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Increasing inequality in general intelligence and socioeconomic status as a result of immigration in Denmark 1980-2014

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Abstract

We argue that if immigrants have a different mean general intelligence (g) than their host country and if immigrants generally retain their mean level of g, then immigration will increase the standard deviation of g. We further argue that inequality in g is an important cause of social inequality, so increasing it will increase social inequality. We build a demographic model to analyze change in the mean and standard deviation of g over time and apply it to data from Denmark. The simplest model, which assumes no immigrant gains in g, shows that g has fallen due to immigration from 97.1 to 96.4, and that for the same reason standard deviation has increased from 15.04 to 15.40, in the time span 1980 to 2014.

Keywords: National IQs, group differences, country of origin, Denmark, immigration, social inequality, spatial transferability hypothesis, racial diversity, demography

1 Introduction

Many Western European countries currently have high rates of immigration. Generally speaking, immigrants do not fare well in their receiving countries. They have higher crime rates, higher rates of unemployment, lower educational attainment and so on than the native populations. This has given rise to political opposition to further immigration in many countries, e.g. the British National Party in the UK, the National Democratic Party in Germany, the National Front in France, the Party for Freedom in the Netherlands, the Sweden Democrats in Sweden, the Progress Party in Norway, and the Danish People's Party in Denmark. These parties have received increasing voter support in recent elections. For instance, in the last general election in Sweden in 2014, the Sweden Democrats increased their election result from 5.7% to 12.9%[1]. These parties can generally be characterized as nationalist or conservative but they do not necessarily favor free-market policies.

There are also parties that still favor relatively free immigration and the taking in of refugees (e.g. from the ongoing Syrian civil war). Generally speaking, these parties range from the far left to the center of the economic political spectrum. Generally, these parties also favor increased socioeconomic equality which we shall return to later.

1.1 *Immigration to Denmark*

The demographics of Denmark 1980-2014 by origin is shown in Figure 1.

It can be seen that the percentage of the population of foreign origin has increased from 3.0% to 11.1% from 1980 to 2014 (Jan. 1st). From the graph it appears that the number of Danes has been roughly constant during this time span. However, this is hard to square with the (total) fertility data as shown in Figure 2.

As can be seen, the fertility of women with Danish origin is well below replacement levels (about 2.1). Given reasonable assumptions about population age structure, sex distribution and increases in lifespan, the demographic data appears to be inconsistent with the fertility data.

The reason for the apparent paradox is that there is a constant conversion of people from the 'foreign origin' category to the 'Danish origin' category. The reason this happens is that Statistics Denmark uses a

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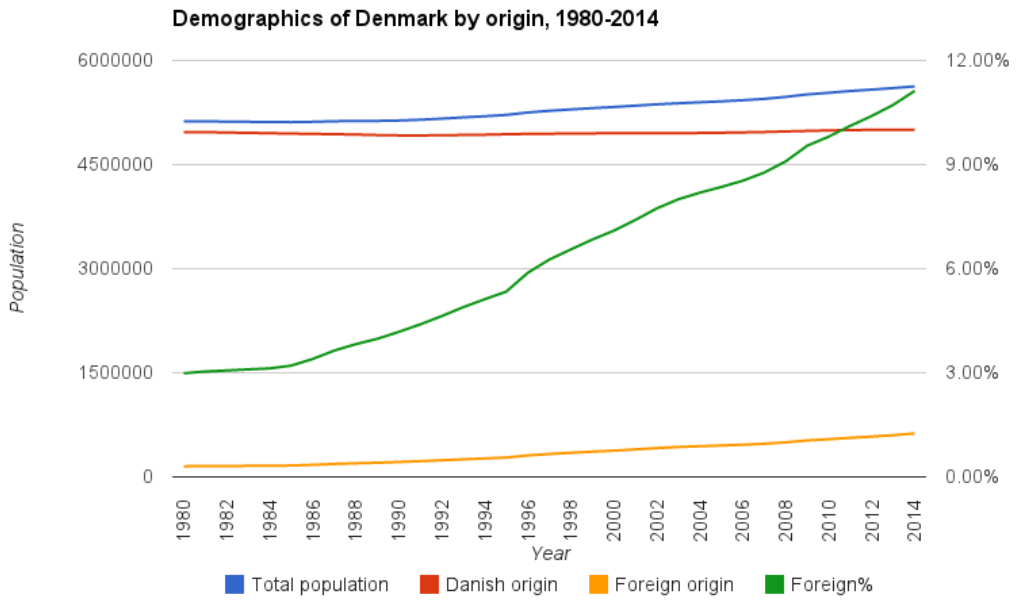


Figure 1: Immigrant population size over time in Denmark. Constructed by the authors using population data from Statistics Denmark (Danmarks Statistik). Database: *FOLK2: Folketal 1. januar efter køn, alder, herkomst, oprindelsesland og statsborgerskab*. Note that "Foreign%" is read at the right y-axis while the others are on the left.

