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The effects of top tax rates on superstar inventors

Ufuk Akcigit, Salome Baslandze, Stefanie Stantcheva 27 April 2015

Taxing high earners is an issue of growing importance in many nations. One concern is that raising rates will lead high earners to move elsewhere. This column suggests that top-tier inventors are significantly affected by top tax rates when deciding where to live. The loss of these highly skilled agents could entail significant economic costs in terms of lost tax revenues and less overall innovation.

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There is currently heated public debate about whether higher top tax rates will cause an exodus of valuable, high income and highly skilled economic agents. Opponents of higher taxes claim that they will unavoidably lead to a brain drain and an exodus of the most qualified people, especially as barriers to labour mobility between developed countries are reduced. On the other hand, proponents of higher taxes maintain that migration decisions are driven by other (possibly non-economic) considerations and would not respond very much to higher taxes. This debate has been enlivened by recent budget deficits that have forced governments to reconsider tax burdens on different income groups.

Labour mobility

It is generally acknowledged that capital is highly mobile, an argument often used by policymakers to justify lower taxation on capital. Much less is known about the mobility of labour in response to taxation. Lots of anecdotal evidence is discussed in the media and in policy debates – for instance, following French actor Gerard Depardieu's highly contentious Russian citizenship adoption in protest against France's (effective) top tax rate increase¹ – but rigorous evidence is scarce due to a lack of international panel data.

Kleven et al. (2014) study a Danish tax reform that temporarily reduced top tax rates on high income foreigners and they find very strong effects on the inflow of migrants. In another recent paper Kleven, Landais, and Saez (2013) show that highly paid football players react to top tax rates when choosing in which country to work. Of course, we can't extrapolate from their football players estimates for other professions, since football players are typically very young and mobile.

Inventors are highly valuable economic agents

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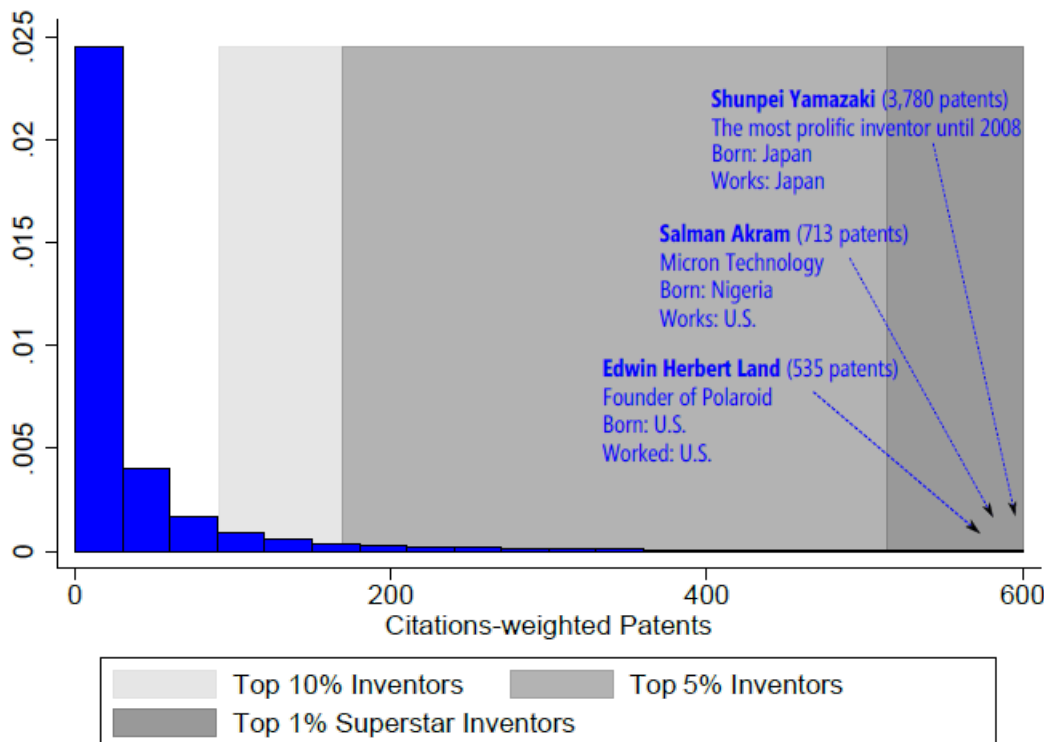
A group of highly valuable economic agents that policymakers perhaps might worry about is inventors, the creators of innovations and potential drivers of technological progress. Inventors may well be important factors for a country's development and competitiveness – highly skilled migration has been shown to be both beneficial for a receiving country's economy and to disproportionately contribute to innovation (Kerr 2013).

