Who donates and how? New evidence on the tax incentives in the canton of Geneva, Switzerland

Lideikyte-Huber, Giedre; Pittavino, Marta

How to cite

LIDEIKYTE-HUBER, Giedre, PITTAVINO, Marta. Who donates and how? New evidence on the tax incentives in the canton of Geneva, Switzerland. In: Journal of empirical legal studies, 2022, vol. 19, n° 3, p. 758–797. doi: 10.1111/jels.12322

This publication URL: https://archive-ouverte.unige.ch/unige:163578
Publication DOI: 10.1111/jels.12322

DOI: 10.1111/jels.12322

ORIGINAL ARTICLE

JOURNAL OF EMPIRICAL LEGAL STUDIES

Who donates and how? New evidence on the tax incentives in the canton of Geneva, Switzerland

Giedre Lideikyte Huber[1] | **Marta Pittavino**[2]

[1]Faculty of Law, Geneva Centre for Philanthropy, University of Geneva, Geneva, Switzerland

[2]Geneva School of Economics and Management (GSEM), Geneva Centre for Philanthropy, University of Geneva, Geneva, Switzerland

Correspondence
Giedre Lideikyte Huber, Faculty of Law, University of Geneva, 40 Boulevard du Pont-d'Arve, 1205 Geneva, Switzerland.
Email: giedre.lideikyte-huber@unige.ch

Abstract

The present study is the first large-scale empirical legal analysis of tax incentives for charitable giving in Switzerland, and one of the few studies globally. Using unique longitudinal data including household income and wealth of the entire taxpayers' population of the Canton of Geneva, Switzerland, we study patterns of charitable deductions and characteristics of donors making such deductions. Our study period extends over a decade (2001-2011), this period also encompassing a legal reform that raised ceilings for charitable deductions. We observe that an overwhelming majority of donors make deductions that never reach the legal ceiling, especially after the reform. Nonetheless, we identify a subset of donors that are potentially tax-incentive sensitive, because their deductions constantly reach (or exceed) this ceiling. Deductions made by those donors amount to 30%–54% of all such deductions in the canton of Geneva. If compared to all donors, the donors in this particular subset are older (in their mid-late 60s), mostly single, wealthier and more regular givers (deducters). Analyzing the deduction patterns in the entire donors' population, we observe that deducting charitable donations have become increasingly popular during the study period. In addition, we find that donors' relative generosity tends to decrease when their income and wealth increase. Those results have important tax policy implications and relevance in modeling tax incentives for charitable giving, in both Switzerland and elsewhere.

INTRODUCTION

A great number of countries implemented in their tax codes income tax incentives that are linked to the charitable giving activity (OECD 2020)[1]. Such incentives usually take form of legal norms that reduce either taxpayers' taxable income (for instance, in a form of a tax deduction) or tax liability (in form of a tax credit) in relation to a charitable donation reported through tax filing. The broad goal of such tax incentives is to boost charitable donations to nonprofit organizations because the latter provide many crucial services to the society (Duquette, 2016, p. 51).[2] This goal is seldom explicitly identified by the legislator. Legislative proposals often indicate the general intent to boost charitable giving, but do not specify to what extent the legal norms establishing tax incentives for charitable giving are expected to alter the donors' giving behavior and at what types of donors such reforms are aimed (Lideikyte Huber et al., 2021).[3] In addition, the effect of legal norms establishing tax incentives on donors' behavior is not evaluated regularly or at all (Lideikyte Huber et al., 2021). As a result, knowledge about the impact of tax incentives for charitable giving on taxpayers is still very incomplete and can be further investigated.

Identifying the exact characteristics of donors that could potentially be responsive to tax incentives is a major issue for legislators and policy makers both for legal and public finance reasons. Such knowledge helps designing more efficient tax incentives,[4] and thus spending public money optimally, which is required by the democratic mandate of any legislator in Western countries. The fundamental principles of tax law, such as the one of ability to pay, require using tax incentives carefully due to their potentially unequitable effects in progressive income tax systems. In particular, structured in a form of tax deduction, such incentives provide an "upside-down" subsidy, because their benefits increase as the recipient's income and/or wealth increases (Thuronyi, 1988, p. 1159).[5] In addition, all tax incentives (deductions or credits) leave out the persons who are outside of the tax system, for instance, those who have a very low income (Surrey, 1970, p. 720). While incentivizing private giving through taxes, the legislator also indirectly delegates its budgetary powers to private actors,

[1]See a study by the OECD of 40 countries in OECD (2020).

[2]The research indicates, however, other positive effects of such incentives (Bönke et al., 2013).

[3]In Switzerland, we see regular suggestions to introduce new tax incentives for charitable donations or to increase the existing ones, with a broad goal to boost charitable giving. The most recent attempt was via a parliamentary initiative no. 14.470 "Making Switzerland a more attractive place for foundations" of 9 December 2014

[4]The question on the efficiency of a tax incentive for charitable giving is a difficult one and includes several parameters, of which the most important is donor's tax-price elasticity. However, there are but also crowding-out, which is the rate of reduction of private donations as a response to governmental direct subsidies to the charitable sector (Bönke et al., 2013, p. 40) and the comparative efficiency of governmental actions in the sector.

[5]Imagine a hypothetical case, where a person A has a taxable income of CHF 50,000 which is subject to an overall personal income tax rate of 15% and a person B with respectively CHF 200,000 of taxable income, subjected to rate of 35%. A fully deductible charitable donation of CHF 100 will cost CHF 85 to A and only CHF 65 to B, even though the amount of donation is the same and B has a larger ability to pay (her income is higher).

providing them with an important influence (increasing with the amount donated) outside democratic decision-making mechanisms. For all those reasons, tax incentives must be used carefully and in an informed way.

Research to date shows that at least some donors are responsive to tax incentives, as the latter increase either reported charitable donations (not all donations being always reported in tax returns) and/or total donations (Almunia et al., 2020; Andreoni, 2015, p. 362).[6] Donors' behavior can be influenced by several factors (Bönke et al., 2013, p. 39). Certain authors observe a link with *the size of donations*, showing that donors giving larger amounts react more to tax incentives (Fack & Landais, 2010). Others find such links studying the *characteristics of the donors themselves*, such as their income, wealth, age and other characteristics (Adena, 2021). Clotfelter, 1990 shows that giving increases with the donors' income (even though giving as a percentage of donors' income, which is in relative and not absolute terms, is declining), education and age (Andreoni, 2015, p. 361). The most recent US studies also highlight that top donor households are also more likely to be married, older, and to have children than those who are not top donors (Duquette & Mayo, 2021). Studying affluent donors' motivation via survey, Osili et al. (2021) report that nearly half of the affluent donors in the US indicate that receiving a tax benefit sometimes motivates them to give and 14.5% of such donors indicate that a tax benefit always motivates them (Osili et al., 2021, p. 13). Same authors find that the vast majority (88.1%) of affluent households gave to charity in 2020 (Osili et al., 2021). The observation that donors from richer income and/or wealth segments are more responsive to tax incentives appears both in European and US papers (Adena, 2021; Bakija & Heim, 2011). In a number of studies that are not necessarily related to tax deductions researchers conclude that those who earn more are more likely to give to charity and give larger amounts (Clark et al., 2019, p. 13, and references). However, Clark et al. (2019), for instance, find, subject to certain limitations, that when looking at the percent of household income given within a single year the reverse holds true: households at the lowest end of the income spectrum give a higher percent of their overall income (Clark et al., 2019, p. 13). For tax policy purposes, it would be relevant to see whether such trends can be confirmed in other jurisdictions, such as Switzerland.

Overall, the effect of tax incentives for charitable donations has been studied extensively in certain Western countries, especially in the United States, the

[6]In the economic literature, there is a consensus that donors' responsiveness to tax incentives for charitable giving is heterogeneous (Bönke et al., 2013; Fack & Landais, 2010). They usually measure the responsiveness of donors via the concept of tax-price elasticity. It describes the change in donors' giving behavior when the "price" of charitable giving changes—for instance, when the government introduces a tax incentive allowing to deduct donations from taxable income (Bakija, 2013, p. 559). Donors who change their giving behavior in response to such a decrease in price are considered to be "tax-price elastic," and vice-versa. See a summary of literature on this concept in Lideikyte Huber et al. (2021).

United Kingdom, France, and Germany. However, due to the lack of data, this literature is still very inconclusive about certain points. Globally, the charitable giving behavior of the very wealthy and their responsiveness to tax incentives is largely understudied (Andreoni, 2015, p. 361; one of the rare empirical studies in this respect: Osili et al., 2021). The studies on the effect of tax incentive reforms on giving are scarce. The majority of the latter also come from the US literature (see, for instance, studies on possible impact of Tax Cuts and Jobs Act of 2017 by Clark et al., 2019; Duquette, 2019). This topic is still completely novel in certain other countries, including Switzerland, where no empirical research on tax incentives for charitable giving has been produced until 2021 (Lideikyte Huber et al., 2021).

Being the first large-scale quantitative analysis of tax incentives for charitable giving in Switzerland, the current study adds to the existing research in several ways. It is the first endeavor to analyze the pattern of deductions in relation to deduction ceilings in income tax laws. The other unique feature of this work is analyzing donors' deductions in relation to changes in deduction ceilings during an income tax reform. We also provide a first in-depth study into the characteristics of donors by income and wealth in Geneva, Switzerland, including the segment of very wealthy donors, the latter being understudied worldwide. Unlike many studies in this field, our longitudinal data encompass the entire population of taxpayers of an administrative unit (canton), allowing to control many important aspects, such as the reoccurrence of giving behavior by the same donor, and thus increasing the reliability of potentially policy insights.

The present article is organized as follows: "Tax Deductions for Charitable Giving in Swiss Law and the 2006 Reform" section introduces the legal framework in Switzerland before and after the legal reforms. "Methodology" section describes the methodology. "Results and Discussion" section presents our results and discussions. "Summary and Conclusions" section summarizes the main findings and presents the conclusions.

TAX DEDUCTIONS FOR CHARITABLE GIVING IN SWISS LAW AND THE 2006 REFORM

Direct tax law framework

Switzerland has a progressive individual income taxation system, tax being levied at federal, cantonal, and municipal levels. Federal income tax is applied uniformly. Its maximum rate of 11.5% is enshrined in Art. 128 para. 1 let. 1 of the Swiss Federal Constitution and the progressive tax rates and scales are laid down in the federal law, which is directly applicable (Art. 36 DFTA). In terms of cantonal taxes, the Swiss cantons, which are 26, are autonomous in setting their own tax scales, tax rates, and tax allowances (Art. 129 para. 2 Federal

Constitution, art. 1 para 3 DTHA [Federal Constitution of the Swiss Confederation of 18 April]). For this reason, tax rates are very different from one canton to another, concerning both minimum and maximum tax as well as rate progressivity (Swiss Tax Conference, 2021a). In terms of the form of the income tax, the overwhelming majority of cantons use the basic tax scale system (simple tax) combined with a multiplier (tax coefficient), the latter being adapted annually according to cantonal budgetary needs (usually by the cantonal legislator) (Swiss Tax Conference, 2021a, p. 27). This system has been adopted by the canton of Geneva, where such multiplier is expressed in percentages on the tax base defined in cantonal laws.[7] The rates and perception of taxes by municipalities, which were 2148 in Switzerland on January 1, 2022,[8] vary. In most cases, municipal taxes are levied as supplements to the cantonal taxes, using a "municipal multiplier" (Swiss Tax Conference, 2021b, p. 74), which is the case in the canton of Geneva (Swiss Tax Conference, 2021a, p. 28).

Switzerland is one of the rare countries in the world levying a wealth tax (Swiss Tax Conference, 2021a, p. 1). It is a cantonal direct tax, as federal taxes on wealth are no longer levied since 1956 (Swiss Tax Conference, 2021a, p. 1). The justification of maintaining a wealth tax is based on several arguments. Fundamentally, wealth is, similarly to income, an expression of an individual ability to pay; the very possession of assets confers on the holder a financial capacity largely independent of the income derived from that wealth (Swiss Tax Conference, 2021a, p. 1). Additional argument is that one's wealth includes not only investments that generate returns, but can also include consumption items (Swiss Tax Conference, 2021a, p. 1). Finally, the wealth tax has, to a certain extent, a control function on the income tax by comparing the changes in wealth reported by the taxpayer from one tax period to the next (Swiss Tax Conference, 2021a, p. 1).

