that included the elimination of the reduced rates as well as of many exemptions (Swiss Federal Council, 2008). However, the reform did not pass parliament. A main argument was that it would hit the poor proportionally harder. Moreover, particular political interests from groups that benefit from reduced rates nowadays prevented the reform from being successful.

In order to see whether such a reform indeed would have a regressive impact and generally to evaluate what the effects of a uniform VAT rate are, the proposal is used for the simulation of the uniform tax.

Summing up, this section introduced the functioning of the value added tax and its prevalence today. The theory of optimal taxation was illustrated and the arguments for rate differentiation were evaluated. After presenting empirical research with respect to the distributional aspects of consumption taxed, the situation in Switzerland was laid out such that one can now turn to the data.

3 Data & Methodology

This chapter describes the research approach, the data and the methodology. Furthermore assumptions and limitations of the chosen approach are discussed.

3.1 Research Approach

The aim of the paper is to assess the distribution of the VAT burden in Switzerland and to simulate a uniform tax rate whose effects are analysed with respect to distributional aspects. In the Swiss Household Budget Survey (HBS) detailed data on household consumption is available, which makes it possible to estimate the amount of VAT paid by the household. The model is constructed by matching expenditure from the household survey to its corresponding tax rates. The amount of VAT paid by the households is then calculated for different household types, across income quintiles by applying the tax rates to the corresponding amounts of expenditure. The tax burden is measured as the share of VAT spending in relation to disposable income and total expenditure. In order to simulate the effects of a flat value added tax, the estimated tax revenue, which will be compared to the actual revenue, is used to calculate the tax rate needed on all consumption goods for the reform to be revenue neutral. Assuming that households do not significantly alter their behaviour, the tax burden in a system of a uniform rate with very few exemptions is calculated. Again the tax burden is estimated in relation to disposable income and expenditure. The distributional effects of such a reform are analysed. Underlying assumptions and limitations of this approach are discussed in detail in section 3.4.

3.2 Data

This section describes first the Household Budget Survey before showing some descriptive statistics about the income and expenditure in the survey.

3.2.1 Household Budget Survey

This data is taken from the Swiss Household Budget Survey (HBS), which each year randomly selects households to keep track of their expenditures for one month. Socio-economic indicators and information are asked to complete the survey.

The sample population of the Household Budget Survey is the permanent resident Swiss population and the sample units are private households. Collective households such as prisons or elderly care homes are thus not included. Each year approximately 3000 households participate in the survey. The selection of participating households is done randomly by drawing households from the Swiss Statistical Office's random sample register (FSO, 2013a). Telephone interviews and written questionnaires are the means by which the survey is conducted. The focus of the survey lies on the consumption and income of the households. Other characteristics such as size and type of household, major region and linguistic region, income bracket, age and gender of reference person as well as the status of household occupants, that is, whether they are tenants or owners, are asked additionally. The data is weighted on three different levels in order to ensure a representative picture of the Swiss population. First the sample is weighted according to the including probability. Then the probability of participation of a household is taken into account by considering certain other variables like the socio-economic background of a household. In a last step a calibration method, which is based on the known distribution of the Swiss population, is applied (FSO 2013a, p. 8). Biases due to household selection and participation should be minimised by this procedure. The results from the survey are subsumed in periods of three years (ibid.).

The data used for this analysis is weighted and aggregated data; specifically the data is aggregated across income quintiles, based on gross income. Data from 2006-2008 and 2009-2011 is used. While the focus lies on the current distributional aspects, the development over time will be analysed shortly as well. Problems arising due to the data structure will be discussed in section 3.4.2.

3.2.2 Income and Expenditure in the HBS

The following two tables show the income distribution in the two survey periods. One observes that in both periods total expenditure is greater than disposable income for the first and the second quintile. Expenditure almost equals disposable income for the third quintile in 2006-2008. The

forth and the fifth quintile spend clearly less than their disposable income. This shows that borrowing and saving patterns are present.

Table 1: Income and expenditure of households, 2006-2008

	Gross Income	Disposable Income	Total expenditure
All households	8916	6338	5826
Poorest (below 4610)	3244	2332	3223
2 nd quintile (4610-6674)	5700	4132	4364
3 rd quintile (6675-8953)	7758	5586	5466
4 th quintile (8954-1230)	10494	7558	6700
Richest (above 12321)	17377	12080	9377

Note: Values in CHF. Thresholds for income quintiles in parentheses. Source: Author's elaboration, based on HBS (FSO, 2014).

The difference in the average gross income between the first and the second survey period is CHF 614. The disposable income increased by CHF 403 and total expenditure by CHF 159. It can be observed that the gross income for the first two quintiles increased by roughly half of the average amount, while it was substantially more for the high-income households.

Table 2: Income and expenditure of households, 2009-2011

	Gross Income	Disposable Income	Total expenditure
All households	9530	6741	5985
Poorest (below 4880)	3475	2538	3354
2 nd quintile (4880-7173)	6053	4299	4535
3 rd quintile (7174-9702)	8414	6074	5657
4 th quintile (9703-13170)	11255	8108	6877
Richest (above 13171)	18448	12682	9501

Note: Values in CHF. Thresholds for income quintiles in parentheses. Source: Author's elaboration, based on HBS (FSO, 2014).

Information about the income and expenditure of the different household types can be found in Appendix C.

3.3 Methodology

This section describes the methodology applied and introduces the definitions needed in order to analyse the distributional effects of the value added tax. Moreover, assumptions and limitations of the analysis are discussed.

3.3.1 Assigning Tax Rates to Expenditure

The first step in this data analysis is to match categories of expenditures to different tax rates. There are 361 expenditure items in the survey. Hence the sub-categories are very specific, which makes the analysis possible in the first place. Even though the categories are accurate, it is not always straightforward to determine the corresponding tax rate. To illustrate, one can look at the category of *Package trips*. Here the tax rate is difficult to assign, as first one cannot separate the expenditure for transportation, accommodation and restaurants. If transportation is by air, it is free from VAT. Accommodation would be taxed with a special rate, if it were in Switzerland. However, as most package trips have a destination abroad, the whole category is declared as exempted. A table (Table 11) with all categories and the respective tax rate can be found in Appendix A. If the matching was not straightforward, the problems with the category and the arguments are shortly described. After having assigned tax rates to the various categories of goods and services, expenditures of goods of the same tax rates are added and the amount of tax paid is calculated. This is done for the three different tax rates to obtain the total amount of VAT paid per household.

3.3.2 Calculating Tax Burden Ratios

Subsequently tax burden ratios are calculated. Two different measures are considered: VAT burden as a share of disposable income and VAT burden as a share of total expenditure. There are different arguments for the two measures.

While VAT burden with respect to disposable income gives a valid picture of the actual situation, it is seen as inadequate to assess the tax burden in a lifetime context (OECD/KIPF 2014, p. 36).

This is because the effect of borrowing and saving is not taken into account. To illustrate, the savings in one period will result in expenditure in a future period and hence be taxed. Or they are used to pay back loans or credits with which taxed consumption has been financed in the past (ibid. p. 34). The high income today will thus likely be subject to VAT in a lifetime context. To remove these effects of saving and borrowing, an expenditure-based approach is chosen. For example students are temporarily poor and have probably a rather high expenditure because they have student loans. The VAT burden they face now does not reflect adequately the tax burden they face over their lifetime, as they will earn more and hence incur a lower tax burden during their working life. According to the life-cycle theory by Modigliani and Brumberg, consumption-spending patterns are more stable during a lifetime than incomes as individuals adjust their saving and borrowing behaviour in different cycles of life in order to smooth consumption (Deaton, 2005). It could be observed in Table 1 and Table 2 that patterns of savings are present and they seem to be rather strong for some income groups. These patterns can also be observed for different household types, see Appendix C. Consequently, when analysing distributional effects, it seems superior to look at the tax burden as a proportion of expenditure.

Total expenditure is defined as consumption expenditures (including housing) plus the category of “other expenditures”, including optional insurances, fees and gifts.

Figure 1: Definition total expenditure

$$\begin{array}{l}
 \hline
 \text{Consumption expenditure} \\
 + \text{ other expenditures (insurances, fees, gifts)} \\
 \hline
 = \text{ Total expenditure} \\
 \hline
 \end{array}$$

Source: Author's elaboration according to HBS (FSO, 2014).

On the other hand the income-based approach is superior in the way it already takes into account the effects on the tax and transfer system. The figure below shows how disposable income is defined in the Household Budget Survey. The same definition of disposable income is used in the tax-benefit micro simulation model for the European Union, EUROMOD, which is applied in some of the studies mentioned above.

Figure 2: Definition disposable income

Labour income
+ Income from capital and properties
<hr/>
= Primary income
+ Social-security benefits and pensions
+ Monetary transfers from other households
<hr/>
= Gross income
– Mandatory transfer expenditure
– Monetary transfers to other households
<hr/>
= Disposable income

Source: Author's elaboration according to HBS (FSO, 2014).

