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REDISTRIBUTION IN A DIVIDED WORLD

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Chapter 1
Introduction:
Redistribution in a Divided World*

1 Globalization and Inequality

The world is becoming more integrated economically, but despite this process of globalization the world remains divided in many respects. The world is thus both integrated and divided, at the same time, but along different dimensions. Economic integration has made countries more interdependent and this interdependence makes the remaining divisions more acute. In particular, interdependence has reduced countries ability to redistribute income between groups in society. The starting point of this dissertation is a situation in which political, economic and social communities do not coincide; a world with a more or less global economy, divided into sovereign political states encompassing diverse social communities. The five essays study different aspects of redistributive policy in such a world.

Economic integration is a result of two sets of causes. First, technological and social changes have reduced the effective economic distance between countries. This have made the world markedly smaller and included a larger part of the world in the global economy. In particular improvements in transportation and communications technology have made it easier and cheaper to move goods, services and factors of production between countries and continents (Tanzi 1995). The development of modern information technology is the last, but an important, part of this process of integration. The second

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set of causes is political reforms aimed at lowering barriers to trade. The last decades have witnessed a rapid reduction, and often elimination, of tariffs on traded goods and services. There has also been a reduction in non-tariff barriers to trade, i.e. various technical, bureaucratic and legal hindrances to trade. Social changes, in particular the dominance of 'western culture', have also facilitated trade.

As a result of these developments, the past 50 years have seen an exceptional growth in world trade and a steady increase in world exports as a share of GDP. Merchandise exports have grown on average by 6% annually and total trade in 1997 was 14-times the level of 1950. The increase in international trade has contributed to the economic growth and prosperity which large parts of the world has experienced after World War II. However, economic integration has also created international spillovers, in the sense that activities and policies in one country affect other countries. These spillovers make it more difficult for governments to control events within their own countries. Partly as a response to the increased economic interdependence and the resulting reduction in national autonomy, there have been some developments in direction of international political integration. Two trends are particularly important. First, there has been a sharp growth in membership in international organizations such as the United Nations (UN), the International Monetary Fund (IMF) and the World Trade Organization (WTO). The membership in the UN has, for example, increased from the original 51 in 1945 to 188 today, and the membership in the IMF has grown from 39 members when it was established in 1946 to 182 members today. Second, deeper regional integration has taken place in many parts of the world. This process has gone farthest in Europe through the establishment of the EU and the EEA.

Despite these important developments towards integration the world remains, and in some respects has become more, divided both economically, politically and socially. Even if trade in goods, services and capital have been liberalized, labour markets are still highly segregated. The opportunity to migrate to another country is limited for large parts of the worlds population, especially for those who might have the best reasons to do so. Furthermore, the worlds resources and wealth are highly unevenly distributed and the division between rich and poor countries is a striking feature of the world order. Citizenship in rich countries are perhaps more important today than ever before. The process of international political integration has been slower and more limited than the process of economic integration. Despite its reported

death, the nation-state is still the main pillar of the political and legal world order and the political jurisdictions are therefore smaller than economic areas. The world is also divided socially and culturally. Social communities are typically smaller than both economic areas and political jurisdictions. One important reason for this is that peoples abilities to form personal bonds and attachments to other people are limited.

Globalization is not a new phenomenon. By some measures the world economy was equally integrated before World War I and the return to protectionist policies during the interwar period. The second wave of globalization has, however, changed in important ways. First, it is primarily capital, not labour that has experienced increased international mobility. This has created an asymmetry between highly mobile capital and relatively immobile labour that did not characterize the first wave of globalization (Rodrik 1997). Furthermore, the composition of international trade has changed. In particular trade in similar products, so-called intraindustri trade, has increased as a share of total trade. This development has exposed a larger share of the economy to international competition. Finally, the welfare state, with a large public sector and generous social security systems, has developed after World War II. The need for government revenues has therefore increased dramatically compared with the last peak of globalization. Higher tax levels have made differences in tax policy more important for countries competitiveness and increased the problem of tax competition between countries.

There is evidence that there has been an increase in the inequality of disposable income in the OECD countries during the last two decades (Gottschalk and Smeeding 1997) and globalization has been claimed to be an important cause of this development. Globalization could increase income inequality partly through its effect on the pre-tax income distribution and partly through its effect on the cost of redistribution. Economic theory suggests that globalization might increase pre-tax inequality for two reasons. First, we would expect that trade between countries well endowed with skilled labour and countries well endowed with unskilled labour would reduce the wage of unskilled labour in the first type of countries. However, the fact that the major part of international trade takes place between rich industrialized countries implies that the importance of this effect is limited (Krugman 1997). Second, and perhaps more importantly, increased international mobility of capital increases the elasticity of demand for labour in each country and thus reduces the bargaining power of workers. The result might be a downwards pressure on their wage. Globalization does not only increase pre-tax inequal-

ity, but it could also reduce the governments ability to redistribute income. Economic integration and increased mobility of persons, goods and factors of production make the task of redistributing income between groups within the nationstate increasingly difficult because internationally mobile tax bases can escape taxation by moving to another jurisdiction (see e.g. Christiansen, Hagen and Sandmo 1994 and Sinn 1990).

Below we give a brief presentation of the five papers in the dissertation and their main results. The presentation is organized around three themes that have motivated the dissertation. The next section shows how the papers might shed some light on the relationships between national and international justice. Section 3 relates the papers to the problems that arise when an integrated economic area consists of more than one jurisdiction, while section 4 discusses how the dissertation might contribute to a better understanding of the importance of social attachments and altruistic motivation in redistributive policy. Section 5 concludes with some general remarks.

2 National and international justice

The relationship between national and international income distribution has a central position in the dissertation. Theories of distributive justice have mainly been concerned with closed economies. Their focus have been on the choice of distributive principles; i.e. what should be distributed and how should it be distributed? Economic interaction between countries raises some fundamental ethical questions not often addressed in this literature, such as; i) Between whom should we distribute? In particular, why should redistribution primarily take place within the nationstate? ii) What gives a public entity the right to tax a certain tax base? In particular, what gives a state the right to tax an international tax base and how should such tax rights be distributed between states? iii) What is the relationship between national and international distributive justice? In particular, how do we resolve conflicts between national distribution and international distribution? iv) What is the relationship between the liberal right to free movement and distributive justice? In particular, can considerations of distributive justice justify limitations in the free movement of labour, goods or capital?

The papers in this dissertation will hopefully shed some light on several of these questions. However, the focus is on the question of how the right to tax should be distributed between jurisdictions. The ability, and right,

to levy taxes is a fundamental feature of a sovereign state. Without the power to appropriate economic resources a state would be unable to redistribute resources among its citizens and to provide public goods. International transactions give rise to situations where more than one country have the ability to tax the same tax base. It is therefore important to determine how the right to tax should be distributed between countries. How this is done affects countries ability to redistribute resources nationally as well as the international distribution of tax revenues.

The dissertation distinguishes between two fundamentally different ways of approaching the question of tax right distribution. According to what we call *the entitlement approach,* certain connecting factors between a tax base and a country gives the country an entitlement, or a non-derivative right, to appropriate these economic resources. Somewhat simplified one could say that the entitlement approach sees a country's right to tax, and the corresponding tax liability of a tax subject, as deriving from special duties that we have to persons or groups that we have a particular relationship to. The alternative approach is what we call *the assignment approach.* Within this approach international tax principles are viewed as pragmatic rules derived from general moral considerations. The just principles of taxation are those that distribute, or assign, tax rights in such a way as to maximise some general objective. The assignment approach thus rejects the notion of special duties and views the just distribution of tax rights simply as the best way to implement the general duties we have towards everyone as human beings.

The first paper in this dissertation, "Moral Theory and International Fiscal Law", focuses on the entitlement approach and its relationship to international fiscal law. Earlier discussions of how international fiscal law can be justified have essentially been listings of different considerations that might be taken into account. This paper aims to contribute to a more systematic analysis of these issues by discussing to what extent different theories of distributive justice can justify the main elements of international fiscal law. The paper shows that the main features of international fiscal law presupposes an entitlement approach to the distribution of tax rights. However, it also shows that the main normative traditions that conforms with this approach would question the set of connecting factors that are identified as a legal basis for taxation in international law, either because it is too inclusive or because it does not include some morally relevant types of relationships, or both. Furthermore, the paper argues that the entitlement approach and international fiscal law is incompatible with the cosmopolitanism of important traditions

in moral philosophy. Cosmopolitan moral theories would object both to the way in which the entitlement approach conceives the delimitation of fiscal jurisdictions and to its distributional implications.

The second paper in this dissertation, "National and International Justice in Bi-lateral Tax Treaties", applies the assignment approach and studies the choice between two ways to distribute the right to tax capital income between countries, the residence principle and the source principle.[1] The choice of international tax principle affects countries' ability to redistribute between capital owners and workers. However, it also affects the distribution of income between capital importing and capital exporting countries. The paper shows that this choice, at least partly, is a choice between national and international inequality. It also argues that from the perspective of cosmopolitan moral theories there might be situations where the source principle is preferable to the residence principle because the source principle can reduce international inequality by allowing poor capital importing countries a larger share of the tax revenues.

3 Economic integration and political division

A central theme in this dissertation, and in the international tax literature, is the problems that arise when an integrated economic area consists of more than one jurisdiction. This creates situations where decisions made by one jurisdiction affects the welfare of citizens of other jurisdiction. In particular tax policy in one country might affect the well-being of taxpayers in other countries. Tax policy in one country affects the welfare of other countries both directly trough the prices faced by foreigners and indirectly through the effect on foreign governments tax revenues (Dahlby 1996). The fundamental problem is the absence of an international government that can take into account the 'global' effects of fiscal policies on resource allocation and income distribution. Several of the papers in the dissertation address different aspects of this problem.

The paper "Tax Treaties and the Marginal Cost of Funds" studies how the existence of international tax externalities affects the cost of financing

[1] Under the residence principle the country where the capital owner is a resident has the right to tax the global capital income irrespectively of where the capital is invested. Under the source principle a country has the exclusive right to tax all capital income that arises within its borders.

public goods. In particular it analyses the marginal cost of public funds under different international tax regimes when the government has a uniform, broad-based value added tax as its only source of revenue and when countries produce both tradeable and non-tradeable goods.[2] Using the concepts of direct and indirect tax externalities developed by Bev Dahlby (1996), it distinguishes between national and international marginal cost of funds, and explores the effects of a bilateral tax treaty that eliminates double taxation through the universal application of either the destination principle or the origin principle.[3] Without non-tradeable goods the destination principle eliminates all tax externalities and secures an efficient provision of public goods. The paper shows that this result no longer holds when non-tradeable goods are introduced. Furthermore, it shows that we cannot generally say whether a regime with a tax treaty results in a better allocation of resources between public and private goods than a regime without a tax treaty and that we cannot say whether a destination principle should be preferred to a origin principle.

Two other papers in the dissertation also analyse problems that arise because an integrated economic area consists of more than one jurisdiction. The paper "National and International Distributive Justice in Bi-lateral Tax Treaties" introduced above focuses on so-called capital tax competition and tries to incorporate the effects on both national and international equity in the choice of tax principles. In the next section we shall discuss the paper "Redistribution and the Size of Jurisdictions". This paper also assumes the existence of interjurisdictional tax externalities, but shows that eliminating these externalities by reducing the number of jurisdictions might have an adverse effect on redistribution.

4 Political centralization and social segregation

While political jurisdictions typically are smaller than economic areas, peoples attachments are strongest to groups that are smaller than the political

[2]Non-tradeable goods are goods that can be consumed by foreign residents in the country where they are produced, e.g. hotel-, restaurant- and other services.

[3]The destination principle gives the exclusive right to tax to the importing country (the country of destination), while the origin principle gives the exclusive right to tax to the exporting country (the country of origin).

unit. The last two papers in the dissertation studies the effect of having jurisdictions that extend beyond the groups which a person is attached to. The starting point of both these papers is that people are limited altruists in the sense that they only care about a limited number of other individuals. The importance of this assumption is evident when we keep in mind that redistributive policies typically are determined through democratic procedures. In a representative democracy redistributive policies that secure the welfare of its minorities require the voluntary support of a majority of its citizens. Obtaining such support is only possible if there exists a feeling of identification on the part of the citizens and strong alliances between them. One particular danger lies in the alienation between rich and poor individuals. Many western societies are characterized by a relatively affluent majority and a marginalized minority of unemployed, unskilled, disabled or old. Transfers between the rich majority and the poor minority will typically depend on the majority's feeling of solidarity with, and responsibility for, the minority.

The paper "Inequality, Segregation, and Redistribution", co-authored with Kjetil Bjorvatn, uses the idea of limited altruism to explain why egalitarian countries might redistribute more than inegalitarian countries. Mainstream economic theory predicts that countries with large inequalities in pre-tax income distribution will tend to be more redistributive than countries which are more equal in this respect. Empirical studies, however, offer no strong support for this theoretical prediction. In fact, a number of studies indicate that the opposite may be true, namely that countries which are more equal in terms of pre-tax income distribution tend to redistribute more than less egalitarian societies. The paper offers an explanation to this puzzle. In a model of endogenous choice of location and endogenous degree of altruism, it demonstrates that large pre-tax differences in income may lead to a residential segregation of rich and poor. Such segregation may then in turn reduce the social attachment between rich and poor and the willingness of the rich to make transfers to the poor. Conversely, societies with small pre-tax differences in income may be characterized by larger transfers and a less segregated population structure.

The final paper, "Redistribution and the Size of Jurisdictions", analyses the relationship between the size of jurisdictions and the degree of redistribution. The paper questions the claim, well know from the fiscal federalism literature, that redistribution should take place at the central level, by showing that a territorial delimitation of fiscal jurisdiction, and decentralization

of tax policy, might be justified even when the sole purpose of fiscal policy is to redistribute between rich. In addition to the assumption of limited altruism, the paper assumes that people are impure altruists. When people are impure altruists their willingness to help is, at least partly, motivated by the pleasure, or *warm glow* feeling, that the act of helping gives and not by the interest in the welfare of others as such. The paper shows that an increase in the size of jurisdictions decreases the degree of tax competition and reduce the cost of redistribution. However, it also reduces the weight given to minority interests by the majority. The number of jurisdictions that maximizes global welfare is therefore given by a trade-off between these two forces.

The relationship between redistribution and country size established in this paper can be seen as a contribution to some of the normative questions mentioned in section 2. Many writers on international justice have been concerned with the apparent tension between the universality of cosmopolitan moral theories and existence of nation-states with responsibility for redistribution within their territory. The paper shows that it makes sense from a utilitarian point of view, to let people who care about each other's welfare be responsible for each other's welfare and this might justify a delimitation of fiscal jurisdictions.

5 Final Remarks

This dissertation is not a unified work and it is difficult to draw conclusions from the work as a whole. However, some general remarks seems justified on the basis of the five papers.

