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ABSTRACT

Departures from self-centred, consumption-oriented decision making are increasingly common in economic theory and are well motivated by a wide range of behavioural data from experiments, surveys, and econometric inference. A number of studies have shown large negative externalities in individual subjective well-being due to neighbours' incomes. These reflect the role of nearby households as comparison groups acting in individuals' reference-dependent preferences over income or consumption. At the same time, there are many reasons to expect positive spillovers from having prosperous neighbours. We combine high-resolution geographic data from three Canada-wide social surveys and the 2001 census to disentangle the spatial pattern of reference groups in urban areas and to identify channels of positive and negative spillovers on life satisfaction. We find evidence of significant effects of others' income at different scales and are able to reject a number of alternative explanations for the findings.

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1 Introduction

In many contexts of predictive analysis and policy framing, economists assume without evidence that desirable benefits accrue to humans based primarily on their absolute levels of consumption. More broadly, it is conventional to focus without empirical justification on models in which (1) individual returns to behaviour greatly outweigh externalities and in which (2) changes in any reference levels intrinsic to utility vary less quickly than other factors relevant to behaviour. The first assumption may be counter-factual to the external marginal effect of, for instance, the intrinsic and shared pleasure of human social interaction, or of the reference-framing comparisons which can motivate consumption and determine satisfaction.[1] In the modern tradition, the focus of psychological and anthropological research differs starkly with that of economics in that regarding both motivation and well-being, economists focus on fixed preferences over absolute

[1] There is often confusion over the claims and implications of happiness research, resulting mainly from a common confusion in teaching and practice of economics at the earliest stage. To make this explicit, it is necessary to remember that economists mean two entirely separate things by *utility*. One use of utility is in describing behaviour. This is a "positive" undertaking; that is, it is characterised by a falsifiable proposition. The proposition is that on average, at least in somewhat static situations, human behaviour is characterised by the optimisation of some well-behaved and stable function, the *decision-making* utility. A second meaning of utility is the original sense of the word, by which Jeremy Bentham meant *well-being*. There is no falsifiable proposition associated with the normative choice of using revealed preferences as an objective of policy. This is simply a value choice. One does not need to believe that humans maximise some preference function in order to hold as a value that policy ought to maximise people's choice sets. One does not need to hold the maximisation of economic choice as a core value in order to believe that behaviour is roughly characterised by rational (decision-making) utility maximisation. The two claims are orthogonal. One is subject to scientific testing and one is not. The two are, however, commonly confounded by the use of the word utility to imply both welfare and revealed preferences.

Advocates of taking self-assessed life satisfaction as a powerful measure of well-being need not question both of these claims. Their position is a normative one, a simple value judgment that the well-being we care about may be, or ultimately can only be, assessed by those experiencing it. An advocate of life satisfaction as an important objective in policy may believe one way or another about behaviour being well explained by an optimisation process. Another proposition entirely separate from the value judgment would be that satisfaction with life is also a proxy for *decision-making utility* — that is, that people act to maximise their happiness. Just like the simpler neoclassical assumption of the existence of a utility function which rationalises behaviour, this is a falsifiable claim, unlike the value judgment that life satisfaction is an important policy objective.

The present work does not address the issue of rational decision making or behavioural maximisation of happiness. It *does* take for granted the untestable value statement that life satisfaction is a proxy for well-being. This serves as a motivation for the endeavour to determine empirically the influences on that well-being.

consumption while others view social comparisons and behaviour emulation as central phenomena in human societies.

Economists tend to be sympathetic to concerns about these missing aspects of human nature but often counter that "allowing" a broad range of influences on utility in models undermines the ability of economic arguments to explain anything non-tautologously. In fact, discussion of interdependent and non-constant preferences — in the context of status-seeking, habituation, conspicuous consumption and affluence, and relative versus absolute poverty — has steadily pervaded the literature on consumption behaviour and the labour-leisure choice since the early modern economists (Marx and Engels, 1848; Veblen, 1899; Pigou, 1920; Duesenberry, 1949; Galbraith, 1958; Duncan, 1975). Modern evolutionary economic arguments (Rayo and Becker, 2004; Eaton and Eswaran, 2003) and corroborating neurological measurements (Tobler et al., 2005; Fliessbach et al., 2007), psychological studies, and economic inference provide overwhelming support for the claim that relative assessments figure prominently in our utility over consumption,[2] yet the detailed nature of these comparisons remains hard to measure and hard to incorporate into theory.

We pursue instead a more empirical approach. In recent decades the measurement of self-reported satisfaction with life (SWL) has increasingly been espoused as a new tool to assess the form of the utility function in a direct and quantitative way. The steadfast exclusive reliance on observed behaviour to reveal (or to compare) marginal utilities is giving way among economists to an increased interest in and acceptance of SWL as a window into well-being. This may allow the assumptions mentioned above to be assessed head on and invites the possibility of disentangling questions about behaviour from those about normative goals.

Nevertheless, while SWL scores can in statistical applications generally be

[2]Rayo and Becker (2004) argue, using a principal-agent framework, that our internal reward circuitry has finite bounds and therefore must have evolved with features that engineers would call automatic gain control and a (temporal) high-pass filter. That is, the offset and the scale for processing a consumption level into a psychological reward adapt to make best use of the available range of the reward experience. Tobler et al. (2005) mention a similar argument in explaining their observed neuronal activity. Dopamine neurons respond (*i.e.,* reward their host) in relation to the difference between the received versus anticipated payoffs rather than to absolute levels. In a controlled experiment using functional MRI to measure brain activity response to relative rewards, Fliessbach et al. (2007) find that midbrain regions known to be influenced both by primary rewards like food delivery and by more abstract incentives responded according to relative payment rewards, independently of the absolute level of payment. Eaton and Eswaran (2003) suggest a specific sense in which innate preferences should evolve to be jealous of one's competitors.

treated as a cardinal measure of well-being[3] (Frey and Stutzer, 2002; Ferrer-i Carbonell and Frijters, 2004; Krueger and Schkade, 2008) , the task of unravelling SWL's individual and average determinants remains a complex one. Indications point towards profound ramifications for policy, and some may already be obvious but the details lie ahead.

To date, a number of panel studies, particularly using European data, have addressed the question of relativities in life satisfaction due to income or consumption. Several of these studies show complete adaptation of reference levels for income over only a few years (van de Stadt et al., 1985; Clark, 1999). More generally, in a review of the literature, Clark et al. (2008) conclude that, due to the combined effects of comparison with contemporaries and adaptation over time, only about 13% of the short term marginal benefit of individual income changes would accrue after several years if the changes applied to everyone.

Such studies which resolve individual-level changes in fortune support predictions made earlier in explaining a lack of improvement of nationally averaged life satisfaction in nations experiencing rapidly increasing affluence (Easterlin, 1974).

In this paper, we address the question, "to whom do people compare their fortunes?" We focus on geographic aspects of consumption and income reference levels and on the counteracting social benefits of having prospering neighbours. Only a few studies have included geographically localised reference groups in the context of competitive consumption effects on SWL.[4] Using geography for delineating reference groups is partly a matter of convenience or, rather, a crude approximation to more probable and specifically matched comparison groups based on social distance. Nevertheless, the evidence corroborates the suspicion that individuals often exhibit implicit comparisons to geographically localised averages in determining their overall satisfaction. Our work is closely related to that of Kingdon and Knight (2007), who analyse both positive and negative externalities of average incomes on household satisfaction in South Africa. They use averages at two scales — village clusters and broader districts — and conclude from amongst several possible explanations that their findings are evidence of intrinsic empathy for those nearby and comparison with those slightly further away.

[3]Or what economists call utility in the original sense of Jeremy Bentham. Where utility implies instead a value whose maximisation motivates behaviour, the question is, as already mentioned, distinct and partly still open.

[4]We mention here only studies in which reference groups are more localised than an entire country. Ferrer-i Carbonell (2005) also separates reference groups according to East and West Germany even after unification. See Clark et al. (2008) for a review of the SWL effects of income more generally.

Helliwell and Putnam (2007) innovate by using geographic groups defined by census regions to assess the relativities and additivities in social capital due to education. They conclude that, at least for explaining a variety of measures of social engagement, such spatially defined reference groups are more appropriate than those constructed on the basis of similarity in personal characteristics without regard for geographic proximity. Their analysis does not relate as directly to the subjective evaluation of overall well-being, such as we pursue here, yet inasmuch as people compare themselves with those they know or see, one may expect a similarly important influence of neighbours in our study.

In further confirmation of the importance of proximity, Knight and Song (2006) report preliminary results from a survey in rural China in which respondents were asked explicitly about their comparison groups. The vast majority reported that their main comparison group consisted of either neighbours or fellow villagers rather than kin or people in the township or from broader geographic regions.

In Canada, a first look at our current question using Canadian surveys was conducted by Helliwell and Huang (2005), who included average incomes at the level of the Census Tract in a regression for SWL. They found that the externalities of reference levels at this scale mostly or entirely negated the individual benefits to marginal variation in income.

With considerably more detailed analysis on this question, Luttmer (2005) uses individual data from the U.S. National Survey of Families and Households to estimate the SWL effect of local average incomes on individuals. He also finds no net social benefit to increasing incomes using reference localities consisting of about 150,000 inhabitants. In contrast we will at our finest scale make use of regions in Canada with a median of 530 inhabitants.

In a rare natural experiment over neighbourhood selection, Oreopoulos (2002) found no neighbourhood effects on labour market outcomes in a small sample of households randomly assigned to housing projects in different Canadian locations.

The principle of invidious income seeking has also been used in revealed preference models. In a working paper, Vigdor (2006) uses the shape of local income distributions across the United States to explain voters' differing tendencies to support redistributive policy. When local geographic reference groups appear in preferences over relative income, the seemingly counterintuitive support for regressive taxation by the poor can be explained as a rational response intended to optimise local relative position.

Given the pervasiveness and remarkable magnitude of the interdependence of welfare functions on geographic neighbours, understanding the scale and nature of local reference groups and mutually beneficial social groups is a desirable goal with possibly important implications for urban planning and all levels of fiscal and even trade policy. Our objective in this paper is to look for geographically localised influences on SWL at a variety of spatial scales in order to determine which are most important in a developed country like Canada. Popular accounts of "keeping up with the Joneses" next door suggest that at least in some neighbourhoods, emulation of conspicuous consumption by others is made at a very local scale. On the other hand, some research suggests that even national status is relevant, in a kind of competitive economic nationalism. Our contribution is distinguished from others by its focus on multiscale geography, its emphasis on urban inhabitants, and its use of Canadian data. Although we are able to resolve income gradients on the scale of $\sim$100 m, our main finding is that in Canada income comparisons exist and significantly dominate any counteracting effects primarily at the scale of census tracts and metropolitan regions, the latter being typically several tens of kilometers in scale.

