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Jason Beckfield[1], Sigrun Olafsdottir[2], and Elyas Bakhtiari[2]

Abstract

The existence of social inequalities in health is well established. One strand of research focuses on inequalities in health within a single country. A separate and newer strand of research focuses on the relationship between inequality and average population health across countries. Despite the theorization of (presumably variable) social conditions as "fundamental causes" of disease and health, the cross-national literature has focused on average, aggregate population health as the central outcome. Controversies currently surround macro-structural determinants of overall population health, such as income inequality. We advance and redirect these debates by conceptualizing inequalities *in* health as cross-national variables that are sensitive to social conditions. Using data from 48 World Values Survey countries, representing 74% of the world's population, we examine cross-national variation in inequalities in health. The results reveal substantial variation in health inequalities according to income, education, sex, and migrant status. While higher socioeconomic position is associated with better self-rated health around the globe, the size of the association varies across institutional context and across dimensions of stratification. There is some evidence that education and income are more strongly associated with self-rated health than sex or migrant status.

Keywords

global, inequality, health

The inverse relationship between social position and health—often referred to as the "health gradient"—is a central finding from decades of work on the social determinants of health (Cutler, Deaton, & Lleras-Muney, 2006; House, 2002; Kitagawa &

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Hauser, 1973; Mirowsky & Ross, 2003; Schnittker & McLeod, 2005; Williams, 1990; Williams & Collins, 1995). Indeed, low social standing has been theorized as a "fundamental cause" of disease that reproduces the health gradient through time and space (Link & Phelan, 1995; Phelan & Link, 2005). Although various types of inequality can represent a fundamental cause, the predominant research focus within this theoretical perspective has been on inequalities based on socioeconomic status. Research at the intersection of social inequality and health has tended to take two forms: On the one hand, researchers have examined individual-level inequalities in health within a single society, frequently the United Kingdom and the United States (Goesling, 2007; Lynch, 2006; Marmot, 2005; Schnittker, 2004; Warren, 2004; Yang, 2008), establishing social factors, such as income, education, gender, race/ethnicity, or immigration status, as predictors of various health outcomes. On the other hand, researchers have explored the relationship between aggregate indicators of income inequality and aggregate health outcomes across multiple, but usually advanced, industrialized nations (Babones, 2008; Beckfield, 2004; Wilkinson, 1996; Wilkinson & Pickett, 2006), finding mixed support for the relationship between income inequality and population-health indicators, such as life expectancy and infant mortality.

While research has focused on either inequalities *in* health within a single society or the relationship between inequality *and* health across societies, less is known about inequalities *in* health in comparative context (Beckfield, 2004; Beckfield & Krieger, 2009; Olafsdottir, 2007). Cross-national comparison is essential because it can show how generalizable the relationship between inequality and health is at the individual level and can promote theoretical development and empirical testing of the broader social forces that shape health inequalities. For example, recent comparative work shows that generous family policies may have a positive impact on the health of parents in Iceland, while lack of such policies may negatively impact the health of parents in the United States (Olafsdottir, 2007). Our goal in this paper is to advance the comparative turn in research on health inequalities by conceptualizing and analyzing health inequality itself (as generated by markers of social position, such as education, income, sex, and migrant status) as a dependent variable. We illustrate the promise of this approach by developing cross-nationally comparable measures of health inequality and describing the global variability in health inequalities. The results suggest that the multidisciplinary debate over whether income inequality harms health (Beckfield, 2004; Jen, Jones, & Johnston, 2009; Kim, Kawachi, Vander Hoorn, & Ezzati 2008; Wilkinson & Pickett, 2006) can be extended in a new direction by investigating the determinants of inequalities in health.

Indeed, inequalities in health at the individual level are substantial, and income and education have been found to be key predictors of health outcomes. In general, those with lower levels of income and education experience worse health than those with higher levels (Mirowsky, Ross, & Reynolds, 2000; Robert & House, 2000; Schnittker & McLeod, 2005). Sex differences are more complex, with women typically disadvantaged relative to men on measures of morbidity and mental health but not mortality (Rieker, Bird, & Lang, 2010). U.S.-focused research shows that Blacks are disadvantaged relative to Whites across a range of health outcomes (Williams & Collins, 1995),

and there are ongoing debates over the health effects of migration. Consequently, we focus on four indicators when creating our measures of cross-national variation in health inequalities: income, education, sex, and minority status (proxied by being foreign-born, a measure that generalizes outside the United States). This is an important first step, since relatively little is known about how the strong associations observed in the United States and selected other countries translate into a diverse sample of developed and developing countries (see Eikemo, Huisman, Bambra, & Kunst, 2008; Kunst et al., 2004; Mackenbach et al., 2008; and Van Doorslaer & Koolman, 2004, for studies of health inequalities in Europe). We also know relatively little about the macrosocial factors that may differentially affect health inequalities based on social cleavages (Beckfield & Krieger, 2009; Putnam & Galea, 2008). After demonstrating the extensive cross-national variability of the health gradient, we then begin to explore the possible determinants of the health gradient. As noted, much of this research has focused on the impact of income inequality on health. While some researchers have enthusiastically supported the income inequality hypothesis (Wilkinson & Pickett, 2006), others have failed to find supportive evidence (Beckfield, 2004). Anticipating the arguments and evidence below, we argue for redirecting the debate on health and inequality by focusing on inequalities *in* health within and across countries rather than the relationship between inequality *and* health across countries (Olafsdottir & Beckfield, 2011).

In this paper, we use World Values Survey (WVS) data to address two overarching research questions: First, how much do health inequalities based on social position vary across 48 societies? Second, does income inequality at the societal level impact those health inequalities? Our paper proceeds in three steps. First, we review the literature on the relationship between inequality and health, focusing on inequalities *in* health across multiple nations and highlight recent work suggesting what factors may account for cross-national variation in health inequalities. Second, we provide figures that evaluate the health gradient in a cross-national perspective. We begin by using binary logistic regression models to evaluate the effects of income, education, gender, and migrant status on self-assessed health. We then create our new dependent variables and evaluate their relationships to income inequality. Third, in the concluding section, we discuss some of the implications (and the limitations) of our results and provide suggestions for further research.

Social Inequalities Generate Health Gradients

The "fundamental-cause" perspective interprets the health gradient as a relationship between social position and health that reproduces itself through multiple mechanisms. Link and Phelan (1995) have directed health scholarship back to societal-level social inequality by arguing that social standing will always be linked to health because it represents a fundamental cause of disease, in that the impact of social standing on health cannot be eliminated by intervening on the mechanisms that link social standing to health disparities. The inverse relationship persists because access to resources (such as money, knowledge, power, and social networks) can be used to avoid health risks and to minimize the consequences of illness. This implies that mortality-reducing

technologies and knowledge should steepen the health gradient, because the better off can take advantage of them faster (Cutler et al., 2006; Lutfey & Freese, 2005).

