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Missing Miles: Evasion Responses to Car Taxes*

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Abstract

We study a tax evasion response to car taxes in Finland, where used car importers overstate the mileage to reduce tax liability. First, we develop a tax evasion measure by comparing reported mileage upon import with subsequent information from vehicle inspections, and find that a decline in mileage — "missing miles" occurs frequently. Second, we analyze a tax rate increase, and observe a reduction in the number of imported used cars, but only among non-evaders. Finally, we analyze an RCT varying the salience of tax enforcement measures, which suggests that providing information about new measures reduces missing miles.

Keywords: car tax, tax evasion, enforcement measures JEL-codes: [H21, H23, H26, C93]

Tiivistelmä

Tässä tutkimuksessa tutkitaan autoveron kiertoa Suomessa. Maahan käytettyjä autoja tuovat saattavat liioitella autolla ajettuja kilometrejä vähentääkseen autoon kohdistuvia autoveroja. Tutkimuksessa kehitetään mittari veronkierrolle, joka vertaa auton tuonnin yhteydessä ilmoitettuja kilometrejä myöhemmin katsastuksen yhteydessä havaittuun matkamittarilukemaan. Tämä mittari paljastaa, että kilometrien liioittelu tuonnin yhteydessä on suhteellisen yleinen ilmiö. Lisäksi tutkimuksessa hyödynnetään vuoden 2012 autoveron muutosta, joka nosti paljon päästävien autojen veroasteita. Tulosten perusteella tämä vähensi maahan käytettynä tuotujen autojen määrää, mutta vain niiden autojen osalta, joista ei kierretä veroa. Lopuksi tutkitaan, miten veronkiertoon voidaan vaikuttaa aiempaa tehokkaammalla vertailutietojen hyödyntämisellä verovalvonnassa. Kenttäkokeessa, jossa autojen tuojille ilmoitettiin paremman vertailutiedon olemassaolosta, havaittiin tämän vähentävän veronkiertoa.

Asiasanat: autovero, veronkierto, verovalvontatoimet

1 Introduction

Car taxes are part of many countries' environmental policies (see Sallee 2010), but these policies may create unintended behavioral responses. For example, car manufacturers have been found to (legally) alter the tax-relevant characteristics of cars without materially changing the actual functioning of the cars (Klier and Linn 2010, 2012, Sallee and Slemrod 2012 and Reynaert and Sallee 2016). Somewhat relatedly, Fisman and Wei (2004) found that taxes related to importing of goods from another country created significant (illegal) evasion responses visible as the low share of goods in the high-tax categories. A natural conjecture from these observations is that car taxes related to importing or registering of cars would also create evasion responses. However, there is a significant gap in the literature on the evasion responses that car taxes may create.

In this paper we explore a new and previously unexamined evasion response to car taxes in the context of Finnish car import tax policy – overstating vehicle mileage. Importers of used cars may evade some of the car tax by overstating the vehicle's mileage[1], reducing the tax base and the tax due, on the car. First, we can provide a high-quality estimate of the magnitude of tax evasion from car taxes remitted from imported used cars. To do this, we exploit an institutional setting where we can compare self-reported information about imported cars to administrative data from car inspections. More precisely, tax evasion occurs by overstating mileage in the car import tax declaration, because that reduces the taxable value of a car. We can compare the stated mileage upon import to the mileage collected in mandatory car inspections at the same time or at a later date with the car tax declaration, and link the information to the same car. Observing that reported mileage has declined as a car ages is a nearly foolproof trace of car tax evasion—"missing miles."

Second, we are able to estimate how tax rates affect the probability of tax evasion, and what kind of import decisions respond to variation in tax rates. We focus on a Finnish car import tax reform in April 2012 that significantly increased tax rates on cars with high CO2 emissions, while it left tax rates on cars with median or low CO2 emissions either unchanged or only slightly increased. We study how the variation in tax rates affected the prevalence of evasion among imported used cars.

Finally, we estimate the evasion and real responses to changes in the strictness of tax enforcement. We begin by providing descriptive evidence of the significance of tax enforcement in car tax evasion responses by studying a change in the enforcement regime in 2013. This evidence, however, is not compellingly causal, due to the lack of control group that did not face the change in an enforcement regime. However, we are able to

[1] In this paper we use the word "mileage" to refer to the total number of miles a vehicle has been driven, or a report on that figure, rather than its alternative definition as the average distance a vehicle can travel on a specified quantity of fuel; we will use the term "fuel efficiency" to refer to the latter concept.

provide some causal evidence by analyzing a randomized controlled trial (RCT) designed in collaboration with the Finnish Customs that varied the salience of tax enforcement for car importers in the latter half of 2014.

Our results show systematic evidence of missing-miles evasion. We find that, on average, approximately 10% of cars imported as used to Finland between 2008 and 2015 exhibit a compelling trace of at least some tax evasion. Tax evasion is relatively more prevalent among imports of cars that have high CO2 emissions, and thus face higher car tax rates. Tax evasion has reduced tax revenue by about 15%, for a total of about 9 million euros in the observation period.

We find that higher tax rates are associated with more tax evasion among imported cars. However, higher tax rates do not seem to increase the number of imported cars on which taxes have been evaded; rather they decrease the number of imported cars on which taxes have not been evaded. The time trends of the number of evading cars seems unaffected by the tax reform, even among those cars for which the tax rate increased on average by 7 percentage points. Nevertheless, higher tax rates affected tax revenue due to a lower number of cars being imported. We also find that the elasticity of number of used cars being imported with respect to tax rate would be biased almost by a factor of two if one does not separate evasion responses from non-evasion responses.

Having established that tax evaders do not respond to variation in the tax rate, the natural follow-up inquiry concerns what factors do influence evasion. The evidence derived from the change in the enforcement regime in 2013 strongly suggests that stricter enforcement reduces tax evasion: from the start of extensive usage of third-party information in tax enforcement, the number of cars on which taxes were evaded began to decline sharply, and the decline continued for many years. The decline in tax evasion occurs similarly among cars to which high or low tax rates are applied. In this way the different timing of tax reform and the change in enforcement regimes help us to separate how tax rates and enforcement influence car import and tax evasion decisions.

Finally, we use an RCT to provide causal evidence of the impact of tax enforcement on tax evasion. In 2014, in cooperation with the Finnish customs authority, we implemented an extensive RCT that informed some likely car importers of the use of the third-party information that began to be collected in 2013. Of course, the effectiveness of this treatment depends on to what extent taxpayers did not already know about the usage of this information in the tax enforcement. Another treatment in the experiment increased the salience of the public disclosure of reported mileage, which makes "missing miles" visible to potential buyers of the car. The results from this experiment show that these enforcement treatments reduced the prevalence of missing miles, supporting the view that this type of tax evasion responds more to tax enforcement than to variation in tax rates. Notably, though, we do not find any effect of the enforcement-related treatments on the number of imported used cars on average.

In the last decade, there has been an explosion of academic interest in studying tax evasion. Previous related studies utilize RCT designs in which treatment letters are sent out to firms or individuals, and related to outcome data from tax returns, other registers, and third-party information to measure the amount of misreporting.[2] One broad finding in accordance with our results is that individuals and firms do respond to information about expanded enforcement, at least in the short run, by reducing tax evasion (see, e.g., Slemrod, Blumenthal, and Christian (2001) and Meiselman (2017)), especially in settings where third-party information has not been extensively utilized in tax enforcement (see, e.g., Kleven et al. (2011)). Marion and Muehlegger (2008) report that dyeing tax-preferred diesel fuel in a way that enhanced tax enforcement was effective in reducing evasion, and find that the effects were larger among the U.S. states with higher diesel taxes.

Moreover, our result that only non-evaders respond to the tax rate changes, but evaders do not, alludes to an interesting mechanism that has not been widely analyzed in the previous literature. According to this mechanism, the estimated probability of tax evasion might respond to tax rates even when tax evaders do not change their behavior. This apparent controversy arises from the fact that the estimated probability averages the behavior of those that evade and those that do not, and in our empirical example, the probability is affected only through the response of the latter group. This occurs more likely in cases where extensive margin responses are common (such as when economic agents are importing goods). For example, the result by Fisman and Wei (2004), showing that higher tax rate is associated with more tax evasion could be partly explained through this mechanism. Overall, our results suggest that being able to distinguish real behavior and tax evasion is important to better understand what underlies the aggregate responses to policies.

The paper proceeds as follows: section 2 describes the Finnish car import tax system and related enforcement details, section 3 presents the data and our indicator of tax evasion. Section 4 offers evidence on what factors affect tax evasion and shows evidence of the "missing miles". Section 5 discusses the results of the RCT. Finally, section 6 offers concluding remarks.

2 Car Taxes in Finland

Almost all cars driven in Finland are imported. Finland levies a tax on all vehicles[3] imported into or newly registered in Finland, regardless of whether the vehicle is new or

[2]See a recent survey by Slemrod (2017) that summarizes the recent literature regarding the empirical analysis of tax evasion.

[3]This includes passenger cars, vans, buses, motorcycles, and so on.

used. We will refer to this as the car tax.[4] This tax must be remitted before a vehicle's introduction to or first registration in Finland, and is collected by Finnish Customs. The person entered in the register as the owner of the vehicle is liable for remitting the car tax. However, if the vehicle is imported by a business that Customs has authorized as a registered agent, the agent must remit the car tax.[5]

Finland has had a long history of taxing cars. The very first car imported to Finland in 1900 faced a heavy duty. Since then, cars newly registered in Finland have faced high taxes in the form of duties, or since 1958 in the form of car taxes. Beginning in 1994, a car tax of almost 100% was levied on the tax-exclusive import value of the car,[6] in addition to a value-added tax of 22% on the car-tax-inclusive value of the car. Thus, the total statutory tax burden facing new cars was more than 130% of the import value of a car.

A car tax law[7] passed in May 2003 introduced major changes that applied to cars imported after January 2003.[8] The two key changes were a change in the definition of the tax base and a reduction in car tax rates. The next major change took effect on January 1, 2008[9], when the car tax schedule was altered to depend on the CO2 emissions of the car, so that the car tax rate varied between 12.2% and 48.8%, depending on the CO2 emissions, with the highest tax rate applying to cars with CO2 emissions exceeding 360 g/km. Both of these reforms decreased the average tax rates on cars compared to the 1994 tax rate schedule.

2.1 The 2012 tax reform

In this paper we focus on the 2012 reform to Finnish car tax that raised the gradient of the tax schedule with respect to CO2 emissions. As Figure 1 shows, the 2012 reform lowered the tax rate for cars with CO2 emissions below 110 g/km, but raised the tax rate at an increasing rate for cars with CO2 emissions above this level, resulting in tax rates between 5% to 50%. Overall, the average car tax rate increased.

[4] In addition to the car tax, an annual vehicle tax is collected on all registered cars in Finland. This tax contains two parts, The first part is the so-called "basic" tax that depends on the CO2 emission value, or, for older cars, the mass of the vehicle. An additional part is applied only to cars that use other than petrol as a motive power, e.g. diesel, so that the annual vehicle tax is higher for these cars. Also, importantly, the level of vehicle taxes does not depend on the value or other characteristics of cars. The annual vehicle tax for a typical car is between 100 and 400 euros, which is a small fraction of typical car taxes that are several thousand euros.

[5] If the tax cannot be collected from the registered agent, the person entered in the register as the vehicle's owner is liable for the tax, unless he or she can demonstrate having remitted to the registered agent or their representative an amount expected to be the tax liability.

[6] Finlex 1482/1994

[7] Finlex 266/2003

[8] The motivation for this change was an EU Court of Justice ruling that the Finnish tax system of used cars was too heavy and thus favored new cars. This change reduced the taxation of used cars in general, and especially for recently produced used cars.