Below we discuss the data and approach (Section 2), present the results of reduced form linear regressions in light of possible confounding effects and competing interpretations (Section 3) and discuss the implications of our findings (Section 4).

2 Data and method

We use life satisfaction reports, among other variables, from three surveys conducted across Canada: the second wave of the Equality, Security, and Community survey (ESC2, 2002-2003), the Ethnic Diversity Survey (EDS, 2002), and the General Social Survey Cycle 17 (GSS, 2003). See Online Supplement B for more detail on, and differences between, these surveys.

The surveys comprise a total of $\sim$70,000 individuals and they have some key questions in common. Most importantly, respondents were asked to rate their overall life satisfaction on a 5 or 10 point scale. Numerous other questions relevant to social interactions and socioeconomic and cultural backgrounds were posed, and some of these variables will be employed below. A significant feature of the surveys which facilitates our geographic analysis is that all three provide six-digit postal codes of respondents' residences at the time of the survey. In dense urban regions these correspond to a resolution of about one street block, or $\sim$200 m.

Complementing these individual samples is the public use version of the 2001 Canadian Census, which is released with many variables available at the *Dissemination Area* (DA) level. In cities, DAs are composed of one or more neighbouring

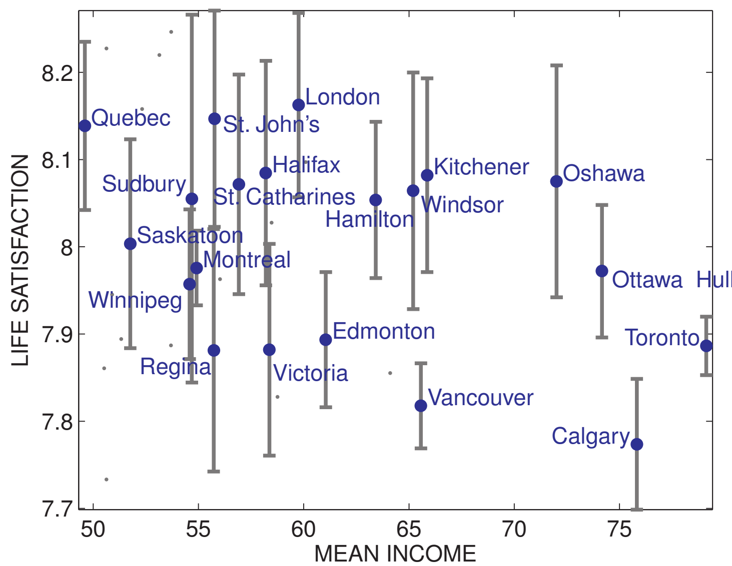


Figure 1: **Life satisfaction and mean income (k$/yr) averaged by CMA.**

blocks, with a population of 400 to 700 people, and they cover all of Canada. Recall that in Luttmer (2005) the resolution available is ~150,000 inhabitants, and in the popular German panel, GSOEP, individual locations are poorly resolved. The availability of both survey and census information with extremely fine resolution makes the Canadian data attractive for our purpose, even though the surveys are cross-sectional and preclude modelling with individual fixed effects. Figure 1 and Figure 2 demonstrate some superficial relationships between geographically averaged survey and census data, and foreshadow certain results to come.

We also make use of the 2001 Census data at the individual level, but only to aggregate census-tract income means according to certain population subgroups detailed later in Section 3.8.

An equation representative of the majority of estimates to follow is the "ordered logit" equation for the log odds of individual i reporting a value $j+1$ or higher:

$$\log\left(\frac{\text{Prob}\left(\text{SWL}_i > j\right)}{\text{Prob}\left(\text{SWL}_i \leq j\right)}\right) = c_j + \alpha\cdot\mathbf{X}_i + \tilde{\beta}\cdot\mathbf{Y}_i + \varepsilon_i + \sum_r \left(\Delta_r \cdot \left[\mathbf{Y}_i - \bar{\mathbf{Y}}_{R_{ir}}\right] + \gamma_r \cdot \mathbf{Z}_{R_{ir}} + \nu_{R_{ir}}\right) \qquad (1)$$

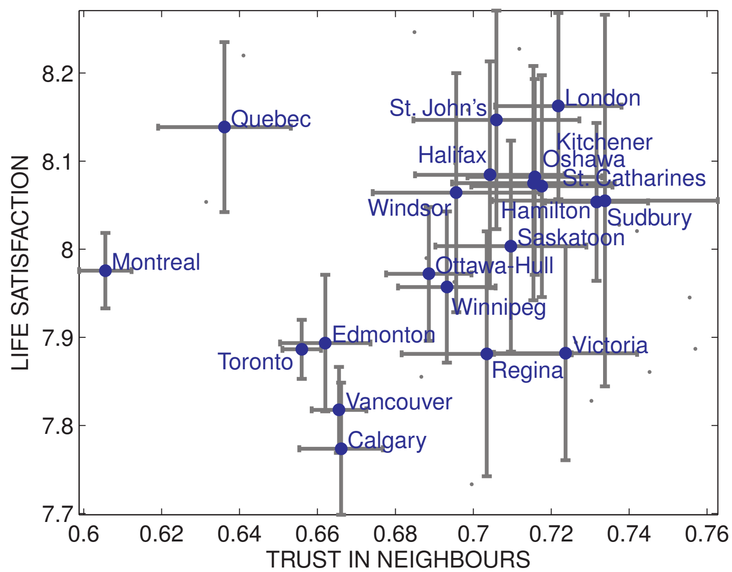


Figure 2: **Life satisfaction and self-reported trust in neighbours, averaged by CMA.**

Here the $\mathbf{X}_i$ are personal characteristics affecting individual i's well-being such as employment, marital status, health, and personality. In the empirical analysis to follow, a distinction will be made between relatively objective characteristics and those that rely strongly on a subjective self-assessment. $\mathbf{Y}_i$ are variables such as income which may influence SWL both absolutely and relatively. The region R_{ir} is the census region of scale r around individual i. Coefficients on relative levels $\mathbf{Y}_i - \bar{\mathbf{Y}}_{R_{ir}}$ are allowed to vary independently for each comparison region scale r. $\mathbf{Z}_{R_{ir}}$ represents other variables describing the geographic scale r around individual i which either do not have individual counterparts or are not thought to enter the utility function in a relative way.

We use an ordered logit[5] model(1) in order to estimate the underlying, or experienced, well-being through the discrete measure available from surveys. By using this formulation we need not rely on a cardinal interpretation of SWL.

[5]This is also known as a "proportional (log) odds model" for obvious reasons. An alternative ordinal model, the ordered probit, is often used in the subjective well-being literature. However, similar results are typically found from OLS and either ordinal method (Ferrer-i Carbonell and Frijters, 2004). Ordered logit has the advantage of a simple interpretation of coefficients, since the marginal effect of a covariate on the log odds is constant, regardless of the values of other covariates. We test other methods below.

Equation (1) is equivalent to a slightly more convenient form,

$$\log\left(\frac{\text{Prob}\left(\text{SWL}_i > j\right)}{\text{Prob}\left(\text{SWL}_i \leq j\right)}\right) = c_j + \alpha\cdot\mathbf{X}_i + \beta\cdot\mathbf{Y}_i + \varepsilon_i + \sum_r\left[\delta_r\cdot\bar{\mathbf{Y}}_{R_{ir}} + \gamma_r\cdot\mathbf{Z}_{R_{ir}} + \nu_{R_{ir}}\right] \quad (2)$$

when $\tilde{\beta} \equiv \beta - \sum_r \Delta_r = \beta + \sum_r \delta_r$. For instance, consider the case when Y_i represents own income and $\bar{\mathbf{Y}}_{R_{ir}}$ average local incomes. Then β represents the marginal effect on the log odds of an increase to own income, while the marginal effect of a simultaneous, uniform increase to everyone's income is $\tilde{\beta}$, the sum of all the coefficients on incomes in equation (1). It may be noted that since we use logarithms[6] of dollar income values, the functional form of equation (1) constrains the comparisons to enter the well-being function in the form of ratios.

For the estimates in this paper, the geographic reference areas are simply the fixed regions defined by the census.[7] These are each one of: 49,000 Dissemination Areas (DAs) with median population ~540; 4800 Census Tracts[8] (CTs) with median population ~4300; 5600 Census Subdivisions (CSDs) which in urban areas usually correspond to city boundaries; 27 Census Metropolitan Areas (CMAs); and 10 Provinces (PRs) containing at least one CMA.

The use of an invariant set of census regions makes possible another tool for isolating the contextual effects under study. This is to include geographic fixed

[6]Helliwell and Huang (2005) find that linear income can be excluded when both linear and logarithm forms are included in a regression of life satisfaction.

[7] We used two techniques to provide contextual variable averages around each individual for a subset of census and survey variables and for a range of spatial scales. In one computationally intensive method, circles are drawn around each respondent's location at radii of 100 m, 800 m, 2 km, 4 km, 10 km, 20 km, and 100 km. Survey variable aggregates are formed by averaging over respondents lying in the inner circle or in one of the annuli defined between successive circles. The respondent is excluded from the inner circle. Census variable aggregates are formed by overlaying the circles on a map of polygons defining one size of census region (for instance, the DAs). For the inner circle and for each annulus, a weight is assigned to each census polygon according to its fraction lying within the aggregation region, and these weights are multiplied by population counts in each census region to generate appropriately weighted means of the desired variables. We do not find a qualitative difference in results between this method and the simpler one with fixed regions and thus prefer the simpler one. In order to eliminate spurious correlation of error terms, each reference region calculated for an individual in this simpler method also excludes the next smallest census region containing the individual.