First, seen together the papers might contribute to a better understanding of the relationship between political and economic integration. The second and the third paper show that in a situation in which political jurisdictions are small relative to the economic area, the outcome might be suboptimal with respect to resource allocation and income distribution compared with the cooperative optimum. The last essay, however, shows that when political jurisdictions become large compared with the size of social communities the result might be suboptimal as well. The dissertation thus suggest that there might be a trade-off between the effects on interjurisdictional externalities and the effects on social segregation in questions of enlargement of political units

Second, the dissertation also shed some light on why small countries with a highly egalitarian wage structure, such as the Nordic countries, have been the countries most concerned with income redistribution. The dissertation suggests that this phenomenon could be explained by two effects. First, a relatively equal pre-tax wage distribution might result in a less segregated society and such societies might be more willing to help a poor minority. Second, people in small countries might be more motivated by the warm-glow effect to help each other.

Finally, the papers illustrate the importance of introducing normative theory into the analysis of international tax regimes. The choice of international tax principles affects both national and international income distribution. Both normative theory and economic theory therefore need to be developed so as to take account of these effects. There are reasons to believe that this type of analysis will become increasingly important. The process of economic integration increases the effect the distribution of tax rights have on national and international income distribution. To the extent that governments are motivated by a concern with international justice a normative analysis of the just distribution of the right to tax is necessary in order to suggest in what direction we might want to change the existing international tax regime. Furthermore, globalisation also give rise to new and difficult questions of international tax right distribution. In particular, the growth in international political institutions, the increased importance of multinational companies and the dawn of the internet age represent challenges that can only be met by rethinking international fiscal law.

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Chapter 2

Moral Theory and International Fiscal Law *

Abstract

According to international fiscal law a country has the legal right to tax if certain types of connections exist between the country and the tax subject. The paper argues that this way of distributing the right to tax presupposes the view that particular relationships give rise to special obligations. The paper analyses different versions of this approach and discusses to what extent they are able to justify the main features of international tax law and the way in which fiscal jurisdictions are delimited. Objections to this approach from cosmopolitan moral theories are also discussed.

1 Introduction

A fundamental feature of a sovereign state is its ability, and right, to levy taxes. Without the power to appropriate economic resources a state would be unable to redistribute resources among its citizens and provide public goods. According to international fiscal law the right to tax requires some sort of relevant connection between the taxing jurisdiction and the tax base. International transactions give rise to situations where more than one country have a relevant connecting factor to the same tax base. In order to avoid double taxation it is necessary to establish rules, or co-called international tax principles, determining how the right to tax should be distributed among

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countries so as to limit the type of connections that gives a country a legal right to tax. This is the primary task of the bilateral tax treaties. There is a large, and steadily increasing number, of such agreements. By reducing the problem of double taxation they have been an important precondition for increased international trade and economic integration.

The international distribution of the right to tax affects countries' ability to redistribute resources nationally as well as the international distribution of tax revenues. Integration of the world economy makes the question of how the right to tax should be distributed increasingly important. If the interests of countries coincide we could view the choice of international tax principles from a purely national point of view. However, if countries differ in their preferences, or other characteristics, their preferred choice of principle will not generally coincide. It is then interesting to ask what constitutes a just international distribution of tax rights.[1] There are two fundamentally different ways of approaching this question. The first is what we will call the entitlement approach. According to this approach certain connecting factors between a tax base and a country gives the country an entitlement, or a non-derivative right, to appropriate these economic resources. Somewhat simplified one could say that the entitlement approach views a country's right to tax, and the corresponding tax liability of the tax subject, as deriving from special duties that we have to persons or groups we have particular relationships to.[2] The alternative approach is what we will call the assignment approach. Within this approach international tax principles are viewed as pragmatic rules derived from general moral considerations. The just principles of taxation are those that distribute, or assign, tax rights in such a way as to maximise some general objective. The assignment approach thus rejects the notion of special duties and views the just distribution of

[1]It is important to distinguish between redistributive taxation and benefit taxation in discussing why a jurisdiction is justified in levying taxes. Benefit taxes could be seen as user charges; taxes that are paid by the tax subject to cover the expenses he causes through the use of goods and services provided by the government. Redistributive taxes, on the other hand, are taxes that have as their main objective to redistribute resources between individuals or groups. Taxes are also levied for other reasons, e.g. to correct for externalities or to stabilise the economy. Even if other types of taxes poses some interesting normative questions, this paper primarily discusses the justification for redistributive taxes. This allows the paper to focus on the relationship between the principles of international taxation and theories of distributive justice.

[2]We use the term special duties in a broad sense, so as to include include obligations that derive from voluntary agreements or contracts.

tax rights simply as the best way to implement the general duties we have towards everyone as human beings.

This paper focus on the entitlement approach and its relationship to international fiscal law. Earlier discussions of how international fiscal law can be justified have essentially been listings of different types of considerations that should be taken into account in choosing tax principles (see Pires 1989, Martha 1989, Musgrave and Musgrave1972 or Vogel 1997). This paper aims to contribute to a more systematic analysis of these issues by discussing to what extent different theories of distributive justice can justify the main elements of international fiscal law.

Section 2 below presents the main features of international fiscal law and how bilateral tax treaties have tried to limit the types of connections that give countries a right to tax. The next section, section 3, argues that the entitlement approach is required to give a normative justification of existing international fiscal law. Different traditions within this approach are presented and it is discussed whether theories within these traditions can justify the legal basis for taxation in international fiscal law and to what extent they support particular international tax principles. Section 4 discusses how the delimitation of fiscal jurisdiction might affect the justification of international fiscal law. The assignment approach and its main objection to the entitlement approach, the distributional objection, are discussed in section 5. Finally, section 6 summarises some of the results and discusses possible policy implications.

2 International Fiscal Law and Principles of International Taxation

Who is entitled to collect any particular tax is one of the oldest problems of taxation (Pires 1989, ch. VI). Before the establishment of strong nation states, disputes over this question were frequent. With the establishment of nation states such conflicts were greatly reduced, mainly due to what has come to be known as the principle of territoriality. In its most general form the principle of territoriality states that a country has complete sovereignty, within its territory, but no such rights outside its territory. International fiscal law has maintained the main idea underlying the principle of territoriality, that there must exist a particular relationship between a country and a

tax base if the country is to have a legal right to tax a person, a transaction or a property (Biehl 1982). However, international fiscal law also recognises some non-territorial connections as a justifiable basis for taxation. The connections that give countries a legal right to tax are essentially tax liability relationships. This means that the existence of the connections makes the tax subject obligated to make a financial contribution (Knechtle 1979, p. 35). The total sum of these obligations is commonly called the tax liability.

According to international fiscal law, the connections between a country and a tax subject that give rise to tax liability can be of both personal and economic nature. Two types of personal attachments are recognised as legal bases for the right to tax. First, a country has the legal right to tax all its citizens, irrespectively of where they live or where they earn their income. Secondly, a country has the legal right to tax all individuals that reside within its territory, even if they are not citizens. International law also allows countries to tax in the absence of any personal connection if there exists an economic connection by location of economic activity or economic assets. Personal connections, both citizenship and residence, give rise to full, or unlimited, tax liability, while economic attachments only give rise to limited tax liability. A country has, in other words, the legal right to tax the global income of all its citizens and residents, but it can only tax the income that arise within its own borders in the absence of such connections. In practice most countries, with a notable exception in the USA, exempt their citizens from taxation if they both live abroad and receive all their income from foreign sources.

Several features of international fiscal law should be noted. First, characteristics of a country, e.g. that it is poor, or of the tax subject, e.g. her ability to pay, do not constitute any legal justification of taxation. It is only the existence of particular relationships between the country and the tax subject that might give a country the legal right to tax. Second, only a limited set of such relationships give rise to the right to tax. In particular, historical relationships, e.g. former residence or former citizenship, do not create tax liabilities. Third, relationships that give countries a legal right to tax do not necessarily give rise to the same tax liabilities. As noted above, a purely economic relationship only gives rise to a limited tax liability, while personal connections, either residence or citizenship, gives the country the right to tax the global income of the tax subjects. Finally, international fiscal law regulates the distribution of tax rights between sovereign nations and it does not recognise the tax right of any other groups or entities.

2.1 Overlap of fiscal jurisdictions

Mobility of individuals, factors of production and commodities between jurisdictions gives rise to situations where the same tax subject or tax object has an economic or personal connection to more than one jurisdiction. Economic integration has therefore made overlap of tax jurisdictions more common. Such situations typically lead to so-called double taxation, that international transactions are taxed more than once.[3] This problem has concerned economists and policy makers, since double taxation means that income from international transactions are taxed at a higher rate than domestic transactions and this results in less gain from trade and inefficient allocation of resources.

The overlap of tax jurisdictions can be interpreted in two ways. First, it can be seen as reflecting that the tax subject has tax liabilities towards more than one jurisdiction. In this case it is not necessarily correct to give one country the exclusive right to tax. A second interpretation could be that the international fiscal law allows taxation on the basis of too many types of connections. The choice of tax principles, and the bi-lateral tax treaties, can accordingly be seen either as a way to distribute revenues between legitimate claimants or as an attempt to identify the morally relevant connection and limit the basis of taxation to this.

In order to eliminate double taxation bilateral tax treaties establish principles of international taxation. These principles are conflict rules that stipulate which holder of a taxing power is competent to tax a particular tax object, or parts of a tax object, in the case of an overlap of tax systems (Knechtle 1979, pp.65-67).[4] In the bilateral tax treaties the right to tax income is commonly given either to the source country or to the residence country. The rule that the country of residence is given the exclusive right to

[3]Following Biehl, we use the term transaction to designate all economic activity which can possibly be taxed. National transactions which exclusively tax place inside a national territory are only subjected to the respective national legislation. International transactions, on the contrary, can be affected by two or more national tax legislation, depending on whether or not each national authority succeeds in identifying or localizing (at least part of) these activities inside its national territory. (Biehl 1982, p. 190).

[4]These principles only provide a limitation of the conceivable connecting factors and such limiting factors do not necessarily prevent international double taxation. Even when such limitations on the connecting factors exist there might still be more than one jurisdiction with such connecting factors. Furthermore, overlap of tax claims might arise because states rely on different connecting factors.

tax is called the residence principle and rule that country of source is given the exclusive right to tax is called the source principle.[5] Some countries maintain the right to tax the global income of all their citizens. We shall call the view that the country of citizenship should have the exclusive right to tax the citizenship principle. Combinations of these principles are also possible, in particular the residence principle is commonly combined with a withholding tax levied by the source country. The source country is under this regime typically allowed to levy a fixed tax on the shared tax base and this tax is fully credited by the residence country. The tax revenue is thus shared between the two countries.

The choice of international tax principles has been central in the literature on international taxation. The economic literature has focused on the effect different principles have on the allocation of savings and investments between countries and on the cost of public funds (see Frenkel et. al 1991 for an overview). Some theorists have also studied how different principles affect the international distribution of tax revenues (e.g. Musgrave and Musgrave 1972 and Cappelen 2000a). However, neither the legal nor the economic literature on international taxation have made systematic attempts to justify the main elements of international fiscal law that is the basis for these principles. Below we present different traditions within what we have called the entitlement approach and discuss to what extent these traditions are able to justify the way in which the right to tax is distributed between countries or to suggest how the legal basis for taxation should be limited.

3 The Entitlement Approach

According to the entitlement approach the right to levy taxes on a particular tax base belongs to a country in a way that is analogous to the way in which a person has an entitlement to a thing. This tax base entitlement is based on some special relationship between the taxing jurisdiction the tax subject or tax object. The analogy should, however, not be overdrawn since the way in which a country could be said to acquire the right to tax is fundamentally different from the way in which an individual could be said to

[5]These are principles for taxation of income. Analogous principles for commodity taxation are the principle of destination (i.e. the right to tax a commodity falls on the importing country) and the principle of origin (i.e. the country that exports the commodity has the right to tax it). See Biehl (1982) for a general taxonomy.

acquire a property right. In the case of redistributive taxation, a person's tax liabilities to a country could be seen as reflecting a distributional obligation towards the individuals within that country. As noted above, the entitlement approach holds that such obligations require some particular connections to the country. This requirement express the view that such relationships give rise to special distributive obligations over and above those that derive from general duties. The question of how the right to tax should be distributed is therefore closely linked to the question of how the distributive group is constituted. If one defends the view that the distribution of tax rights should be done on the basis of particular connecting factors one must argue that distributive obligations are different and more extensive within a the group defined by these connecting factors than outside the group.

One might distinguish between different traditions within the entitlement approach according to what type of relationship is viewed as morally relevant. Below we present three traditions that fall within the entitlement approach; the mutual benefit tradition, the communitarian tradition, and the voluntarist tradition. The common feature of these traditions is that they hold that we have, or could have, different and more extensive distributional obligations towards particular individuals if we stand in a special relationship to these individuals. However, the nature and extent of the redistributive obligations that arise from special relationships generally depend on the nature of the relationship in question.

3.1 The mutual benefit tradition

David Hume, and more recently John Rawls and David Gauthier, have characterised the existence and necessity of social co-operation as part of the "circumstances of justice" (Hume 1777, pp. 145-153, Rawls 1971, pp. 126-130 and Gauthier 1985, pp. 10-14). According to this tradition society should be understood as "a co-operative venture for mutual advantages" marked both with identity of interests and conflict (Rawls 1971, p. 126). Social co-operation makes possible a better life for everyone through the increase in production that results from joining forces. But there is also a conflict of interests since everyone prefers a larger to a lesser share of the benefits produced by their co-operation. This tradition is an entitlement approach in the sense that distributive obligations arise from a particular relationship; co-operation in order to create a social surplus. According to the mutual benefit tradition, distribution should therefore take place among those who

participate in social cooperation. A crucial question within this tradition is how the concept of social cooperation is construed. The answer to this question affects both *who* are seen as participants in social cooperation and *what* is considered the social surplus to be divided among the participants.

If social cooperation is interpreted as economic cooperation, the mutual benefit tradition would hold that economic relationships give rise to special distributive obligations between the participants. It might seem reasonable to assume that economic cooperation primarily takes place where goods and services are produced, because this is where economic values are created. If this assumption is correct this interpretations of the mutual benefit tradition suggests that only economic relationships give rise to tax liabilities and that the source principle should apply. The view that economic allegiance is the source of the right to tax has a long tradition in the literature on international taxation. A late 19th century German author, George von Schantz, presented this view in 1892 and argued for the use of the source principle along these lines, i.e. that economic relationship should be the sole basis for tax rights. If social cooperation is construed as economic cooperation it is only the cooperative surplus, and not the total production, that should be distributed. This seems to give moral support to the view that economic connections only give rise to limited tax liabilities.

A problem with using economic relationships as a basis for the distribution of tax rights is related to the difficulties involved in identifying where values are created in the case of international transactions. It is commonly assumed that values are created in the country of production. However, with multinational companies it is often difficult to identify the country of production. This problem is even more pronounced with the new internet economy. Furthermore, it could be argued that values are created in the countries in which the goods are sold, or in the countries where they are consumed, and not in the countries where they are produced.