Because taxes as well as social-security benefits are included in the calculation of disposable income, the distributional effects of the income tax and the transfer system are considered. This means that we are looking at the actual situation and simulate a reform solely concerning the VAT, accounting for the other parts of the tax system and holding them constant.

The results of this analysis are presented across the income distribution (income quintiles are used, based on gross income) in the two waves of the survey. Hence income is used to measure whether a household is rich or poor. Expenditure could be used as well to distinguish poor from rich households; these two alternatives are seen as balanced (IFS 2011, p. 365, or see Crossley et al., 2009 and Carrera, 2010). However, due to data availability only the income approach is used in this work. The effects on different household types are analysed. The HBS defines five different household types: Single households containing one adult under the age of 65, couple households in which the reference person is under the age of 65, couples with one or more children (children under the age of 18 and between 18 and 24, if still in education), pensioner single households above 65 and pensioner couple households in which the reference person is over the age of 65.

Some of the methodological issues and their theoretical background are addressed in the following section.

3.4 Assumptions and Limitations

Some assumptions made in order to conduct the analysis and the simulation, are elaborated below. Additionally the limitations of the methodology are discussed.

3.4.1 Assumptions

Tax shifting assumptions

This study, as many other empirical papers (e.g. OECD, 2014a; IFS, 2011; Decoster et al., 2010; Leahy et al., 2011), assumes that the economic incidence of the tax lies on the consumer. While the statutory incidence is on the firms producing goods and services, tax shifting is assumed such that the consumer bears the tax burden in the end. However, as mentioned in section 2, due to many exemptions without pre-tax-deduction a hidden tax exists that cannot be directly passed on consumers. Estimations for Switzerland suggest that around 30% of total VAT revenue stems from this source (economiesuisse 2013, p. 8). Therefore, one has to be aware that taxes are not always shifted completely to the consumers. They might either be less or more than fully passed on (OECD/KIPF 2014, p. 28). One can assume that the tax is forwarded to consumers through higher prices. Hence consumers also pay a tax on goods that are exempted from the VAT. The amount of taxes paid by households is therefore probably underestimated. In contrast the opposite can be true for goods with high demand elasticity, like meals in a restaurant, and a vivid competition among the firms producing the good (ibid.).

Behavioural responses

When simulating the effect of a uniform tax rate, the simplifying assumption that households do not change their consumption pattern is made. Different arguments can be made for this assumption. First, talking about necessities, which are taxed with a reduced rate now and subject to a higher rate after a reform, households do not have a great choice to shift their consumption to lower taxed goods, since there are none. Also, demand elasticities of items such as food tend to be very low (Leahy et al. 2011, p. 218). Secondly, the reduction from the standard rate to a uniform tax rate will most likely not be very substantial. It is therefore plausible to assume that behavioural response stay within a small margin. Thirdly, one can argue that ignoring behavioural responses and being aware of the uncertainties of the results is favourable opposed to model the changes with many assumptions, which are hard to test for.

VAT exemptions

Twenty-nine goods are either exempted from VAT or zero rated, that is, free from VAT and can hence obtain refunds for VAT paid on input goods. As previously mentioned, it is not clear whether or not producers of exempted goods shift the tax to the consumer. If tax shifting takes place, the consumer already bears a tax when consuming tax-exempt goods. Due to data limitations in this area, this paper follows the approach from the OECD study (OECD/KIPF 2014) and does not distinguish between zero rated and exempted goods in the analysis. This leads probably to an underestimation of the actual tax burden and the revenue. It could also lead to an underestimation of the regressivity or the progressivity of the tax system. The effect of the bias depends on the economic tax incidence of the hidden tax. Since there is no evidence on this, the issue unfortunately cannot be considered further.

Consumer durables

In the HBS all purchases are included, also the purchase of durables (FSO 2013a, p. 8). If the expenditures do not take place on a daily or weekly basis it is asked how frequently such purchases are made. Based upon this information, an optimal survey period is specified for different goods and the average monthly expenditure for infrequently purchased durables can be calculated (ibid. p. 7). This procedure ensures that durables are neither under- nor overestimated in the survey.

3.4.2 Limitations

Excise taxes

The OECD study (OECD/KIPF 2014) also covers excise taxes imposed on alcohol, tobacco and transport fuels in order to assess the whole consumption tax burden. Excise taxes are often calculated ad valorem and or ad quantum, that means based on their value and or their quantity (OECD/KIPF 2014, p. 29). In Switzerland ad quantum taxes are levied on fuels, alcohol (spirits and beer, but not wine) and tobacco (SCA, 2015a). On tobacco also an ad-valorem tax is levied. While alcoholic beverages are additionally liable to VAT, fuels and tobacco products are not (ibid.). As the idea behind taxes on alcohol, tobacco and fuels is mainly to decrease their use with respect to negative externalities, these excise taxes are excluded from the analysis. This is without doubt a limitation when analysing the total tax burden for households. Nevertheless, as excise taxes are not affected by a change in the general VAT, it is reasonable from a policy perspective to exclude these taxes from the simulation.

Deadweight loss, administration and compliance costs

The deadweight loss of a tax as well as the administration and compliance costs can justifiably be counted as a part of the tax burden (Warren 2008, p. 13). Nevertheless, due to the lack of data on these variables, this part of the tax burden is ignored when analysing the current situation. The tax burden is hence defined as the amount of VAT spent per household. An important assumption discussed above is that households do not alter their consumption patterns because of the tax reform. This implies that there is no additional deadweight loss caused by the reform and consequently the deadweight loss is ignored in the simulation as well.

Taxes on non-residents and taxes by other countries on residents

Analysing the value added tax burden of private households necessarily ignores taxes imposed on non-residents. At the same time taxes imposed on households by other countries, for instance through travelling and consumption abroad, cannot be modelled due to data constraints. However, as the aim of the paper is to analyse the VAT burden resulting from the Swiss system, this is a minor limitation.

Changes in the transfer system

When comparing the tax burden of the VAT for different income groups with respect to disposable income, the income tax system is already taken into account. This is favourable as one likes to look at the current situation with the income tax system in place. However, if major reforms have taken place, comparisons become flawed. In Switzerland, the greatest part of income taxation does not occur on a federal level. The cantons have fiscal sovereignty and consequently the tax rates differ substantially between the various cantons. Minor reforms like a change of the tax rate occur frequently and might influence the income distribution reflected in the HBS. Nevertheless, because of lacking regional data, possible effects from changes in the cantonal income taxation cannot be considered here.

Mandatory transfer payments, like the health insurance premium, have been on the rise constantly during the last decade (FSO, 2015b). As the health insurance premium is the same across different income groups it does not impact the distribution of income and is therefore not of special concern. With regard to the social security contributions paid by employers and employees, the overall burden decreased from 12,6% to 12,5% in 2011. This 0,1% reduction was divided into a 0,05% decrease for both the employee and the employer. The working population hence faced a

very slight reduction of their mandatory transfer payments in 2011 (FSIO, 2015). In the current setting, an evaluation of this change is not feasible.

Data

Some limitations stem from the data source used in this work.

Accumulation of years

Three years were cumulated into one survey period, from 2006 to 2008 and from 2009 to 2011, in order to obtain reliable estimates for household types, which have a low participation rate such as for instance pensioners. This is problematic when it comes to comparability. Prices might have changed during this three-year period due to inflation or other factors. In spite of that, no inflation adjustment takes place in the HBS. At the same time consumption patterns could have been adjusted during this time span exactly because of the change in prices and it is reasonable to argue that not all income groups adjusted their behaviour to the same extent. Looking at the changes in the Consumer Price Index (CPI) between 2006 and 2008, some categories of goods have seen substantial price changes. In total the CPI was 3 points higher in 2008 than in 2006 (FSO, 2015a). In the second survey period considered here, 2009-2011, the changes are smaller, overall the CPI increased by 1 point between 2009 and 2011 (ibid.). Because the change in the CPI is attributed mainly to price increases in goods, which are not liable to VAT, like fuels and rentals, an inflation adjustment is not likely to improve the quality of the data. Therefore, no correction for inflation is performed.

Another issue to be considered is that a change in the VAT rate was introduced the 1st of January 2011. While this is unproblematic for the first wave, 2006-2008, it poses difficulties for the analysis of the data from 2009-2011. The effects of the reform cannot be assessed properly due to the accumulation of the data. However, as is not a main goal of the paper to assess changes over time, it will not be investigated further. For the analysis of the period 2009-2011 the old VAT rates are applied, first for simplicity and second because only one out of three years is affected by the higher VAT rates. We assume that households did not adjust their behaviour, as the changes in the rates were minor. Still, naturally this procedure will result in some inaccuracies.

