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Net fiscal contributions of immigrant groups in Denmark and Finland are strongly predictable from country of origin IQ and Muslim%

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Abstract

The relationships between national IQs, Muslim% in origin countries and estimates of net fiscal contributions to public finances in Denmark (n=32) and Finland (n=11) were examined. The analyses showed that the fiscal estimates were near-perfectly correlated between countries (r = .89 [.56 to .98], n=9), well-predicted by national IQs (r's .89 [.49 to .96] and .69 [.45 to .84]), and Muslim% (r's -.75 [-.93 to -.27] and -.73 [-.86 to -.51]). Furthermore, general socioeconomic factor scores for Denmark were near-perfectly correlated with the fiscal estimates (r = .86 [.74 to .93]), especially when one outlier (Syria) was excluded (.90 [.80 to .95]). Finally, the monetary returns to higher country of origin IQs were estimated to be 917/470 Euros/person-year for a 1 IQ point increase, and -188/-86 for a 1% increase in Muslim%.

Key words: immigration, country of origin, national IQ, IQ, intelligence, cognitive ability, Muslims, Islam, public finances, inequality

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1. Introduction

A number of recent studies have shown that country of origin characteristics are moderately to very predictive of immigrant group performance, broadly speaking (Fuerst & Kirkegaard, 2014; Jones & Schneider, 2010; Kirkegaard & Becker, 2017; Kirkegaard & Fuerst, 2014; Rindermann & Thompson, 2014). The studies have examined a number of socioeconomic outcomes which can be usefully grouped into four categories: 1) employment/benefits use, 2) income/wealth, 3) crime, and 4) educational attainment.[2] Studies of immigrant performance have often been limited to just a single type of variable, most commonly crime (e.g. Kirkegaard & Becker, 2017). The analyses are dependent on data availability and some data types are harder to find than others. Still, it has generally been found that two key characteristics of origin countries predict immigrant performance: national IQ and Muslim % (the percentage of Muslims in the population). These can broadly be thought of measuring 'can do' and 'will do' factors (Gottfredson, 1997), but the causality (or lack thereof) of especially the latter predictor has not been firmly established. No formal meta-analyses yet exists of the predictive validities, but in the studies with the best quality data, the correlations between outcomes and the two predictor variables were usually in the .45 to .70 region (Kirkegaard, 2014a; Kirkegaard & Fuerst, 2014).

When variables from multiple categories are present in a single dataset, they can be factor analyzed. This has so far invariably revealed a strong general factor which can be taken to reflect general socioeconomic performance. For this reason, it was named *the S factor* by analogy with the g/G factor of cognitive ability (Kirkegaard, 2014b; Rindermann, 2007). S emerges not just when the units of analysis are immigrant groups in a given host country, but also when they are sovereign nations (Kirkegaard, 2014b), sub-national divisions (states, regions, counties, census tracts, city districts etc.; (Carl, 2016; Fuerst & Kirkegaard, 2016; Kirkegaard, 2016a, 2016b)), first names (Kirkegaard & Tranberg, 2015b), and individuals (Kirkegaard & Fuerst, In print). When a dataset allows analyses at multiple levels and for multiple groups, it has been found that the factor structure is very stable (Kirkegaard, 2016a; Kirkegaard & Fuerst, In print).

While the S factor is a useful measure of overall immigrant performance, it is not yet known how well it corresponds to more traditional economic concepts such as net fiscal contribution to public finances. Thus, the purpose of this study was to examine the relationship between immigrant group fiscal contributions, other socioeconomic outcomes (S indicators) and country of origin characteristics.

2. Data

2.1. Fiscal estimates for Denmark

Estimates of the fiscal effects of immigrants usually group countries into very broad groups that prevent disaggregation to the country-level. For instance, Hansen et al. (2015) estimated the net fiscal

2 One might want to split the employment and benefit use outcomes, but due to most benefits being related to unemployment, they are very strongly correlated.

contribution to public finances of five broad groups in Denmark:

- Ethnic Danes (etniske danskere)
- First generation Western immigrants (vestlige indvandrere)
- Later generation Western immigrants (vestlige efterkommere)
- First generation non-Western immigrants (ikke-vestlige indvandrere)
- Later generation non-Western immigrants (ikke-vestlige efterkommere)

Every person with legal residence in Denmark is classified into a single group. If the person is born in a foreign country, he is classified as a first generation immigrant. If the person is born in Denmark, but neither parent is both a Danish citizen and born in Denmark, he is classified as a later generation immigrant. If at least one parent is both a Danish citizen and born in Denmark, then he is classified as ethnic Danish.