[9] Finlex 1292/2007

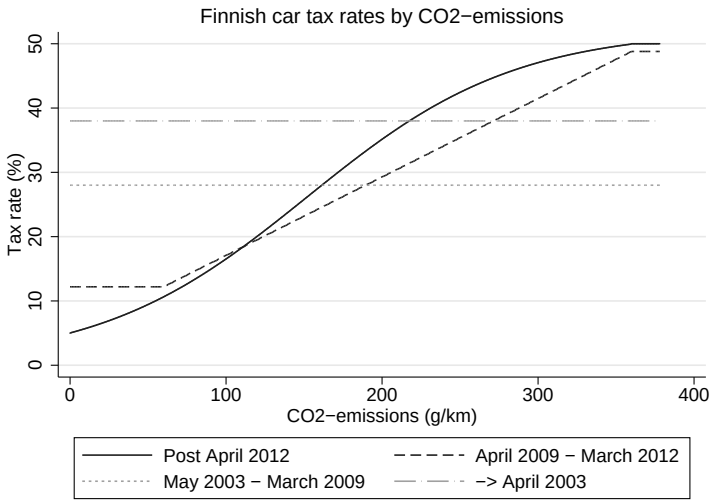

Figure 1: Finnish car tax rates over time

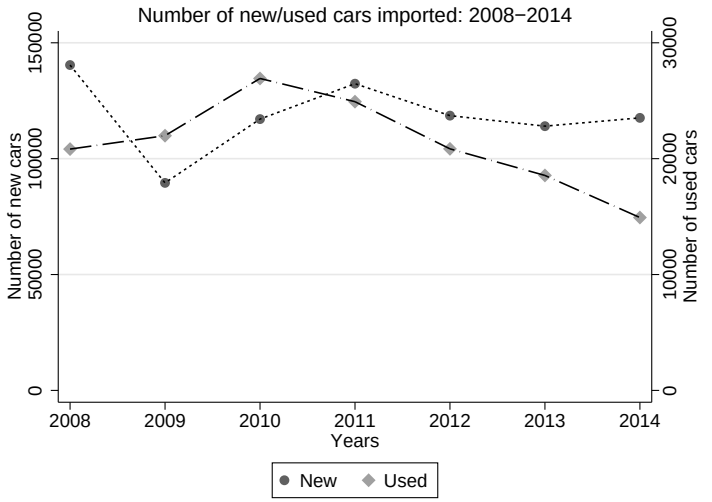

Figure 2: Number of new and used cars imported to Finland over time

We examine the effect of car taxes on the import of used cars into Finland and its interaction with missing-miles tax evasion. To offer evidence of the extent of used car imports to Finland, Figure 2 shows the number of new and used cars imported from 2008 to 2014. On average more than 100,000 new cars are imported annually. Used car imports comprise over 15% of the yearly addition to the Finnish car fleet. As we discuss below, there is a declining trend in the number of used cars imported after 2010, while no similar trend appears for new cars. While there are no sharp changes in the time trends, we observe a small decrease in car imports after the 2012 reform that increased the average car tax rate.

2.2 The tax enforcement regime and changes to it in 2013

As described above, the tax base is in principle the value of the car. In practice, the Customs authority estimates the value for used cars based on the price of similar cars sold in Finnish retail markets for used cars. The Customs authority bases the evaluation on the technical characteristics of a car, such as make and model, age of the car and its overall condition. One important characteristic in this estimation procedure is the car's mileage. Higher mileage leads to a lower value of a car in the retail markets, and thus the estimated taxable value of a car with higher mileage is also lower.

It follows that a straightforward method for falsely reporting the taxable value of a car is to inflate the mileage upon import. This is accomplished by reporting too high a mileage when filing the car tax return, perhaps while also altering the reading on the odometer. Of course, if one only reports falsely the mileage when filing the car tax declaration, he or she would be caught if Customs inspects the odometer reading. However, apparently the Customs authorities do not check the odometers very often. If one also alters the odometer reading, he or she would not be caught even in the case of an inspection. The two known methods (to the researchers) to alter an odometer reading are to buy a dedicated device for the purpose for a few hundred euros, or to buy odometer changing as a service from a company.[10]

The fines that are imposed upon a car importer in the case of being caught falsely reporting the mileage are defined loosely in the law, and are thus largely at the discretion of the customs. They depend on the severity of the misreporting, and at a minimum the owed taxes must be paid plus a small fine. This is usually applied if the misreporting occurred only once and from one car. At the other extreme a criminal case may be opened against the car importer, with the possibility of imprisonment.

We can assess car tax evasion through over-reported mileage because we have access to a novel source of comparison information about cars' true mileage that originates from annual car inspections that are mandatory for all cars registered for use on public roads in Finland. The data from the Finnish Transport Safety Agency (FTSA) contain mileage information from annual inspections (in later years cars under five years old need to be inspected biannually). Comparing the mileage upon inspection to the reported mileage upon import provides insight regarding missing miles.

The Finnish authorities began exchanging information across different agencies starting in 2013. The FTSA mandated the inspection stations performing the inspections to systematically record the odometer reading from all cars. This information is gathered into registers and is also available for the Customs.[11] Customs then have reliable

[10] Odometer fraud is a common problem worldwide, but taxes aside the incentive for owner/sellers of used cars is to roll back the odometer, whereas in our setting the incentive upon import is to roll it forward.

[11] The exchange of information between car inspection stations, FTSA and Finnish Customs was passed

comparison information about the mileage with only a few months delay, that they can utilize in their tax enforcement. The Customs started to run systematic checks on cars that had a suspiciously high discrepancy between reported mileage and this new comparison information. However, the Customs did not publicly advertise the existence of this information. Moreover, the Customs used only the mileage from the first registration inspection that takes place at the same time as the car tax declaration is filed. It is thus possible to keep the inflated reading in the odometer over this first inspection, and later reduce it. Then the lower mileage would still be visible to a researcher at a later inspection.

3 Missing miles

We analyze car tax evasion via misreporting of mileage by examining a trace of under-compliance in car tax filing, in the sense of Slemrod and Weber (2012), rather than more direct evidence of evasion, for example from audited tax filings.

As explained above, we have access to a novel source of information about cars' true mileage that originates from annual car inspections. Due to the new regime that mandated all inspection firms to collect odometer readings, the data from the Finnish Transport Safety Agency (FTSA) contain mileage information from annual inspections since 2013, which can be compared with the mileage reported at the time of import in data from the Customs authority. We also have access to another data source that contains mileage information from a sample of about 40% of car inspections since 2008.[12] Using this chain of links, we can follow the same car from the day it was imported to Finland, through its annual inspections, until it is removed from the FTSA registers when it is scrapped or exported. The Customs data also allows us see how frequently the same individuals or firms import cars to Finland. We use this last piece of information in the randomized controlled trial discussed in Section 5.

Because inspection always occurs after import, mileage reported upon inspection that is *less* than upon import is a strong trace of tax evasion. The only possible alternative explanation, other than unsystematic data errors, is downward odometer fraud after import. To evaluate this possibility, we investigate whether, in the absence of tax incentives, downward changes in mileage are a common phenomenon. Figure 3 shows the change in recorded mileage from one inspection to the next for cars that are imported to Finland

by the law in January 2013 but it did not come into effect not until the beginning of 2014 (HE 144/2012). However, in practice, car inspection stations started to collect mileage information in January 2013. Therefore, we have comprehensive comparison information about the mileage of cars already from 2013 onwards.

[12]The data in the 40% sample come from one car inspection company that saved odometer readings during this period. Thus, this is not a random sample and is not necessarily representative of the universe of car inspections.

as new, for which observed mileage upon import has no tax implications. The left panel shows the whole distribution, and the right panel excludes those observations that are within 3,000 kilometers of zero to improve the readability of the non-zero observations. There exist some scattered observations on the negative side, implying data errors or frauds after car imports, but not many. Thus the figure shows that, in the absence of a tax evasion motivation, a decline in mileage is a very rare phenomenon.

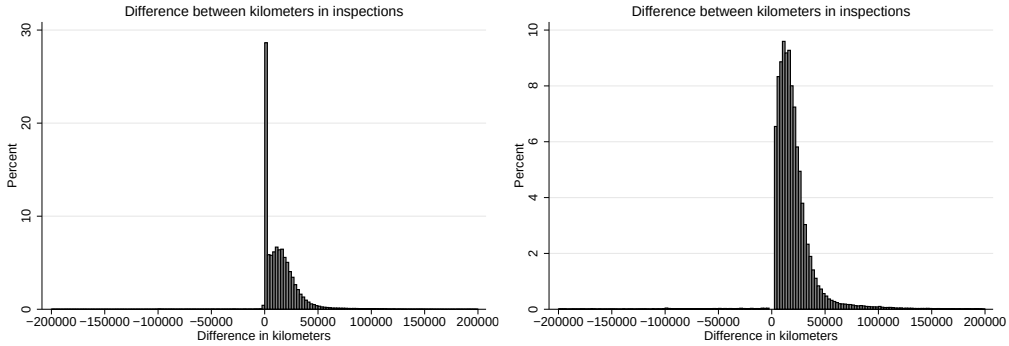

Figure 3: The development of mileage from one inspection to another

We next turn to investigating the difference between the mileage reported upon import and upon inspection for used cars, for which overstating mileage upon import can reduce tax liability. Although we have data on all imports beginning in 2000 and all inspections from 2013, we have the inspection mileage for only a selected 40% sample of cars between 2008 and 2012. Thus, the first inspection mileage is occasionally observed at some time later than the mileage reported upon import. Because of this, Figure 4 is divided into two panels. The left panel refers to those cars for which car tax filing and inspection mileage are observed at most four months apart. The right panel shows the mileage difference for the remaining cases between 2008 and 2015, i.e., those for which the inspection was observed at least five months after import and import tax filing. The resulting distribution shows that, when the two pieces of information are observed at about the same time, about 70% of the observations have close to a zero difference. Given the sizable zero spike, other parts of the distribution are difficult to distinguish in the figure. In the right panel, although unsurprisingly there are many observed positive changes in observed mileage as time passes, strikingly there is also mass at *negative* values that expands to more than -200,000 kilometers. This data pattern is a compelling trace of tax evasion.

In one sense, the mileage observed during an inspection at the same time the car is imported provides our best measure of mileage inflation due to tax evasion, because this measure is not obscured by the fact that the mileage of cars increases over time as it is driven. To more clearly observe the shape of this distribution, Figure 5 reproduces it without the observations close to zero. The figure depicts the distinguishable misreporting of mileage and especially shows a clear spike at -100,000 kilometers, along with another

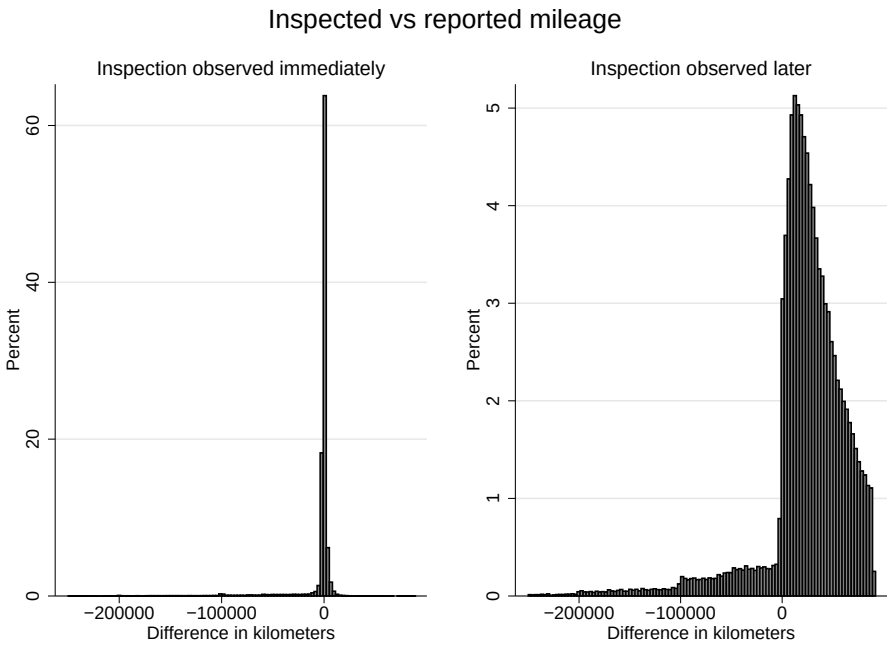

Figure 4: The development of mileage between tax decisions and inspections

smaller one at -200,000 kilometers. These spikes are striking, and are likely to indicate round-number mileage inflation: for a car with less than 100k on the odometer, a tax evader decides to put a number one (or two!) in front of the true mileage when filling in the car tax declaration form and perhaps on the odometer, as well.