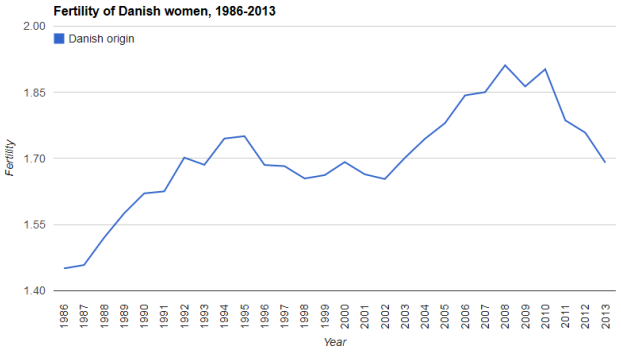


Figure 2: Total fertility of women with Danish origin. Constructed by the authors using population data from Statistics Denmark (Danmarks Statistik). Database: *FERT1: Samlet fertilitet efter herkomst*

legalistic definition of 'Danish origin' whereby if one has at least one parent who is himself/herself in the 'Danish origin' category and is a Danish citizen, then one will be placed into the 'Danish origin' category[1]. This means that if one is, as the authors are, interested in the number of persons who are genetically Danish (in the sense of belonging to a Danish cluster in population genetic analyses), then these data will be somewhat contaminated by the inclusion of non-Danes in the 'Danish origin' group.

Furthermore, if immigrants have higher fertility than Danes (which is known to be the case[2]), then the fertility rates given above are themselves overestimates, which means that Danes are even fewer and becoming fewer.

[1] More information about can be found here in Danish.

The above means that the number of immigrants is underestimated to an unknown degree. For an attempt, probably too pessimistic, at modeling that tries to solve this problem, see [3].

The composition of the origin countries has changed substantially over the years. Table 1 shows the largest 10 countries of origin in selected years and their relative sizes.

In 1980, 6 of the top countries were Western, but by 2000, this was down to 3, and by 2014 to 1. It is also noteworthy that the relative size of each country diminishes with time, indicating that the immigrant population is becoming more diverse.

2 A policy conundrum

We think that immigration to Western countries as it is happening right now leads to a policy conundrum for some policy makers. Our argument is as follows:

First, people who migrate to Western countries generally have a lower average level of g than the countries they migrate to and selection effects do not substantially alter this for most countries. Second, migrants generally retain their average levels of g from their home countries. Third, g is an important cause of socioeconomic inequality within countries.

From these three premises, we draw the following conclusions: Immigration causes increased inequality in g within countries, and as a result of this, immigration causes higher socioeconomic inequality within countries.

Table 1: Relative immigrant sizes by country of origin for chosen years. Expressed as a percentage of the total immigrant population.

1980 (%)	1990 (%)	2000 (%)	2010 (%)	2014 (%)
DEU (17.6)	TUR (14.0)	TUR (13.0)	TUR (11.0)	TUR (9.9)
SWE (10.7)	DEU (11.0)	DEU (6.8)	DEU (5.8)	POL (5.9)
TUR (9.4)	SWE (6.5)	BIH (5.3)	IRQ (5.4)	DEU (5.1)
NOR (9.3)	NOR (6.2)	LBN (5.1)	POL (5.3)	IRQ (4.9)
PAK (5.2)	PAK (5.7)	PAK (4.7)	LBN (4.4)	LBN (4.1)
GBR (5.1)	YUG (5.0)	YUG (4.6)	BIH (4.1)	PAK (3.7)
YUG (5.0)	POL (4.6)	IRQ (4.0)	PAK (3.8)	BIH (3.6)
POL (4.3)	IRN (4.1)	SOM (4.0)	YUG (3.2)	SOM (3.0)
USA (3.9)	GBR (4.1)	NOR (3.9)	SOM (3.1)	IRN (2.8)
FIN (2.7)	LBN (3.8)	SWE (3.9)	NOR (3.0)	ROU (2.7)

If the argument is sound, then policy makers who prefer high rates of immigration and who want to decrease, or at least keep stable, socioeconomic inequality within their country face a problem.

In the next three subsections we provide evidence for our three premises.

2.1 *Premise 1: National differences in g*

The first part of our argument is that immigrants to the West often hail from countries which have lower levels of measured g than do Western countries. We derive this premise from reported immigration rates in conjunction with well validated measure of national average cognitive ability. As for the latter, Richard Lynn has pioneered the study of national IQs and collected a huge database of studies. The latest dataset and the global correlates of these are reported in his and Vanhanen's 2012 book *Intelligence: A unifying construct for the social sciences*[4]. There is no reasonable doubt left as to whether members of different nations have different average measured IQs, although there is room left for discussion about the exact magnitude of the differences[5, 6, 7, 8, 9] and the precise psychometric nature of them (e.g., to what exact extent they are in g).