It should be noted that while most categories are immutable, the 'later generation' groups are not. If a person is born in Denmark to parents who are born in Denmark but lack citizenship, he is classified as a later generation immigrant. However, if one or both parents later gains Danish citizenship, the person will be reclassified to the ethnic Dane category.[3] Research indicates that a substantial number of persons, perhaps 400k, of non-Danish (genetic) ancestry have been classified into the ethnic Dane category. This would constitute about 8% of the group, so interpretation of this category is increasingly problematic (Kirkegaard, 2017; Kirkegaard & Tranberg, 2015a; Nyborg, 2012). In 2014, the Danish statistics agency published findings about a set of 16.3k third generation immigrants (børn af efterkommere). 88% were classified as ethnic Danes and 90% had non-Western ancestors. They were too young to allow reliable analyses of many outcomes, but the data indicated that they performed no different than the second generation in school grades, secondary education attainment. There was an uncertain but possible increase in the female employment rate (Danmarks Statistik, 2014).

Hansen et al. (2015) estimated the net fiscal contributions by estimating the total revenue and the total expenses to the public budget. This was done by estimating revenue from sources such as income tax, sales tax, and interests on stocks, and expenses from sources such as individual benefits and use of public services (e.g. hospitals, education). The net fiscal contribution was strongly related to age, as shown in Figure 1.

3 This interpretation was confirmed in a personal email from Dorthe Larsen (22. Feb. 2017), who is responsible for the population data at the Danish statistics agency.

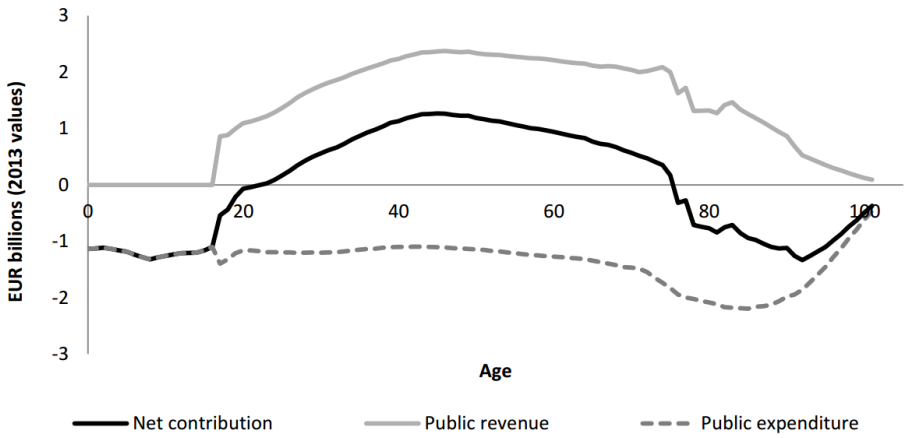

Figure 1: Net fiscal contribution by age (2013 cohort). Source: Hansen et al. (2015).

Thus, between age 20 and 75, the net fiscal contribution is positive and negative at other ages. This reflects the fact that young persons do not work (much) and thus pay few taxes, while costing money due to education and childcare. The elderly also do not generally work (much), receive income from the state in pensions and have large health costs towards the end of life. The net fiscal contributions of the five groups according to this model are shown in Table 1.

Origin group	Net contribution per person-year (EUR)
Ethnic Danes	-695
First generation Western	2,546
Later generation Western	47
First generation non-Western	-2,238
Later generation non-Western	-1,070

Table 1: Net fiscal contribution to public finances by broad origin group. Denmark, 2013 data. From Hansen et al. (2015). Not age-adjusted.

The above data are not useful for country-level analyses. However, the Danish ministry of finance recently published a report with more refined and detailed estimates (Finansministeriet, 2017), including age-adjusted results for the major origin groups, and age-unadjusted results for the 32 largest country of origin groups. They used a more detailed model than Hansen et al. (2015) by virtue of having more available data, were better able to individuate income and expenditures to single persons and hence national origin groups. They successfully linked 93% of revenues to single persons, but only 72% of expenses (p. 18). Table 2 shows the main results of their modeling for the 5 broad groups (values were given in Danish Kroner were converted to Euros):

Group	Actual contribution	Age-adjusted contribution
Ethnic Danes	1,478	1,478
First generation Western	4,032	134

Later generation Western	-9,408	1,344
First generation non-Western	-7,526	-12,768
Later generation non-Western	-17,204	-6,854

Table 2: Net fiscal contribution to public finances by broad origin group, EUR/person per year. Denmark, 2014 data. From Finansministeriet (2017).[4]

Thus we see that the large difference between the two Western groups mainly reflects age differences, while the relative position of the two non-Western groups is reversed. The changes reflect that later generation Westerners are mainly children and youths and thus still under education, that first generation non-Westerns are mainly adults in working age with a low employment rate, and that later generation non-Westerns are mainly children and youths.

The estimates for the 32 countries of origin were calculated the same way as above, but unfortunately, no age-adjusted variants were published.