More importantly, it is not obvious that the notion of social cooperation in the mutual benefit tradition should be construed in purely economic terms. For some writers, such as Rawls, society as a whole, not just its economy, should be conceived of as a cooperative scheme from which everyone receives a wide range of economic and non-economic benefits. Given this interpretation of social cooperation, the mutual benefit tradition would also identify residence as source of tax liabilities since residing within a territory normally is sufficient for participation in the prevailing scheme of cooperation. This suggests that the right to tax should be divided between the source country

and the residence country, e.g. through a system where the country of source is given a right to levy a withholding tax.

Two features of international fiscal law seem difficult to reconcile with the mutual benefit tradition. First, all theories within this tradition would reject relationships that do not involve some sort of social cooperation as the basis for tax rights. It could therefore be argued that the claim that mere citizenship is a sufficient basis for taxation is incompatible with the mutual benefit tradition, since citizenship does not necessarily imply any type of economic or social interaction.[6] Second, international fiscal law does not consider historical relationships to be legal grounds for taxation. This feature does not conform well with the mutual benefit tradition since it implies that an individual might enjoy the benefits of social cooperation without ever contributing herself.[7]

The mutual benefit tradition also seem to have some implications for the choice of bi-lateral tax treaties. In particular it seems that one way to limit the right to tax; the residence principle, is incompatible with the mutual benefit tradition since this principle does not give the country of source any share of the tax revenues.

3.2 The communitarian tradition

According to the communitarian tradition an individual is partly defined by her relationships and the various rights and obligations that go along with these, so these commitments themselves form a basic element of personality (Miller 1988, p. 648). Rights and obligations are therefore, at least partly, defined between members of particular societies or communities at particular times.[8] The morally relevant type of connection thus seems to be social and/or cultural relationships. To the extent that a person has

[6]Some writers argue that citizenship should be viewed as a cooperative enterprise for mutual benefit, but it is hard to see how this could be in the case in the absence of these types of interaction.

[7]This possibility is particularly important in situations where so-called 'brain drain' is a problem or when migration patterns are systematically related to different life stages, so-called life time migration. These phenomena might undermine the possibility of financing public goods, such as health care and education, given this feature of international fiscal law.

[8]Most communitarians would accept that there exist moral constraints on our behaviour with respect to persons outside our group, but maintain that these are of a different kind or less extensive than those towards members of our community.

other, and more extensive, obligations towards individuals within the same community, the communitarians would argue that delimitation of fiscal jurisdictions should correspond to the such communities. Clearly, an important and difficult question within this tradition is how the concept of community is construed and what type of attachments and loyalties that constitute a community.

Without attempting to give a precise definition of the term community it might seem reasonable to assume that an individual generally would be a member of the community where she resides. If this were the case the communitarian tradition could be seen as justifying the tax right of the residence country. The communitarian tradition could also be said to support the tax right of the country of citizenship, inasmuch as citizens consider themselves to be members of a single civic community.

The main problem with communitarianism as a justification of international fiscal law is the fact that people identify with communities on different terms and this results in a fundamental ambiguity as to how the distributional community should be construed. Furthermore, it is difficult to justify taxation on the basis of economic relationships within the communitarian tradition, since it is possible to have income from a country without having any social or cultural ties to that country. The communitarian tradition also seems incompatible with the practice that the native country, or the country of former residence, has no legal right to tax the income that accrues to an individual that permanently has left the country, because membership in a community, or a society, not necessarily are affected by a change in residence.[9]

The main implication that the communitarian tradition has for the formulation of the bilateral tax treaties concerns the use of the source principle. This tradition seems to be incompatible with the source principle since it does not give the community to which the tax subject belongs any right to tax that persons income.

3.3 The voluntarist tradition

According to the voluntarist tradition, distributional obligations only arise from voluntary contractual relationships. Mere participation in a relationship

[9]What constitutes permanently leaving a country may vary. Often the criteria for residence are such that a person is considered a resident in two countries at the same time.

is not sufficient to give rise to special responsibilities, such responsibilities must always arise from some voluntary act. Applied to the question of the distribution of tax rights this implies that tax liabilities only arise from relationships that are entered into voluntarily by the tax subject. The concept of voluntary agreement is important to the different versions of voluntarism. How this concept is construed will determine what type of relationships that constitute a justifiable basis for taxation.

The best know voluntarist tradition is libertarianism. According to this theory all individuals have certain basic liberties or rights, such as the right to life and health, to property and to liberty. These rights constitute the bounds of individual freedom of action which people cannot transgress. Individuals have these rights irrespective of the existence of any particular relationship or institutional structures. According to the libertarian theory any state or government has to be the result of a voluntary agreement by all individuals. This constraint on state functions, generally implies that only certain limited and specific tasks should be undertaken by the state. A libertarian theory of distributive justice contains a principle of just acquisition of resources, a principle of just transfer of resources, and a principle of rectification of past injustice, but there is no principle of redistribution.[10] Transfers of resources between individuals might be legitimate, however, if it is a result of a process that does not violate any individual rights, a result of voluntary contracts. Robert Nozick argues that even if the framework is libertarian, individual communities within it need not be, and perhaps no community chooses to be so (Nozick 1974, p. 320). Redistributional schemes could be perfectly legitimate in so far as they take place within voluntary communities.

It could be argued that continued citizenship, or other types of political association, represents some sort of tacit consent to the redistributive policy within that group. One argument for viewing states as voluntary associations would be to say that democratic elections if they are held, constitute a periodic reaffirmation of citizens support for the institutions of the state. If this line of argument is accepted it could constitute an argument in favour of a citizenship principle of the type that is applied by the US and the Philippines. The voluntarist tradition could also justify other type of connections as a basis for taxation. In particular, one could argue that the choice to stay

[10]It has been argued that the so-called Lockean proviso, important in the derivation of property rights, implies some distributive obligations irrespective of any voluntary agreement, but I shall not consider this argument here.

within a community or a state rather than to migrate could constitute an acceptance of the institutions and laws regulating the society. This would identify residence as a source of tax liability. A similar argument could be made with respect to economic relationships.

The main problem with a voluntarist justification of international fiscal law lies in the claim that the type of connections that give a country the legal right to tax actually constitute voluntary agreements. If the concept of voluntary agreement is interpreted strictly, e.g. so as not to include tacit consent, none of the relationships recognised in international fiscal law might be considered a justifiable basis for taxation according to the voluntarist tradition. However, given the legitimacy of the international fiscal law, voluntarist theories would not object to any bilateral tax treaty that limited the right to tax so long these treaties themselves are a result of voluntary agreements.

4 Delimitation of fiscal jurisdiction

According to international fiscal law, the right to tax is to be distributed between sovereign states. Within the entitlement approach this could be seen as a claim that distributive groups constituted by special relationships coincide with the actual borders of the nation state. This is not the place to ask the larger question of whether the nation state is the appropriate level of redistribution. However, we will discuss the more limited question of whether the distributional groups identified by the different entitlement theories can be said to coincide with the existing fiscal jurisdictions.

Within the mutual benefit tradition the moral significance of state borders is based on the empirical claim that the extent of social cooperation between countries is insignificant compared with similar domestic interaction. If social cooperation is construed in economic terms, this claim is plainly false. There is often more economic interaction between neighboring regions of different countries than between regions within the same country. Furthermore, if economic interaction is the basis for redistribution, then increased economic integration and interdependence would require that the right to tax be vested in institutions of progressively wider and wider scope. In a globalized economy, it could be argued that the distributive communities constituted by special relationships should include all of humanity. This is the position of the so-called global Rawlsians, such as Charles Beitz and Thomas Pogge

(Beitz 1975 and 1979 and Pogge 1989 and 1994). More precisely, these writers argue that the mutual-benefit logic implies that the Rawlsian maximin principle should be applied on a global scale, rather than at the national level (Beitz 1979).

According to the communitarian tradition, redistribution should take place within the community. The nation state is the appropriate agency of redistribution only if people primarily identify with their nation. However, people tend to identify themselves with communities that are not necessarily territorially delimited. Since individuals are members of different communities or groups it is inherently difficult to identify the relevant social and cultural groups and to define the exact borders of such groups. Furthermore, actual states do not coincide with social and cultural groups. Several ethnic and religious groups generally coexist within the same country and the same community might live in several different countries.

To the extent citizenship and/or residence could be seen as a voluntary commitment, the nation state could be viewed as a voluntary association. In this case, the distributive groups would coincide with the borders of nation states. The problem with this type of argument is that it seems implausible to claim that citizenship generally is the result of a voluntary commitment. Only very few individuals have a real choice of citizenship or country of residence. Most voluntarists, such as Nozick, would therefore argue against the view that the nation state could be conceived as a voluntary association and hold that distributive communities would have to be much smaller (Nozick 1974, pp. 320-23).

With the possible exception of theories that identify citizenship as the source of distributional obligations, theories within the entitlement approach do not seem to support the claim that redistribution primarily should take place within the nation states. The distributive groups defined by these theories seem to either include people who are not members of the same jurisdiction, to exclude people who are members of the same jurisdiction, or both. In other words: even if the entitlement approach succeeds in justifying a particular delimitation of distributive groups it has not necessarily justified why the right to tax should be distributed between sovereign states.

5 The distributional objection

According to the entitlement approach, the right to tax a particular tax base can be said to belong to a country. What I have called the assignment approach rejects this idea. The basic feature of the assignment approach is the view that we have the same distributive obligations towards every human being and it rejects the view that special relationships give rise to special obligations. The assignment approach takes all human beings, even distant strangers, to be included in the scope of justice and argues that the same principles must be used to assess both national and international income distribution. In this sense the assignment approach is more cosmopolitan in scope than the entitlement approach.[11] The assignment approach would be the approach taken by utilitarians such as Peter Singer and Robert Goodin (Singer 1972 and Goodin 1985, 1988 and 1995). Utilitarians would hold that special duties should be regarded as being only "distributed general duties" and derive the whole of their moral force from general duties (Goodin 1988, p. 678). The utilitarians would view the just distribution of tax rights as a question of how the distributional obligations we have towards all other human beings best could be implemented. The assignment approach would therefore reject the idea that jurisdictions should correspond to distinct distributive communities and question why there should be any delimitation of tax jurisdiction in the first place. In particular it would question whether the nation state in fact is the appropriate agency for redistribution. These questions echo the concern, expressed by many writers on international justice, about the tension between cosmopolitan moral theories and existence of nation states with responsibility for redistribution within its territory.

5.1 The Assigned responsibility model

Robert Goodin has developed an approach called the "assigned responsibility model" that can be seen as an attempt to justify the existence of nation states within a cosmopolitan moral theory such as utilitarianism (Goodin 1988 and 1995). According to this model, state borders can be seen as convenient ways of allocating responsibilities that themselves derive from universal principles. Robert Goodin argues that "a great many general duties

[11] As noted in the last section, some writers within the entitlement approach, such as Beitz and Pogge, would be equally cosmopolitan. Most of what is said about the assignment approach in this section could also be said about their theories.

point to tasks that, for one reason or another, are pursued more effectively if they are subdivided and particular people are assigned special responsibility for particular portions of the task" (Goodin 1995, p. 282). Often this has to do with the advantage of specialisation and division of labour (Shue 1988). At other times, it has to do with lumpiness in the information required to do a good job, and the limits on people's capacity for processing requisite quantities of information about a great many cases at once. The fact that we are limited altruists, i.e. that we care about a limited number of other people, constitutes another argument for delimitation of fiscal jurisdiction, since we would want people who care about each other to take care of each other (Cappelen 2000b). In this perspective, delimitation of fiscal jurisdictions can be seen as a way to assign responsibility for discharging certain general duties vis-à-vis individuals to particular state agents. This way of assigning duties is obviously not randomly chosen, neither should the delimitation of jurisdictions be. A particular delimitation of jurisdiction is only justified to the extent that it assigns responsibility in the most efficient way. Accordingly, the just principles of international taxation should in this perspective be interpreted as the connection that constitutes the optimal basis for assigning distributive obligations to particular groups. However, even if the assigned responsibility model to some extent reconciles the cosmopolitan nature of general obligations with a territorial delimitation of fiscal jurisdiction, it can still be used to criticise the existing jurisdictional borders.

5.2 The Distributional Objection

A characteristic feature of the entitlement approach is that it does not take account of the that consequences the choice of tax principle has in terms of distribution and efficiency. What we could call the distributional objection challenges this feature of the entitlement approach. The objection points out that benefits arising from special relationships might work to the disadvantage of those who are most in need (Scheffler 1994 and 1997). This effect is easily seen in the context of international taxation. The rich part of the worlds population is more closely interconnected with each other, through economic cooperation, co-residence and citizenship, than with the poor. If the right to levy redistributive taxes is delimited to groups constituted by such relationships the result will be that rich people take responsibility for rich people and poor people take responsibility for poor people. The assignment approach would argue that it is not an efficient way of assigning

responsibilities to put the poorly-off in charge of the poorly-off and the well-off in charge of the well-off. If there has been a misallocation of some sort, so that some states have been assigned care of many more people than they have been assigned resources to care for them, then a reallocation resources is called for (Goodin 1988, p. 685).

For a given delimitation of fiscal jurisdiction, the assignment approach would argue that the choice between different principles in taxation should depend on a trade-off between efficiency consideration, national equality and international equality (Cappelen 2000a). Most theories within the assignment approach hold that there could be situations where national equality could be sacrificed for the sake of international equality and that there could be situations where both national and equality could be sacrificed for the sake of efficiency. How this trade-off should be made would depend on the particular moral theory.

The assignment approach is not committed to the view that the international distribution of tax revenues has to be related to any particular relationship between the country and the tax base. Theories within this approach would argue that tax revenues should be distributed according to characteristics of the country (e.g. the number of inhabitants, the GDP per capita etc.). Several theorists have proposed to use the tax system to promote international distributive justice. Two prominent proposals have been made by Pogge and Tobin. Pogge advocates the use of a global resource tax, while Tobin argues the case for a tax on international currency transactions (Pogge 1998 and Tobin 1996). An alternative way to take account of international distribution of income, could be to maintain the main features of international fiscal law, but allow poor countries a larger share of tax revenues. One way to do this could be to allow poor countries to levy a higher withholding tax on income, in particular capital income, that had the poor country as its source, but accrued to residents of rich countries (Cappelen 2000a).

6 Final Remarks

According to international fiscal law a country only has the right to tax if there exists a particular type of relationships between the taxing jurisdiction and the tax base. The paper has shown that the main features of international fiscal law presupposes what we have called an entitlement approach to the distribution of tax rights. However, the discussion in section 3 showed

that the main normative traditions that conforms with the entitlement approach would question the set of connecting factors that are identified as a legal basis for taxation in international law, either because it is too inclusive or because it does not include some morally relevant types of relationships, or both. We also showed, in section 4, that it is difficult, even within the entitlement approach, to justify that the right to tax should be distributed exclusively between sovereign states. Furthermore, we have argued that the entitlement approach is incompatible with the cosmopolitanism of important traditions in moral philosophy. Cosmopolitan moral theories would object both to the way in which the entitlement approach conceives the delimitation of fiscal jurisdictions and to its distributional implications.

