Does Inequality Harm the Middle-Class?

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Abstract

The paper provides estimates of the effect of economic inequality on middle class well being in Switzerland. Economic well being is proxied by a person's satisfaction with his/her income. Two inequality indicators are used, one standard (the Gini coefficient of the pre-tax income distribution) and one novel (the number of luxury car registrations per 1000 population). Identification is through cross-sectional variation of these indicators at various levels of spatial aggregation. Results using data from the Swiss Household Panel confirm the existence of a robust inverse relationship between inequality and satisfaction among the middle class.

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1 Introduction

Income inequality is a divisive issue in society. What is seen by some as a useful incentive and a necessary consequence of a competitive market system is perceived by others as a key shortcoming of capitalism and a source of social corrosion. To make matters worse, economic theory oscillates between two extreme positions regarding the desirability of different distributional outcomes. Under ordinal utility, no welfare rankings of different income distributions are possible, beyond narrow applications of the Pareto principle. With a cardinal utility function $U_i = u(y_i)$, where y_i is own income, the usual concavity assumption implies that, from a distributional perspective, aggregate welfare is maximized under complete income equality.

Other social science disciplines have been more pragmatic on the issue of inequality and well being, putting evidence ahead of theoretical reasoning. Wilkinson and Pickett (2006) review many studies in sociology and epidemiology that link income inequality to the quality of social relations, health (including mental illness) and numerous behavioral outcomes (such as crime, drug use, teenage pregnancy and the like). Comparing data from different countries, they find for example that rates of mental illness are five times higher in the most unequal compared to the least unequal societies. In their view, inequality is a root cause of dysfunctional societies (see also Wilkinson and Pickett, 2009).

Of course, such findings are in perfect agreement with the simple utilitarian view positing that overall welfare is diminished by higher income inequality (for a given mean income). The key is then the concavity of the well being function and the main driver for the negative association between inequality and aggregate welfare is the increased degree of deprivation among the poor. By contrast, people in the upper deciles of the income distribution benefit from higher inequality. Indeed, Rousseau (2008) argues that the stagnation of aggregate subjective well being in the U.S. since 1975 – as measured by survey responses to happiness questions – can be attributed to the fact that income gains have accrued disproportionally to the top income earners and that real incomes have fallen for the poor. The implied increase in happiness inequality is, however, disputed by Stevenson and Wolfers (2008).

An alternative explanation for a negative association between aggregate well being and inequality posits that inequality lowers personal utility directly, *ceteris paribus*, for given own income and thus regardless

of position in the income distribution. In economics, an important proponent of this line of reasoning is Frank (2007) who argues specifically that inequality is harmful for the middle class. The main theoretical arguments for such a middle class effect are reviewed in the next section.

While Frank (2007) lists suggestive evidence in support of his claim, a direct test that higher inequality lowers middle class well being is, to the best of our knowledge, still missing. This paper is an attempt to fill the gap. Two distinct types of evidence are presented. In a first step, we follow the lead of previous tests for negative inequality effects based on individual level data, where a measure of individual well being (happiness, satisfaction) was regressed on the income of a person and on income inequality – typically the Gini coefficient or a quantile ratio – defined over an appropriate reference region (for example Alesina et al., 2004, and Schwarze and Härpfer, 2007). However, in contrast to those earlier papers, we explicitly focus on middle class individuals, a distinction that is important if the true effect is heterogeneous.

In a second step, we provide evidence on a particular transmission channel emphasized by Frank (2007). This channel relies on the presence of consumption externalities whereby additional spending by rich neighbors triggers "keeping up with the Joneses" responses, that lead to overspending and thus reduced well being by the middle class. Previous evidence includes a study by Kuhn et al. (2008) showing that neighbors are more likely to upgrade their car if a person won in a lottery. A similar externality was already noted in an earlier paper by Neumark and Postelwaite (1998) who showed that the probability of a woman being employed depends positively on her sister-in-law being employed. But even if it is the case that people change their consumption or employment decisions depending on what others do, it is not clear a-priori whether this makes them worse off.