2.2. Fiscal estimates for Finland

The Finnish think tank *Suomen Perusta* recently published a Finnish-language report where they estimated the net fiscal cost for the largest 10 countries of origin as well as Finland itself (Salminen, 2015b). Along with the report, an English-language summary was published (Salminen, 2015a). The study followed roughly the same method as the Danish studies detailed above, except that all results only concerned the working age population, defined as ages 20 to 62.

A second report is in works and will detail the life-course contributions of the groups, similarly to the Danish ministry of finance report. However, it was not ready in time for this study.

2.3. Other data

The country-level net fiscal contribution estimates discussed above were used along with data from the following sources:

- S scores for Denmark were copied from Kirkegaard & Fuerst (2014).
- National IQs were copied from Lynn & Vanhanen (2012).
- National Muslim prevalence rates from Pew Research Center (2011).

A few additions were to the datasets for IQ and Muslim% based on interpolating values from nearby countries. This method has been validated by previous research (Lynn & Vanhanen, 2012, p. 10) and works due to the strong spatial autocorrelation for the variables (Fuerst & Kirkegaard, 2016; Gelade, 2008; Hassall & Sherratt, 2011).

4 It should be noted that the large positive contribution of ethnic Danes is due in part is a change in law that year. If it is adjusted for, the net contributions are as follows: ED -403, FGW 3,495, LGW -9,946, FGNW -7,661 and LGNW -17,070. Unfortunately, no age-adjusted versions of these are given and thus for method consistency, the law change-unadjusted numbers are given in the table.

3. Analyses

3.1. Comparison of net fiscal contributions in Denmark and Finland

Figure 2 shows the scatterplot of the net fiscal contributions for the two countries.

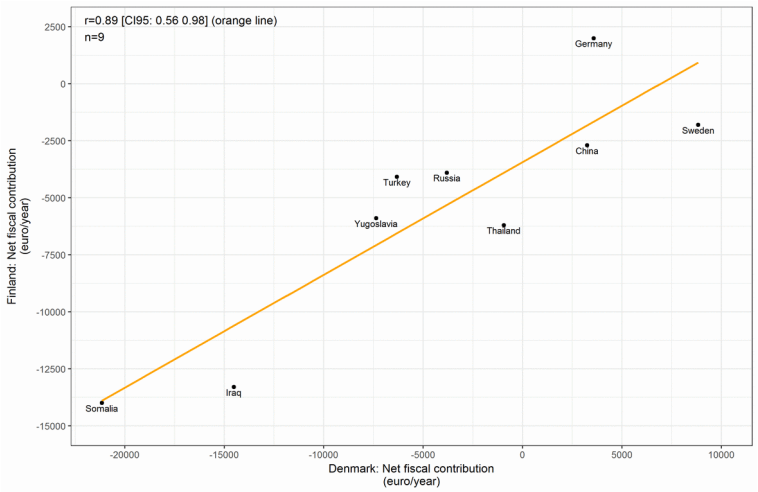

Figure 2: Net fiscal contribution to public finances in Denmark and Finland.

Two origin groups did not overlap between the samples (Finland, Estonia), so there were only 9 cases. Still, we see a near-perfect relationship. This is despite the fact that the Finnish estimates concern only the working age population while the Danish numbers concern the entire population. Though it may seem surprising, a recent study of German and Danish crime rates for immigrant groups found that despite age being a confound in many analyses, adjusting for age does not do much variables' correlations to other variables (Kirkegaard & Becker, 2017). The change usually is one of scale (reduced dispersion) but dispersion does not affect correlations as they are scale-invariant.

In line with the above, it can be noted that the Danish dispersion of values is much larger: the standard deviations are 10,603 and 5,083.[5] This might reflect the increased sophistication of the modeling approach, the increased variation from the age confound, or plain sampling error.

3.2. Prediction correlations

How well does the predictors predict the net fiscal contributions? Figures 3-6 show the scatterplots.

5 This is not due to outliers, the median absolute deviations – a robust alternative – show a 2.3:1 ratio vs. 2.1:1 for standard deviations.