In this paper, we take the fundamental-cause approach as a point of departure for developing a comparative framework for theorizing health inequalities (see Olafsdottir, 2007, for an approach that focuses on social inequality and the welfare state and Beckfield and Krieger, 2009, for a review of the nascent empirical literature). We argue that societies establish systems for the distribution of resources, social hierarchies that generate relative social comparisons, and institutional mechanisms for translating social and individual resources into health. This opens up a new question: How much (and why) do health inequalities vary across societies? Following the logic of the fundamental-cause approach, one would expect to observe substantial cross-national variation in health inequalities, such that one finds steeper health gradients in richer, healthier societies than in poorer, less-healthy societies, as people higher up the social hierarchy take disproportionate advantage of health-improving knowledge and technologies. Conversely, a case can be made that if social inequality translates into health inequality through mechanisms that vary in different social contexts, one would expect to observe constant health gradients across societies—especially if, as we do below for income and education, one measures social standing on *relative* scales. That is, in addition to reproducing itself over time, an extension of the fundamental-cause perspective might anticipate that the health gradient is a constant across a heterogeneous set of places. Existing evidence shows significant health gradients in the United States (Adler et al., 1994; Krieger et al., 2008; Mirowksy & Ross, 2003; Ross & Mirowsky, 1995; Ross & Wu, 1995, 1996; Schnittker, 2004; Williams, 1990; Williams & Collins, 1995) and most western European countries (Mackenbach et al., 2008), including the United Kingdom (Davey Smith, Bartley, & Blane, 1990; Macintyre, 1997; Townsend & Davidson, 1982) and Finland (Lahelma, Rahkonen, & Huuhka, 1997).

Health gradients are not unidimensional, reflecting the fact that there are multiple dimensions of social standing and multiple ways in which people can gain access to resources (Graham, 2007; House, Lantz, & Herd, 2005). Education, income, gender, and migrant status are all important cleavages in societies around the world. Education reflects social status in a broad manner and is related to both material and non-material resources (Lahelma, 2001). There are several advantages associated with using education as a source of stratification in health research. It is broadly stable across the life course, equally suitable for men and women, and more comparable across countries than occupation (Valkonen, 1989). However, educational structures change over time (Lahlema, 2001), and while perhaps more comparable than occupation, the meaning of education still varies across national contexts, especially, perhaps, between richer and poorer countries. Nevertheless, education is a crucial component of understanding why social class is related to health, since in addition to the material resources it may provide, it gives people knowledge that shapes their health behaviors that impact health and illness (Lahelma, 2001).

While education is associated with social status, health behaviors, health-related knowledge, and material resources (Kingston, Hubbard, Lapp, Schroeder, & Wilson,

2003; Mirowsky & Ross, 2003), it is important to isolate the role of material resources, most directly measured by income. Family income is, despite some problems associated with the measure, an indicator of the material resources individuals and families have at their disposal (Lahelma, 2001). Together, these two indicators provide insights into the material and non-material components of social standing that generate socioeconomic gradients in health. As Cutler and colleagues (2006, p. 114) point out, it is important to estimate the effects of income and education separately, both because different mechanisms are at work and because of the need to identify potential policy levers (see also Starfield, 2006). Indeed, estimating income-based and education-based health gradients separately and comparing them in a broad cross-section of societies can shed light on whether economic resources or social status matters more for health and how societal context itself might shape exactly how much resources and status matter for health.

While much of the cross-national work on health inequalities has focused on inequality based on socioeconomic status, it is important to consider other social cleavages that matter within and across societies. Research has shown that while women generally outlive men, they have worse health throughout the life course (Rieker et al., 2010). There may, of course, be some biological explanations for these differences, yet the largest part of the explanation can be found in the social roles assigned to men and women within societies. For example, research has indicated that women´s lifestyle protects their health, compared to men, but that their vulnerable position in the workplace and within the home contributes to their worse health outcomes throughout their lives (Ross & Bird, 1994). Focusing on gender in a cross-national perspective, Bird and Rieker (2008) have developed the framework of constrained choice, highlighting how socially constructed social roles impact health behavior and health inequalities between men and women across the globe. They particularly highlight the importance of social policies as a possible mechanism equalizing health across genders, a point that is supported by the impact of family policies on health of parents in Iceland (Olafsdottir, 2007).

Within the United States, much of the literature on health disparities focuses on racial and ethnic differences in health outcomes. As expected, minority groups often experience worse health than groups that hold a more advantageous position in society, and research consistently shows that African Americans experience some of the worst health outcomes in the United States, whereas Whites and Asian Americans generally have better health outcomes. Perhaps contradictorily, research has indicated that immigrants are often healthier than their native counterparts, but this difference decreases the longer a person resides in the United States. This has been explained both as a positive effect of health selection and as a negative effect of acculturation (Antecol & Bedard, 2006; Cho, Frisbie, Hummer, & Rogers, 2004; Kennedy, McDonald, & Biddle, 2006). As many of the countries that are included in the WVS do not have a similar history of multiple racial/ethnic groups living in the society, the survey does not have particularly good measures on race and ethnicity. Therefore, we rely on whether the respondent is an immigrant and look at whether that status results in better or worse health across our 48 countries.

Our first analytical step, then, is to examine the variation in the health inequalities based on social position in our sample of 48 countries. Drawing on the extensive literature that shows that those who have less education or less income have worse health outcomes, our *universal gradient* hypothesis (Hypothesis 1) predicts worse health for the relatively poor (vs. the relatively high income), the relatively less educated (vs. the relatively more educated), women (vs. men), and migrants (vs. the native-born) in all 48 nations.

Does Income Inequality Generate Health Inequalities?

The scholarship reviewed above has convincingly established that disadvantaged individuals in many affluent democracies have worse health than those in more advantageous positions. That is, there is consensus on the existence of social inequalities *in* health within many societies. Conversely, there is an ongoing, heated debate among comparative health researchers over whether the level of income inequality in a society is associated with aggregate, societal-level measures of population health, such as the infant mortality rate and life expectancy (Beckfield, 2004; Jen et al., 2009; Kim et al., 2008; Wilkinson & Pickett, 2006). That is, there is dissensus on the existence of a relationship between inequality *and* health. To take a recent characterization of the debate, Zimmerman (2008) colorfully notes that research on the association between inequality and health is now generating "far more heat than light, with two dug-in sides lobbing analyses back and forth with increasing sophistication and decreasing effect" (p. 1882). We argue that one way to generate some light is to examine whether and to what degree economic inequality in a society influences inequalities *in* health.

We anticipate that economic inequality within and among societies should be related to inequalities in health within societies. Researchers interested in comparative health care systems noted in the 1970s that inequality in capitalist societies creates and sustains health disparities (McKeown, 1979; Navarro, 1976), which gives reason to believe that some societies may have more health inequality than others, especially where market relations predominate. Moreover, there are dramatic differences between richer and poorer countries in aggregate measures of population health (Brady, Kaya, & Beckfield 2007; Goesling & Firebaugh, 2004), which is another reason to believe that social inequalities in the health of populations could differ dramatically across societies at very different levels of economic development. Following the logic of the fundamental-cause approach outlined above, we would expect steeper health gradients in richer societies. Comparative researchers have pointed out various societal factors, such as social inequality, that may impact health inequalities within and across countries (Beckfield & Krieger, 2009; Kunitz, 2007; Kunitz & Pesis-Katz, 2005; Olafsdottir & Beckfield, 2011; Wilkinson, 1996). However, this association has not been systematically tested across multiple national contexts, nor has the focus been on the relationship between economic inequality and social inequalities in health.