The object of the tax is the net wealth (Art. 13 DTHA), which is defined as the value, expressed or appreciable in money, of all movable and immovable property as well as rights and claims belonging to the taxpayer or of which he is a usufructuary.[9] In principle, only the net wealth is taxable, i.e. all assets minus the total established debts, and, when applicable, certain deductions (Geneva).[10] Certain assets that are exempt from the wealth tax. In particular, lump sum insurances in connection with occupational pension plans are exempt from wealth tax until the time of payment in all cantons, even if they have a cash surrender value (Swiss Tax Conference, 2021a, p. 5). Since 2001, household

[7]For Geneva cantonal wealth tax base, see Art. 59 of the Personal Income Tax Act (PITA).
[8]https://www.bfs.admin.ch/bfs/fr/home/statistiques/catalogues-banques-donnees/cartes.assetdetail.20604224.html, accessed February 30, 2022.
[9]Such assets are for instance cash, bank accounts (including crypto-currency), securities, mortgage claims, private loans, premium deposits with insurance companies, capital insurances, real estate; precious metals, cars and boats as well as caravans and the like, horses, livestock, collections of any kind (stamps, coins, works of art, etc.), works of art, and jewelry. Swiss Tax Conference, Wealth tax, 2021, p. 4; Art. 47 PITA.
[10]See Art. 13 para. 1 DTHA; Wealth tax, p. 4; see also the definition of wealth and its assessment in Geneva cantonal law: Arts 46 et seq., 56 et seq PITA.

furniture and commonly used personal items are no longer taxed in any canton (Art. 14 para. 3 DTHA). The assets are estimated at market value (at 31 December of the tax year in question, in the same way as for income taxation), but the law stipulates that the yield value can also be taken into consideration (Art. 14 para. 1 DTHA; Art. 49 para. 1–2 PITA). Wealth tax is as a general rule levied in the taxpayer's residence canton, except in cases where the latter is subjected only to a limited tax liability (Art. 4 DTHA) (ex. taxpayer has real estate or business outside the canton of residence). Such wealth is, however, considered for the tax rate. Thus, while reporting one's wealth, a taxpayer must indicate a breakdown of total wealth in Switzerland and abroad (Swiss Tax Conference, 2021a, p. 4).

Concerning the tax rates, in most cantons, wealth tax rates are set in a progressive manner (continuous or stepwise progression) and their rates are expressed in per thousand (Swiss Tax Conference, 2021a, p. 27). Given the diversity of cantonal tax laws, the tax burden can vary significantly from one canton to another, or even from one municipality to another within the same canton (Swiss Tax Conference, 2021a, p. 32). The canton of Geneva has a highest maximum wealth tax rate that is around 1% of the taxable wealth. However, certain cantons, including Geneva, provide for a maximum tax limit (for instance, defined as a percentage of taxable income), meaning that the tax burden on income and/or wealth, or the total burden of income and wealth taxes (cantonal, state and municipal taxes) must not exceed it (Swiss Tax Conference, Personal Income Tax, 2009, p. 76).[11]

In terms of the taxation procedure, the cantons carry out all the tax assessment and collection, i.e. in relation to federal, cantonal as well as municipal taxes (Art. 128 para. 4 Cst.). Thus, the tax filling and taxation in relation to direct taxes (income and wealth) is done at a cantonal level, depending on taxpayer's residence. Taxpayer files one tax declaration, and receives two separate taxation decisions indicating federal and cantonal taxes with the details about how they were calculated (taxable income, accepted deductions, etc.). In terms of the procedural obligations, the taxpayer has must do whatever is necessary to ensure complete and accurate taxation (Art. 42 para. 1 DTHA).[12] For instance, at the request of the tax authority, a taxpayer must provide oral or written statements, present accounting books, supporting documents and other evidence as well as documents concerning economic situation (Art. 42 para. 2 DTHA).

The particular characteristic of the Swiss taxation procedure is that the power of the tax authority to demand evidence concerning a taxpayer directly

[11]In Geneva, for taxpayers domiciled in Switzerland, taxes on wealth and income—including cantonal and municipal tax surcharges—may not exceed a total of 60% of net taxable income. However, for the assessment, the net return on assets is set at a minimum of 1% of net assets. This means that if the assets in taxpayer's wealth do not produce any return, it will be presumed that their hypothetical return is 1%. Art. 60 para. 1 PITA.

[12]Swiss direct taxation is based on the so-called "principle of taxpayer cooperation," which essentially consists of the obligation for taxpayers to fill in their tax returns in a complete and correct manner and, at a later stage, to respond to any additional requests from the tax authority (Molo, 2017, p. 82).

from third parties is limited, and in particular by the Swiss banking secrecy provisions applicable to Swiss residents (Art. 127 para. 2 DFTA, Art. 43 al. 2 DTHA, Molo, 2017, p. 82). This potentially facilitates direct tax misreporting, for both wealth and income tax purposes. Swiss banking secrecy can be defined as the duty of discretion of the bank and certain persons associated with it with respect to the business relationships it has with its clients (Molo, 2017, p. 79.). This obligation derives from several legal bases, including the Swiss Criminal Code.[13] It prevents banks from disclosing information about their clients, even in a case of suspected tax avoidance.[14] Thus, a bank can, and must, invoke banking secrecy against an investigation by a tax authority (Molo, 2017, p. 82). As an example, if a tax authority requests a bank whether a given Swiss taxpayer has accounts there, the bank will refuse to provide this information. The priority of banking secrecy over the powers of the tax authorities, both in the taxation procedure and in the tax evasion procedure, distinguishes Swiss law from that of most other European countries (Molo, 2017, p. 82 and quoted references[15]), and even beyond.

Tax deductions for charitable donations

Under the current Swiss law, taxpayers can deduct charitable donations, subject to a specific ceiling, from their taxable income (individuals) or taxable profits (corporations) for federal and cantonal tax purposes. The deduction ceiling for federal income tax purposes is currently 20% of the net taxable income or profits, with a minimum donation requirement of 100 CHF (Art. 33a DFTA). Cantons are free to set their own tax deductions (Art. 9 para. 2 let. i DTHA).[16] Most of the cantons, including the canton of Geneva, have also adopted a ceiling of 20% of net taxable income (calculated for cantonal tax purposes), without a minimum donation requirement.[17] However, one canton has no deduction ceiling (Basel-Stadt), and cantons of Neuchatel and Jura adopted ceilings of 5%

[13]In particular, three legal bases define the Swiss banking secrecy: the protection of the private sphere and of the rights of the personality according to arts 27 et seq. of the Swiss Civil Code and the Federal law of June 19, 1992 on data protection (LPD), the obligation of the "good and faithful execution of the mandate" in the sense of art. 398 para. 2 of the Swiss Code of Obligations within the framework of the contractual relationship between the bank and its client, and art. 47 of the Federal Act of 8 November 1934 on Banks and Savings Banks, which does not provide an autonomous definition of the banking secrecy, but constitutes a provision of the administrative criminal law punishing the violators of this same secrecy (Molo, 2017, p. 79).

[14]Swiss tax law operates a delicate distinction between tax evasion, which is fined by a penalty and dealt with by administrative authorities, and tax evasion, which is a criminal offense.

[15]This author indicates that, for instance, in the French taxation procedure, the tax authorities can directly request information from banks, and certain banking operations (e.g., the opening or closing of a bank account) are automatically communicated to them.

[16]Under the Federal Constitution, cantons set their own tax scales, tax rates and tax allowances (Art. 129 para. 2).

[17]See, for instance, Art. 30 para. 1 PITA.

and 10% respectively (Federal Tax Administration, 2021a). Donations to political parties are not deductible on this legal basis.[18]

To be deductible, the donation must be made to legal entities benefiting from a tax exemption as pursuing public service or public interest goals (Arts 33a and 56 let. g DFTA). The law and, particularly, the case law specify the tax-exemption conditions for such entities. One of the main conditions is that the entity cannot pursue economic goals, as these cannot be considered as of public interest. Maintaining significant shareholdings in business corporations while being a non-profit entity might be considered a public interest goal only when the interest in maintaining such a corporation is subaltern to the entity's activity in seeking public interest goals (Art. 56 let. g DFTA; Lideikyte Huber, 2019).

In order to claim a deduction for a charitable donation, a taxpayer should indicate all annual charitable donations in one amount in the tax declaration, along with proofs (usually receipts issued by a charitable entity). The amount which tax administration retains for deduction for federal and cantonal purposes (depending on respective deduction ceilings) is indicated in the taxation decision. Cantonal tax administrations calculate the deductible amount in several steps (Art. 33a DFTA). Firstly, it discounts all deductions from the gross income mentioned in Articles 26 to 33 of the DFTA (federal taxes) and 29 à 36B PTA (cantonal taxes), such as deductions related to self-employed business activity, wealth, social deductions, etc.). The 20% ceiling is based on the remaining taxable income after the above deductions. The charitable donation is deducted from the remaining income and capped, if necessary, at the aforementioned ceiling. Several other deductions follow afterwards before establishing the final amount of taxable income.

The federal (2006) and the cantonal (2009) law reforms

The 20% deduction ceiling of taxable income or profits was introduced on January 1, 2006 as part of a larger reform of the Swiss federal law,[19] replacing the previous ceiling of 10%. This reform mostly modified civil law norms related to different aspects of foundations, which were identified as the most popular legal vehicles in Switzerland for hosting charitable activities. The general aim of the reform was to encourage donors "to give up part of their wealth", since private wealth had risen sharply in the previous years (Parliamentary Initiative, n.d., No. 00.461; Economic Affairs and Taxation Committee, 2003, pp. 7426–7427). Despite the focus on the civil law framework, tax law modifications were also conducted, arguing that the previous tax incentives were insufficient to encourage individuals to part with an "important" portion of their wealth (Economic Affairs and Taxation

[18]They are deductable under another legal norm—member contributions and other payments of up to CHF 10,100 to a political party are deductable as general deductions under art. 33 al. 1 let. 1 DFTA.
[19]Swiss Civil Code (Foundation Law) (n.d.), Amendment of 8 October 2004, SR 4545.

Committee, 2003, p. 7428). Such a justification was the only tax policy objective expressly stipulated by the legislator, from which we deduct that at least one of the goals of the reform was to encourage the increase in donations.[20]

The reform introduced three major modifications of federal tax law norms related to charitable giving.[21] First, the existing ceiling for the deduction of charitable donations increased from 10% to 20% of taxable income or profits. Second, a deduction of charitable noncash donations was introduced. Third, the deductions of donations to the Swiss Confederation, the cantons, the communes, and their institutions were made deductible as donations to charitable tax-exempt entities.[22] This provision was mainly intended to ensure that universities, which in Switzerland are mainly federal or cantonal institutions (Federal Parliament, 2003, p. 7426), also benefit from the charitable deductions system, highlighting the need to fund considerable investments in teaching, research, and science (Parliamentary Initiative, n.d., No. 00.461).[23] The Economic Affairs and Taxation Committee of the Council of States specifically highlighted that donations for research and education were quite interesting for the State and could help relieve its burden in this area (Economic Affairs and Taxation Committee, 2003, p. 7432). Overall, this reform has greatly expanded the possibilities for potential tax deductions in the field of charitable giving.

During the legislative process, the most-debated element was the increase in the ceiling for deductible donations; other tax law changes did not prompt controversial discussions.[24] Initially, much higher ceilings were suggested. The Economic Affairs and Taxation Committee of the Council of States[25] was convinced that the activities of foundations pursuing public service or public utility goals would effectively be fostered via a more generous practice of deducting donations (Economic Affairs and Taxation Committee, 2003, p. 7431). The initial project proposed a 40% deductible ceiling of net income and/or net profit. Moreover under certain specific conditions, such as a particularly important public interest, an enduring commitment to finance a foundation and at least an equivalent deduction granted by the canton and the municipality, the ceiling could reach 100% (Bill Modifying Swiss Civil Code, n.d., p. 7459). However, large increases in deductible ceilings were dismissed during the legislative procedure by the majority of cantons and the Federal Council

[20]The general goal of the 2006 reform was "the liberalization of the Swiss foundation law in order to boost the establishment of foundations". FR: "libéraliser le droit suisse des fondations afin d'encourager la constitution de fondations", Economic Affairs and Taxation Committee, 2003, p. 7426.

[21]The reform also introduced changes in the Value Added Tax and Withholding Tax Acts, but they will not be considered in the framework of the present contribution.

[22]Code civil suisse (Droit des fondations), Modification du Octobre 8, 2004, RS 4545.

[23]Also see Federal Parliament, deliberation 00.461, p. 1216.

[24]Regarding the deductibility of noncash donations, some cantons only pointed out potential valuation problems that could arise. In its message, the Federal Council recognized the need for rules to establish uniform practice in this respect (Federal Council, 2003, p. 7466).