The paper addresses this issue more directly: first, we test whether increased income inequality (measured by the Gini coefficient), or increased conspicuous consumption (measured by the prevalence of luxury sport cars in the region) reduces subjective well being. This is in the spirit of a number of recent papers who use the happiness approach for the valuation of intangibles, including Welsch (2002) for pollution, Berger (2010) for environmental safety, and Welsch (2008) for civil conflict. Secondly, we test whether increased inequality raises consumption aspirations, proxied by individual's self-reported information on the amount of income needed "to make ends meet".

All evidence is based on data for Switzerland for the year 2002. Previous studies on happiness in Switzerland include Frey and Stutzer (2000), Stutzer and Frey, (2006) and Lalive and Stutzer (2010). The main dataset is an annual household survey, the Swiss Household Panel (Budowski et al., 2001). The survey has a module on subjective well being, among it a question on the degree of "financial satisfaction" which is measured on a 0 (completely dissatisfied) to 10 (completely satisfied) scale. It also provides information on household income as well as the "make ends meet" question mentioned before (see also Stutzer, 2004, for an earlier use of that question to analyze the determinants of income aspirations). Indicators of income inequality are obtained from external sources. Gini coefficients at various aggregation levels (municipality, region, canton) were provided by the Federal Tax Office. We obtained car registration data from the Federal Roads Office, specifically the number of newly registered luxury sports cars (Ferrari and Porsche) per 1000 population at the regional level.

2 Income Inequality and Personal Utility

In order to explore possible pathways through which income inequality may affect personal utility, we start with a generalized utility function:

$$U_i = u(y_i, Y) \tag{1}$$

where Y is a vector of everyone's income. Thus, individual utility does depend not only on own income, but also on the income of others. There are a number of explanations, why Y might matter in the utility function.

The dominant one is the relative income hypothesis (See Clark et al. (2008) for an extended review of the relative income literature.) Let the comparison income be given by

$$y_i^* = \sum_{j \neq i} \delta_{ij} y_j \tag{2}$$

where $\delta_{ij} \geq 0$ and $\sum_{j \neq i} \delta_{ij} = 1$. Under the relative income hypothesis, $U_i = u(y_i, y_i^*)$, where it is assumed that $\partial U_i / \partial y_i > 0$ and $\partial U_i / \partial y_i^* < 0$. The same general idea can be captured if income in (1) is replaced by

consumption. The relative income hypothesis becomes then a relative consumption hypothesis, and we can write $U_i = u(c_i, c_i^*)$, where again $\partial U_i/\partial c_i^* < 0$. The typical explanation is that people have the proclivity of making upward comparisons, i.e. $c_i^* > c_i$, and they are the less satisfied the more their consumption or income falls short of their expectations and aspirations set by the status of the comparison group (Easterlin, 1974, Frank, 2007). It is in this sense that an increased variance of Y or C in the population can have a negative effect on utility (as it becomes harder to "keep up with the Joneses", given that they were ahead and are now even more ahead, in absolute terms).

A variant of the relative income hypothesis replaces comparison income y_i^* by income rank such that $U_i = u(y_i, rank(y_i))$. In an extreme version of status dependent preferences, $\partial U_i/\partial y_i = 0$ and only rank matters. The link to inequality is indirect though. For instance, one can argue that an increase in inequality reinforces the salience of status comparisons, making those of lower ranks worse off. What both approaches do show is that an increase in everyone's income does not need to increase aggregate well being (Easterlin, 1974).

A second reason why incomes of others may matter for own utility results from direct utility interdependence, or caring preferences. This argument has been explored by Tomes (1986). Assume that people derive positive utility from the utility of others whom they care for, or negative utility from the utility of others whom they envy. Since utilities of others depend on those people's incomes, these interdependence effects can be captured by the same utility function (1). An interesting special case arises if the utility function is additively separable:

$$U_i = u(y_i) + \sum_{j \neq i} \gamma_{ij} U(y_j) \tag{3}$$

where γ is Edgeworth's coefficient of effective sympathy. For example, if $\gamma_{ij} = \gamma$, a Taylor series expansion of the second term in (3) around mean income gives

$$U_i = u(y_i) + \gamma(n-1)U(\bar{y}) + 1/2U''(\bar{y}) \sum_j \sum_k \gamma(y_j - \bar{y})(y_k - \bar{y}) + \text{higher order terms.} \tag{4}$$

With concave utility functions U_j, increased mean income has a positive, and increased income inequality a negative effect on utility for sympathetic individuals (assuming $\gamma > 0$, Tomes, 1986).