We argue that economic inequality should be positively associated with the level of inequality in health in a society. Here, we can imagine that the effect of individual income on individual health is the same in two societies, but one has higher levels of

income inequality, making the association between income and health stronger, mechanically, in the higher-income-inequality society. In addition, individuals with either educational or income advantage in a higher-income-inequality society may have even more resources that they can translate even more effectively into better health, and the poor would be even more deeply disadvantaged (Evans, Hout, & Mayer, 2004; Hout & Fischer, 2003). Furthermore, if income serves as a buffer against the strains of everyday life (Hall & Lamont, 2009), lower-income people in higher-inequality societies should be less healthy, generating a steeper gradient. Finally, if income inequality is an accurate index of the general level of social inequality in a society (in other words, if income inequality captures social stratification in a very general way), then income inequality should be positively associated with all four measures of health inequality. Thus, our *income inequality* hypothesis (Hypothesis 2) suggests that nations with higher levels of income inequality will have larger health inequalities.

Data and Method

Our analysis proceeds in two stages. In the first stage, we assess our first hypothesis—that health gradients exist across social contexts—by estimating health gradients based on education, income, gender, and immigration status in a heterogeneous set of societies. In the second stage, we assess our second hypothesis—that health gradients are steeper where income inequality is greater—by estimating the associations between our measures of inequality in health based on income, education, gender, and immigration status and our measures of income inequality at the societal level.

The WVS includes a wide range of societies, making it ideal for an exploration of cross-national variation in health inequalities (Hopcroft & Bradely, 2007). The original purpose of the WVS was to compare a wide array of societies in terms of general attitudes and values (Inglehart & Baker, 2000), but the data set also offers researchers interested in multiple topics, including health, a unique opportunity to examine cross-national differences. Each national sample is designed to be representative of the adult (ages 18 and over in most cases) non-institutionalized population. Sampling procedures vary slightly across the nations included but in general begin with geographically designated primary sampling units (e.g., ZIP codes in the United States). Respondents within these units are then randomly selected for in-person interviews. The "master survey" in English is translated into the predominant national language for non-English-speaking countries. Further details about the WVS can be found at worldvaluessurvey.org. We use data from the fifth (2005-2008) wave of the WVS. Again, the key advantage of the WVS data for our purposes is that they include a heterogeneous cross-section of societies that allows us to examine the generality of the health gradient and to explore one of its possible determinants. In detailing our data and methods below, we highlight our measurement and estimation efforts at ensuring cross-national comparability.

After deleting cases with missing data, we have 47,640 observations from 48 WVS countries, representing 74% of the world population, specifically the following:

Australia (in the figures below, AUS), Burkina Faso (BFA), Bulgaria (BGR), Brazil (BRA), Canada (CAN), Chile (CHL), China (CHN), Columbia (COL), Cyprus (CYP), Ethiopia (ETH), Finland (FIN), France (FRA), Great Britain (GBR), Germany (GER), Ghana (GHA), Guatemala (GTM), Hong Kong (HKG), India (IND), Indonesia (IDN), Iran (IRN), Iraq (IRQ), Italy (ITA), Japan (JPN), Morocco (MAR), Moldova (MDA), Mexico (MEX), Mali (MLI), Malaysia (MYS), Netherlands (NLD), Poland (POL), Romania (ROM), Russia (RUS), Rwanda (RWA), Slovenia (SVN), South Africa (ZAF), South Korea (KOR), Spain (ESP), Sweden (SWE), Switzerland (CHE), Thailand (THA), Trinidad and Tobago (TTO), Turkey (TUR), Taiwan (TWN), Ukraine (UKR), Uruguay (URY), United States (USA), Vietnam (VNM), and Zambia (ZMB).

Self-Assessed Health

We use self-assessed health to create our new variables, health gradients based on education, income, gender, and immigration status. Survey respondents were asked, "All in all, how would you describe your state of health these days? Would you say it is . . ." and the response categories were *very good, good, fair, poor*, and *very poor*. We binarize this measure for analysis, coding *very good* and *good* as 1 and other responses as 0. This measure has been established as a valid indicator of health that predicts mortality and shows strong test-retest reliability (Davies & Ware, 1981; Idler & Benyamini, 1997; Idler, Hudson, & Levanthal, 1999; Lundberg & Manderbacka, 1996; Schnittker, 2004). Here, we follow a number of other comparative health researchers in employing this measure as an indicator of health status (Eikemo et al., 2007; Espelt et al., 2008; Kunst et al., 2004; Mackenbach et al., 2008; Mansyur, Amick, Harrist, & Franzini, 2008; Olafsdottir, 2007). In addition, this variable has been recommended as suitable for comparative research by the World Health Organization (de Bruin, Pichavet, & Nossikov, 1996). Self-assessed health is a partial but valid indicator of health status that has been validated as a predictor of mortality in a number of studies (Idler & Benyamini, 1997).

Education and Income

To create our four indicators of health inequalities, we first generate societal-level measures of health inequality using individual-level predictors of self-assessed health. The measures of gender and immigration status are created directly from a variable measuring whether the respondent is a woman or a migrant, but making comparable measures of education and income is more challenging. This is both a substantive and methodological issue. Anticipating the measurement details below, we address the comparability of measures in two ways: First, rather than relying on absolute income or education, we transform our measures into relative measures that better capture what it means to have certain levels of education or income within societal context. Second, we use binary logistic regression to estimate measures of health inequalities that are margin-free in that they are unaffected by cross-national differences in the distributions of education and income.

Education is also measured with three relative categories to ensure cross-national comparability (Goesling, 2007); the original question from the English questionnaire asked, "What is the highest educational level that you have attained?" We construct the education measure as follows: Respondents in the top quartile of the national educational attainment distribution are coded as "relative high education," and respondents in the bottom quartile are coded as "relative low education," while others are coded as "relative middle education." The middle category is again the reference category in the regression models.

Income is measured for households, since it more accurately captures available resources than individual income (Lahelma, 2001). The original income measure in the WVS is a 10-category ordinal variable, but to enhance the cross-national comparability of income, we rely on relative indicators of affluence and poverty (Bolzendahl & Olafsdottir, 2008; Olafsdottir, 2007). Specifically, we create three dummy variables and classify respondents as "relative low income" if their income falls into the bottom quartile of the income distribution, as "relatively high income" if it falls into the top quartile of the distribution, and as "relative middle income" if it falls between those extremes. In the models, "relative middle income" serves as the reference category.

Female is an indicator variable, where 1 = female and 0 = male.

Immigration status is a binary variable where 1 = that the respondent has a parent who was not born in the country and 0 = both parents were born in the country. As this immigration indicator was available only in 37 countries, this variable is not included in the other models.