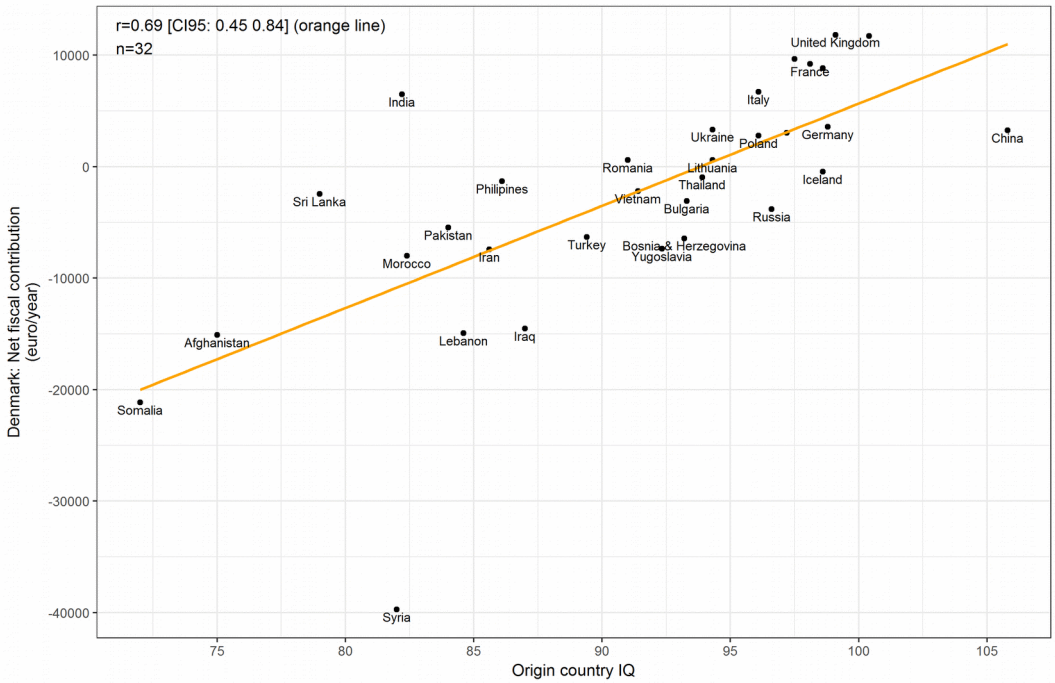

Figure 3: Origin country IQ and net fiscal contribution in Denmark.

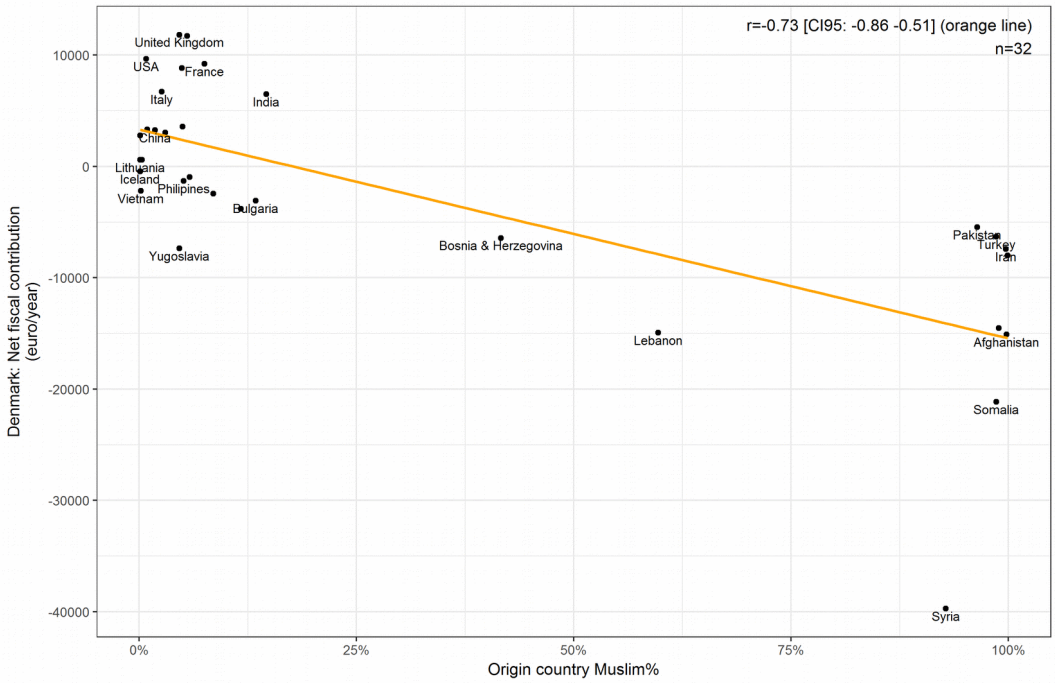

Figure 4: Origin country Muslim% and net fiscal contribution in Denmark.