[25]FR: *Commission de l'économie et des redevances du Conseil des Etats*, which is a commission of the higher chamber of the Swiss Parliament.

(i.e. Swiss federal government).[26] A 20% ceiling was therefore adopted (Federal Act Modifying Civil Code, 1990, p. 4551).

The federal law changes were followed by cantonal law modifications, which in Switzerland often occur as a later step. In Geneva, the 5% deduction ceiling of taxable net individual income increased to 20% in 2009 (Art. 8 of the Personal Income Tax Act—V, n.d.)[27]. During the cantonal parliament discussions about the bill, the extent of the ceiling was not extensively debated,[28] and the general idea was to align it with the federal law. One of the major concerns was the possible budgetary impact. It was highlighted that the statistics about the impact of the federal 2006 revision were not known, and there are no statistics on the fiscal impact of such a measure in other cantons that have changed their legislation (Report of the Fiscal Commission PL 9863-A, 2007, p. 7, pp. 3–4, 7; Fiscal Commission, n.d.). Some members highlighted that the difficulty (if not, in their view, impossibility) of estimating the overall impact on public finances of this reform, since it involves individual attitudes (Report of the Fiscal Commission PL 9863-A, 2007, p. 7). Notwithstanding, the project was adopted in a rather non-controversial way, highlighting that the bill "has no greater ambition than to encourage the generosity of our fellow citizens. (…) it aims to increase the possibility of reducing taxes on donations, gifts or inheritance in favor of these numerous public utility associations which play a major role in our Republic. (…) The goal is to encourage these acts of generosity which could be a way of affirming Geneva's of excellence that Geneva is in terms of culture and research" (Report of the Fiscal Commission PL 9863-A, 2007, p. 20).

A timeline with the introduction of the different ceilings in the Swiss federal and Geneva cantonal law is shown in Table 1:

METHODOLOGY

Data sources and study population

Our analysis draws on data with selected variables from taxpayers' returns for the period 2001–2011, confidentially shared by the Tax Administration of the

[26]The cantons were mainly concerned that high deductions would excessively affect tax revenues. The Federal Council argued that in general, charitable deductions create unequal treatment, as taxpayers taxed at high marginal tax rates are favored over those with lower incomes. In addition, extending the possibility of making a deduction seriously undermines the distinctive fiscal character of taxes, whose goal is to finance the tasks of the State. From a public finance perspective, the norms instituting such deductions were questionable not only because do they not respect the principle of "gross accounting" but they also ultimately restrict the financial sovereignty of the Federal Parliament. Particularly, by allowing a taxpayer to decide on allocating certain funds to certain public tasks, the system would delegate some budgetary authority to the taxpayer and such standards are not compatible with the requirements of the Federal Finance Act (Federal Council, 2003, pp. 7466–7467).
[27]See the discussion of Parliamentary deliberations, Canton of Geneva (n.d.), bill No. 9863 (in French).
[28]See however Minority report, Report of the Fiscal Commission PL 9863-A, p. 34.

TABLE 1 Timeline with deductible ceilings for charitable deductions, calculated on the intermediary net income, in federal and Geneva cantonal individual income tax laws

	2001	2001	2003	2004	2005	2006	2007	2008	2009	2010	2011
Federal law (CH)	10%				20%						
Cantonal law (GE)	5%								20%		

Canton of Geneva (TACG) for the present study. The selected variables provide information on the entire population of taxpayers in the Canton of Geneva (approximately 250,000 households). A different data set was provided for each year under study. Each data set comprised the same nine variables, an entire description of them (except one variable) is provided in Lideikyte Huber et al. (2021); the ones particularly used in the present study are described and listed below with their original name provided in brackets[29]:

- "Coded ID" (**"identifiant"**): a coded ID for each taxpayers. This variable allows to follow the same taxpayer over time, except in four specific cases. The same coded ID is used for a given taxpayer for each fiscal year. As Switzerland has a joint filing system, married couples are considered and treated as one taxpayer in the same way as a single non-married individual, and they have only one coded ID (in this paper, any deducting taxpayer, couple, or individual is referred to as "deducter").
- "Year of birth" (**"annee_de_naissance"**): the year of birth of a taxpayer (which is either an individual or a household, depending on marital status). For married couples, it is the year of birth of the "principal" taxpayer, usually the man.
- "Income_bracket" (**"bareme_revenu"**)—the binary (0/1) indication of a possible "splitting" of income tax rate in the tax income computation, showing whether tax filling is joint (1) or individual (0).
- "Global net taxable income" (**"revenu_net_imposable_taux"**): the net taxable income for cantonal tax purposes (after all deductions) applied to set the tax rate; this includes the totality of any foreign income.
- "Net taxable income in Geneva" ("**revenu_net_imposable_GE**"): the net taxable income in the canton of Geneva. In 2010 and 2011, the canton of Geneva has introduced several changes to its personal income tax law (e.g., extension of the deduction for family expenses). Those changes to a certain extent influenced the definition of taxable income for cantonal tax purposes. For this reason, the calculation of taxable income of 2001 through 2009 on a number of points diverges from its calculation in 2010 and 2011 and are not perfectly comparable[30]
- "Gross wealth" (**"fortune_brute"**): global wealth of the taxpayer.

[29]We have used a similar set of data in Lideikyte-Huber, Pittavino & Peter (2021), however, some key variables were not included in our previous publication.
[30]Information provided by the Tax Administration of the Canton of Geneva while delivering data.

- "Fortune_imposable" ("**fortune_imposable**"): taxable wealth.
- "Deductions for donations" (**"versements_benevoles**"): the amount of deduction (if any) for charitable giving admitted for cantonal tax purposes; this amount represents either an entire annual amount of deducted donations (in case it is less than the deductible ceiling) or capped amount of annual donations, if exceeding the deductible cantonal ceiling (5% in 2001–2008 and 20% in 2009–2011).
- "Intermediary net income for deductible donations" **("Sous_total_ded_dons")**: this variable serves as a key reference point for calculating deductions that are under, equal or more than the legal cantonal ceiling (5% or 20%, depending on the year). It could only be digitally extracted from the databases of the Geneva Tax Administration for the tax years 2010 and 2011. For the previous years, it was determined by internal calculations performed by the Geneva Tax Administration, based on the elements of the tax base that are included in its definition.[31]

These data were selected for taxpayers residing in the Canton of Geneva as well as for taxpayers residing in another Swiss canton or abroad but taxed in Geneva. The information above does not allow us to distinguish between these different categories of taxpayers. In addition, as from the 2009 tax year (the same year when deduction ceilings were raised for charitable donations), taxpayers who are usually taxed at source have the possibility of filing a return, if they meet certain conditions, and are then treated as resident taxpayers ("quasi-residents"). The status of quasi-resident allows a taxpayer subject to withholding tax residing abroad to file a tax return in order to take into account effective expenses and other deductions.[32] These taxpayers are approximately 2000 in 2009, 4000 in 2010 and 5600 in 2011. The variables provided by TACG do not allow us to identify quasi-resident taxpayers.[33]

As reported in a previous study (Lideikyte Huber et al., 2021), the total number of taxpayers in the canton of Geneva has steadily increased, from 234,117 in 2001 to 266,336 in 2011. The share of the taxpayers deducting charitable donations more than doubled, rising from 8.3% in 2001 to 19.3% in 2011, with a steep increase in 2005 (deducting taxpayers reaching 16.3% in Table 2). Concerning the general pattern of deductions during the studied period, the total amount of yearly charitable deductions increased very significantly, from CHF 29,133,697 in 2001 to CHF 72,741,235 in 2011 (amounts nonadjusted for inflation) which is due to the rise in population; a substantial increase of 48% of deductions is

[31]Information provided by the TACG on data delivery.

[32]Such a status can be given to a non-resident taxpayer if at least 90% of the taxpayer's worldwide income is taxable in Switzerland. For a married couple, the worldwide income of the spouses must be added together and at least 90% of this total must be taxable in Switzerland. Cantonal Tax Administration, Qu'est-ce qu'un quasi-résident? | ge.ch (https://www.ge.ch/taxation-ordinaire-ulterieure-tou/qu-est-ce-qu-quasi-resident), accessed April 04, 2022, last accessed July 11 2022.

[33]Information provided by the Geneva Tax Administration (TACG) on data delivery.

recorded in 2009 (Table 3; Lideikyte Huber et al., 2021). The summary statistics on the Geneva taxpayers' population are in Appendix 1 (Figures 1 and 2).

Analytical strategy

Donors' deductions in relation to legal ceilings

In order to study the patterns of deductions, we have analyzed whether the deducted amounts are close or equal to (and arguably over)[34] the legal ceilings for the charitable deductions that are calculated as a specific percentage of the intermediary net income. The legal ceilings for the studied period were as follows: federal income tax—10% of the intermediary net income until 2006 and 20% afterward; cantonal income tax—5% of the intermediary net income until 2008 and 20% afterward as it is showed in Table 1 (supra II C).

Summary statistics of donors by year have been computed. The deduction for charitable giving has been related and compared with the corresponding income percentage. This computation has been possible because of a variable "intermediary net income for deductible donations", used by the TACG to compute the cantonal ceiling of fiscal deductions for charitable donations for each taxpayer. The corresponding percentage (i.e., <1%, <6%, >10%, ≥4%, etc.) of each deducted amount for donations were computed in relation to this variable, representing the reference given by the TACG to make this computation. Deep investigations on the percentage and exact number of taxpayers who contribute for less than 1% (<1%), 2%, 6%, equal and more than 4% and equal and more than 10% and 20% (after cantonal reform) can be found in Table 3 in the "Results and Discussion" section. Computations for all the percentage ceilings were performed, only the most relevant being, however, shown in this paper.

As the cantonal deduction ceiling was 5% for the period 2001–2008, we explored further the segment of donors giving "equal and more than 4%" of their net income. Our hypothesis was that these donors may be concerned with deduction ceiling for one of two reasons: (1) either they are specifically targeting the 5% cantonal deduction ceiling in order to give donations that provide them with the maximum tax benefit, meaning that they are very sensitive to the deduction ceiling; or (2) they give higher donations then deduction ceiling, but they cannot deduct the entire amount due to this ceiling, which might be source of concern. As the taxable income is determined on the basis of income earned during the tax period, it may in certain circumstances be difficult to know before the end of the fiscal year what will be the specific deduction ceiling for the year, and thus the exact

[34]Due to our data, if a deduction reaches the cantonal legal threshold, we are unable to define whether the deducted amount is equal or exceed this threshold (this data provides the information on deductions and not total donations).

TABLE 2 Six taxpayers' income classes in the Canton of Geneva in 2001. The fifth column corresponds to the total donors by each class in 2001

Income class	Income (x) class (net income, CHF)	Number of taxpayers	% of taxpayers per year	Number of deducting taxpayers	% of deducting taxpayers among same income class	% of deducters among all taxpayers	Amount of deductions (CHF)	Median deduction per income class
Low	$x \leq 22{,}463$	58,532	25.00	1220	2.08	0.52	395,442	180
Low-middle	$22{,}463 < x \leq 47{,}743$	58,531	25.00	3473	5.93	1.48	1,733,002	258
Middle	$47{,}743 < x \leq 78{,}370$	58,533	25.00	5430	9.28	2.32	3,804,624	330
Middle-high	$78{,}370 < x \leq 172{,}000$	46,825	20.00	6856	14.64	2.93	7,624,170	480
High	$172{,}000 < x \leq 420{,}000$	9369	4.00	1818	19.40	0.78	4,100,334	850
Very high	$x > 420{,}000$	2327	1.00	538	23.12	0.23	11,476,115	2500
		234,117	**100.00**	**19,335**		**8.26**	**29,133,687**	

TABLE 3 The percentage of donors' population analyzed by the size of their deductions ("D") as percentage of their taxable income ("TI")

				Donors' population in percentages analyzed by the size of their deductions ("D") as percentage of their taxable income ("TI")							
Year	**Federal ceiling (%)**	**Cantonal ceiling (%)**	**Total deducters (donors)**	**D equal or more 20% TI (%)**	**D equal or more 10% TI (%)**	**D less 10% TI (%)**	**D less 6% TI (%)**	**D less 5% TI (%)**	**D equal or more than 4% TI (%)**	**D less 2% TI (%)**	**D less 1% TI (%)**
2001	10	5	19,335			99.97	99.93	96.89	**8.16**	82	51.27
2002			25,272			**100**	99.94	95.68	**7.04**	83.76	68.96
2003			30,276			**100**	100	95.24	**6.58**	84.94	70.83
2004			35,192			**100**	99.99	95.25	**6.54**	84.78	70.87
2005			39,553			**100**	99.99	95.13	**6.54**	84.89	71.35
2006	20		39,511			**100**	100	95.38	**6.27**	85.60	72.26
2007			42,248			**100**	100	95.50	**5.99**	86.33	73.66
2008			45,083			**100**	100	95.73	**5.8**	86.74	74.53
2009		20	47,349	0.52	1.73	98.27	96.50	95.52	**5.98**	86.59	74.24
2010			49,389	0.62	2.06	97.94	95.72	94.72	**6.89**	85.03	72.17
2011			51,492	0.56	2.00	98.00	95.93	94.84	**6.76**	85.43	72.73

Note: Bold values represent the percentage of donors makingdeductions that are close, equal or exceeding the cantonal legal deductionceiling of 5%, that was in effect before the 2009 reform.