In addition, we use a limited number of essential control variables for basic demographic characteristics. Age is measured in years and is expected to have a negative association with the dependent variable. Employment status is an indicator variable, where 1 = full-time employment and 0 = else, and is expected to show a positive association with health. Because the focus of our paper is on social status health inequalities, we do not show the results for the controls in the figures and tables that follow. These results are as expected and are available from the authors.

Estimation of the Health Gradients

We use predicted probabilities, generated from binary logistic regression models, to measure health inequalities. For instance, we measure education-based health inequality by calculating the predicted probability of respondents with low relative education reporting good or very good health and subtracting that from the predicted probability of respondents with high relative education reporting good or very good health. This use of predicted probabilities is preferable to reporting differences in logistic regression coefficients because predicted probabilities do not require the assumption that the error variance is identical across countries.

Because income and education are significantly correlated, and because it has been argued that access to higher incomes accounts for part of the education-health association (Mirowsky & Ross, 2003), we enter income and education into the model separately (see Mackenbach et al., 2008, for another study that estimates the education and

income associations with health separately). Gender inequality in health is also measured as a difference in predicted probability, specifically, the predicted probability that women report good or very good health minus the predicted probability that men report good or very good health. Unfortunately, the analysis of migrant status is limited to a smaller set of WVS countries, due to data availability. In the calculation of predicted probabilities, all covariates other than the focal covariate are held at their means.

Income Inequality and Health Inequalities

Once we have established the size of the health inequalities in each of the 48 nations, we examine the associations between our measures of health inequalities and a common measure of income inequality: the Gini coefficient. Data come from the UNU-WIDER database.

Given the relatively small number of countries in our sample, we show the data in a set of scatterplots. We estimate pairwise correlations between our contextual covariate and our measures of health inequalities based on income and education. We display scatterplots that show the data, the estimate of the linear fit between health inequality and income inequality, and the 95% confidence interval around the linear fit. Such descriptive analysis is appropriate in this case, since the structural correlates of health inequality have only begun to be assessed. Given the relatively small sample ($N = 48$) of countries in the WVS, we leave large-N assessments of these findings to future work. Our goal is to provide fresh evidence on the extent of variation in health inequality, and the relationship between health inequalities and income inequality, in as broad a cross-section of societies around the world as possible.

Analysis Plan

In sum, then, the plan for our analysis is as follows: (a) estimate binary logistic regressions of self-rated health on *relative income*, age, sex, and employment status; (b) estimate binary logistic regressions of self-rated health on *relative education*, age, sex, and employment status; (c) estimate binary logistic regressions of self-rated health on *sex*, age, and employment status; (d) estimate binary logistic regressions of self-rated health on *migrant status*, age, sex, and employment status; (e) calculate the difference in the predicted probability of good self-rated health for the higher-ranked social position versus the lower-ranked social position, using each of the four regression models (where each regression model is estimated separately for each of our 48 societies); and (f) describe the associations between income-, education-, sex-, and migration-based inequalities in health and a general measure of income inequality, the Gini coefficient.

Results

We begin our discussion of the results with our measures of cross-national differences in health inequalities, as estimated using individual-level data on our 48 societies.

Then, we turn to our analysis of the relationship between societal-level health inequality and income inequality. We finish by showing our gradients based on gender and immigration status.

A Universal Gradient?

The first step of our analysis is to evaluate whether there is a universal health gradient across our sample of 48 societies. Figure 1 shows large cross-national differences in the extent to which the relatively affluent report better health than relatively poor people. The figure shows, for each country, the difference in the predicted probability of reporting good health for the relatively affluent versus the relatively poor, along with the 95% confidence interval calculated using the delta method (Xu & Long, 2005). Indeed, it shows that there are significant differences in health based on income in all of our countries except three (Hong Kong, Malaysia, and Switzerland). Overall, our results show that relative poverty harms health even in poor countries. Indeed, low income is associated with significantly worse self-reported health in nearly every country (45 out of 48 countries). Yet, importantly, there is substantial variation in the magnitude of the association. The effects of relative poverty or affluence appear to be sensitive to varying social conditions that do not merely reflect economic development, as the largest differences countries as diverse as Great Britain, Bulgaria, Ukraine, Rwanda, and Mexico. The universal gradient hypothesis is therefore largely supported regarding income.

Figure 2 shows a similar relationship for the difference between those with high levels of education and those with low levels of education. In fact, the relationship is significant in all countries but Iraq, and the largest health inequalities based on education are in Chile, Bulgaria, Guatemala, and South Africa. Again, we find support for our universal gradient hypothesis.

Taken together, our results provide reasonably strong support for the universal gradient hypothesis. They show that those who are advantaged in terms of income or education have better health in more than half of our nations and conversely show that those who are disadvantaged in terms of income and education have worse health. Yet, and perhaps more importantly, the results show that there are important differences across the measures, underscoring the importance of looking at them separately.

Turning to health inequalities based on gender and immigration status, Figures 3 and 4 show a more complex picture. While it appears to be the case that those who are in a vulnerable socioeconomic position across countries experience worse health, the way in which other forms of inequality, in our case, gender and immigration status, translate into health inequalities is more mixed. As an example, women experience significantly worse health than men in nine countries but significantly better health in nine countries. Similar patterns are observed for immigration status; immigrants have better health outcomes in some countries but worse in others. These mixed findings underscore the importance of considering what societal characteristics may be related to these types of health inequalities and what it is about the social context that benefits women's health in some societies but harms it in others.