2.2 *Premise 2: Spatial transferability of g and correlates*

The spatial transferability hypothesis has two parts. The first is that immigrants generally retain their average levels of g, and the second is that these also give rise to the usual correlates of g at the group level. Many recent studies have supported both parts of this claim[10, 11, 12, 13, 14, 2, 15, 16, 17, 18], see also [19] for a review. The question is no longer whether they retain their g levels and correlates or not, but to which degree and for how long (intergenerational transferability).

2.3 *Premise 3: g as an important cause of socioeconomic inequality*

Two things are required: 1) that g varies in the population, and that 2) g is a cause of socioeconomic outcomes. No one denies the first any longer[20, chapter 4], so we turn to the second.

There is a long running discussion of g's role in causing social inequality. That this is so was one of the points of *The Bell Curve*, and had also been made by one of its authors already by 1971[21].

How do we find out whether g is causally related to later socioeconomic status? There are at least five lines of evidence: First, g and socioeconomic status correlate in adulthood. This has consistently been found for so many years that it hardly bears repeating[22, 23]. Second, in longitudinal studies, childhood g is a good correlate of adult socioeconomic status. A recent meta-analysis of longitudinal studies found that g was a better correlate of adult socioeconomic status and income than was parental socioeconomic status[24]. Third, there is a genetic overlap of causes of g and socioeconomic status and income[25, 26, 27, 28]. Fourth, multiple regression analyses show that IQ is a good predictor of future socioeconomic status, income and more, even controlling for parental income and the like[29]. Fifth, comparisons between full-siblings reared together show that those with higher IQ tend to do better in society. This cannot be attributed to shared environmental factors since these are the same for both siblings[30, 31].

Based on the evidence listed above, we find it reasonably well-established that g is an important cause of socioeconomic inequality.

3 National g and socioeconomic inequality

Before dealing with inequality in g and socioeconomic inequality, it is worth noting the relationship between national g and socioeconomic inequality.

At least one study has attempted to predict the change in the average g in a host nation (Denmark) resulting from immigration[3]. The average g of a country might have effects on socioeconomic inequality in the country independently of inequality in g. To see if this might be the case, we ran the correlations between the following variables:

- LV's 2012 estimated IQs with corrections by Jason Malloy (see comments in datafile)[4, 32]
- United Nation's 2009 10-10 (top 10%, bottom 10%) income ratios[33]
- UN's 2007 20-20 income ratios[34]
- World Bank's 2011 Gini coefficients[35]
- Central Intelligence Agency's (CIA) 2008 10-10 income ratios[36]
- CIA's 2011 Gini coefficients[37]
- a common factor extracted (principal axis factoring) from the five inequality variables above. KMO=.787, 79% of variance, all loadings .819-.956.

Results from the above are shown in Table 2.

There are negative correlations between national g measures and income inequality measures, such that the higher g countries are more equal. This may be because higher g countries adopt more egalitarian policies. Alternatively, it may be because lower g countries have higher g inequality. Similar results have been reported before[38, 39].

4 Modelling population merges

4.1 Code

We wrote R code[2] to calculate the aggregation of populations. The source code is available so other researchers can verify our results and reuse the code for future projects. See Section 11.

[2] R is a free, powerful, easy to use programming language designed for data mining and statistics. See http://www.r-project.org/

4.2 The model for merging populations

Each population is modelled as a normal distribution with the same standard deviation (15), and with the size given in the census data as well as their national IQ. The computational model works by dividing the region of interest into small intervals, and finding the area of each population in each interval and summing these.

Consider the case where we want to model the merging of two equal sized populations with means of -.5 and .5, and standard deviations of 1. Suppose that we want to model it in the region -5 to 5. The effect of decreasing the interval size is to increase the resolution and make the estimates from the intervals closer to the true normal distributions. Figure 3 shows the output using interval sizes of 2, 1, .5, and .1.

As can be seen, interval size .1 is sufficiently accurate to very closely approximate the normal distributions. We tested smaller interval sizes but found that they changed results very little but added greatly to the computation time. One can also increase or decrease the region modeled, but since almost all persons (99.9%) fall within 3 deviations from the mean of their population, increasing it further makes very little difference while increasing computational time.

For our modelling purposes we thus settled on the region from -5 to 5 with steps of .1.

4.3 Modelling the effect of population merges on the dispersion of g

There are many ways to measure the dispersion (or inequality, in other words) of a distribution. The standard deviation (SD or σ) is a measure of the dispersion of a distribution which can almost be thought of as being the average absolute distance to the mean. The formula for calculating the SD is:

$$\sigma_x = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \bar{x})^2} \quad (1)$$

Where $\bar{x}$ is the mean value and x_i is the i'th value.

It can be seen from this that if one adds datapoints to a dataset which are farther than the SD from the mean, the SD will increase accordingly and the mean will move in the direction of the added datapoints. Consider the dataset shown in Figure 4:

The SD of this particular dataset (N=25) is 2.04. If one adds another "10" to it, the SD becomes 2 and the mean remains unchanged. Adding either a "9" or

Table 2: Correlations between inequality measures, their general factor and national IQs. Sample sizes range from 119 to 154 with a mean of 130.