Thus far, we have provided "trace" evidence strongly suggesting that some used car importers inflated the reported mileage for tax evasion purposes. To understand more precisely how common this is, and how the inflated mileage relates to the tax system, we next present some statistics related to car taxes and mileage in Table 1. The table presents information about car taxes and mileage for all used cars, and then separately for those cars that exhibit declining mileage of more than 5,000 kilometers between import and the lowest mileage value in inspections at the time of the car tax report or later, and therefore are likely to have evaded taxes. These statistics are shown for CO2 quintiles of cars and at the bottom of the table as a total for all used cars. For each cell, the average is in italics and the number of observations is below that.

Given that after the tax reform in 2008, the rate of car tax increases with CO2 emissions, it is meaningful that the average tax increases with the CO2 quintile. The "km" column shows the average number of kilometers (in thousands) reported to have been driven upon import to Finland. On average, cars in all CO2 quintiles are driven more than 100,000 kilometers, with the highest number in the middle quintile.

In each CO2 quintile, the car tax remitted by the evaders is lower than the overall average, and the reported mileage is higher. Of course, the lower amount of car taxes could reflect that their cars have a true lower value, that they have evaded taxes to arrive

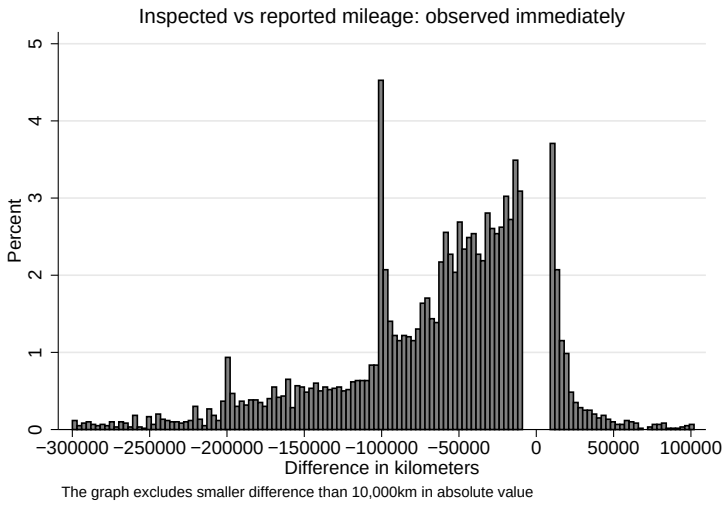

Figure 5: The development of mileage between tax decisions and inspections, immediate observation excluding zeros

at the lower amount, or some of both. The "km_ev" column shows the amount of mileage corrected for tax evasion, which is the average amount of mileage inflation in car import tax filings for each CO2 quintile. The correction is made by taking the observed negative difference between the comparison information and the car tax report and adding that amount in absolute value to the mileage. It is clear that, conditional on evading, the average amount of mileage inflated, "km_ev", is a large fraction of the reported mileage, "km".

The last column in Table 1 shows the fraction of cars having at least 5,000 kilometers of inflated mileage in their import tax filing, shows that having some discrepancy between the reported and comparison mileage is not a rare phenomenon. The frequency of apparent tax evasion increases with the CO2 quintile (and the tax rate), with the highest frequency, in the fifth quintile of the final column, indicating that substantial taxes are evaded upon import: 13% of the highest CO2 quintile cars imported as used.

To shed further light on the extent of the missing-miles phenomenon, we approximate the amount of tax evasion in euros. To perform this calculation, we first estimate a regression of actual car tax liability against the reported mileage for each CO2 quintile separately. The amount of car taxes of each car is regressed against the reported mileage, denoted *mileage*. The regression includes also other covariates, X, to be able to fully explain the determination of car taxes. These other covariates include CO2 values linearly and in cubic form (which is quite flexible given that we already estimate this separately for five different CO2 bins), fixed effects for the make of a car, μ_c, and eight dummies for the age of the car in years when the car was imported to Finland. The regression equation is estimated separately for each CO2 quintile as follows.

CO2	Car tax	km	Cartax	km	km_ev	D<-5k
	All		Evaders			
1	*3609*	*103*	*1979*	*158*	*75*	*.057*
	35202	35202	1989	1989	1989	35202
2	*4268*	*127*	*2586*	*198*	*105*	*.063*
	41224	41224	2591	2591	2591	41224
3	*4553*	*141*	*2746*	*215*	*115*	*.093*
	34435	34435	3209	3209	3209	34435
4	*4695*	*147*	*3001*	*204*	*111*	*.1*
	38983	38983	3993	3993	3993	38983
5	*6089*	*137*	*3941*	*188*	*97*	*.13*
	36478	36479	4879	4880	4880	36479
Total	*4642*	*131*	*3041*	*195*	*102*	*.089*
	186322	186323	16661	16662	16662	186323

Table 1: Descriptive statistics of car taxes and mileage

$$Tax_c = \alpha + \beta_1 mileage_c + \beta_2 X_c + \mu_c + \epsilon_c \quad (1)$$

The results of this regression are shown in the Appendix Table 12. In short, the results confirm that higher mileage is associated with lower car taxes on average: 1,000 more reported kilometers reduce the car taxes on average by about 5.4 euros. The relationship increases in absolute value with CO2 classes. In order to estimate the amount of uncollected tax, we add to the predicted car taxes a number of missing miles multiplied by the coefficient from the regression estimate of to what extent higher reported mileage reduces car tax liability. To calculate evasion, we used only those cases where the "missing miles" exceeded 5,000 kilometers. For example, take a car that, based on the reported values, is estimated to have remitted 3,000 euros in car taxes. However, for that car we observe 100,000 kilometers missing from the car tax report. The example car is in the second highest CO2 quintile, for which an additional 1,000 reported kilometers reduces the car tax liability by an average of 5.6 euros. Thus, in this case we add 560 euros to the 3,000 euros to get to the true tax liability for this car, 3,560 euros.

Using the framework explained above, we can calculate the expected tax liability, the estimated tax evasion, and the estimated true tax liability for all cars. We then aggregate the data across the CO2 quintiles to come up with average taxes paid and average car tax evasion by CO2 quintile. We draw Figure 6 from these averages. The 95% confidence interval is based on the standard error for the mean.

Figure 6 shows, for each quintile, the average taxes from an average car imported, from a car imported that has been detected of having tax evasion and what these taxes would on average be when the amount of tax evasion is added to the reported taxes. The figure suggests that missing miles tax evasion leads to a significant reduction of car

tax collections in all CO2 quintiles. The tax evasion is more pronounced in the higher quintiles, likely because in higher quintiles more taxes are being evaded and because a given amount of overstated miles contributes more to the tax bill in the higher quintiles. However, tax evasion is statistically and economically significant in all quintiles.

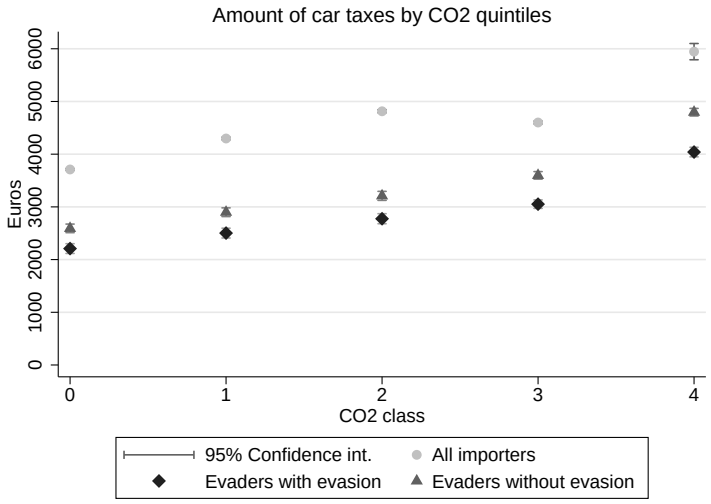

Figure 6: Euro amount of car taxes by CO2 quintiles with controls

We show the aggregate statistics of these tax evasion estimates in Table 2. Columns (1) to (3) show average numbers in euros, and columns (4) to (6) show aggregate numbers in thousands of euros. Column (1) shows the average car tax remitted by all used car importers, and column (2) shows the tax remitted by those who have been detected of evading. Column (3) shows the average amount of tax evasion estimated by the method described above. Column (4) shows the aggregate car tax remitted by all importers, and column (5) the aggregate tax remitted by the importers that have been detected of evading. Column (6) shows the aggregate amount of tax evasion. The first five rows refer to CO2 quintiles, and the last row shows the sum over all cars in the column.

CO2cl	Tax All (1)	Tax By evader (2)	Evasion (3)	Tot tax All (4)	Tot tax By evader (5)	Tot Evasion (6)
1	3710	2209	383	150756	4128	717
2	4298	2503	396	177370	5601	886
3	4814	2775	434	196355	8673	1356
4	4601	3052	547	182262	11664	2089
5	5946	4041	756	245380	20033	3749
Total	23369	14580	2516	952123	50099	8797

Table 2: Descriptive statistics of estimated tax evasion in euros

Table 2 shows, that of the total amount of taxes of approximately 952 million euros

over the eight-year inspection horizon (column (4)), we estimate that 8.8 million euros was evaded (column (6)). Furthermore, the evaders remitted as an aggregate only 50 million euros (column (5)), thus they evaded about 15% of the tax revenue they should have remitted. We believe that this tax evasion measure is probably a lower bound of true tax evasion, due to, for example, incomplete detection of inflated mileage in the car tax reports.

The next sections attempt to shed more light on the factors that determine tax evasion by utilizing frameworks that allow for causal interpretation.

4 What affects tax evasion?

To provide some descriptive evidence of the time trends in tax evasion, Figure 7 presents similar time trends to figure 2 above for used cars, but separates the number of imported used cars by their tax evasion status. In the figure, the number of used cars from which evasion is detected is on the left y-axis, and the number of used cars from which tax evasion is not detected is on the right y-axis. The lines show the trends of the number of cars over the years 2008 through 2016. The figure suggests that the number of used cars imported with tax evasion starts to sharply decline in the second half of 2013 and beyond. In contrast, the number of cars from which taxes have not been evaded shows a drop in 2012, at the year of the tax reform, but does not show any dramatic decline at the time of the new tax enforcement regime in 2013. Below we find more systematic evidence on to what extent tax evasion is affected by tax rates and tax enforcement measures.