The main traditions in moral philosophy thus seem unable to justify the main features of international fiscal law. One response to this result could be to see it as a confirmation of the realist view; countries simply exploit their power to tax and any agreements on tax principles are based on self interest and bargaining power (Brennan and Buchanan 1980). Countries' attempts to justify their practice by reference to normative principles are nothing more than cheap talk. Furthermore, the analysis above has not taken into account problems of implementation. Lack of global enforcement mechanisms and lack of morally relevant information might explain important parts of the existing international fiscal law, e.g. why historical relationships are not recognized as a legal basis for taxation.

Despite these objections to the relevance of an analysis of the relationship between moral theories and international fiscal law, there are several reasons why such considerations could be important for policy makers. First, there are evidence that governments are motivated, at least partly, by a concern with international justice. To the extent this is the case, a normative analysis of the just distribution of the right to tax would suggest in what direction we might want to change the existing international tax regime. Second, the process of economic integration increases the effect the distribution of tax rights has on national and international income distribution and thus makes this an even more important policy issue. Furthermore, globalisation also give rise to new and difficult questions of international tax right distribution. In particular, both the increased importance of multinational companies and the dawn of the internet age represent challenges that can only be met by rethinking international fiscal law. Finally, there is a significant growth in international political institutions, both at the regional and the global level. Whether, and to what extent, such institutions should have tax rights will

therefore be an important questions in the future, and an answer to this question requires a normative theory of the right to tax.

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Chapter 3

National and International Distributive Justice in Bilateral Tax Treaties,*†

Abstract

This paper analyses the choice between the residence principle and the source principle in international capital taxation. The focus of the literature has been on the efficiency aspects of the two principles. The present paper ties in with this literature, but incorporates effects on both national and international equity. It is shown that the choice between the two principles of international taxation to some extent is a choice between national and international inequality. The paper argues that from the perspective of a global planner there might be situations where the source principle is superior to the residence principle because the source principle reduces international inequality.

1 Introduction

In open economies people can invest their capital outside the country in which they are resident. This creates situations where more than one jurisdiction is able to tax capital income. In order to avoid double taxation, it is therefore necessary to agree on a rule that determines how the right to tax should be distributed between the countries with the power to tax (Biehl

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1982). The choice between different types of double taxation relief, in particular the choice between the source principle and the residence principle, has been the subject of both political and theoretical interest. An important result in the literature on international tax policy is the inefficiency of source taxes. Many writers have argued that residence taxation, if it could be effectively enforced, is preferalble to source taxation (Gordon 1986, Frenkel et al. 1991, Bucovetsky and Wilson 1991 and Homburg 1999). The focus of the literature has been on the efficiency aspects of the two principles. The present paper ties in with this literature, but incorporates effects on both national and international equity. It is important to include equity considerations into the comparison of the two principles because the principles affect both national and international income distribution. Differences in capital endowments are a source of both national and international income inequality and an old theme in political and moral debate is how, and to what extent, income inequalities generated by the uneven distribution of capital endowments should be equalised. The choice of international tax principle affects countries' ability to redistribute between capital owners and workers as well as the distribution of income between capital importing and capital exporting countries. The paper shows that this choice is, to some extent, a choice between national and international inequality. It also argues that from the perspective of a global planner there might be situations where the source principle is superior to the residence principle because the source principle can reduce international inequality.

Two differences between the source principle and the residence principle have been important in the analysis of the two principles. First, the two principles affect the international allocation of investments and savings differently (for an overview, see Frenkel, et al 1991). The source principle implies that the after-tax return on investments is the same for residents of all countries and this implies that the allocation of savings will be efficient. However, since the tax rates might differ across countries, the before tax return will generally not be equalised and capital will not be efficiently allocated between countries. The residence principle, on the other hand, secures efficient allocation of investments, but not of savings, since pre-tax returns will be equalised while after-tax returns will differ. This paper ignores the welfare loss associated with international differences in pre-tax return by assuming that capital is supplied inelastically. Since capital is assumed to be perfectly mobile, differences in after-tax returns to capital create distortions. This feature biases the model towards the residence principle. This is done

to focus on the internation equity aspects of the source principle.

A second difference between the two principles concerns how they affect the cost of financing public goods and redistributing income (Zodrow and Mieszkowski 1986, Wildasin 1989, Wilson 1989, Sinn 1990). It is a widespread concern that globalisation and increased mobility of the tax base increase the marginal cost of public funds for given tax rates. When tax bases are mobile each country has an incentive to lower its taxes in order to attract a larger tax base. The result of such tax competition is a downward pressure on the tax levels. The choice of tax principle affects the mobility of the tax base and thus the degree of tax competition. Under the source principle it is costly to redistribute resources between capital owners and workers because it is fairly easy to move capital from one jurisdiction to another. With the residence principle the capital owner has to take up residence in another country to escape taxation. Since people are less mobile than capital, the problem of tax competition will be more severe under the source principle than under the residence principle. A small country faced with a perfectly elastic supply of capital will be unable to set a higher capital tax rate than its trading partners. Concerns for national redistribution would therefore favour the residence principle over the source principle. In this paper this difference is captured by the assumption that people are completely immobile while capital can move freely between countries.

Principles of international taxation also affect the distribution of income between countries. One of the main reasons why it is difficult to agree on a common principle is that principles of international taxation differ in how the gains from international transactions are distributed between the countries.[1] With the notable exception of Peggy and Richard Musgrave (Musgrave and Musgrave 1972) few economist have tried to introduce such considerations into the evaluation of international tax policy. The difference between the residence principle and the source principle may be viewed as the difference

[1] Another feature of the source principle is that it calls for *in rem* rather than personal taxes, since it is concerned with where income arises rather than to whom it accrues (Musgrave 1987). It is generally necessary to have information about persons' total income or other personal characteristics in order to levy progressive income taxes and such information is not available about non-residents. The source principle therefore reduces the ability of the tax system to redistribute income between groups within a jurisdiction. Unlike the source principle, the residence principle is compatible with a personal system of income taxation. This paper will ignore this difference between the two principles by assuming that the government is restricted to using a unit tax on capital under both regimes.

between taxing the net national product (its residents' world-wide income) and taxing the net domestic product (the income produced by all factors of production employed in that country). A capital exporting country has a larger net national product than net domestic product. A net exporter of capital, on the other hand, has a prima facie reason to favour the residence principle since the income that accrues to its residents from foreign investments exceeds the income that accrues to foreign residents investing in its country. In particular some Third World countries have argued that the residence principle favours the industrialised, and capital rich, world since it gives the right to tax international capital income to the capital exporting country. The source principle on the other hand favours the capital poor countries in two ways. First, it increases the tax base of capital importing countries and thus the tax revenues for a given capital income tax. Secondly, it gives the poor country a chance to attract capital by setting low tax rates or to exploit the opportunity for tax exporting by setting high tax rates.

If the interest of countries coincided we could view the choice of tax principle from a purely national point of view. However, if countries differ in their preferences, in their size, in their per capita capital endowments or other characteristics, their preferred choice of principle will not generally coincide. We then need to ask what principle should be considered just from an international point of view. There are two fundamentally different ways of approaching this type of question. The first is what we could call *the entitlement approach* (Scheffler 1994 and 1997). According to this approach certain connecting factors between a tax base and a country gives the country an entitlement, or a non-derivative right, to appropriate these economic resources. Somewhat simplified one could say that the entitlement approach sees a country's right to tax as deriving from special duties that we have to persons or groups wo whom we have a particular relationship. The alternative approach could be called *the assignment approach* (Goodin 1995). Within this approach international tax principles are viewed as pragmatic rules derived from general moral considerations. The just principles of taxation are those that distribute, or assign, tax rights in such a way as to maximise some general objective. The assignment approach thus rejects the notion of special duties and views the just distribution of tax rights simply as the best way to implement the general duties we have towards everyone as human beings. This paper explores the last of these two approaches and looks at the choice between tax principles from the point of view of a social planner concerned with the global welfare. From the point of view of the

global welfare maximiser, the choice between the residence principle and the source principle depends on a trade-off between efficiency consideration, national equity and international equity. The model developed below attempts to capture this trade-off.

The paper is organised as follows. The next section describes the model and analyses the optimal national policy under the two principles. Section 3 introduces the perspective of the global planner and discusses under what conditions such a planner might prefer the source principle. In section 4 we consider the possibility of combining the residence principle with a withholding tax and section 5 concludes.

2 The Model

This paper analyses the choice between different principles of international taxation in a model with two types of people; workers and capital owners (denoted P and R). The workers and the capital owners inelastically supply one unit of labour or capital respectively. The national endowments of the two factors are thus equal to the number of workers and capital owners that are residents in the country. Capital and labour are the only two factors of production used in the production of a single final good. We assume that there are only two countries; one capital rich and one capital poor (denoted 1 and 2 respectively), where the rich country is assumed to have higher per capita endowments of capital, i.e. the number of capital owners relative to the number of workers is higher in the rich country than in the poor country. The two countries can be thought of as two regions where each region consists of identical countries applying a residence principle within the group.

We assume that the capital owners have a higher before-tax income than the workers and that the average per capita income in the capital rich country is higher than in the capital poor country. There are thus two types of inequality in this economy. There is inequality within each country between workers and capital owners and there is inequality between the capital rich and the capital poor country.

Neither workers nor capital owners can change residence. Labour cannot move from one country to another, but capital is perfectly mobile between countries and the capital owners sell their capital where the after tax return is highest. Since capital is supplied inelastically and there is only one final good, the only type of inefficiency in the model is associated with the allocation of

capital between countries.

All individuals are assumed to have the same indirect utility function, $v(I)$, and we assume that $v' > 0$ and $v'' < 0$. The income of the capital owners in country i, I_{Ri}, is simply their after tax return to capital, denoted ρ_i. The income of the workers in the same country, I_{Pi}, is equal to the wage, w_i, plus the lump-sum transfer, T_i.

In each country there is one firm that is assumed to behave competitively and use a constant return to scale production function.

$$F_i(K_i, L_i) \tag{1}$$

where K_i is the capital employed in country i and L_i is the labour employed in country i. We assume that the technology in the capital rich country is at least as productive as the technology in the capital poor country, i.e. that $F_1(\bar{K}, \bar{L}) \geq F_2(\bar{K}, \bar{L})$ for any $(\bar{K}, \bar{L})$. Normalising the price of the final good to one, the firm's profit is given by

$$\pi_i = F_i(K_i, L_i) - r_i K_i - w_i L_i \tag{2}$$

where w_i is the unit cost of labour (the wage) in country i and r_i is the unit cost of capital in the same country. From the Euler theorem we know that the firm earns zero profit. The first order conditions of this optimisation problem imply that

$$\frac{\partial F_i}{\partial L_i} = w_i \tag{3}$$

$$\frac{\partial F_i}{\partial K_i} = r_i \tag{4}$$

Since each worker is assumed to supply one unit of labour inelastically, the wage is residually determined as $w_i = \partial F_i(K_i, \bar{L}_i)/\partial L_i$, where $\bar{L}_i$ is the number of workers in country i. The labour supplied by the workers in the two countries is assumed to be homogenous. Any international difference in wages must therefore be a result of either international differences in technology or in the amount of capital invested per worker. From the first-order conditions

we can derive the demand for capital in country i as a function of the price of capital, $K_i(r_i)$.

The governments are assumed to be nationalistic in the sense that they only take account of the welfare of their own residents in determining their tax policy. Each country tries to maximise the utility of its citizens using a unit tax, t_i, on capital and a lump sum transfer, T_i, to its workers. We assume that the governments do not have the ability to discriminate against outflowing capital or capital owned by non-residents. The government is assumed to maximise

$$W_i = \bar{K}_i v(I_{Ri}) + \bar{L}_i(I_{Pi}) \tag{5}$$

where $\bar{K}_i$ is the number of capital owners in country i, subject to

$$\Pi_i - \bar{L}_i T_i \geq 0 \tag{6}$$

where Π_i is the government revenue function. Since the tax base is different under the two principles the revenue function depends on the international tax regime. Below we study the solution to the government optimisation problem under the residence principle and under the source principle.

2.1 The residence principle

Under the residence principle the country where the capital owner is a resident has the right to tax the global capital income irrespective of where the capital is invested. Since we assume that capital owners can costlessly move their capital to the country with the highest return we know that an equilibrium in the capital market requires that a capital owner residing in a country, i, has the same after-tax return, ρ_i, in both countries, i.e.

$$\rho_i = r_1 - t_i = r_2 - t_i \tag{7}$$

which implies that $r_1 = r_2$, i.e. that the marginal product of capital must be the same in both countries. The demand for capital in each country is then given by $K_i^R = K_i(r)$, where r denotes the common pre-tax return to capital and where the superscript denotes the regime. The market clearing condition can be written as

$$\bar{K}_1 + \bar{K}_2 - K_1(r) - K_2(r) = 0 \tag{8}$$

from which we derive the common pre-tax rate of return, $r = r(\bar{K}_1 + \bar{K}_2)$, as a function of the total amount of capital in the two countries. The pre-tax return to capital and the allocation of capital between the two countries are, in other words, independent of the tax policy in the two countries. As noted above, global efficiency in production requires that the marginal product of capital is the same in all countries, otherwise it would be possible to reallocate capital between the countries and increase world production. The residence principle satisfies this requirement. The principle does not generally secure an efficient allocation of savings. However, since capital is supplied inelastically in this model this does not create any distortions. The government revenue function under the residence principle is given by

$$\Pi_i = t_i \bar{K}_i \tag{9}$$

and the Lagrangian can be written as

$$L_i = \bar{K}_i v(r - t_i) + \bar{L}_i v(w_i + T_i) + \lambda_i (t_i \bar{K}_i - T_i \bar{L}_i) \tag{10}$$

The first-order conditions of this problem are given by

$$\frac{\partial L_i}{\partial t_i} = -\bar{K}_i v'_{Ri} + \lambda_i \bar{K}_i = 0 \tag{11}$$

$$\frac{\partial L_i}{\partial T_i} = \bar{L}_i v'_{Pi} - \lambda_i \bar{L}_i = 0 \tag{12}$$

$$\frac{\partial L_i}{\partial \lambda_i} = t_i \bar{K}_i - T_i \bar{L}_i = 0 \tag{13}$$

where $v'_{Ri} = v'(r - t_i)$ and $v'_{Pi} = v'(w_i + T_i)$. Using (11) and (12) we get

$$v'_{Ri} = v'_{Pi} \tag{14}$$

Since the capital tax is a lump-sum tax under this regime, this is what we would expect from a utilitarian government; that redistribution takes place until the marginal utility of income is equal for both workers and capital owners. This implies that the incomes of the two groups have to be equal, i.e. that $r - t_i = w_i + T_i$. Using (14) we know that the common after-tax income under this regime, I_i^R, is given by

$$I_i^R = \frac{F_i(K_i^R, \bar{L}_i) - r(K_i^R - \bar{K}_i)}{\bar{K}_i + \bar{L}_i} \tag{15}$$

The expression in the nominator on the right-hand side is the net national income in country i. Since capital income tax is effectively a lump-sum tax the government in each country can secure a first-best distribution of the net national income so that both workers and capital owners have the same income. However, while there will be national income equality in both countries there might be considerable international inequality. This inequality depends on the international distribution of capital endowments and on the differences in production technology in each country.