A third potential explanation for the inclusion of others' income in the utility function is that Y proxies for the availability of public goods that enter U_i but are not directly controlled for. Examples are the quality of public services, including schools, price level, crime and anti-social behavior, but also the breadth and variety of goods and services provided privately. For example, if higher inequality increases crime, reduces local community social capital and lowers the quality of public services, it will tend to reduce utility *mutatis mutandis*.

A fourth channel is related to uncertainty. In the standard model, expected utility is a probability weighted average of utility in the different states of the world. With concave utility function $U_i = u(y_i)$, this is a decreasing function of income dispersion. Once income is known, the uncertainty is resolved and the expectation becomes irrelevant. However, in a dynamic view of well being, inequality may matter for today's utility, as it provides useful information for forming expectations regarding next year's income (which is uncertain). As uncertainty increases with income dispersion, higher inequality will reduce current utility. This effect can be moderated by individuals' mobility perspectives, e.g. expectation to move up or down in the income distribution over time (Senik, 2005)

Last but not least, people may have sentiments of fairness and justice that makes them inequality-averse *pe-se* (Fehr and Schmidt, 1999). As Thurow (1977) puts it, there can be an "aesthetic taste for equality or inequality similar in nature to a taste for paintings" (p. 327). One conjecture is that inequality-aversion is more likely to arise if people perceive the unequal outcomes to be the result of luck rather than effort. The related concept of deservingness has been recently explored by Oswald and Winkelmann (2008).

3 Data

3.1 Swiss Household Panel

The data employed in this study are part of the fourth wave of the Swiss Household Panel collected in 2002. This dataset is comparable in structure and scope to other European panel household surveys, such as the German Socio-Economic Panel or the British Household Panel. In 2002, a total of 5'700 individuals living in 3'582 distinct households were interviewed. For administrative reasons, the merging of regionally

disaggregated inequality indicators was only feasible for that particular wave, and we are therefore limited to a cross-sectional analysis. Since inequality indicators are quite persistent, at least over the span of a few years, the advantage of a genuine panel structure would be limited in any case.

Middle class individuals are identified based on information on household income (net of taxes and after transfers). For this purpose, the OECD equivalence scale, which assigns a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child was employed. All incomes between the 4th and the 9th decile were classified as middle class. After excluding persons younger than 20, and those older than 70, and dropping the poor (bottom 40%) and the rich (top 10%) the final sample has 2'454 observations.

3.2 Geographic units

Switzerland is composed of about 2'900 municipalities. According to the population census of 2000, they range in size from 24 inhabitants (Corippo in the Verzasca Vally in Ticino) to 368'875 inhabitants (Zurich). A total of 1'053 municipalities are represented among participants of the Swiss Household Panel.

The next larger administrative unit are Bezirke. An alternative regional division of Switzerland is based on so-called spatial mobility (mobilité spatiale, or MS) regions. 106 such regions were defined by the Swiss Federal Statistical Office for the original purpose of analyzing spatial mobility between comparable micro regions (SFSO, 2005).

Finally, Switzerland is a confederation of 26 cantons whose role and political functions pretty closely resembles that of the States within the U.S.; Again, population sizes vary considerably, from a mere 15'199 in the canton of Appenzell Innerrhoden to 1.3 million in the canton of Zurich. The geographic delineation of Swiss cantons is historically determined and sometimes awkward. Many agglomerations straddle canton borders, and the same holds true for labor markets. The aforementioned spatial mobility regions are an attempt to better reflect Switzerland's de-facto division into economically and socially related regions.