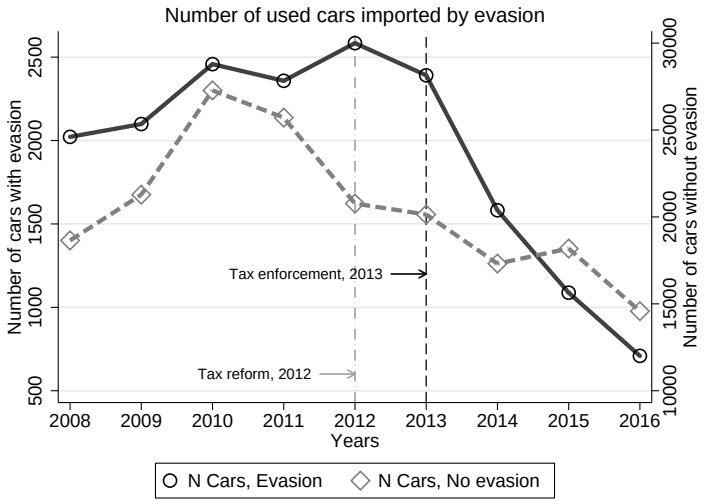

Figure 7: Time trends of imported used cars divided by evasion status

4.1 The impact of tax rates on tax evasion

In this section, we analyze how car tax rates affect the extent of missing-miles tax evasion. We first focus on examining the impact of tax rates on the probability that an imported used car has an inflated mileage report and then investigate the effect of car tax rates on the amount of imported cars with and without tax evasion.

In order to provide causal evidence, we need variation in tax rates. We rely on the 2012 reform, because the bulk of our data from annual car inspections offering comparison information for reported mileages does not extend before the 2008 reform, making analysis of the earlier reforms impossible.

Figure 8 depicts the tax schedules before and after the 2012 reform by CO2 values (right y-axis); as shown already in Figure 1. This reform made the tax schedule more steeply dependent on CO2 values; the tax rate increased for virtually all imported used cars, and declined only in the very low end of CO2 distribution. Figure 8 also shows the distribution of imported used cars by CO2 values, with densities on the left y-axis. In order to provide graphical evidence on the impact of the reform on tax rates, we divide the imported used cars into two groups; those with CO2 emissions under 180 g/km and those with CO2 emissions above that threshold. The division line between the groups is marked as the vertical dashed line in the figure. We chose this cutoff to have two roughly equal size groups and a clear difference in the tax increases faced by the two groups. We split the data into two groups first to provide visually clear evidence, but below we present estimates of the impact of tax rates on evasion using continuous tax rate variation.

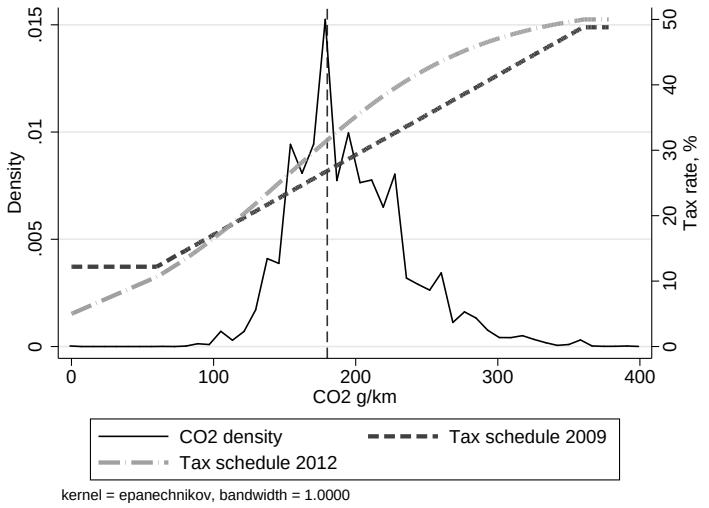

Figure 8: The CO2 distribution of imported used cars around the 2012 reform and the tax schedule change

Table 3 provides descriptive statistics for the two groups measured one year before and after the April 2012 reform. The table shows that, in the lower CO2 group, the average

tax rate was about 24% prior to the reform and for the high CO2 group it was about 31%. After the reform, the average tax rates for the same groups were 26% and 38%, respectively. Thus, the tax rate increased for the low CO2 group by about 2 percentage points, and by just under 7 percentage points for the high CO2 group. The last column shows that 6% of the low CO2 group cars exhibit traces of tax evasion (more than 5,000 kilometers reported in car tax filing compared to car inspection information), while the comparable figure is 10% for the high CO2 group.

CO2 group	Stat	Car tax %, pre	Car tax %, post	Ind. tax evasion
Low CO2	Mean	24.22	26.26	0.06
	Sd	*2.33*	*3.93*	*0.24*
	N	21485	17334	21485
High CO2	Mean	30.82	37.61	0.10
	Sd	*6.55*	*5.87*	*0.30*
	N	37673	20881	37673

Table 3: Descriptive statistics for imported used cars prior and post to the 2012 reform

Next, we present evidence on the likelihood of importing cars and evading car taxes around the 2012 reform for the low and high CO2 emission groups. This is based on regressions of half-year indicators on the dummy of whether or not the reported mileage was 5,000 kilometers higher than the comparison information separately for the two groups separately. The equation to be estimated is as follows:

$$D(diffkm > 5000)_{ct} = \alpha + \sum_{t=1}^{8} \beta_t Halfyear_t + \zeta_1 CO2_c + \zeta_2 Obsmileage_{ct} + \epsilon_{ct}. \quad (2)$$

In equation (2), the outcome is the dummy for having a discrepancy of more than 5,000 kilometers. This is regressed against 8 indicators for $Halfyear$, $CO2$ value and the time difference between the import and the inspection ($Obsmileage$) of a car c in half year t. The variable ϵ_{ct} is the residual error term. In the figure the two lines are centered at zero in period -2, and the lines represent deviations from the trend around this point.

Figure 9 shows the coefficients of interest,β_i. It is clear from the figure that the trends in the two groups follow each other fairly closely prior to the reform, but as soon as the reform happens (i.e., starting in April 2012) the likelihood of import tax evasion jumps up for the high CO2 emission group by about 4 percentage points, with no estimated increase for the low CO2 emission group. The estimated likelihood of evasion stays on a higher level for two years after the reform for the high CO2 group relative to the low CO2 group. The figure establishes that the two groups can be meaningfully compared, and that tax rates seem to increase the extent of tax evasion quite significantly.

Table 4 shows the results of differences-in-differences estimation for the same groups as in Figure 9. Instead of showing the estimate for each half year, the table shows the

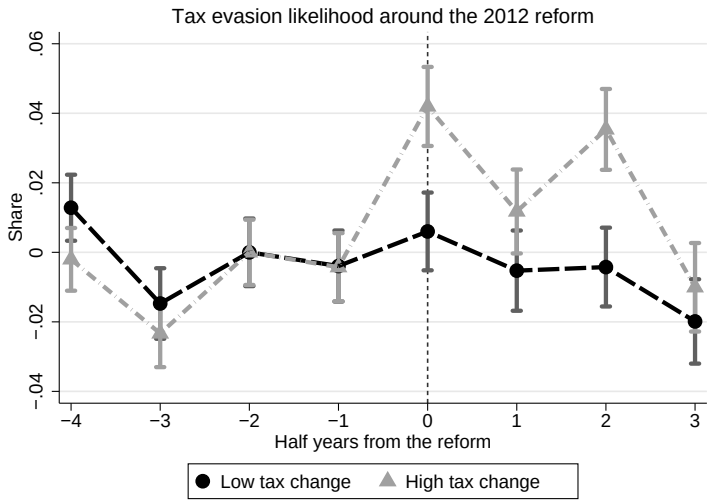

Figure 9: Likelihood of tax evasion around the 2012 reform

difference between the two groups after the reform. In column (1) the estimate shows that, on average, the likelihood of evasion increased by 2.6 percentage points after the reform. When adding controls (in column (2)), such as CO2 dummies, weight of a car and car make fixed effects, the estimate drops to 1.4 percentage points. Adding the average number of cars by CO2 group in column (3) does not alter the result from column (2).

The changing likelihood of evading taxes in Figure 9 and Table 4 may be due to importers who previously may have chosen not to evade now do so, and/or because importers who choose not to evade are now less likely to import cars due to the higher tax rate. In order to disentangle these effects, Figure 10 describes the overall trends over time in the number of imported used cars, dividing them into high and low CO2 class and also by whether or not taxes have been evaded on the imported car. Overall, the number of cars on which taxes have not been evaded is far greater than cars from which taxes have been evaded. At the time of the 2012 reform, marked with the vertical dashed line, we see that the number of cars with no tax evasion declines, especially in the high CO2 emission group for which tax rates increased by almost 7 percentage points on average. There is no accompanying increase in the number of cars in the high CO2 group where we do observe evasion. This suggests that the finding of increased likelihood of tax evasion was largely due to non-tax evaders responding to higher tax rates by reducing their imports.

In order to more formally analyze the relationship between the tax rates, the number of imported used cars, and tax evasion, we next estimate the elasticity of the number of imported used cars with respect to the tax price for different subsamples. We calculate the tax price being one plus the car tax rates described in table 3 above. Then, we calculate the logarithm of the number of used cars in cells defined by different classifications of

	(1)	(2)	(3)
VARIABLES	Ind. tax ev.	Ind. tax ev.	Ind. tax ev.
DD	0.026***	0.014***	0.014***
	(0.004)	(0.004)	(0.004)
High CO2	0.041***	-0.053***	-0.053***
	(0.002)	(0.020)	(0.020)
N cars			-0.004***
			(0.001)
Constant	0.023***	0.051	0.051
	(0.004)	(0.038)	(0.038)
N	97,230	97,230	97,230
R^2	0.011	0.097	0.097
CO2 cl.		X	X
Weight		X	X

Table 4: Likelihood that taxes are evaded after the 2012 tax reform

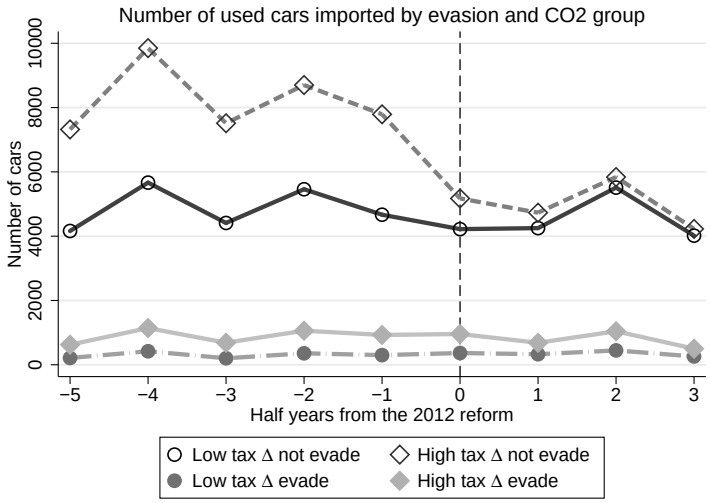

Figure 10: Number of imported used cars by tax evasion and CO2 class

cars. We base the elasticities on the following regression equation.

$$\triangle \log Ncar_{ct} = \alpha + \beta_1 \triangle \log(1 + MTR)_{ct} + \zeta_1 X + \epsilon_{ct} \tag{3}$$

The elasticities are then estimated from regression (3), where the dependent variable is the difference in the log number of cars from the previous half year in each cell, and the independent variable is the difference in the log tax price for the cars in that cell. The other covariates in control vector X are the CO2 dummies and dummies for car age. We calculate this for all used cars imported around the 2012 reform for which we observe the comparison mileage, and divide this into those for which we observe that taxes have been evaded and those for which we observe that taxes have not been evaded.