2.2 The source principle

Under the source principle each country has the exclusive right to tax all capital income that arises within its borders. Under this regime it is possible for capital owners to escape taxation in their own country by moving their capital to another jurisdiction. In equilibrium, capital must therefore have the same after-tax returns in both countries:

$$r_1 - t_1 = r_2 - t_2 \tag{16}$$

Denoting the common after-tax return to capital as ρ, we know that the demand for capital will be a function $K_i^S = K_i(\rho + t_i)$, where the superscript denotes the tax regime. The capital market equilibrium condition under the source principle can be written as

$$\bar{K}_1 + \bar{K}_2 - K_1(\rho + t_1) - K_2(\rho + t_2) = 0 \tag{17}$$

from which we obtain as a function of the tax rates in the two countries, $\rho = \rho(t_1, t_2)$. By implicit differentiation of (17) we have that $\partial\rho/\partial t_i = -K_i^{S\prime}/(K_1^{S\prime} + K_2^{S\prime})$ and we observe that $0 < \partial\rho/\partial t_i < -1$. An increase in the tax in one country reduces the common international after-tax return to capital. The source principle thus introduces an interdependence between the tax policies in the two countries. This effect, whereby the tax policy in one country changes the prices faced by non-nationals, is commonly referred to as *tax exporting*. Using the terminology introduced by Dahlby (1996) we can describe tax exporting as a *direct tax externality* in the sense that it *directly* affects the indirect utility function of non-nationals and this effect is not taken into account by the taxing country. For a capital tax levied in a capital importing country, the direct tax externality will be unambiguously negative. However, if the tax is levied by a capital exporting country, the tax externality may be positive as the country will worsen its terms of trade by imposing a source tax on capital. We have assumed that firms behave competitively, and the terms of trade effect will therefore result in increased pre-taxed wages in the capital importing country. The size and sign of the direct externality will in general depend on the effect an increase in the tax rate has on the international after-tax return to capital and on the share of the total capital owned by the taxing country.

The government's revenue under the source principle is not related to the endowments of capital, but to the capital invested in the country. The revenue function is given by

$$\Pi_i = t_i K_i(\rho(t_1, t_2) + t_i) \tag{18}$$

This revenue function constitutes a source of *tax competition* in the sense that the countries have an incentive to lower their taxes in order to attract capital. Tax competition between the countries is a *positive indirect tax externality* in the sense that the governments tax decisions affect the tax revenues of other governments and thus their ability to provide public goods or redistribute income. It is a *positive* tax externality in the sense that an increase in the tax in one country results in migration of capital to other jurisdictions and thus increases the tax base of these countries. The Lagrangean of the governments optimisation problem under the source principle is given by

$$L_i = \bar{K}_i v(\rho) + \bar{L}_i v(w_i + T_i) + \lambda_i(t_i K_i^S - T_i \bar{L}_i) \tag{19}$$

The first-order conditions are:

$$\frac{\partial L_i}{\partial t_i} = \bar{K}_i v'_{Ri} \frac{\partial \rho}{\partial t_i} + \bar{L}_i v'_{Pi} \frac{\partial w_i}{\partial t_i} + \lambda_i (K_i^S + t_i \frac{\partial K_i^S}{\partial t_i}) = 0 \tag{20}$$

$$\frac{\partial L_i}{\partial T_i} = \bar{L}_i v'_{Pi} - \lambda_i \bar{L}_i = 0, \lambda_i = v'_{Pi} \tag{21}$$

$$\frac{\partial L_i}{\partial \lambda_i} = t_i K_i^S - T_i \bar{L}_i = 0, t_i = \frac{T_i \bar{L}_i}{K_i^S} \tag{22}$$

From condition (20) we observe that the effects of an increase in the capital tax under the source principle differs from the effects under the residence principle in three interesting ways. Firstly we have the fact that the after-tax return to capital may fall by less than the tax, i.e. that $\partial \rho / \partial t_i > -1$. Secondly, an increase in a country's unit tax has a negative effect on wages, through the effect on domestic investments, an effect that is not present under the residence principle. The third difference is that the tax base under the source principle is the capital invested in the country and not the capital endowments.

From the chain rule and the factor price frontier we have that $\frac{\partial w_i}{\partial t_i} = \frac{\partial w_i}{\partial r_i} \frac{\partial r_i}{\partial t_i}$ and that $\partial w_i / \partial r_i = -(K_i^S / \bar{L}_i)$ (Bucovetsky and Wilson 1991). Furthermore, from (17) we have that $\partial r_i / \partial t_i = (1 + \partial \rho / \partial t_i)$. Using (20)-(21) we then get

$$\frac{v'_{Ri}}{v'_{Pi}} = \frac{K_i^S}{\bar{K}_i} (1 + \frac{\varepsilon_{Ki}}{\partial \rho / \partial t_i}) \tag{23}$$

where $\varepsilon_{Ki} = -\frac{t_i}{K_i^S} \frac{\partial K_i^S}{\partial t_i}$. The expression on the left-hand side can be seen as a measure of the degree of national redistribution. When the measure is equal to one there is complete equalisation of after-tax income within the country. For values lower than one the capital owners have a higher after-tax income than the workers and for values above one the workers have higher after-tax income than the capital owners. We observe that the degree of redistribution depends on three effects. Firstly, the cost of redistribution depends on the ratio between the tax base and the capital endowment of its

capital owners. The larger the endowments of capital that a country has, the larger the share of the tax burden that will be born by its own capital owners. Secondly, the degree of redistribution depends on the elasticity of the tax base. An increase in the elasticity of the tax base increases the cost of redistribution and thus reduces the degree of redistribution. Finally, redistribution between workers and capital owners can only take place to the extent the country is able to affect the after-tax return to capital. If is $\partial\rho/\partial t_i$ small, most of the tax burden will be shifted on to the immobile factor, labour, in terms of lower wages.

With the residence principle each country is able to achieve the first-best distribution of its national income. A country therefore prefers the residence principle to the source principle when the net national product under the residence principle exceeds the net domestic product under the source principle. If the net domestic product under the source principle is larger than the net national product under the residence principle there will be a trade-off between the size of the tax base and the cost of redistribution. The gain in tax base might outweigh the efficiency loss associated with the tax externalities introduced by the source principle for one of the countries. It is useful to note that a country that is a net capital exporter under the residence principle might become a net capital importer under the source principle. We can therefore not conclude from the fact that a country is importing capital under the residence principle that it would enlarge its tax base with a shift to the source principle.

3 The Global Planner

It is possible that the two countries would prefer different principles to regulate the taxation of international capital income. In such a situation it is interesting to ask which principle would best serve international justice. Moral assessment of institutions that affect both national and international distribution is inherently difficult. One needs to answer both the question of which principle of distributive justice should be applied and whether or not the same principle should be applied to both national and international distribution. Some moral philosophers have argued that principles of justice should only be applied at the national level, while others have argued that a different, and less demanding, set of principles should be applied to international distribution. Theories within what I described as the assign-

ment approach to international justice are typically *cosmopolitan* theories of justice. These theories take all human beings, even distant strangers, to be included in the scope of justice and argue that the same principles must be used to assess both national and international income distribution. Utilitarians, such as Peter Singer (1972) and Robert Goodin (1995), have argued that the goal of redistributive policy should be to maximise the global welfare. Similarly, some Rawlsian theorists, such as Charles Beitz (1979) and Thomas Pogge (1989), have argued that the maximin criterion should be applied to issues of international justice as well as to national justice.[2] Below we shall assume that the global planner would endorse a utilitarian principle of justice, but most of the results would follow whenever the global planner gives some weight both to national and international distribution. The important point is that most theories within the assignment approach would maintain that there could be situations where national redistribution could be sacrificed for the sake of international distribution.

We assume that the global planner wants to maximise the sum of utility in the two countries, i.e. he puts equal weight on the welfare of all individuals irrespective of where they live. The welfare function is then given by

$$W = \bar{K}_1 v(I_{R1}) + \bar{K}_2 v(I_{R2}) + \bar{L}_1(I_{P1}) + \bar{L}_2(I_{P2}) \tag{24}$$

If the global planner could determine the income of each individual she would simply choose the first best utilitarian optimum

$$W^{FB} = (\bar{K}_1 + \bar{K}_2 + \bar{L}_1 + \bar{L}_2) v\left(\frac{F_1(K_1^R, \bar{L}_1) + F_2(K_2^R, \bar{L}_2)}{\bar{K}_1 + \bar{K}_2 + \bar{L}_1 + \bar{L}_2}\right) \tag{25}$$

i.e. the income would be distributed equally among all individuals both within each country and between countries. Capital would also be allocated efficiently between countries so that the marginal productivity in capital is equal in both countries. If the global planner could determine a lump-sum transfer from the rich country to the poor, it could achieve the first best allocation by using a residence principle. The source principle can only be optimal in this model if a just international distribution cannot be secured

[2] John Rawls (1993) has objected to this interpretation of his theory and argued that his maximin criterion applies only to domestic justice.

through transfers from the rich to the poor country. In this paper we assume that lump-sum transfers between countries are not possible and that international income transfers are either impossible or prohibitively costly. The justification for this assumption is partly that it seems to be difficult to get political support for increased transfers to poor countries and partly that such transfers tend to be less than successful in achieving their objectives.

Assuming that the only policy instrument available to the global planner is the choice of tax principle in the bilateral tax treaties we might have a trade-off between efficiency and national redistribution on the one hand and international redistribution on the other. In order to determine which distribution of tax rights would maximise the global welfare the social planner would have to compare global welfare under the two different regimes

$$W^R = \begin{array}{l}(\bar{K}_1 + \bar{L}_1)v(\frac{F_1(K_1^R,\bar{L}_1)+r(\bar{K}_1-K_1^R)}{\bar{K}_1+\bar{L}_1}) \\ +(\bar{K}_2 + \bar{L}_2)v(\frac{F_2(K_2^R,\bar{L}_2)+r(\bar{K}_2-K_2^R)}{\bar{K}_2+\bar{L}_2})\end{array} \tag{26}$$

$$W^S = (\bar{K}_1 + \bar{K}_2)v(\rho) + \bar{L}_1 v(w_1 + \frac{t_1^S K_1^S}{\bar{L}_1}) + \bar{L}_2 v(w_2 + \frac{t_2^S K_2^S}{\bar{L}_2}) \tag{27}$$

where is t_i^S the optimal tax for country i under the source principle. Under the residence principle there is no national income inequality and no inefficiency, but the distribution might involve considerable international inequality. Under the source principle there is no international inequality between capital owners, but there is inequality between both workers and capital owners within each country and between workers in different countries. When the tax rates in the two countries are unequal there will also be an inefficient allocation of capital under the source principle.

It is inherently difficult to compare different regimes without using specific utility and production functions. We shall focus on the after-tax income of the workers in the capital poor country, by assumption the individuals who are worst off under the two regimes. If the objective of the global planner was given by the maximin criterion this focus would be sufficient. With a utilitarian objective function we have to weigh the potential benefit to the worst off against possible losses to other groups. However, if we can show that the source principle can increase the income of the worst off individuals we know that the principle, for some utility functions, maximises global welfare.

In order to find out when this is likely to be the case we need to study some special cases.

i) Two identical countries

One interesting special case is the situation where the two countries are identical, both with respect to factor endowments and technology. In this situation the residence principle would always be preferable to the source principle. Under the residence principle both countries distribute their income equally between workers and capital owners and both countries have the same national income so there will be neither national nor international income inequality. The residence principle will, in other words, be sufficient to secure a first-best global optimum. Due to the symmetry, there will not be any international income inequality or any inefficient allocation of capital under the source principle either. However, the source principle introduces tax externalities between the countries that create inequality within each country. Noticing that $K_i = \bar{K}_i$ and that $\partial\rho/\partial t_i = -1/2$ when the two countries are identical we can rewrite (23) as

$$\frac{v'_{Ri}}{v'_{Pi}} = (1 - 2\varepsilon_{Ki}) < 1 \tag{28}$$

In this case the tax rates in both countries are unambiguously too low as long as $\varepsilon_{Ki} > 0$ (Hoyt 1991). The insight we derive from this special case is that the optimality of the source principle must be a result of some asymmetry between the two countries. Identical, or relatively similar, countries always prefer a residence principle. This result could explain the predominance of the residence principle between the OECD countries.

ii) No capital endowments in the poor country

The difference in per capita capital endowments is one important type of asymmetry between the two countries. In the extreme case where the residents of the poor country have no capital endowments, i.e. when $\bar{K}_2 = 0$, the poor country will not have any tax base at all under the residence principle. The welfare in the poor country, W_2^R, is then simply

$$W_2^R = \bar{L}_2 v(w_2^R) = \bar{L}_2 v(\frac{F_2(K_2^R, \bar{L}_2) - rK_2^R}{\bar{L}_2}) \tag{29}$$

In this case the source principle must be as good as the residence principle for the poor country. This can be seen by observing that by setting the tax equal to zero, the poor country will be at least as well off under the source principle as under the residence principle. As long as the tax rate in the poor country is equal to, or lower than, the tax rate in the rich country the poor country will be better off under the source principle. The welfare gains associated with reduced international inequality would then have to be weighted against the loss of welfare due to reduced national redistribution in the rich country.

iii) A small and a large country

Another important source of asymmetry between countries lies in their relative size. Differences in country size in the context of international tax competition has been analysed by Bucovetsky and Wilson (Bucovetsky 1991 and Wilson 1991). These writers show that a sufficiently small country can gain from tax competition under the source principle. Kanbur and Keen (1993) also derive this result in the context of indirect taxes and show that there might be cases where a small country gains from the possibility of tax competition because it can undercut the large country. A similar mechanism is at work in the model presented above and we want to focus on how this might affect the global planners evaluation of the two tax principles. To see this, it might be useful to study the special case where the poor region is small in terms of capital demand so that $\partial t_j/\partial t_i \approx 0$. The capital poor country will be better off under the source principle if it can increase its revenues by setting its tax equal to the tax in the capital rich country. However, it might gain from setting a lower tax in order to attract a larger tax base. If they can attract capital by lowering their tax rates without inducing a similar reduction in the rich countries tax rates they might want to 'free ride' on this possibility. Even if the poor country is capital exporting under the residence principle, it might prefer a source principle because it might benefit sufficiently from the opportunity to attract capital by lowering its tax rates. The relative size of the two countries is also important for the effect the source principle has on national redistribution in the rich country. If the poor country is sufficiently small relative to the rich country, the effect on national redistribution in the capital exporting country will be negligible. In this case the source principle might maximise global welfare.

iv) Extremely inelastic capital demand

When the demand for capital is very inelastic, the capital importing country prefers the source principle. In this situation the capital importing country will want to exploit its opportunity to export parts of the tax burden. This is clearly seen in the extreme case where the amount of capital exported from the rich to the poor country is independent of the tax rate in the poor country, i.e. when $\partial K_i/\partial t_i \approx 0$. In this case the capital import will be independent of the tax level in the two countries and will thus be the same as under the residence principle. The poor country gains because its tax base increases. Furthermore, since there are no positive tax externalities, national redistribution will not be more costly under the source principle than under the residence principle.