The main goal of this paper is to find out whether inequality matters for middle class well being at all. A secondary objective is to determine whether there are differences depending on the size of the unit for which inequality is defined. Is it inequality at the municipal level, at the regional level, or rather at the

cantonal level that matters? Wilkinson and Pickett (2006) reviewed close to 170 papers on the association between income inequality and health. They found that the strength of evidence for such a link increased with the size of the comparison region. In particular, local neighborhood results were rather mixed, whereas income inequality measured over larger areas (regions, states of even countries) produced more unequivocal results. This finding supports their argument that the effect of inequality works by exacerbating social hierarchies within the entire society. Deprived neighborhoods have poor health outcomes not because of their within-inequality, but rather because of their low status relative to other neighborhoods. It is, of course, an open question whether this argumentation applies equally for the effect of inequality on well being, rather than health. The "keeping-up-with the Joneses" argument would suggest otherwise.

From a statistical point of view, the trade-off is not clear cut: using smaller areas means having more observations, and thus more potentially useful variation in the data. On the other hand, some of this additional variation may be measurement error, which can lead to attenuation bias.

3.3 Measuring income inequality

The income inequality data stem from the Swiss Federal Tax Administration (Jeitziner and Peters, 2007). The SFTA has published Gini coefficients for all municipalities and Cantons of Switzerland, as well as mean income, median income and number of people living in every municipality, all for the tax year of 2002. Every Swiss resident with income has to file an annual tax return. Taxable income includes income from all sources (mainly labor earnings, interest and rental income) but excludes social security contributions (retirement and unemployment insurance). The income of jointly declaring couples is divided evenly.

The resulting Gini coefficient measures personal income inequality *before* taxes. This is not ideal, since utility is usually derived from disposable income, and many of the channels discussed in the previous section (including reference incomes, altruism and uncertainty) are more appropriately thought of in terms of post-tax income. However, pre- and post-tax Gini coefficients tend to be highly correlated.

The reason is that the main driving force for pre-tax income inequality is the tax system itself, and in particular the amount of tax progression which varies between cantons. For example, the 2002 marginal tax rate (for cantonal and local income tax) for a single person with annual income between 150,000 and

200,000 was 12.7 percent in the canton of Schwyz, the canton with the highest pre-tax Gini coefficient, compared to 22.5 percent in the canton of Uri, the canton with the lowest pre-tax Gini (Eidgenössische Steuerverwaltung, 2009, p. 11). As a rule, the lower the tax progression the higher pre-tax inequality, as people with high incomes tend to settle in cantons with low marginal taxes. Across all cantons, the correlation between marginal tax rates for the 150,000 to 200,000 income bracket and the pre-tax Gini coefficient was -0.43 in 2002.

Jeitziner and Peters (2007) report Ginis only for the municipal and cantonal levels, but not for the intermediate regions. We therefore had to construct these missing Ginis using population-weighted averages of reported Gini coefficients at the municipal level. While such an aggregation introduces error as it neglects income inequality between municipalities in a region, we found that, when we did the same for the cantonal level (where the exact Ginis are available for comparison), the error was rather small and unsystematic.

Our second measure of inequality focuses on consumption instead of income. The relative income mechanisms discussed in the previous section can only work if the reference group income is known to a person. But even if this is not the case, publicly visible consumption is a strong signal of underlying incomes. Thus, one can study the effect of income inequality alternatively by studying consumption disparities, and in particular the effect of high-end, or luxury good, consumption. Of course, the signal will only work if the consumption of those goods is publicly visible, luxury sport cars being a good example.

– – – – – –see Figure 1 – – – – – – –

We therefore obtained car registration data from the Federal Roads Office for the year 2001. The stock of cars is not kept on file, so we focus on new registrations of luxury sports cars. We selected two brands, Ferrari and Porsche. The one year lag makes sure that these cars were visible "on the street" by the time the survey was taken in 2002.

