



WISSENSCHAFTSZENTRUM BERLIN
FÜR SOZIALFORSCHUNG

SOCIAL SCIENCE RESEARCH
CENTER BERLIN

Salmai Qari *
Kai A. Konrad **
Benny Geys ***

Patriotism, Taxation and International Mobility

* WZB

** WZB, Free University of Berlin and Max Planck Institute for
Intellectual Property, Competition and Tax Law

*** WZB

SP II 2009 – 03

March 2009

ISSN Nr. 0722 – 6748

Research Area
Markets and Politics

Schwerpunkt
Märkte und Politik

Research Unit
Market Processes and Governance

Abteilung
Marktprozesse und Steuerung

Zitierweise/Citation:

Salmai Qari, Kai A. Konrad, Benny Geys, **Patriotism, Taxation and International Mobility**, Discussion Paper SP II 2009 – 03, Wissenschaftszentrum Berlin, 2009.

Wissenschaftszentrum Berlin für Sozialforschung gGmbH,
Reichpietschufer 50, 10785 Berlin, Germany, Tel. (030) 2 54 91 – 0
Internet: www.wzb.eu

ABSTRACT

Patriotism, Taxation and International Mobility

by Salmay Qari, Kai A. Konrad and Benny Geys *

For patriotic citizens, living in their native country is intrinsically preferable compared to living in the diaspora. In this paper, we analyze the implications of such a patriotic lock-in in a world with international migration and redistributive taxation. In a formal model of redistribution with international migration and fiscal competition we derive the main hypothesis: that countries with a more patriotic population should have higher redistributive taxes. Using ISSP survey data and combining them with OECD taxation data, we find robust evidence suggesting that a) higher patriotism is associated with higher tax burdens, and b) this relation is stronger for the upper-middle range of the income distribution.

Keywords: Patriotism, international mobility, taxation, redistribution, fiscal competition

JEL Classification: H20, H73

ZUSAMMENFASSUNG

Patriotismus, Besteuerung und Internationale Mobilität

Die individuelle Entscheidung, dauerhaft im Ausland zu leben, wird sowohl von finanziellen als auch von nicht-monetären Aspekten beeinflusst. Patriotismus (Heimatbindung) ist einer dieser nicht-monetären Faktoren, der zwischen den Ländern aber auch innerhalb eines Landes variiert. Ausgehend davon analysieren wir zunächst theoretisch die Auswirkungen von Patriotismus auf den Steuerwettbewerb zwischen zwei Ländern. In der ersten Stufe des Spieles entscheiden die Individuen, ob sie auswandern oder nicht und in der zweiten Stufe erheben die Länder vom hoch-produktiven Anteil der Bevölkerung (unabhängig vom Ursprung der Individuen) Steuern zur Umverteilung. Wenn die ursprüngliche Bevölkerung (vor Migrationsbewegungen) in Land A im Durchschnitt heimatverbundener als die in Land B ist, reagiert sie weniger elastisch auf den Steuersatz. Im Gleichgewicht führt daher höherer (durchschnittlicher) Patriotismus zu höheren Steuersätzen. Im zweiten Teil überprüfen wir diese Hypothese empirisch, indem wir ISSP-Surveydaten und OECD-Steuerdaten zusammenführen. Im Ländervergleich besteht für gleiche relative Einkommen ein positiver Zusammenhang zwischen Patriotismus und Steuerbelastung.

* The authors are given in reverse alphabetical order, and contributed equally. We thank Tom Cusack, Martin Hellwig, Sebastian Kessing, Heike Solga and Vito Tanzi for discussion, comments and valuable suggestions. The usual caveat applies. Konrad gratefully acknowledges financial support provided by the Deutsche Forschungsgemeinschaft in the priority program 1142.

1 Introduction

Henry Morgenthau Jr., US Secretary of the Treasury during World War II, instructed Walt Disney to work on an animated movie to make US citizens less reluctant to pay their income taxes. The result was entitled *The New Spirit* and features Donald Duck who is, initially, disinclined to pay income taxes. He then, however, becomes convinced that “Taxes to beat the Axis” is his patriotic duty and happily pays his taxes (see Jones 1989: 716n; Watts 1995: 103n).¹ Although it was certainly innovative and ground-breaking, the production of *The New Spirit* is not a unique episode in history. Indeed, the role of patriotism for fiscal policy during war had been acknowledged in the US and UK long before World War II². Likewise, patriotism has recurrently been invoked to mobilize citizens for other contributions such as military service (Levi 1997).

Patriotic sentiments are usually invoked during times of war. Nonetheless, patriotism is likely to be important for governments’ (fiscal) policy in various contexts, countries and time periods, not just in times of war. Indeed, moral appeals to “patriotic duty” – such as in *The New Spirit* and its sequel entitled *The Spirit of ’43* – are likely to carry significant weight also in times of peace.³ Moreover, they relate to a warm glow of paying taxes⁴, which is only one manifestation of a possibly close link between patriotism and personal income taxation. A further potentially important link between patriotism and taxation – and the focus of the current paper – emerges in an international context when taking into consideration fiscal competition between countries and taxpayer mobility. This was already acknowledged by Seligman (1892, 138n):

¹http://en.wikipedia.org/wiki/The_New_Spirit.

²On the role of patriotism for war financing in the UK during World War I, see Stamp (1932). Bank et al. (2008) collect more systematic evidence on the relationship between US fiscal policy and wars and demonstrate that US tax reforms leading to higher tax burdens have often been enacted during wartime. Durand (1917, 905) relates this association between war and taxes to patriotism: “One can hardly overestimate the effect of patriotic sentiment during war time as an aid to the fiscal policy of the government. Much heavier taxes can be successfully collected during war than during peace.”

³Interestingly, the discussion about whether paying taxes is a patriotic duty was also an issue in the presidential campaign 2008 (see, e.g., Joe Biden on ABC News, September 22, 2008, and the discussion his statement induced). While the US is currently at war in Iraq and Afghanistan, Biden’s appeal should mainly be seen against the background of the current financial crisis.

⁴Harbaugh et al. (2007) found evidence from brain scans that paying taxes in laboratory experiments causes physiological rewards, and Konrad and Qari (2008) show that patriotism positively affects citizens’ tax compliance.

It is not always strictly true, as Adam Smith said, that “the proprietor of stock is properly a citizen of the world, and not attached to any particular country”. Feelings of patriotism, of local pride, of desire of proximity to friends, of long custom and old usage sometimes play a considerable role.

To better understand the underlying argument, it is good to remember that although patriotism easily becomes a value-laden concept and often bears a negative connotation⁵, in essence it refers to “devotion to one’s country” (OED 2003: 2122). This love and devotion can – pragmatically – be understood as being linked to an intrinsic preference for living in one’s native country, compared to living in the diaspora (all else equal). Patriotism, in other words, leads individuals to experience a (non-monetary) benefit (or “patriotic rent”) from residing in their native country.⁶ Patriotic citizens may then be willing to pay higher income taxes in their native land, not only because of patriotic duty (see Donald Duck in *The New Spirit*), but also because they have to pay these taxes to reside in their native country.

This paper adds in two main ways to this literature. First, theoretically, we formalize Seligman’s (1892) argumentation about the role of patriotism in the context of fiscal competition, using a simple median voter framework of redistributive taxation in the spirit of Meltzer and Richard (1981), enhanced by the possibility of international migration. This allows us to better characterize the exact effects of patriotic feelings in an international context, and derive empirically testable implications. The model shows that, for countries of equal size, an increase in patriotism in one country raises the equilibrium tax rate in that country. The intuition is that patriot’s “patriotic rent” increases their cost of emigration. They might thus refrain from moving abroad under conditions where they would have done so in the absence of their patriotism. Countries can “exploit” this by implementing higher

⁵Patriotism is often linked to nationalism and hostility toward the “out-group” (e.g., Druckman 1994; Mummeny et al. 2001). This, however, pertains only to “blind”, “unquestioning” patriotism, but not to “constructive” patriotism (Schatz et al. 1999, 151). Hence, recent research suggests that a clear distinction should be made between nationalism and patriotism (see Blank and Schmidt 2003; Huddy and Khatib 2007, and references therein).

⁶This rent can be one of the underpinnings for location preferences such as “home attachment”, which has been assumed and analyzed, e.g., by Mansoorian and Myers (1993). They, however, focus on countries’ incentives for interregional transfers.

taxes in the equilibrium.⁷

Second, rather than rely on descriptive evidence, we test this main prediction of our model using the *International Social Survey Programme National Identity (2003) study* – which includes information on individuals’ patriotism – and matching this dataset with OECD data on tax burdens (across 21 countries in the year 2003). The empirical analysis indicates a strong and consistent positive correlation between patriotism and fiscal burden, even when controlling for other factors. This result remains robust in a number of alternative specifications, and when employing an instrumental variables approach to control for possible endogeneity. This suggests that the higher shadow cost for patriotic citizens relocating abroad does indeed, as hypothesized by the theory, allow countries to exploit the patriotic feelings of their population through the tax system.

Our analysis contributes to several strands of research. First, a literature starting with Meltzer and Richard (1981) identifies determinants of the amount of redistribution. While Meltzer and Richard (1981) themselves highlight that the efficiency costs of taxation may limit redistribution, later studies illustrate that redistribution may be affected by the modes of redistribution available (Lizzeri and Persico 2001), uncertainty and perceptions about social mobility during lifetime or across generations (Glazer and Konrad 1994, Piketty 1995, Benabou and Ok 2001), the role of redistribution as insurance (Sinn 1995, Moene and Wallerstein 2001), specificity and portability of skills (Iversen and Soskice 2001), demography (Razin et al. 2002), non-monotonicity (Epple and Romano 1996), the existence of power coalitions (Breyer and Ursprung 1998, Iversen and Soskice 2006), proportional representation in political decision making (Austen-Smith 2000) or the amount of mobilization and political engagement (Solt 2008). Our paper reveals an important role of patriotism: patriotism may affect the ability of governments to extract tax revenue from the highly skilled, highly mobile and use this revenue for redistribution to the less well-off in a globalized world.

We also add a new aspect to the discussion about the future of the welfare state and

⁷For complementary theoretical analyses that focus on different mechanisms that are also based on “home attachment”, allow for factor mobility on the basis of given taxes, and generate higher taxes in the equilibrium for different reasons, see Ogura (2006) for capital income taxes, and Konrad (2008) for labor income tax competition with loyal and non-loyal citizens for a revenue-maximizing government.

redistribution in an international context. Rodrik (1998) argued that welfare state institutions may become more important as countries become more open in a globalizing world. But, at the same time, policy makers and economists are concerned that migration and international tax competition may erode the financial basis for governmental policy. That is, while from a welfare point of view mobility has upsides and downsides,⁸ high mobility of highly skilled (and high income earners) is likely to have detrimental effects on the amount of fiscal revenue that is available for redistribution. The tax competition literature in economics, for example, has extensively analyzed the (potentially) detrimental effects of tax competition for mobile tax bases and the resulting reduced scope for redistributive taxation and financing public goods.⁹ In line with Seligman’s (1892) pioneering conjecture from more than one hundred years ago, we argue that patriotism, and the attachment it generates to home, might help prevent a possible “race to the bottom” among mobile high income earners. Intuitively, patriotism generates a base of loyal citizens which makes the tax base less elastic with respect to tax rate changes, and this leads to a tax competition equilibrium in which taxes may stay high, and thus to higher taxes in the countries with a more patriotic population.¹⁰

In the next section the formal framework is outlined. Then, in section 3, we turn to the empirical evaluation of the core predictions about the link between patriotism and taxation. Finally, section 4 brings together the main conclusions and discusses some implications of our findings.