Table 5 shows the estimates of the elasticity of the number of imported used cars with respect to the tax price. Columns (1) through (3) show a simple regression without control variables for which the aggregated cells over which the data is aggregated are based on 15 CO2 classes, three car age classes, half years and make of a car. Using crude aggregation reduces the number of cells and the inaccuracy of the tax variation, but ensures that not many cells are missing due to not having imported cars in some half years. Thus the number of cars in each cell is large. Columns (4) through (6) utilize much finer cells defined by the 100 CO2 and 8 car age classes on top of half years and make of a car. Columns (1) and (4) include all observed cars for which we have comparison mileage information around the 2012 reform, columns (2) and (5) include only cars for which we observe a trace of tax evasion, and columns (3) and (6) include only cars for which we do not observe any trace of tax evasion.

	(1)	(2)	(3)	(4)	(5)	(6)
VARS	All	Evas.	No evas.	All	Evas.	No evas.
Elasticity	-0.194	-0.490	-0.501	-0.186	0.593	-0.405**
	(0.312)	(0.771)	(0.329)	(0.170)	(0.458)	(0.190)
Constant	0.276***	0.404***	0.254***	0.228***	0.282***	0.194***
	(0.025)	(0.047)	(0.025)	(0.016)	(0.037)	(0.016)
N cells	6,617	1,870	6,354	17,399	2,331	15,917
N cars	98,874	8,003	89,185	84,469	4,193	75,854
R^2	0.085	0.154	0.070	0.050	0.081	0.041

Table 5: Elasticity of number of imported used cars with respect to the price plus tax

Strikingly, the estimated elasticity attracts a different sign for the tax-evasion and no-tax-evasion cars. Among the no-evasion cars, a lower tax-inclusive price (i.e., a lower tax rate) is associated with higher demand, as would normally be expected. The elasticity with respect to the tax price is estimated to be about -0.4, and is statistically significant in column (6). In contrast, and corroborating the intuition derived from figure 10, demand

for those cars for which we observe tax evasion does not respond to the changes in statutory tax rates in a statistically significant way, and the point estimates are even positive. This result is consistent with the idea that the possibility of evasion mitigates what would otherwise be the demand-reducing impact of a tax increase. If we were not able to observe tax evasion, we would estimate an elasticity that would be about half as large as what it is for no-tax-evasion cars, and that would not be statistically significant (comparing columns (4) and (6)).

We next quantify the value of tax evasion and import response to tax rates in monetary terms. First, we calculate the estimated amount of tax revenue lost due to missing miles utilizing the same framework that was described in Figure 9 and Table 4. The estimated euro amount of tax evasion is the outcome of a regression that is estimated as follows:

$$\log Evasion_{ct} = \alpha + \beta_1 \log(1 + MTR)_{ct} + \zeta_1 X + \epsilon_{ct} \tag{4}$$

In equation (4) the outcome ($\log Evasion_{ct}$) is the log of the euro amount of estimated evasion, and the explanatory variables are the log of the tax price (one plus the car tax rate) and a vector of covariates for car c observed at half year t. The variable ϵ_{ct} is the residual error term. The covariates used include fixed effects for the make of a car, dummies for the age of the car at the time of import, dummies for CO2 emissions and dummies for the weight of a car in 20 bins. The data is restricted to the six years around the 2012 reform by the year of import.

One feature in this setting is that observed tax evasion is a combination of the continuous choice of how much tax to evade, and whether or not to import a used car and possibly evade taxes. In an attempt to control for the importing behavior, we impose a two stage structure, where we first estimate a differences-in-differences model in which the outcome is the number of imported used car in cells defined by make, CO2 and car age dummies as well as tax evasion dummy. Apart from the outcome variable, the model specification is the same as in Table 4. We then predict how the tax reform affected the extensive margin choices of what kind of cars are being imported and use this as an additional covariate in the elasticity estimation. If the tax rate variable has a statistically significant coefficient even after controlling for this extensive margin behavior, then the intensive margin evasion depends on tax rates.

Table 6 presents the estimates of the elasticity of the euro value of tax evasion with respect to the tax price. The outcome variable in columns (1) through (5) is the log of the euro value of evasion and in columns (6) and (7) the log of the euro value of car taxes added with the estimated evasion. Columns (1) and (2) present a regression without controlling for the extensive margin behavior. Column (1) presents a simple regression with only the variables visible in the table: the log of tax price, a dummy for high CO2 group, a dummy for after the reform, and a constant. The estimated elasticity is quite

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARS	Evasion	Evasion	1^{st} stage	Evasion	Evasion	Taxes	Taxes
Elasticity	3.108***	1.174**		2.427***	-0.107	1.235***	0.265***
	(0.369)	(0.594)		(0.367)	(0.589)	(0.075)	(0.041)
DD			-0.207***				
			(0.014)				
Pred N ev.				-0.286***	-1.998***	0.231***	-0.207***
				(0.020)	(0.304)	(0.005)	(0.027)
High CO2	0.279***	0.113	-0.206***	0.282***	-0.655***	0.154***	0.300***
	(0.040)	(0.244)	(0.075)	(0.039)	(0.248)	(0.008)	(0.052)
After	-2.871***	-2.058***	-0.318***	-2.910***	-3.338***	0.175***	0.234***
	(0.030)	(0.079)	(0.029)	(0.030)	(0.207)	(0.006)	(0.019)
Constant	3.595***	3.657***	-0.060	4.270***	3.104***	7.230***	7.712***
	(0.069)	(0.384)	(0.144)	(0.083)	(0.390)	(0.021)	(0.101)
N	23,010	23,010	97,230	23,010	23,010	94,053	94,053
R^2	0.293	0.355	0.308	0.300	0.371	0.093	0.814
Controls		X	X		X		X

Table 6: Estimates of elasticity of tax evasion and taxes in euros with respect to the tax price (one plus the car tax rate)

high in column (1), 3.11, indicating that higher tax rates lead to significantly more tax evasion from an average imported used car. Column (2) repeats this exercise and adds the extensive vector of controls described above. The controls reduce the estimated coefficient to 1.17, but it remains highly statistically significant.

This first-stage estimate for how tax rate affects the kind of cars imported is presented in column (3). We then use the prediction from this regression to control for the effect of tax reform on what kind of cars are being imported. Inclusion of this control variable in column (4) produces a somewhat smaller elasticity estimate compared to that in column (1). When we add a full vector of control variables in column (5), the elasticity estimate is no longer statistically different from zero, and the point estimate is close to zero, -0.11. This suggests that the elasticity of tax evasion with respect to the tax price occurs primarily along the extensive margin (whether or not to evade), because controlling for the extensive margin behavior eliminates both the economical and statistical significance of the elasticity estimate (with other controls).

Finally, columns (6) and (7) show the elasticity with respect to the tax price of the true car taxes: the reported car taxes added with the evasion. Column (6) is a sparse specification, and column (7) shows a specification with a full set of controls. The estimated elasticities are 1.23 and 0.27, respectively. These estimates indicate that increasing the tax rate has a modest positive impact on the remitted car taxes.

In sum, in this section we uncover evidence that higher car tax rates do not affect the number of cars imported with tax evasion, or the euro amount of tax evasion. In

fact, the analysis shows that the amount of tax evasion is quite insensitive to variation in tax rates. This is intriguing given that our analysis by CO2 rates in section 3 suggested that higher tax rates and tax bases are correlated with more tax evasion. However, we showed that a dummy variable for whether or not an imported used car has some taxes evaded (the likelihood of tax evasion) responds to tax rates, through the changes in real behavior.

4.2 Tax enforcement

In the previous section we discovered that variation in tax rates do not directly affect the amount of tax evasion. This raises the question of what other factors affect tax evasion. In this section we analyze the contribution of tax enforcement measures on tax evasion. In this analysis we rely on before-and-after analysis due to the lack of control group. In section 5, we analyze a randomized control trial that induced variation in the perception of enforcement measures.

We examine the impact of the introduction of a new enforcement scheme under which mileage information was systematically collected from car inspections and compared to the reported tax filings by the Customs. This change in the enforcement regime took place beginning in 2013; there were no car tax base or rate changes in that year.

Figure 11 shows the trends in the number of imported used cars for two CO2 groups for which no tax evasion was detected (the same division that was used in the previous section). Recall that the car tax rate increased in 2012 for the high CO2 group by approximately 7 percentage points, while the tax increase was only modest for the low CO2 group. As shown above, we observe a clear decline in the number of imported used cars in the high CO2 group at the time of the 2012 rate reform, while there is no clear change in the low CO2 group. The timing in the figure is not as sharp as before, because now the half years are divided within the calendar year and not centered at the time of the reform, in April 2012.

Figure 12 depicts the number of imported used cars by dividing the data similarly into two CO2 groups, but restricting the sample to those for which we observe tax evasion. As shown before, we do not observe any break in the trend around the tax reform of 2012. What is clear, though, is a dramatic decline in estimated tax evasion in both groups starting in the latter half of 2013. The number of imported cars with detected evasion continues to decline and levels out only in the latter half of 2015. The clear break in the trend starts precisely at the same time that the Customs began to employ the enforcement regime using a third-party information from car inspections. We surmise that car importers learned about this new regime gradually over time, and as they become aware of it, many concluded that the chance of getting caught had non-trivially increased. Note also that the figure illustrates that, when the RCT described below begins in the

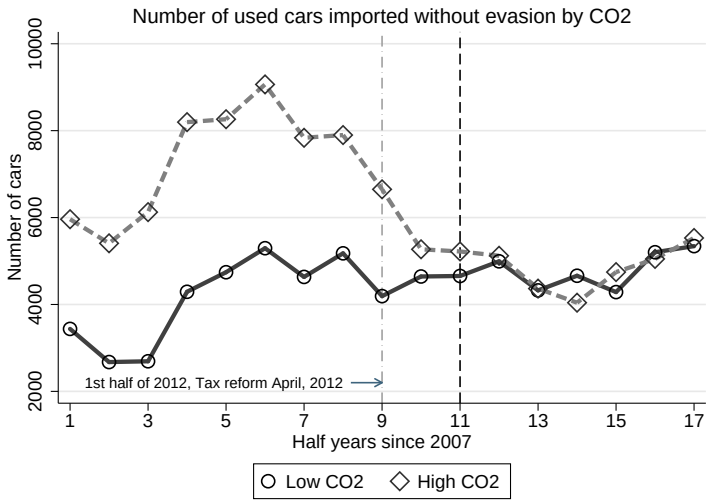

Figure 11: Trends among imported used cars with no evasion divided into high and low CO2 groups

latter half of 2014 (half year 14 in the figure), much of the evasion behavior has already apparently disappeared.

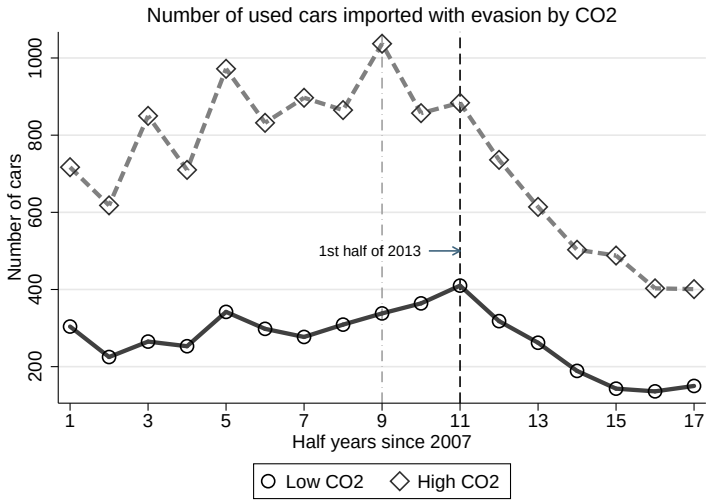

Figure 12: Trends among imported used cars with observed evasion divided into high and low CO2 groups

To summarize, we find evidence of an intriguing, previously unexplored behavioral mechanism. The results in Section 4.1 suggest that only non-evaders respond to the tax rate changes by decreasing the number of imported used cars after the tax increase, but evaders do not respond to tax rate changes at all. This Section shows that stricter enforcement measures can affect the amount of tax evasion. Therefore, the real margin responses (number of imported cars) and evasion responses (missing miles) clearly depend on different factors and require different policy measures. To learn more about the effects

of enforcement on tax evasion, the next Section provides evidence from an RCT in which we offered salient details about the use of third-party information in tax collection.