A total of 1'324 Porsche and Ferrari cars were newly registered in Switzerland during the year 2001. This corresponds to a ratio of about 0.24 per 1000 population. However, there is pronounced regional and local variation. The highest registration rate of 0.64 was observed for the Canton of Zug, whereas Berne had the lowest rate (0.09). The relationship between Gini coefficient and registration rates at the cantonal level is shown in Figure 2. The correlation coefficient is $r = 0.6$.

– – – – – –see Figure 2 – – – – – – –

4 Empirical Modelling and Results

We estimate the effect of inequality on well being by exploiting geographic variation in inequality. Are those who live in a more unequal municipality/region/canton less satisfied than others, and if so, how large is the effect of inequality on well being? We would like to estimate the effect "all else equal", and therefore use linear regression to account for potential confounders. The most important variable to condition on is own income. This follows directly from (1) where the inequality effect is defined for a given own income, i.e. *ceteris paribus*. In our sample of middle class households, own income and inequality cannot be assumed to be orthogonal. Rather, middle class incomes will tend to "benefit" from increased inequality. In addition, the own income effect is interesting in itself, since it provides a natural monetary scale in order to assess the magnitude of the inequality effects, if any, through equivalent compensating variations.

We report regression results with and without a secondary set of controls. These are individual level explanatory variables commonly found in the well being literature. They include log-household size, employment status, gender, a second order polynomial in age, marital status, citizenship and language region.

Some of the previous literature on relative income effects (as exemplified by Luttmer, 2005) has included spatial average incomes as additional regressor. It is unclear whether this strategy is useful in the present context. First, even if we limit our attention to the reference income model, mean income is unlikely to be a valid reference point for middle class people (as most of them will compare themselves with people with incomes above the mean). Second, if we think that institutions (local authorities) confront the equity-efficiency trade-off by selecting for example the optimal degree of redistribution, then mean income is endogenous and we should not control for it. Similarly, the inequality aversion argument does not predict that mean income should affect well being. By contrast, the altruism model has such a prediction, as increased mean income should increase well being while increased inequality is predicted to decrease it.

In the data we find a substantial positive correlation of close to 0.5 between mean incomes and Gini coefficients across cantons. While it is possible in theory to increase the variation of a distribution without

shifting the mean (mean preserving spread) this is unlikely to happen in practice, where income floors generate heavily skewed income distributions and increased inequality will primarily result from gains to the upper percentiles. By the same token it will be hard to disentangle the effects of mean and spread of income. From the relative income point of view, increases of both Gini and mean income proxy for upward movements in reference points. In the end, we don't take a hard stance on the issue but rather provide both types of evidence, with and without controls for mean income. We tend to find that results without mean income are more robust.

The absence of panel data precludes the inclusion of regional effects. It is well known that OLS standard errors of aggregate regressors (such a regional inequality) may be severely downward biased if errors are correlated within regions. In order to guard against overly optimistic inferences we therefore report clustered standard errors.

Finally, we should point out that the analysis does not aim at identifying the channel through which inequality impacts on well being. The previous section listed at least five such causal pathways. Rather, the objective of this paper is the estimation of the overall net effect. More detailed analyses would require different data and are thus beyond the present possibilities.

4.1 Income satisfaction

Table 1 shows the estimated regression coefficients and clustering-adjusted standard errors for the two key variables, logarithm of own income and Gini coefficient in geographic unit and in addition, if included, the effect of logarithmic mean income. The dependent variable is an individual's income satisfaction. Estimates are based on 2402 observations from the Swiss Household Panel. From left to right, there are two columns each for results at the municipal, regional and cantonal level, respectively.

For example, from the first column we find a Gini estimate of -2.49 (in the top panel without secondary regression controls) which reduces to -1.97 (in the bottom panel including those socio-demographic characteristics). Both estimates of the municipal level inequality effects are statistically significant. Including logarithmic mean income changes the municipal estimates to -2.06 and -1.31, respectively. A similar pattern arises for the regional estimates: again the Gini effect exceeds -2 in magnitude except for the model

including log mean income and secondary controls, where it drops to -1.42. The results confirm our conjecture that it is difficult to separate the effects of mean income (which is also negative) and inequality. When one factor increases in magnitude, the other becomes smaller, and vice versa. In the following, we therefore concentrate on the models that exclude the log of mean income.