⁸Bhagwati and Dellalgar (1973) and Bhagwati (1976) argued more than 30 years ago that “brain drain” endangers the countries from which this drain originates and argued for a coordinated corrective tax on the brain drain. Justman and Thisse (1997, 2000) maintain that mobility of skilled labor may deprive a country of the fruits of *public* educational investment (thus leading to underinvestment in public education). To the contrary, Andersson and Konrad (2003) point out that the outmigration threat may overcome the problem of time-consistent taxation of the returns from *private* investment in education. Wildasin (2000) – combining both views – claims international migration can be good or bad for educational investment, depending on the public or private nature of education financing.

⁹This concern has been raised first in the context of capital income taxation. See, e.g., Zodrow and Mieszkowski (1986), Wildasin (1988) and Wilson (1986). Sinn (1997) shows why tax competition is likely to be dysfunctional and may make the welfare state unsustainable. For overviews of this vast literature, see Wilson (1999), Brueckner (2003), Fuest et al. (2005) and Sørensen (2007).

¹⁰Apart from patriotism and the citizen loyalty it may generate, other elements that cause countervailing forces to the race to the bottom have been identified in theoretical work. Baldwin and Krugman (2004) focus on agglomeration advantages. Hohnhaus, Konrad and Thum (1994) and Zissimos and Wooders (2008) consider aspects of heterogeneity and product differentiation. Our empirical test is independent of these other aspects.

2 The formal framework

We consider a static¹¹ game with migration followed by taxation and redistribution. Suppose there are two countries, A and B . Each country has two political parties denoted as D_K and R_K , for $K \in \{A, B\}$. The sets of individuals born in countries A and B are $I_A = [0, 1 + n_A]$ and $I_B = [0, 1 + n_B]$. In each country, a subset $[0, 1]$ of individuals has low productivity, implying that they earn an income equal to w_L . The remaining individuals have a high productivity, and earn a gross income equal to $w_H > w_L$. The size of the group of individuals with high productivity born in A and B is $n_A < 1/2$ and $n_B < 1/2$, respectively. The incomes w_L and w_H are exogenous and fixed reflecting, for instance, individuals' marginal productivity in a competitive labor market with constant returns.¹² Individuals also differ in terms of their *patriotism*: each individual obtains a particular (non-monetary) pleasure from residing in his/her native country, compared to living in the respective other country.¹³ For an individual i born in country K , this pleasure is denoted as $h_K + \eta_i$. It consists of a deterministic and a stochastic component. The deterministic component $h_K \geq 0$ measures the happiness individuals enjoy on average from residing in their native country, and we refer to values h_A and h_B as the *average patriotism rent*. This rent does not need to be the same across both countries. The stochastic component, η_i , is an independent draw from the same distribution for all individuals. We assume that $E(\eta_i) = 0$, and that the distribution is characterized by a cumulative distribution function

¹¹Our framework could be embedded into a fully dynamic multi-period supergame with the two-stage game considered here being played in each period: i.e. migration choices followed by taxation choices in each of the periods, with individuals and parties who have an infinite life and maximize discounted present values (or an overlapping generations structure). In the absence of migration costs, the equilibrium we derive below for the static game is also an equilibrium in such a finitely or infinitely repeated game. If there was an infinite number of periods, equilibria other than the one we derive can be supported (e.g., by trigger strategies), and the uniqueness result we have would be lost.

¹²We could make w_L and w_H a function of relative scarcity of types, or of other factors of production (such as capital) in the two countries. We refrain from doing so, however, as this would significantly complicate the analysis without affecting our main conclusions.

¹³One might argue that non-natives may over time develop patriotism toward their new home-country. This is not captured here. This need not be problematic as the country moved into is less likely to “re-socialize” individuals into feeling patriotic about it when these individuals' identities and loyalties are firmly established in the native country (Hooghe 2005; Johnston 2005). Given that scholars studying identity formation and the internalization of norms and loyalties generally agree that “agents' first and most intensive period of socialization occurs inside the main institutions of state socialization (for example, education systems)” (Johnston 2005, 1026), the development of patriotic feelings may be more difficult for immigrants. This holds especially for those who have spent considerable time in their native country (as relative length of embeddedness within both structures is crucial; see Egeberg 2004).

$G(\eta_i)$ that is continuous on its whole support - given by $[-(w_H + \max\{h_A, h_B\}), w_H]$ - and continuously differentiable on this interval.¹⁴

In STAGE 1, individuals choose whether to stay in their country of origin or to migrate to the other country. Simplifying, we assume that individuals with a low income are immobile, and individuals with a high income are perfectly mobile in this stage.¹⁵ The sets J_A and J_B with measures $1 + \gamma_A$ and $1 + \gamma_B$ describe the post-migration distribution of individuals. Here, $\gamma_A \in [0, n_A + n_B]$ is the size of the population of high income earners who choose to reside in country A , and similarly for γ_B . As there is no other place to go to or to come from, it must be that $\gamma_A + \gamma_B = n_A + n_B$. These population sizes are observed at the end of STAGE 1. Moreover, individuals lose their mobility at the end of this stage.¹⁶

In STAGE 2, a political equilibrium determines taxes and redistribution. The timing with taxation following the migration choices maps the idea that migration decisions are “more long-term” than taxation, but is not essential for the qualitative predictions here. In each country ($K \in \{A, B\}$) both parties - D_K and R_K - choose policy platforms (t_K, S_K^H, S_K^L) consisting of a proportional tax rate $t_K \in [0, 1]$ that applies uniformly to all inhabitants, and non-negative subsidies $S_K^H \geq 0$ and $S_K^L \geq 0$, where S_K^H and S_K^L are the amounts paid to high and low productivity residents respectively. We allow for different per-capita subsidies for the two different types of individuals, but require that all individuals with the same gross income receive the same per-capita subsidy. The proposed policy platform has to obey a government budget constraint. Given that gross tax revenue in country K is given by $(w_L + \gamma_K w_H)t_K$ and tax collection has a cost equal to $\frac{t_K^2}{2}(w_L + \gamma_K w_H)$, net tax revenue

¹⁴The random element induces a smooth distribution of patriotism rent, similar to the distribution of home-attachment in Mansoorian and Myers (1993).

¹⁵The assumption that migration is only an option for high income earners is common in the literature - see, for example, Andersson and Konrad (2003) and Beine et al. (2008) - and builds on findings by, among others, Docquier and Marfouk (2006), that highly educated workers are five to ten times more likely to emigrate. Note also that “welfare tourism” - i.e., migration by the poor for welfare benefits - is probably of only minor concern in the international context analyzed here, as transfer entitlements can be tied to how long a person has resided in the country.

¹⁶Mobility is often higher in earlier stages of life (e.g., when deciding where to study or at the beginning of one’s professional career) and, due to high set-up costs, is a more “long-term” decision compared to taxation (which is adjusted more frequently). Similar timing regarding migration and policy choices is adopted, for instance, in Mitsui and Sato (2001).

T_K that is available for redistribution is¹⁷

$$T_K = (t_K - \frac{t_K^2}{2})(w_L + \gamma_K w_H). \quad (1)$$

Hence, a balanced government budget requires

$$S_K^L + S_K^H \gamma_K = (t_K - \frac{t_K^2}{2})(w_L + \gamma_K w_H). \quad (2)$$

Voters observe the policy platform choices of the parties and vote for one or the other platform. We assume sincere voting. The platform that receives the most votes is implemented. In case of a draw, a random device decides on implementation. Once these decisions are made, income accrues, taxes are collected, tax revenue is redistributed according to the policy platform and the game ends.

We now turn to the payoffs of the players. Individuals care about the sum of net income and patriotic rents. The net income of an individual locating in country K is $(1-t_K)w_L + S_K^L$ if the income of the individual is w_L , and $(1-t_K)w_H + S_K^H$ if the individual's income is w_H . An individual i born in country A and staying in this country receives in addition a patriotic rent equal to the sum of the deterministic average patriotism rent h_A , and the idiosyncratic component η_i . Note that the overall patriotic rent for i can be negative in country A even though $h_A \geq 0$ if the idiosyncratic component η_i is sufficiently negative. If the individual i is born in A and moves to B , the received patriotism rent is zero. This is a normalization and without loss of generality.¹⁸ The intrinsic patriotic rent for an individual i who is born in B and stays in B is defined analogously as $h_B + \eta_i$. Summarizing, the

¹⁷The cost of taxation may have many possible microeconomic underpinnings. In the simplest case, the cost of taxation may be the physical transaction cost of tax collection or tax compliance. Still, it could also be seen as a short cut for accounting for an excess burden of taxation. The convexity of this cost in the tax rate is a common and plausible assumption used to describe the excess burden of taxes (e.g., Bolton and Roland 1996: 100).

¹⁸For instance, the patriotic rents for living in countries A and B could be $h_A + \alpha_i$ and β_i , respectively, for an individual i born in country A , with stochastic α_i and β_i . In this case, η_i can simply be seen as $\eta_i = \alpha_i - \beta_i$. The absolute levels of α_i and β_i matter for happiness, but the difference is all that matters for the migration decision.

payoff of an individual i with high income w_H , born in country A ($i \in I_A$) is

$$\begin{aligned} u_i &= (1 - t_A)w_H + S_A^H + h_A + \eta_i && \text{if } i \text{ stays in } A \\ u_i &= (1 - t_B)w_H + S_B^H && \text{if } i \text{ moves to } B. \end{aligned} \quad (3)$$

The payoff for individuals born in country B is defined analogously. The payoff of individuals with low income in country K is

$$u_i = (1 - t_K)w_L + S_K^L + h_K + \eta_i. \quad (4)$$

As individuals with low productivity do not have a residence choice here, they always stay in the country where they were born. They may have a positive or negative patriotic rent from this.

Finally, we assume all political parties are office motivated. Each party chooses the policy platform that, given the anticipated choice by the competing party in the same country, maximizes the probability of winning a majority of votes. As the median voter theorem will apply in our framework, it is well known that a large class of alternative party preferences would lead to the same voting equilibrium in STAGE 2. Solving for the subgame perfect equilibrium of this game, we find two main results.