[8]Census Tracts and Metropolitan Areas are special in that they exist only in urban regions and that some variables, such as those to do with the detailed distribution of income, are only offered by Statistics Canada for CTs. For urban regions we are able to aggregate these variables up from the CTs to the larger regions.

effects at a given level of geography in order to identify spatial relationships at the next smaller scale. The appropriate modification to equation equation (2) is then:

$$\log\left(\frac{\text{Prob}(\text{SWL}_i > j)}{\text{Prob}(\text{SWL}_i \leq j)}\right) = c_j + \alpha \cdot \mathbf{X}_i + \beta \cdot \mathbf{Y}_i + \varepsilon_i + \sum_{r<R}\left[\delta_r \cdot \bar{\mathbf{Y}}_{\text{CR}_{ir}} + \gamma_r \cdot \mathbf{Z}_{\text{CR}_{ir}} + \nu_{\text{CR}_{ir}}\right] + \phi_{\text{CR}_{iR}} \quad (3)$$

where CR_{ir} is the census region of scale r which contains respondent i's residence, r now indexes the census region scale in order of increasing size (DA, CT, CSD, CMA, and PR), $\phi_{\text{CR}_{iR}}$ is a geographic fixed effect for some scale R, and where the equation only resolves local relative income effects at spatial scales r smaller than R. A source of endogeneity of particular interest in this study arises when unmeasured and geographically autocorrelated factors are related to both income and life satisfaction. In equation equation (3), the coefficient δ_{R-1} on the contextual effects of the largest resolved scale is unbiased by any unmeasured geographic variation present at the scale of R. For instance, consider the unmeasured influence of regional price levels, differences in government quality, cultural factors affecting community strength or lifestyle choices, and variation in climatic or other geographic amenities. Each of these possible missing variables represents a source of endogeneity because geographic variation captured only in the error term $\nu_{\text{CR}_{ir}}$ may be causally correlated with a component of SWL captured only in ε_i. As a result, all coefficients on smaller-scale contextual effects would be biased. If these unmeasured influences exist, for instance, at the CMA level, then including dummy variables $\{\phi\}$ for each CMA will eliminate bias on the remaining coefficients. By separately running a series of estimates using fixed effects at different values of geographic scale R, the set of coefficients $\{\delta_{R-1}\}$ for R corresponding to CT, CSD, and CMA[9] can be extracted and interpreted as the local Veblen effect at each scale.

We make use of a number of objective and some subjective controls in **X** and **Z**. See Helliwell (2003) for a study of similar individual variables and national measures of social capital which prove to be significantly correlated with SWL in 46 countries. Our controls also include a measure of psychological coping resources from a series of questions in the GSS. As discussed by Helliwell and Huang (2005), this measure of "mastery" is likely to over-correct for personality

[9]Limits of the sample size and available computing power both made the use of fixed effects at the DA level impractical. Because many provinces are dominated by one or a few CMAs, province-level fixed effects were generally not used either.

since it is likely correlated with outcomes (in particular, incomes) but it is useful in the absence of panel data and individual fixed effects.

3 Results and interpretation

In this section we present our main findings and test them against several reasonable "classical" explanations for the observed correlations between own and others' income. We find evidence of a strong relative income effect at certain geographic scales. This effect appears to be stronger for those who are likely to know their region better, which is consistent with an explanation based on contemporary reference setting. We further show that not all determinants of well-being contribute in a predominantly relative way.

3.1 Classical regression

Table 1 on page 11 presents results from a fairly conventional series of regressions for life satisfaction among urban survey respondents. Each non-shaded column reports coefficients and standard errors for one regression using data from the survey indicated in the row labeled "survey". In all cases shown, coefficients are from an ordered logit model and are displayed in raw, unexponentiated form.[10] For example, column (3) in Table 1 indicates that a factor 10 increase in household income, holding other variables constant, is associated with a 34% increase (since $e^{0.29} \approx 1.34$) in the predicted odds of being at least one step higher on the standard ten-point SWL scale.

The first three columns of Table 1 record estimates of similar models carried out separately on data from urban respondents in each of three surveys. Missing coefficients reflect the lack of certain questions in some surveys. The fourth, shaded column contains mean coefficients for each covariate, calculated by weighting each individual estimate by the inverse square of its standard error. When a variable is only available from a subset of the surveys, the mean shown reflects the coefficients from available regressions. The geographic fixed effects

[10] This provides easy identification of positive and negative effects based on the sign of the coefficient. In accordance with equation (1), an exponentiated coefficient represents the modeled change, for a one unit increase in the covariate, of the ratio of probabilities of reported SWL being in a higher category to that of it being in any lower one. In the ordered logit model, this marginal influence on probability is the same for any values of the other covariates — and thus at any level of life satisfaction.

	(1)	(2)	(3)	⟨1-3⟩	(4)	(5)	(6)	⟨4-6⟩	(7)	(8)	(9)	⟨7-9⟩	(11)	(12)	⟨11-12⟩
log(HH inc)	**.48***	**.21***	**.29***	**.26***	**.52***	**.23***	**.31***	**.29***	**.57***	**.25***	**.32***	**.29***	**.30***	**.71***	**.37***
	(.12)	(.046)	(.055)	(.034)	(.12)	(.046)	(.044)	(.031)	(.15)	(.049)	(.053)	(.035)	(.097)	(.21)	(.088)
health	**1.64***		**2.73***	**2.55***	**1.61***		**2.74***	**2.40***	**1.56***		**2.77***	**2.56***		**3.25***	**3.25***
	(.21)		(.093)	(.085)	(.17)		(.11)	(.094)	(.25)		(.12)	(.10)		(.39)	(.39)
trust-N	**.50***	**1.73***	**1.03***	**1.13***	**.51***	**1.80***	**1.01***	**1.01***	**.57***	**1.84***	**1.06***	**1.14***	**2.25***	**.99***	**1.77***
	(.11)	(.095)	(.083)	(.054)	(.076)	(.097)	(.12)	(.053)	(.092)	(.092)	(.070)	(.048)	(.18)	(.23)	(.14)
married	**.55***	**.44***	**.41***	**.44***	**.58***	**.47***	**.41***	**.45***	**.57***	**.46***	**.40***	**.44***	**.74***	.29	**.67***
	(.11)	(.060)	(.065)	(.041)	(.12)	(.056)	(.049)	(.035)	(.12)	(.057)	(.059)	(.039)	(.12)	(.27)	(.11)
asmarried	***.34***	**.51***	**.39***	**.42***	***.26***	**.42***	**.32***	**.35***	.19	**.45***	**.29***	**.34***	***.46***	***.56***	**.50***
	(.14)	(.090)	(.073)	(.053)	(.13)	(.066)	(.055)	(.040)	(.16)	(.088)	(.078)	(.055)	(.20)	(.26)	(.16)
separated			**−.44***	**−.44***			**−.46***	**−.46***			**−.46***	**−.46***		**−1.13***	**−1.13***
			(.10)	(.10)			(.078)	(.078)			(.092)	(.092)		(.35)	(.35)
divorced	−.24		−.077	−.11	−.16		−.087	*−.092**	−.26		−.096	*−.11**		.085	.085
	(.16)		(.086)	(.076)	(.21)		(.057)	(.055)	(.21)		(.072)	(.068)		(.36)	(.36)
widowed	.25		.001	.062	.32		−.020	.051	.30		−.050	.004		.14	.14
	(.22)		(.13)	(.11)	(.24)		(.12)	(.11)	(.33)		(.14)	(.13)		(.48)	(.48)
male	*−.12**	*−.068**	**−.16***	**−.12***	**−.12***	*−.073**	**−.17***	**−.13***	−.091	*−.066**	**−.17***	**−.12***	***−.18***	−.18	*−.18**
	(.071)	(.040)	(.039)	(.026)	(.046)	(.038)	(.032)	(.022)	(.078)	(.039)	(.037)	(.025)	(.077)	(.18)	(.071)
noReligion		−.011	**−.19***	**−.13***		.093	**−.14***	**−.10***		.12	**−.12***	−.058	.20	−.22	.060
		(.063)	(.046)	(.037)		(.079)	(.037)	(.034)		(.077)	(.045)	(.039)	(.13)	(.18)	(.10)
godImportance	**.47***	**.54***	**.35***	**.44***	**.57***	**.60***	**.40***	**.51***	**.59***	**.62***	**.41***	**.52***	**.82***	**.61***	**.76***
	(.12)	(.067)	(.059)	(.041)	(.075)	(.070)	(.061)	(.039)	(.088)	(.068)	(.057)	(.039)	(.14)	(.20)	(.11)
student		**1.26***	**.67***	**1.02***		**1.26***	**.66***	**.99***		**1.25***	**.54***	**.93***	**1.65***	.57	**1.48***
		(.14)	(.17)	(.11)		(.15)	(.16)	(.11)		(.16)	(.18)	(.12)	(.29)	(.69)	(.27)
employed		**1.19***	**.59***	**.95***		**1.19***	**.59***	**.93***		**1.19***	**.48***	**.84***	**1.45***	.36	**1.27***
		(.13)	(.16)	(.099)		(.14)	(.15)	(.10)		(.16)	(.16)	(.11)	(.26)	(.60)	(.24)
domestic		**1.07***	**.71***	**.92***		**1.07***	**.71***	**.89***		**1.10***	**.58***	**.82***	**1.26***	.19	**1.08***
		(.15)	(.17)	(.11)		(.15)	(.14)	(.10)		(.17)	(.16)	(.12)	(.29)	(.63)	(.26)
unemployed	**−.85***		−.13	**−.51***	**−.82***		−.14	*−.37**	**−.78***		−.24	**−.45***		−.32	−.32
	(.20)		(.20)	(.14)	(.29)		(.21)	(.17)	(.26)		(.21)	(.17)		(.69)	(.69)
retired		**1.42***	**.85***	**1.17***		**1.40***	**.85***	**1.12***		**1.42***	**.72***	**1.03***	**1.75***	.26	**1.38***
		(.15)	(.17)	(.11)		(.13)	(.13)	(.090)		(.19)	(.17)	(.12)	(.31)	(.53)	(.27)
age	**−.065***	**−.055***	**−.086***	**−.071***	**−.064***	**−.059***	**−.088***	**−.075***	**−.063***	**−.063***	**−.091***	**−.077***	**−.072***	***−.086***	**−.075***
	(.014)	(.009)	(.008)	(.005)	(.014)	(.009)	(.007)	(.005)	(.019)	(.009)	(.008)	(.006)	(.016)	(.034)	(.014)
$(age/100)^2$	**8.14***	**5.58***	**8.47***	**7.29***	**7.82***	**5.94***	**8.66***	**7.61***	**7.83***	**6.38***	**8.99***	**7.79***	**7.50***	***7.59***	**7.52***
	(1.41)	(.97)	(.92)	(.60)	(1.26)	(.94)	(.77)	(.54)	(1.82)	(.98)	(.91)	(.63)	(1.83)	(3.78)	(1.65)
CMA f.e.					✓	✓	✓	✓							
CSD f.e.									✓	✓	✓	✓			
CT f.e.													✓	✓	✓
survey	E2	ED	G17	⟨3⟩	E2	ED	G17	⟨3⟩	E2	ED	G17	⟨3⟩	ED	G17	⟨2⟩
obs.	2633	24113	12970	39716	2535	24113	12970	39618	2013	23468	12197	37678	8454	1397	9851
pseudo-R^2	.037	.053	.062		.039	.058	.064		.044	.069	.069		.167	.100	
$N_{clusters}$					30	42	46		47	221	192		762	111	

Table 1: **A "classical" regression for life satisfaction on household income and personal characteristics.** Estimated coefficients are shown from ordered logit models of SWL. Standard errors (in parentheses) are calculated using clustering whenever geographic fixed effects (f.e.) are indicated. Surveys are identified with E2 for ESC2, ED for EDS, and G17 for GSS17. Shaded columns indicating by ⟨3⟩ that multiple surveys are included present weighted means of coefficients from estimations carried out separately for each survey. Not shown are a series of controls for household size. Only urban respondents are included. Significance: **1%*** ***5%*** *10%**

described in equation equation (3) are accounted for by including dummies at one level of census geography, as indicated by the rows CMA f.e. for metropolitan area fixed effects, CT f.e. for census tract fixed effects, and so on. Standard errors are calculated using clustering with the same groups as used for the geographic fixed effects.