Consider Alexander G Bell, the inventor of the telephone; James L Kraft, who patented a pasteurisation technique and founded Kraft Foods; Ralph Baer, the inventor of the first home video gaming console that contributed to the expansion of the video gaming industry; or Charles Simonyi, a successful product developer at Microsoft. In addition to being very prolific inventors, they had something else in common: they were all immigrants. This is not very surprising given that migration rates increase in skill (Docquier and Marfouk 2006) and inventors are ranked very highly in the skill distribution.

It's true that inventors vary vastly in their quality and innovativeness. A patent's economic value is typically measured by forward citations received (for a survey of the literature see Abrams, Akcigit, and Popadak 2014).

Figure 1 shows the distribution of inventors as ranked by their citations-weighted patents. The data is taken from US Patent Office for the period 1977-2003 for eight countries: Canada, Great Britain, Germany, France, Italy, Japan, Switzerland, and the US (Akcigit, Baslandze and Stantcheva 2015). While the median inventor has only 11 citations, the average top 1% inventor has hundreds of times more citations. Among top inventors, some are highly successful migrants. In general, higher quality inventors are more mobile than lower quality inventors.

Figure 1. Distribution of inventors' qualities measured by citations-weighted patents



Do 'superstar' inventors respond to top tax rates?

In recent research (Akcigit, Baslandze, and Stantcheva 2015) we study the international migration responses of superstar inventors to top income tax rates for the period 1977-2003 using data from the European and US Patent offices, as well as from the Patent Cooperation Treaty (Miguelez and

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Fink 2013). Our focus is on migration across eight technologically advanced economies: Canada, France, Germany, Great Britain, Italy, Japan, Switzerland, and the US. To abstract from capital and corporate taxes as much as possible, we restrict our attention to inventors who are company employees and are not the owners ('assignees') of their patents.

Superstar inventors are those in the top 1% of the distribution of citations-weighted patents in a given year and 'stars' are inventors who are just below superstars in terms of quality and are in the top 1-5% of the citations-weighted patent distribution.

From outside survey evidence, we know that superstar inventors are highly likely to be in the top tax bracket and, hence, directly subject to top tax rates. Stars or inventors of lower quality are much less likely to be in the top bracket. The top tax rate, which can also be viewed as a 'success tax' can also have either an indirect motivating or discouraging effect on inventors in general, even on those who are not yet in the top bracket.

Macroeconomic effects

There is a strong and significant correlation between top tax rates and those inventors who remain in their home countries. The relation is strongest for superstar inventors. Figures 2 and 3 show that superstar inventors are highly sensitive to top tax rates. The elasticities imply that for a ten percentage point reduction of top tax rates from 50% to 40%, a country would be able to retain on average 3.3% more of its top 1% superstar inventors. This relation weakens as one moves down the quality distribution of inventors – the top 25-50% or the bottom 50% of inventors are no longer sensitive to top tax rates.

Figure 2. Inventors who remain in their home countries and top marginal retention rates since the 1970s

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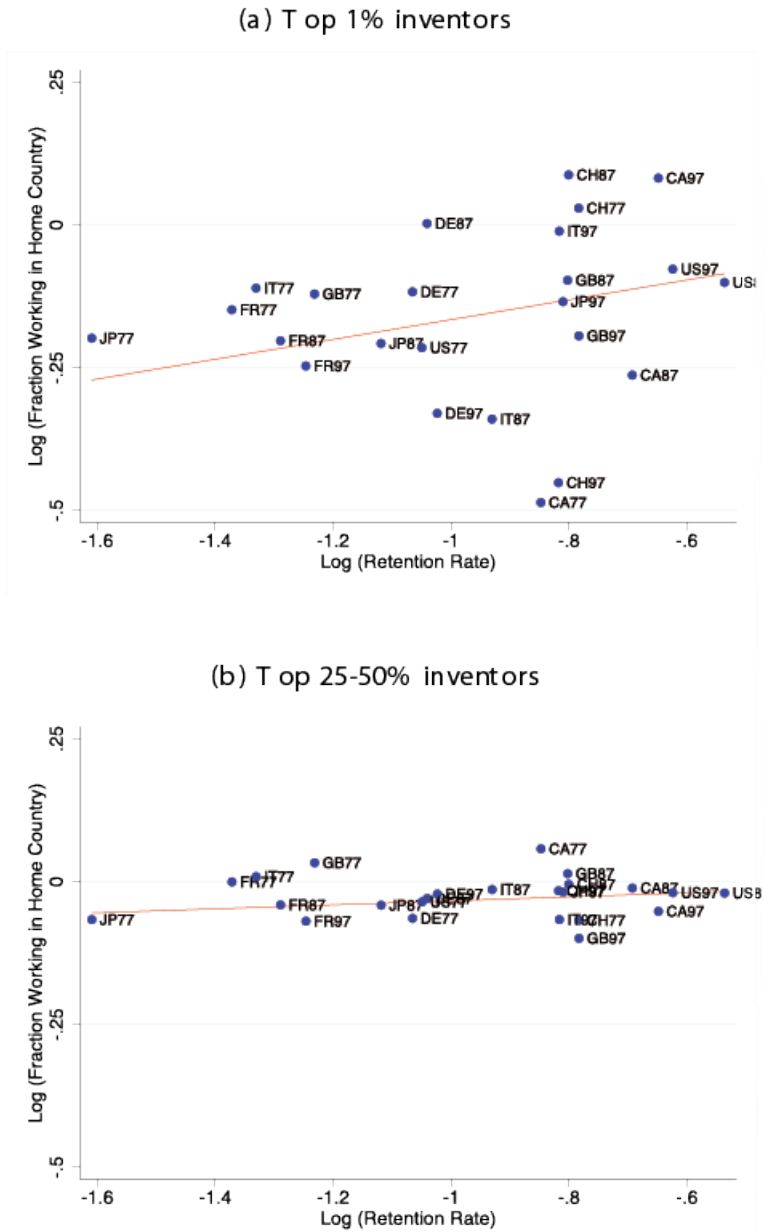
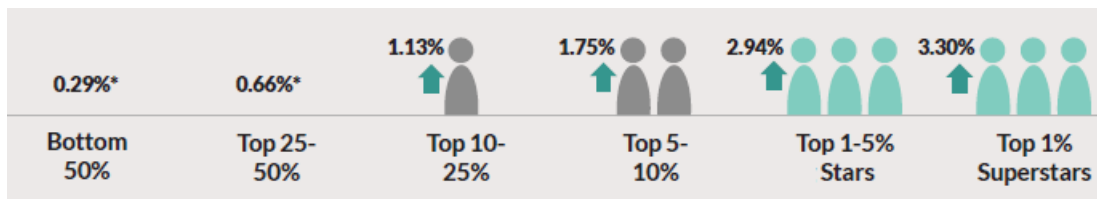