Proposition 1 *A subgame perfect equilibrium exists and is unique.*

A proof is in the appendix. Intuitively, the groups with low productivity choose their optimal income tax rates in each of the two countries. They take into consideration that the share of highly productive individuals in their own country is decreasing in the tax rate in their own, and increasing in the tax rate of the other country. This causes a unique crossing of the reaction functions. Patriotism, and the home attachment (or “lock-in”) it creates, typically leads to strictly positive taxes in the equilibrium. Patriotism weakens the “race to the bottom” in competitive tax setting between countries.¹⁹

The comparative static properties of this equilibrium yield the main hypothesis of our empirical analysis:

¹⁹See Brueckner (2003) for an empirical overview of the effects of strategic interaction among governments.

Proposition 2 *Higher patriotism in a country yields a higher equilibrium tax rate in this country and a lower equilibrium tax rate in the other country (i.e., $\frac{dt_A}{dh_A} > 0$, $\frac{dt_B}{dh_B} > 0$, $\frac{dt_A}{dh_B} < 0$ and $\frac{dt_B}{dh_A} < 0$).*

A proof of Proposition 2 is also in the appendix. If country A initially has an indigenous population that is more patriotic on average than the population in country B (i.e., $h_A > h_B$), then, for identical tax rates (i.e., $t_A = t_B$), the mobile high income earners in A are less likely to emigrate than the mobile high income earners from country B . Country A thus ends up with a larger set of high income earners in the post-migration equilibrium than country B ($\gamma_A > \gamma_B$). For the median voter in A , this makes a higher tax rate more desirable than in B . This higher tax has general equilibrium repercussions. As shown in the proof of the proposition, these repercussions are weaker than the primary effect.

Proposition 2 yields our main empirical hypothesis: higher patriotism induces higher tax rates.

3 Empirical analysis

In this section, we assess our general hypothesis by linking individuals’ “patriotism” (using the 2003 ISSP “National Identity II” survey) to their income tax burden (exploiting the OECD “Taxing Wages” database), for a set of 21 countries in the year 2003.²⁰ The empirical model and the data employed in the analysis are described in section 4.1, while the main results are brought forward in section 4.2. Finally, section 4.3 provides a number of robustness checks.

3.1 Empirical specification

We assess the predictions derived from the theory by estimating a regression equation of the following form:

$$Tax_{i,j} = \beta_0 + \beta_1 Proud_{i,j} + \mathbf{x}'_{i,j} \boldsymbol{\beta}_2 + e_{i,j} \quad (5)$$

²⁰The countries are: Australia, Austria, Canada, Denmark, Finland, France, (West-)Germany, Hungary, Ireland, Japan, New Zealand, Norway, Poland, Portugal, Slovak Republic, South Korea, Spain, Sweden, Switzerland, United Kingdom and United States.

where $Tax_{i,j}$ represents the (income) tax burden²¹ faced by individual i in country j , $Proud_{i,j}$ denotes individual i 's level of patriotism and $\mathbf{x}'_{i,j}$ is a vector of control variables (each of these is further discussed below). While equation (5) is clearly specified based on the use of individual-level data, it is important to stress that the analysis below is carried out *both* at the individual level *and* at a more aggregate level of analysis (we return to this issue below).

The dependent variable, $Tax_{i,j}$, is defined as gross income minus net income, divided by gross income. As such, it quantifies the income tax burden as the share of gross income paid in income taxes and social security contributions. It is calculated by linking the income level each respondent in the 2003 ISSP survey claims to earn to the income tax rate data in the OECD “Taxing Wages” study. The latter study provides information on workers’ income tax payments as well as social security contributions levied on employees for several benchmark cases depending on household type and income level. More specifically, information regarding the overall income tax burden is provided for 200 levels of income (ranging from 0% to 200% of the average employee’s income) for each of the countries surveyed.²² This thus provides a relatively detailed description of the income tax burden along the income scale, allowing us to match each respondent closely to the tax burden calculated by the OECD for his/her income group (and household type).

We restrict our sample to those respondents in the ISSP dataset who are single, and this is for two reasons. First, the ISSP data do not allow a clear portrait of how multi-individual households are constituted (e.g., whether adults in a given household are married, cohabiting, live with their (grand)parents or children is difficult to establish with certainty). This information, however, is crucial to accurately determine the appropriate tax rates in the OECD data, and thus to derive our central tax burden variable. Second, singles are

²¹Other taxes might play a role as well. Still, income taxes might be particularly important (as illustrated by the choice in *The New Spirit* to focus on income tax payments). Moreover, we have no information on other taxes.

²²One could argue that individuals earning the average worker’s income (or even twice that amount) are not necessarily the “rich and mobile” for which our theoretical model (implicitly) predicts the strongest effects. Nevertheless, for most countries in our sample, the 90th-percentile of the income distribution corresponds to approximately 1.5 times the average worker’s income (Atkinson, 2008). Exceptions are Ireland and the US, where the 90th-percentile is at 200% of the average worker’s income (Atkinson, 2008). Hence, we feel confident that most of the income distribution which is of empirical interest to our model is de facto represented in our sample. We are grateful to Tom Cusack for extensive and fruitful discussions on this point.

likely to be more mobile and less attached to a country for personal reasons (e.g., married individuals, or individuals taking care of children and/or (grand)parents are more strongly bound to a given country and might ‘grow’ to love it because of that). Singles constitute a ‘least-likely’ category of individuals to become exploited by a national government for patriotic reasons, providing a harsh test for structural effects. If one observes the predicted effects within this group, it provides strong evidence in favor of our hypothesis (cf. Eckstein, 1975; King et al., 1994; Yin, 2003).

We also exclude all (1,309) respondents claiming an income below 60% of the average worker’s income in their country. This, likewise, has two reasons. First, these citizens often have a net wage exceeding the gross wage (leading to a negative tax burden), making it difficult to interpret their tax “burden”. This lack of tax payments also implies that this group cannot be exploited by the government through higher income taxation related to their (possible) patriotism. Second, net income exceeding gross income indicates that these respondents are likely to be recipients of social welfare benefit schemes. They might prefer higher (income) tax rates to finance redistribution in their favor and they become more attached to their country due to the receipt of welfare benefits. This, however, entails a reverse causality argument (where high tax rates lead to more “patriotism”). To prevent this from artificially inflating support for our hypothesis, we exclude this income group (although we return to this exclusion in the robustness analysis below). Imposing a cut-off at 60% is arbitrary. We chose this cut-off to exclude all negative tax burdens from the sample, thereby limiting the effect of welfare benefit receipts on our tax burden variable. Moreover, imposing a cut-off at 50% or 70% does not affect our main findings (see Table 3 in the results section).

The core explanatory variable of our analysis is the respondent’s patriotism ($Proud_{i,j}$). It is determined relying on a set of questions in the 2003 ISSP “National Identity II” survey probing for the respondent’s proudness about his/her country: “How proud are you of [country] in each of the following?” Since this question is asked about the country one resides in at the time of the survey, we exclude all non-nationals from the dataset such as to obtain the most accurate representation of how citizens of a given country feel toward their own country. Hence, we only regard, say, French citizens living in France and exclude people of

non-French nationality interviewed in France. This restriction brings the empirical analysis closer in line with the idea in the theoretical model that non-nationals (are likely to) lack a “patriotism rent”.²³ Note also that articulated patriotism – as measured in surveys – is not necessarily a direct measure of h_A and h_B . Patriotism is sampled among the population that emerges in the post-migration equilibrium. As some individuals with sufficiently negative idiosyncratic patriotism $\eta_i < 0$ will have left the country in equilibrium, average articulated patriotism among the indigenous population in the post-migration equilibrium should be higher than the average patriotism among all individuals who are born and raised in a given country. Nevertheless, for the testable implications of the formal analysis, this is not a problem.²⁴

“Patriotism” may, at first, seem difficult to quantify. In fact, the “proudness”-question is raised for ten different social, economic, historical and political characteristics of the country at hand (see Table 1), leading to the question which of these variables is most closely connected with the patriotism rent from living in one’s own mother country. Fortunately, there is a natural solution to this problem. As all ten questions explore one common underlying concept (i.e., patriotic sentiments) and are measured in common units (i.e. a four-point Likert-type scale ranging from “very proud” to “not proud at all”), they satisfy the basic criteria for use in a factor analysis (cf. Kennedy, 2005). We therefore follow standard practice and combine the answers from all ten questions into a single index through

²³Nonetheless, retaining non-nationals in the sample – based on the idea that people living for a long period of time in a country that is not their native country may nonetheless develop an attachment to this country (cf. supra) – does not affect the qualitative findings of our analysis (available upon request).

²⁴More formally, the average patriotism rent among the indigenous population in the post-migration equilibrium is

$$[h_K + E(\eta_i | i \in I_K \cap J_K)] > h_K \text{ for } K \in \{A, B\}.$$

For instance, let $n_A = n_B$. Then, for $h_A > h_B$, we find that $t_A > t_B$ in the equilibrium. This means that, apart from the patriotism rent and in pure income terms, the fiscal conditions in country A for high income earners are less attractive than in country B . Hence, the cut-off $h_A + \eta_i$ of indigenous individuals who stay in A is higher than the cut-off $h_B + \eta_i$ for indigenous individuals in B . Accordingly, $t_A > t_B$ and the differential effects on outmigration in A and in B reinforces the pre-existing differences between the expected patriotism rents of non-migrants in the two countries from $h_A - h_B$ to

$$[h_A + E(\eta_i | I_A \cap J_A)] - [h_B + E(\eta_i | I_B \cap J_B)] > h_A - h_B$$

in the equilibrium. For our estimations, this implies that the coefficient that measures the effect of differences in actual patriotism will be biased downward. Hence, if actual migration changes the measured patriotism in the indigenous population of a country, then this effect biases the empirical test against our hypothesis.

Table 1: Patriotism factor analysis ($N = 5023$)

	Rotated Factor Loadings
The way democracy works	.68244177
Its political influence in the world	.60596827
economic achievements	.62622493
Its social security system	.62780228
Its scientific and technological achievements	.35983848
Its achievements in sports	.11578783
Its achievements in the arts and literature	.16349948
armed forces	.3408436
Its history	.15194136
Its fair and equal treatment of all groups in society	.53190732
Eigenvalue: 2.211	
Variance explained: 69.47%	

a factor analysis using the principle-factor method as the technique of extraction (with orthogonal varimax rotation; Kaiser 1958).²⁵ The scores of the first principal factor resulting from this analysis constitute our composite indicator of patriotism when estimating equation (5). The analysis reveals that the data can be summarized by one single strong factor.²⁶ Using this factor as a measure of proudness becomes the natural choice for quantifying patriotism. Table 1 shows the results for this first principal factor.