Variable	UN 10/10	UN 20/20	CIA 10/10	WB Gini	CIA Gini	General factor
r with IQ	-.37	-.40	-.36	-.40	-.47	-.44

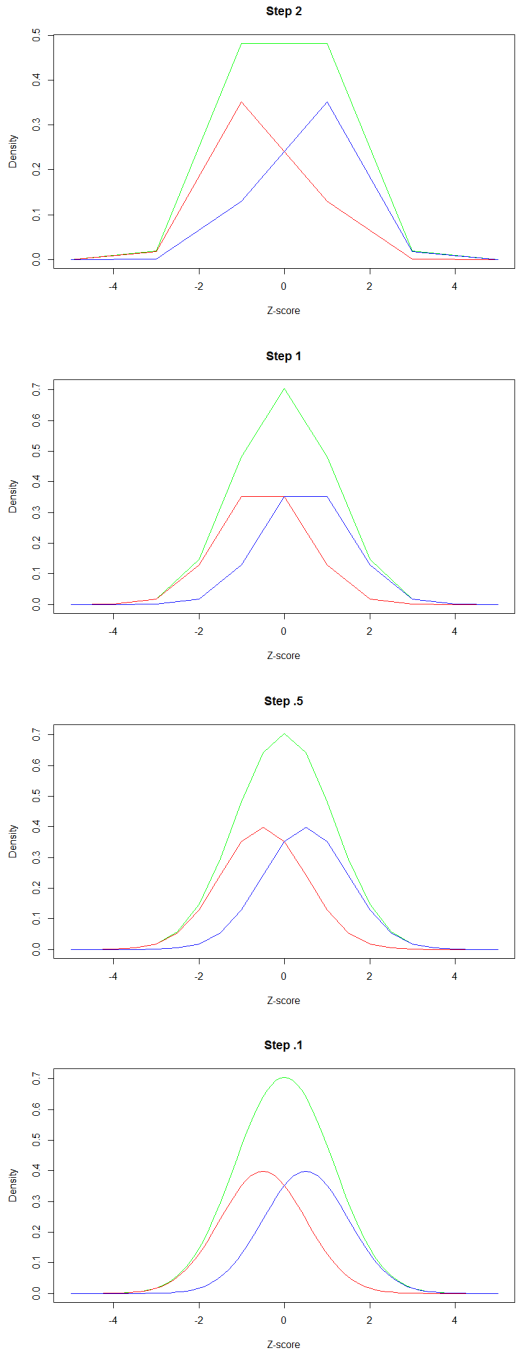


Figure 3: Two populations of equal size (red, blue) and the composite population (green). Steps of 2, 1, .1.

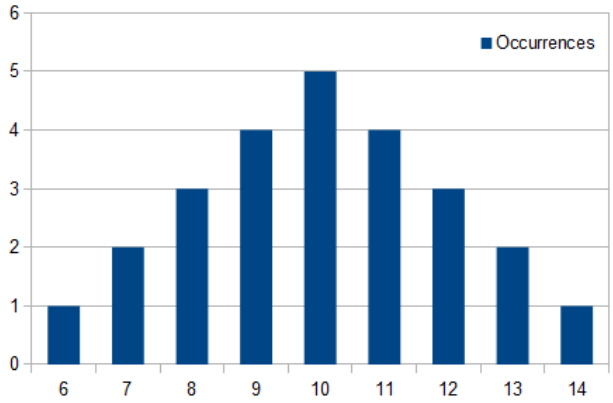


Figure 4: An example dataset.

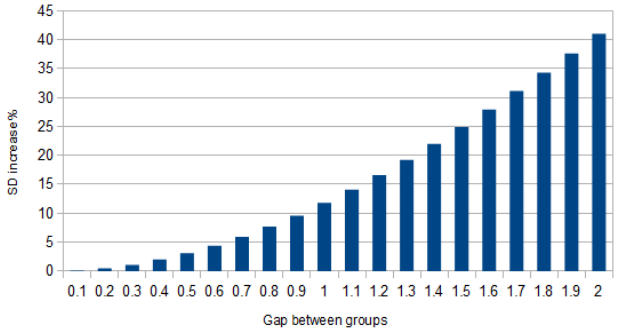


Figure 5: Increases in SD of a trait by adding together two normal distributions with different gaps.

an "11" reduces the SD to 2.01. On the other hand, adding a "6" or "14" increases the SD to 2.15. The farther away from the mean the added datapoint is, the more the mean moves and the more the SD increases.

Things are somewhat different when working with normal distributions. Adding together two normal distributions with equal sizes and SDs but different means always results in an increase in SD. Figure 5 shows the relationship between the gap between the population means (in standard deviations) and the resultant increase in SD from adding two equal sized populations together.

One can calculate the SD and mean of a composite population by using the interval midpoints as units and their densities as weights.