Figure 3. Inventors' responses to decreased top tax rates³



Microeconomic effects

At the individual inventor level, we have developed a detailed model for location choice. This wasn't easy for two reasons. First, location choices are clearly also driven by factors other than taxes – such as language, distance to one's home country, and career concerns – for which we include controls. Second, inventors may earn different pre-tax wages in different countries. This is a counterfactual we cannot observe and have to control for through a detailed set of proxy measures.

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Taxes affect superstar inventors' decisions on where to live

The results highlight that superstar top 1% inventors are significantly affected by top tax rates when deciding where to live. For instance, our results suggest that, given a ten percentage point decrease in top tax rates, the average country would be able to retain 1% more domestic superstar inventors and attract 38% more foreign superstar inventors.

Our results are presented in Figure 4, which shows how many more domestic superstar top 1% inventors countries could retain and how many more foreign superstar inventors they could attract with a ten percentage point top tax rate decrease.

Figure 4. Microeconomic analysis of domestic and foreign superstar inventors' responses to top tax rate decreases

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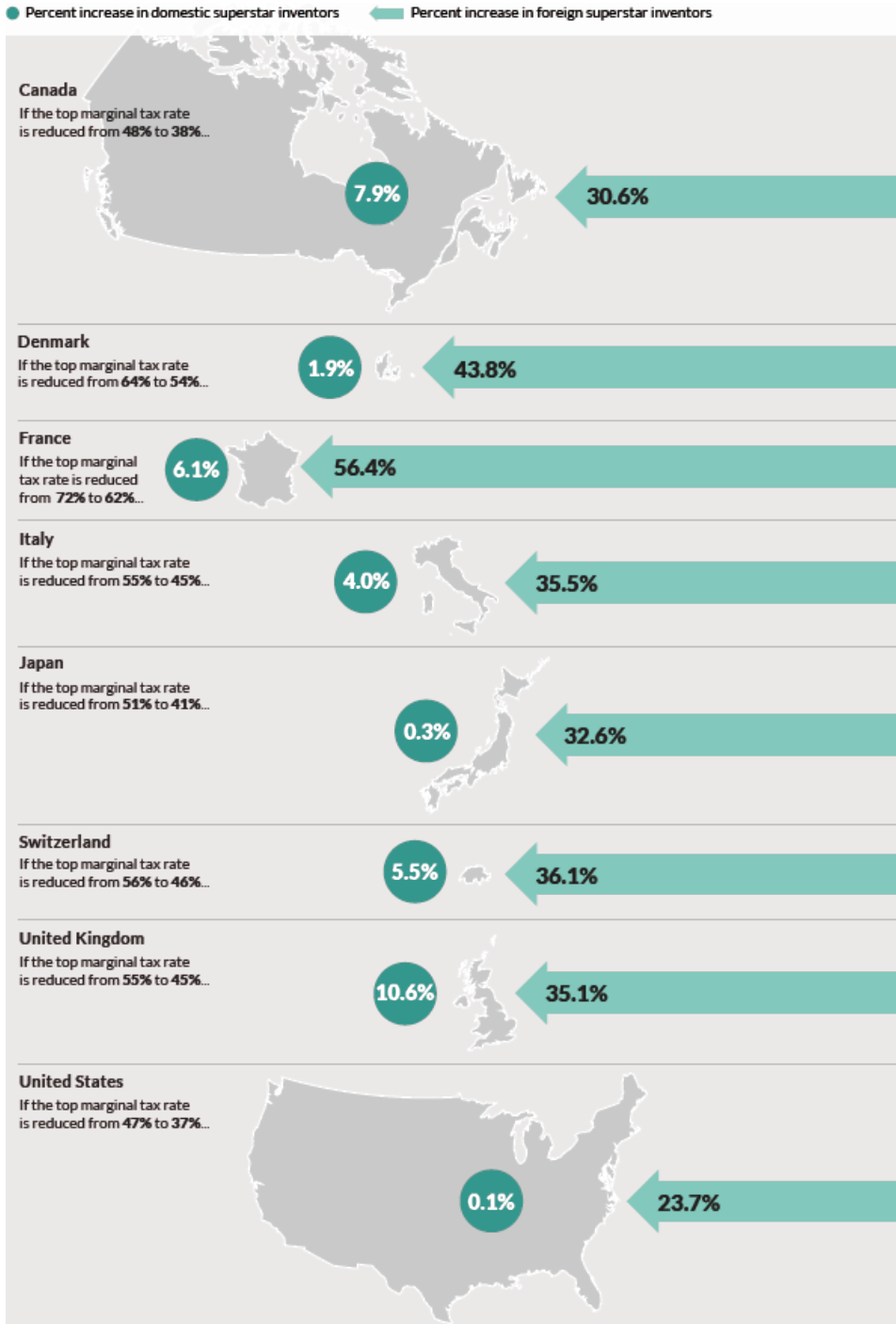
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The number of domestic superstar top 1% inventors and foreign superstar inventors that would be 'added' to a country if the top tax rate decreases by ten percentage points in the year 2000.

We also consider long-term mobility, defined as a one-way move abroad. It turns out that long-term mobility is still affected by taxes, but to a lesser extent. This seems to imply that there are some adjustment costs to moving that might prevent inventors from moving back once they leave due to higher taxes.

The influence of companies on inventors' migration responses to taxes

One would expect companies to have an important influence on the inventor's decision to move abroad. For instance, working for a multinational company might facilitate an international move,

both directly within the company and indirectly by providing international exposure. Depending on the bargaining power between employer and employee, the relocation decision might well be driven by the former rather than by the latter. In that case, and if the employer has other considerations than personal income tax, we would observe a dampened migration effect of taxes in the data. Note, nevertheless, that employers should take personal income taxes into account to some extent, if competition for superstar inventors forces them to pay higher wages as a compensation for higher taxes.