5 An RCT Analysis of Enforcement Policy

In August 2014, in association with the Finnish customs authority, we initiated a randomized controlled trial (RCT) to assess the efficacy of the recent change in the car tax regime. In the experiment, Customs sent out letters to randomly chosen groups among a set of likely car importers, providing different information about the new enforcement measures. There were four different letters: a baseline (control) letter and three main treatment letters, described below, comprising 5,000 letters in each group, for a total of 20,000 letters.[13] The behavior of the four letter groups can also be potentially compared with a no-letter group, the baseline population from which the letter groups were chosen but did not receive any letter. The results of the RCT must be interpreted in the context described in Figure 12. At the time of our RCT, tax evasion has already significantly declined from previous years. It is highly likely that at least some of the previous tax evaders already knew of the enforcement measures, the salience of which the RCT attempts to increase.

We use a standard difference-in-difference strategy to estimate the effects of different information treatments. We estimate the following DD regression:

$$(R-C)_{it} = \beta_0 + \beta_1 1(after_t) + \beta_2 1(treat_i) + \beta_3 DD_{it} + \beta_4 X_{it} + \varepsilon_{it} \tag{5}$$

where $(R-C)_{it}$ is the outcome variable of the mileage difference of used imported cars between the reported mileage R and comparison information from car inspections C for cars i in time t. On average, the time interval between reported mileage and car inspection information is 11-12 days.[14] We also use this same estimation strategy to estimate the effects of the letters on the probability of importing cars before and after receiving a treatment letter. The variable $1(after_t)$ takes the value of 1 after the treatment letter were sent out and 0 otherwise, $1(treat_i)$ is an indicator for individuals that received one of the letters and 0 for the control group, and DD_{it} is the interaction variable of the latter two terms. The coefficient β_3 identifies the average change in an outcome in the treatment group relative to the control group before and after the treatment. In order to offer more precise estimates we include a vector of control variables X_{it} in the model that includes the time lapse between the reported mileage upon import and the car inspection information in days, the CO2 emission level of an imported cars and five-year car age cluster dummies for imported cars.

[13] The letter wording is provided in the Appendix.

[14] Table 13 in the Appendix shows the average time between reported mileage and car inspection.

The target population for the experiment was individuals (not firms) who were judged to be likely to import a used vehicle to Finland in the near future. Because the population considering importing a vehicle is not directly observable, the experiment targeted those who had imported a car in the recent past, up to almost four years prior to the experiment (January 2011 - August 2014). In the data, about 40% of individuals who bring a used car to Finland have imported a car within this period. The letters were sent to recipients randomly chosen from this larger population.

The first treatment is a control letter, included to gauge how receiving an anodyne informational letter from the Customs affects potential car importers. This letter explains how imported used vehicles are taxed and the consequences of non-compliance.

The second treatment is designed to test the impact of the public disclosure of information. The letter informs potential car importers that the Customs authority operates a web site where anyone can search for information about vehicles imported to Finland in the past. By entering the vehicle identifying number (serial number), the user can learn the mileage reported upon import and other information about the car. The letter specifies that the site can be used as a tool to evaluate the value of used cars. In principle, if the mileage of the car upon import was significantly larger than its current odometer reading, this suspicious mileage history could reduce the perceived value of the car. The letter also mentions that the web service will likely be improved in the future to make it even more informative about imported used vehicles.

We hypothesize that receiving this information reduces the willingness of an individual to over-report the mileage of a car upon import while possibly planning to later deflate the odometer reading for resale. The chances of getting away with this behavior are reduced under public disclosure because the reported mileage upon import is publicly available information and could be compared with the mileage reported when the car is later put up for sale – adding 100,000 kilometers upon import that later disappears looks suspicious to a potential buyer. Once it is clear that successful evasion is less likely, we expect to see less inflation of mileage upon import.

The third treatment letter indicates that Customs will check the information provided by a car importer against other administrative information, such as the mileage of the vehicle recorded in the regular car inspection. The letter specifies that car tax declarations where the reported mileage is at least 10% higher than the comparison mileage will be audited. This is a probability notch design, where the notch is relative to the actual mileage.[15] This information may or may not be available to the general public, but the most important message imparted is that it is available to Customs for enforcing the car tax. The information is provided to the Customs by the Finnish Transport Safety Agency. This cross-check presumably increases the probability of getting caught from tax

[15] Our analysis of the data does not show any evidence of bunching at this 10% threshold either before or after the treatment in different groups.

evasion, and in theory this would reduce the willingness to over-report the mileage. This would be new information for prospective importers, as the system in which the mileage is recorded in regular inspections was new.

The fourth treatment combines the second and third treatments by including in the same letter statements about the public disclosure system and the existence of the third-party information. This treatment is included to learn about the combined effect of the probability of detection and the effect of the public disclosure system on the future value of the car.

All the letters specify that the time period to which the treatments apply is one year from the time of receipt (from August 2014 to July 2015). This is the time period for which the Finnish Customs committed to examine the differences in reported and inspected mileages of imported used cars for these treatment groups. The effects of different letters can be disentangled by their potential differential impact on the car tax mileage statements.

RCT results

Table 7 provides some statistics on the balance across the groups to check that the randomization was successful and to help interpret the estimates. Table 7 shows the average pre-treatment mileage differences and the average share of the cars with mileage differences that exceed 5,000 kilometers. The table shows that the mileage difference between the import report and comparison inspection information hovers between 8,250 and 8,750 kilometers across groups, and that the differences are not statistically significant. The probability of having more than a 5,000 kilometers negative difference (missing miles) is approximately 10% across the groups. The groups seem to be well-balanced according to this statistic as well.[16] Finally, there are around 5,400 imported used cars for which we observe the mileage comparison information before the treatment in each group. The letter groups have a very similar number of observations, but by design the no-letter group (treatment group 0) has over double the amount of observations compared to the other groups.

We estimate using a difference-in-differences method the effects of the treatments on the extent to which reported mileage upon subsequent import differs from the lowest mileage upon inspection and on the number of cars imported to Finland. Figure 13 shows the distribution of changes in kilometers from those observed at car inspection to those reported in car tax declaration. The figure shows the difference for the control group not receiving a letter in the left panel and the letter groups 2-4 in the right panel. A

[16] Table 13 in the Appendix shows the balancing test results comparing treatment groups to the control group for the difference in reported and inspected mileage in kilometers, the likelihood of misreporting more than 5,000 kilometers and the number of days between reported mileage and car inspection. The table shows that the groups are statistically very similar before treatment period.

Treatment group	Statistic	Difference in km	P (Δkm<-5000)
0	mean	8754.376	0.100
	s.e. mean	354.347	0.003
	N	13181	13181
1	mean	8723.296	0.103
	s.e. mean	533.736	0.004
	N	5374	5374
2	mean	8371.206	0.108
	s.e. mean	570.352	0.004
	N	5409	5409
3	mean	8531.894	0.096
	s.e. mean	560.062	0.004
	N	5333	5333
4	mean	8250.621	0.099
	s.e. mean	559.775	0.004
	N	5401	5401

Table 7: Pre-reform difference in reported and inspected mileage and probability of this difference exceeding 5,000 kilometers by treatment groups

negative difference indicates that mileage was higher upon import than upon inspection, and suggests tax evasion. In all groups, the most common case is that inspection and tax declaration mileage are close to each other or equal, resulting in large spikes centered on zero in the distribution. To be able to focus on the non-zero differences, the figures exclude differences smaller than 5,000 kilometers in absolute value. The figure reveals no visually obvious difference between the control and treatment groups, but multiple treatment groups can mask a small change in some of the treatments, and thus we need to estimate whether there are any differences between treatment groups.

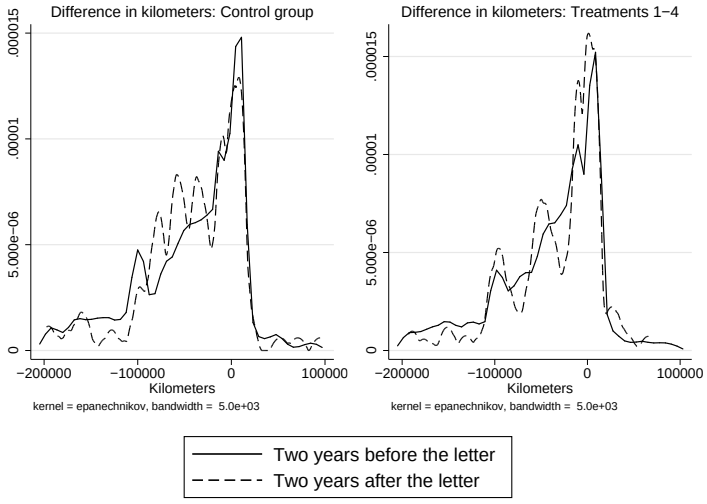

Figure 13: Mileage difference between inspection and tax decision in control and treatment groups

We explore the effect of these treatments on the difference in mileage between inspected and reported kilometers, and show the results in Table 8. The outcome variable is the mileage difference reported between car tax declaration and inspection. A positive estimated coefficient on the DD variable indicates that mileage reported upon import has been decreased, and thus that tax evasion has been reduced due to the treatment. The regressions include as control the CO2 value, the time difference between observing the tax mileage and inspection mileage, and car-age class fixed effects.

Column (1) shows the estimated overall treatment effect of receiving any one of the treatment letters (letters number 2, 3 or 4) against receiving letter 1 (the neutral letter). The DD coefficient indicates that the reported mileage upon import decreases by about 3,100 kilometers against inspection mileage, and the coefficient is statistically significant at the 5-% level. Column (2) compares letters 2, 3 and 4 against receiving no letter, and columns (3) to (6) repeats the exercise, but comparing individual letters against the no-letter group each in separate regressions. Column (7) combines those receiving letters 3 or 4 and compares them against the group receiving no letter, and column (8) compares these against those either receiving no letter or receiving the neutral letter 1.