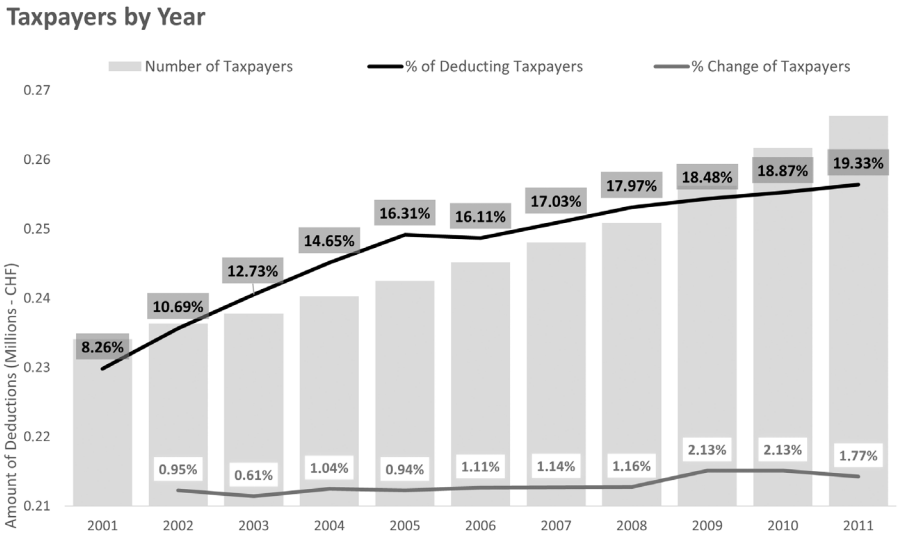


FIGURE 1 Changes in the taxpayers' population and in the share of taxpayers that deduct charitable contributions in 2001–2011

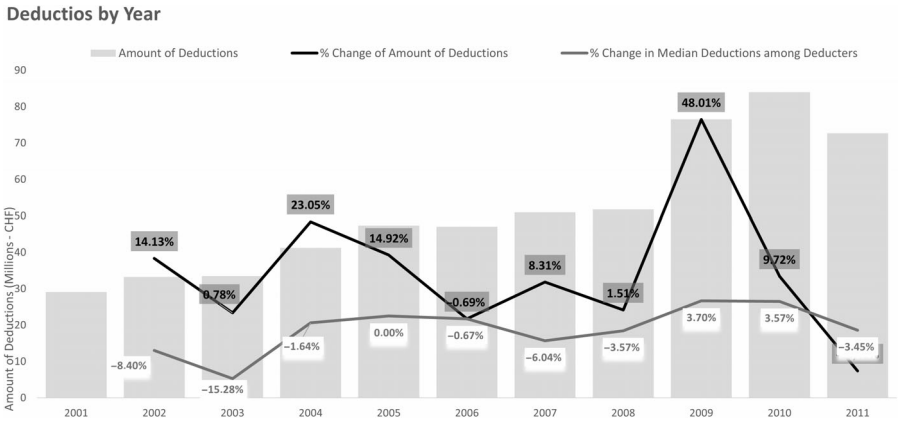


FIGURE 2 Changes in the total amount of deductions as well as in the median deduction in 2001–2011

amount of the possible deduction.[35] Thus, we have assumed that people who give "equal or more than 4%" might in fact be willing to target the 5%, but without wanting to exceed it. As such, the linear correlation coefficients

[35]Art. 16 DTHA; Art. 2 para. 1 of the former law on the taxation of individuals over time of the canton of Geneva (LITPP-II) D 3 12 of August 31, 2000 (no longer in force); Art. 61 PITA.

$$pxy = \frac{\text{covariance}\,(X, Y)}{\sqrt{\text{var}(X)\text{var}(Y)}},$$

$$-1 \le pxy \le 1.$$

Estimated through the Pearson moment correlation coefficients (*Pearson*, 1895):

$$r_{X,Y} = \frac{S_{XY}}{\sqrt{S_{XX}S_{YY}}}$$

with

$$S_{XY} = \sum_{i=1}^{n} (X_i - \bar{X})(Y_i - \bar{Y}),$$

$$S_{XX} = \sum_{i=1}^{n} (X_i - \bar{X})^2,$$

$$S_{YY} = \sum_{i=1}^{n} (Y_i - \bar{Y})^2$$

were computed for all the 11 years (2001–2011) both for the entire donor's population and for the donors who contributed with a deduction equal or more than 4%. Pearson's correlation coefficient is a measure of the strength of a linear association between two variables. In other words, it determines whether there is a linear component of association between two continuous variables.

Giving by income and wealth: Summary statistics and regression analysis

The entire donors' data set has firstly been analyzed with an exploratory data analysis. The main summary statistics (e.g., mean, SD, min, max, median, length, and missing values) has been computed. The resulting correlations mentioned above show a very high multicollinearity between these two pairs of variables, in order to measure the amount of variance explained by each one of them for the resulting model the variance inflation factor (VIF) has been calculated. This quantity was computed to select the optimal variables for our analysis. This is an indication of the presence of multicollinearity. The VIF of an explanatory variable X_j is defined by

$$\mathrm{VIF}_j = \frac{1}{1 - R_j^2},$$

where R_j^2 is the coefficient of determination of the model where X_j is regressed (by least square in relation to the remaining explanatory variables). It allows to understand and to select the variables to correlated with each other, to not occurring in model overfitting issue (see Appendix 2). A simplified criterion to select the variables is the following: when we have $p - 1$ explanatory variables and if we find that for the average of them the VIF_j is superior to 5 and certain VIF_j are superior than 10, there is a problem of multicollinearity. For our specific data sets, there was a problem of multicollinearity between (Net total income, Deducted Income and Net Ge Income) and (i.e., Gross wealth and Taxable wealth).

Considering the most important variables and their relating meaning after the VIF calculation, only "global net taxable income" and "gross wealth" have been kept for being modeled. Considering Y_i, the "deductions for donations" as the outcome variable, X_1 = "year of birth", X_2 = "global net taxable income," and X_3 = "gross wealth," a first multiple regression model with the donors population in 2001 has been fitted. In particular, the model fitted can be modeled as:

$$Y_i | X_i \sim N\left(\mu_X, \sigma^2\right), i = 1, \ldots, n, \text{or (multiple linear regression)},$$

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \cdots + \beta_{p-1} X_{ip-1} + \varepsilon_i,$$

with $\varepsilon_i \sim N\left(0, \sigma^2\right)$, independent and identically distributed (iid).

With $p = 4$, representing the three explanatory variables and the intercept, and ε_i = "epsilon_i" the resulting errors assumed to be independent and identically Gaussian distributed with a null mean and variance σ^2 (Pittavino et al., 2017a, 2017b). Even if the explanatory variables resulted statistically significant the whole fit of the model was poor. In order to improve our results and to describe the donors' behavior by income classes, a simple quantile linear regression with Y = "total net income" as response variable and X = "deductions for donations" as explanatory variables has been modeled and fitted. The simple quantile linear regression is analogous to the simple linear regression, where it estimates the response quantiles as a function of the explanatory variables.

The model (simple linear regression):

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

with $\varepsilon_i \sim N(0, \sigma^2)$ and independent from the observations was analyzed by each response quantile.

In the regression analysis, we have chosen to use "income" as dependent variable to describe the related income classes, depending on the different quantiles, as a function of the variable "deductions for donations". The resulting graph with the fitted regression lines can be found in Figure 1 and is commented in the next section. Addition to quantile regression methods also robust fixed effects regression (Avella Medina et al., 2015; Huber & Ronchetti, 2009), a more accurate statistical method for considering outliers, were fitted by each year with the goal to see how changes in income and wealth between household affect their giving. A robust regression with an efficiency of 70% has resulted for all the 11 years the best fit among several regressions models tried with an averaged adjusted robust R^2 of 0.4, that given the heterogeneous data is a good result. For the case of the linear regression analysis, the R^2 was 0.2 at maximum for all years.

Even if some authors would have suggested a logarithmic transformation given the asymmetrical nature of the data, for this specific case given the ceiling would not have been beneficial its applications.

The income classes for the year 2001 are described in Table 2 and were computed in this way for all the years.

RESULTS AND DISCUSSION

General responsiveness of donors to deduction ceilings

Are donors concerned by the deduction ceilings established in tax laws? Summary statistics presented in the Table 3 provide us with important and previously unreported findings about taxpayers' deductions in the canton of Geneva.

Overall, we observe that the cantonal ceiling for charitable deductions prior and especially after the reform concern only a very small portion of deductions. The overwhelming majority of donations are significantly smaller than the legal deductible ceilings. Over 80% of all donors in any given year do not ever reach 2% and over 70% do not reach 1% of their net income. Thus, it appears that the lower cantonal deduction ceiling of 5% before the reform was largely sufficient for most donors. Roughly, the same percentage of donors' population continue to give less than 2% and 1% of their net income even after the cantonal ceiling was brought to 20% in 2009. After the reform, over 99% of all donors do not reach cantonal and federal deduction thresholds.

Concerning the 5% deduction ceiling, we observe that it was reached every year prior to the reform by a subgroup of taxpayers which is constantly 4%–5% of all the deducters. In addition, we observe that roughly the same number of the taxpayers continued to make similar deductions *after* the

ceiling was increased to 20%. This could suggest that even prior the reform, they have been constantly targeting the 5% ceiling and retained this habit after the reform.

Concerning the 20% ceiling, which from the year 2009 becomes the ceiling for both federal and cantonal deductions, we observe that from 2009, only around 0.5% of taxpayers (246 in 2009, 306 in 2010 and 288 in 2011) reach it. As the number of taxpayers is almost constant during 3 years, this might suggest a certain tendency in this subgroup of taxpayers.

This prompted us to explore further two segments of taxpayers: (1) the ones deducting equal or more 4% of their taxable income during the entire study period; (2) the segment of donors giving equal or more than 20% of their net taxable income after the reform.

Characteristics of donors that reach deduction ceilings

We have identified a segment of donors that may be sensitive to income deduction ceiling, as their deductions match exactly, are very close to or potentially exceed legal deductible ceilings for this period. We have therefore analyzed the further characteristics of this segment. A negative correlation has been found for all the 11 years between "year of birth" and "deductions for donations", meaning that younger taxpayers (born around the 80s) deduct less or the other way around, the older they are (born around the 50s), the more they deduct.

The further characteristics of donors "equal and more than 4%" were explored through summary statistics in the Table 3 and compared with the summary statistics for *all* donors in the Table 4

We observe that the net income of donors giving "equal and more than 4%" fall into the middle-high-income range as defined for the year 2001 (Table 1). The values of their mean and median income are constantly lower if compared to values of the entire donors' population, except for the mean income in 2009 (SD ranging between 230,000 and 1.35 million, depending on the year). However, both the mean and median of their wealth are significantly higher in comparison with all donors (with SDs ranging between 11 and 32 million). Those individuals give very high donations (deductions)—the mean values are in certain cases 53 times higher than the ones of the entire donors' population (e.g., in 2009, 14,783 for selected donors and 280 for all donors); the median values are 2–2.6 times higher (e.g., in 2009, 4205 for selected donors and 1617 for all donors). Those donors are on average and median a decade older—at the time of donation, they are in their mid- and late-60s, in comparison with the average and mean age of all donors, which is mid-50s. It is interesting to observe that the mean and median values concerning the age of donors are constant through all years in

TABLE 4 Summary statistics of the donors deducting equal to 4% and more of their net income (amounts not adjusted for inflation)

Year	No. of donors deducting > or = 4%	Total deductions	Average deduction	Median deduction	Average net global income	Median net global income	Average gross-wealth	Median gross wealth	Average year of birth	Median year of birth	Single	Married,[a] or single with dependents[b]
2001	1577	10,044,899	6369	3000	124,552	58,338	2,736,978	379,830	1938	1937	1360	217
2002	1780	9,103,138	5114	2971	101,687	58,761	2,105,624	421,730	1939	1937	1535	245
2003	1993	9,435,589	4734	2901	93,070	56,237	2,599,434	450,967	1939	1937	1760	233
2004	2301	11,288,508	4905	2855	96,840	54,365	2,867,785	474,454	1940	1938	2010	291
2005	2585	12,041,041	6457	2828	126,148	54,130	3,534,739	530,691	1942	1939	2277	308
2006	2479	15,275,376	6161	2703	119,125	52,349	3,995,395	528,944	1941	1938	2210	269
2007	2530	16,337,751	6457	2828	126,148	54,130	3,534,739	530,691	1942	1939	2217	313
2008	2616	13,530,154	5172	2849	101,944	54,621	2,847,336	498,403	1942	1940	2307	309
2009	2833	41,881,239	14,783	4205	142,776	54,192	4,042,140	513,396	1943	1941	2596	237
2010	3404	47,823,616	14,049	3815	119,400	41,845	3,934,337	514,765	1943	1941	3011	393
2011	3481	33,354,987	9582	3734	87,904	42,181	2,734,628	527,318	1944	1941	3112	369

[a]The civil status « married » also includes registered same-sex partners under Swiss law.