Table 1 indicates that it is mainly the first four and the last question which load most strongly on the extracted underlying component. For these five questions, the (rotated) factor loading lies well above the critical value of 0.35 suggested by Pennings et al. (1999). The questions regarding scientific and technological achievement as well as armed forces obtain factor loadings which hover around this critical value, while the remaining three questions appear to add little to the underlying component. Intuitively it appears reasonable that these five questions are highly correlated with latent patriotism. For most people, patriotic feelings or proudness of one’s country are more likely to derive from, say, individuals’ perceptions of the country’s political influence in the world than its achieve-

²⁵Such an analysis allows efficient consolidation of the information from a “large number of possible explanatory variables” into one (or, possibly, multiple) composite indicator(s) (Kennedy 2005, 212) and has been argued to “mitigate the influence of idiosyncratic measurement error within each of the variables (...) [thereby maximizing] the likelihood of measuring the underlying concept more precisely” (Coffé and Geys 2005, 490). Note also that the suitability of data for a factor analysis is often measured via the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (which indicates the proportion of variance that is common among the variables included in the analysis). The (normalized) index has values between 0 and 1, with larger values indicating that the data are better suited to factor analysis (Kaiser 1974; Kaiser and Rice 1974). In our case, the KMO-index obtains a value of 0.864.

²⁶There was only one factor with an eigenvalue larger than one.

ment in arts or sports (which may be deemed as more individual, rather than country-level, achievements). Given that the factor scores resulting from the factor analysis increase with patriotic feelings, support of the main hypothesis would imply $\beta_1 > 0$, ceteris paribus.

Beside the central explanatory variable, we add a number of control variables to capture the effect of potential mediating factors. First of all, an individual's tax burden is critically determined by his/her position in the income distribution. To account for this, we employ two approaches. In a direct approach, we include individual i 's position in the income distribution of his/her country ($IncPos_{i,j}$). Specifically, $IncPos_{i,j}$ designates for each individual i in country j what percentage of country j 's average wage his/her income represents. It is derived by linking individual i 's income (as stated in the ISSP survey) to the corresponding income (and tax) bracket in the OECD dataset. Hence, as the OECD provides detailed data for 200 income levels (see above), $IncPos_{i,j}$ ranges from 0% to 200%. The coefficient estimate is expected to be positive. In a second, more indirect approach, we approximate each individual i 's wage (and thereby income position) relying on a number of individual-level characteristics that are generally found to be closely linked to wage levels. Specifically, and building on an entire literature starting with the work of Mincer (1958, 1974), we include experience (proxied via an individual's age; i.e., Age_i and Age_i^2), years of education (Edu_i), gender (Sex_i), union membership ($Union_i$) and public sector employment ($Public_i$). This alternative specification is in closer keeping with the literature on individual-level wage determinants and, more importantly, allows us to assess whether our results are robust to choices made regarding the proxy for individuals' relative income position.

Further, we control for a number of country characteristics. First, the country's unemployment rate ($Unem_j$) is taken from the World Development Indicators. Unemployment increases the need for public spending on unemployment (and, potentially, other social welfare) benefits, and thus is likely to be associated with higher equilibrium tax rates. We include the level of GDP (per capita and in natural logarithms to account for the highly skewed distribution of this variable; GDP_j). Following Wagner's Law, we expect that the wealth of a country is associated with higher taxes. Inclusion of this variable is also important to account for the relative size of countries. We also account for the ideological

persuasion of the government ($IDEO_j$) based on the oft-cited idea that left-wing parties are more in favor of government intervention and redistribution than their right-wing counterparts, which is likely to lead to higher tax burdens (e.g., Hibbs 1977). The variable $IDEO_j$ is obtained from the Comparative Political Dataset (Armingeon et al. 2008) and takes on values between 1 and 5, with higher numbers representing more leftist governments. As governments are unable to immediately change fiscal policies to match their ideological preferences, we lag this variable by four years. Due to the strong temporal dependence in the series, using slightly shorter or longer lags makes little difference to our findings. Given the coding scheme, we expect this variable to be positively related to the income tax burden. We include an index of fiscal decentralization ($Decentr_j$), measured as the share of total government revenues raised at the national level (likewise taken from the Comparative Political Dataset; Armingeon et al. 2008). The idea here is that if public good provision is decentralized and lower-level governments are fiscally autonomous, the central government itself is in need of less financial resources, allowing income tax rates to be lower.

Although our dataset pools cross-sections from different countries, we do not include country fixed effects. To include country fixed effects would lead to a focus on within-country variation, whereas our model predicts that variation in patriotism is associated with between-country tax differentials (controlling for other factors, in particular income). Since we use various country variables to control for obvious level differences in the tax schedule among the countries in our sample, one might consider clustering the standard errors on the country level to control for unobserved country characteristics. However, Hubert-White type standard-errors for country-level clusters are inappropriate in our setting as it requires a large number of clusters with relatively few observations in each cluster.²⁷ Our sample shows the exact opposite tendency: few clusters with numerous observations.

A possible objection against a pure individual-level approach might be the dependence of observations of individuals who live in the same country and belong to the same income class, as those respondents clearly face the same tax burden. To address these issues we estimate two variants of equation (5). The first specification is on the individual-level,

²⁷See Wooldridge (2003) and the references therein for studies showing that cluster-robust estimation may fail even if the number of clusters is as large as 40 or 50.

while the second version averages all variables on the country-income level. This drastically reduces the number of observations²⁸, but goes a long way to address the dependence problem discussed above.²⁹

3.2 Results

Our main findings are brought together in Table 2. The first column regresses individuals' tax burdens on their patriotism score (Proud) controlling only for the relative income position (IncPos). The second column reports the baseline specification on the individual level and controls for income position and country characteristics. The third column proxies the income position indirectly by a number of individual characteristics. The last two columns in Table 2 present the results on the aggregate level, using income classes rather than individuals as the units of observation. For this, we identify all respondents with the same relative income position separately for each country. The average patriotism of these groups is denoted as "Aver. Proud". Column (4) regresses the income tax burden for each income group on the average patriotism controlling only for the income position. Thus, column (4) is the aggregate version of column (1). Finally, column (5) adds country-level controls analogously to column (2). Since the "indirect" alternative (column 3) makes no intuitive sense in the collapsed dataset, we refrain from this additional estimation in that setting.

Starting discussion of our findings with a brief description of the control variables, we find that – as expected – individuals placed relatively higher in the country's income distribution face a significantly higher tax burden. Also, in line with the proposition that left-wing governments are more in favor of government intervention, the tax burden is higher when the government's ideological position (four years ago) was further to the left. The extent of fiscal decentralization, on the other hand, is linked to a lower income tax burden (supporting

²⁸The maximum number of observations in this case would be equal to the number of countries times the number of income classes (i.e., 200), but our sample does not provide respondents for all income levels for each country.

²⁹Some might deem this still does not go far enough. Collapsing data at the country level (thus leaving one observation per country), however, decreases the sample size to 21, precluding reliable statistical analysis. Nevertheless, casual observation from cross-plotting the resulting tax burden and patriotism data at the country level shows that even in this case our results are qualitatively left unaffected (while admittedly not controlling for possible confounding factors).

Table 2: Main Results

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
IncPos	0.12248*** (0.00468)	0.10195*** (0.00381)		0.08491*** (0.01114)	0.08619*** (0.00884)
Age			0.23380*** (0.06501)		
Age ²			-0.00225*** (0.00067)		
Sex			1.88686*** (0.37026)		
Edu			0.27436*** (0.05535)		
Public			-0.82331* (0.42788)		
Union			3.09433*** (0.42241)		
GDP		3.96927*** (0.51366)	3.14274*** (0.58088)		0.59531 (0.79669)
Unem		0.38383*** (0.08271)	0.30377*** (0.09112)		0.09516 (0.13024)
IDEO		2.54898*** (0.08774)	2.76133*** (0.11362)		3.18169*** (0.32262)
Decentr		-0.05294*** (0.01048)	-0.06389*** (0.01273)		-0.05474** (0.02323)
Proud	2.26109*** (0.23151)	0.67330*** (0.19506)	0.86107*** (0.24705)		
Aver. Proud				3.56788*** (0.66683)	1.89189*** (0.62989)
_cons	14.21586*** (0.54147)	-28.35142*** (5.97603)	-18.93337*** (6.81860)	19.65969*** (1.16655)	8.17895 (8.77925)
<i>N</i>	1941	1777	1649	292	282
adj. <i>R</i> ²	0.33209	0.54374	0.34812	0.27319	0.53518

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results are from OLS regressions. The explained variable for columns (1)-(3) is the tax burden of individual i in country j . The explained variable for columns (4) and (5) is the average income tax burden calculated (separately for each country) for all available income classes.

IncPos is the respondent's relative income position. It ranges from 0% to 200% and is equal to 100% if the respondent's income is equal to the average single worker's income in the OECD taxing wages study. Sex is a dummy indicating males. Edu denotes years of schooling. Public is a dummy indicating if the respondent works in the public sector. Union is a dummy indicating union membership. Proud is respondent's patriotism. It is the predicted score for the first principal factor derived from a set of 10 patriotism questions. GDP (per capita and in natural logarithm) and unemployment rate (Unem) are taken from the world development indicators. IDEO is an ordinal ranking for government's ideological position and takes integer values between 1 and 5, where higher values indicate more leftist governments. Decentr is an index of fiscal decentralization, defined as the share of government revenues raised at the national level. Aver. Proud is the average patriotism calculated (separately for each country) for all available income classes.

Column (1) controls directly for the income position by using IncPos, while column (3) proxies the income position by other individual characteristics. Column (2) shows the baseline specification which adds country-level controls to the individual income position. Columns (4) and (5) show the aggregate versions of columns (1) and (2), respectively.

the idea that the central government in such a setting needs less resources from, among others, income taxation). These three results are robust in sign and significance across both the individual-level and the country-income level sample. GDP and unemployment show the expected positive relation to the tax burden, but this is only statistically significant at conventional levels in the individual-level estimations.

Turning to our central patriotism variable, we find strong and consistent support for our main proposition. The estimations based on individual data (columns (1)-(3) in Table 2) show that individual patriotism –while controlling for the relative income position– is positively associated with the individual income tax burden. Individuals who are more patriotic (in the sense that they are proud of their country) face a significantly higher income tax burden. The point estimates are very similar in all three estimations, indicating that this result is not dependent on the approach used to measure individuals’ relative income positions. Further, the estimates using averages of individuals in income classes (columns (4) and (5) in Table 2) show that the positive association remains strong on the more aggregate level. This evidence is strongly in line with the theoretical hypothesis. It suggests that countries are able to exploit the patriotic feelings of their population by levying higher taxes.³⁰

We also assess whether the patriotism effect in our dataset is particularly strong for high income groups and/or particularly weak for low income groups. We do this in two ways. First, we estimate the model for those respondents of the ISSP survey who claim to earn less than 60% of the average worker’s income. For these low income people, the theory predicts no relation between patriotism and the tax burden (though, as mentioned, there may be a reverse causality problem here leading to a spurious positive relationship between the two variables, see section 4.1). Column (1) of Table 3 estimates the model on this low income subsample of our population (i.e., 1,309 observations) and illustrates that this is indeed the case. The patriotism variable has a positive sign, but never reaches statistical significance at conventional levels. Column (2) estimates the model for all respondents with an income above 50% of the average worker’s income. Columns (3) and (4) show the results

³⁰This does not imply that an individual’s higher patriotism causes him/her to be taxed higher on an individual basis (as, obviously, tax systems do not work on such an individual basis). It does indicate, however, that the tax system underlying individuals’ tax burdens can extract patriotic rents.