These examples show that the question of whether or not it will be optimal to base a bilateral tax treaty on the source principle rather than the residence principle, depends on the degree of asymmetry between the two countries. If the two countries are relatively similar with respect to per capita capital endowment and production technology, such as is the case within the OECD area, it would be optimal from the point of view of the global planner to use the residence principle. However, if the countries differ in their per capita capital endowment and in their technology it might be optimal to choose the source principle. In particular it might be beneficial to apply the source principle in bilateral tax treaties between a large capital exporting country and a small capital importing country. The reason is partly that it gives the capital poor country a larger tax base, and partly that it gives the small country a chance to exploit international tax externalities to its benefit. At the same time the effect on national redistribution in the rich country will be limited. The net effect of a shift from the residence principle to the source principle might therefore be an increase in global welfare. It is, however, interesting to observe that the source principle does not necessarily reduce the international inequality. In some cases, in particular, when it is invested more capital per worker in the capital poor than in the capital rich country, the source principle might increase international inequality compared with the destination principle.

In the model above, we have assumed that the capital has to be invested in one of the two countries. However, the main difference between the two principles becomes even more distinct if we assume that both countries are small. If both the countries were small compared with the world economy they would have to take the international after tax return to capital as given,

i.e. $\partial\rho/\partial t_i = 0$. In this situation, the countries would be unable to use the capital tax to redistribute income between workers and capital owners. Any tax imposed on the capital owners would be born by the workers. This is a version of the result found in the literature on international taxation, that source-based taxes should not be used when a country face a perfectly elastic supply of capital (Frenkel et al. 1991; Bucovetsky and Wilson 1991). If all countries set their tax rates equal to zero, the return to capital and labour under the source principle will be the same as the pre-tax return under the residence principle. If both countries have the same technology, the pre-tax return to labour and capital will therefore be the same in both countries and independent of the tax regime. The only difference between the two principles is then their effect on national and international distribution of income. Under the residence principle, there is intra-national equality, but international inequality. Under the source principle, on the other hand, there is no intra-national income equalisation, but international equality in the sense that workers and capital owners have the same income irrespective of where they live. The choice between the two principles thus becomes a choice between two types of inequality. To see how the global planner would make such a choice it is useful to assume that the populations in the two countries are the same and that the total number of capital owners in the two countries is equal to the total number of workers. We can then identify the regime that maximises global welfare by comparing the difference between the per capita net national product in the two countries and pre-tax return to capital and the pre-tax wage under the residence principle. Global utility is maximised under the source principle if the difference between the per capita income in the two countries is larger than the difference between the return to the two factors. If, on the other hand, the national inequality under the source principle is larger than the international inequality under the residence principle, then the global planner would prefer the residence principle.

4 A Residence Principle with a Withholding Tax

It could be argued that the choice between the residence principle and the source principle is a false choice because the residence principle could be combined with a withholding tax levied by the source countries. Under the

residence principle with a withholding tax the source country is allowed to levy a fixed tax, τ, on the imported capital.[3] The withholding tax is fully credited by the residence country and will thus not affect the allocation of capital between the two countries. The difference between this regime and the residence principle is effectively a lump-sum transfer of $\tau(\bar{K}_1 - K_1)$ from the rich country to the poor country. The government revenue function is then given by

$$\Pi_i = t_i \bar{K}_i + \tau(K_i - \bar{K}_i) \tag{30}$$

We know that since each country is able to secure a first-best allocation of its national income, all individuals within country i will have the same income, I_i^{RW}, given by

$$I_i^{RW} = \frac{F_i(K_i^R, \bar{L}_i) - (r - \tau)(K_i^R - \bar{K}_i)}{\bar{K}_i + \bar{L}_i} \tag{31}$$

From the perspective of the global planner a residence principle with a withholding tax is preferable to a pure residence principle. If both countries have the same technology it is possible to achieve the first-best global optimum for a given withholding tax. The withholding tax that achieves this, is the one that equalises the per capital national income in both countries. Both countries will then distribute their national income equally between workers and capital owners. The resulting income distribution would be identical to the first best global optimum described in section 3. This corresponds to the result found by Janeba (1995). He studies the choice between the different types of double taxation relief and shows that withholding taxes under a residence principle could benefit both countries compared with the source principle.

If the two countries do not have the same technology, large income inequalities between the two countries might persist even under a residence principle with a withholding tax. This can be seen by noting that a withholding tax only increases the tax revenues of a poor country to the extent

[3] The assumption that the withholding tax is exogenously fixed circumvents the problem of strategic withholding taxes. A discussion of these issues is given in Bond and Samuelson (1989).

that it imports capital. When the technology in the poor country is less productive than the technology in the rich country, the capital import might be limited even under a residence principle. If the source principle is preferable to the residence principle in such a situation, e.g. because the poor country is small and can attract capital by lowering its tax, it might also be preferable to the residence principle with a withholding tax.

5 Concluding Remarks

We have shown that the choice between the residence and the source principle of international capital taxation is, at least partly, a choice between national and international inequality and that there could be situations where the global planner would choose the source principle rather than the residence principle. If both countries have the same technology, residence taxation with a withholding tax is preferable from the perspective of the global planner both to the source principle and to the residence principle. If the technology is not the same, there might be situations where the source principle is the best way to alleviate international inequality.

A surprising feature of this finding is that it implies that a regime with tax externalities might be preferable to a regime without tax externalities. Why would the global planner want to introduce tax externalities? The reason is that from the perspective of the global planner, consumption is 'inefficiently' distributed between countries since the marginal utility of income is not the same in both countries. The residence principle results in a first-best national optimum in each country, but the allocation is not a first-best global optimum. If the externalities introduced by the source principle reduce international inequality it might be preferable to the residence principle, even if the result is increased national inequality. The best way to regulate international capital taxation could, therefore, be to apply the residence principle in tax treaties between relatively rich countries, such as the OECD-countries, and apply the source principle in the tax treaties between these countries and third world countries.

One could question the relevance of such an approach given the fact that no such global planner exist or any institutions to enforce justice at the international level. However, even if international justice is unenforceable we might still be interested in knowing what it is. Furthermore, there is some evidence that rich countries, to a limited extent, are motivated by

considerations of international justice and are willing to take into account the welfare of poorer countries.

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Chapter 4

Tax Treaties and the Marginal Cost of Funds*

Abstract

This paper analyses the marginal cost of public funds under different international tax regimes when the government has a uniform, broad-based value added tax as its only source of revenue and when countries produce both tradeable and non-tradeable goods. Using the concepts of direct and indirect tax externalities developed by Bev Dahlby (1996) it distinguishes between national and international marginal cost of funds and explores the effects of bilateral tax treaties that eliminate double taxation through the universal application of either the destination principle or the origin principle.

1 Introduction

The value added tax accounts for a large and increasing share of government revenues. The cost associated with raising revenues through such a tax is therefore an important policy issue. Politicians and economists have been worried that increased mobility of commodities and consumers might increase the cost of financing public goods since an increase in the tax might shift consumption away from the taxing country (Sinn 1990).

There is a large literature on commodity tax competition and on the choice between the destination principle and the origin principle of commodity taxation (e.g. Mintz and Tulkens 1986, Keen 1987, Kanbur and Keen

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1993, Lockwood 1993, Lockwood, de Meza and Myles 1994 and Keen and Lahiri 1998). One result in this literature is that with perfect competition and factor mobility, the destination principle secures an efficient provision of public goods (Lockwood 1998). This paper contributes to this literature by studying the choice between the destination and the origin principle in a situation with non-tradeable goods. Non-tradeable goods are goods that can be consumed by foreign residents in the country where they are produced, e.g. hotel-, restaurant- and other services. It can also be interpreted as goods that it is difficult or impossible for the importing country to levy taxes on, e.g. cross-border shopping. The important feature of these goods is that they allow the country of production to levy taxes on goods bought by foreign residents even under the destination principle. The paper shows that in a situation with non-tradeable goods the destination principle will not generally secure an efficient provision of public goods and that the elimination of double taxation by the introduction of either the destination principle or the origin principle might not improve welfare.

2 Tax externalities and the marginal cost of funds

Taxation in open economies introduces the possibility that the tax policy in one country might affect the well-being of taxpayers in other countries. In general, increased mobility makes tax jurisdictions become more interdependent and this interdependence gives rise to both negative and positive tax externalities. Tax policy in one country might affect the welfare of other countries directly trough the prices faced by foreigners and indirectly through the effect on foreign governments tax revenues (Dahlby 1996). In the same way as traditional externalities introduce a gap between the private and the social marginal cost of an activity, tax externalities introduce a gap between the marginal cost of public funds (MCF) that is borne by the taxing country and the marginal cost of funds that would be faced if the countries cooperated, what we will call the international MCF. We shall identify the cooperative solution as the one that would be chosen if the countries cooperated in maximising the sum of utility in the countries. A gap between the national and the international MCF will result in either overprovision or underprovision of public goods compared with the cooperative solution.

Three phenomena widely discussed in the international tax literature; tax exporting, tax competition and double taxation, can all be described as ways in which national tax policies affect the welfare of consumers in other countries. Tax exporting, that the tax policy in one country affects the prices faced by non-nationals, can be viewed as a *direct tax externality* in the sense that it directly affects the indirect utility function of non-nationals and the welfare effects of this are not taken into account by the taxing country. The international trade literature has long recognized that taxation of traded goods might result in a welfare-increasing change in terms of trade by increasing the price of exported products relative to the prices of imported products. Since tax exporting shifts some of the burden of taxation on to non-residents it can be seen as a negative tax externality. It has therefore been argued that tax exporting might induce overprovision of public goods provision compared to cooperative solution (Wildasin 1987b).[1]

Tax competition and double taxation result in *indirect tax externalities* in the sense that the tax policy in one country affects the tax revenues of other governments and thus their ability to provide public goods. Whereas direct tax externalities directly affect the prices faced by non-residents, indirect externalities affect the welfare of non-residents indirectly through the budget constraint of their governments. A positive indirect tax externality might be seen to arise from the fact that tax bases are becoming increasingly mobile between jurisdiction. Mobility generally makes it easier for tax bases to escape taxation by moving to another jurisdiction. This might happen through the migration of tax subjects or tax objects or through a shift in production or sale from domestic firms or markets to foreign firms or markets. This situation is often referred to as tax competition since each jurisdiction will have an incentive to lower its tax rate in order to attract mobile tax bases. Conversely, an increase in one country's tax rate will result in an increase in other countries tax revenues: a positive indirect tax externality. The literature on commodity tax competition was initiated by the seminal paper of Mintz and Tulkens (1986). This and subsequent papers (e.g. Kanbur and Keen 1993 and Haufler 1996) show that with origin-based taxes countries have incen-

[1]This result only holds, however, if tax exporting affects the marginal and not only the average cost of funds. It has been shown that if the government choose an optimal mix of tax instruments, tax exporting might under non-pathological conditions not affect the MCF (Wildasin 1987a). In this paper we study the MCF in a situation where the government is restricted to use a uniform VAT and in such situations this result does not apply.

tives to lower their taxes in order to increase their tax base. An increase in a country's VAT causes consumers to purchase commodities that are taxed by other jurisdictions if the goods in the two countries are substitutes (if the goods are complements this will be a negative tax externality). It has been shown that the existence of this positive tax externality between countries might lead to underprovision of public goods and reduce the optimal level of redistribution. These results echoes the results from the literature on international capital tax competition (e.g. Zodrow and Mieszkowski 1986, Wilson 1986).

An increase in a country's VAT might also result in *negative* indirect tax externalities. This possibility arises in particular when jurisdictions have overlapping tax bases, e.g. when both the exporting and the importing countries levies tax on traded goods. An increase in one country's tax will then increase the price of the common tax base and, if the goods are normal goods, reduce the tax base. The double taxation problem is essentially similar to the double marginalization problem discussed by Spengler (1950). In Spengler's model the externality arises because the retailer does not take into account the effect on the manufacturers profit when choosing prices. In the double taxation story we do not have a vertical chain of monopolies but a situation that could be described as two monopolies producing perfectly complementary goods. In the same way as the two producers could have increased their profit by cooperating, it can be shown that double taxation might result in the over-taxation of the common tax base, leaving the countries on the wrong side of the Laffer-curve.

The distribution of tax base entitlements is closely related to the problems of tax externalities. Double taxation arises because more than one jurisdiction has the right to tax the same tax base. To avoid double taxation it is necessary to determine a commonly agreed distribution of the right to tax international tax bases. This is the primary task of the bilateral tax treaties. Problems of tax competition arise because no jurisdiction has an unconditional right to tax certain tax bases. By defining tax rights in such a way as to make it more costly to escape taxation by moving to another jurisdiction, these problems can be reduced. The attraction of the destination principle lies in the fact that people are less mobile than commodities. Similarly, tax exporting might be seen as a result of the fact that countries sometimes are able to shift part of the tax burden onto foreigners. Another attraction of the destination principle is that it reduces the possibility of taxing the consumption of foreigners. However, as we shall study in this paper, the destination

principle does not eliminate this possibility when there exists non-tradeable goods.

The three externalities discussed above introduce a wedge between the national MCF and the international MCF. This paper compares the share of the international marginal cost of taxation that is borne by the taxing country before and after one of these of externalities, the negative externality due to double taxation, is eliminated through a bilateral tax treaty that establishes the universal application of either a destination principle or an origin principle of international taxation.

The rest of this paper is organized as follows. Section 2 presents a two country model of commodity taxation and develops a measure of the share of the international marginal cost of taxation that is borne by the taxing country. Section 3 studies the effect of establishing either a destination or origin principle and thus eliminating the double taxation in a situation without any non-tradeable goods. Section 4 studies that same questions in a situation with non-tradeable goods and compare the results with those in section 3. Section 5 concludes.

3 The Model

We study the effect of different international tax principles in a model with two countries; country 1 and country 2. Each country sell one tradable good, denoted x_1 and x_2 respectively, and one non-tradable good, denoted y_1 and y_2 respectively. These goods might be viewed as composite goods. Non-tradeable goods can be bought by foreigners, but they have to be consumed in the country where they are produced and the country where the foreign consumers are citizens is therefore unable to tax these goods. Tradeable goods can, in the absence of a tax treaty, be taxed by both the exporting and the importing country. In each country there is a representative individual (i.e. the population is normalized to one) and this individual is endowed with one unit of leisure. The individual in country i has the utility function

$$u^i = u(x^i, y^i, l^i) + h(g^i) \tag{1}$$

where l^i and g^i are the levels of leisure and public good consumed in country i and x^i and y^i are the consumption vectors of tradeable and non-tradeable goods for the individual in the same country. There is no in-

ternational incidence of public expenditure and the utility is, for analytical convenience, assumed to be separable in public goods and private consumption. We let leisure be the numeraire and the representative individual in each country have a fixed full income, I, which is untaxed. There is perfect labour mobility, but individuals cannot change citizenship.[2] Labour is the only factor of production and the production technologies for all goods, including the public good, are assumed to exhibit constant returns to scale. Firms are assumed to be price takers and the producer price of all goods are normalized to unity. There are no transportation costs. Let q_j^i be the consumer price of the tradeable good j in country i. Furthermore, let p_j be the consumer price of non-tradeable good j (which will be the same for all consumers). The individual living in country i maximizes her utility subject to the constraint that

$$q^i x^i + p y^i + l^i = I \tag{2}$$

where q^i is the tradeable goods price vector faced by consumers in country i and p is the price vector of the non-traded goods. The price of the public good is normalized to unity so the expenditure on public goods are equal to g^i. The indirect utility function of the representative individual of country i can then be written as

$$v^i = v(q^i, p, I) + k(g^i) \tag{3}$$

From the solution to the consumer problem we can derive the demand functions for the commodities as a function of the vector of tax rates and the income.