[b]A single, widowed, divorced, separated person and living with minor children, or children between the ages of 18 and 25 who are studying or doing an apprenticeship, or a relative for whom the taxpayer is essentially responsible financially.

both segments. We also find that in most cases they are single and without dependents (small children or family members), which particularly contrasts with the description of the general donors' population, where the majority of donors are households married and/or with dependents.

Another important finding made possible by the longitudinal analysis is that those donors are very regular givers. 301 donors made charitable contributions during the entire period of study of 11 years, while 202 have contributed along 10 years of study. Only around 17% of those "deducters" have only given once during the studied period; 40% of all "deducters" give between 7 and 11 times during the studied period, and their deductions are always reach (or exceed) or are very close to the maximum deduction ceiling authorized by the cantonal law until the end of 2008, and continue to be in this range even after the reform.

Concerning the very small subgroup of donors that give 20% or more of their taxable income during the years 2009–2011 some additional interesting observations emerge. Those donors are even older than the segment of donors giving 4% and more (median age is 66 in 2009, 69 in 2010 and 2011), much wealthier (gross average wealth between 8 and 12 million). They make between 10% (2009, 2011) and 17% (2010) of all the deductions in the canton of Geneva, thus it is a very important segment of donors, even though a very small one (between 246 and 306 taxpayers.

In summary, it appears that donors that are concerned by deduction ceilings, as they reach (or exceed) the deduction ceiling, are older and probably retired (mid-late 60s); they are regular givers and have a lower net taxable income than the general donors' population, but a gross wealth that is significantly higher (even very high). The amount of their median deductions is also significantly higher than the mean and median values of all donors. Those tendencies remain constant throughout the entire study period (Tables 5 and 6).

Characteristics of donors by income and wealth in relation to their deductions

What are the characteristics of the income and wealth of donors, and how do they reflect in their donations? Can we identify any differences, in terms of wealth and income, between all donors and the ones that we identified as specifically concerned by tax incentives (i.e., who deduct equal to 4% and more of their taxable income)? In order to answer those questions, we have carried out a quantile regression analysis for all deducting donors as well as for the subset of deducting donors that are responsive to tax incentives.

Confirming the existing research, we find that the donors with lower wealth tend to give proportionally more in comparison to their wealth. In other words, the relative generosity of individual donors decreases with wealth. It must,

TABLE 5 Summary statistics of all donors (amounts not adjusted for inflation)

Year	Total deductions	Average deduction	Median deduction	Average net global income	Median net global income	Average gross-wealth	Median gross wealth	Average year of birth	Median year of birth	Single	Married,[a] or single with dependents[b]
2001	29,133,697	393	1507	149,675	75,247	1,541,612	225,855	1946	1946	9004	10,331
2002	33,248,984	360	1315	134,571	76,669	1,400,292	233,350	1946	1946	11,843	13,429
2003	33,507,115	305	1098	124,466	74,330	1,346,426	233,480	1947	1946	14,255	16,021
2004	41,229,743	300	1171	129,723	73,912	1,371,231	229,879	1948	1947	16,744	18,448
2005	47,381,886	300	1197	132,526	73,732	1,496,830	241,775	1948	1948	18,454	21,099
2006	47,056,580	298	1190	142,687	73,450	1,626,139	257,448	1949	1948	18,672	20,839
2007	50,968,564	280	1206	150,449	74,911	1,619,586	255,171	1950	1949	19,863	22,385
2008	51,735,693	270	1147	146,779	75,971	1,461,825	247,254	1951	1950	21,283	23,800
2009	76,574,313	280	1617	134,285	76,573	1,578,332	254,987	1951	1951	22,529	24,820
2010	84,014,116	290	1701	125,708	69,189	1,586,965	256,309	1952	1952	23,328	26,061
2011	72,741,235	280	1412	129,388	69,140	1,611,136	262,190	1953	1953	24,350	27,142

[a]The civil status « married » also includes registered same-sex partners under Swiss law.
[b]A single, widowed, divorced, separated person and living with minor children, or children between the ages of 18 and 25 who are studying or doing an apprenticeship, or a relative for whom the taxpayer is essentially responsible financially.

TABLE 6 Summary statistics of donors giving 20% or more of their taxable income (amounts not adjusted for inflation)

Year	Total deductions	Average deduction	Median deduction	Average net global income	Median net global income	Average gross-wealth	Median gross wealth	Average year of birth	Median year of birth
2009	7,511,679	30,411	3563	126,468	15,262	12,216,685	887,713	1945	1943
2010	14,669,354	48,096	3566	191,544	8296	12,381,455	608,074	1944	1941
2011	7,310,972	25,473	3869	98,784	7664	8,165,617	702,169	1945	1942

however, be highlighted that within wealthier classes, the number of donors is much higher (Table 1). In summary, people with lower wealth deduct (and thus donate) proportionally larger amounts to their income and wealth, that is, they are more generous than people with higher wealth, but the latter *deduct* more often. It, however, does not mean that people with lower wealth and income *donate* less often because they simply might be renouncing to the deductions. This finding is constant for all deducting donors as well as the "responsive" ones (Figure 1 for 2001; Appendices 3 and 4 for the whole study period).

The analysis of deductions by taxable income classes shows a different picture between those two groups of donors. The deductions by donors that are around 4% or more of the taxable income rise linearly with their income, in all income classes, during the most of the studied years (this trend is less visible in 2009–2011, where the cantonal reform of 20% ceiling entered into force) as their donations are close to or exceed the deduction ceiling (Appendix 4). This trend is not pronounced when studying the wealth of those donors (Figure 3). In general, we find that the average behavior of all donors/deducters corresponds to the portion of population identified as middle-income class, while the "middle-high-," "high-," and "very high"-income class have a less generous behavior (higher income, less giving).

Those results have been confirmed by the robust regression analyses estimates, their related p-values and goodness of fit, as showed in Table 7. We can see the fixed effect regressions for the bivariable models with income and wealth, resulted in statistically significant variables for the income estimates among all the 11 years of study, while the wealth variable was not always significant (p-value >0.05). For 9 years (all but 2009 and 2010), the wealth estimates were even negative, showing an inverse correlation between charitable giving and wealth. Contrary to outcomes from standard linear regressions for all deducters with a bivariable fit, as well.

SUMMARY AND CONCLUSIONS

Income tax incentives for charitable giving are very popular worldwide, despite sometimes being criticized from a legal perspective. Such criticism, which particularly concerns tax deductions, is based on the fundamental principles of tax law, notably the ability to pay. In progressive income tax systems, tax deductions deviate from this principle producing unequitable effects, as they provide higher benefits to higher-income taxpayers. In addition, democratic concerns are expressed in relation to the effect of tax incentives that effectively give budgetary prerogatives to donors. For all those reasons, when introducing new tax incentives for charitable donations or increasing the existing ones, the legislator has to address public finance and redistribution concerns. In order to do this, it is essential to be

TABLE 7 The beta estimates: $\widehat{\beta}$ and the p-values: P "Net Total Income": I_{nc} and "gross wealth": Wth, with the adjusted R^2: R^2_{Adj} resulting from the standard linear regression bivariable model and from the robust regression bivariable model fitted for each year under study

	Linear regression estimates					Robust regression estimates				
Year	$\widehat{\beta}_{I_{nc}}$	$p_{I_{nc}}$	$\widehat{\beta}_{W\text{th}}$	$p_{W\text{th}}$	R^2_{Adj}	$\widehat{\beta}_{I_{nc}}$	$p_{I_{nc}}$	$\widehat{\beta}_{W\text{th}}$	$p_{W\text{th}}$	R^2_{Adj}
2001	5.2×10^{-2}	<0.05	-9.0×10^{-6}	0.02	0.99	5.2×10^{-2}	<0.05	-6.4×10^{-7}	0.04	1.00
2002	5.1×10^{-2}	<0.05	-1.4×10^{-5}	0.23	0.98	5.3×10^{-2}	<0.05	5.5×10^{-7}	0.30	1.00
2003	5.2×10^{-2}	<0.05	4.4×10^{-6}	0.03	0.99	5.3×10^{-2}	<0.05	-3.2×10^{-8}	0.90	1.00
2004	5.1×10^{-2}	<0.05	2.8×10^{-6}	0.60	0.99	5.3×10^{-2}	<0.05	-1.4×10^{-7}	0.53	1.00
2005	4.9×10^{-2}	<0.05	-2.9×10^{-5}	<0.05	0.98	5.3×10^{-2}	<0.05	1.0×10^{-7}	0.79	1.00
2006	5.3×10^{-2}	<0.05	-1.4×10^{-5}	<0.05	0.99	5.3×10^{-2}	<0.05	-2.9×10^{-8}	0.85	1.00
2007	5.2×10^{-2}	<0.05	-4.1×10^{-6}	0.35	0.99	5.3×10^{-2}	<0.05	2.0×10^{-8}	0.87	1.00
2008	4.9×10^{-2}	<0.05	3.9×10^{-5}	<0.05	0.98	5.3×10^{-2}	<0.05	-1.5×10^{-7}	0.42	0.99
2009	6.8×10^{-2}	<0.05	2.6×10^{-3}	<0.05	0.76	4.9×10^{-2}	<0.05	6.1×10^{-5}	<0.05	0.92
2010	6.5×10^{-2}	<0.05	2.2×10^{-3}	<0.05	0.79	4.7×10^{-2}	<0.05	4.3×10^{-6}	0.65	0.89
2011	1.2×10^{-1}	<0.05	-1.4×10^{-4}	0.04	0.66	4.8×10^{-2}	<0.05	4.7×10^{-6}	0.49	0.99

informed about the patterns in deductions as well as the characteristics of deducting donors. The present study seeks to contribute in this respect.

The data we use are exceptional in two regards. First, it encompasses, over a decade, the entire population of taxpayers, with specific longitudinal information on individual donors. Second, it contains evidence about the potential effects of a tax law reform. Nonetheless, the present study was, however, hindered by the inability to receive the data on the amount of gross income of taxpayers, which would give a more complete picture of their ability to pay. In addition, we did not receive the amounts of deductions for federal income tax purposes, which would allow us to observe more closely the changes in the patters of deductions in relation to both cantonal and federal tax reforms. The amounts of donations (in comparison to the amounts of capped deductions) would have helped to identify more precisely the changes in the overall giving during the study period.

Who deducts charitable contributions, and what is the pattern of such deductions?