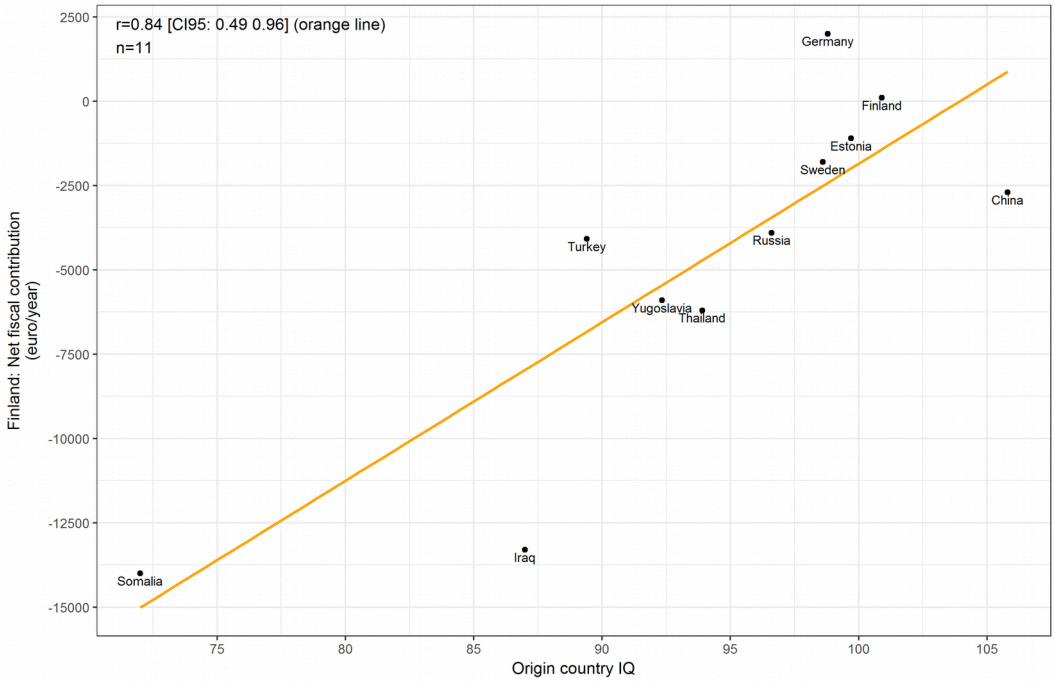

Figure 5: Origin country IQ and net fiscal contribution in Finland.

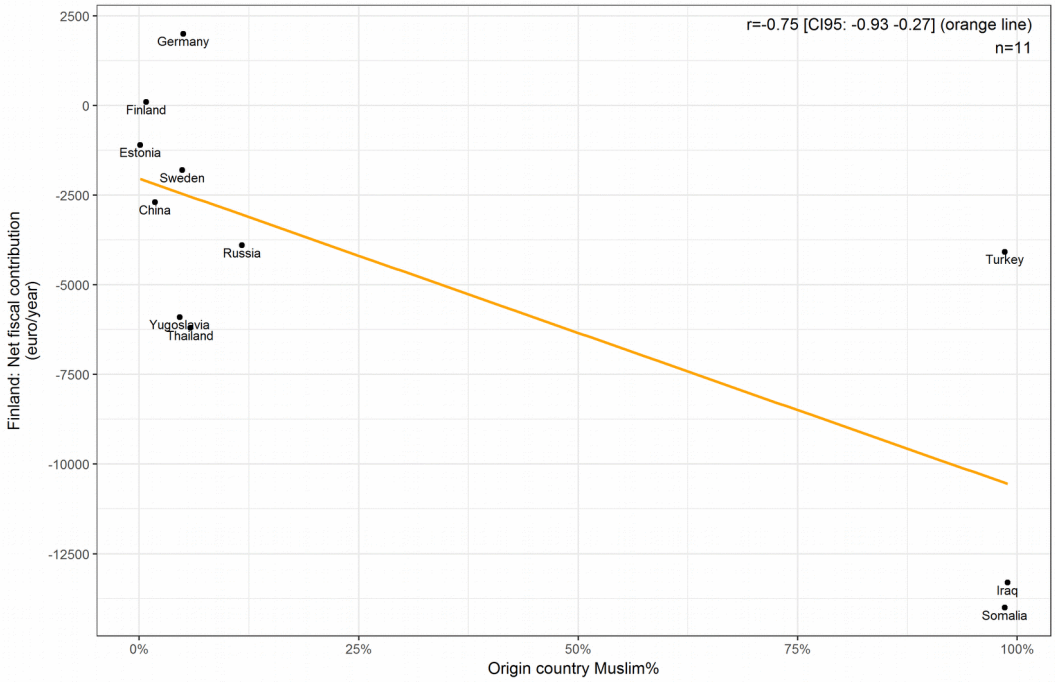

Figure 6: Origin country Muslim% and net fiscal contribution in Denmark.

It is clear that Syria is an outlier. This is likely because this group consists primarily of recent refugees. The Finnish data do not seem to have any consistent outliers: Turkey is an outlier for Muslim%, but not for IQ, and Iraq is an outlier for IQ, but not for Muslim%. However, the number of cases is very small, so any outlier might just be part of a stronger pattern that would be visible if we had more cases.

3.3. The relationship between S and net fiscal contribution

As discussed in the introduction, an S score is an overall measure of how well a group does in the society. This is conceptually very closely related to the net fiscal contribution of a group. After all, the fiscal contribution is a complex function of income, employment, use of benefits, and crime rate. Employment and income are of course themselves functions of educational attainment. Still, there seems to be no theoretical reason to expect there to be a perfect relationship between the two variables. The S factor is a line in multidimensional space that best sums up the co-variation between the outcome variables, and there is no reason why this should assign the same weight or importance to variables that the complex net fiscal contribution function does.