Unlike the majority of results to follow, the explanatory variables in Table 1 do not include regional averages of income. A standard interpretation of the positive coefficients for household income (in $\log_{10}$ form) found for this specification is that increasing incomes can be expected to benefit average SWL. The results also show that most coefficients, including that on household income, are relatively unaffected by the inclusion of regional fixed effects. Unsurprisingly in light of the existing literature, measures of self-reported health, trust in neighbours, religiosity, involvement in a marriage-like relationship, youth, and old age have positive and significant partial correlations with SWL. Being unemployed and being male are each negative predictors of reported well-being. Included in all regressions but not shown are dummy variables for household size. Categories of 1, 2, 3, 4, 5, and >5 occupants are admitted in order to account for different impacts of household income on survey respondents.

Aside from the self-reported health and trust variables, the set of non-income controls used in this table will frequently be used but not shown explicitly in subsequent estimates. Although religiosity is included among them, we consider these variables to be relatively objective attributes as compared with health and trust. These latter subjective measures may be influenced by the respondent's personality type and current level of affect at the time of the interview.[11] They are nevertheless considered to be important and distinct determinants of SWL and, if anything, can be expected to correct partly for the individual variation in optimism and personality type which might play into SWL responses.

The row labeled "pseudo-R^2" provides a measure of the explained portion of individual variation in the dependent variable. It is generally believed that all but about 10%-20% of SWL variation between adult individuals is due to predetermined individual characteristics (Diener, 1984), which gives rise to a low pseudo-R^2 in all our estimates. The table shows that progressive inclusion of fixed effects at the province, metro area, city, and census tract level has the result of increasing the explained portion of individual variation without significantly changing other coefficients.[12] Similar results to these are obtained (but not shown) using

[11] See, however, Barrington-Leigh (2008b) for an effort to quantify this influence.

[12] The number of observations diminishes considerably when CT dummies are included in the

an OLS model. In that case, the R^2 varies as high as 0.39 in the case with local fixed effects at the census tract level. This suggests that, despite the large idiosyncratic variability in reported SWL, localised factors are an important determinant of SWL.

3.2 Veblen effects

Table 2 shows estimates of the same equations as Table 1 but now augmented with reference income levels. The coefficient β on the logarithm of own household income now represents the individual marginal benefit of income when others' incomes are held constant. Rows (1) and (2) indicate that a factor of 10 increase in own household income, holding others' constant, is associated with only a 20% or 30% increase in the probability of being one point higher out of 10 in SWL. This small value is consistent with previous studies. It is also similar to that found in the previous "classical" regression, likely reflecting the fact that respondents predominantly live in large, high-income cities. The row labelled "$\sum\beta_{\text{inc}}$" shows $\tilde{\beta}$, the sum of the various income coefficients (see (2)). This is the net social benefit of marginal changes to the household income of oneself and of everyone else in one's own CMA. This value is significantly negative, indicating that, holding other factors constant, respondents in metro areas with higher average income tend to report a significantly lower satisfaction with life. This reduced-form result appears to be stronger than that found in other studies. It does not, however, imply that raising the income level of all metro regions at once would result in decreased well-being, since all national-level effects, including federal public goods funded by income taxes, are held constant in the present analysis. Clearly to encompass all these channels of influence one must appeal to cross-country comparisons.

Reminiscent of the findings of Kingdon and Knight (2007) is the positive coefficient generally found on the most local geographic reference group's income along with negative coefficients on the mean income of wider regions.

As described in Section 2, these reference levels are based on mean incomes reported in the 2001 census and exclude residents of the next smallest census region containing each respondent. For instance, the CSD average income is calculated for each survey respondent as the mean household income amongst residents who live in the respondent's CSD but not in his or her CT. CSD mean income,

equation, so the corresponding rise in the explained portion is less remarkable in this case. The set of included respondents is in each case restricted by the exclusion of regions with few samples. For the regressions shown here, the minimum allowed cluster size was 9.

	(1)	(2)	(3)	⟨1-3⟩	(4)	(5)	(6)	⟨4-6⟩	(7)	(8)	(9)	⟨7-9⟩	(11)	(12)	⟨11-12⟩
log(HH inc)	.26	**.23***	**.32***	**.27***	.29	**.23***	**.31***	**.26***	***.41***	**.25***	**.30***	**.27***	**.28***	**.70***	**.35***
DA: log(HH inc)	.093	.14	***.41***	**.28***	.24	.15	**.41***	**.28***	.81	.13	***.42***	**.32***	.58	−.18	.27
CT: log(HH inc)	.14	−.33	**−.58***	**−.43***	.031	*−.33**	**−.60***	**−.47***	*−.91**	−.29	**−.61***	**−.51***			
CSD: log(HH inc)	−1.46	.11	−.43	−.24	−.72	.21	*−.36**	−.12							
CMA: log(HH inc)	−.56	**−1.13***	**−1.08***	**−1.08***											
$\sum\beta_{\text{inc}}$	−1.53	***−.98***	**−1.36***	**−1.19***	−.15	.26	−.25	.26	.31	.093	*.12**	***.11****	**.86***	***.52***	**.66***
health	**1.04***		**2.74***	**2.61***	**.87***		**2.75***	**2.59***	*.76**		**2.78***	**2.66***		**3.29***	**3.29***
trust-N	**.49***	**1.73***	**1.05***	**1.25***	**.40***	**1.80***	**1.05***	**1.27***	**.47***	**1.84***	**1.09***	**1.26***	**2.22***	**1.04***	**1.81***
married	**.63***	**.45***	**.44***	**.45***	**.69***	**.47***	**.45***	**.46***	**.77***	**.46***	**.42***	**.46***	**.73***	.30	**.67***
asmarried	*.37**	**.46***	**.35***	**.40***	.27	**.42***	**.34***	**.37***	.47	**.45***	**.31***	**.38***	***.45***	***.57***	**.49***
separated			**−.45***	**−.45***			**−.44***	**−.44***			**−.47***	**−.47***		**−1.07***	**−1.07***
divorced	−.24		−.098	−.11	−.15		−.086	−.087	−.17		−.10	−.11		.048	.048
widowed	.10		−.029	−.009	.084		−.037	−.008	***.49***		−.072	.072		.026	.026
male	−.018	*−.078**	**−.16***	**−.11***	−.11	***−.082***	**−.16***	**−.12***	−.11	*−.076**	**−.17***	**−.12***	***−.17***	−.21	***−.17****
noReligion		.009	**−.21***	**−.13***		.083	**−.18***	**−.13***		.11	**−.15***	*−.074**	*.21**	−.18	.089
godImportance	***.36***	**.56***	**.38***	**.45***	**.44***	**.59***	**.40***	**.50***	***.45***	**.62***	**.41***	**.51***	**.83***	**.62***	**.76***
student		**1.27***	**.65***	**1.03***		**1.26***	**.64***	**.99***		**1.24***	**.53***	**.93***	**1.57***	.43	**1.39***
employed		**1.20***	**.58***	**.98***		**1.20***	**.57***	**.93***		**1.18***	**.47***	**.84***	**1.38***	.23	**1.20***
domestic		**1.07***	**.69***	**.92***		**1.08***	**.69***	**.88***		**1.08***	**.58***	**.82***	**1.20***	.056	**1.00***
unemployed	**−1.17***		−.19	**−.51***	***−.99***		−.21	***−.42****	**−.94***		−.29	***−.50****		−.24	−.24
retired		**1.41***	**.84***	**1.17***		**1.40***	**.84***	**1.13***		**1.40***	**.71***	**1.03***	**1.65***	.089	**1.28***
age	−.030	**−.059***	**−.091***	**−.071***	*−.027**	**−.061***	**−.093***	**−.078***	*−.035**	**−.065***	**−.093***	**−.075***	**−.070***	***−.084***	**−.073***
$(\text{age}/100)^2$	***4.94***	**5.95***	**8.99***	**7.26***	**4.37***	**6.20***	**9.12***	**7.50***	**5.30***	**6.62***	**9.20***	**7.62***	**7.34***	***7.49***	**7.37***
CMA f.e.					✓	✓	✓	✓							
CSD f.e.									✓	✓	✓	✓			
CT f.e.													✓	✓	✓
survey	E2	ED	G17	⟨3⟩	E2	ED	G17	⟨3⟩	E2	ED	G17	⟨3⟩	ED	G17	⟨2⟩
obs.	1141	23589	12201	36931	1035	23589	12201	36825	806	22955	11429	35190	8257	1363	9620
pseudo-R^2	.038	.054	.064		.041	.058	.066		.050	.069	.070		.166	.099	
N_{clusters}					23	42	46		23	220	185		747	109	

Table 2: **Baseline estimates of relative income effects.** See Table 1 on page 11 for a description of the format. For compactness, standard errors are not shown. The $\sum\beta_{\text{inc}}$ row shows the sum $\tilde{\beta}$ of estimated coefficients on own and others' income. Significance: **1%*** ***5%*** *10%**

which is likely to be related through taxes to the amount of funding in the civic jurisdiction, receives an insignificant coefficient. In general, progressively incorporating fixed effects does not significantly alter the estimated coefficients. This indicates that our measures of mean census income are not proxying for other, unmeasured geographic characteristics, and that collinearity between income at different geographic scales is not driving the results.

3.3 Exposure response

In order to seek revealing differences, we next estimate the geographic spillover effects of income for different subpopulations. Outside of the Online Supplement, a simpler form of tabulated estimates is given in most of the tables to follow. Table 3 exemplifies this summary format and its first two columns summarise all of Table 2.

Column (1) contains the mean coefficients for the baseline equation already recorded in column $\langle 1-2 \rangle$ of Table 2. Column (2) of Table 3 compiles the mean coefficients on $\{\delta_{R-1}\}$ described in Section 2 and taken from columns $\langle 4-6 \rangle$, $\langle 7-9 \rangle$, and $\langle 10-12 \rangle$ in Table 2. These correspond to the estimated marginal benefit of a region's income when fixed effects at the next highest geographic scale are controlled for.