In general, we observe that deducting charitable donations have become increasingly popular during the study period, in 2011 nearly one taxpayer out of

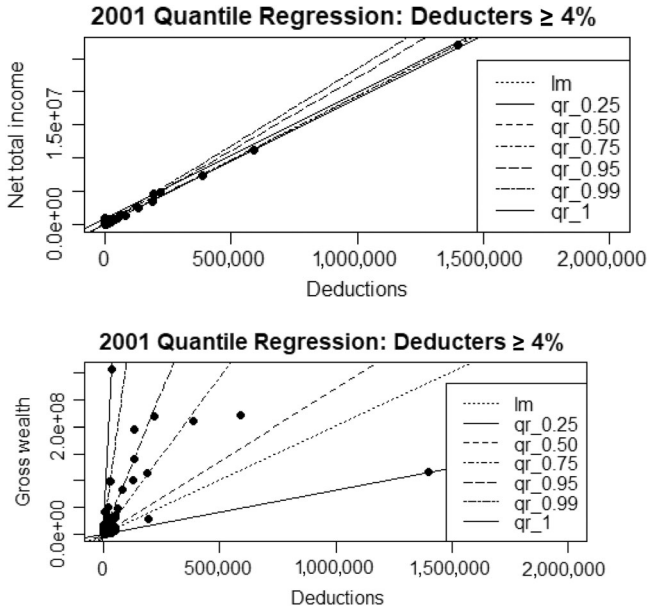


FIGURE 3 Quantile regression lines for charitable deductions with, respectively, taxable income and wealth as outcome variables at time and deductions for donations as explanatory variable (2001) (Appendices 3 and 4 for regression analysis 2001–2011)

five claiming such a deduction. However, in terms deduction ceilings, an overwhelming majority of donors made donations that are significantly smaller. In particular, over 80% of all deductions in any given year do not ever reach 2% and over 70% do not reach 1% of the cantonal deduction ceiling. Roughly, the same percentage of donors continue to deduct less than 1%–2% of their net income even after the cantonal ceiling was brought to 20% in 2010. Over 99% of donors do not reach the new 20% ceiling after the reform. In this respect, in terms of the 2009 reform, it appears that the "old" cantonal deduction ceiling of 5% was largely sufficient for the majority of donors, whose deductions do not even come close to it. Data beyond 2011 would, however, be needed to verify if their behavior changes in the longer term.

However, we have identified a subset of donors that constantly make deductions close to the cantonal deduction ceiling of 5% during the entire study period. Even though it is a very small part of all donors (around 6%–8% and only 0.7% of the entire population in 2001), they give around 30%–54% of all donations, thus representing a very important donor group in the canton of Geneva. The link between the increase in donors' income and donations is also confirmed by a quantile regression analysis as well as the robust regression analysis. Those donors are older and probably retired (in their mid-late 60s), mostly single, with taxable income belonging to the middle-high-class income bracket, which is lower in its mean and median if compared to the entire donors' population. Their wealth is, however, significantly higher than the mean and median of all donors, suggesting that it could be an important indicator of the donors' sensitivity to tax ceilings, even though tax deduction does not provide benefits for wealth tax purposes. Most of them are very regular donors—around 40% of those make charitable deductions between 7 and 11 years during the studied 11-year period. The very small subset of donors that persist giving around 20% of the cantonal ceiling after the reform are extremely wealthy donors—in comparison to the subpopulation giving 4% or more, the former have even higher wealth and make much bigger deductions.

Several assumptions could be drawn studying the donors deducting 4% and over. Even though we do not have data about their total deductions prior to the reform (only capped amounts), we could speculate that it is likely that even before the reform they might have been targeting 5% threshold, because the number of taxpayers giving around 5% remains very stable even after the reform, when ceiling was lifted to 20% (Table 3). This is also supported by the fact that only an extremely small amount of taxpayers reach 20% after the reform, so it is not very likely that deductions before the reform, when tax conditions were less generous, were much larger. This would need to be confirmed with additional data, for instance on deductions for federal income tax purposes. One might also speculate that taxpayers kept a habit of giving around the cantonal ceiling of 5% of their income after the reform, because roughly the same percentage of taxpayers continues making deductions around 5%.

The fact that the donors reaching (and perhaps targeting) deduction ceilings are wealthier could be explained through a few hypothesis—apart from the fact that such taxpayers have larger available resources for giving. In particular, one must note that the Canton of Geneva has one of the most progressive income tax rates in Switzerland, in which case the benefits of the charitable deductions increase steeply with income, hence creating a higher incentive to deduct more. The fact that the mean and median net taxable income values of such donors are lower in comparison with the values related to all donors might be related to the fact that their larger charitable deductions influence the amount of the final taxable income. Another, more technical explanation of the fact that wealthier donors often reach (and maybe target) the deduction ceiling would also be the availability of a professional tax advice and filing, which allows income tax optimization and is often used by wealthy taxpayers.

From a policy perspective, several conclusions could be drawn. In general, a charitable deduction became a very common feature in tax reporting in the canton of Geneva during the studied period and the legislator should take this into account. In the future studies, it would be interesting to investigate whether the same tendencies could be observed in other Swiss cantons. Studying the entire donor population, we also confirm the existing research that donors with lower income and wealth tend to deduct (and thus give) proportionally more (i.e. the generosity of individual donors decreases with income and wealth, the exception being the donors whose donations increase linearly with their income). We identify a subset of donors that are potentially tax-incentive sensitive, because their deductions constantly reach (or exceed) the ceiling. The policymakers in Geneva should pay a particular attention to the group of taxpayers identified here, due to their huge share of annual donations. We consider that it might be possible that this group of taxpayers were specifically targeting the most beneficial cantonal deduction 5% ceiling prior to the reform, and retained this habit after the reform (further data would be needed to study whether the deductions shift closer to the 20% ceiling in the years after 2011). The fact that the taxpayers may be choosing the most beneficial ceiling could be useful not only for Geneva legislator but also for other Swiss cantons, as well as more generally for the jurisdictions with multiple ceilings for income tax purposes. In the light of such findings, an increase in deductible ceilings may have an impact on the size of deductions (donations) by those taxpayers, but the legislator should consider the time it might take for the taxpayers to adapt to those changes. This fact should be carefully considered during tax reforms and not only in relation to charitable giving but also in relation to other public policy goals, incentivized through taxes.

ACKNOWLEDGMENTS

This project is financed by the Swiss National Science Foundation (SNSF) (grant number 182839). The authors greatly thank Professor Henry Peter, the Head of the Geneva Centre for Philanthropy (GCP), for his continuous

scientific support. The authors are also extremely grateful to the Tax Administration of the Canton of Geneva (TACG) for providing the data for this study. Our sincere thanks also go to Professor Roy Welsch of the Massachusetts Institute of Technology (MIT), Boston for his advice on statistical modeling, to Professors Michael Devereux, John Vella and all the team of the Oxford University Center for Business Taxation for their valuable comments, as well as to Professor Sebastian Schanz of the Universität Bayreuth for his advice on data analysis.

Open access funding provided by the University of Geneva

DATA AVAILABILITY STATEMENT

Data necessary to replicate the results of this article are available upon request from the corresponding author, subject to a written agreement to share such data by the Tax Administration of the Canton of Geneva.

REFERENCES

Adena, M. (2021). Tax-price elasticity of charitable donations: Evidence from the German taxpayer panel. In H. Peter & G. L. Huber (Eds.), *Routledge handbook of taxation and philanthropy*. Routledge.

Almunia, M., Guceri, I., Lockwood, B., & Scharf, K. (2020). More giving or more givers? The effects of tax incentives on charitable donations in the UK. *Journal of Public Economics*, *183*, 104114.

Andreoni J. (2015). Charity and philanthropy, economics of. *International encyclopedia of the social and behavioral sciences* (Vol. 2, p. 360). https://www.researchgate.net/publication/304194767_Charity_and_Philanthropy_Economics_of

Avella Medina, M. A., & Ronchetti, E. M. (2015). Robust statistics: A selective overview and new directions. *Wiley Interdisciplinary Reviews: Computational Statistics*, *7*, 372–393.

Bakija, J., & Heim, B. T. (2011). How does charitable giving respond to incentives and income? New estimates from panel data. *National Tax Journal*, *64*(2), 615–650.

Bakija, J. (2013). Tax policy and philanthropy: a primer on the empirical evidence for the United States and Its Implications, *Social Research*, *80*(2), 559.

Bill Modifying Swiss Civil Code (Draft). (n.d.). FF 2003 (p. 7453).

Bönke, T., Massarrat-Mashhadi, N., & Sielaff, C. (2013). Charitable giving in the German welfare state: Fiscal incentives and crowding out. *Public Choice*, *154.1–2*, 39–58.

Clark, C.J., Han, X., Osili, U. O., Kalugyer, A., Ottoni-Wilhelm, M., Pasic, A., & Rooney, P. M. (2019) *Changes to the giving landscape*. Report, Indiana University Lilly Family School of Philanthropy at IUPUI 2019. http://generosityforlife.org/wp-content/uploads/2019/10/Changes-to-the-Giving-Landscape_Vanguard-Charitable_2019-FINAL.pdf

Clotfelter, C T (1990). *The impact of tax reform on charitable giving: A 1989 perspective*. NBER Working Paper No. w3273, Available at SSRN: https://ssrn.com/abstract=226702

Duquette, N. J. (2016). Do tax incentives affect charitable contributions? Evidence from public charities' reported revenues. *Journal of Public Economics*, *137*(2016), 51–69.

Duquette, N. J. (2019). Do share-of-income limits on tax-deductibility of charitable contributions affect giving? *Economics Letters*, *174*, 1–4.

Duquette, N. J., & Mayo, J. (2021). Who gives and who gets? Tax policy and the long-run distribution of philanthropy in the US. In *Routledge Handbook of Taxation and Philanthropy*. Routledge. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3856954

Economic Affairs and Taxation Committee. (2003). Report of the on the Parliamentary initiative "Reform of the legislation governing foundations" of October 23, 2003), RS 00.461 (FR:

Rapport de la Commission de l'économie et des redevances du Conseil des Etats du 23 octobre 2003 Initiative parlementaire "Révision de la législation régissant les fondations").

Fack, G., & Landais, C. (2010). Are tax incentives for charitable giving efficient? Evidence from France. *American Economic Journal-Economic Policy*, *2*, 117–141.

Federal Act. (1990). Federal Act of 14 December 1990 on the harmonization of direct taxation at cantonal and communal levels (DTHA), RO 1991 1256, https://www.fedlex.admin.ch/eli/cc/1991/1256_1256_1256/fr

Federal Constitution of the Swiss Confederation of 18 April 1999, AS 1999 2556. https://www.fedlex.admin.ch/eli/cc/1999/404/en

Federal Council. (2003). Opinion of December 5, 2003 on the parliamentary initiative "Revision of the Law on Foundations (Schiesser)" and on the report of the Committee for Economic Affairs and Taxation of the council of states of 23 October 2003.

Federal Parliament. (2003). Deliberation 00.461 Pa. Iv. Schiesser Fritz. Revision of the Law on Foundations Report.

Federal Tax Administration. (2021a). Tax brochures for the 2021 tax period, income and wealth tax of individuals (p. 2). (Deductions for donations). belastungsobergrenze-ev-de-fr.pdf

Fiscal Commission. (n.d.) Canton of Geneva, minority report PL 9863-A. https://ge.ch/grandconseil/m/memorial/seances/560301/2/20/

Huber, P. J., & Ronchetti, E. M. (2009). *Robust statistics* (2nd ed.). Hoboken, NJ.

Lideikyte Huber, G., Pittavino, M., & Peter, H. (2021). Tax incentives for charitable giving: 2006 Reform and Geneva based evidence. In H. Peter & G. L. Huber (Eds.), *Routledge Handbook of Taxation and Philanthropy*. Routledge.

Lideikyte Huber, G. (2019). Activité à but lucratif d'une entité d'utilité publique exonérée d'impôt: Notion et limites. *Expert Focus*, *3*, 215-217.

Molo, G. A. G. (2017). Du secret bancaire à la transparence financière. *Schulthess Éditions Romandes*, 82.

OECD. (2020). Taxation and philanthropy. *OECD Tax Policy Studies*, No. *27*. OECD Publishing, Paris. https://doi.org/10.1787/df434a77-en

Osili, U., Clark, C., & Bergdoll, J. (2021). The 2021 Bank of America Study of Philanthropy: Charitable giving by affluent households, September 2021. https://scholarworks.iupui.edu/handle/1805/26654

Parliamentary Deliberations on theParliament of the Canton of Geneva. (n.d.). MGC 2007-2008/V A 4054; bill No. 9863.

Parliamentary Initiative. (n.d.). No. 00.461 "Revision of the Law on Foundations of 14.12.2000" ("Schiesser initiative") (FR: Initiative parlementaire No. "Révision de la législation régissant les fondations"). https://www.parlament.ch/fr/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20000461

Pearson, K. (1895). Notes on regression and inheritance in the case of two parents. *Proceedings of the Royal Society of London*, *58*, 240–242.

Personal Income Tax Act. (n.d.). Personal Income Tax Act of the Canton of Geneva (PITA; D 3 08) of 27 September 2009.

Personal Income Tax Act—V. (n.d.). Canton of Geneva (FR: Loi sur l'imposition des personnes physiques (LIPP-V) Determination of net income—Calculation of tax and tax rebate—Compensation for the effects of cold progression (LIPP-V; D 3 16) of September 22, 2000 (entry into force: 01.01.2009).