There is no published study that computed S factor scores for immigrant groups in Finland, but there is for Denmark (Kirkegaard, 2014a; Kirkegaard & Fuerst, 2014). The S factor scores from Denmark were based on detailed statistics for income, benefits use, crime and education broken down by age group, and thus they represent very precise reliable S estimates. Figure 7 shows the scatterplot.

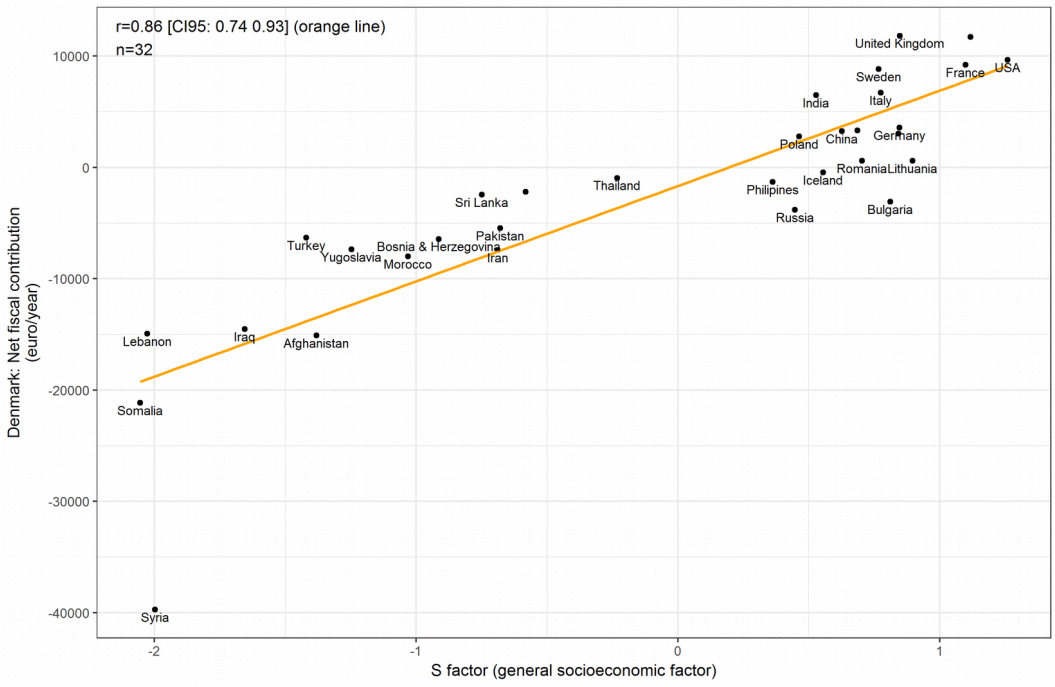

Figure 7: General socioeconomic factor and net fiscal contribution in Denmark.

The correlation between the variables was very strong as expected. Some of the lower correlation is due to Syria, which was a large negative outlier. The data the S factor scores are based on dates to 2012

which is before the main waves of refugees/migrants from the Syrian civil war arrived.[6] The fiscal data, however, concern the year 2014, which was the year with the most refugees/migrants arriving. If we exclude Syria, the correlation improves to .90 [.80 to .95].

Due to the near-perfect correlation, S scores might have significant utility in economic modeling of origin groups for which it is hard or impossible to get the data needed for the complex fiscal models. If one excludes Syria, the mean prediction error is approximately 4,622 Euros.[7]

3.4. Modeling the fiscal value of the predictors

Because we have real world monetary values as opposed to mere factor scores, it is possible to estimate the worth of a 1 IQ increase in the origin country as well as a 1% increase in Muslims (in the origin country). This can be done for both countries. Table 3 shows the results.

Country	+1 IQ	+ 1% Muslim
Denmark	917	-188
Finland	470	-86
Mean	694	-137

Table 3: Regression model results for both countries. Unstandardized betas.

As was also seen in Section 3.1, the dispersion is larger in the Danish dataset, which makes the slope larger. Averaging across datasets, a 1 IQ point increase in the origin country is associated with an increase of 694 Euros/year per person. Similarly, a 1% increase in Muslims at the origin country, is associated with deficit of -137 Euros/year per person.