The individual letter treatments are not alone very robustly statistically significant in columns (3) through (5), perhaps due to the relatively low number of observations. When we compare letter 4 to the no-letter group, we estimate a positive and statistically significant estimate of almost 3,000 kilometers. Also, combining letters 3 and 4 tends to produce a statistically significant estimate of reducing tax evasion in the form of missing mileage. This evidence suggests that offering information about the availability of use third-party information allowing Customs to compare the reported mileage and actual mileage of cars decreases the misreporting of individuals. These effects are non-trivial as the pre-treatment mean difference is approximately 8,500 kilometers (see Table 7). Therefore, the results suggest an approximately 35% decrease in misreported mileage.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARS	L1v2,3,4	L0v2,3,4	L0v1	L0v2	L0v3	L0v4	L0v3,4	L01v3,4
DD	3,101**	2,026*	-1,203	1,396	1,831	2,922**	2,388**	2,731***
	(1,582)	(1,050)	(1,657)	(1,462)	(1,412)	(1,274)	(1,114)	(1,040)
Const.	7,650***	5,671***	6,036**	4,012	7,223***	3,968	6,242***	6,992***
	(2,272)	(1,998)	(2,424)	(2,644)	(2,433)	(2,434)	(2,108)	(1,867)
N	23,636	32,181	20,397	20,427	20,301	20,395	26,225	32,151
R^2	0.251	0.257	0.255	0.270	0.257	0.252	0.250	0.248

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: The effect of RCT on missing mileage

Table 9 presents estimates of the effect of the treatments on reported mileage upon

	(1)	(2)	(3)	(4)	(5)
VARS	L0v2,3,4	L1v2.3.4	L1v3.4	L0v3.4	L1,2v3.4
Evader	-59,062***	-59,705***	-60,146**	-59,171***	-59,723***
	(946)	(1,212)	(1,446)	(1,046)	(1,213)
DD	579	1,983	2,711**	2,097***	2,453**
	(762)	(1,302)	(1,320)	(772)	(958)
Ev*DD	2,184	1,692	2,527	3,100	2,048
	(2,740)	(4,515)	(4,608)	(2,771)	(3,215)
After	-4,507***	-5,525***	-5,922***	-4,974***	-5,271***
	(586)	(1,203)	(1,205)	(549)	(791)
Ev*After	49,183***	50,689***	51,098***	49,556***	51,163**
	(2,383)	(4,344)	(4,414)	(2,221)	(2,823)
Treat	-226	-183	-470	-533	-664
	(327)	(454)	(486)	(363)	(405)
Const.	1,370***	1,412***	1,816***	1,541***	1,610***
	(250)	(386)	(393)	(212)	(282)
N	38,564	23,933	17,893	32,524	23,933
R^2	0.462	0.459	0.450	0.457	0.460

Table 9: The effect of RCT with interaction of previous evaders

import, and interacts this with whether or not a car importer evaded taxes before the start of the RCT, defined as an indicator that is equal to one only if we find missing miles of more than 5,000 kilometers for at least one of the cars an individual imported in the period between January, 2010 and June, 2014 (the RCT started in July, 2014). The estimate is a triple DD; it includes all the possible interaction terms. In these specifications, we begin by comparing those not receiving any letter to those receiving letter 2, 3 or 4 in column (1).

The triple DD variable is Ev*DD, and Table 9 shows that the interacted coefficients are not statistically significant in any of the specifications. However, the DD coefficient without interaction becomes more statistically significant than before. This suggests that the treatments did not affect the mileage reports of those that had evaded before (and were possibly caught by Customs), but rather affected those that had not evaded before, but were potentially considering doing so. They would then abandon their intentions to evade taxes after receiving letter 3 or 4, which informed them about the use of third-party information in tax enforcement.

We next show the results of regression analyses where the outcome is an indicator for having a negative difference in excess of 5,000 kilometers between the car tax filing and the lowest subsequent inspection observation. Table 10 presents the results of this exercise. Because of the way the dependent variable is defined, an estimated negative coefficient is consistent with a treatment restraining missing-miles tax evasion. The columns are organized in the same order as in Table 8, but utilizing the indicator instead of the mileage

difference as the outcome. We find some weak evidence of a statistically significant decline in tax evasion in response to receiving a tax enforcement letter making tax evasion less attractive. The significant estimates occur mostly in the same groups as in Table 8, especially columns (6) and (7). Columns (5)-(8) all point to about a 2 percentage point reduction in the probability of tax evasion after receiving the letter, usually from a baseline of about 10 percent. Interestingly, this point estimate is of the same order of magnitude as the impact of a higher tax rate on the probability of tax evasion (although that occurred mainly through the kind of cars imported).[17]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARS	L1v2,3,4	L0v2,3,4	L0v1	L0v2	L0v3	L0v4	L0v3,4	L01v3,4
DD	-0.000	-0.016	-0.016	-0.006	-0.019	-0.022*	-0.021*	-0.016
	(0.013)	(0.010)	(0.014)	(0.015)	(0.014)	(0.013)	(0.011)	(0.010)
Const.	-0.066***	-0.068***	-0.077***	-0.063***	-0.069***	-0.079***	-0.074***	-0.076***
	(0.015)	(0.012)	(0.012)	(0.015)	(0.014)	(0.012)	(0.012)	(0.010)
N	23,756	32,332	20,482	20,516	20,393	20,481	26,345	32,298
R^2	0.042	0.040	0.037	0.043	0.036	0.038	0.037	0.037

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: The effect of RCT on an indicator of having greater than -5,000 kilometers difference

Finally, we turn to an analysis of how the letter treatments affected the number of cars imported, in order to assess whether or not the knowledge of expanded enforcement of evasion made importing less attractive. In principle, the expanded enforcement would not only affect evasion but also the "real" decision of whether to import a car; some marginal importers might import a used car only if the tax liability could be reduced by evading. We calculate the number of cars imported before the experiment per person, either by quarter or by the entire before and after periods, where the before period is defined to be from January, 2012 to June, 2014, and the after period is from July, 2014 to September, 2015. We first present the time trends of the number of car imports in the different treatment groups in Figure 14. The left panel of the figure shows the intensive margin number of cars imported per person and per quarter (conditional on having imported), and the right panel shows the number of cars including the extensive margin decision (whether or not to import). Neither panel shows an obvious effect. The intensive margin response shows some decline in some of the letter groups, especially in the letter-2 group compared to the control groups. The extensive margin response declines in all groups

[17] In Table 14 in the Appendix we replicate these results using information about the previous tax evaders as a control in the regressions, similarly to Table 9. The estimates are similar in size to those presented in Table 10, but controlling for previous evasion patterns clearly produces more statistical power for the estimates.

at the start of the treatment (i.e., at time zero), because the baseline population was selected based on having imported a car prior to the treatment (explained in detail above). However, there are no discernible differences between the groups in whether or not to import a car.

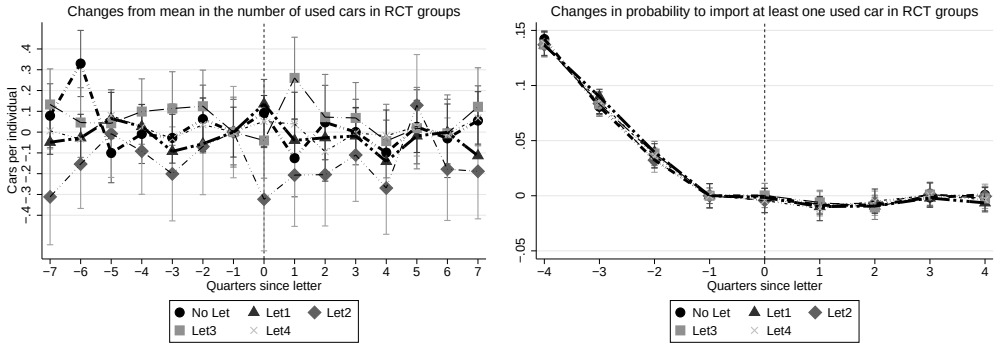

Figure 14: Time trends of changes in log number of used cars imported and probability of import at least one car

To quantify these responses, we perform regressions with individual-level fixed effects using again a DD estimation strategy and calculating robust standard errors throughout. Table 11 shows the DD results for the number of cars imported (the intensive margin response) by person and counting together all used cars that have been imported before and after the treatment. Column (1) reports the estimated effect of receiving letters 2, 3 or 4 against receiving letter 1 (the neutral letter). Columns (2) to (4) compare the control letter against other letters individually. Columns (5) to (7) compare letters 2, 3 and 4 against receiving no letter in individual specifications. None of the point estimates is statistically significantly different from zero. The point estimates are both negative and positive and thus, the treatments seem not to have changed the number used of cars imported. Expanded enforcement apparently reduced evasion without affecting in a detectable way the volume of used car imports.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARS	L1v2,3,4	L1v2	L1v3	L1v4	L0v2	L0v3	L0v4
Diff-in-Diff	-0.358	-0.098	-0.032	0.030	-0.103	-0.047	0.011
	(0.269)	(0.083)	(0.041)	(0.036)	(0.078)	(0.042)	(0.036)
Constant	1.687***	1.346***	1.174***	1.142***	1.325***	1.230***	1.210***
	(0.112)	(0.088)	(0.046)	(0.047)	(0.063)	(0.044)	(0.046)
N	17,434	9,308	9,204	9,330	15,999	15,895	16,021
R^2	0.026	0.029	0.042	0.029	0.018	0.017	0.014
N of indiv.	14,358	7,540	7,537	7,565	12,996	12,993	13,021

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: The effect of RCT letters on the number of imported cars

In sum, the RCT results suggest that offering information about the usage of third-party information in the tax enforcement can reduce the misreporting of individuals. The letters created responses only for treatments that included information about the usage of third party information. The treatment providing information about the public disclosure of information did not decrease the amount of tax evasion. However, offering salient information about the usage of third-party information in tax collection or public disclosure information seemed not to have any effects on the number of cars imported.

6 Conclusions

This paper studies the importing behavior of used cars to Finland. We focus on tax evasion responses to the tax system relying on a unique trace of tax evasion based on comparing the mileage reported upon import, which affects the car tax liability, with the mileage recorded in annual and mandatory car inspections. Observing that the mileage of a car *declines* as a car gets older is a strong indicator of tax evasion.

Our results show that missing-miles tax evasion is a fairly common phenomenon, detected in approximately 10% of imported cars. This kind of tax evasion is relatively more common among imports of cars that face higher car tax rates, suggesting a positive correlation between tax rates and tax evasion. However, when we use the variation in tax rates created by the tax reform of 2012, we observe that the tax rates do not affect the extent of tax evasion. Therefore, relying on the natural experimental tax variation, our conclusion is that car tax rates do not affect the amount of tax evasion. Our results do, though, support the view that an increase in tax rates decreases the amount of used car imports, suggesting real responses to the tax rate changes.

We offer descriptive evidence that a stricter enforcement regime reduced tax evasion. To provide more compelling evidence of the causal effect of the enforcement regime,

we study the results from an RCT design that shows that offering salient information about more effective tax enforcement initiatives enhances the efficiency of tax collection. Increasing the salience of the use of third-party information on mileage to detect evasion in the RCT reduced the mileage reported upon import while not affecting the number of imported used cars. However, offering information about the public disclosure of mileage reported did not change the reporting behavior of car importers.

Our results produce rich detail about the interaction between tax evasion and real behavior. We find that only non-evaders respond to the tax rate changes by decreasing the number of imported used cars after the tax increase, while evaders do not. We also find a clear reduction in tax evasion due to the improvements in enforcement practices and after offering information about them. These results together show that the real margin responses (the number of imported cars) and the evasion responses (missing miles) depend on different factors. These results suggest that, in this setting, different remedies should be targeted to the different policy concerns: enforcement improvements and information about them to tackle tax evasion, and tax rate adjustments to affect real behavior.

References

[1] Fisman, R., and Wei, S-J. 2004. "Tax Rates and Tax Evasion: Evidence from 'Missing Imports' in China." Journal of Political Economy, 112 (2): 471–496.

[2] Kleven, H. J., Knudsen, M. B., Kreiner, C. T., Pedersen, S. and Saez, E. 2011. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark." Econometrica 79 (3): 651–692.

[3] Klier, T. and Linn, J. 2010. "The Price of Gasoline and New Vehicle Fuel Economy: Evidence from Monthly Sales Data." American Economic Journal: Economic Policy, 2 (3): 134–153.

[4] Klier, T. and Linn, J. 2012. "New-vehicle Characteristics and the Cost of the Corporate Average Fuel Economy Standard." RAND Journal of Economics, 43 (1): 186–213.

[5] Marion, J. and Muehlegger, E. 2008. "Measuring Illegal Activity and the Effects of Regulatory Innovation: Tax Evasion and the Dyeing of Untaxed Diesel." Journal of Political Economy 116 (4): 633–666.