Aggregation of the data

The data used in this paper is, as mentioned, aggregated data. This diminishes the scope of possibilities for analysis. Some studies (see IFS, 2011) argue that distinguishing between poor and rich by the distribution across expenditure has advantages in so far as expenditure seems to be a

better proxy for lifetime wealth than income (ibid. 373). The households are sorted across income distribution, based on gross income. Other studies sort the households across disposable income distribution. Due to the aggregation level of the data it is not possible to use and evaluate the different approaches in the analysis.

Another limitation arising from the aggregation of the data is that one cannot perform a household equalisation, which is usually done to adjust the income of households with different compositions in order to achieve comparability. The so-called equivalence scales assign different weights to the household members, based on characteristics such as for instance age (Anyaegbu 2010, p. 50). If no equalisation takes place, households with varying characteristics are compared. To illustrate, there might be many single households in the lowest income category while there are probably more families, that is, couples with at least one child, in the higher income groups. This should be kept in mind when looking at the overall picture. The problem fortunately becomes significantly smaller in the analysis of different household types; there the composition of the household is already taken into account.

The results of the analysis are presented in the subsequent section.

4 Results

This chapter presents the results from the calculations of the VAT burden of households in different income groups as well as the results from the simulation and its effects with respect to distributional aspects.

4.1 Value Added Tax Burden

In the first survey period, 2006-2008, the average tax burden per household was 217,7 Swiss Francs per month. In the second period, 2009-2011, this value amounted CHF 222. Based on these numbers, the total revenue from private households per year was calculated and compared to the actual VAT revenue according to official statistics. The calculated amount is lower than actual VAT revenue for two reasons. First, VAT paid by companies that sell goods exempt from the tax and thus cannot credit the VAT paid on input goods is not included and might make up to 30% of total tax revenue (economiesuisse 2013, p. 8). Second, household surveys tend to underreport consumption when compared to national accounts (IFS 2011, p. 367). In Table 3 below the actual VAT revenue is compared to the calculations performed.

Table 3: Revenue under the existing tax structure

	Estimated VAT revenue		Official Statistics
	CHF in billions	% of actual VAT	CHF in billions
2006-2008	8,485	42,99	19,738
2009-2011	9,296	44,77	20,764

Note: For the official values, the average from the three respective years was taken. Source: Author's elaboration, official statistics according to FTA (2015a).

The study by IFS (2011) calculates the revenue ratios for European Union countries and finds numbers that account for in between 44% of total VAT revenue in Germany and 97% in Greece (2011, p. 368). The numbers obtained here, approximately 43% and 45%, hence can be assigned to the lower range of estimations.

4.1.1 Tax Burden: With Respect to Income

The average VAT burden per household measured with respect to disposable income is 3,67% for the period 2006-2008 and 3,52% for the period 2009-2011. Measuring the average tax burden across the income distribution as a share of disposable income the VAT is slightly regressive. In both survey periods the first quintile has the highest share of VAT and this share is falling when moving across the distribution. The better off the households are the smaller is the share of their income they pay in VAT. Comparing the two survey periods a decline in the tax burden can be noticed. This decline is present for all income groups except the second quintile, where the burden remains unchanged.

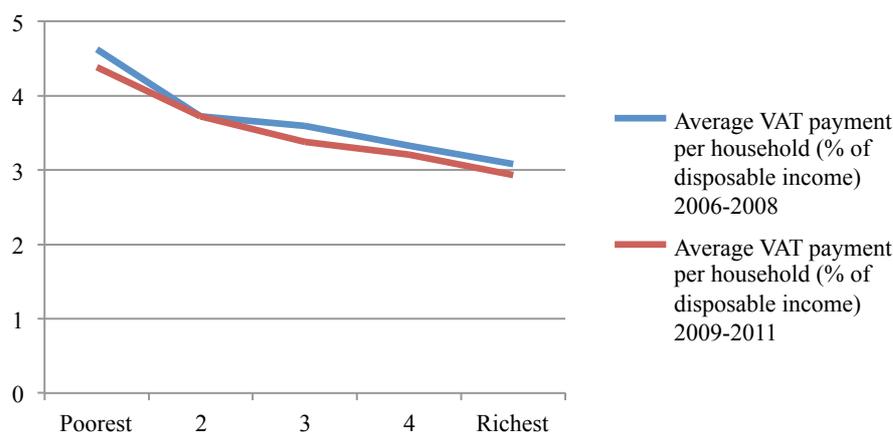
Table 4: VAT burden across the income distribution (% of disposable income)

Income Quintile Group	Average VAT burden per household (% of disposable income)	
	2006-2008	2009-2011
Poorest	4,62	4,38
2	3,72	3,72
3	3,59	3,38
4	3,33	3,21
Richest	3,08	2,93

Source: Author's calculations based on HBS (FSO, 2014).

This result is displayed in the figure below, where one observes the regressive pattern and the small decline from the first to the second survey period. It is further notable that the burden from the valued added tax is small in general, with a share of VAT spending approximately between 3 and 5 % of disposable income.

Figure 3: Average VAT payment per HH (% of disposable income)



Source: Author's elaboration based on HBS (FSO, 2014).

4.1.2 Tax Burden: With Respect to Expenditure

The average overall tax burden with respect to total expenditure is 3,65% in the first survey period, 2006-2008, and 3,63% in the second period from 2009-2011. Thus it is higher than when measured with respect to disposable income. The decline in the overall tax burden, which was observed before, is much smaller when measuring the tax burden with respect to expenditure. While the two different measurement concepts lead to a tax burden that is almost equal in the first survey period, the shares differ more for the second period.

When assessing the tax burden with respect to expenditure across the income distribution, the regressive pattern disappears. The VAT is slightly progressive when evaluated from a lifetime income perspective. The decrease in the tax ratio between the first and second survey period, which could be observed with respect to income, becomes smaller and is not present throughout all income groups anymore. For the second as well as the fourth quintile the tax burden rose by 0.01 and 0.02 percentage points, respectively. A small decrease is observed for the other income groups.

Table 5: VAT burden across the income distribution (% of expenditure)

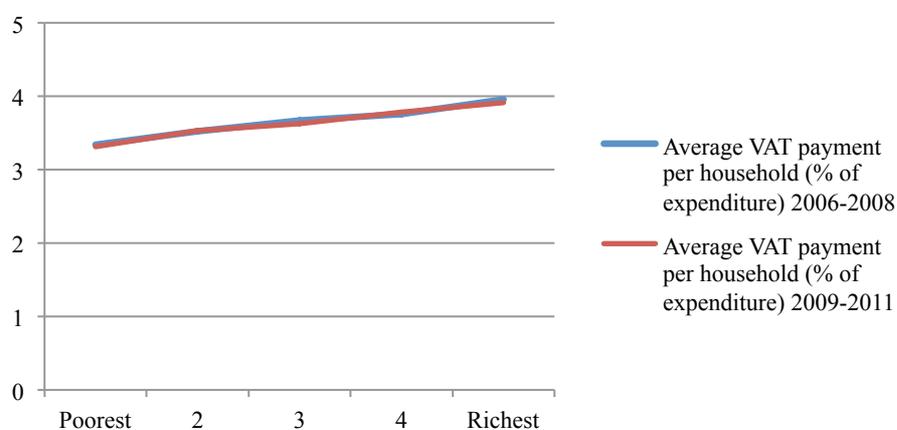
Income Quintile Group	Average VAT burden per household (% of expenditure)	
	2006-2008	2009-2011
Poorest	3,34	3,31
2	3,52	3,53
3	3,67	3,63
4	3,76	3,78
Richest	3,96	3,91

Source: Author's calculations based on HBS (FSO 2014).

The differences between the income groups are very small in both survey periods. Measuring the tax burden with respect to income led to an decrease of 1,54 percentage points from the first to the fifth quintile for the first survey period, while here, taking expenditure as a base, we observe an increase of 0,62 percentage points. For the second survey period the decrease is 1,45 percentage points when adopting an income base, compared to a 0,6 percentage point increase when looking at the tax burden as a share of total expenditure. The regressivity that can be seen with income as a measurement base is thus stronger than the progressivity observed with expenditure as a base.

In the figure below it becomes visible that the differences between the survey periods are minor.

Figure 4: Average VAT payment per HH (% of expenditure)



Source: Author's elaboration based on HBS (FSO 2014).

It has to be kept in mind that the above-presented results are averages over a quintile, and thus might not reflect the effect on all groups within a quintile. It also has to be acknowledged that an equalisation of households (according to the number and characteristics of household members) could not be performed with the publicly available data. The results for different household types are shown in the next section.

4.1.3 Tax Burden: Different Household Types

More insights into the distributional patterns can be gained by analysing the effects for different household types.