The remaining odd-numbered columns similarly show coefficients, averaged over surveys, from regressions without fixed effects but carried out over specific subsets of the survey sample, as indicated by the rows containing ✓'s and ×'s. The even-numbered columns display the coefficients $\{\delta_{R-1}\}$ from the corresponding set of regressions carried out with geographic controls. The row labeled "survey" indicates which survey or how many surveys were used. When fewer than three surveys are used it is because not all offer the criterion defining the particular subpopulation. For instance, columns (5) and (6) reflect the fact that only GSS17 includes a question about the length of neighbourhood tenure.

Columns (3) to (10) show that survey respondents who indicate tenure in their neighbourhood or city of at least ten years are more strongly and negatively affected by a higher income in their local region (CT).

Conversely, those who have relocated more recently appear to benefit more from the affluence of their close neighbours at the DA scale. There is also the suggestion that those who are "new" to the city may be less sensitive to CMA mean income than those who are new to their neighbourhood but may not be new to the city. Columns (11)–(14) indicate that the negative effect of nearby others' income on SWL is much stronger amongst native-born Canadians as compared

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
log(HH inc)	**.27***	**.35***	**.28***	**.28***	**.35***	**.33***	**.28***	**.27***	**.36***	**.38***	**.31***	**.26***	**.24***	*.27**	**.20***	.14	**.37***	**.39***
DA: log(HH inc)	***.28***	.27	.23	.27	***.53***	*.47**	.30	.27	*.58**	*.56**	.22	.22	.23	.068	***.35***	.74	.050	.13
CT: log(HH inc)	−**.43***	−**.51***	−***.68***	−**.73***	−.42	−.39	−**.72***	−**.71***	−.21	−.44	−.19	−.039	−**.55***	−**.59***	−**.63***	−**.60***	−.28	−.34
CSD: log(HH inc)	−.24	−.12	−.31	−.28	−.68	−.67	−.27	−.24	−*1.04**	−.90	−.26	−.024	−.13	−.032	−.26	−.20	.21	.34
CMA: log(HH inc)	−**1.08***	−**1.08***	−*.91**	−*.91**	−*.96**	−*.96**	−***1.03***	−***1.03***	−.64	−.64	−.61	−.61	−**1.07***	−**1.07***	−***.67***	−***.67***	−**1.98***	−**1.98***
$\sum\beta_{\text{inc}}$	−**1.19***		−**1.40***		−*1.17**		−**1.44***		−.95		−.42		−**1.28***		−**1.03***		−**1.68***	
health	**2.61***		**2.81***		**2.67***		**2.83***		**2.53***		**2.72***		**2.77***		**2.81***		**2.62***	
trust-N	**1.25***		**1.15***		**.88***		**1.10***		**.90***		**1.58***		**1.29***		**1.52***		**1.00***	
controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
geo fixed effects		✓		✓		✓		✓		✓		✓		✓		✓		✓
$\tau_{\text{neigh}} \geq$10yr			✓	✓	×	×												
$\tau_{\text{city}} \geq$10yr							✓	✓	×	×								
foreign born											✓	✓	×	×				
own house															✓	✓	×	×
survey	⟨3⟩	⟨2⟩	G17	G17	G17	G17	G17	G17	G17	G17	⟨2⟩	⟨0⟩	⟨2⟩	⟨2⟩	⟨2⟩	⟨1⟩	⟨2⟩	⟨0⟩
obs.	36931	≥9620	7087	≥0	5114	≥0	9001	≥0	3200	≥0	9316	≥0	26474	≥3361	25867	≥4424	9923	≥0
pseudo-R^2			.067		.061		.067		.059									

Table 3: **Summary of Veblen coefficient estimates for various subgroups.** Weighted mean coefficients and, in parentheses, standard errors for mean coefficients are shown. These means are averaged across estimates carried out separately for each survey. Odd-numbered columns show estimates carried out without geographic fixed effects but restricted to specific subsets of the survey sample, as indicated by the rows containing ✓'s and ×'s. The even-numbered rows display mean coefficients $\{\delta_{R-1}\}$ extracted from the corresponding set of regressions carried out with geographic controls. In these rows, the coefficients on household (HH) income and on DA-level average income are generated (where possible) in regressions which include a complete set of geographic dummies at the CT level. The coefficients for income at the DA, CT, and CSD level are generated in regressions which include a complete set of geographic dummies at the next highest geographic level. The "survey" and "obs." rows for these columns show the minimum number of surveys and smallest total sample size used for any of the coefficients. For instance, "≥ 0" indicates that sample sizes were insufficient to complete any estimates with dummy variables at the smallest level, the CTs. Not shown are coefficients for the set of more objective (but including religiosity) individual controls which are shown in Table 1. The complete results underlying these mean coefficients are shown in the Online Supplement in Table 12 on page 41. Significance: **1%*** ***5%*** *10%**

with immigrants.

Homeowners and non-owners, shown in columns (15) to (18), differ in the dependence of their reported SWL on both their own household income and on others'. One may hypothesize that homeowners are likely to have lived in the same neighbourhood for longer, and therefore be more influenced by its norms. On the other hand, non-homeowners are likely to feel less secure and settled in regions with high incomes and house prices. These suppositions find support in the differences between coefficients on CT and CMA incomes for homeowners and renters, but alternative hypotheses will need to be addressed below for a confident interpretation.

3.4 Price levels

All income variables presented so far have been measured in nominal terms, uncorrected for price levels. One natural objection to finding a strongly negative coefficient on the metropolitan area's mean income in nominal terms is that this average is likely to reflect regional price levels. The negative coefficient could therefore reflect individuals' intrinsic assessment of their real income. Because inter-regional price level comparisons are difficult to carry out,[13] we cannot correct all income measures for local buying power. However, geographic fixed effects naturally account for any possible variation in local costs as well as geographic amenities. Assuming that mobility is high enough for CMA-level fixed effects to capture the main differences in the value of nominal incomes, it remains only to test our estimates of CMA-level effects using the available price comparators. Restricting the sample to ten major city regions for which Statistics Canada calculates comparative cost of living data and repeating our baseline estimate, we find the same pattern of coefficents, as shown in Table 4.

[13] Statistics Canada remains cautious in accounting for housing cost differences across locations, and therefore provides only very limited consumer price comparisons across Canada [Personal communication, Erwin Diewert]. In general, when geographic location confers amenity values, prices for real estate and even other local commercial goods may incorporate an associated premium. In principle, such premia may reflect physical characteristics of the location or an endogenous social value of exclusivity. See Barrington-Leigh (2008a) for a model of endogenous exclusivity in real estate value driven by pure Veblen consumption.

	(1)	(2)	(3)	(4)
log(HH inc)	***.27****	***.35****	***.24****	***.27***
DA: log(HH inc)	***.28***	.27	*.28**	.12
CT: log(HH inc)	**−.43***	**−.51***	***−.41***	**−.43***
CSD: log(HH inc)	−.24	−.12	−.16	−.021
CMA: log(HH inc)	**−1.08***	**−1.08***	**−1.87***	**−1.87***
$\sum \beta_{\text{inc}}$	**−1.19***		**−2.00***	
health	**2.61***		**2.58***	
trust-N	**1.25***		**1.24***	
CMA prices			✓	✓
controls	✓	✓	✓	✓
geo fixed effects		✓		✓
survey	⟨3⟩	⟨2⟩	⟨3⟩	⟨2⟩
obs.	36931	≥9620	24094	≥6793

Table 4: **Effect of CMA price correction.** Summary of estimates in the format described on page 16. Estimates in the columns with "CMA prices" are carried out with all income measures corrected for CMA price level. Only CMAs for with available price indices are included. Significance: **1%*** ***5%*** *10%**

3.5 Wealth and income

Ideally, in a neoclassical formulation a better measure of lifetime expected wealth — or indeed of current consumption — would be included to predict SWL. We next test some alternative specifications in order to account for the possibility of mismeasuring an absolute consumptive contribution to SWL. Luttmer (2005) addresses the concern that relying on the log of mean household income as a reference value may just provide flexibility to accomodate an alternative, underlying functional form for households' own income. Table 5 shows a test against this possibility by incorporating, along with the dummy variables for household size that are always included, the respondent's own income and his or her household's income adjusted in a conventional way for family size.[14] Also in this specification are the respondent's housing payments, estimated house market value, and the nearby average of reported house values from the census. Because a primary form of savings for many households is in house ownership, living in an affluent area may proxy for owning at least part of a relatively expensive house. While a higher house value might imply higher mortgage payments for house owners and therefore less current consumption of other goods, it may also be a less noisy indicator of total wealth and thus future expectations of affluence than is current income.

The table shows in columns (1) to (4) mean coefficents from the available surveys. The final column summarises the geographic reference effect estimates using fixed effects at each level. The coefficients estimated with CT fixed effects suffer from a small sample size in one survey, which accounts for the large coefficient on own income; see Table 13 on page 46 in the Online Supplement. As noted by Helliwell and Huang (2005), the dominance of household income over personal income, even for wage earners in a multi-person household, is evidence of empathy dominating over any relative income effects within the household unit.

Available in Canadian census data and the EDS survey is a question about the size of one's primary dwelling. One's own house size is a significant candidate for measures of conspicuous affluence, and thus Veblen effects, but a large and comfortable home may also represent a direct channel through which material consumption promotes SWL. In addition, a measure of local house sizes may be a further proxy for respondents' wealth or indebtedness. With these motivations, Table 6 reports a specification that includes measures of own and local house size.

[14] This "household equivalent" income measure is not used throughout most of the analysis because the inclusion of a set of separate controls for household sizes is a less restrictive specification.