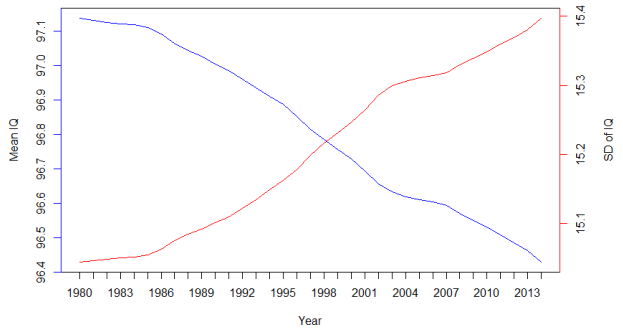


Figure 6: Change in mean IQ and SD over time in Denmark modeled from population data by country of origin and national IQs.

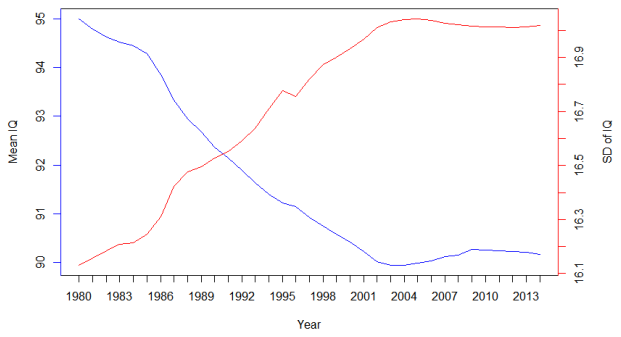


Figure 7: Change in mean IQ and SD over time in the immigrant population in Denmark modeled from population data by country of origin and national IQs.

5 Immigration and the inequality of g in Denmark

We are now ready to consider the effect of immigration on inequality of g in Denmark. We downloaded the most recent population data from Statistics Denmark for use in the modeling.[3] The data span the years 1980 to 2014 (the data are from the 1st of January every year).

Then, for each year, we estimated the composite IQ distribution by modeling the effect on Danish IQ of changes in the composition of the population, based on the national IQs of the immigrants' countries of origin (using the same national IQ data as previously). The plot of the results is shown in Figure 6.

The model predicts that the mean of IQ has fallen while its SD has increased in the years 1980-2014. Since IQ is not on a ratio scale, it does not make sense to calculate the decrease as a percent. However, SD is on a ratio scale (has a true 0), so a percent can be calculated. The increase from 1980 to 2014 is modeled to be 2.4%.

A reviewer suggested that we also examine the change in means and SD in the immigrant population over time. We reran the model excluding Denmark. The result is shown in Figure 7.

The mean immigrant IQ has seen a decrease since 1980 owing to changes in the composition of the immigrant population. However, this effect seems to have stopped around 2003 and the immigrant population has stabilized on a mean IQ of about 90 according to the model. An analogous but reverse pattern is seen with the SD, namely that it increased from 1980 but has been stable since about 2003.

6 Immigrant gains in g

The critical reader will have noticed that the model so far assumes that there are no changes in g in the immigrant populations once they reach Denmark. However, almost all scholars agree that persons from countries with low g have g levels that are environmentally depressed (e.g. by poor nutrition, lack of formal schooling, poor health, see [40] for direct genetic evidence of this). If there are gains in immigrant g, then the effect on both the mean and SD of g in Denmark is overestimated by the model. It therefore seems wise to attempt to model how things might look given gains in immigrant g.

There is no expert consensus about exactly which populations are environmentally depressed in g, how much they are depressed, how much they will improve upon moving to Denmark, or how quickly (e.g. first generation vs. third generation). Without a guiding theory to rely on, we chose a simple way of modeling gains. We imagined three different scenarios: one where there are large gains, one with medium gains and one with small gains. We modeled these in concrete terms as the gap between average immigrant g and the average g of the general population of Denmark shrinking by 75%, 50% and 25% respectively. For instance, if the host country had an IQ of 100, and one used the 50% gains-model, then immigrants from a country of origin with an IQ of 80 would be assumed to improve to IQ 90 in the model.

We applied these gains only to countries with an IQ lower than Denmark. In other words, we did not assume that immigrants from higher scoring countries become environmentally depressed in Denmark. If one assumes this, both the mean and SD decrease.

[3] FOLK2: Folketal 1. januar efter køn, alder, herkomst, oprindelsesland og statsborgerskab

With these new IQs, we reran the model. Comparative results are shown in Table 3.

Scholars with different opinions regarding the heritability of global group differences will favor different model parameters. In our opinion, the previous results from Kirkegaard (2013[14]) are most consistent with no gains or weak gains (if there were strong gains, the measured IQ would be far higher than that modeled). Since we consider the scenario of no gains (between group heritability of 100%) implausible[4], we place our money on something akin to the weak gains scenario.