With respect to disposable income

In the first survey period the pattern of the tax burden is generally regressive when analysed as a share of disposable income. However, in at least one of the survey periods for all household types the third quintile has a lower share of VAT spending than the fourth. The difference is nonetheless minor. Single households in the first quintile have clearly the highest share of VAT spending with respect to their disposable income in 2006-2008. Surprisingly this share drops substantially in the second survey period (-1,29 percentage points). Single households still pay the greatest burden in 2009-2011, closely followed by pensioner couples. In contrast, on average it is couples with children that pay the highest VAT burden in the first survey period. Pensioner couples have on average the most considerable tax burden in the second survey period.

Generally the tax burden ratios drop for three groups from the first to the second period; Single households, couples and couples with children pay a smaller share, while single pensioners and pensioner couples pay more. The slight decrease when looking at the main picture (see Table 4) can therefore be attributed to the working households and hence probably to rising incomes.

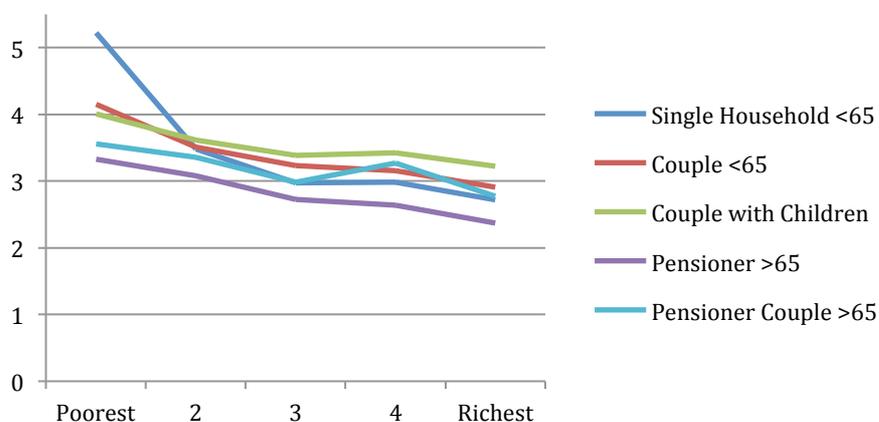
Table 6: VAT burden across income distribution and household type (% of disposable income).

Income Quintile Group	Average VAT burden per household (% of disposable income)									
	Single Household <65		Couple <65		Couple with Children		Pensioner >65		Pensioner Couple >65	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
Poorest	5,22	3,93	4,15	3,86	4,01	3,59	3,33	3,44	3,56	3,92
2	3,48	3,08	3,51	3,32	3,62	3,28	3,08	3,06	3,36	3,66
3	2,97	3,01	3,23	3,05	3,39	3,22	2,73	2,59	2,98	3,33
4	2,98	2,80	3,16	3,06	3,42	3,20	2,64	2,84	3,27	3,30
Richest	2,72	2,54	2,91	2,81	3,22	2,97	2,37	2,84	2,77	2,87

Source: Author's calculations based on HBS (FSO, 2014).

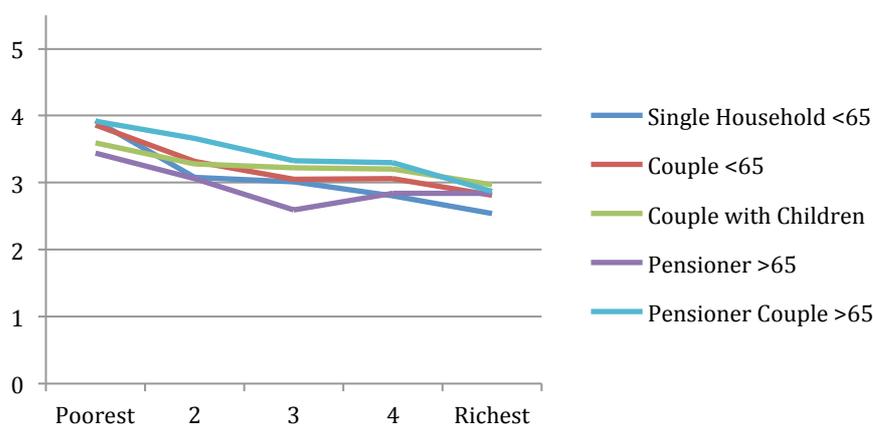
Figure 5 and Figure 6 below illustrate the distributional effects for different household types. The spike that is observed for single households in the first quintile during the survey period 2006-2008 disappears in the second period. Moreover one can see how the distribution of the VAT burden changed. Pensioner couples for instance face a lower burden compared to other types of households in 2006-2008, however, in 2009-2011 they bear the highest burden.

Figure 5: VAT burden for different household types (% of disposable income), 2006-2008



Source: Author's elaboration, based on HBS (FSO, 2014).

Figure 6: VAT burden for different household types (% of disposable income), 2009-2011



Source: Author's elaboration, based on HBS (FSO, 2014).

It is worth noting that the differences between the income groups on the whole are very small. This is in contrast to the results for many OECD countries, where large differences up to 15 percentage points between the richest and the poorest group exist (IFS 2011, p. 370). A reason for this result might be the low value added tax rates in Switzerland. In comparison with other OECD countries, Switzerland has the third lowest standard rate. Only Japan and Canada have with 5% a lower rate. The average standard rate for OECD countries was 18,5% in 2011 (OECD 2014, p. 60). Looking at the VAT spending of households, according to a report prepared for the European Commission, the average EU-27 household spends 11% of its expenditure in VAT (IHS 2013, p. 17). The VAT burden in Switzerland, as calculated here, is lower and does not vary substantially for different types of households.

With respect to expenditure

As before, when the measurement base is changed to expenditure, the tax burden ratios are somewhat progressive (Table 7). High-income households pay a higher share of their expenditure in VAT than low-income households. Couples without children pay on average the highest share of their expenditure in VAT, the number is lowest for single household pensioners. Again the numbers are very close to each other. A minor decline in the tax burden from the first to the second survey period is observed. The households that belong to the working population face lower tax burdens while the share is on average almost unchanged for pensioners and pensioner couples.

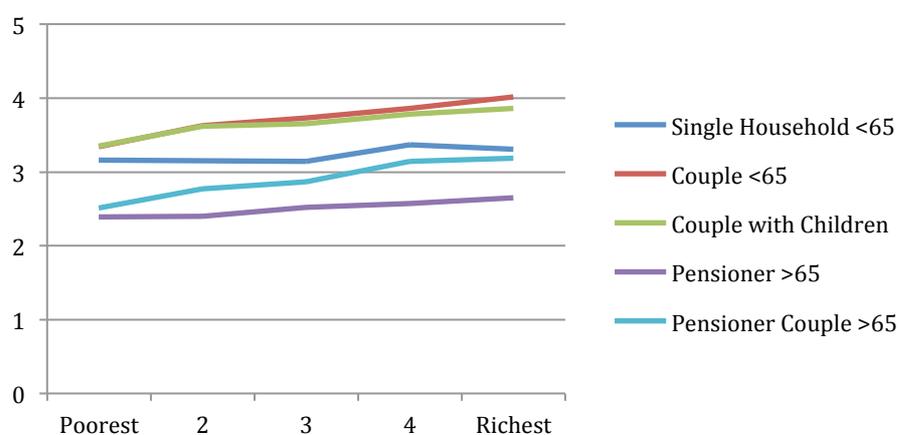
Table 7: VAT burden across income distribution and household type (% of expenditure)

Income Quintile Group	Average VAT burden per household (% of expenditure)									
	Single Household <65		Couple <65		Couple with Children		Pensioner >65		Pensioner Couple >65	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
Poorest	3,16	2,96	3,34	3,06	3,35	3,28	2,39	2,21	2,51	2,57
2	3,15	3,12	3,63	3,59	3,62	3,47	2,40	2,59	2,77	2,85
3	3,14	3,22	3,73	3,67	3,65	3,60	2,52	2,43	2,87	3,11
4	3,37	3,28	3,86	3,83	3,78	3,72	2,57	2,74	3,14	3,10
Richest	3,31	3,33	4,02	3,95	3,86	3,74	2,65	2,79	3,19	3,22

Source: Author's calculations based on HBS (FSO, 2014).

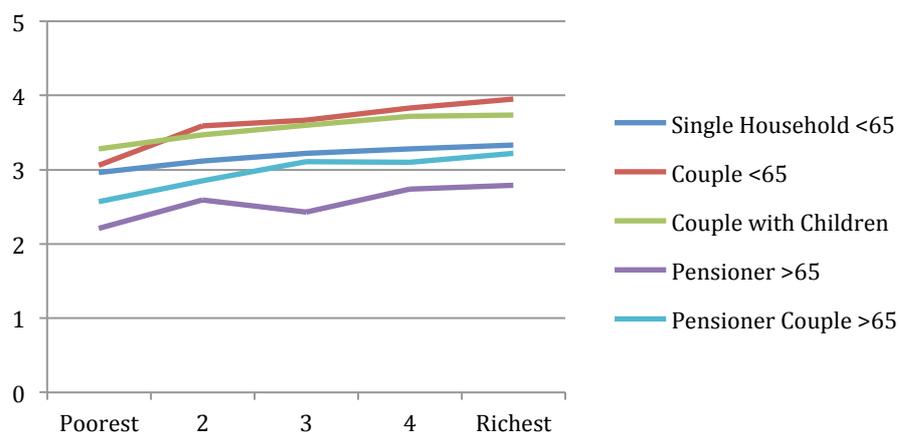
The figures are displayed to illustrate the differences in tax burdens with respect to expenditure for the five types of households. The existing patterns only show small changes from the first to the second survey period. For instance, the tax burden single households face becomes more progressive and couples with children pay more compared to couples without children in the period 2009-2011.