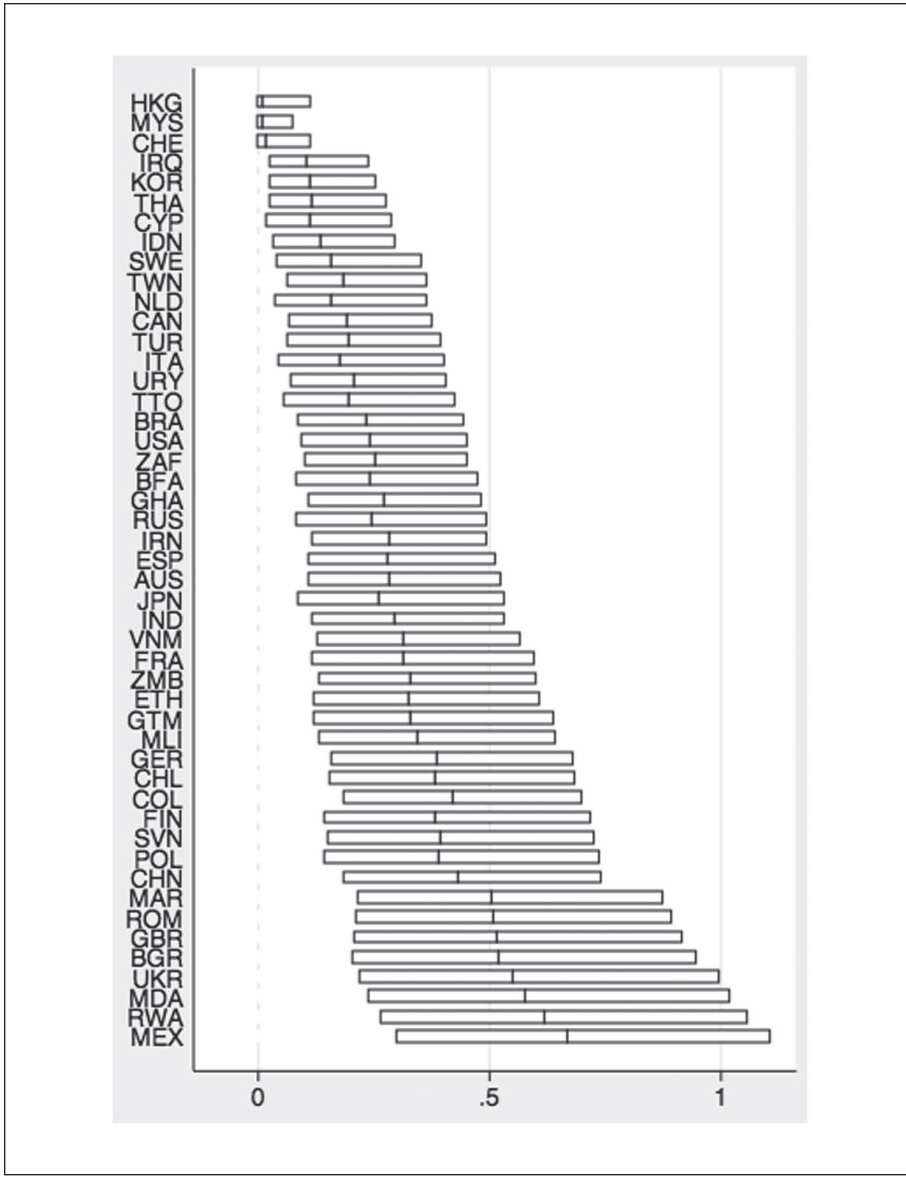

Figure 1. Health inequalities based on income.

Income Inequality and the Health Gradient

The next step in our analysis is to explore how these variations are conditioned by income inequality in these 48 societies. Our second hypothesis, the income inequality

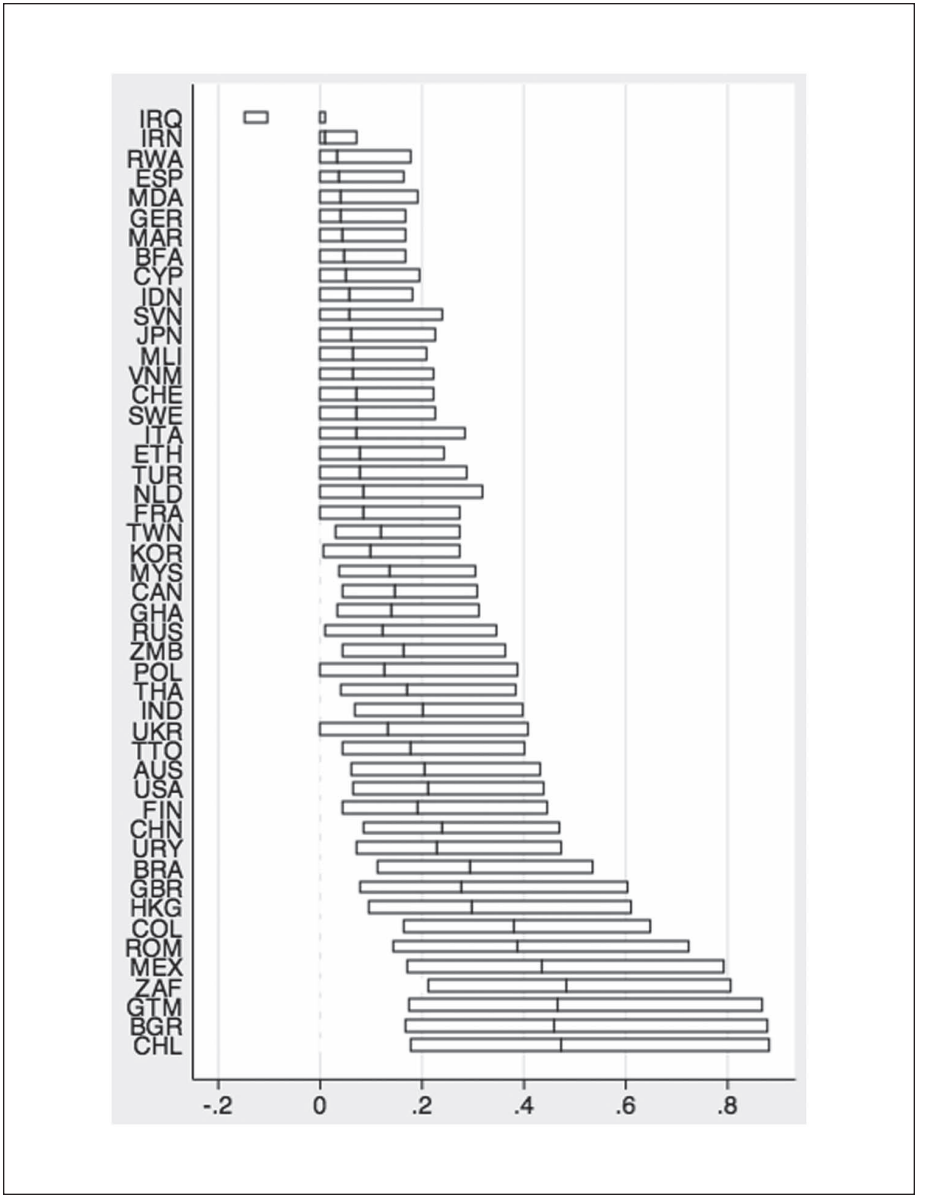

Figure 2. Health inequalities based on education.

hypothesis, suggests that health inequalities should respond to economic inequality, such that we observe steeper health gradients in societies with higher levels of income inequality. We expect the level of income inequality at the societal level to be more