Pittavino, M., Dreyfus, A., Heuer, C., Benschop, J., Wilson, P., Collins-Emerson, J., Torgerson, P. R., & Furrer, R. (2017a). Comparison between generalized linear modelling and additive Bayesian network; identification of factors associated with the incidence of antibodies against Leptospira interrogans sv Pomona in meat workers in New Zealand. *Acta Tropica*, *173*, 191–199.

Pittavino, M., Dreyfus, A., Heuer, C., Benschop, J., Wilson, P., Collins-Emerson, J., Torgerson, P. R., & Furrer, R. (2017). Data on leptospira interrogans sv pomona infection in

meat workers in new Zealand. *Data in Brief*, *13*, 587–596. https://doi.org/10.1016/j.dib.2017.05.053

Report of the Fiscal Commission. (n.d.). Report of the Fiscal Commission in charge of studying the bill of Renaud Gautier, Olivier Jornot, Christiane Favre, Sophie Fischer, Francis Walpen, Beatriz de Candolle, Fabienne Gautier, Pierre Weiss, Edouard Cuendet, Yves Niedegger, Eric Stauffer, Roger Golay and Guy Mettan amending various tax laws tax laws (taxation of donations), Secretariat of the Parliament of the Canton of Geneva, 7 May 2007, Cantonal bill 9863-A (FR: PL 9863-A). https://ge.ch.

Surrey, S. S. (1970). Tax incentives as a device for implementing government policy: A comparison with direct government expenditures. *Harvard Law Review*, *4*, 712.

Swiss Civil Code (Foundation Law) (n.d.), Amendment of 8 October 2004, SR 4545.

Swiss Tax Conference. (2021a, April). Tax information, wealth tax on individuals (Status of the legislation as at 1 January 2021) ("Wealth Tax"). https://www.estv.admin.ch/estv/fr/accueil/afc/systeme-fiscal-suisse/recueil-informations-fiscales.html

Swiss Tax Conference. (2021b, February). (FR: Conférence Suisse des impôts) Tax informations, personal income tax of natural persons (status of legislation as at 1 January 2021), ("Personal income tax"), https://www.estv.admin.ch/estv/fr/accueil/afc/systeme-fiscal-suisse/recueil-informations-fiscales.html

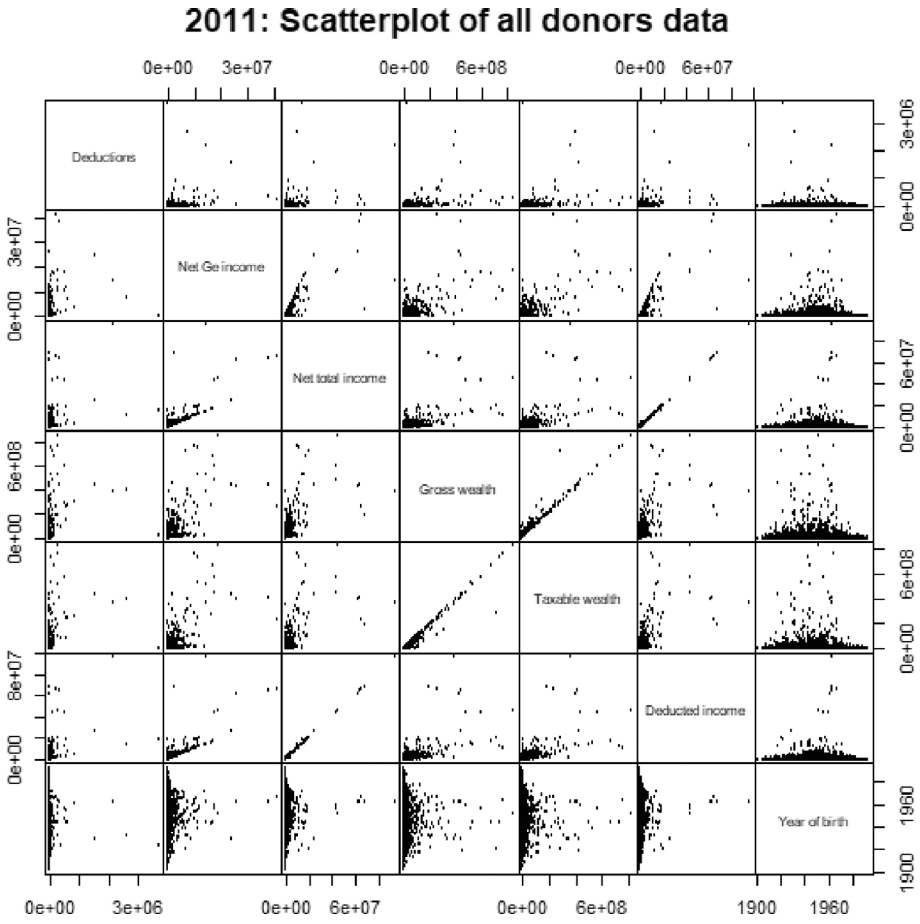
Thuronyi, V. (1988). Tax expenditures: A reassessment. *Duke Law Journal*, *6*, 1155.

How to cite this article: Lideikyte Huber, G., & Pittavino, M. (2022). Who donates and how? New evidence on the tax incentives in the canton of Geneva, Switzerland. *Journal of Empirical Legal Studies*, *19*(3), 758–797. https://doi.org/10.1111/jels.12322

APPENDIX 1: SUMMARY STATISTICS ON THE ENTIRE GENEVA TAXPAYERS' POPULATION (LIDEIKYTE HUBER ET AL., 2021)

Year	Number of taxpayers	Deducting	Non-deducting	% of deducting taxpayers	% yearly change in all taxpayers	Amount of deductions (CHF)
2001	234,117	19,335	214,782	8.3		29,133,697
2002	236,341	25,272	211,069	10.7	0.9	33,248,984
2003	237,777	30,276	207,501	12.7	0.6	33,507,115
2004	240,254	35,192	205,062	14.7	1.0	41,229,743
2005	242,521	39,553	202,968	16.3	0.9	47,381,886
2006	245,224	39,511	205,713	16.1	1.1	47,056,580
2007	248,017	42,248	205,769	17.0	1.1	50,968,564
2008	250,886	44,707	206,179	18.0	1.2	51,735,693
2009	256,236	47,349	208,887	18.5	2.1	76,574,313
2010	261,703	49,389	212,314	18.9	2.1	84,014,116
2011	266,336	51,492	214,844	19.3	1.8	72,741,235

APPENDIX 2: SCATTERPLOT OF ALL DONORS DATA, FROM AN EXPLICATIVE YEAR 2011, TO SHOW HOW SOME OF THE EXPLICATORY VARIABLES (I.E., GROSS WEALTH AND TAXABLE WEALTH) AND (NET TOTAL INCOME, DEDUCTED INCOME AND NET GE INCOME) WHERE EXTREMELY HIGH CORRELATED. TO ADDRESS THIS POINT, THE VARIANCE INFLACTION FACTOR HAS BEEN APPLIED