7 Comparison with cognitive data from the military draft

Denmark has a military draft for randomly chosen young men. The draft includes a written, non-verbal IQ-type test[41]. While the test data are unfortunately not public, a study was published in 2005 that includes some test data from 2003 (N=21,159). One of us previously used this dataset to test whether the mean immigrant IQ was predictable using almost the same model as used in the present study[14]. The dataset is of further use here because it makes it possible to calculate the SD within the 'Western' group and within the 'non-Western' group.[5]

In the military data, the 'non-Western' group had an SD 14.2% larger than the 'Western' group.[6] The reason this value is higher is that the 'non-Western' group is quite heterogeneous in terms of the IQs of the countries of origin. Using the model to predict this value using the general population 2003 data gives 11.3% which is not too far off (estimated SD's 15.01 for 'Western' and 16.70 for 'non-Western').

However, this value is based on the population data for all ages. The military draft data concerns only young men (and some women volunteers), so one should use data for young males instead. We fetched population data for men aged 18-19 in 2003, averaged them, and reran the model. The new results were slightly closer to the military data estimate: 11.7%. (SD's 15.01 and 16.77 for 'Western' and 'non-Western', respectively)

The question as to the cause of the larger than expected SD is a perplexing one. The fact that some non-Danes are classified as 'Danish origin' means that the

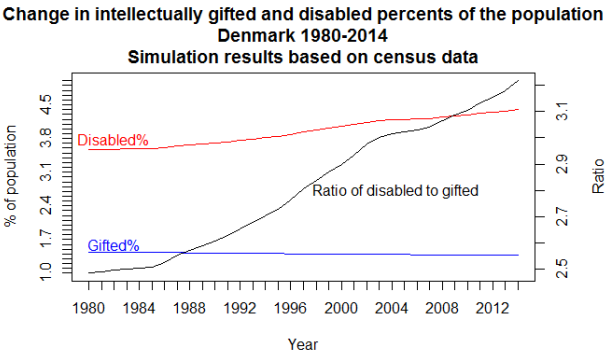


Figure 8: Percents of disabled and gifted individuals and their ratio, Denmark 1980-2014. Results based on the no-gains model.

SD ratio should be smaller than modeled, not larger. One hypothesis however is that it is due to some 'non-Western' countries having negative selection for g (e.g. refugees) while other 'non-Western' countries have positive selection for g (e.g. rich enough to hire human smugglers). For this hypothesis to fit the result, the selection for g would have to vary quite a lot more in the 'non-Western' countries compared with the 'Western' ones. We are not aware of any evidence for this.

8 Is the increase in dispersion too small to be socially important?

One might wonder whether the effect size is simply too small to matter. Even assuming the implausible no-gains parameter means that the SD is modeled to go up only 2.4%. In *The Bell Curve*, Herrnstein and Murray discussed a similar point, namely what social consequences a small change in mean IQ would have[29, p. 364]. The answer is that for the tails of the distributions, it means quite a lot. The same is true of changes in dispersion.

Economists spend quite a lot of time studying economic inequality and they have invented a number of ways to quantify this. One common method is to examine how much more the top 10% or 20% of the population earns than the bottom 10% or 20%. This measure is not quite applicable to IQ data because it is not on a ratio scale, but it is possible to examine the number of persons above and below some predetermined thresholds. We decided to examine IQs 130 and 70 which are usually used as the thresholds for intellectually gifted and disabled, respectively. Figure 8 shows just this, along with the ratio of disabled per gifted modeled with the no-gains parameter.

The reason why the gifted% and disabled% are not the usual 2.3% is that the IQ of Denmark has been modeled as 97.2, not 100. As can be seen from the

[4] A reviewer objected that no g gains is compatible with less than 100% heritability if one assumes gene-environment interaction/correlation models. We think these are unlikely to be relevant at the global scale for g and so ignore this potentiality here.

[5] The reason for the quotation marks is that the extension has since changed due to changes in EU-membership as well as being generally debateable.

[6] Cell J179 in *military_draft_data.xlsx*. See Section 11.

Table 3: Comparative results from different scenarios regarding immigrant gains.

Scenario	Change in IQ 1980-2014	Increase in SD 1980-2014
No gains	-.71	.35 (2.35%)
Weak gains (25%)	-.53	.20 (1.36%)
Medium gains (50%)	-.34	.09 (.63%)
Strong gains (75%)	-.16	.03 (.19%)

graph, the disabled% rises faster than the gifted% falls. This is because immigration mostly adds people to the left side of the population distribution but does not subtract on the right side. Still, the ratio between them has increased quite a bit according to the model. From 2.48 to 3.22, an increase of 30%.

Since the gifted proportion of society contributes disproportionately in taxes through their high income, and the disabled is a net drain on societal resources, changing this ratio may cause economic problems because there may not be enough rich persons to pay for the poor[42, 43]. More concretely, a study found that 9% of total health-care costs in the Netherlands in 1994 were due to intellectual disability[44]. In Denmark, 30% of the public primary school budget is spent on special education, but students receiving special education only constitute 14.3% of the total student body (Table 2.1 in [45]). The number of students receiving special education has been growing since perhaps the mid 1980s (Figure 3.6 in [45]) which may be due to more low g immigrants as well as changes in diagnostic practice.