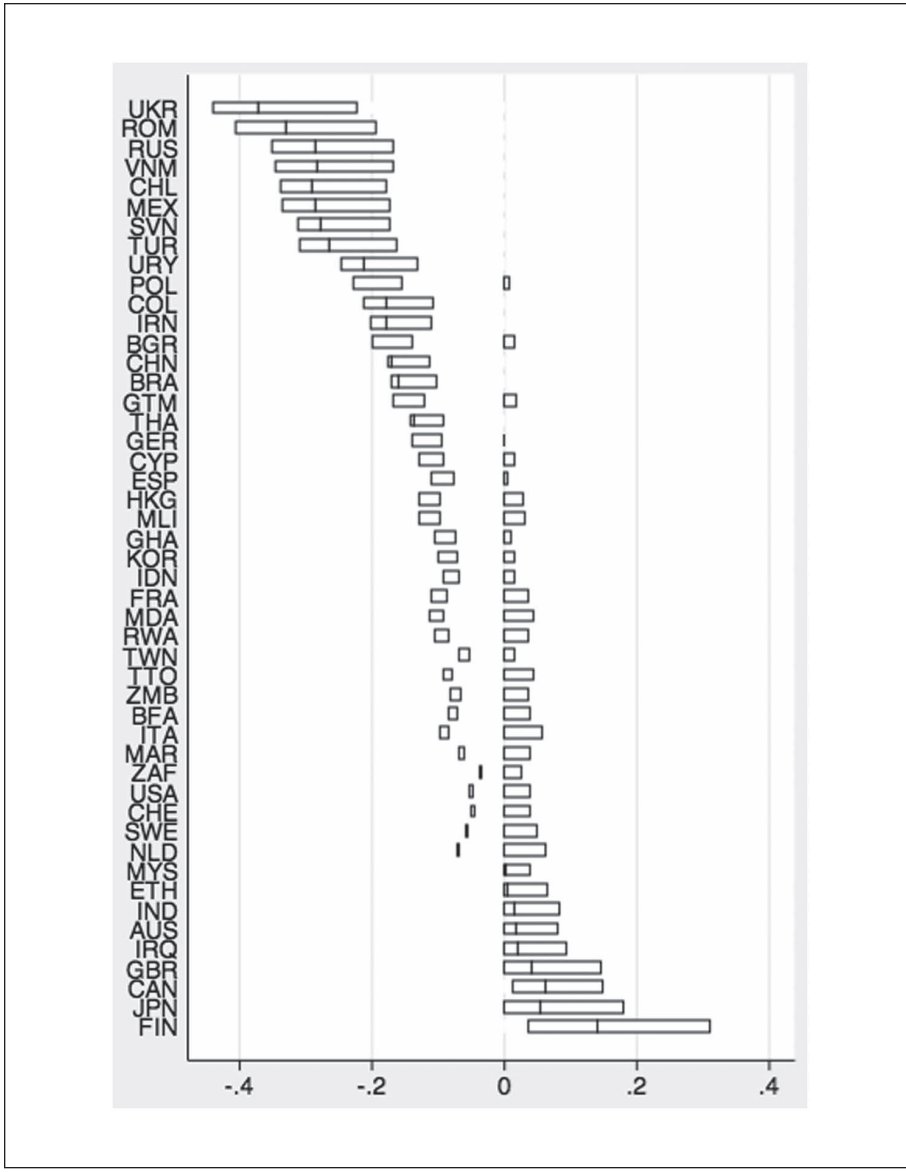

Figure 3. Health inequalities based on gender.

strongly associated with the health inequalities based on income than health inequalities based on the other indicators. The results are displayed in Figures 5 through 8, which show scatterplots and linear regression fits. Figure 5 shows the results for our income inequality hypothesis: cross-national comparisons of *levels* of income

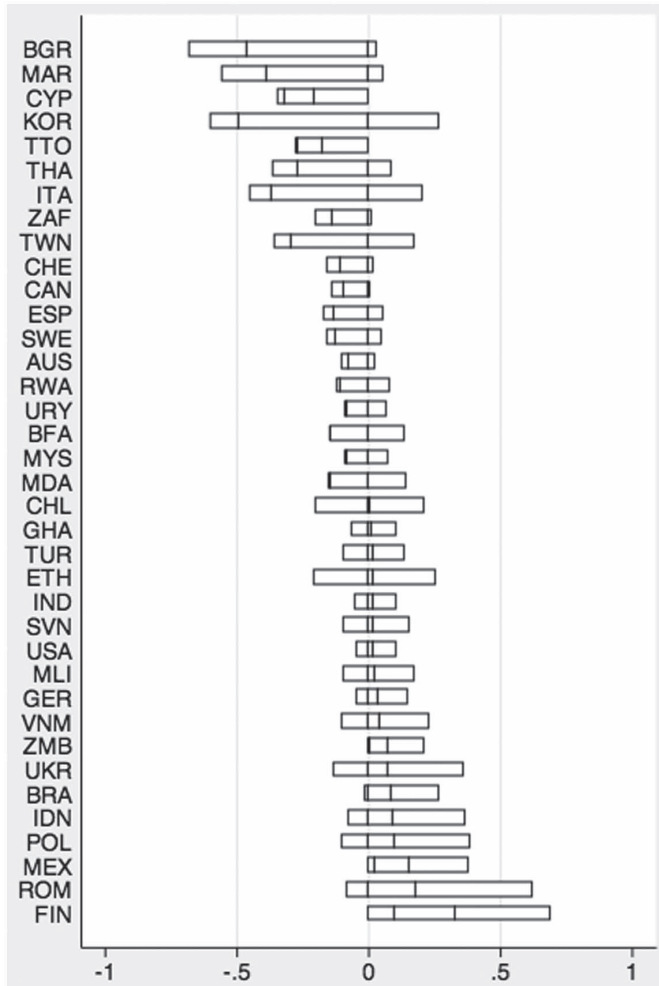

Figure 4. Health inequalities based on immigration.

inequality. Figure 5 shows that health inequalities based on income have a weak correlation with income inequality (r = .09). Conversely, Figure 6 shows that health inequalities based on education have somewhat of a stronger relationship with the level of income inequality (r = .43). Consequently, our income inequality hypothesis receives at best weak support.

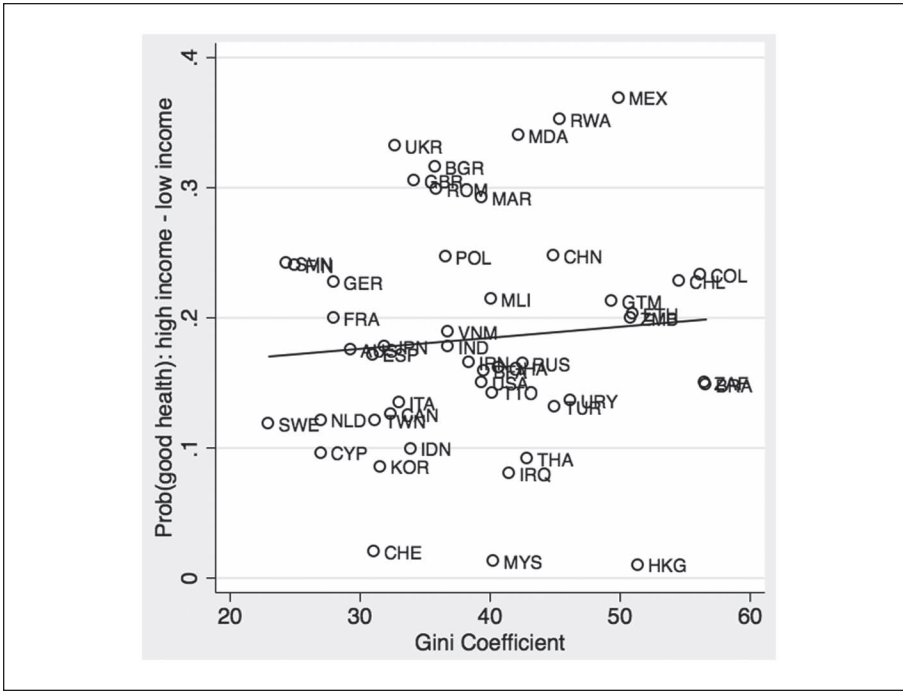

Figure 5. The relationship between income inequality and health inequalities based on income.