3.1 The governments' problem

The government in country i is assumed to maximize the indirect utility, v^i, of its representative individual subject to the requirement that its expenditures on public goods, g^i, does not exceed its tax revenues, R^i, i.e. that $R^i \geq g^i$. The governments are assumed to be restricted to use a general value added

[2]The assumption of perfect factor mobility is important in this context. Lockwood (1998), shows that with perfect competition and factor immobility, the destination and the origin principle are equivalent with uniform taxation.

tax, t^i, that is levied uniformly on the country's tax base, in financing the provision of public goods. Since the VAT is a distortionary tax it might cost more than one dollar to raise an extra dollar of tax revenue, i.e. the marginal cost of funds might exceed one.[3] In such a situation the classical Samuelson formula for optimal provision of public goods, that assumes that public expenditures are financed with lump-sum taxes, has to be modified (Atkinson and Stern 1974, Ballard and Fullerton 1992). Samuelson measured the marginal cost of a project by the marginal rate of transformation and in order to introduce the distortionary effect of taxation it is therefore common to multiply this revenue cost of public goods with the marginal cost of public funds. The marginal cost of funds, or the cost of revenue, is commonly defined as the change in consumer welfare divided by the change in government revenue (e.g. Ballard and Fullerton 1992 and Wildasin 1987a).

In open economies it is useful to distinguish between what we have called the national and the international marginal cost of funds. The national marginal cost of funds, denoted MCF_i^i, is the marginal welfare costs born by the residents of the country that levies the tax, divided by the marginal increase in tax revenues in the same country. This measure can be written as

$$MCF_i^i = -\frac{v_{t^i}^i/\lambda^i}{R_{t^i}^i} \tag{4}$$

where λ^i is the marginal utility of income in country i. The expression in the numerator on the right hand side of (4) is a money-metric measure of the change in consumer welfare from a marginal increase in t_i in the country that levies the tax. This measure is divided by the change in tax revenue in the same country, $R_{t^i}^i$.

The international marginal cost of funds, denoted MCF^i, is given by considering the cooperative solution. We assume that the cooperative problem is to choose the tax rates in the two countries so as to maximize $W = v^2 + v^2$ subject to the two countries' budget restrictions. Since we are not interested in issues of international distribution we assume that the marginal utility of

[3]When distortionary taxes have to be used it is common to assume that the marginal cost of funds is larger than one. However, there are cases where the MCF may be less than one. Perhaps the best example of this possibility is environmental taxes (Pigouvian taxes) since such taxes might reduce or eliminate, rather than create, distortions.

income and the marginal utility of public goods consumption is the same in both countries. The international marginal cost of funds associated with an increase in the VAT in country i can then be written as

$$MCF^i = -\frac{v^i_{t^i}/\lambda^i + v^j_{t^i}/\lambda^j}{R^1_{t^i} + R^2_{t^i}} \tag{5}$$

where $i \neq j$. This measure is the sum of the money-metric welfare cost in both countries divided by the change in government revenue in both countries.

Non-cooperative national tax policies might result in either overprovision or underprovision of public goods compared with the cooperative solution, depending on whether MCF^i_i is lower than or higher than MCF^i. It is therefore interesting to study the relationship between the national and the international cost of funds under different international tax regimes. In order to do this we analyse the relative share of the international marginal cost of funds that is borne by the country levying the tax. This share, denoted by θ^i, is given by

$$\theta^i = \frac{MCF^i_i}{MCF^i} = \left[\frac{v^i_{t^i}/\lambda^i}{v^i_{t^i}/\lambda^i + v^j_{t^i}/\lambda^j}\right]\left[\frac{R^i_{t^i} + R^j_{t^i}}{R^i_{t^i}}\right] \tag{6}$$

The non-cooperative provision of public goods will coincide with the cooperative solution when the national MCF is equal to the international MCF, in other words when $\theta^i = 1$. This condition can be rewritten as

$$\frac{R^j_{t^i}}{R^i_{t^i}} = \frac{v^j_{t^i}/\lambda^j}{v^i_{t^i}/\lambda^i} \tag{7}$$

where $i \neq j$. The left hand side of (7) is the change in tax revenue in the rest of the world for a marginal change in t^i relative to the change in tax revenue in country i. This can be seen as a measure of the indirect tax externality and we denote this measure as $\alpha^i \equiv R^j_{t^i}/R^i_{t^i}$. The right hand side is the change in consumer welfare for non-residents relative to the change in consumer welfare for residents in country i. This expression can be seen as a measure of the direct tax externality and it is denoted by $\sigma^i \equiv (v^j_{t^i}/\lambda^j)/(v^i_{t^i}/\lambda^i)$. The provision of public goods in the non-cooperative

situation will coincide with the cooperative solution when $\alpha^i = \sigma^i$. This result can be given the following interpretation; if the share of the welfare cost borne by foreigners are equal to the share of the gains that is received by foreigners, these effects cancel out

Using the measure of the indirect and direct tax externality the expression (6) can then be rewritten as

$$\theta^i = \frac{MCF_i^i}{MCF^i} = \frac{1+\alpha^i}{1+\sigma^i} \tag{8}$$

Starting from a situation without any tax treaty we are interested in studying how α^i and σ^i are affected by the introduction of either the destination principle or the origin principle. Furthermore, we want to compare the effect of introducing the destination principle and the origin principle in a situation without any non-tradeable goods and a situation with non-tradeable goods.

4 All goods are tradeable

We start by analysing a situation where all goods are tradeable. Without a tax treaty, the tax base of a country i is all goods that either have the country as its origin or as its destination (or both). All producer prices are normalized to one and an ad valorem tax is therefore equal to a specific tax. Since it is easier to study a specific tax than an ad valorem tax this is a useful simplification. The revenue function for country i can then be written as

$$R^i = (x_i + x_j^i)t^i \tag{9}$$

where $x_i = x_i^i + x_i^j$ and $i \neq j$. International transactions can be taxed by both countries and part of the tax base, $x_i^j + x_j^i$, is therefore shared by the two countries. The tradeable goods prices faced by the consumer in country i are given by

$$q_j^i = \begin{array}{ll} 1+t_i & for \quad i=j \\ 1+t_i+t_j & for \quad i \neq j \end{array}$$

where the superscript denotes the residency of the consumer and the subscript denotes the origin of the product. By studying these prices we see that for $i \neq j$ we have that $\frac{dq_i^i}{dt^i} = \frac{dq_i^j}{dt^i} = \frac{dq_j^i}{dt^i} = 1$ and $\frac{dq_j^j}{dt^i} = 0$. An increase in country i's VAT will increase the price of all goods produced in i and all goods produced abroad, but consumed in country i. The price of other goods will not be affected.

To find the measure of the indirect tax externality we observe that the first derivative of the two countries revenue functions with respect to a change in country i's tax rate are given by

$$R_{t^i}^i = (x_i + x_j^i) + (\frac{dx_i}{dt^i} + \frac{dx_j^i}{dt^i})t^i \tag{10}$$

$$R_{t^i}^j = (\frac{dx_j}{dt^i} + \frac{dx_i^j}{dt^i})t^j \tag{11}$$

We will in general assume that the tax rates are set optimally and that $R_{t^i}^i > 0$, i.e. that country i is on the right side of the Laffer curve. $R_{t^i}^j$ captures two effects. The first is the effect an increase in t_i has on the tax base shared by the two countries, what we could call the double taxation effect. If we assume that all goods are normal goods we know that the own-price effect creates a negative tax externality, i.e. that $\frac{\partial x_j^i}{\partial q_j^i} < 0$ and $\frac{\partial x_i^j}{\partial q_i^j} < 0$. Furthermore, we will assume that the own-price effect dominates the cross-price effect which implies that $\frac{dx_j^i}{dt^i} < 0$ and $\frac{dx_i^j}{dt^i} < 0$. The second effect is the cross-price effect on the part of the tax base that is taxed only by country j. The sign of this effect will be either positive or negative depending on wether the goods are substitutes or complements. The positive indirect tax externality associated with commodity tax competition arise when the goods produced in the two countries are substitutes, i.e. when $\frac{dx_i^j}{dt^i} > 0$. The sign of $R_{t^i}^j$ is therefore indeterminate unless the goods are complements. Using (10) and (11) we can write the measure of the indirect tax externality as

$$\alpha_T^i = \frac{R_{t^i}^j}{R_{t^i}^i} = \frac{(\frac{dx_j}{dt^i} + \frac{dx_i^j}{dt^i})t^j}{(x_i + x_j^i) + (\frac{dx_j}{dt^i} + \frac{dx_j^i}{dt^i})t^i} \tag{12}$$

where the subscript T indicates that we are looking at the case with only tradeable goods. The sign of α_T^i will depend on the sign of $R_{t^i}^j$ and might therefore be positive or negative. When the goods are substitutes the sign will depend on the relative strength of the tax competition effect and the double taxation effect. The value of α_T^i is likely to be higher for small countries than for large countries, because small countries tend to be more open and have a larger share of their production consumed by non-nationals.

Since country i is able to tax commodities that are consumed by non-nationals there will be a negative direct tax externality. Using Roy's theorem we find that the first derivative of the indirect utility functions in the two countries with respect to t_i and the change in consumer welfare in country j relative to the change in country i are given by

$$v_{t^i}^i = -\lambda^i(x_i^i + x_j^i) \leq 0 \tag{13}$$

$$v_{t^i}^j = -\lambda^j(x_i^j) \leq 0 \tag{14}$$

$$\sigma_T^i = \frac{v_{t^i}^j/\lambda^j}{v_{t^i}^i/\lambda^i} = \frac{x_i^j}{x_i^i + x_j^i} \geq 0 \tag{15}$$

The direct tax externality captured by σ_T^i is the tax exporting effect. We note that σ_T^i is equal to the share of country i's tax base that is consumed by foreign residents relative to the share that is consumed by its own nationals (we can express σ_T^i this way because we have assumed that $\lambda^j = \lambda^i$). When markets become more integrated, a larger share of a country's production will typically be consumed by foreigners and σ_T^i will increase. In this paper we have assumed that the countries are symmetrical, but it is easy to see that small countries generally will have a higher σ_T^i than large countries because they will export a larger share of their production. Using (12) and (15) we have that the share of the international marginal cost of funds that is born by the country levying the tax is

$$\theta_T^i = \frac{1 + \alpha_T^i}{1 + \sigma_T^i} \tag{16}$$

In general we do not know whether this share will be above or below one. We can therefore not say whether we get overprovision or underprovision of public goods compared with the cooperative solution. However, if the goods are complements we know that $\alpha_T^i < 0$ and since $\sigma_T^i \geq 0$ we have that $\theta_T^i < 1$, i.e. that we get overprovision of public goods. More generally we get overprovision when $\alpha_T^i < \sigma_T^i$ and underprovision when $\alpha_T^i > \sigma_T^i$. The provision of public goods will in other words depend on the importance of the tax competition effect relative to the tax exporting and double taxation effect.

4.1 The destination principle

The most common way to eliminate double taxation is to employ the destination principle. A country that employs the destination principle levies the VAT on all goods and services destined for final consumption within its territory regardless of the goods' origin. Hence, the destination-based VAT is essentially a consumption tax. Therefore, exports are exempted, whereas imports are taxed. The revenue function of country i is then given by

$$R^i = (x_i^i + x_j^i)t^i \tag{17}$$

We observe that country i is not allowed to tax the traded goods produced in its own country when they are consumed by the resident of country j. Under this regime the resident of a country i is therefore faced with the following set of prices

$$q_j^i = \begin{array}{ll} 1+t_i & for \quad i=j \\ 1+t_i & for \quad i \neq j \end{array}$$

From these prices we have that $\frac{dq_i^i}{dt^i} = \frac{dq_j^i}{dt^i} = 1$ and $\frac{dq_i^j}{dt^i} = \frac{dq_j^j}{dt^i} = 0$ for $i \neq j$. An increase in country i's VAT will only affect the prices of goods consumed by residents of country i.

With the destination principle the first derivative of the two countries revenue functions with respect to a change in country i's tax rate and the measure of the indirect tax externality are given by

$$R_{t^i}^i = (x_i^i + x_j^i) + (\frac{dx_i^i}{dt^i} + \frac{dx_j^i}{dt^i})t^i \tag{18}$$

$$R^j_{t^i} = 0 \tag{19}$$

$$\alpha^i_{TD} = \frac{R^j_{t^i}}{R^i_{t^i}} = 0 \tag{20}$$

where the subscript D denotes that destination principle applies. We observe that an increase in the VAT in country i has no effect on the revenues in country j because there is neither an own-price nor a cross-price effect on country j's tax base. Since $R^j_{t^i} = 0$ we have that $\alpha^i_{TD} = 0$. the indirect tax externalities are in other words eliminated by the introduction of the destination principle.

The most obvious effect of implementing the destination principle is that it eliminates the possibility of taxing tradeable goods consumed by non-residents. The first derivative of the indirect utility functions in the two countries and the measure of the direct tax externality is therefore given by

$$v^i_{t^i} = -\lambda^i(x^i_i + x^i_j) \leq 0 \tag{21}$$

$$v^j_{t^i} = 0 \tag{22}$$

$$\sigma^i_{TD} = \frac{v^j_{t^i}/\lambda^j}{v^i_{t^i}/\lambda^i} = 0 \tag{23}$$

As expected, the destination principle eliminates the problem of tax exporting because country i only taxes goods consumed by its own residents. Using (20) and (23) we have that the share of the international marginal cost of funds that is born by country i simply is

$$\theta^i_{TD} = \frac{1 + \alpha^i_{TD}}{1 + \sigma^i_{TD}} = 1 \tag{24}$$

i.e. the country that levies a VAT is faced with the full international MCF. This reflects the result reported by Lockwood (1998) that with perfect factor mobility, perfect competition, and destination based taxes, there are no tax spillovers. Consequently, the provision of public goods in the non-cooperative situation will coincide with the cooperative solution. We can therefore say that a move from a situation without a tax treaty to a situation with the destination principle will be welfare improving.