Danish newspapers have mentioned the fact that immigrants are overrepresented among students in special education classes for many years. For instance, in an article from 2000, a psychologist from the Copenhagen area states bluntly that "If one compares children with ethnic origin with children with only Danish background, one can see that 82% more immigrant children are generally retarded"[46]. We searched the Danish media database Infomedia for articles in major newspapers with the words "indvandrere specialundervisning" (immigrants special education) in them. The search gave 177 results, although some of them were clearly not relevant. Due to the practice of using different euphemisms for immigrants, it is harder to locate relevant material.[7]

When politicians have commented on the issue, they have explained it as being caused by inbreeding depression since cousin marriages are much more common among some immigrant groups. A politician from the Social Democrats (the largest center-left party) wrote that "The over-representation is of course due to inbreeding in families with immigrant background, for what else could it be?"[47]. Clearly, it did not occur to him that groups may differ in cognitive ability without it being due to inbreeding. Unsurprisingly, multiple politicians called for a ban on cousin marriages, a eugenic law[48, 47].

[7] Terms used include: indvandrere (immigrants), tosprogede (bilinguals), anden etnisk baggrund (other ethnic background), nydanskere (new Danes).

9 Has social inequality gone up? A tentative scenario

The results of the modeling indicate that g-variance is increasing in Denmark and that average g is falling too. Conditioned on both factors, one would predict that social inequality is increasing. Of course, there are many factors that affect social inequality, and the predicted effect size due to increased g variance is probably small, so any effect might not yet be readily visible in actual data; moreover, immigration could potentially be causally associated with other factors that increase equality, so one can not conclude that net inequality will increase due to the present type of immigration. One might, though, suspect that it would.

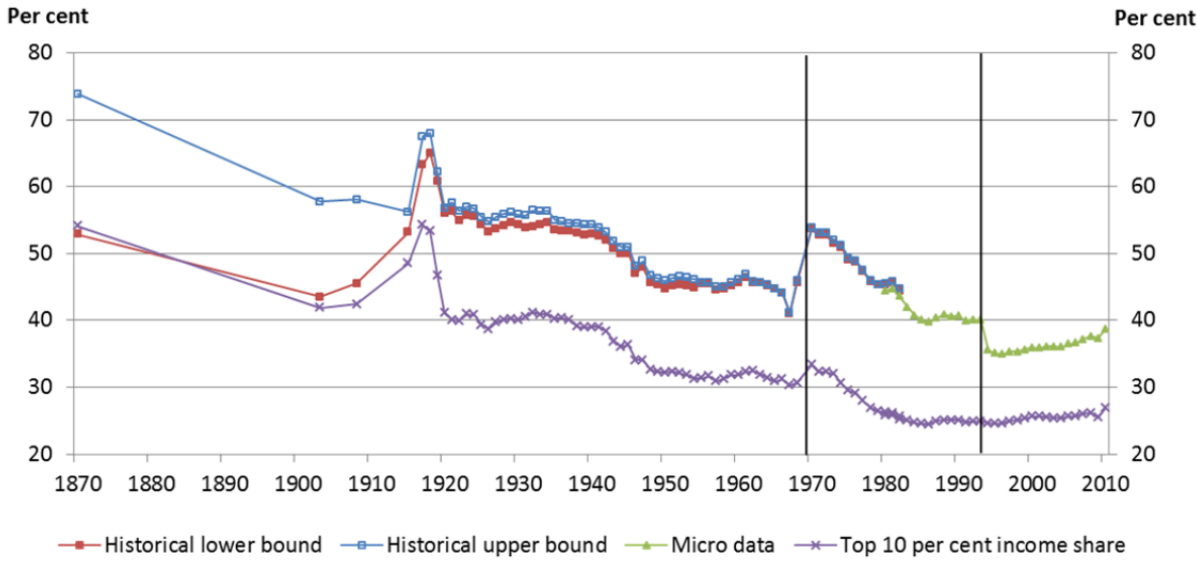
If one looks at income data, then generally inequality has been decreasing since the beginning of the century, but there is an upwards trend in the recent period from perhaps the mid 1980s to now. Figure 9 shows Gini coefficients from late 1800s to 2010 as estimated by Atkinson et al (2013)[49], and Figure 10 shows similar estimates by Neamtu et al (2013)[50].

To be sure, the recent increase in economic inequality may be due to many things that have nothing to do with increased variation in g from immigration. The present study does not attempt to show that the recent increase is due to immigration, and we merely regard the above as circumstantial evidence.

10 Discussion and conclusion

Assuming that the argument set forth in the beginning is sound, how is a policy maker to respond? We think there is one very good response from an egalitarian perspective. He may grant that immigration of lower g people to his high g country will increase the inequality of g and hence socioeconomic inequality

The Gini coefficient for taxable income



Notes: The first vertical line indicates the change from family to individual taxation in 1970, the second the grossing up of transfers in 1994. The top income series have been adjusted for the latter data break by assuming that the grossing up only affected the income total as described above. Something similar is not possible for the Gini coefficient.