APPENDIX 3: QUANTILE REGRESSIONS 2001–2011, ALL DEDUCTERS

Figure A.3.1: 2001 Quantile Regression: All Deducters, Net Total Income

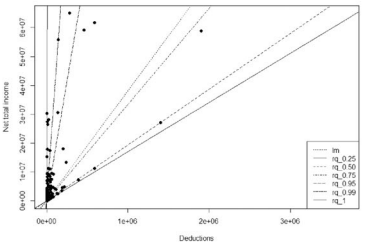


Figure A.3.2: 2001 Quantile Regression: All Deducters, Gross Wealth

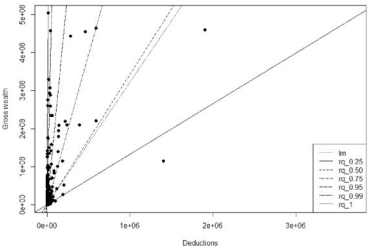


Figure A.3.3: 2002 Quantile Regression: All Deducters, Net Total income

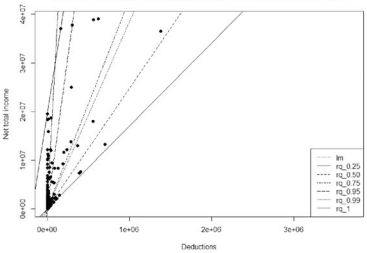


Figure A.3.4: 2002 Quantile Regression: All Deducters, Gross Wealth

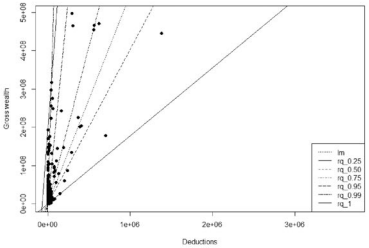


Figure A.3.5: 2003 Quantile Regression: All Deducters, Net Total income

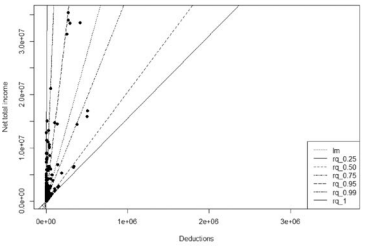


Figure A.3.6: 2003 Quantile Regression: All Deducters, Gross Wealth

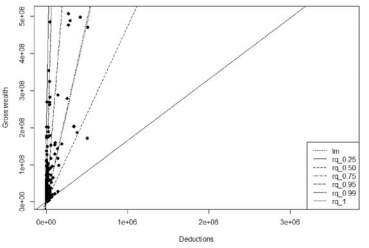


Figure A.3.7: 2004 Quantile Regression: All Deducters, Net Total income

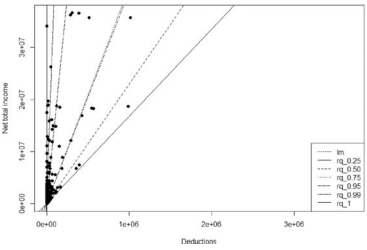


Figure A.3.8: 2004 Quantile Regression: All Deducters, Gross Wealth

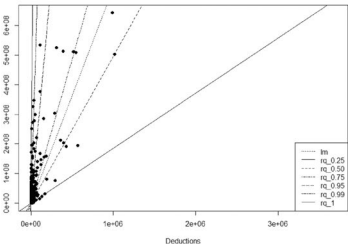


Figure A.3.9: 2005 Quantile Regression: All Deducters, Net Total Income

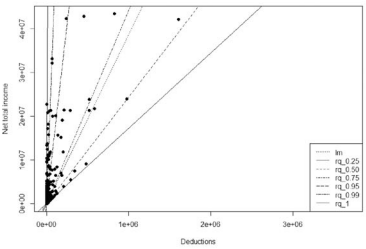


Figure A.3.10: 2005 Quantile Regression: All Deducters, Gross Wealth

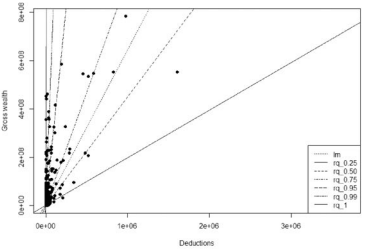


Figure A.3.11: 2006 Quantile Regression: All Deducters, Net Total Income

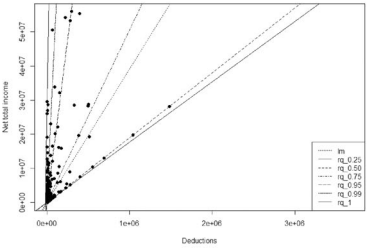


Figure A.3.12: 2006 Quantile Regression: All Deducters, Gross Wealth

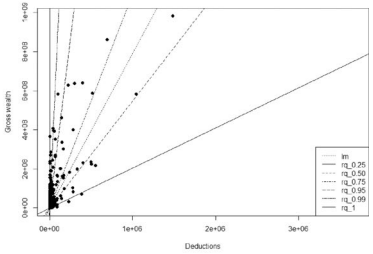


Figure A.3.13: 2007 Quantile Regression: All Deducters, Net Total Income

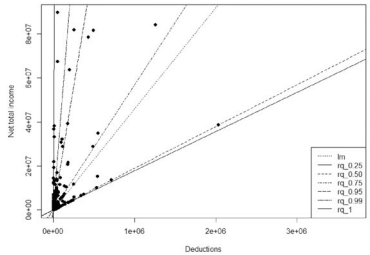


Figure A.3.14: 2007 Quantile Regression: All Deducters, Gross Wealth

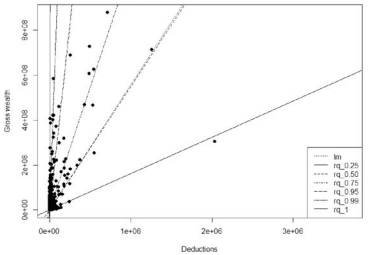


Figure A.3.15: 2008 Quantile Regression: All Deducters, Net Total Income

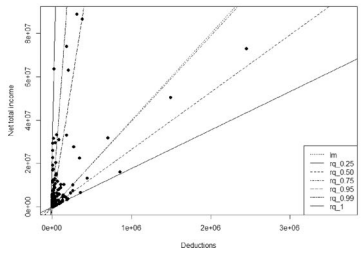


Figure A.3.16: 2008 Quantile Regression: All Deducters, Gross Wealth

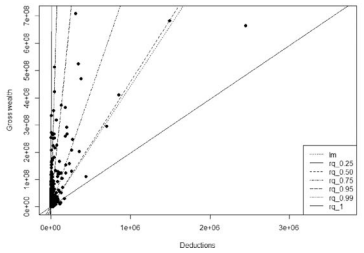


Figure A.3.17: 2009 Quantile Regression: All Deducters, Net Total income

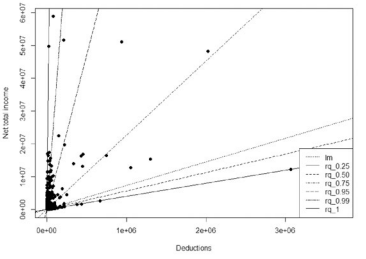


Figure A.3.18: 2009 Quantile Regression: All Deducters, Gross Wealth

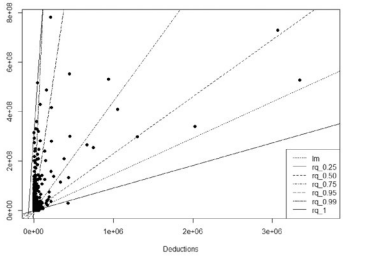


Figure A.3.19: 2010 Quantile Regression: All Deducters, Net Total income

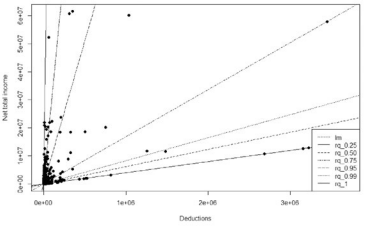


Figure A.3.20: 2010 Quantile Regression: All Deducters, Gross Wealth

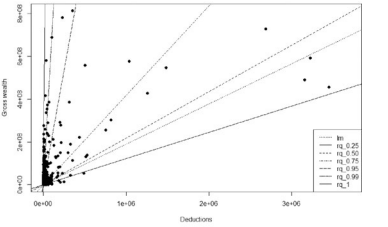


Figure A.3.21: 2011 Quantile Regression: All Deducters, Net Total income

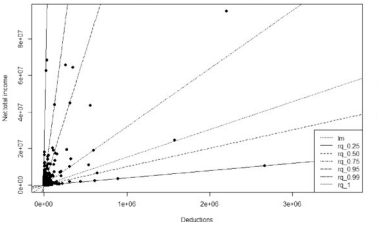
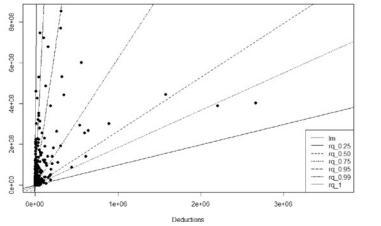


Figure A.3.22: 2011 Quantile Regression: All Deducters, Gross Wealth



APPENDIX 4: QUANTILE REGRESSIONS 2001–2011, DEDUCTERS ≥ 4%

Figure A.4.1: 2001 Quantile Regression: Deducters => 4%, Net Total income

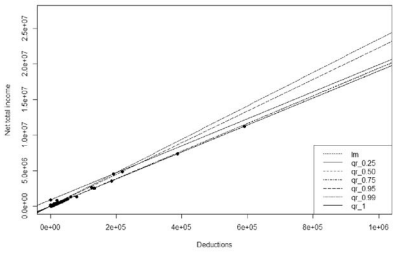


Figure A.4.2: 2001 Quantile Regression: Deducters => 4%, Gross Wealth

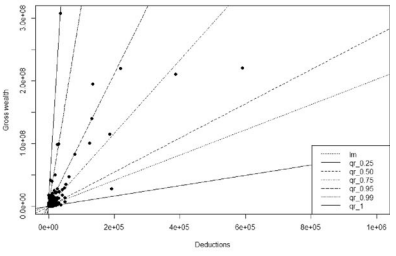
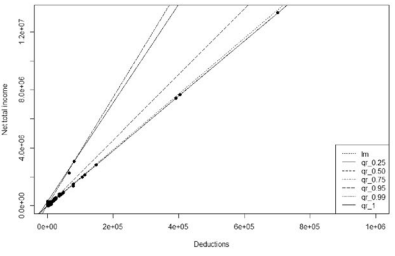


Figure A.4.3: 2002 Quantile Regression: Deducters => 4%, Net Total income



2002 Quantile Regression: Deducters => 4%, Gross Wealth

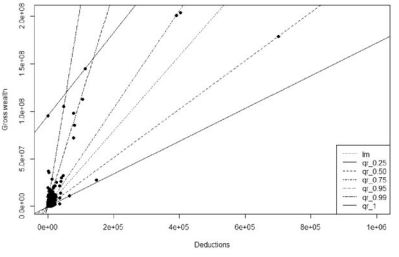


Figure A.4.5: 2003 Quantile Regression: Deducters => 4%, Net Total income

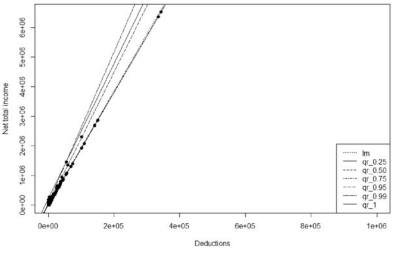


Figure A.4.6: 2003 Quantile Regression: Deducters => 4%, Gross Wealth

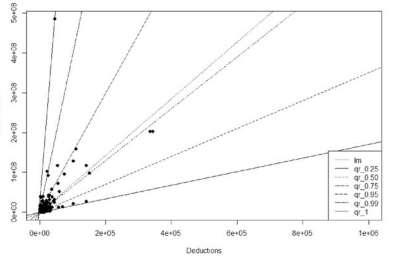


Figure A.4.7: 2004 Quantile Regression: Deducters => 4%, Net Total income

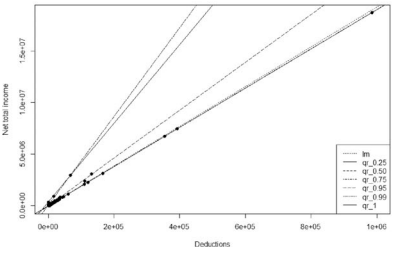


Figure A.4.8: 2004 Quantile Regression: Deducters => 4%, Gross Wealth

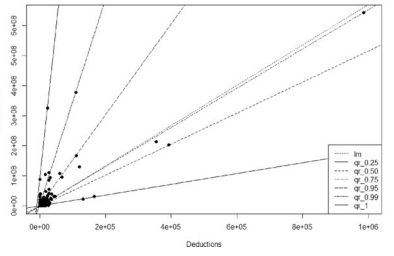


Figure A.4.9: 2005 Quantile Regression: Deducters => 4%, Net Total Income

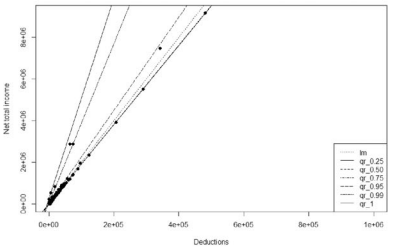


Figure A.4.10: 2005 Quantile Regression: Deducters => 4%, Gross Wealth

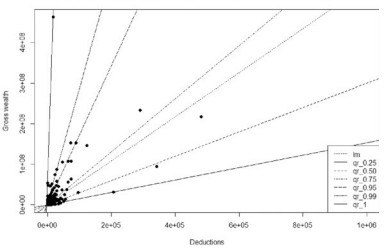


Figure A.4.11: 2006 Quantile Regression: Deducters => 4%, Net Total income

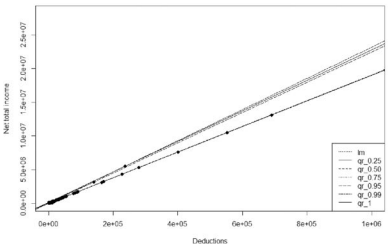


Figure A.4.12: 2006 Quantile Regression: Deducters => 4%, Gross Wealth

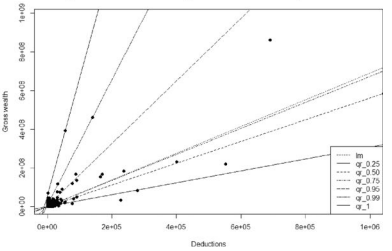


Figure A.4.13: 2007 Quantile Regression: Deducters => 4%, Net Total income

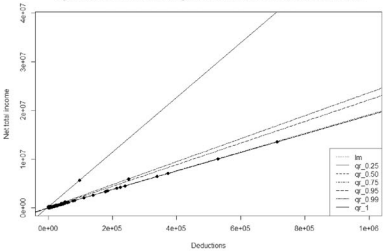


Figure A.4.14: 2007 Quantile Regression: Deducters => 4%, Gross Wealth

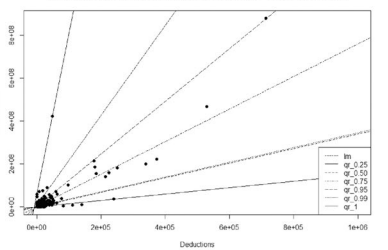


Figure A.4.15: 2008 Quantile Regression: Deducters => 4%, Net Total income

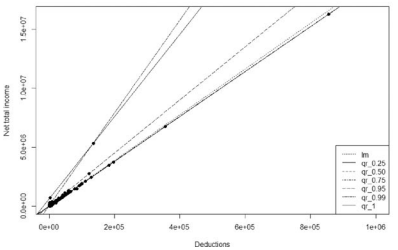


Figure A.4.16: 2008 Quantile Regression: Deducters => 4%, Gross Wealth

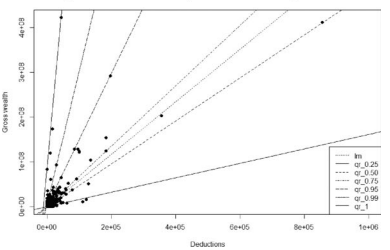


Figure A.4.17: 2009 Quantile Regression: Deducters => 4%, Net Total income

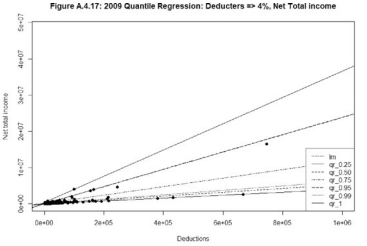


Figure A.4.18: 2009 Quantile Regression: Deducters => 4%, Gross Wealth

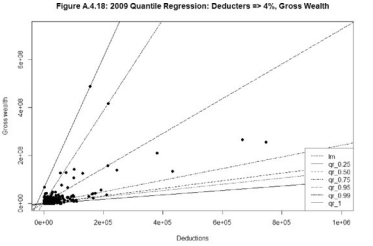


Figure A.4.19: 2010 Quantile Regression: Deducters => 4%, Net Total income

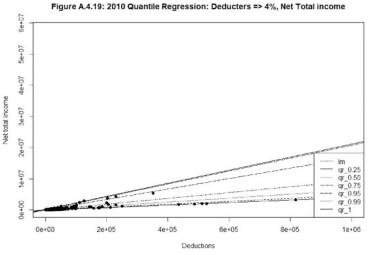


Figure A.4.20: 2010 Quantile Regression: Deducters => 4%, Gross Wealth

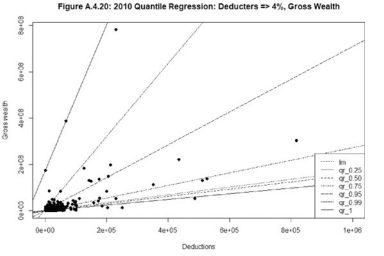


Figure A.4.21: 2011 Quantile Regression: Deducters => 4%, Net Total income

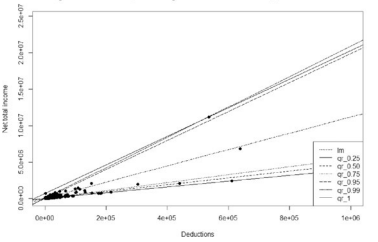


Figure A.4.22: 2011 Quantile Regression: Deducters => 4%, Gross Wealth