Table 3: Regression Results for different cut-off values of the income level

	(1)	(2)	(3)	(4)
	$\leq 60\%$	$\geq 50\%$	$\geq 60\%$	$\geq 70\%$
IncPos	6.10305*** (0.48537)	0.11109*** (0.00338)	0.10195*** (0.00381)	0.11626*** (0.00401)
GDP	-54.12004*** (9.62412)	3.42926*** (0.43179)	3.96927*** (0.51366)	4.03107*** (0.60198)
Unem	-6.97151*** (1.96084)	0.34582*** (0.07123)	0.38383*** (0.08271)	0.36360*** (0.09705)
IDEO	-22.31255*** (4.85806)	2.72026*** (0.08158)	2.54898*** (0.08774)	2.46445*** (0.08731)
Decentr	0.48920 (0.32509)	-0.07411*** (0.00913)	-0.05294*** (0.01048)	-0.05494*** (0.01157)
Proud	9.91470 (10.31079)	0.51486*** (0.17757)	0.67330*** (0.19506)	0.62607*** (0.19898)
_cons	334.49453*** (93.05330)	-23.21967*** (4.99381)	-28.35142*** (5.97603)	-30.64166*** (7.06587)
N	1309	2114	1777	1595
adj. R^2	0.31833	0.60821	0.54374	0.57715

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results are from OLS regressions. The explained variable is the tax burden of individual i in country j .

Proud is respondent's patriotism. It is the predicted score for the first principal factor derived from a set of 10 patriotism questions.

See Table 2 for a description of the control variables.

for individuals with an income above 60% and 70% respectively. Comparing columns (4), (3) and (2) we find (some) evidence that the positive association between patriotism and tax burden is stronger for the upper part of the income distribution.

Second, we employ a quantile regression approach to evaluate the effect of patriotism on several parts of the tax burden (and thereby, though indirectly, income) distribution. While standard OLS estimates conditional mean functions, quantile regression methods allow us to estimate “models in which quantiles of the conditional distribution of the response variable are expressed as functions of observed covariates” (Koenker and Hallock 2001, 143; see also Koenker 2005). By analyzing a full range of conditional quantile functions, this technique provides a richer analysis of the stochastic relation among the variables.

Since there are not enough observations to perform the quantile regression on the aggregate level, we restrict the analysis to our main sample of respondents earning more than 60% of the average worker’s income. While our baseline specification in the second column of Table 2 provides just one estimate for the conditional mean, we now analyze the relationship between tax burden and the regressors for different quantiles of the tax burden distribution.

The results from estimating five distinct quantile regressions (based on equation (5)) for the 0.50 to 0.90 quantiles of the tax burden distribution of the main sample are depicted in Table 4. Table 4 illustrates that the patriotism-effect is strongest for the upper part of the tax burden distribution. While in almost all cases the coefficient estimate is found to be positive (this holds also for lower quantiles; not reported), the coefficient estimates only become significantly different from 0 when surpassing the 0.6 quantile. The effect slackens off again toward the higher ends of the tax burden distribution. For the respondents with the highest tax rates (in the sample), the patriotism variable is once again insignificant. This result may simply derive from a limited number of observations at this range (indeed, the mass of the distribution of tax burdens is quite low at the upper tail). Taking the result at face value, however, it appears to fit with a theoretical argument by Breyer and Ursprung (1998) who explain that the very upper end of the income distribution may not pay much taxes, because this upper end, instead of accepting high taxes, may bribe the decision makers in a representative democracy.

Table 4: Quantile Regression Results

	Quantile				
	0.5	0.6	0.7	0.8	0.9
IncPos	0.09612*** (0.00000)	0.09949*** (0.00039)	0.09809*** (0.00113)	0.12201*** (0.00143)	0.12478*** (0.00118)
GDP	9.67611*** (0.00000)	10.20596*** (0.04994)	2.55035*** (0.15607)	0.85694*** (0.17789)	-0.26622* (0.16042)
Unem	1.08261*** (0.00000)	1.16453*** (0.00854)	-0.25194*** (0.02638)	0.10138*** (0.03322)	0.21393*** (0.03716)
IDEO	1.95204*** (0.00000)	1.73278*** (0.01118)	3.56494*** (0.02777)	5.63174*** (0.02959)	6.94562*** (0.02605)
Decentr	0.04690*** (0.00000)	0.03814*** (0.00123)	-0.09758*** (0.00345)	-0.01640*** (0.00375)	-0.05173*** (0.00351)
Proud	0.00000 (0.00000)	0.03809 (0.02435)	0.17767*** (0.06705)	0.24369*** (0.08400)	-0.00000 (0.07836)
_cons	-94.89520*** (0.00000)	-99.51628*** (0.58560)	-6.17993*** (1.83211)	-2.10792 (2.10156)	9.41614*** (1.99268)
<i>N</i>	1777	1777	1777	1777	1777

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results are from quantile regressions. The explained variable is the tax burden of individual i in country j .

Proud is respondent's patriotism. It is the predicted score for the first principal factor derived from a set of 10 patriotism questions.

See Table 2 for a description of the control variables.

3.3 Robustness analysis

3.3.1 Reverse causality?

A high (income) tax burden may correspond to extensive (or high-quality) public goods provision, which might lead citizens to like their country better and, hence, be more patriotic. While such a reverse-causality argument may hold regarding questions about proudness of certain aspects of their country (such as the social security system or fair and equal treatment of individuals), it is much harder to maintain for other proudness questions (such as a country's economic achievements or political influence in the world). Nonetheless, this section takes this potential reverse causality argument seriously and employs an instrumental variables (IV) approach to evaluate to what extent it might affect our results. Finding a suitable instrument for patriotism is not straightforward. One could think of medals won in Olympic Games or victories in wars, but while the former only caters to one very specific aspect of possible patriotic sentiment (and one that does not appear to matter very much in our data, cf. Table 1), the latter is hard to operationalize (especially as most countries in our sample have not experienced any major conflicts since WWII; and even in that global conflict winners and losers are sometimes hard to determine accurately).

We instrument our measure of patriotism with the country's number of neighbors. This builds on the idea that it can be argued that citizens of countries with less neighbors are more susceptible to patriotic feelings (while there is, a priori, no reason to believe that the number of neighbors is related to tax burdens).

Columns (3) and (4) of Table 5 show the IV results. For ease of comparison the first two columns replicate the baseline OLS regression results (taken from columns (2) and (5) of Table 2). The table shows that, both when using the individual-level sample as when relying on the more aggregated sample, the relation between patriotism and tax burdens remains qualitatively similar.³¹ That is, the coefficient estimate retains its positive sign and statistical significance at conventional levels. While the estimated coefficient of patriotism becomes larger (suggesting there is some downward bias in the OLS estimations), the IV estimations confirm the results presented in the baseline estimation.

³¹The coefficient for the instrument in the first stage is precisely estimated (statistically different from zero at the 5 % level).

Table 5: Instrumental Variable Regression Results

	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
IncPos	0.10195*** (0.00381)	0.08619*** (0.00884)	0.05755** (0.02814)	0.00730 (0.05175)
GDP	3.96927*** (0.51366)	0.59531 (0.79669)	-19.83290* (10.82730)	-18.22327** (8.90185)
Unem	0.38383*** (0.08271)	0.09516 (0.13024)	1.19259** (0.56128)	1.51726* (0.83818)
IDEO	2.54898*** (0.08774)	3.18169*** (0.32262)	5.71525*** (1.54001)	4.05669*** (1.42531)
Decentr	-0.05294*** (0.01048)	-0.05474** (0.02323)	0.03599 (0.07697)	0.21634 (0.15875)
Proud	0.67330*** (0.19506)		51.19768** (23.02788)	
Aver. Proud		1.89189*** (0.62989)		56.20055** (23.79564)
_cons	-28.35142*** (5.97603)	8.17895 (8.77925)	189.39538* (99.81564)	170.84283** (81.15100)
<i>N</i>	1777	282	1777	282

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The explained variable for columns (1) and (3) is the tax burden of individual i in country j . The explained variable for columns (2) and (4) is the average income tax burden calculated (separately for each country) for all available income classes.

Proud is respondent's patriotism. It is the predicted score for the first principal factor derived from a set of 10 patriotism questions. Aver. Proud is the average patriotism calculated (separately for each country) for all available income classes. See Table 2 for a description of the control variables.

Columns (1) and (2) present OLS regressions, while columns (3) and (4) show the corresponding IV regression results.

3.3.2 Alternative patriotism measure

The 2003-wave of the ISSP survey contains a number of further questions probing people’s attachment to their country. Specifically, there are six such questions: “How close do you feel to [country]?”, “I would rather be a citizen of [country] than of any other country in the world”, “There are some things about [country] today that make me feel ashamed of [country]”, “The world would be a better place if people from other countries were more like [country nationality]”, “Generally speaking, [country] is a better country than most other countries” and “People should support their country even if the country is in the wrong”. These were not included in the analysis thus far for two reasons. First, they constitute a more heterogeneous set of questions, and appear to generally invoke more interpretation on the part of the respondent (while “being proud” might be a sentiment that is more easily evaluated). Moreover, reference to a sense of superiority in some of these questions might better reflect nationalism, rather than patriotism (see, for example, Huddy and Khatib, 2007, and references therein). Second, the potential reverse causality argument is likely to be stronger for these questions. As they do not refer to evaluation of proudness of certain, well-defined achievements, the answer is likely to be of a more general nature and might be “contaminated” by the country’s fiscal policies.³²

Nonetheless, as a check on the robustness of our findings to the specific set of questions selected in the main analysis, we re-estimate the model including these additional questions in the factor analysis. The first two columns of Table 6 regress individuals’ tax burdens on the alternative patriotism measure (Proud II), which is the score of the first principal factor of the extended set of 16 questions. Columns (3) and (4) replicate the aggregate analysis using the alternative patriotism index.

The regression results are virtually unchanged. Patriotism is once again significantly positively related to the tax burden in all estimations, in line with theoretical predictions. This, however, appears mainly due to the fact that the additional questions do not load strongly on the first factor. Hence, the resulting score of the first factor closely resembles the previous patriotism measure leading to similar regression results. Our findings support the

³²As the responses to these questions are thus likely to be (at least as) endogenous as those to the questions used in the main analysis, they could obviously not be used as instruments in the IV estimation.