Figure 7: VAT burden for different household types (% of expenditure), 2006-2008



Source: Author's elaboration, based on HBS (FSO, 2014).

Figure 8: VAT burden for different household types (% of expenditure), 2009-2011



Source: Author's elaboration, based on HBS (FSO, 2014).

A reason why the picture is progressive when the tax burden in respect to expenditure is considered might be the reduced rates on necessities such as food and medication. Low-income households tend to spend a greater proportion of their consumption expenditure on these items and as they are taxed with a lower rate, their corresponding VAT payment is lower. Why this pattern cannot be seen in the income approach is likely due to borrowing and savings behaviour: From the HBS it becomes clear that all household types in the lowest quintile have expenditures that are higher than their disposable income (see Appendix C). This is true for both survey periods and indicates that people fund consumption by either drawing down savings or borrowing money. It implies that at some point during their life they will need to spend less in order to pay back loans and hence then they will incur lower VAT with respect to their income. On the other hand, the working households in quintiles 3 to 5 spend less than their disposable income. These households save and their savings will be liable to VAT later on, for example after being retired, driving up the tax burden with respect to income for pensioners. The tax burden with respect to income depends on the saving and borrowing pattern. On these grounds it can be argued that the expenditure based approach pictures lifetime income and hence the overall distributional effects of the VAT better (see also IFS 2011, pp. 372ff).

In the following section the effect of a tax reform on the distribution of the tax burden is analysed.

4.2 Simulation: Uniform VAT Rate

The first part of the simulation is to determine the rate needed in order to generate the same amount of revenue as before. This is straightforward when it comes to all the goods that are taxed at a reduced rate at the moment, however rather difficult concerning all the exemptions present in the system. Abolishing all the exemptions is not realistic, as some exemptions are due to the difficulty to tax certain goods and are also present in countries with a broad tax base and a uniform rate like New Zealand (OECD/KIPF, 2014). Such goods and services include financial services, insurances as well as gambling and the lottery (Swiss Federal Council 2008, p. 7048).

The reform considered here includes the introduction of a uniform rate on all goods that are currently taxed with one of the three rates. Additionally most of the exemptions are abolished. In this I follow the propositions already made by the Swiss government in 2008 and evaluate the abolishment of 20 out of 29 exemptions. The exemptions for goods and services, which are difficult to tax, are kept. The renting of property, which was exempted before, will still be exempted and the same holds for production in agriculture and education (Swiss Federal Council 2008, p. 7045-7049). Goods, which are currently not liable to VAT because they are taxed with different excise taxes, such as cigarettes and fuels will still be exempted as well. A table with the goods and their respective post-reform tax rate can be found in Appendix B (Table 12).

Based on this reform proposal it is calculated how high a uniform rate would have to be in order to generate the same amount of tax revenue as before. For this purpose the revenue generated by household consumption as surveyed in the Household Budget Survey is calculated and then the new rate structure is applied to the expenditure. The number of households is taken from the Federal Statistical Office (FSO, 2008 and 2013b). A revenue-neutral rate of 5,70% is calculated based on the expenditure in the survey period 2006-2008 and a rate of 5,64% for the period 2009-2011. This result shows that the composition of the VAT burden changed from the first to the second survey period.

Compared to the budget-neutral proposition of 6% made by the Swiss government the obtained rates are slightly lower (Swiss Federal Council, 2008). As previously described, the estimated tax revenue based on private consumption accounts for roughly 45% of the official tax revenue. A substantial amount of funds today is raised through hidden taxes, which are supposed to decrease with the elimination of tax exemptions. This implies that a rate of around 5,7% probably would not be revenue neutral but result in a decline in tax revenue. It is thus more realistic to simulate the flat rate with a rate of 6%. This number proposed by the Federal Council is based on their own

estimations, however unfortunately their report does not describe how the number was obtained precisely. We assume that the distributional consequences of a reform can be pictured more reasonable using this rate. Based on the HBS, the newly calculated tax revenue with a VAT rate of 6% would account for 48% of the official revenue. For the simulation the latest available dataset from the period 2009-2011 is taken.

4.2.1 Simulation Results: With Respect to Income and Expenditure

In the table below the general results for tax burdens are displayed, both as a share of disposable income as well as a share of total expenditure. The pattern of the tax burden ratios is very similar to the analysis of the current situation with reduced rates. From a lifetime income perspective the tax reform results in a slightly progressive VAT. As a share of disposable income the flat rate is regressive to some extent, as it is the case with the actual system. The tax burden is higher than before, but the change is minor. The tax base is much broader compared to the pre-reform situation and because there are no reduced rates, the standard rate is lower. Therefore the overall tax burden does not rise substantially. The reform is regressive regardless of the measure applied. The percentage point changes that are displayed in parentheses illustrate that the tax burden increases proportionally more for low-income households.

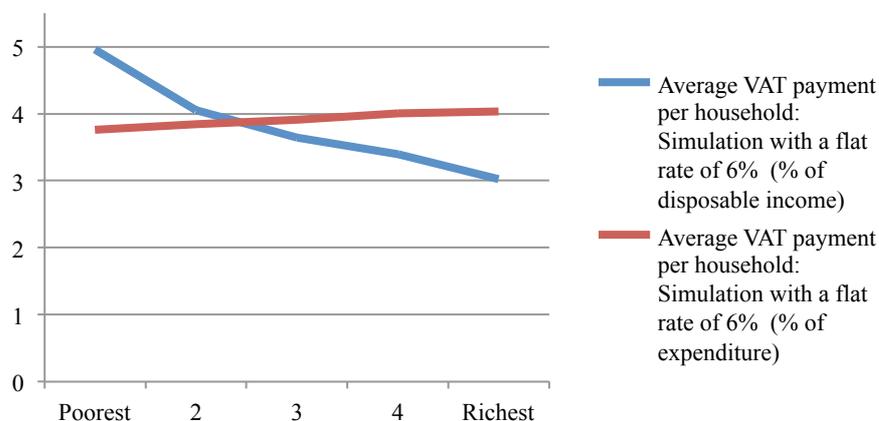
Table 8: Simulated VAT burden across the income distribution

Income Quintile Group	Average VAT burden per household: Simulation with a flat rate of 6%	
	% of disposable income	% of expenditure
Poorest	4,96 (+0,58)	3,76 (+0,45)
2	4,05 (+0,33)	3,84 (+0,31)
3	3,64 (+0,26)	3,91 (+0,28)
4	3,40 (+0,19)	4,01 (+0,23)
Richest	3,02 (+0,09)	4,03 (+0,12)

Note: Percentage point change compared to the pre-reform situation 2009-2011 in parentheses. Source: Author's calculations based on HBS 2009-2011 (FSO, 2014).

In the graph below it can be observed that the VAT is still slightly progressive as a share of expenditure and still regressive with respect to disposable income.

Figure 9: Simulated average VAT payment per HH



Source: Author's elaboration based on HBS 2009-2011 (FSO 2014).

The average tax burden with respect to disposable income is 3,51% after the reform compared to 3,29% before. The burden as a proportion of expenditure increased from 3,71% to 3,95%.

In the next section the impact on different household types is considered.

4.2.2 Simulation Results: Different Household Types

The simulated tax burdens are presented first as a proportion of disposable income and second as a proportion of total expenditure.

With respect to disposable income

One can see in Table 9 that the VAT measured as a share of disposable income is regressive for all household types. It is highest for pensioner couples in the first quintile and lowest for single households in the fifth quintile. The changes in the tax burden, compared to the situation in the survey period 2009-2011, are small. Nevertheless, the reform is regressive with greater tax increases for the less well-off households. This is true for all household types. Pensioners and pensioner couples face the greatest increase with on average roughly 1 percentage point. Couples without children encounter the smallest rise in their tax burden.