4. Discussion and conclusion

As has been found in many other studies (Kirkegaard, 2014a; Kirkegaard & Becker, 2017; Kirkegaard & Fuerst, 2014), national IQs were good predictors of immigrant performance at the group level (r's , 69 and .84). The proposed causal model for these findings is a combination of cognitive ability-based meritocracy and spatial transferability of psychological traits: when bright or dull people move, they mostly remain equally bright or dull at their new homes, including when these are in other countries. Because higher cognitive ability cause better socioeconomic outcomes such as higher education, income, occupational status and lower crime, group differences in cognitive ability – whether these are nationality-related or not – are reflected in social inequality between them (Gordon, 1997; Gottfredson, 1998; Herrnstein & Murray, 1994; Lynn & Vanhanen, 2012).

The same previous studies have also found Muslim% to be a good predictor. The reason for the validity

6 According to http://refugees.dk/fakta/tal-og-statistik/hvor-mange-kommer-og-hvorfra/, the number of persons from Syria arriving in Denmark were: 3,855 (2009), 5,115 (2010), 3,806 (2011), 6,184 (2012), 7,557 (2013), 14,732 (2014), 21,316 (2015), 6,234 (2016).

7 The formula is: $\sigma_{est} = s_Y * sqrt(1-r^2)$ (Cohen & Cohen, 2003, p. 39).

of Muslim% is less obvious. It is hard to model the predictor jointly with national IQ because the small samples of origin countries make regression model estimates imprecise. A plausible hypothesis is that countries with more Muslims send more Muslim immigrants, and that Muslims immigrants have values that are disharmonious with those of people living in Western countries (see e.g. Koopmans, 2015). The disagreements over preferred policies cause significant outgroup antipathy resulting in crime against the native population and reduced willingness to integrate into the host country's society and customs. This causal path is more speculative due to a relative dearth of individual-level research on the topic. Unfortunately, it is difficult to find large survey datasets that sample sufficient numbers of Muslims and measure their cognitive ability, religious beliefs, values, cultural practices as well as a number of pertinent socioeconomic outcomes such as crime.

Aside from differneces in the number of Muslims and the mean cognitive ability of groups, other plausible causes of social inequality include selection effects, language barriers, legal barriers (e.g. recognition of relevant educational degrees), length of stay in the host country, and lasting environmental effects (e.g. physical or psychological traumas from war). Unfortunately, little or no data are available for many of these possible causes.

The monetary estimates of national IQ and Muslim% should not be taken strongly due to the small samples in terms of origin countries (n's 32 and 11), host countries (n = 2) and net fiscal contribution estimates (n = 1 for each country), as well as the use of zero-order analyses. The estimates represent current best guesses that await further study.

Supplementary material and acknowledgments

Supplementary materials including code, high quality figures and data can be found at https://osf.io/t287j/.

The peer review thread is located at:

Thanks to reviewers:

References

Carl, N. (2016). IQ and socio-economic development across local authorities of the UK. *Intelligence*, *55*, 90–94. https://doi.org/10.1016/j.intell.2016.02.001

Cohen, J., & Cohen, J. (Eds.). (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed). Mahwah, N.J: L. Erlbaum Associates.

Danmarks Statistik. (2014). *Indvandrere i Danmark 2014*. København: Danmarks Statistik. Retrieved from http://www.dst.dk/da/Statistik/Publikationer/VisPub?cid=19004

Finansministeriet. (2017). *Økonomisk analyse: Indvandreres nettobidrag til de offentlige finanser* (p.

96). Finansministeriet. Retrieved from http://archive.is/1OYii.

Fuerst, J., & Kirkegaard, E. O. W. (2014). Do National IQs Predict U.S. Immigrant Cognitive Ability and Outcomes? An Analysis of the National Longitudinal Survey of Freshman. *Open Differential Psychology*. Retrieved from https://openpsych.net/paper/20

Fuerst, J., & Kirkegaard, E. O. W. (2016). Admixture in the Americas: Regional and national differences. *Mankind Quarterly*.

Gelade, G. A. (2008). The geography of IQ. *Intelligence*, *36*(6), 495–501. https://doi.org/10.1016/j.intell.2008.01.004

Gordon, R. A. (1997). Everyday life as an intelligence test: Effects of intelligence and intelligence context. *Intelligence*, *24*(1), 203–320.

Gottfredson, L. S. (1997). Why g matters: The complexity of everyday life. *Intelligence*, *24*(1), 79–132. https://doi.org/10.1016/S0160-2896(97)90014-3

Gottfredson, L. S. (1998). Jensen, Jensenism, and the sociology of intelligence. *Intelligence*, *26*(3), 291–299. https://doi.org/10.1016/S0160-2896(99)80013-0

Hansen, M., Schultz-Nielsen, M. L., & Tranaes, T. (2015). *The Impact of Immigrants on Public Finances: A Forecast Analysis for Denmark* (SSRN Scholarly Paper No. ID 2564977). Rochester, NY: Social Science Research Network. Retrieved from https://papers.ssrn.com/abstract=2564977

Hassall, C., & Sherratt, T. N. (2011). Statistical inference and spatial patterns in correlates of IQ. *Intelligence*, *39*(5), 303–310. https://doi.org/10.1016/j.intell.2011.05.001

Herrnstein, R. J., & Murray, C. A. (1994). *The bell curve: intelligence and class structure in American life* (1st Free Press pbk. ed). New York: Simon & Schuster.