Table 6: Alternative patriotism measure

	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
IncPos	0.12131*** (0.00476)	0.10097*** (0.00389)	0.08492*** (0.01117)	0.08679*** (0.00890)
GDP		3.94102*** (0.51636)		0.48622 (0.79228)
Unem		0.37009*** (0.08329)		0.11123 (0.12809)
IDEO		2.55187*** (0.08963)		3.10340*** (0.32020)
Decentr		-0.05445*** (0.01058)		-0.04990** (0.02322)
Proud II	2.31258*** (0.23537)	0.57676*** (0.20093)		
Aver. Proud II			3.61881*** (0.66948)	1.97953*** (0.63726)
_cons	14.30152*** (0.55031)	-27.74955*** (6.00383)	19.60420*** (1.16556)	8.98435 (8.69718)
N	1884	1722	288	278
adj. R^2	0.32834	0.53821	0.28137	0.53230

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results are from OLS regressions. The explained variable for columns (1) and (2) is the tax burden of individual i in country j . The explained variable for columns (3) and (4) is the average income tax burden calculated (separately for each country) for all available income classes.

Proud II is respondent's patriotism. It is the predicted score for the first principal factor derived from an extended set of 10 patriotism and six nationalism questions. Aver. Proud II is the average patriotism calculated (separately for each country) for all available income classes.

See Table 2 for a description of the control variables.

view that the six additional questions indeed refer to nationalism rather than patriotism.

3.3.3 Additional control variables

The model could clearly be extended by regarding, for example, the effects of globalization, trade openness, and so on. Since the coefficients for these variables were unstable and mostly insignificant, we have dropped these from the model. We also considered various measures of governance quality (see Kaufmann et al., 2006). Because the six indexes are highly correlated with each other, columns (1)-(6) of Table 7 introduce them one by one into the model. This affects mainly the coefficient estimates of previously included country-level controls (especially GDP and unemployment), which is due to the correlation between the country variables like GDP and the governance quality measures. Except for column (3) the point estimates for patriotism are smaller compared to our baseline regression. This suggests a weak positive correlation between patriotism and the various governance quality measures. However, patriotism has additional explanatory power in all six regressions.

3.3.4 Country-by-country elimination

Finally, we drop all countries one by one from the sample to assess whether our results are driven by the inclusion of any of these. The results of these 21 additional regressions are presented graphically in Figure 1. The value for the coefficient estimates in each estimation are given on the Y-axis, while the country excluded from a given run of the model is presented on the X-axis. The squares in the figure represent the point estimates for each regression, whereas the lines indicate the 90% confidence interval around each estimate. Note that in all cases we included the full set of control variables (though we do not report these to preserve space). The results clearly indicate that in all subsamples (which have at least 1,500 observations each) the effect of patriotism on the tax burden remains positive and statistically significant at least at the 90% confidence level. The coefficient estimates are, moreover, very stable across these additional estimations (with the exception of excluding Denmark, which causes the coefficient estimate for patriotism to drop by about half). Hence, our main findings are not driven by any particular country in the sample.

Table 7: Additional control variables

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	OLS	OLS
IncPos	0.10032*** (0.00373)	0.09800*** (0.00369)	0.10199*** (0.00379)	0.09840*** (0.00361)	0.10020*** (0.00364)	0.09674*** (0.00319)
GDP	1.22835** (0.56835)	2.51109*** (0.53608)	3.90463*** (0.51613)	-0.02464 (0.56684)	-1.58134*** (0.58239)	-0.32707 (0.53077)
Unem	0.43067*** (0.08593)	0.53451*** (0.08890)	0.41459*** (0.08294)	0.50091*** (0.08996)	0.68393*** (0.09176)	0.47925*** (0.08552)
IDEO	2.33443*** (0.08739)	2.28480*** (0.07989)	2.47334*** (0.09378)	1.88348*** (0.08408)	1.99590*** (0.08160)	1.29387*** (0.08458)
Decentr	-0.07014*** (0.01041)	-0.07700*** (0.01075)	-0.06171*** (0.01076)	-0.07417*** (0.01049)	-0.08056*** (0.01030)	-0.13473*** (0.01133)
Proud	0.48546** (0.19426)	0.49707*** (0.19134)	0.73141*** (0.19495)	0.31610* (0.18948)	0.33489* (0.18943)	0.43006** (0.17234)
Government Effectiveness	4.64667*** (0.51483)					
Regulatory Quality		6.91828*** (0.70034)				
Political Stability			1.48263*** (0.30227)			
Control of Corruption				6.16749*** (0.43214)		
Rule of Law					10.73315*** (0.65025)	
Voice and Accountability						29.55432*** (1.17598)
_cons	-7.61866 (6.20501)	-22.49105*** (6.20302)	-28.76762*** (6.00199)	3.05129 (6.34629)	10.85971* (6.36734)	-16.26238*** (6.22680)
N	1777	1777	1777	1777	1777	1777
adj. R^2	0.55871	0.56219	0.54682	0.58442	0.58661	0.64000

Robust standard errors in parentheses

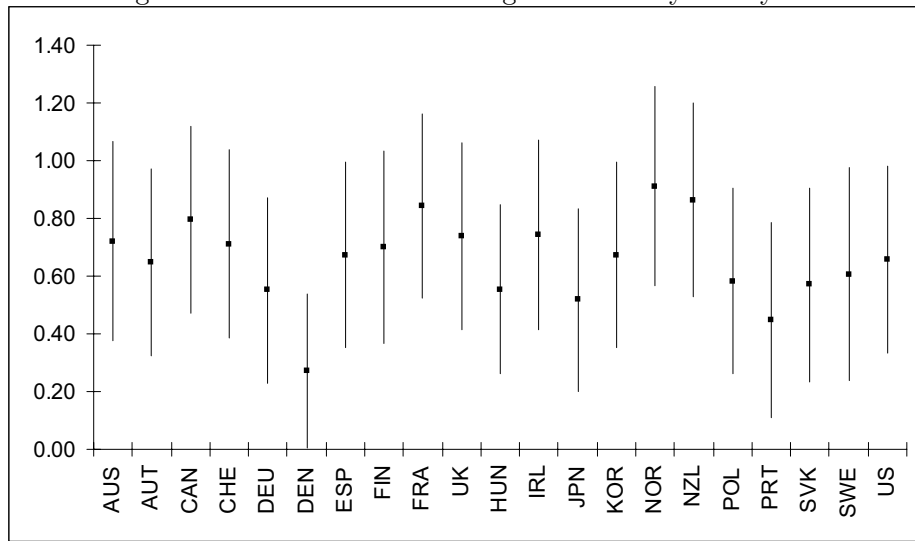
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results are from OLS regressions. The explained variable is the tax burden of individual i in country j .

Proud is respondent's patriotism. It is the predicted score for the first principal factor derived from a set of 10 patriotism questions.

See Table 2 for a description of the control variables.

Figure 1: Results from excluding each country one by one



4 Conclusion

There is by now an extensive literature on nationalist movements and national identities. While, as argued above, nationalism and patriotism should be clearly distinguished, this literature is interesting nonetheless as it has brought forward a wide range of arguments as to why such identities develop (or are developed). These include cultivation of the identity for itself (e.g., Anderson 1991) or to delineate the boundaries of the nation as autonomous and distinguishable relative to others (e.g., Prizel 1998). Our analysis suggests one further reason to develop such identities, or, at least, an important side-effect of developing such identities: to provide a supportive base for the welfare state and intra-state redistribution. Piecemeal evidence on a number of countries suggests that countries indeed actively use their education system for teaching their young generations patriotism and for incubating emotions and values such as “loving your own country”.³³ Of course, such policies may be

³³A comprehensive international study of this phenomenon is not known to us. Newspaper reports some years back show that educational reforms have been discussed or implemented in Japan (The Economist 19/12/06, page 92) and Poland (Neue Züricher Zeitung, 11/6/2006), by which patriotism receives more emphasis at school. Maosen (1990) reports that inculcating patriotism was and is an aim of the education policy in China both in imperial and communist times up to today. In the former German Democratic Republic, “loving the German Democratic Republic” was the first law for their youth organizations. Even democratic countries like the United States have a tradition of instilling patriotism at an early stage of life. An example for this is the Boy Scouts Charter (chapter 3) which states “...to teach them patriotism, courage, self-reliance and kindred virtues, using the methods which are now in common use by Boy Scouts” as one of their main educational objectives.

pursued for many purposes. We have shown in this analysis that, once these preferences exist, they can be, and seemingly are, instrumentalized for fiscal policy. Given the negative side-effects that patriotism may have, we would certainly not like to argue that this is a desirable way to sustain the welfare state. However, it follows from our findings that it can at least be seen as a positive side-effect of patriotic sentiments.

References

- [1] Anderson, Benedict, 1991, *Imagined communities: Reflections on the origin and spread of nationalism*, London: Verso.
- [2] Andersson, Fredrik, and Kai A. Konrad, 2003, Human capital investment and globalization in extortionary states, *Journal of Public Economics*, 87 (7-8), 1539-1555.
- [3] Armingeon, Klaus, Romana Careja, Marlène Gerber and Phillip Leimgruber, 2008, *Codebook: Comparative political data set III, 1990-2004*, Institute of Political Science, University of Berne.
- [4] Atkinson, Anthony B., 2008, *The changing distribution of earnings in OECD countries (The Rodolfo Debenedetti Lecture Series)*, Oxford: Oxford University Press.
- [5] Austen-Smith, David, 2000, Redistributing income under proportional representation, *Journal of Political Economy*, 108, 1235-1269.
- [6] Baldwin, Richard E., and Paul Krugman, 2004, Agglomeration, integration and tax harmonisation, *European Economic Review*, 48(1), 1-23.
- [7] Bank, Steven A., Kirk J. Stark and Joseph J. Thorndike, 2008, War and taxes, UCLA School of Law, Law & Economics Research Paper Series, No. 08-10.
- [8] Beine, Michel, Frédéric Docquier and Hillel Rapoport, 2008, Brain drain and human capital formation in developing countries: winners and losers, *Economic Journal*, 118, 631-652.
- [9] Benabou Roland and Efe A. Ok, 2001, Social mobility and the demand for redistribution: The POUM hypothesis, *Quarterly Journal of Economics*, 116, 447-487.
- [10] Bhagwati, Jagdish, 1976, The brain drain, *International Social Science Journal*, 28 (4), 691-729.

- [11] Bhagwati, Jagdish, and William Dellalgar, 1973, The brain drain and income taxation, *World Development*, 1 (1-2), 94-101.
- [12] Blank, Thomas and Peter Schmidt, 2003, National identity in a united Germany: nationalism or patriotism? An empirical test with representative data, *Political Psychology*, 24(2), 289-312.
- [13] Bolton, Patrick and Gerard Roland, 1996, Distributional conflicts, factor mobility, and political integration, *American Economic Review*, 86 (2), 99-104.
- [14] Brueckner, Jan, 2003, Strategic interaction among governments: An overview of empirical studies, *International Regional Science Review*, 26(2), 175-188.
- [15] Breyer, Friedrich, and Heinrich W. Ursprung, 1998, Are the rich too rich to be expropriated? Economic power and the feasibility of constitutional limits to redistribution, *Public Choice*, 94, 135-156.
- [16] Coffé, Hilde, and Benny Geys, 2005, Institutional performance and social capital: an application to the local government level, *Journal of Urban Affairs*, 27(5), 485-501.
- [17] Docquier, Frédéric, and A. Marfouk, 2006, International migration by education attainment, 1990-2000, in: C. Ozden and M. Schiff (eds.), *International Migration, Brain Drain and Remittance*, New York: Palgrave Macmillan, 151-199.
- [18] Druckman, Daniel, 1994, Nationalism, patriotism, and group loyalty: A social psychological perspective, *Mershon International Studies Review*, 38(1), 43-68.
- [19] Durand, E. Dana, 1917, Taxation versus bond issues for financing the war, *Journal of Political Economy*, 25 (9), 888-916.
- [20] Eckstein, Harry, 1975, Case study and theory in political science, in F.I. Greenstein and N.W. Polsby (Eds.), *Handbook of Political Science: Strategies of Inquiry* (volume 7). Reading, MA: Addison-Wesley.
- [21] Egeberg, Morton, 2004, An organizational approach to european integration: outline of a complementary perspective, *European Journal of Political Research*, 43(2), 199-219.