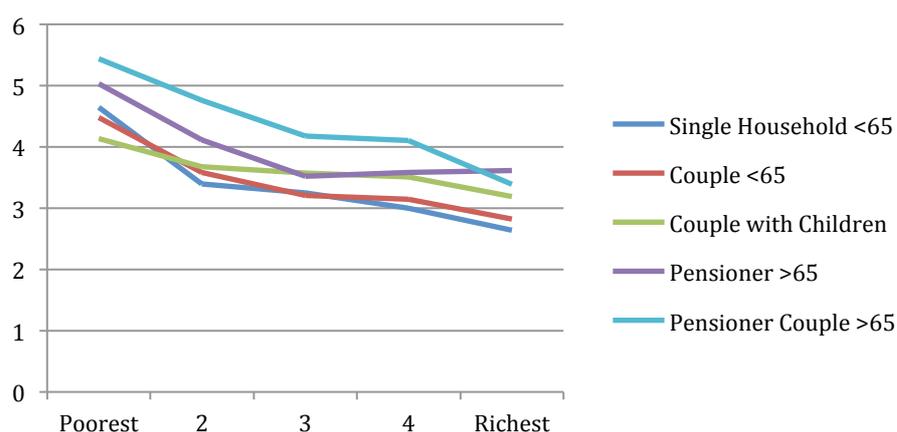
Table 9: Simulated VAT burden across income distribution and household type (% of disposable income)

Income Quintile Group	Average VAT burden per household (% of disposable income)				
	Single Household <65	Couple <65	Couple with children	Pensioner >65	Pensioner Couple >65
Poorest	4,65 (+0,72)	4,48 (+0,62)	4,14 (+0,55)	5,03 (+1,59)	5,44 (+1,52)
2	3,40 (+0,32)	3,58 (+0,26)	3,68 (+0,4)	4,12 (+1,06)	4,76 (+1,1)
3	3,25 (+0,24)	3,21 (+0,16)	3,57 (+0,35)	3,52 (+0,93)	4,18 (+0,85)
4	3,00 (+0,2)	3,15 (+0,09)	3,51 (+0,31)	3,58 (+0,74)	4,10 (+0,8)
Richest	2,64 (+0,1)	2,82 (+0,01)	3,19 (+0,22)	3,61 (+0,77)	3,39 (+0,52)

Note: Percentage point change compared to the pre-reform situation 2009-2011 in parentheses. Source: Author's calculations based on HBS 2009-2011 (FSO 2014).

Figure 10 depicted below illustrates the tax burdens for different household types with a uniform VAT of 6%, measured with respect to disposable income. Compared to the current situation (Figure 6) the tax is more regressive. The difference between the first and the fifth quintile is more pronounced after the reform.

Figure 10: Simulated VAT burden for different household types (% of disposable income)



Source: Author's elaboration, based on HBS 2009-2011 (FSO, 2014).

With respect to expenditure

Considering the tax burden with respect to expenditure in Table 10, the VAT is considered marginally progressive for all household types except single households where it is roughly proportional. Generally the changes from one income group to another are very minor, only for pensioners in the lowest quintile the increase is 1 percentage point or higher. Like before, pensioner and pensioner couples see on average the greatest increase in VAT burden while couples without children face the smallest increase. Yet, the changes are smaller than in the analysis with respect to disposable income.

While the changes seem minor it is worth noting that the reform has a regressive effect. The increase in tax burden is thus greater for low-income households than it is for high-income households and this holds for all household types.

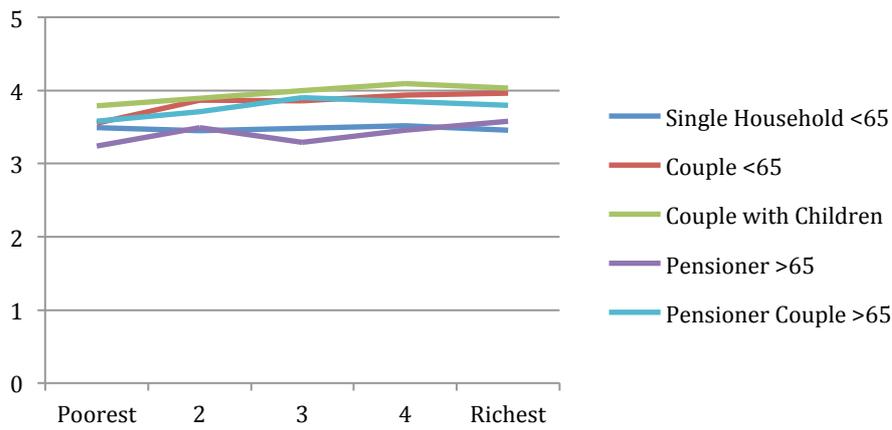
Table 10: Simulated VAT burden across income distribution and household type (% of expenditure)

Income Quintile Group	Average VAT burden per household (% of expenditure)				
	Single Household <65	Couple <65	Couple with children	Pensioner >65	Pensioner Couple >65
Poorest	3,49 (+0,53)	3,55 (+0,49)	3,79 (+0,51)	3,24 (+1,03)	3,58 (+1,01)
2	3,45 (+0,33)	3,87 (+0,28)	3,89 (+0,42)	3,49 (+0,9)	3,71 (+0,86)
3	3,48 (+0,26)	3,86 (+0,19)	4,00 (+0,4)	3,29 (+0,86)	3,90 (+0,79)
4	3,52 (+0,24)	3,94 (+0,11)	4,09 (+0,37)	3,46 (+0,72)	3,85 (+0,75)
Richest	3,46 (+0,13)	3,96 (+0,01)	4,03 (+0,29)	3,58 (+0,79)	3,80 (+0,58)

Note: Percentage point change compared to the pre-reform situation 2009-2011 in parentheses. Source: Author's calculations based on HBS 2009-2011 (FSO 2014).

Figure 11 illustrates the distribution of the VAT burden after the reform. In comparison with the pre-reform situation (Figure 8), the slight progressive effect of the tax diminishes and the VAT seems to be roughly proportional after implementing a uniform consumption tax rate.

Figure 11: Simulated VAT burden for different household types (% of expenditure)



Source: Author's elaboration, based on HBS 2009-2011 (FSO, 2014).

It is assumed, as explained in section 3.4.1, that households do not change their spending behaviour, that is, they spend the same amount of money for the same goods as they did before. The results should be treated as approximations since this is an abstraction from reality.

5 Discussion

The results described in the previous chapter will now be evaluated and compared with existing research in this area.

How does the value added tax affect the income distribution in Switzerland? The results obtained show, as in other studies (for example OECD (2014a), IFS (2011) O'Donoghue et al. (2004), Decoster et al. (2010)), that the discussion depends crucially on the measurement base adopted for assessing the distributional impact. Whether one looks at the tax burden in relation to total expenditure or disposable income changes the picture thoroughly. The current system of VAT in Switzerland with three different rates and many exempted goods is slightly regressive with respect to disposable income, when sorted across the income distribution. However, the system is to some extent progressive when defining the tax burden as the share of total expenditure. So far in literature there is no clear consensus on which measurement is favourable. Due to saving and borrowing patterns that become obvious in the Household Budget Survey, the expenditure-based approach is preferred in this context. Hence the impression that the current consumption tax system hurts the poor proportionally more than the rich is not founded.

The VAT burden is also relatively evenly spread over different household types. Couples tend to pay on average the highest share while it is lowest for pensioners, but the difference is only 0,71 percentage points in the first survey period and 0,69 percentage points in the second period. It can be observed that the VAT burden generally decreases from the first to the second survey period. The decrease in the VAT burden with respect to disposable income can be attributed to the fact that total expenditure constitutes a smaller share of disposable income in the period 2009-2011 than in 2006-2008. However, why the VAT burden with respect to total expenditure declined, is unclear. Changes in consumption patterns might have happened in the wake of the economic downturn after the financial crisis.

Simulating a tax reform with a flat VAT of 6% and the elimination of many exemptions (20 of 29) yields two main results. Firstly, the post-reform tax system is still marginally progressive when evaluated with the expenditure-based approach and secondly, the reform is regressive, increasing the tax burden proportionally more for the low-income than for the high-income households. An explanation is that low-income households spend a greater amount of their total

expenditure on goods that are either taxed with a reduced rate, or exempted from VAT. Households in the first quintile spend 24,3% of total expenditure on reduced rated or exempted goods (which are taxed after the reform), whereas this share is 19,5% for the fifth quintile.

The regressive effect is not very strong, however it should still be considered in the design of a reform. A tax reform is more likely to pass parliament if the level of distribution is not affected (see Linder, 2012).

With respect to the simulation of a tax reform, one should also discuss the behavioural assumptions made. Assuming that individuals do not change their consumption behaviour after a tax change might be realistic in the case of food, where the change in the tax rate is minor with an increase of 4 percentage points and where we look at a good considered a necessity. However there might be a strong reaction for goods that are now exempt from taxes and will be taxed with 6% afterwards. On the other hand the effect might not be as substantial because in the sectors currently exempted from tax like for instance in the health sector or in social services, there is a relevant amount of hidden tax collected, which probably already influences the prices. This implies that the newly introduced VAT would not be fully passed through to consumers. While this aspect is not modelled in other studies either, the behavioural aspects are incorporated through micro simulation models in some papers (see OECD/KIPF, 2014). An application of a micro simulation model however lies outside the scope of this paper.