	(1)	(2)	(3)	(4)	(5)
log(own inc)	.049	.038	*.11**	***.35***	***.35***
log(HH inc/$\sqrt{hh}$)	**.18***	***.22****	***.15***	.059	.059
DA: log(HH inc)	***.37***	***.36***	*.30**	.089	.089
CT: log(HH inc)	**−.56***	**−.60***	**−.67***		**−.67***
CSD: log(HH inc)	−.13	−.14			−.14
CMA: log(HH inc)	**−.87***				**−.87***
$\sum \beta_{\text{inc}}$	***−1.06***	.21	−.12	***.96***	
mortgagePayment	−.034	−.030	−.024	.050	
log(houseValue)	.13	.15	.095	−.006	
DA: log(houseValue)	−.15	−.10	.14	.11	.11
health	**2.71***	**2.81***	**2.84***	**3.19***	
trust-N	**1.27***	**1.52***	**1.37***	**1.82***	
trust-G	−.0004	.018	.021	−.14	
controls	✓	✓	✓	✓	✓
Geo dummies		CMA	CSD	CT	✓
survey	⟨3⟩	⟨2⟩	⟨2⟩	⟨2⟩	⟨2⟩
obs.	27634	26901	25486	4142	≥4142
pseudo-R^2					

Table 5: **Summary of alternate measures of wealth and income.** The first four columns represent coefficients averaged over surveys, as in the shaded columns of Table 2 on page 14. The fifth column shows summary coefficients of the kind described on page 16. Detailed estimates summarised in this table are found in Table 13 on page 46. Significance: **1%*** ***5%*** *10%**

	(1)	(2)	(3)	(4)	(5)
log(HH inc)	**.20***	**.21***	**.21***	.14	.14
DA: log(HH inc)	.28	.21	.29	.35	.35
CT: log(HH inc)	***−.60***	**−.79***	***−.59***		***−.59***
CSD: log(HH inc)	−.37	−.22			−.22
CMA: log(HH inc)	*−.59**				*−.59**
$\sum \beta_{\text{inc}}$	**−1.05***	*−1.18**	.088	.49	
houseRooms	.002	.004	.006	.003	
DA: houseRooms	.007	.029	.008	.053	
CT: houseRooms	.006	.019	.001		
health	**2.61***	**2.66***	**2.85***		
trust-N	**1.33***	**1.30***	**1.63***	**2.21***	
trust-G	−.004	.018	.017	.009	
controls	✓	✓	✓	✓	✓
Geo dummies		CMA	CSD	CT	✓
survey	⟨3⟩	⟨3⟩	⟨2⟩	⟨1⟩	⟨1⟩
obs.	26990	26884	24486	4424	≥4424
pseudo-R^2					

Table 6: **Own and neighbours' dwelling sizes.** The first four columns represent coefficients averaged over surveys, as in the shaded columns of Table 2 on page 14. The fifth column shows summary coefficients of the kind described on page 16. Detailed estimates summarised in this table are found in Table 14 on page 47. Significance: **1%*** ***5%*** *10%**

Other than a possible decrease in the strength of the CMA-level Veblen coefficient, we find no significant changes in income effects and no significant role for own or neighbours' dwelling sizes.

3.6 Life in the big city

Canada has a small number of large metropolitan areas, making it a difficult object of study for unpacking different CMA-level influences on SWL. It is possible that mean incomes are correlated with (*i.e.,* proxying for) the size of a metropolis and that the coefficient on mean CMA income is reflecting an omitted variable bias due to unmeasured negative qualities of big city life.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
log(HH inc)	**.27***	**.35***	**.28***	**.27***	**.36***	**.34***	**.28***	**.27***	**.37***	**.40***	**.30***	**.27***	**.25***	*.26**	**.20***	.14	**.38***	**.39***
DA: log(HH inc)	***.27***	.26	.24	.27	***.52***	***.48***	.30	.27	*.58**	*.58**	.21	.21	.24	.060	***.35***	.74	.075	.14
CT: log(HH inc)	**−.45***	**−.51***	***−.74***	**−.85***	−.47	−.44	**−.77***	**−.82***	−.26	−.43	−.14	.059	**−.57***	**−.64***	**−.64***	**−.64***	−.24	−.31
CSD: log(HH inc)	*−.42**	***−.35***	−.63	−.61	*−.85**	−.79	−.60	***−.59***	*−1.15**	−.97	−.37	***−.75***	−.35	***−.38***	*−.48**	***−.53***	.18	.20
CMA: log(HH inc)	−.33	−.33	.19	.19	.25	.25	−.068	−.068	.97	.97	−.17	−.17	−.35	−.35	−.033	−.033	*−1.36**	*−1.36**
$\sum \beta_{inc}$	−.81		−.67		−.18		−.85		.51		−.13		*−1.12**		−.57		−1.33	
health	**2.61***		**2.80***		**2.70***		**2.83***		**2.57***		**2.71***		**2.78***		**2.82***		**2.65***	
trust-N	**1.24***		**1.10***		**.87***		**1.07***		**.88***		**1.57***		**1.28***		**1.53***		**1.00***	
trust-G	.013		.051		−.014		.041		−.027		.027		.017		.008		.009	
CT: Fraction: immigrants	.11		.038		.42		.16		.34		.20		.036		.086		.24	
CSD: Fraction: immigrants	**−.78***		*−.74**		−.67		***−.74***		−.81		−.48		**−.83***		**−.72***		***−.85***	
CMA: log(pop)	**.099***	**.099***	.079	.079	−.12	−.12	.079	.079	*−.18**	*−.18**	.009	.009	**.13***	**.13***	***.11***	***.11***	.077	.077
CT: log(ρ_{pop})	−.025	*−.056**	−.052	*−.11**	−.089	***−.13***	*−.071**	***−.13***	−.055	−.063	−.001	.021	−.024	−.036	−.021	−.050	.006	−.063
CSD: trust-N	**−.82***		−.20		***−1.67***		−.36		***−1.83***		−.50		***−.83***		*−.65**		***−1.62***	
controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
geo fixed effects		✓		✓		✓		✓		✓		✓		✓		✓		✓
$\tau_{neigh} \geq 10$yr			✓	✓	×	×												
$\tau_{city} \geq 10$yr							✓	✓	×	×								
foreign born											✓	✓	×	×				
own house															✓	✓	×	×
survey	⟨3⟩	⟨2⟩	G17	G17	G17	G17	G17	G17	G17	G17	⟨2⟩	⟨0⟩	⟨2⟩	⟨2⟩	⟨2⟩	⟨1⟩	⟨2⟩	⟨0⟩
obs.	36897	≥9620	7086	≥0	5113	≥0	9000	≥0	3199	≥0	9316	≥0	26468	≥3361	25861	≥4424	9923	≥0
pseudo-R^2			.068		.063		.068		.061									

Table 7: **Summary coefficients with urban life controls.** Summary of estimates in the format described on page 16. The standard controls are included but not shown. Significance: **1%*** ***5%*** *10%**

There are a number of such factors missing in the baseline equation which one might suppose to be correlated with both mean incomes and life satisfaction. At the risk of over-correcting for these factors, Table 7 summarises estimates from a specification incorporating the fraction of immigrants at CT and CSD scales, the population size and density (ρ), and local average trust levels. These variables are motivated by the fact that high density areas tend to hold a more transient population which may affect social capital and, in turn, SWL. Qualitatively, the results with these controls reproduce the patterns found in the baseline case, especially for the CT-level coefficients.

3.7 Symmetry of income effects

Another way to subdivide the sample is in accordance with income itself. Other studies have reached different conclusions on the question of whether the relatively poor or the relatively rich are especially influenced by the comparison of incomes. One might expect the affluent to be more interested in relative status (Veblen, 1899). Conversely, one might expect the below-mean group to be more affected if emulation behaviour is more influenced by upward than downward comparisons, in accordance with the idea of "loss aversion". Luttmer (2005) finds no asymmetry in the effect of neighbours' income between those above and below the median income. Ferrer-i Carbonell (2005) reports mixed results, with West Germans showing an asymmetric and upwards comparison effect but East Germans showing symmetric reference behaviour. McBride (2001) reports the opposite — a significantly stronger influence of the comparison group, and correspondingly weaker influence of own income, for high-income respondents in the 1994 USA General Social Survey. Similarly, Kingdon and Knight (2007) find in South Africa that relative income is more important at higher levels of absolute income.

We look for deviations from our linear specification by modifying equation (1) to allow separate coefficients Δ_r^+, Δ_r^- in each region r for those respondents above ($\imath_{ir}^+ = 1$; $\imath_{ir}^- = 0$) and below ($\imath_{ir}^+ = 0$; $\imath_{ir}^- = 1$) the reference level:

$$\log\left(\frac{\text{Prob}\left(\text{SWL}_i > j\right)}{\text{Prob}\left(\text{SWL}_i \leq j\right)}\right) = c_j + \alpha \cdot \mathbf{X}_i + \tilde{\beta} \cdot \mathbf{Y}_i + \varepsilon_i + \sum_r \left(\left[\imath_{ir}^+ \Delta_r^+ + \imath_{ir}^- \Delta_r^-\right] \cdot \left[\mathbf{Y}_i - \bar{\mathbf{Y}}_{R_{ir}}\right] + \gamma_r \cdot \mathbf{Z}_{R_{ir}} + \nu_{R_{ir}}\right) \tag{4}$$

	SWL	SWL	SWL
	(1)	(2)	(3)
log(HH inc)	$-$**.37***		
	(.08)		
DA: Δ^{-}log(HH inc)	**.18***		
	(.06)		
DA: Δ^{+}log(HH inc)	.05		
	(.06)		
CMA: Δ^{-}log(HH inc)	$-$**.82***		
	(.11)		
CMA: Δ^{+}log(HH inc)	$-$**.78***		
	(.10)		
log(houseValue)		$-$**.14***	
		(.05)	
DA: Δ^{-}log(houseValue)		.14	
		(.10)	
DA: Δ^{+}log(houseValue)		$-$.11	
		(.13)	
CMA: Δ^{-}log(houseValue)		$-$**.30***	
		(.11)	
CMA: Δ^{+}log(houseValue)		$-$**.40***	
		(.11)	
houseRooms			$-$.04
			(.06)
DA: Δ^{-}houseRooms			**.09***
			(.03)
DA: Δ^{+}houseRooms			**.07***
			(.02)
CMA: Δ^{-}houseRooms			$-$*.13**
			(.07)
CMA: Δ^{+}houseRooms			$-$*.11**
			(.06)
own house		√	√
Obs.	30115	22936	23184
pseudo-R^2	.005	.002	.001

Significance: **1%*** **5%** *10%**

Table 8: **Symmetry in comparison effect.** Unlike in other tables, the coefficients on region averages here are $\Delta_r^{\pm}$ rather than δ_r; see equation (4).