- [22] Epple, Dennis and Richard E. Romano, 1996, Ends against the middle: Determining public service provision when there are private alternatives, *Journal of Public Economics*, 62 (3), 297-325.
- [23] Fuest, Clemens, Bernd Huber and Jack Mintz, 2005, Capital mobility and tax competition, *Foundations and Trends in Microeconomics*, 1 (1), 1-62.
- [24] Glazer, Amihai and Kai A. Konrad, 1994, Intertemporal commitment problems and voting on redistributive taxation, *Journal of Urban Economics*, 36, 278-291.
- [25] Harbaugh, William T., Ulrich Mayr, and Daniel R. Burghart, 2007, Neural responses to taxation and voluntary giving reveal motives for charitable donations, *Science*, 316(5831), 1622-1625.
- [26] Hibbs, Douglas, 1977, Political parties and macro-economic policy, *American Political Science Review*, 71, 1467-1487.
- [27] Hohaus, Bolko, Kai A. Konrad, and Marcel Thum, 1994, Too much conformity - a Hotelling model of local public goods supply, *Economics Letters*, 44(3), 295-299.
- [28] Hooghe, Lisbet, 2005, Several roads lead to international norms, but few via international socialization: A case study of the european commission, *International Organization*, 59(Fall), 861-898.
- [29] Huddy, Leonie and Nadia Khatib, 2007, American patriotism, national identity, and political involvement, *American Journal of Political Science*, 51(1), 63-77.
- [30] Iversen, Torben, and David Soskice, 2001, An asset theory of social political preferences, *American Political Science Review*, 95 (4), 875-893.
- [31] Iversen, Torben and David Soskice, 2006, Electoral institutions and the politics of coalitions: why some democracies redistribute more than others, *American Political Science Review*, 100, 165-181.
- [32] Johnston, Alistair I., 2005, Conclusions and extensions: toward mid-range theorizing and beyond Europe, *International Organization*, 59(Fall), 1013-1044.

- [33] Jones, Carolyn C., 1989, Class tax to mass tax: the role of propaganda in the expansion of the income tax during World War II, *Buffalo Law Review*, 37, 685-737.
- [34] Justman, Moshe and Jacques-Francois Thisse, 1997, Implications of the mobility of skilled labor for local public funding of higher education, *Economics Letters*, 55, 409-412.
- [35] Justman, Moshe and Jacques-Francois Thisse, 2000, Local public funding of higher education when skilled labor is imperfectly mobile, *International Tax and Public Finance*, 7, 247-258.
- [36] Kaiser, Henry F., 1958, The varimax criterion for analytic rotation in factor analysis, *Psychometrika*, 23(3), 187-200.
- [37] Kaiser, Henry F., 1974, An index of factorial simplicity, *Psychometrika*, 39(1), 31-36.
- [38] Kaiser, Henry F. and John Rice, 1974, Little Jiffy: Mark IV, *Educational and Psychological Measurement*, 34, 111-117.
- [39] Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi, 2006, Governance matters V: aggregate and individual governance indicators for 1996 - 2005, Policy Research Working Paper Series 4012, The World Bank.
- [40] Kennedy, Peter, 2005, *A guide to econometrics (5th Edition)*, Maldon/Oxford UK: Blackwell Publishing.
- [41] King, Gary, Robert O. Keohane and Sidney Verba, 1994, *Designing social inquiry: Scientific inference in qualitative research*. Princeton NJ: Princeton University Press.
- [42] Koenker, Roger and Kevin Hallock, 2001, Quantile regression, *Journal of Economic Perspectives*, 15(4), 143-156.
- [43] Koenker, Roger, 2005, *Quantile regression*, Econometric Society Monograph Series, Cambridge UK: Cambridge University Press.
- [44] Konrad, Kai A., 2008, Mobile tax base as a global common, *International Tax and Public Finance*, 15(4), 395-414
- [45] Konrad, Kai A. and Salmai Qari, 2008, Patriotism and tax compliance, mimeo.

- [46] Levi, Margaret, 1997, *Consent, dissent, and patriotism*, Cambridge University Press.
- [47] Lizzeri, Alessandro and Nicola Persico, 2001, The provision of public goods under alternative electoral incentives, *American Economic Review*, 91, 225-239.
- [48] Mansoorian, Arman, and Gordon M. Myers, 1993, Attachment to home and efficient purchases of population in a fiscal externality economy, *Journal of Public Economics*, 52(1), 117-132.
- [49] Maosen, Li, 1990, Moral education in the People's Republic of China, *Journal of Moral Education*, 19 (3), 159-171.
- [50] Meltzer, Allan H. and Scott F. Richard, 1981, A rational theory of the size of government, *Journal of Political Economy*, 89, 914-927.
- [51] Mincer, Jacob, 1958, Investment in human capital and personal income distribution, *Journal of Political Economy*, 66(4), 281-302.
- [52] Mincer, Jacob, 1974, *Schooling, experience and earnings*, New York: National Bureau of Economic Research.
- [53] Mitsui, Kiyoshi, and Motohiro Sato, 2001, Ex ante free mobility, ex post immobility, and time consistency in a federal system, *Journal of Public Economics*, 82, 445-460.
- [54] Moene, Karl Ove, and Mark Wallerstein, 2001, Inequality, social insurance, and redistribution, *American Political Science Review*, 2001, 859-874.
- [55] Mummendey Amélie, A. Klink and Rupert Brown, 2001, Nationalism and patriotism: National identification and out-group rejection, *British Journal of Social Psychology*, 40(2), 159-172.
- [56] OED, 2003, *Shorter oxford english dictionary*, Oxford, UK: Oxford University Press.
- [57] Ogura, Laudo M., 2006, A note on tax competition, attachment to home, and underprovision of public goods, *Journal of Urban Economics*, 59 (2), 252-258.
- [58] Pennings, Paul, Hans Keman and Jan Kleinnijenhuis, 1999, *Doing research in political science: An introduction to comparative methods and statistics*. London: Sage.

- [59] Piketty, Thomas, 1995, Social mobility and redistributive politics, *Quarterly Journal of Economics*, 110, 551-584.
- [60] Prizel, Ilya, 1998, *National Identity and Foreign Policy: Nationalism and leadership in Poland, Russia and Ukraine*, Cambridge UK: Cambridge University Press.
- [61] Razin, Assaf, Efraim Sadka, and Phillip Swagel, 2002, The aging population and the size of the welfare state, *Journal of Political Economy*, 110, 900-918.
- [62] Rodrik, Dani, 1998, Why do more open economies have bigger governments? *Journal of Political Economy*, 106(5), 997-1032.
- [63] Schatz, Robert T., Ervin Staub and Howard Lavine, 1999, On the varieties of national attachment: blind versus constructive patriotism, *Political Psychology*, 20(1), 151-174.
- [64] Seligman, Edwin R.A., 1892, The shifting and incidence of taxation, *Publications of the American Economic Association*, 7 (2/3), 7-191.
- [65] Sinn, Hans-Werner, 1995, A theory of the welfare state, *Scandinavian Journal of Economics*, 97, 495-526.
- [66] Sinn, Hans-Werner, 1997, The selection principle and market failure in systems competition, *Journal of Public Economics*, 66 (2), 247-274.
- [67] Solt, Frederick, 2008, Economic inequality and democratic political engagement, *American Journal of Political Science*, 52, 48-60.
- [68] Sørensen, Peter B., 2007, The theory of optimal taxation: what is the policy relevance? *International Tax and Public Finance*, 14 (4), 383-406.
- [69] Stamp, Sir Josiah, 1932, *Taxation during the war*, Oxford, UK: Oxford University Press.
- [70] Watts, Steven, 1995, Walt Disney: Art and politics in the American century, *Journal of American History*, 82 (1), 84-110.
- [71] Wildasin, David E., 1988, Nash equilibria in models of fiscal competition, *Journal of Public Economics*, 35(2), 229-240.

- [72] Wildasin, David E., 2000, Labor-market integration, investment in risky human capital, and fiscal competition, *American Economic Review*, 90, 73-95.
- [73] Wilson, John D., 1986, A theory of interregional tax competition, *Journal of Urban Economics*, 19(3), 269-304.
- [74] Wilson, John D., 1999, Theories of tax competition, *National Tax Journal*, 52 (2), 269-304.
- [75] Wooldridge, Jeffrey M., 2003, Cluster-sample methods in applied econometrics, *American Economic Review*, 93(2), 133-138.
- [76] Yin, Richard K., 2003, *Case study research: Design and methods* (3rd Edition), Thousand Oaks: Sage.
- [77] Zissimos, Ben, and Myrna Wooders, 2008, Public good differentiation and the intensity of tax competition, *Journal of Public Economics*, 92(5-6), 1105-1121.
- [78] Zodrow, G.R. and P. Mieszkowski, 1986, Pigou, Tiebout, property taxation, and the underprovision of local public goods, *Journal of Urban Economics*, 19(3), 356-370.

5 Appendix

We prove Propositions 1 and 2 in this Appendix.

Proof of Proposition 1. We turn to an analysis of subgame perfect equilibrium and solve by backward induction. Consider STAGE 2. At this stage (γ_A, γ_B) is given. For given γ_K in country K , the voting game has a unique Condorcet winner with $S_K^H = 0$, $S_K^L = T_K(t_K^*)$ and

$$t_K^*(\gamma_K) = \gamma_K \frac{w_H}{w_L + \gamma_K w_H}. \quad (\text{A-1})$$

To confirm this, first note that the individuals with low income constitute a majority and have the same preferences regarding combinations of (t_K, S_K^L, S_K^H) .³⁴ For any given t_K , individuals with low productivity prefer the smallest possible transfer to individuals with high productivity. Hence, $S_K^H = 0$ and $S_K^L = T_K(t_K)$ describes their most preferred transfers for any given tax rate.³⁵ Moreover, it can be confirmed that (A-1) is the unique maximum of

$$u_i = (1 - t_K)w_L + (t_K - \frac{t_K^2}{2})(w_L + \gamma_K w_H) + h_K + \eta_i \quad (\text{A-2})$$

and that $t_K^*(\gamma_K) \in (0, 1)$. Hence, $(t_K, S_K^L, S_K^H) = (t_K^*(\gamma_K), T_K(t_K^*), 0)$ constitutes the unique equilibrium in STAGE 2 in each country.