Regardless of specification, the own income effect is large and stable between 1.1 and 1.2, meaning that an increase in income by 10 percent is predicted to move mean satisfaction by 0.11 to 0.12. Taking a Gini estimate of -2 as the lower limit of the estimated effect, we thus come to the following quantitative assessment of the effect of inequality on well being: a rise in the Gini of 18 percentage points, equivalent to a rise from the Canton with the lowest level of inequality in the sample (Uri) to the Canton with the highest level of inequality (Schwyz), leads to a fall in mean income satisfaction by at least 0.36 points. This effect corresponds to a 0.2 standard deviation move in income satisfaction (SD of income satisfaction is about 2), or a 5% reduction in mean satisfaction, and it is about the same as that of a 30 percent reduction in personal income.

In Table 2, the Gini coefficient is replaced by the number of luxury cars per 1000 inhabitants that were newly registered in 2001 in the appropriately defined geographic region. All other specification details are left unchanged. The key findings are as follows: the luxury car effect is negative throughout, and always statistically significant; adding secondary controls does not make much of a difference to the magnitude of the estimated luxury car effect; the log mean income effect is again in a trade off relationship with the luxury car effect. However, the effect is insignificant in all but one regression, justifying our preference for a sole inequality indicator.

The size of the coefficient at the municipal level is about -0.4. This estimate indicates that one additional luxury car registration per 1000 inhabitants lowers predicted financial satisfaction on average by 0.4, or, at the mean income satisfaction of 7.3, by 5.5 percent. The estimate increases in magnitude when the size of geographic unit is expanded. It doubles to 0.8 for the regional estimates, and further increases to between -1 and -1.2 for the canton level estimates. The corresponding effect magnitudes are accordingly larger. For example, a rise in the cantonal registration rate from the Canton with the lowest rate in the sample (Berne) to the Canton with the highest rate (Zug) predicts a fall in mean income satisfaction by at least

$-1 \times 0.54 = -0.54$, or 7.4 percent of mean satisfaction.

A possible explanation for the observation that the effect size increases with region size is that measurement error is reduced when aggregation is over larger units. Our measure of new car registrations can be interpreted as a proxy for the steady state stock of such cars. In small units (at the municipal level) there are a considerable number of zeros (in 74% of all municipalities, there were no luxury car registered in 2001) which clearly is a bad indicator of the stock. Second, luxury cars are very mobile by their very nature, so that it is plausible that the effect of a higher number of such cars is felt at the cantonal level as well.

To summarize, the two alternative ways of measuring income inequality – either by Gini or by luxury car prevalence – lead to largely similar conclusions, namely that the income satisfaction of Swiss middle class individuals is indeed negatively affected by inequality. The model predicts that moving from the most unequal canton to the least unequal canton in Switzerland entails a more than 5 percent gain in mean satisfaction.

4.2 Making ends meet

If the middle class feels "squeezed" by increased inequality as they want to keep up with the "Joneses", specifically persons ahead of them whose incomes have gone up even more (such as the Trumps, Buffetts and Gateses), this should be revealed in a positive relationship between inequality and the perceived "minimum monthly income needed to make ends meet" of "minimum comfort budget". Table 3 tests this proposition.

The dependent variable is the response to a make-ends-meet question in the 2002 wave of the Swiss Household Panel. This question is answered only by the household head, reducing the number of observations to 1472. The average response was 5157 Swiss Francs, or 2370 Franks per capita.

The organization of results is similar to that of the previous section. A total of twelve separate regressions were performed, with and without secondary controls, for the three geographic units, and for the two inequality indicators, Gini coefficient and number of luxury cars per 1000 population. The first two rows of the top and bottom panels of Table 3 show the estimated coefficients of household size and own income

(both entered on a logarithmic scale). These are largely unaffected by the specification. The estimated elasticity of the required income with respect to household size is about 0.4; the own income elasticity is slightly higher, about 0.45. For each percent increase in own income, the subjective amount required to make ends meet goes up by 0.45 percent, clear evidence of income adaptation and shifting income norms. This estimate is almost identical to the 0.43 elasticity reported by Stutzer (2004) for Switzerland based on a different dataset and a different year (data collected between 1992 and 1994).