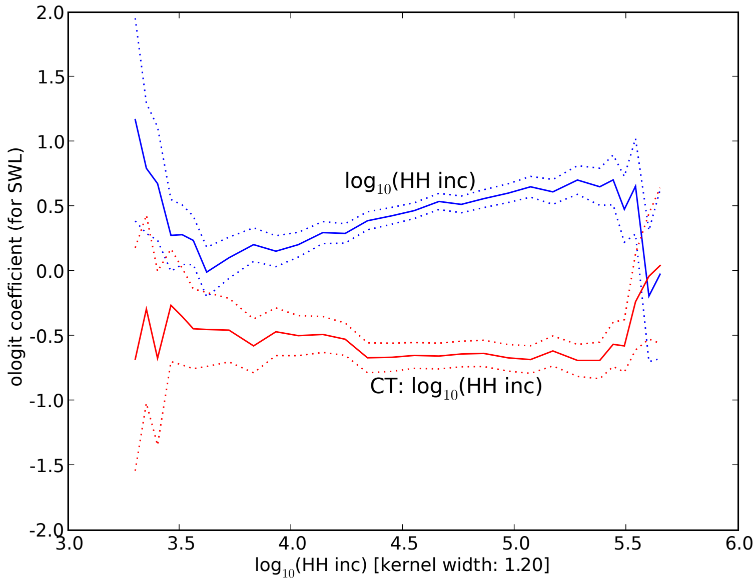
The results in Table 8 corroborate the findings of Luttmer (2005) by showing an absence of any asymmetry in coefficients between those individuals who are above and below the average at each geographical scale. This pattern is revealed for each of the observed values of income, house value, and house size. This symmetry seems somewhat surprisingly close, but considering that explanations are given above for either of the other alternatives, we may say without identifying the psychological channels more explicitly that our observations might represent some zero-sum combination of asymmetric effects.

A slightly different question is whether the Veblen effect is stronger for individuals with higher or lower *absolute* income levels. In order to treat this question, we conducted a semi-parametric regression in which the box kernel ranged over absolute household income.[15] Figure 3 shows the results both for a simplified equation containing household and CT mean incomes along with our standard controls and trust in neighbours, and for a more complete specification containing reference income levels for three geographic scales as well as the same controls. In both cases, the coefficient on absolute income increases with income, suggesting an imperfect specification. For the simpler equation the CT-level Veblen coefficient is approximately constant, while the more complete specification contains the suggestion that the CT-level reference effect also increases with increasing income.

3.8 Geo-demographic reference groups

Various mechanisms by which geographic proximity might help to determine reference group formation are plausible. For example, people are likely to interact with their close neighbours and community members in a number of contexts, are likely to work alongside and commute past people who live in the same city, and are likely to have grown up or attended high school in the same metropolitan region. Effective reference levels may be set by emulating one's friends or coworkers, by absorbing some standard from the broader anonymous population, or through some other process of social interaction or information dissemination. By using individual-level data from the 2001 census, we are able to construct some mean incomes for simple, identifiable sub-samples of the population in each census region. Table 9 contains a summary of the findings when local members of

[15] An ordered logit model was estimated separately for numerous subsamples, each subsample corresponding to respondents with incomes in a particular range, noted in Figure 3 as the kernel width. Using smaller kernel widths resulted in noisier but consistent patterns.



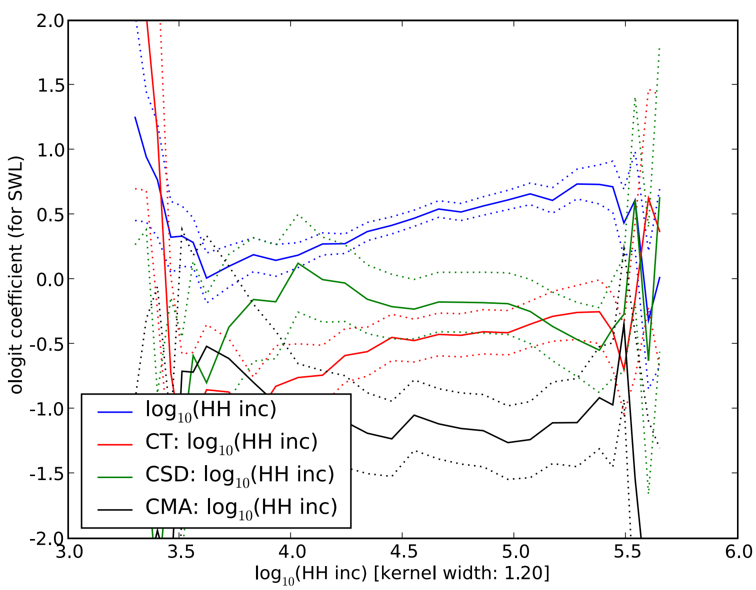


Figure 3: **Veblen coefficients as a function of income.** Dotted lines show the range of one standard error.

one's age group or local members of one's visible minority group are used as a reference set. Age categories are 15-19, 20–24, 25–29, 30–39, 40–49, 50–64, and 65+ years, while the "visible minority" designations are those defined by Statistics Canada: Chinese, South Asian, Black, Filipino, Latin American, Southeast Asian, Arab, West Asian, Korean, Japanese, and Other visible minorities. Only respondents who fall into one of the respective categories are included in the "Age Group" and "Visible minority" estimates. We find a significantly reduced CMA income comparison effect when one's own age group is used as a reference, but at least as strong an effect at the CT level. Suggestive of a similar but weaker finding to that of Kingdon and Knight (2007) for the "divided society" of South Africa is our finding of an absense of a comparison effect at the CT level combined with a stronger one at the scale of CSDs when visible minority groups are the candidate reference group.[16] However, our sample sizes becomes small when restricted to these categories. Further investigation along these lines appears to be warranted. For instance, Charles et al. (2007) report a stronger conspicuous consumption behaviour for certain visible minority or ethnic groups.

3.9 Further robustness checks

Table 10 contains a summary of some further checks of the robustness of our estimates. Using OLS or ordered probit in place of ordered logit gives comparable raw coefficients (with the standard factor between probit and logit). Eliminating respondents who reported the highest possible score for SWL does change the picture slightly but leaves unchanged, in particular, the strong negative consumption externality at the CT level.

3.10 Absolute and relative benefits of health

For informing policy, empirical well-being research might have little to say if it was found that all determinants of SWL contributed only relatively through context-dependent reference levels. Alpizar et al. (2005) posed hypothetical choices to students in order to assess the positional and relative benefits of different kinds of goods. They found that utility from most goods derives from both absolute and relative consumption, although certain goods such as leisure and insurance provide more absolute benefits than housing and income.

[16]Because "visible minority" status is only available in one survey, a proper comparison of coefficients considers only the EDS results for the "All" and "Visible minority" cases detailed in Table 16 on page 50.

	All (1)	All (2)	All (3)	All (4)	(5)	Age groups (6)	Age groups (7)	Age groups (8)	Age groups (9)	(10)	Vismin groups (11)	Vismin groups (12)	Vismin groups (13)	Vismin groups (14)	(15)
log(HH inc)	**.28***	**.27***	**.29***	**.37***	**.37***	**.27***	**.29***	**.32***	**.37***	**.37***	.069	.091	.075		.075
	(.036)	(.032)	(.037)	(.087)	(.087)	(.036)	(.034)	(.039)	(.087)	(.087)	(.10)	(.061)	(.10)		(.10)
CT: log(HH inc)	***−.29***	**−.32***	**−.36***		**−.36***	*−.22**	*−.20**	**−.58***		**−.58***	.35	.33	.082		.082
	(.13)	(.097)	(.091)		(.091)	(.12)	(.11)	(.088)		(.088)	(.32)	(.25)	(.29)		(.29)
CSD: log(HH inc)	−.21	−.16			−.16	−.11	−.17			−.17	−.28	***−1.25***			***−1.25***
	(.28)	(.26)			(.26)	(.26)	(.11)			(.11)	(.91)	(.52)			(.52)
CMA: log(HH inc)	**−1.67***				**−1.67***	−.38				−.38	−1.40				−1.40
	(.39)				(.39)	(.26)				(.26)	(1.19)				(1.19)
$\sum \beta_{\text{inc}}$	**−1.88***	.19	−.004	**.37***		***−.97***	.058	.11	**.37***		−1.26	−.83	.16		
	(.40)	(.24)	(.047)	(.087)		(.48)	(.042)	(.069)	(.087)		(.98)	(.79)	(100.0)	(0)	
health	**2.63***	**2.60***	**2.69***	**3.26***		**2.64***	**2.61***	**2.70***	**3.26***						
	(.091)	(.099)	(.11)	(.39)		(.091)	(.10)	(.11)	(.39)						
trust-N	**1.24***	**1.24***	**1.26***	**1.73***		**1.23***	**1.22***	**1.27***	**1.73***		**1.57***	**1.59***	**1.57***		
	(.063)	(.064)	(.058)	(.15)		(.063)	(.064)	(.059)	(.15)		(.22)	(.22)	(.24)		
trust-G	.007	.024	.033	.049		.002	.026	.035	.049		.092	**.10***	*.12**		
	(.029)	(.020)	(.026)	(.071)		(.029)	(.021)	(.026)	(.071)		(.088)	(.036)	(.073)		
controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
geo fixed effects		CMA	CSD	CT	✓		CMA	CSD	CT	✓		CMA	CSD	CT	✓
survey	⟨3⟩	⟨3⟩	⟨3⟩	⟨2⟩	⟨2⟩	⟨3⟩	⟨3⟩	⟨3⟩	⟨2⟩	⟨2⟩	ED	ED	ED	ED	ED
obs.	37701	37601	35937	9851	≥9851	37647	37547	35896	9851	≥9851	4581	4541	4425	0	≥0
pseudo-R^2											.057	.061	.066		
N_{clusters}												18	50		

Table 9: **Demographic / geographic subpopulations as reference groups.** Columns labeled "All" show ordered logit estimates for all respondents using overall means as reference levels. "Age Group" estimates use mean incomes from respondents' own age group as reference levels. "Vismin" estimates include only visible minority respondents and their own-group's mean incomes. Columns marked with a ✓ for "geo fixed effects" show summary coefficients of the kind described on page 16. Other columns represent coefficients averaged over surveys, as in the shaded columns of Table 2 on page 14. Detailed estimates summarised in this table are found in Table 16 on page 50. Significance: **1%*** ***5%*** *10%**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
log(HH inc)	**.27***	**.35***	**.33***	**.36***	**.17***	**.21***	**.52***	**.92***
	(.037)	(.090)	(.035)	(.080)	(.021)	(.048)	(.052)	(.24)
DA: log(HH inc)	***.28***	.27	**.31***	.31	***.17***	.15	**.45***	−.085
	(.13)	(.29)	(.11)	(.26)	(.074)	(.16)	(.16)	(.75)
CT: log(HH inc)	−**.43***	−**.51***	−**.48***	−**.53***	−**.28***	−**.32***	−.32	−**.47***
	(.16)	(.12)	(.14)	(.10)	(.091)	(.070)	(.20)	(.17)
CSD: log(HH inc)	−.24	−.12	−.14	−.050	−.10	−.043	−.33	−***.43***
	(.22)	(.16)	(.18)	(.12)	(.12)	(.095)	(.27)	(.17)
CMA: log(HH inc)	−**1.08***	−**1.08***	−**.91***	−**.91***	−**.64***	−**.64***	−*.72*	−*.72*
	(.26)	(.26)	(.22)	(.22)	(.15)	(.15)	(.33)	(.33)
$\sum \beta_{\text{inc}}$	−**1.19***		−**.92***		−**.69***		***.53***	
	(.28)		(.29)		(.16)		(.27)	
health	**2.61***		**2.03***		**1.44***		**2.32***	
	(.091)		(.074)		(.052)		(.099)	
trust-N	**1.25***		**.99***		**.70***		**1.15***	
	(.061)		(.052)		(.034)		(.071)	
controls	✓	✓	✓	✓	✓	✓	✓	✓
geo fixed effects		✓		✓		✓		✓
survey	⟨3⟩	⟨2⟩	⟨3⟩	⟨2⟩	⟨3⟩	⟨2⟩	⟨3⟩	⟨2⟩
SWL≠10							✓	✓
ologit	✓	✓					✓	✓
OLS			✓	✓				
oprobit					✓	✓		
obs.	36931	≥9620	36931	≥9620	36931	≥9620	24893	≥1969