Figures 7 and 8 show the relationship between income inequality and gender and migrant status. Figure 7 shows that countries with higher levels of income inequality have a greater difference in health between men and women ($r = –.27$). Finally, Figure 8 indicates a very weak positive relationship between income inequality and migrant status ($r = .07$).

Discussion

In this paper, we conceptualize and investigate inequality in health using a comparative framework. Building on the fundamental-cause perspective, we develop the hypothesis that inequalities in health should manifest in very heterogeneous social contexts. Building on the literature on income inequality and health, we develop the hypothesis that health inequalities should be sensitive to the level of income inequality at the societal level. Both hypotheses are supported (although support for the second is weaker) by analysis of data from 48 heterogeneous societies represented in the WVS.

One of our central findings is that health inequality generalizes across a very broad range of societies but takes on diverse patterns in different social contexts. Most

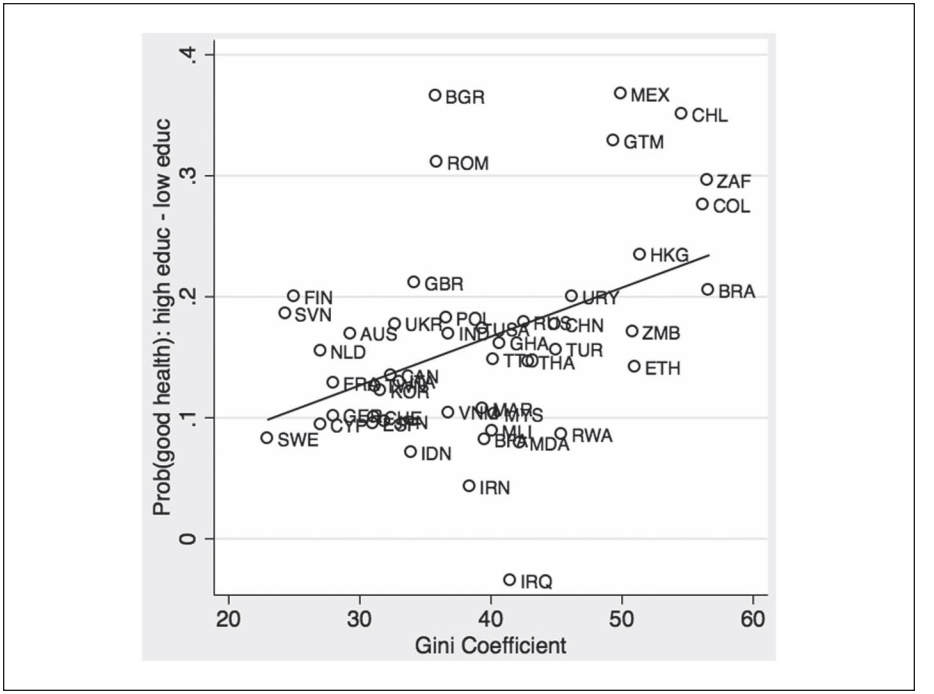

Figure 6. The relationship between income inequality and health inequalities based on education.

striking is the strong association between income inequality (measured at the societal level) and the education gradient in self-rated health. This implies that the fundamental-cause approach to the health gradient can be extended into a comparative framework to understand the variable "social conditions" that generate health gradients. Conceptualizing and measuring health inequality as a cross-national variable opens up a wide range of new research questions that invite new lines of inquiry. Much as the cross-national (and historical) variability in income inequality has sparked critical new and multidisciplinary work on the institutional, demographic, and economic determinants of inequality (Alderson & Nielsen, 2002; Beckfield, 2006; Gottschalk & Smeeding, 1997; Guvenen & Kuruscu, 2007; Kenworthy, 2004; Korpi & Palme, 1998; Neckerman & Torche, 2007), we believe that research on the determinants of *health* inequality can generate important new theory- and policy-relevant questions and insights. In this paper, we have taken a step in this direction by showing how much the socioeconomic gradient in health shifts according to one social condition that varies widely among the countries in our sample: the level of income inequality. Our results imply that societal-level forces may matter significantly for health inequalities and suggest the promise of more work investigating the macro-sociological correlates of health inequalities (Hall & Lamont, 2009; Putnam & Galea, 2008).

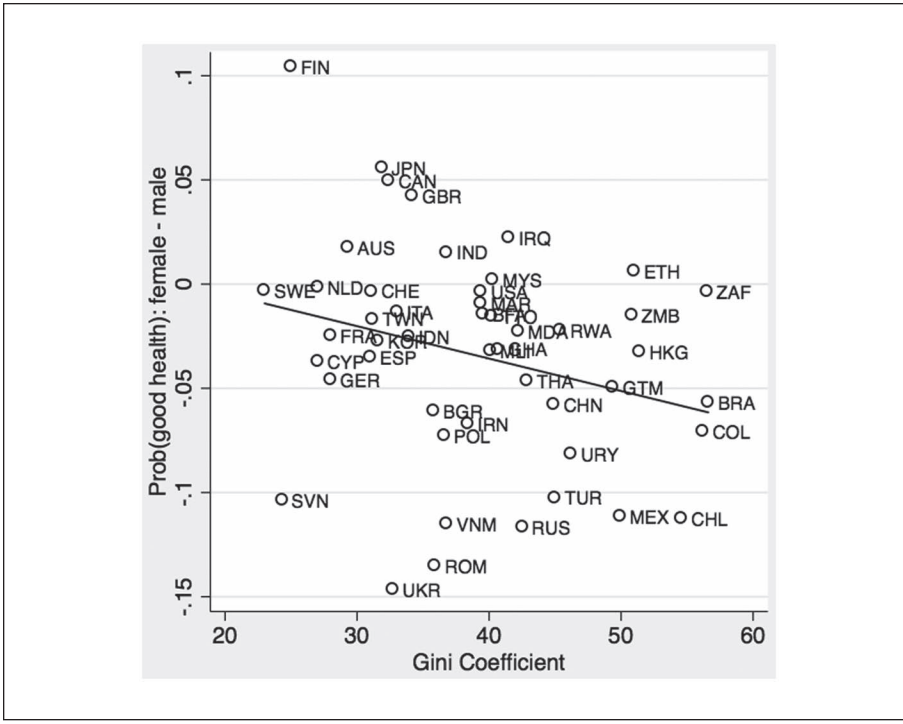

Figure 7. The relationship between income inequality and health inequalities based on gender.