Figure 9: Estimated Gini-coefficients in Denmark for taxable income.

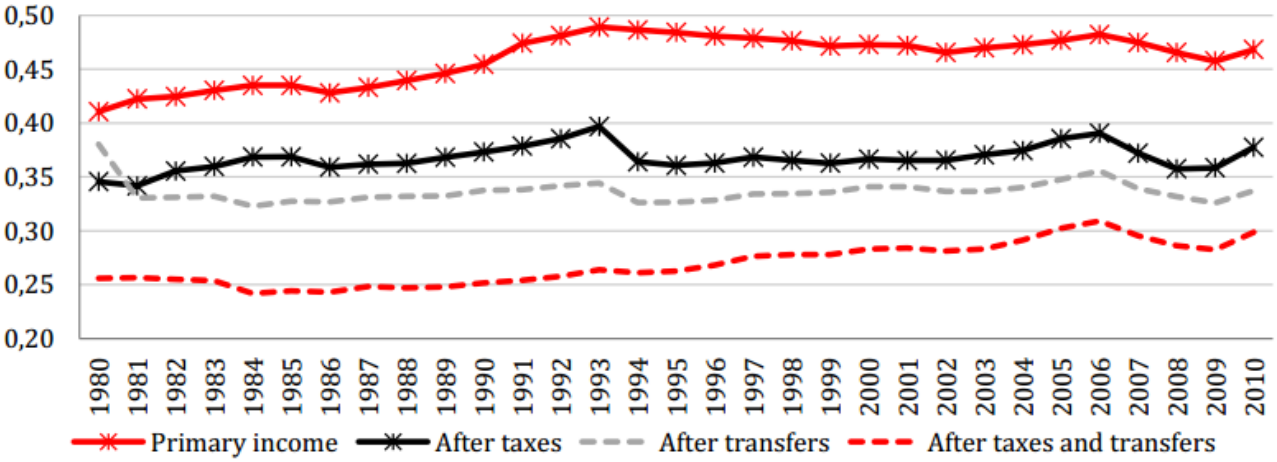


Figure 10: Estimated Gini-coefficients in Denmark for household income inequality, by source of income.

within the country, but argue that we should focus on decreasing between-country socioeconomic inequality, instead of within-country. If that is the goal, then surely there is nothing wrong with how the policy plays out according to our modeling. If national differences in g are the main cause of socioeconomic inequality between-countries, then the most effective solution to reduce this is to lower the g of the countries with the highest levels, and increase those with the lowest levels (and perhaps increase g in all countries). The latter has proved to be very hard, but the former is within reach by opening the borders to persons from low g countries.

In this paper, we have argued that inequality in g leads to inequality in socioeconomic outcomes due to the significance of g as a causal factor. However, a reviewer (Gerhard Meisenberg) has pointed out that increased racial or ethnic heterogeneity within society may cause people to adopt less egalitarian policies which could itself increase socioeconomic inequality, see among others [38, 39, 51, 52].

The net effect of immigration might not be to increase socioeconomic inequality. Other effects may counteract the effect from increased inequality in g. One reviewer (John Fuerst) suggested that immigrants may vote for parties that favor increased wealth distribution. In fact, one survey from 2010 among a representative sample of 1055 immigrants in Denmark showed that they vote almost exclusively for left of center parties. This is excluding the immigration critical *Danish People's Party* which is economically left-wing.[53]

Finally, it should be pointed out that the policy conundrum applies even if immigrants did not differ in mean g levels from the native population or quickly catched up. As long as they fare poorly in society, one may expect socioeconomic inequality to increase. Economist Gregory Clark has in fact argued that immigration of people who fare poorly in society will lead to increased economic inequality without making reference to g[54].

Future studies

Future studies need to be undertaken to repeat the modeling and analyses in this study for other countries. Relevant data is known to exist for Norway, so replication with those seems like an obvious next step.

Instead of looking at an individual country, it is also possible to look at multiple countries. Immigration rates in different countries have been different over time as well as the immigrant composition by country of origin and generation. Per the theory employed in this study, everything else equal, those experiencing more immigration will have increased their socioeconomic inequality more (or decreased it less). The difficulty of undertaking such a study is that it requires immigrant population data for many countries over many years, as well as data on socioeconomic inequality (e.g. Gini or 10-10 income ratios).

A good test of the general model would be to apply it to a dataset of scores on cognitive tests taken by immigrants, grouped by country of origin of the test subjects. The test data from the Danish and Norwegian draftees are ideal for this purpose, but it might be hard to gain access to them. Using such data, it would also be possible to examine differential g selection by comparing the mean of immigrants in the host country with that of residents in the home country. This might be able to explain the odd finding that the 'non-Western' SD was higher than modeled even in the extreme no gains scenario.

Supplementary material and acknowledgements

This paper is open science. Data and source code are available at the Open Science Framework repository. The peer review history is available at the submission thread on the journal forum.

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