[6] Meiselman, B. 2017. "Ghostbusting in Detroit: Evidence on Nonfilers from a Controlled Field Experiment." Working Paper, University of Michigan.

[7] Reynaert, S. and Sallee, J. M., 2016. "Corrective Policy and Goodhart's Law: The Case of Carbon Emissions from Automobiles." Working paper, University of California Berkeley.

[8] Sallee, J. M. 2010. "The Taxation of Fuel Economy." in Tax Policy and the Economy, 25, NBER and University of Chicago Press.

[9] Sallee, J. M. and Slemrod, J. 2012. "Car Notches: Strategic Automaker Responses To Fuel Economy Policy." Journal of Public Economics, 96 (11–12): 981–999.

[10] Slemrod, J., Blumenthal, M. and Christian, C. 2001. "Taxpayer Response to an Increased Probability of Audit: Evidence from a Controlled Experiment in Minnesota." Journal of Public Economics, 79 (3): 429–453.

[11] Slemrod, J. and Weber, C. 2012. "Evidence of the invisible: toward a credibility revolution in the empirical analysis of tax evasion and the informal economy." International Tax and Public Finance, 19 (1): 25-53.

[12] Slemrod, J. 2017. "Tax Compliance and Enforcement." Working paper, University of Michigan.

A Appendix, some regression formulas used

In this appendix, we discuss the regressions in section 3.1 that are used to draw Figure 6 are as follows. Separately for each CO2 quintile, an estimation is first made that explains the amount of car taxes actually remitted. We use a specification that explains through covariates the taxable value of a car, and which is likely to be very similar that the Customs actually uses when calculating the taxable value of a car. One of the covariates is the reported mileage, which is the coefficient we use for calculating the importance of missing mileage in euros. The other important covariates are a vector of 100 dummies for CO2 values, the age of the imported used car in years at the time of importing and fixed effects for the make of the car. The equation to be estimated takes the following form.

$$Tax_c = \alpha + \beta_1 mileage_c + \beta_2 CO2_c + \beta_3 CarAge_c + \mu_c + \epsilon_c$$

The coefficient β_1 explains the contribution of mileage to the euro amount of car tax liability. We then take this coefficient for each car and multiply that coefficient by the absolute value of miles estimated to be inflated in the car tax report, i.e. the difference between reported mileage and the lowest inspection mileage at the time of importing the car or later. The result of the multiplication is informative of the euro amount of tax evasion for each car. The figures are drawn from the CO2 quintile averages.

VARS	(1)	(2)	(3)	(4)	(5)	(6)
	All	Q1	Q2	Q3	Q4	Q5
km	-5.411***	-3.915***	-3.814***	-4.102***	-5.601***	-7.141***
	(0.630)	(1.053)	(1.247)	(1.118)	(1.360)	(1.248)
$CO2$	29.739***	-2.479	-445.265***	-1,339.565***	1,073.463***	-147.086***
	(4.155)	(3.556)	(140.191)	(195.900)	(125.515)	(33.119)
$CO2^2$	-0.027**	0.124***	1.365***	3.591***	-2.432***	0.301***
	(0.011)	(0.015)	(0.416)	(0.518)	(0.294)	(0.062)
T btw. info	-18.971***	-13.671***	-17.553***	-23.201***	-16.692***	-27.623***
	(0.570)	(0.634)	(0.724)	(0.835)	(0.962)	(2.208)
Constant	3,375***	2,505***	43,363***	133,952***	-107,324***	29,462***
	(474.604)	(295.447)	(11,782.686)	(18,525.852)	(13,375.176)	(4,474.997)
N	186,322	35,202	38,318	38,092	36,881	37,829
R^2	0.320	0.516	0.507	0.512	0.436	0.235

Table 12: Estimates for the relationship between mileage and car taxes with other covariates

In Table 12 the outcome is car taxes remitted on a car, in euros. The main explanatory variable is mileage on a car in 1,000 kilometers. Other covariates include the CO2 value, linearly and in cubic form, the time between importing and observing the mileage in months, car age dummies at the time of importing and make fixed effects. Column (1)

is for all cars in the sample, column (2) for cars in the first CO2 quintile, column (3) for cars in the second CO2 quintile, and so forth. The estimated negative coefficient of the variable *km* indicates that higher mileage reduces the tax burden on cars on average; the coefficient of -5.4 in column (1) indicates that 1,000 kilometers more reduce car taxes by 5.4 euros for an average car. The result is that, across CO2 quintiles, higher CO2 values are associated with larger coefficients of mileage in absolute value. This relationship that average taxes reduce more with higher mileage arises from car tax rates increasing with CO2 values. Also, cars that have higher CO2 values tend to be more expensive, making the taxable value larger.

B Appendix

August 14, 2014

Customs develops services relating to car taxes and process of importing cars

Dear Recipient,

You have dealt with Customs on matters relating to car taxes in 2010 or after. This letter is not related to these dealings, but rather it's meaning is to inform you about regulation of car taxes and new services relating to them. One of the new services Customs has set up is electronic form with which to make declaration about registering a new car to be used in Finland.

If you are about to import a used car to Finland, you should follow these steps:

1. Submit the declaration of use form. Now you can do it electronically in web address www.tulli.fi/fi/yksityisille/autoverotus/kayttoonottoilmoitus.
2. Fill in the car tax declaration form. Submit it with the appropriate attachments within five days from filing the declaration of usage form.
3. After you have received a decision on your car taxes and remitted the car taxes, register your car to be used in Finland. You can find more precise instruction from a brochure that comes with this letter, or from the web address www.tulli.fi/fi/yksityisille/autoverotus/.

The amount of car taxes is determined by the taxable value of a vehicle and car tax rate. The taxable value of a vehicle is the general retail sales price of a similar car in Finland. The similarity is based on for example make, model, year-model, condition and mileage of a car. From the general retail sales price a deduction of 5% and amount of 750 euros are deducted. The taxable value of a vehicle is formed like this. Car tax rate is based usually on the CO2 emissions of a vehicle. For example, if the car tax rate is 25 and the taxable value of a vehicle is 10 000 euros, car taxes amount to 2 500 euros.

If you declare incorrect information in car tax form about your vehicle, an addition can be imposed on top of your normal car taxes (at most three times the amount of car tax). The sanctions are announced in more detail in car tax law (59 §).

Kind Regards,

Figure 15: Letter 1: Control group

August 14, 2014

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Customs provides also as a new service **Internet service for tax information**. With this free service you can inspect the information of any car imported as used found in car tax decision imported, like the CO2 emissions, mileage and the amount of car taxes. The service is in web address www.tulli.fi/fi/yksityisille/autoverotus/MAHTI.jsp

You can use this service as a help when you **assess the value of a used car**. If, for example, mileage of a car is significantly larger in car tax decision than later in the odometer, is the value of this car lower, than a car that has a coherent mileage history.

Internet service for tax information will be developed so that in the future it is even more easy to use. At the moment, one can search vehicles with the vehicle identification number. In the future it is possible to make searches with the register plate number.

The amount of car taxes is determined by the taxable value of a vehicle and car tax rate. The taxable value of a vehicle is the general retail sales price of a similar car in Finland. The similarity is based on for example make, model, year-model, condition and mileage of a car. From the general retail sales price a deduction of 5% and amount of 750

Figure 16: Letter 2: Treatment of public disclosure of information

August 14, 2014

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Customs enforces car taxation of vehicles imported from abroad. In the enforcement of car taxation, Customs has used since 2013 as supplementary source **information collected in registration audits, such as mileage on vehicle**.

To guarantee fair and just car taxation for all, Customs takes into **retrospective audits** all vehicles imported during 08/2014–07/2015, which has a difference in odometer reader and the comparison information **greater than 10 per cent**. In the cases where this occurs, Customs reinitiates the car tax process.

The amount of car taxes is determined by the taxable value of a vehicle and car tax rate. The taxable value of a vehicle is the general retail sales price of a similar car in Finland. The similarity is based on for example make, model, year-model, condition and mileage of a car. From the general retail sales price a deduction of 5% and amount of 750 euros are deducted. The taxable value of a vehicle is formed like this. Car tax rate is based usually on the CO2

Figure 17: Letter 3: Treatment of available third party comparison information

August 14, 2014

Customs develops services relating to car taxes and process of importing cars

Dear Recipient,

You have dealt with Customs on matters relating to car taxes in 2010 or after. This letter is not related to these dealings, but rather it's meaning is to inform you about regulation of car taxes and new services relating to them. One of the new services Customs has set up is electronic form with which to make declaration about registering a new car to be used in Finland.

If you are about to import a used car to Finland, you should follow these steps:

1. Submit the declaration of use form. Now you can do it electronically in web address www.tulli.fi/fi/yksityisille/autoverotus/kayttoonottoilmoitus.
2. Fill in the car tax declaration form. Submit it with the appropriate attachments within five days from filing the declaration of usage form.
3. After you have received a decision on your car taxes and remitted the car taxes, register your car to be used in Finland. You can find more precise instruction from a brochure that comes with this letter, or from the web address www.tulli.fi/fi/yksityisille/autoverotus/.

Customs enforces car taxation of vehicles imported from abroad. In the enforcement of car taxation, Customs has used since 2013 as supplementary source **information collected in registration audits, such as mileage on vehicle**. Customs takes into **retrospective audits** all vehicles imported during 08/2014–07/2015, which has a difference in odometer reader and the comparison information **greater than 10 per cent**. In the cases where this occurs, Customs reinitiates the car tax process.

Customs provides also as a new service **Internet service for tax information**. With this free service you can inspect the information of any car imported as used found in car tax decision imported, like the CO2 emissions, mileage and the amount of car taxes. The service is in web address www.tulli.fi/fi/yksityisille/autoverotus/MAHTI.jsp. You can use this service as a help when you **assess the value of a used car**. If, for example, mileage of a car is significantly larger in car tax decision than later, is the value of this car lower, than a car that has a coherent mileage history.

The amount of car taxes is determined by the taxable value of a vehicle and car tax rate. The taxable value of a vehicle is the general retail sales price of a similar car in Finland. The similarity is based on for example make, model,

Figure 18: Letter 4: Interaction treatment of public disclosure of information and available third party comparison information

Treatment	Δ in km	t-test:	P (Δkm<-5k)	t-test:	Δ in days	t-test:
	mean	0 vs. treat	mean	0 vs. treat	mean	0 vs. treat
0	8754.4		.100		11.548	
1	8723.3	.962	.103	.582	11.326	.333
2	8371.2	.563	.108	.122	11.642	.684
3	8531.9	.737	.096	.406	11.379	.462
4	8250.6	.445	.099	.722	11.312	.304

Table 13: Balancing tests between control and treatment groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARS	L1v2,3,4	L0v2,3,4	L0v1	L0v2	L0v3	L0v4	L0v3,4	L01v3,4
DD	-0.011	-0.012	-0.002	0.004	-0.013	-0.027**	-0.021**	-0.020**
	(0.012)	(0.009)	(0.013)	(0.014)	(0.012)	(0.011)	(0.010)	(0.009)
EV*DD	0.029	-0.008	-0.036	-0.017	-0.038	0.035	-0.004	0.006
	(0.038)	(0.030)	(0.040)	(0.040)	(0.038)	(0.044)	(0.033)	(0.031)
Const.	-0.049***	-0.032***	-0.031***	-0.030**	-0.016	-0.030***	-0.025***	-0.032***
	(0.014)	(0.010)	(0.010)	(0.012)	(0.010)	(0.010)	(0.009)	(0.009)
N	23,756	32,332	20,482	20,516	20,393	20,481	26,345	32,298
R^2	0.571	0.568	0.563	0.564	0.560	0.570	0.567	0.567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: The effect of RCT on an indicator of having greater than -5,000 kilometers difference with dummies for previous tax evaders