Our findings also carry important implications for the debate over the association between income inequality and population health. Rather than focusing exclusively on aggregate measures of average population health, such as life expectancy and the infant mortality rate, we argue that progress can be made by investigating the social distribution of population health as a social fact that may respond to cross-national differences in, and historical changes in the structure of, social inequality. We have taken a step toward that larger goal by showing that education-based health inequalities are larger where income inequality is greater, but much work remains to be done. For instance, with finer-grained measures of health than we have access to here, quantile regression techniques can be used to model health at points across the health distribution other than the mean (see Martins & Pereira, 2004, for an application to wages). Also, trends in health inequalities within countries can be modeled using time-series techniques to estimate the impact of changes in income inequality within societies that have experienced particularly pronounced U-turns on income inequality, including the United States and the United Kingdom. Of course, the generality of the association between income inequality and health inequality should also be assessed using an even broader array of societies than we have assembled here.

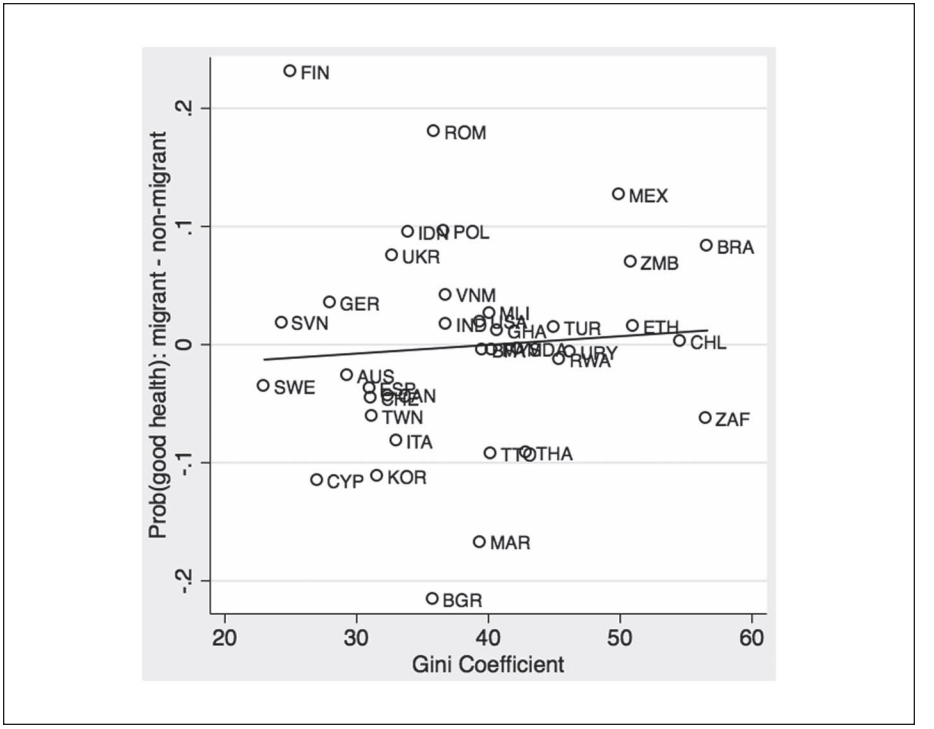

Figure 8. The relationship between income inequality and health inequalities based on immigration status.

As illustrated above, our proposed global agenda has the potential to increase our understanding of some of the key debates within the health and inequality literature. Yet, variation in social conditions reflect more complicated patterns than inequalities across major fault lines in societies. Various macro-level factors have implications for health inequalities within and across nations. Clearly there are major differences between advanced, industrialized nations and developing nations, regarding both institutional arrangements and health profiles. While countries such as the United States have largely moved into a health trajectory of chronic illness, infectious diseases continue to be a major threat in many developing nations. More work is needed that places global health inequalities in the context of the broad global inequalities that characterize our world today. For instance, the highly uneven disease distribution across societies around the world could itself be related to social inequalities in health within societies, and a cross-nationally comparative analysis of cause-specific mortality could make progress on this question.

While it is important to acknowledge the very broad development differences across nations, we argue that more fine-grained comparisons across certain types of countries can shed further light on how health inequalities are created and sustained.

We elected to focus on income inequality in this paper because there is an established cross-nationally comparative literature on income inequality and health, and because comparable measures of income inequality are available for the heterogeneous societies in our sample. With such a broad array of societies, it is possible to investigate other hypotheses as well. For instance, given the debate over the role of economic development in improving population health, it would be interesting to compare the association between development and aggregate health indicators (such as life expectancy and infant mortality) to the association between development and indicators of inequality in health like those we have used here. We would hypothesize that while development may be associated with average population health, it should be not be associated with health inequality, because development by itself does not distribute social goods. On the other hand, we would hypothesize that development combined with equitable social policy is positively associated with average population health and negatively associated with health inequality. These are examples of the sorts of questions that can be addressed only in a broad, cross-national, comparative framework.

Of course, there is also high utility in selecting theoretically relevant groups of societies for analysis. Within the set of advanced industrialized nations, the welfare state, as a political and cultural institution, represents a key institution determining the life chances of individuals. In previous work, we identified three mechanisms that link the welfare state to health inequalities (Olafsdottir & Beckfield, 2011). First, the level of decommodification (Esping-Andersen, 1990) shapes level of inequalities in general, which in turn shapes health inequalities. More specifically, it defines which social groups are excluded and included across a wide array of social policies that may have direct or indirect impact on health inequalities. Second, the way in which the welfare system is organized across the public/private domain of provision is likely to impact health inequalities within and across countries. Third, whether something is provided or not to individuals and groups is a dynamic process, and the kind of support one receives earlier matters for later outcomes. This highlights the importance of looking at health inequalities as a dynamic process, where cumulative advantages or disadvantages begin even before birth (Conley, Strully, & Bennett, 2003). Consequently, it is critical to link institutional arrangements and health inequalities; as such, inequalities are clearly embedded within specific political and cultural contexts.

Such work, in which we are currently engaged, can also help to overcome the limitations of this study, which should of course be noted. The WVS data we use here do not allow for an exploration of longitudinal change in health inequalities (see Krieger et al., 2008, for such an analysis using data from the United States). Nor do the data allow us to analyze potential biological mechanisms (see Avendano et al., 2005, for a study of stroke mortality). Also, self-rated health is but one of many measures that can be employed in research on health inequalities (see Kunst & Mackenbach, 1994, for alternatives). Moreover, because of the cross-sectional nature of our data, we cannot rule out health selection as a potential driver of income- and education-based health inequalities, although we believe it is as interesting to reveal cross-national differences in any health selection effect as it is to show cross-national differences in social

inequalities in health. We have as little evidence on the societal determinants of health selection (that is, what institutions and policies strengthen or weaken the health benefits that accrue to education and income?) as we do on the societal determinants of social causation. Finally, we note that there is controversy over whether questions about self-rated health mean the same thing across cultural groups (our method of comparing predicted probabilities avoids the assumption of equal error variances across societies, but there are most likely other differences that our method does not account for).

While country-specific studies of health inequalities have made great strides in documenting and explaining health inequalities, we think such research should be placed in a global context. A global context aids in the evaluation of health inequalities by providing a comparative scale for how much inequality is "large" or "small." A global context also identifies health inequalities as subject to social action—institutional variables that are not "natural" but instead systematically vary across societies.

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