Table 10: **Robustness checks for estimates of SWL.** Summary of estimates in the format described on page 16. Significance: **1%*** ***5%*** *10%**

	(1)	(2)	(3)	(4)	(5)
log(HH inc)	**.35***	**.34***	**.34***	**.65***	**.65***
	(.057)	(.056)	(.061)	(.20)	(.20)
DA: log(HH inc)	**.49***	**.50***	**.56***	.16	.16
	(.16)	(.15)	(.17)	(.52)	(.52)
CT: log(HH inc)	−*.37**	***−.41***	**−.46***		**−.46***
	(.20)	(.17)	(.16)		(.16)
CSD: log(HH inc)	−.41	−.29			−.29
	(.30)	(.25)			(.25)
CMA: log(HH inc)	**−1.24***				**−1.24***
	(.36)				(.36)
health	**2.72***	**2.71***	**2.78***	**3.39***	**3.39***
	(.089)	(.088)	(.10)	(.35)	(.35)
CT: health	.24	.24	.14		.14
	(.15)	(.15)	(.17)		(.17)
CSD: health	−.16	−.094			−.094
	(.49)	(.51)			(.51)
CMA: health	*1.18**				*1.18**
	(.69)				(.69)
controls	✓	✓	✓	✓	✓
Geo dummies		CMA	CSD	CT	✓
survey	⟨2⟩	⟨2⟩	⟨2⟩	⟨1⟩	⟨1⟩
obs.	13695	13588	12596	1474	≥1474
pseudo-R^2					

Table 11: **Spillover effects of others' health.** The first four columns represent coefficients averaged over surveys, as in the shaded columns of Table 2 on page 14. The fifth column shows summary coefficients of the kind described on page 16. Detailed estimates summarised in this table are found in Table 18 on page 58. Significance: **1%*** ***5%*** *10%**

We test this proposition for one important determinant of SWL. Table 11 shows that, when incomes are controlled for, regional averages of others' health have only positive or insignificant effects on individual SWL. According to this estimate, it may be extrapolated that improving everyone's health at once would make a large positive increase to SWL. Larger scale studies based on cross-country regressions provide further support for the claim that certain non-pecuniary but more objectively measured community attributes, for instance those relating to social capital, are highly valuable social aims from a well-being perspective.

4 Discussion

In investigating the effects of geographic income comparison groups, the focus of our analysis has been on *ex post* welfare, as measured by SWL. Before drawing any practical implications from our findings, we point out several complications in interpreting this subject.

Welfarism and relativism

It is common to recognise three ways in which one's own outcomes are put into perspective in the subjective assessment of satisfaction. These correspond to memories of one's past (hence accomodation to *status quo*), comparison to contemporary norms, and reference to aspirations. By focusing on a cross-section in time and by looking at different potential geographic comparison groups, we are probably learning most about the geographic structure of contemporary norms. Aspirations might be thought of as a calculation of what is reasonably attainable; like the others, this is a standard which affects our satisfaction (Stutzer, 2004). Aspirations may be determined in part by the other two influences (comparison with one's past and with one's society's outcomes) but other structural factors such as personal and institutional constraints will also affect how these aspirations are cognitively formed.

It may be noted that all three contextual effects follow from the evolutionary arguments of Rayo and Becker (2004) and that all result in mean reference levels rising or falling in tandem with consumption levels over time. Thus any of the three can account for the observation that among many nations, average SWL does not grow with national income.

When considered separately, however, these comparison channels may lead to different policy considerations. For instance, aspirations can be expanded upwards for the majority through a relaxation of class constraints; indeed, the formation of a middle class and an increase in social mobility may be a major driver of economic growth through this channel of aspirations (Galbraith, 1979). Well-being effects of reference group emulation can be minimised by decreasing disparities, and evidence of strong adaptation to income levels over time indicates a SWL value of economic growth and of increasing compensation rates as a function of age, though not necessarily beyond those which reflect increasing productivity due to experience.

Some significant warnings have been articulated which lie in the way of such conclusions, especially as they relate to the measurement and alleviation of poverty. Galbraith (1979), in his discussion of the impact of economic aspirations, suggests that people adapt to rates of economic growth just as they do to levels of income, and Sen (1983) in his description of the "capabilities approach" warns against absurd prescriptions which may result from an entirely relativist view of welfare. Sen (1999) has further warned against the metric of utilities, or "welfarism", because it may lead to the implication that limiting people's knowledge or aspirations is good social policy. Nevertheless, and especially in a relatively open and democratic society, SWL meets Sen's own criterion of measuring people's ability to do and to be what they value. Kingdon and Knight (2003) argue that SWL may be an excellent candidate for an encompassing welfare measure even for developing economies.

Endogenous choice of comparison groups and maximisation of SWL

> Hardly any choices are as interactive and interdependent as the choice of whom to associate with, live with, work with, or play with ... (Schelling, 2006, p. 43)

If people are sophisticated in their selection of where to live and with whom to socialise, they will take into account any repercussions that set standards for their own future emulation. This remains a difficult complication to the normative assessment of reference level effects, yet it is mitigated by our use of controls, including the "mastery" measure, and in part by our finding that one dominant comparison group is broadly distributed across metropolitan regions. The latter fact means that most relocations are less likely to change urban Canadians' contemporary reference standards. On the other hand, endogenous choice between different metropolitan areas is poorly accounted for in our work, as is the selection of non-geographic social groups. While mobility between CMAs is quite limited, selection of one's residential CT is much more common. If this decsion is made with the milieu of affluence in mind as an influence on one's own consumption standards, it ought, however, to work against our results, attenuating the negative coefficient on others' CT income. Knight and Song (2006) explicitly asked respondents about their income reference group. They find that individuals who are the least content are those with the geographically broadest reference group.[17]

Falk and Knell (2004) analyse competing effects in comparison group selection and the formation of aspirations when there are both relative and absolute returns to well-being. They predict a positive correlation between ability and endogenous standards. On the other hand, there is also strong evidence that people do not fully realise that reference standards will change and therefore that some superficially attractive choices will not end up being beneficial (Loewenstein et al., 2003). The inclusion in surveys of explicit questions concerning subjective reference groups, such as took place in Wave 3 (2006) of the European Social Survey and in the work of Knight and Song (2006), is therefore a valuable innovation.

There is, furthermore, evidence of systematic deviations from optimisation of SWL. The question of what contributes to SWL as a welfare measure (utility in Jeremy Bentham's sense) is quite distinct from the question of whether SWL is a good approximation for utility as in choice theory. Wilson and Gilbert (2005) discuss humans' limited ability and systematic inability to forecast their own affect. Dunn et al. (2003) address specifically the issue of residence location choice; they use a natural experiment of undergraduate housing assignment as evidence of systematic misprediction of the determinants of one's own SWL.

Thus, the emulation of neighbours or social peers as a behaviour needs to be assessed independently from the reference setting that plays a role in SWL assessment. Nevertheless, our results represent a clearly significant effect of *ex post* neighbours' income.

5 Conclusion

We have attempted both to identify the geographic scales which best describe income comparison groups in Canadian cities and, to some degree, to separate income comparison effects from social benefits such as are exhibited by a feeling of trust. Our finding that income comparison, or emulation, effects dominate

[17] Their work is reported as preliminary.

empathetic ones at levels of metropolitan regions and census tracts is not inconsistent with the findings of Kingdon and Knight (2007) for South Africa. They report negative spillovers of income at the district level (with mean populations of 125,000) but positive spillovers within smaller clusters (with mean population 2,900). Our evidence for an empathetic pattern of income spillover effects on the most local scale is weaker than theirs, although we find that trust in neighbours has spillover effects on an even smaller scale than Kingdon and Knight (2007) can resolve, as well as at larger scales beyond the neighbourhood. We find consistently weaker or nonexistent net effects of others' income at the CSD, or municipal, scale, which is suggestive that tax-funded public goods are an important component of the actual consumption which we would ideally have used in place of our measure of income.

Because of the limited number and variability in CMAs that are intrinsic to Canadian data, our conclusions regarding CMA level effects must remain quite tentative. They nevertheless reflect a strong and important negative association between mean CMA income and mean CMA life satisfaction. It may be that inhabitants of cosmopolitan cities, even in developing nations, form their reference groups in a different manner than do rural dwellers. Our findings do not explain this process and suggest either (1) that comparison groups might consist of more individually specific socially connected networks which tend to be dispersed throughout a broad geographical region or (2) that within metropolitan regions there is high accessibility of information about others' living standards or, at least, wages.

On the other hand income externalities at the census tract level appear to be strong and robust. It may be thought that if urban regions are sites of particularly intense competition over consumption or income status, then past and ongoing urbanisation may have an important effect on production and consumption growth for reasons other than efficiency of production due to agglomeration. However, we do not find evidence of an upward bias to the reference setting. As discussed above, others' results on this question vary. If such reference behaviour is mean-reverting emulation rather than a more one-sided high status seeking, then this aspect of preferences cannot be said to be *driving* needless economic growth.

If the results we find for income relativities should withstand further tests and appear robustly in subsequent surveys, the negative sum of the coefficients on own and comparator incomes suggests the existence of strongly negative consumption externalities. Moreover, these results ignore the negative intergenerational environmental externalities that result from rising global levels of material consumption. Further research is needed to unravel the roles that advertising and other forces play in setting standards for emulation. It has been suggested, for example by Bertrand et al. (2006), that the aggregate negative externalities are made larger by a preponderance of advertising and other information flows advocating higher levels of material consumption relative to activities with positive externalities. A better understanding of how norms are established could help to permit individuals to increase their own SWL while not damaging that of their neighbours or of those in subsequent generations.

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