As to the inequality indicators, we find overwhelming and robust evidence that middle class household heads adjust their response to the make-ends-meet question upward as inequality goes up. Statistically significant effects are found at all three geographic reference levels, although the estimated magnitude is somewhat smaller at the municipal level compared to the region or canton.

Take the regional effects as an example. The point estimates of the Gini coefficient are 0.65 and 0.48, depending on whether secondary explanatory variables are included or not. Therefore, a Gini move from 0.3 to 0.5 is predicted to increase the required income amount by at least 10 percent. Similarly, considering the number of luxury cars instead, the regional coefficients are 0.17 and 0.13, respectively. Adding half a luxury car per 1000 population is thus predicted to increase the required income by at least 7 percent. These effects are both statistically significant and economically substantial.

5 Conclusions

What are the social costs of inequality? While common sense suggests that increasing economic inequality unequivocally harms the poor, it may or may not benefit the middle class and those who are even better off. Theoretical arguments can be put forward on either side, and the answer thus ultimately must be an empirical one.

We provided in this paper such empirical evidence, using Swiss data on individual well being and inequality and regression analysis. Two inequality indicators were used, one standard (the Gini coefficient of the pre-tax income distribution) and one novel (the number of luxury car registrations per 1000 population). Results are strongly suggesting that the middle class is indeed adversely affected by inequality. On one

hand, increased inequality lowers income satisfaction of middle class individuals, ceteris paribus, for given own income. On the other hand, inequality increases the income amount that household heads deem necessary to make ends meet. Both effects are statistically significant and economically substantial.

Our findings may be useful for reassessing the optimal choice along the equity/efficiency trade-off. They also contribute an explanation why aggregate well being in growing but increasingly unequal societies has been stagnating.

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Table 1. Income satisfaction of middle class and inequality (n=2402)

Gini and mean income at level of...	Municipality		Region		Canton	
without controls						
Log own income	1.09*	1.10*	1.07*	1.09*	1.06*	1.08*
	(0.18)	(0.18)	(0.19)	(0.19)	(0.20)	(0.21)
Gini coefficient	-2.49*	-2.06*	-2.78*	-2.01*	-2.29*	-1.49
	(0.74)	(0.90)	(0.85)	(0.95)	(1.18)	(1.14)
Log average income		-0.28		-0.48		-0.78
		(0.27)		(0.30)		(0.29)
with controls[1]						
Log own income	1.20*	1.23*	1.19*	1.22*	1.18*	1.21*
	(0.18)	(0.18)	(0.18)	(0.18)	(0.18)	(0.19)
Gini coefficient	-1.97*	-1.31	-2.14*	-0.99	-1.42	-0.37
	(0.69)	(0.84)	(0.61)	(0.85)	(1.01)	(0.85)
Log average income		-0.42		-0.69*		-0.94*
		(0.26)		(0.28)		(0.30)

Dependent variable: income satisfaction

[1]Controls include log-household size, employment status, gender, a second order polynomial in age, marital status, citizenship and language region.

Standard errors are clustered at the level of the aggregate regressors.

* indicates 5%-statistical significance.

Table 2. Income satisfaction of middle class and conspicuous consumption (n=2355)