Jones, G., & Schneider, W. J. (2010). IQ in the Production Function: Evidence from Immigrant Earnings. *Economic Inquiry*, *48*(3), 743–755. https://doi.org/10.1111/j.1465-7295.2008.00206.x

Kirkegaard, E. O. W. (2014a). Crime, income, educational attainment and employment among immigrant groups in Norway and Finland. *Open Differential Psychology*. Retrieved from http://openpsych.net/ODP/2014/10/crime-income-educational-attainment-and-employment-

among-immigrant-groups-in-norway-and-finland/

Kirkegaard, E. O. W. (2014b). The international general socioeconomic factor: Factor analyzing international rankings. *Open Differential Psychology*. Retrieved from http://openpsych.net/ODP/2014/09/the-international-general-socioeconomic-factor-factor-analyzing-international-rankings/

Kirkegaard, E. O. W. (2016a). Inequality across US counties: an S factor analysis. *Open Quantitative Sociology & Political Science*. Retrieved from http://openpsych.net/OQSPS/2016/05/inequality-across-us-counties-an-s-factor-analysis/

Kirkegaard, E. O. W. (2016b). Inequality among 32 London Boroughs: An S factor analysis. *Open Quantitative Sociology & Political Science*. Retrieved from http://openpsych.net/OQSPS/2016/01/inequality-among-32-london-boroughs-an-s-factor-analysis/

Kirkegaard, E. O. W. (2017, February 23). Indvandrere: definitioner, antal, mønstre, økonomiske konsekvenser, og forklaringer – Teknologipartiet. Retrieved from http://teknologipartiet.dk/2017/02/23/indvandrere-opsummering/

Kirkegaard, E. O. W., & Becker, D. (2017). Immigrant crime in Germany 2012-2015. *Open Quantitative Sociology & Political Science*. Retrieved from https://openpsych.net/paper/50

Kirkegaard, E. O. W., & Fuerst, J. (In print). Admixture in Argentina. *Mankind Quarterly*, *57*(4). Retrieved from https://osf.io/etuy8/files/

Kirkegaard, E. O. W., & Fuerst, J. (2014). Educational attainment, income, use of social benefits, crime rate and the general socioeconomic factor among 70 immigrant groups in Denmark. *Open Differential Psychology*. Retrieved from https://openpsych.net/paper/21

Kirkegaard, E. O. W., & Tranberg, B. (2015a). Increasing inequality in general intelligence and socioeconomic status as a result of immigration in Denmark 1980-2014 |. Retrieved from https://openpsych.net/paper/33

Kirkegaard, E. O. W., & Tranberg, B. (2015b). What is a good name? The S factor in Denmark at the name-level. *The Winnower*. Retrieved from https://thewinnower.com/papers/what-is-a-good-

name-the-s-factor-in-denmark-at-the-name-level

Koopmans, R. (2015). Religious Fundamentalism and Hostility against Out-groups: A Comparison of Muslims and Christians in Western Europe. *Journal of Ethnic and Migration Studies*, *41*(1), 33–57. https://doi.org/10.1080/1369183X.2014.935307

Lynn, R., & Vanhanen, T. (2012). *Intelligence: A Unifying Construct for the Social Sciences* (1st ed.). Ulster Institute for Social Research.

Nyborg, H. (2012). The decay of Western civilization: Double relaxed Darwinian Selection. *Personality and Individual Differences*, *53*(2), 118–125. https://doi.org/10.1016/j.paid.2011.02.031

Pew Research Center. (2011, January 27). Table: Muslim Population by Country. Pew Research Center. Retrieved from http://www.pewforum.org/2011/01/27/table-muslim-population-by-country/

Rindermann, H. (2007). The g-factor of international cognitive ability comparisons: the homogeneity of results in PISA, TIMSS, PIRLS and IQ-tests across nations. *European Journal of Personality*, *21*(5), 667–706. https://doi.org/10.1002/per.634

Rindermann, H., & Thompson, J. (2014). The cognitive competences of immigrant and native students across the world: an analysis of gaps, possible causes and impact. *Journal of Biosocial Science*, 1–28. https://doi.org/10.1017/S0021932014000480

Salminen, S. (2015a). *Immigration and Public Finances in Finland Part I: Realized Fiscal Revenues and Expenditures*. Suomen Perusta. Retrieved from http://www.suomenperusta.fi/immigrants-and-public-finances-in-finland-part-1-summary/

Salminen, S. (2015b). *Maahanmuutot ja Suomen julkinen talous*. Suomen Perusta. Retrieved from http://www.suomenperusta.fi/tutkimus/