We find that inventors who have worked for a multinational company are more sensitive to tax differentials in their location choice. On the other hand, inventors whose company has a significant share of its innovative activity in a given country are less sensitive to the tax rate in that country. This seems to suggest that career concerns can outweigh tax considerations. It could also signal that companies with very geographically localised research and development activities will strongly prefer to keep their superstar inventors at the main research location and dissuade them from moving to lower tax countries.

Migration responses to taxation and policy

The recent evidence suggests that labour, like capital, might be internationally mobile and respond to tax incentives. The loss of highly skilled agents such as inventors might entail significant economic costs, not just in terms of tax revenues lost but also in terms of reduced positive spillovers from inventors and, ultimately, less innovation in a country.

Future empirical studies should aim to shed more light on the magnitude of this cost of taxation. Once we have a better understanding of the migration responses of high earners to taxation, we can then think about the policy implications. The right answer need not necessarily be to tax less and abandon all concerns for redistribution. Instead, it may be worth considering international tax cooperation and harmonisation.

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Footnotes

¹ See e.g. *New York Times* (2013), "That Russian Movie Star, Gerard Depardieu", 3 January 2013.

2 The figure shows the log fraction of inventors who work in their home country against the log of the top retention rate (one minus the top tax rate) over the period 1977-2003. The numbers are eight-year averages. For each dot, the first two letters are the country name and the last two digits are the starting year of the eight-year averaging period. Panel (a) considers only superstar top 1% inventors, panel (b) the top 25-50% of inventors (see Akcigit, Baslandze and Stantcheva 2015, Figure 4).

3 The percentage increase in domestic inventors who remain in their home country if the top tax rate is reduced from a fictitious level of 50% to 40%, in the average country and year (Akcigit, Baslandze, and Stantcheva 2015; figure designed by the Washington Center of Equitable Growth).

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