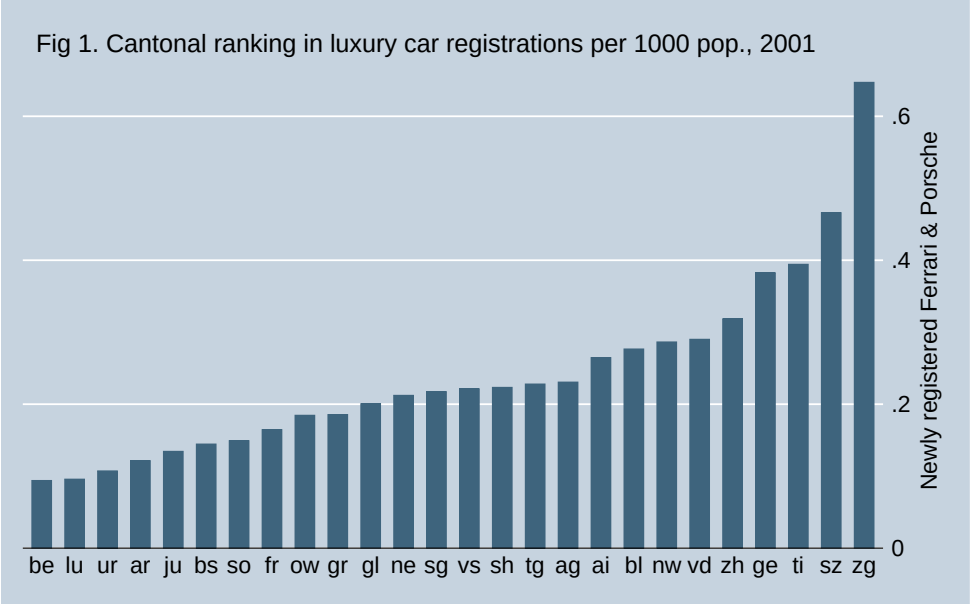
# of new luxury cars/1000 pop. and mean income at level of...						
	Municipality		Region		Canton	
without controls						
Log own income	1.10*	1.12*	1.07*	1.08*	1.07*	1.08*
	(0.18)	(0.18)	(0.19)	(0.19)	(0.20)	(0.21)
# of new luxury cars/1000 pop.	-0.39*	-0.32*	-0.77*	-0.52	-1.16*	-0.75
	(0.13)	(0.16)	(0.29)	(0.43)	(0.45)	(0.47)
Log average income		-0.30		-0.34		-0.49
		(0.28)		(0.44)		(0.32)
with controls[1]						
Log own income	1.23*	1.26*	1.20*	1.22*	1.19*	1.21*
	(0.19)	(0.18)	(0.18)	(0.18)	(0.18)	(0.19)
# of new luxury cars/1000 pop.	-0.37*	-0.29*	-0.78*	-0.43	-0.98*	-0.32
	(0.13)	(0.15)	(0.24)	(0.40)	(0.42)	(0.46)
Log average income		-0.36		-0.48		-0.79*
		(0.26)		(0.39)		(0.36)

Dependent variable: income satisfaction
[1]Controls include log-household size, employment status, gender, a second order polynomial in age, marital status, citizenship and language region.
Standard errors are clustered at the level of the aggregate regressors.
* indicates 5%-statistical significance.

Table 3. Amount needed to make ends meet (n=1472)

	Municipality		Region		Canton	
Gini coefficient						
Log household size	0.39*	0.36*	0.40*	0.37*	0.40*	0.36*
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Log own income	0.43*	0.44*	0.44*	0.45*	0.44*	0.45*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.05)	(0.04)
Gini coefficient	0.34*	0.27*	0.65*	0.48*	0.59*	0.37
	(0.13)	(0.13)	(0.18)	(0.17)	(0.31)	(0.28)
Secondary controls	No	Yes	No	Yes	No	Yes
# of luxury cars/1000 pop.						
Log household size	0.39*	0.36*	0.40*	0.36*	0.39*	0.36*
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
Log own income	0.44*	0.45*	0.44*	0.45*	0.44*	0.45*
	(0.04)	(0.04)	(0.03)	(0.03)	(0.05)	(0.04)
# of luxury cars/1000 pop.	0.06*	0.06*	0.17*	0.13*	0.20*	0.14
	(0.02)	(0.02)	(0.05)	(0.05)	(0.12)	(0.11)
Secondary controls	No	Yes	No	Yes	No	Yes

Dependent variable: logarithm of "amount needed to make ends meet".
Standard errors are clustered at the level of the aggregate regressors.
* indicates 5%-statistical significance.



Source: Federal Roads Office, own calculations.