The theory of optimal taxation describes and discusses the trade-off between equity and efficiency thoroughly (see Atkinson & Stiglitz, 1980). Efficiency refers to taxation with minimised deadweight losses. When it comes to consumption taxes, differentiated rates seem favourable if a distinction between goods consumed by different income groups can be made and if the tax does not distort decisions (ibid.). Often this is not possible, because different income groups consume the same type of goods and if there are varying preferences for certain goods, the administrative costs for taxing these goods differently are very high. In Switzerland, the difference in expenditure shares on goods with reduced rates or exemptions is only 4,8 percentage points between the first and the fifth quintile. These goods do hence not provide a good distinction between consumption patterns of different income groups. The mechanical revenue loss is substantial, especially when put into relation to the redistributive effect (Swiss Federal Council, 2010). Pursuing an equity goal with reduced consumption tax rates seems hence not very efficient. Especially if the government has other possibilities of taxation through which a desired level of progressivity can be achieved, as it is the case with the personal income tax. On these grounds the simulated reform seems to be reasonable, especially if the poor households could be compensated,

which was originally planned in the reform (Swiss Federal Council, 2008). Such a reform would probably lead to a significant decrease in compliance and administrative costs (FDF 2008, p. 7074). According to a study commissioned by the Federal Department of Finance firms would save 22% in compliance costs with a uniform VAT rate. Additionally substantial cost savings could be made by the tax administration (ibid.). The money saved in this way could be used to compensate households losing the most.

When using the estimated tax rate, that is 5,7%, instead of the 6% that has been proposed by the Federal Council, the distributional impact of the reform itself is more regressive. The reason is that the highest income groups benefit more from the decline in the standard rate than the low-income groups as they consume more normally taxed goods. The fifth quintile spends 46,2% of total expenditure on normally taxed goods, whereas this share is only 37,3% for the first quintile. With a rate of 5,7% everyone pays less than with a 6% rate, while this tax burden relief is more pronounced for the high-income households. If one prefers to keep the level of redistribution constant, the higher rate of 6% is favourable. Additionally a compensation scheme is more likely to be feasible with a higher rate and the reform could then be implemented distributionally neutral.

6 Conclusion

This paper contributes to the discussion about the value added tax in Switzerland by investigating the distribution of the tax burden. In order to make a reform of a very complicated system feasible, detailed information about the actual situation, especially with regard to the distributional aspects of the system, is needed. An OECD report (2014) about the distributional effects of the value added tax gives valuable information about the situation in twenty OECD countries. Switzerland is not part of the sample. In order to close this research gap, a very similar approach has been adopted in this study.

The paper shows the distributional aspects of the VAT in Switzerland and investigates the impact of a reform, which simplifies the tax system by eliminating tax exemptions and introducing a uniform rate. The current system is slightly progressive when analysed from a lifetime income perspective and would still be somewhat progressive or roughly proportional after the tax reform. The reform is regressive, hitting the low-income households proportionally harder than the high-income households. However, the effect is small. Therefore, the reform would still be desirable from a perspective of efficiency, especially if the reform is accompanied by a compensation scheme. Substantial gains are expected due to lower administrative and compliance costs.

The limitations regarding the aggregate data available and the modelling should be considered when interpreting the results. Especially the simulation results can be seen as indications rather than facts. Further research could take into account behavioural responses and assess the price effects that will occur in sectors that are currently exempted and where a substantial amount of hidden tax is collected. This will require micro simulation models, such as EUROMOD, and also a considerable amount of assumptions will be needed. Micro simulation models also allow to model reforms with a compensating scheme in order to keep the level of redistribution constant.

Furthermore it will be important to research more in depth the question of lifetime income and whether expenditure is the optimal proxy. The redistribution of income is a highly political topic and therefore a consensus among researchers regarding the measurement issue would be favourable for decision-making in policy.

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Appendix A

Household Budget Survey – Components of consumption and its VAT rates

Table 11: Components of the HBS and the corresponding VAT rate. Green: reduced rate, blue: special rate, orange: standard rate, white: exempted or free from VAT.

50: Consumption expenditure
51: Food and non-alcoholic beverages
511: Food
512: Non-alcoholic beverages
52: Alcoholic beverages and tobacco products
521: Alcoholic beverages
522: Tobacco products
53: Restaurants and accommodation
531: Restaurants
5311: Restaurants, Cafés and Bars
5312: Self-service restaurants and take-away restaurants
5313: Canteens
5314: At private individuals' place
532: Accommodation
5320: Accommodation
56: Clothing and footwear
561: Clothing
562: Footwear
57: Living and energy
571: Rent, mortgage interest, utilities and energy of the main domicile
5711: Rent or mortgage interest of the main domicile
5712: Utilities of the main domicile
5713: Energy of the main domicile
572: Rent, mortgage interest, utilities and energy of other domiciles
5721: Rent or mortgage interest of other domiciles
5722: Utilities of other domiciles
5723: Energy (other domiciles)
573: Repairs and maintenance of the domicile
5730: Repairs and maintenance of the domicile
58: Furnishing and current housekeeping
581: Furniture, decorations and carpets
582: Household linen and home textiles
583: Household- and kitchen appliances
584: Tools and equipment for house and garden
585: Current housekeeping
61: Health expenditure
611: Pharmaceutical products, medical supplies and medical appliances
6110: Pharmaceutical products, medical supplies and medical appliances
6110.01: Medication
6110.02: Glasses and contact lenses
6110.03: Sanitary material, therapeutic appliances and material

612: Services by physicians and hospitals
6120: Services by physicians and hospitals
62: Transportation
621: Purchase and use of autos
6211: Motor cars
6211.01: New motor cars
6211.02: Second-hand motor cars
6212: Motorcycles, scooters and auto cycles
6213: Bicycles
6214: Gear and replacement parts for vehicles
6215: Fuels and lubricants
6216: Service and repair of vehicles
6217: Other services related to vehicles
622: Transportation services
6221: Passenger transport by railway
6222: Passenger transport by road
6223: Passenger transport by air
6224: Passenger transport by inland waterway
6225: Combined transport services
6226: Other purchased transport services
63: Communication
631: Postal services
632: Devices and services for telecommunication
66: Entertainment, leisure and culture
661: Audio-visual, photographic and IT equipment and accessories
662: Other equipment and accessories for entertainment purpose
6621: Durable goods for recreation and sports
6622: Toys, games and hobbies
6623: Sports and camping equipment and accessories
6624: Plants and non-durable goods for gardening
6625: Pets and products related to animal keeping
663: Services for sports, recreation and culture
6631: Services for sports and recreation
6631.01: Entrance tickets to sports events
6631.02: Services in sports and recreation centres, without ski lifts
6631.03: Tickets for cableways, incl. ski lifts
6631.04: Hire of sports and recreation equipment
6631.05: Sports and handicrafts courses
6631.06: Music and dancing courses
6631.07: Contributions to sports clubs
6631.08: Contributions to recreation clubs
6631.09: Other courses within recreation
6632: Cultural services
6632.01: Theatre and concerts
6632.02: Cinema
6632.03: Museums, exhibitions, libraries, zoological gardens etc.
6632.04: Radio and television licences
6632.05: Subscriptions to private television
6632.06: Subscriptions to cable television

	6632.07: Hire of devices and DVD's and CD's
	6632.08: Contributions to cultural clubs
	6632.09: Other services within entertainment and culture
	6633: Gambling
664: Books, Newspapers and stationery	
	6641: Books and brochures
	6642: Newspapers and magazines
	6643: Other pieces of printed matter
665: Package trips	
67: Education- and training expenses	
670: Education- and training expenses	
68: Other goods and services	
681: Personal hygiene	
682: Personal amenities	
683: Social, financial and other services	
	6831: Social services
	6832: Financial services
	6833: Contributions to organisations and associations
	6834: Other services and losses from letting
30: Mandatory transfer expenditures	
31: Social security contributions	
310: Social security contributions	
32: Taxes	
320: Taxes	
330: Health Insurance: Basic insurance premium	
35: Monetary transfer payments to other households	
36: Monetary transfer payments to other households	
360: Monetary transfer payments to other households	
40: Other insurances, fees and contributions	
41: Health insurance: supplementary insurance premium	
410: Health insurance: supplementary insurance premium	
42: Other insurance premium	
420: Other insurance premium	
43: Fees	
430: Fees	
44: Donations, gifts and invitations	
441: Donations	
442: Gifts and invitations	
	4421: Gifts: Food and non-alcoholic beverages
	4422: Gifts: Alcoholic beverages and tobacco products
	4423: Invitations to restaurants, cafés, bars, take-away restaurants and canteens
	4423.01: Invitations to meals in restaurants, cafés and bars
	4423.02: Invitations to non-alcoholic beverages in restaurants, cafés and bars
	4423.03: Invitations to alcoholic beverages in restaurants, cafés and bars
	4423.04: Invitations to meals in self-service restaurants
	4423.05: Invitations to non-alcoholic beverages in self-service restaurants
	4424: Gifts: Clothing and footwear
	4425: Gifts: Furnishing and current housekeeping
	4426: Gifts: Transportation