Turning to STAGE 1, we can now consider the migration choices. Individuals anticipate the shares of highly productive individuals in the migration equilibrium and the tax rates (A-1) that are induced by these shares. The payoff of a highly productive individual that chooses to reside in country K is

³⁴Recall that we assume $n_A + n_B < 1$. If $n_A + n_B > 1$, self-sorting may occur in the equilibrium in the simple framework chosen here. Similarly, if the low income individuals can also migrate, existence of a pure strategy equilibrium may become an issue. However, our assumptions match well with a more general, but more cumbersome, framework in which migration costs of individuals are drawn from a random distribution. In such a setting, only a few high income earners will be fully mobile, while many have intermediate, high or even prohibitive costs of migration. If so, the median voter in both countries has low income, which is what is really needed for the qualitative results we find.

³⁵We require uniform treatment of all individuals regarding the tax rate, and uniform redistribution among groups that are homogeneous regarding their productivities or skills. As is known from Epple and Romano (1996) and the work they inspired, assumptions about feasible redistribution are important for the types of redistribution policies that emerge in the equilibrium.

$$w_H = \begin{cases} (1 - \gamma_K \frac{w_H}{w_L + \gamma_K w_H})w_H + h_K + \eta_i & \text{if } i \in I_K \\ (1 - \gamma_K \frac{w_H}{w_L + \gamma_K w_H})w_H & \text{if } i \notin I_K \end{cases} . \quad (\text{A-3})$$

The payoffs in the two lines of (A-3) refer to whether i was born in K or not. An individual i born in A will stay in A if $(1 - \gamma_A \frac{w_H}{w_L + \gamma_A w_H})w_H + h_A + \eta_i > (1 - \gamma_B \frac{w_H}{w_L + \gamma_B w_H})w_H$. This condition can be solved for the critical η_i that makes i indifferent between staying and moving, which is denoted as

$$\eta_A \equiv (\gamma_A \frac{w_H}{w_L + \gamma_A w_H} - \gamma_B \frac{w_H}{w_L + \gamma_B w_H})w_H - h_A. \quad (\text{A-4})$$

Accordingly, assuming subgame perfect equilibrium play, the set of highly productive individuals who are born in A and migrate to B are

$$n_A G(\Delta_t w_H - h_A), \text{ with } \Delta_t \equiv \gamma_A \frac{w_H}{w_L + \gamma_A w_H} - \gamma_B \frac{w_H}{w_L + \gamma_B w_H}. \quad (\text{A-5})$$

Recall that $G(\cdot)$ denotes the cumulative distribution function of the random component η of patriotism. Similarly, the size of the set of high income earners from B who migrate to A are

$$n_B G((-\Delta_t)w_H - h_B). \quad (\text{A-6})$$

Migration choices based on anticipated taxes hence determine the size of the sets of (post-migration) high income earners in the two countries as

$$\begin{aligned} \gamma_A &= n_A (1 - G(\Delta_t w_H - h_A)) + n_B G((-\Delta_t)w_H - h_B) \\ \gamma_B &= n_A G(\Delta_t w_H - h_A) + n_B (1 - G((-\Delta_t)w_H - h_B)) . \end{aligned} \quad (\text{A-7})$$

Each individual need not consider the change of γ_A or γ_B from her own migration choice here, because each individual has a measure of zero.

For existence of an equilibrium in Proposition 1 note that (A-1) establishes a one-to-one relationship between t_K and γ_K . Replacing Δ_t with the equilibrium value $(t_A^*(\gamma_A) - t_B^*(\gamma_B))$ in the subgame perfect equilibrium for given γ_A and γ_B turns (A-7) into a system of two equations with two unknowns: γ_A and γ_B , as

$$\begin{aligned}\gamma_A(\gamma_A, \gamma_B) &= \begin{cases} n_A \left(1 - G\left(\frac{w_L w_H^2 (\gamma_A - \gamma_B)}{(w_L + \gamma_A w_H)(w_L + \gamma_B w_H)} - h_A\right) \right) \\ + n_B G\left(\frac{w_L w_H^2 (\gamma_B - \gamma_A)}{(w_L + \gamma_A w_H)(w_L + \gamma_B w_H)} - h_B\right) \end{cases} \\ \gamma_B(\gamma_A, \gamma_B) &= \begin{cases} n_A G\left(\frac{w_L w_H^2 (\gamma_A - \gamma_B)}{(w_L + \gamma_A w_H)(w_L + \gamma_B w_H)} - h_A\right) \\ + n_B \left(1 - G\left(\frac{w_L w_H^2 (\gamma_B - \gamma_A)}{(w_L + \gamma_A w_H)(w_L + \gamma_B w_H)} - h_B\right) \right) \end{cases}\end{aligned}\quad (\text{A-8})$$

The existence and uniqueness of a subgame perfect equilibrium is reduced to the question of whether this system has a unique solution. To consider this, note that (A-8) describes a self-mapping $g : \Gamma \rightarrow \Gamma$ for

$$\Gamma \equiv \{(x, y) \mid x \in [0, n_A + n_B], y \in [0, n_A + n_B], x + y = n_A + n_B\} \quad (\text{A-9})$$

The pair $(\gamma_A, \gamma_B) \in \Gamma$ by definition. Moreover, $(\gamma_A(\gamma_A, \gamma_B), \gamma_B(\gamma_A, \gamma_B)) \in \Gamma$, as $\gamma_K(\gamma_A, \gamma_B) \in [0, n_A + n_B]$ and $\gamma_A(\gamma_A, \gamma_B) + \gamma_B(\gamma_A, \gamma_B) = n_A + n_B$ by (A-8). The mapping g is continuous (by using the continuity of G). Moreover, Γ as defined in (A-9) is a compact and convex set. Hence, Brouwer's fixed point theorem can be applied to confirm that this mapping has a fixed point (γ_A^*, γ_B^*) . This fixed point characterizes the post-migration shares of highly productive individuals in the two countries in an equilibrium.

It remains to confirm that this solution is unique. Note that the functional relationship $\gamma_A(\gamma_B)$ in the first equation in (A-8) determines a slope

$$\frac{d\gamma_A}{d\gamma_B} = \frac{\left(n_A G'_A \frac{w_L w_H^2}{(w_L + \gamma_B w_H)^2} + n_B G'_B \frac{w_L w_H^2}{(w_L + \gamma_B w_H)^2} \right)}{\left(1 + n_A G'_A \frac{w_L w_H^2}{(w_L + \gamma_A w_H)^2} + n_B G'_B \frac{w_L w_H^2}{(w_L + \gamma_A w_H)^2} \right)}, \quad (\text{A-10})$$

where

$$G'_A \equiv \frac{\partial G(\eta)}{\partial \eta} \text{ at } \eta = \eta_A \text{ and } G'_B \equiv \frac{\partial G(\eta)}{\partial \eta} \text{ at } \eta = \eta_B.$$

This slope is positive and smaller than 1. Similarly, the second equation reveals a slope $\frac{d\gamma_B}{d\gamma_A}$ that is positive throughout but smaller than 1. Accordingly, these two functions can intersect only once. ■

Proof of Proposition 2. Using (A-1) to replace γ_A and γ_B in (A-7) yields a system of equations that determines the equilibrium tax rates as functions of $n_A, n_B, w_H, w_L, h_A, h_B$

and $G(\eta)$:

$$\begin{aligned}\frac{t_A w_L}{w_H(1-t_A)} &= n_A(1 - G((t_A - t_B)w_H - h_A)) + n_B G((t_B - t_A)w_H - h_B) \\ \frac{t_B w_L}{w_H(1-t_B)} &= n_A G((t_A - t_B)w_H - h_A) + n_B(1 - G((t_B - t_A)w_H - h_B))\end{aligned}\quad (\text{A-11})$$

The system of equations (A-11) determines the equilibrium tax rates in the unique subgame perfect equilibrium. Totally differentiating (A-11) with respect to t_A , t_B , h_A and h_B yields the following system of equations:

$$\begin{aligned}&\begin{bmatrix} -X - \Omega_A & X \\ X & -X - \Omega_B \end{bmatrix} \begin{pmatrix} dt_A \\ dt_B \end{pmatrix} \\ &= - \begin{pmatrix} n_A G'_A \\ -n_A G'_A \end{pmatrix} dh_A - \begin{pmatrix} -n_B G'_B \\ n_B G'_B \end{pmatrix} dh_B,\end{aligned}\quad (\text{A-12})$$

with

$$\begin{aligned}X &\equiv n_A G'_A w_H + n_B G'_B w_H > 0 \\ \Omega_A &\equiv \frac{\partial(\frac{t_A w_L}{w_H(1-t_A)})}{\partial t_A} = \frac{w_L}{w_H(1-t_A)^2} > 0 \\ \Omega_B &\equiv \frac{\partial(\frac{t_B w_L}{w_H(1-t_B)})}{\partial t_B} = \frac{w_L}{w_H(1-t_B)^2} > 0.\end{aligned}\quad (\text{A-13})$$

From here, we can analyze the comparative statics. We find

$$\begin{aligned}\frac{dt_A}{dh_A} &= \frac{\begin{vmatrix} -(n_A G'_A) & X \\ n_A G'_A & -X - \Omega_B \end{vmatrix}}{\begin{vmatrix} -X - \Omega_A & X \\ X & -X - \Omega_B \end{vmatrix}} \\ &= \frac{[(n_A G'_A)(X + \Omega_B) - n_A G'_A X]}{(X + \Omega_A)(X + \Omega_B) - X^2} \\ &= \frac{n_A G'_A \Omega_B}{(X + \Omega_A)(X + \Omega_B) - X^2} > 0\end{aligned}\quad (\text{A-14})$$

The positive sign is obtained as follows. The denominator is positive, as both X and Ω_B are

positive, and the numerator is also positive. Similarly,

$$\begin{aligned}
\frac{dt_B}{dh_A} &= \frac{\begin{vmatrix} -X - \Omega_A & (-n_A G'_A) \\ X & n_A G'_A \end{vmatrix}}{\begin{vmatrix} -X - \Omega_A & X \\ X & -X - \Omega_B \end{vmatrix}} \\
&= \frac{[(n_A G'_A)(-X - \Omega_A) - (-n_A G'_A)X]}{(X + \Omega_A)(X + \Omega_B) - X^2} \\
&= \frac{-n_A G'_A \Omega_A}{(X + \Omega_A)(X + \Omega_B) - X^2} < 0.
\end{aligned} \tag{A-15}$$

Again, the denominator is positive. The numerator is negative, explaining the negative sign.

Given the signs of these expressions, it follows that

$$\frac{d(t_A - t_B)}{dh_A} > 0. \tag{A-16}$$

As $t_A = t_B$ in the equilibrium for $n_A = n_B$, this completes the proof of Proposition 2. ■