4427: Gifts: Entertainment, recreation and culture
4427.01: Toys and games
4427.02: Plants and non-durable goods for gardening
4427.03: Books and Brochures
4427.04: Newspapers and magazines
4427.05: Other pieces of printed matter, writing material and drawing material
4427.06: Entertainment, recreation and culture
4428: Other gifts
80: Premium for life insurance

Notes: There is an additional subcategory in the HBS, which is not shown here as in almost all cases the tax rates are the same. If this was not the case, it was accounted for in the calculation even though not displayed here (e.g. in the category *Energy of the main domicile* one distinguishes between electricity and fuels). Some categories, such as *Package trips* are difficult to assign, as first one cannot separate the expenditure for transportation, accommodation and restaurants. If transportation is by air, it is free from VAT. Accommodation would be taxed with a special rate, if it were in Switzerland. However, as most package trips have a destination abroad, the whole category is declared as exempted. For some categories, the tax rate varies according to whether the producer is within the non-profit sector and below a certain turnover threshold (e.g. in sports or cultural services). In sports clubs most services are offered from firms or clubs that are not liable to VAT (Lamprecht et al., 2011). Hence this category was defined as exempted. Another example is pets and products for their keeping; as cat litter is used in agriculture as well it is subject to the reduced rate. However, other products specifically for pets are taxed normally. Hence in this case the normal rate was deemed to be more appropriate.

Sources: HBS (FSO, 2014) and VAT Act (2009), Author's translations.

Appendix B

Simulation of a tax reform with a uniform rate for all goods

Table 12: Components of the HBS and the corresponding post-reform tax rates. Purple: standard rate, white: exempted or free from VAT.

50: Consumption expenditure
51: Food and non-alcoholic beverages
511: Food
512: Non-alcoholic beverages
52: Alcoholic beverages and tobacco products
521: Alcoholic beverages
522: Tobacco products
5220: Tobacco products
53: Restaurants and accomodation
531: Restaurants
532: Accommodation
56: Clothing and footwear
561: Clothing
562: Footwear
57: Living and energy
571: Rent, mortgage interest, utilities and energy of the main domicile
5711: Rent or mortgage interest of the main domicile
5712: Utilities of the main domicile
5713: Energy of the main domicile
572: Rent, mortgage interest, utilities and energy of other domiciles
5721: Rent or mortgage interest of other domiciles
5722: Utilities of other domiciles
5723: Energy (other domiciles)
573: Reparatons and maintenance of the domicile
5730: Reparatons and maintenance of the domicile
58: Furnishing and current housekeeping
581: Furniture, decorations, carpets and
582: Household linen and home textiles
583: Household- and kitchen appliances
584: Tools and equipment for house and garden
585: Current housekeeping
61: Health expenditure
611: Pharmaceutical products, medical supplies and medical appliances
612: Services by physicians and hospitals
62: Transportation
621: Purchase and use of autos
6211: Motor cars
6211.01: New motor cars
6211.02: Second-hand motor cars
6212: Motorcycles, scooters and auto cycles
6213: Bicycles

6214: Gear and replacement parts for vehicles
6215: Fuels and lubricants
6216: Service and reparation of vehicles
6217: Other services related to vehicles
622: Transportation services
6221: Passenger transport by railway
6222: Passenger transport by road
6223: Passenger transport by air
6224: Passenger transport by inland waterway
6225: Combined transport services
6226: Other purchased transport services
63: Communication
631: Postal services
632: Devices and services for telecommunication
66: Entertainment, leisure and culture
661: Audio-visual, photographic and IT equipment and accessories
662: Other equipment and accessories for entertainment purpose
663: Services for sports, recreation and culture
6631: Services for sports and recreation
6632: Cultural services
6633: Gambling
664: Books, Newspapers and stationery
665: Package trips
67: Education- and training expenses
670: Education- and training expenses
68: Other goods and services
681: Personal hygiene
682: Personal amenities
683: Social, financial and other services
6831: Social services
6832: Financial services
6833: Contributions to organisations and associations
6834: Other services and losses from letting
30: Mandatory transfer expenditures
31: Social security contributions
32: Taxes
33: Health Insurance: Basic insurance premium
40: Other insurances, fees and contributions
44: Donations, gifts and invitations
441: Donations
442: Gifts and invitations
80: Premium for life insurance

Source: HBS (FSO, 2014), Author's translations.

Appendix C

Table 13: Income and expenditure for single households

Single Households < 65	Gross Income		Disposable Income		Expenditure	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
All	6349	7126	4376	4916	4268	4434
Poorest	2632	3076	1896	2282	3138	3043
2	4693	5094	3305	3713	3650	3659
3	5960	6415	4274	4617	4034	4316
4	7248	8018	5091	5579	4506	4752
Richest	11209	13016	7309	8382	6012	6399

Note: Values in CHF. The division into quintiles based on gross income is the following: For 2006-2008: 1st: below 3925, 2nd: 3925-5336, 3rd: 5337-6505, 4th: 6507-8087, 5th: above 8088. For 2009-2011: 1st: below 4341, 2nd: 4341-5795, 3rd: 5796-7076, 4th: 7077-9173, 5th: above 9174. Source: Author's elaboration, based on HBS (FSO, 2014).

Table 14: Income and expenditure for couples

Couples <65	Gross Income		Disposable Income		Expenditure	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
All	11567	11929	8120	8327	6950	6979
Poorest	5373	5631	3734	3878	4650	4889
2	8227	8800	5886	6413	5696	5935
3	10539	10991	7665	7762	6638	6451
4	13177	13607	9362	9778	7662	7807
Richest	20488	20595	13933	13791	10093	9805

Note: Values in CHF. The division into quintiles based on gross income is the following: For 2006-2008: 1st: below 7111, 2nd: 7111-9470, 3rd: 9471-11795, 4th: 11796-14804, 5th: above 14805. For 2009-2011: 1st: below

7631, 2nd: 7631–9875, 3rd: 9876–12162, 4th: 12163–15340, 5th: above 15341. Source: Author’s elaboration, based on HBS (FSO, 2014).

Table 15: Income and expenditure for couples with children

Couples with children	Gross Income		Disposable Income		Expenditure	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
All	10934	11890	7832	8510	7283	7490
Poorest	5748	6187	4031	4392	4821	4798
2	8036	8727	5915	6462	5917	6110
3	9831	10562	7203	7727	6697	6911
4	12063	13077	8762	9604	7922	8249
Richest	18985	20884	13247	14353	11053	11375

Note: Values in CHF. The division into quintiles based on gross income is the following: For 2006-2008: 1st: below 7147, 2nd: 7147-8923, 3rd: 8924-10794, 4th: 10795-13686, 5th: above 13687. For 2009-2011: 1st: below 7777, 2nd: 7777–9657, 3rd: 9658–11534, 4th: 11535–14944, 5th: above 14945. Source: Author’s elaboration, based on HBS (FSO, 2014).

Table 16: Income and expenditure for pensioners

Pensioners	Gross Income		Disposable Income		Expenditure	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
All	4339	3599	3352	3519	3419	3599
Poorest	2192	2586	1634	1663	2279	2586
2	2835	2781	2158	2355	2774	2781
3	3565	3190	2834	2982	3073	3190
4	4650	3968	3497	3836	3584	3968
Richest	8430	5465	6023	5408	5376	5465

Note: Values in CHF. The division into quintiles based on gross income is the following: For 2006-2008: 1st: below 2550, 2nd: 2550-3108, 3rd: 3109-4035, 4th: 4035-5516, 5th: above 5517. For 2009-2011: 1st: below 2635,

2nd: 2635–3381, 3rd: 3382–4372, 4th: 4373–5961, 5th: above 5962. Source: Author’s elaboration, based on HBS (FSO, 2014).

Table 17: Income and expenditure for pensioner couples

Pensioner couples	Gross Income		Disposable Income		Expenditure	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
All	7562	7583	5405	5405	5591	5820
Poorest	3 538	3734	2477	2486	3503	3783
2	4 961	5159	3668	3784	4459	4860
3	6403	6636	4898	4973	5074	5330
4	8175	8398	6064	6090	6318	6485
Richest	14702	13940	9896	9660	8585	8619

Note: Values in CHF. The division into quintiles based on gross income is the following: For 2006-2008: 1st: below 4264, 2nd: 4264–5722, 3rd: 5723–7157, 4th: 7158–9495, 5th: above 9495. For 2009-2011: 1st: below 4470, 2nd: 4470–5869, 3rd: 5870–7363, 4th: 7364–9701, 5th: above 9702. Source: Author’s elaboration, based on HBS (FSO, 2014).