4.2 The origin principle

A country that applies the origin principle levies taxes on all goods and services produced within its territory, irrespective of their final destination. Therefore, exports are taxed, whereas imports are exempted. Hence, the origin-based VAT is essentially a tax on GDP minus gross domestic investments. Country i's revenue function is therefore given by

$$R^i = x^i t^i \tag{25}$$

Under this principle the representative individual in country i is faced with the following system of prices

$$q_j^i = \begin{array}{ll} 1+t_i & for \quad i=j \\ 1+t_j & for \quad i \neq j \end{array}$$

The derivatives of the prices with respect to t^i are the same as under the no-tax treaty regime except for the fact that $\frac{dq_j^i}{dt^i} = 0$. Differentiating the two countries' revenue functions with respect to a change in country i's tax rate gives us the measure of the indirect tax externality

$$R_{t^i}^i = x_i + \frac{dx_i}{dt^i} t^i \tag{26}$$

$$R_{t^i}^j = \frac{dx_j}{dt^i} t^j \tag{27}$$

$$\alpha_{TO}^{i} = \frac{R_{t^i}^{j}}{R_{t^i}^{i}} = \frac{\frac{dx_j}{dt^i} t^j}{x_i + \frac{dx_i}{dt^i} t^i} \tag{28}$$

where the subscript O denotes the origin principle and where $\frac{dx_j}{dt^i} = \frac{\partial x_j^i}{\partial q_i^i} + \frac{\partial x_j^j}{\partial q_i^j}$. The sign of α_{TO}^{i} will depend on the sign of $R_{t^i}^{j}$ and we know that if the goods are substitutes $R_{t^i}^{j} > 0$ and if they are complements $R_{t^i}^{j} < 0$.

Again we can use Roy's theorem to find the first derivative of the indirect utility functions and the measure of the direct tax externality

$$v_{t^i}^{i} = -\lambda^i x_i^i \leq 0 \tag{29}$$

$$v_{t^i}^{j} = -\lambda^j x_i^j \leq 0 \tag{30}$$

$$\sigma_{TO}^{i} = \frac{v_{t^i}^{j}/\lambda^j}{v_{t^i}^{i}/\lambda^i} = \frac{x_i^j}{x_i^i} \tag{31}$$

The origin principle does not eliminate a country's ability to tax non-residents and σ_{TO}^{i} is therefore positive. The representative individual in both countries are assumed to have the same preferences and the same income. Under the origin principle they also face the same prices. We thus have that $x_i^j = x_i^i$ and we know that $\sigma_{TO}^{i} = 1$. Using this the share of the international marginal cost of funds born by country i can be written as

$$\theta_{TO}^{i} = \frac{1}{2}\left[1 + \alpha_{TO}^{i}\right] \tag{32}$$

Whether or not we get overprovision or underprovision of public goods will depend on the value of α_{TO}^{i}. If the goods are complements, i.e. if $\alpha_{TO}^{i} < 0$, we get overprovision. If, on the other hand, the goods are sufficiently strong substitutes, if $\alpha_{TO}^{i} > 1$, we get underprovision. It should be noted however, that $\alpha_{TO}^{i} > 1$ is a very strong requirement since it implies that the increase in

tax revenues in the foreign country is larger than the increase in tax revenues in the countries that levies taxes.

In a situation without non-tradeable goods the destination principle should be preferred to the origin principle if one wants to achieve the cooperative solution. Furthermore, we do not know whether or not the origin principle results in a more efficient allocation of resources than a situation without any tax treaty.

5 With non-tradeable goods

We now turn to the situation where each of the two countries produce one non-tradeable good, y_1 and y_2 respectively, in addition to the tradeable goods. Non-tradeable goods are taxed in the country of production irrespective of the tax regime. Without a tax treaty the tax base of country i is therefore all non-tradeable goods originating within its territory and all tradeable goods that has the country either as its origin or as its destination. The government revenue function in country i in this case is given by

$$R^i = (x_i + x_j^i + y_i)t^i \tag{33}$$

where $i \neq j$ and $y_i = y_i^i + y_i^j$. As in the case without non-tradeable goods, part of the tax base, $x_i^j + x_j^i$, is shared by the two countries. The tradeable goods prices are the same as in the no-treaty regime above. However, the consumers can now buy non-tradeable goods and the prices of these goods, for consumers in both countries, are given by

$$p_i = 1 + t_i$$

where $\frac{dp_i}{dt^i} = 1$ and $\frac{dp_j}{dt^i} = 0$ for $i \neq j$. An increase in country i's VAT will increase the price of all goods produced in i and all goods produced in the other country, but consumed in country i. The price of other goods is unaffected by an increase in t_i.

The first derivative of the two countries' revenue functions and the measure of the indirect tax externality are given by

$$R_{t^i}^i = (x_i + x_j^i + y_i) + (\frac{dx_i}{dt^i} + \frac{dx_j^i}{dt^i} + \frac{dy_i}{dt^i})t^i \tag{34}$$

$$R^j_{t^i} = (\frac{dx_j}{dt^i} + \frac{dx^j_i}{dt^i} + \frac{dy_j}{dt^i})t^j \tag{35}$$

$$\alpha^i_N = \frac{R^j_{t^i}}{R^i_{t^i}} = \frac{(\frac{dx_j}{dt^i} + \frac{dx^j_i}{dt^i} + \frac{dy_j}{dt^i})t^j}{(x_i + x^i_j + y_i) + (\frac{dx_i}{dt^i} + \frac{dx^i_j}{dt^i} + \frac{dy_i}{dt^i})t^i} \tag{36}$$

where the subscript N indicates that we are considering the case with non-tradeable goods. As before we cannot be sure whether an increase in the VAT in country i increases or decreases the tax revenues in country j. However, there is a new cross-price effect on the tax base in country j, associated with the increase in p_i.

The first derivative of the indirect utility functions in the two countries gives us the change in consumer welfare in country j relative to the change in country i

$$v^i_{t^i} = -\lambda^i(x^i_i + x^i_j + y^i_i) \leq 0 \tag{37}$$

$$v^j_{t^i} = -\lambda^j(x^j_i + y^j_i) \leq 0 \tag{38}$$

$$\sigma^i_N = \frac{v^j_{t^i}/\lambda^j}{v^i_{t^i}/\lambda^i} = \frac{x^j_i + y^j_i}{x^i_i + x^i_j + y^i_i} \geq 0 \tag{39}$$

An increase in t_i affects the welfare of foreigners directly by increasing the price of both tradeable and non-tradeable goods produced in country i. When markets become more integrated, a larger share of each country's consumption will typically be produced in foreign countries and σ^i_N will increase. Using (36) and (39) we have that the share of the international marginal cost of funds that is borne by country i is given by

$$\theta^i_N = \frac{1 + \alpha^i_N}{1 + \sigma^i_N} \tag{40}$$

As in the case without non-tradeable goods we cannot in general say whether we will get overprovision or underprovision of public goods. However, if all consumption goods are complements we will get overprovision.

5.1 The destination principle

As in the situation without non-tradeable goods, the destination principle will eliminate double taxation of tradeable goods by giving the country of destination the exclusive right to tax. However, the destination principle does not affect the right to tax non-tradeable goods. For $i \neq j$ we therefore have that $\frac{dq_i^i}{dt^i} = \frac{dq_j^i}{dt^i} = \frac{dp_i}{dt^i} = 1$ and $\frac{dq_j^j}{dt^i} = \frac{dq_i^j}{dt^i} = \frac{dp_j}{dt^i} = 0$. An increase in country i's VAT will thus increases the price of non-tradeable goods produced in i and all tradeable goods consumed in country i. The government revenue function in country i is given by

$$R^i = (x_i^i + x_j^i + y_i)t^i \tag{41}$$

Taking the first derivative of the two countries revenue functions with respect to a change in country i's tax rate we find the measure of the indirect tax externality

$$R_{t^i}^i = (x_i^i + x_j^i + y_i) + (\frac{dx_i^i}{dt^i} + \frac{dx_j^i}{dt^i} + \frac{dy_i}{dt^i})t^i \tag{42}$$

$$R_{t^i}^j = (\frac{dx_j^j}{dt^i} + \frac{dx_i^j}{dt^i} + \frac{dy_j}{dt^i})t^j \tag{43}$$

$$\alpha_{ND}^i = \frac{R_{t^i}^j}{R_{t^i}^i} = \frac{(\frac{dx_j^j}{dt^i} + \frac{dx_i^j}{dt^i} + \frac{dy_j}{dt^i})t^j}{(x_i^i + x_j^i + y_i) + (\frac{dx_i^i}{dt^i} + \frac{dx_j^i}{dt^i} + \frac{dy_i}{dt^i})t^i} \tag{44}$$

We observe that $\alpha_{ND}^i \gtrless 0$, i.e. all the indirect tax externalities are not eliminated by the destination principle. The own-price effect on country j's tax base is eliminated through the introduction of the tax treaty, but there is still a cross-price effect on country j's tax base, $(\frac{\partial x_j^j}{\partial p_i} + \frac{\partial x_i^j}{\partial p_i} + \frac{\partial y_j}{\partial p_i})$, since an increase in country i's VAT increases the prices foreigners have to pay for non-tradeable goods produced in country i. The sign of α_{ND}^i will depend on the sign of $R_{t^i}^j$.

The first derivative of the indirect utility functions in the two countries and the change in consumer welfare in country j relative to the change in consumer welfare in country i are given by

$$v^i_{t^i} = -\lambda^i(x^i_i + x^i_j + y^i_i) \leq 0 \tag{45}$$

$$v^j_{t^i} = -\lambda^j y^j_i \leq 0 \tag{46}$$

$$\sigma^i_{ND} = \frac{v^j_{t^i}/\lambda^j}{v^i_{t^i}/\lambda^i} = \frac{y^j_i}{x^i_i + x^i_j + y^i_i} \geq 0 \tag{47}$$

The destination principle does not eliminate the problem of tax exporting, because taxes on the non-tradeable goods partly is born by foreign consumers. The measure of the direct tax externality, σ^i_{ND}, is therefore always non-negative. However, if the expenditure share on each commodity remains fairly constant under the destination principle we have that $\sigma^i_{ND} \leq \sigma^i_N$, i.e. that the tax treaty reduces the problem of tax exporting. Using (44) and (47) we get the share of the international marginal cost of funds borne by country i

$$\theta^i_{ND} = \frac{1 + \sigma^i_{ND}}{1 + \alpha^i_{ND}} \tag{48}$$

While the destination principle secured an efficient allocation of resources in a situation without non-tradeable goods this is no longer the case when we have non-tradeable goods, i.e. $\theta^i_{ND} \lesseqgtr 1$. In this case we still have both direct and indirect tax externalities and the result might be either overprovision or underprovision of public goods depending on whether $\sigma^i_{ND} \lesseqgtr \alpha^i_{ND}$. We cannot even be sure whether or not $\theta^i_{ND} \lesseqgtr \theta^i_N$, i.e. we do not know whether the elimination of double taxation through the application of the destination principle will reduce the gap between the national and the international marginal cost of funds.

5.2 The origin principle

With the origin principle all goods, including the non-tradeable goods, are taxed in the country where they are produced. For $i \neq j$ we therefore have

that $\frac{dq_i^i}{dt^i} = \frac{dq_i^j}{dt^i} = \frac{dp_i}{dt^i} = 1$ and $\frac{dq_j^j}{dt^i} = \frac{dq_j^i}{dt^i} = \frac{dp_j}{dt^i} = 0$. The government revenue function in country i is then

$$R^i = (x_i + y_i)t^i \tag{49}$$

Taking the first derivative of the two countries revenue functions with respect to a change in country i's tax rate gives us the measure of the indirect tax externality

$$R^i_{t^i} = x_i + y_i + (\frac{dx_i}{dt^i} + \frac{dy_i}{dt^i})t^i \tag{50}$$

$$R^j_{t^i} = (\frac{dx_j}{dt^i} + \frac{dy_j}{dt^i})t^j \tag{51}$$

$$\alpha^i_{NO} = \frac{R^j_{t^i}}{R^i_{t^i}} = \frac{(\frac{dx_j}{dt^i} + \frac{dy_j}{dt^i})t^j}{x_i + y_i + (\frac{dx_i}{dt^i} + \frac{dy_i}{dt^i})t^i} \tag{52}$$

where the subscript O denote the origin principle. As in the case with only tradeable goods, the sign of α^i_{NO} will depend on whether the goods are substitutes or complements. In general we cannot say whether or not the indirect tax externality is reduced by the application of an origin principle.

The first derivative of the indirect utility functions in the two countries and the measure of the direct tax externality is given by

$$v^i_{t^i} = -\lambda^i(x^i_i + y^i_i) \leq 0 \tag{53}$$

$$v^j_{t^i} = -\lambda^j(x^j_i + y^j_i) \leq 0 \tag{54}$$

$$\sigma^i_{NO} = \frac{v^j_{t^i}/\lambda^j}{v^i_{t^i}/\lambda^i} = \frac{x^j_i + y^j_i}{x^i_i + y^i_i} > 0 \tag{55}$$

As in the case without non-tradeable goods we know that since both individuals have the same preferences, face identical prices and have the same income, we have that $x_i^j = x_i^i$ and $y_i^j = y_i^i$. We therefore have that $\sigma_{NO}^i = 1$. The measure of the direct tax externality under the origin principle is thus not affected by the introduction of non-tradeable goods. We also note that $\sigma_{NO}^i \geqslant \sigma_{ND}^i$, i.e. the direct tax externality is larger under the origin principle than under the destination principle. Using (52) and (55) we get the share of the international marginal cost of funds borne by country i

$$\theta_{NO}^i = \frac{1}{2}\left[1 + \alpha_{NO}^i\right] \tag{56}$$

If the goods are complements we get overprovision and if the goods are sufficiently strong substitutes (if $\alpha_{NO}^i > 1$) we get underprovision. In a situation with non-tradeable goods we cannot in general be sure whether or not the destination principle will result in a more efficient provision of public goods than the origin principle, i.e. whether $\theta_{NO}^i \lesseqgtr \theta_{ND}^i$. Furthermore, we cannot say with certainty that the origin principle will improve resource allocation compared with a situation without a tax treaty, i.e. whether $\theta_{NO}^i \lesseqgtr \theta_N^i$.

In order to derive more precise results we have to study specific utility functions. To illustrate this we consider a situation with linear logarithmic utility functions. It this case we know that the expenditure share on each commodity will be constant and this makes it possible to derive explicit expressions for the tax externalities under the different tax regimes. It is easy to show that for a given set of taxes, the relationship between the measures of the direct tax externality under different tax regimes, are given by $\sigma_{NO}^i \geq \sigma_N^i \geq \sigma_{ND}^i \geq 0$. Compared with the regime without any tax treaty a larger share of the tax burden is exported under the source principle and smaller share is exported under the destination principle. A special feature of the case with linear logaritmic utility is that there is no tax competition effect because the share of income used on each commodity is constant. Tax treaties, both those applying the source principle and those applying the destination principle, eliminate double taxation when preferences are linear logarithmic. We therefore know that there will be no indirect tax externalities when double taxation is eliminated, i.e. $\alpha_{NO}^i = \alpha_{ND}^i = 0 \geq \alpha_N^i$. This implies that $\theta_N^i \leq \theta_{NO}^i \leq \theta_{ND}^i \leq 1$. Under all the tax regimes we will get overprovision of public goods, but the destination principle is the tax regime

for which the share of the international MCF borne by the taxing country is closest to 1.

6 Concluding remarks

This paper has studied the marginal cost of funds associated with a uniform VAT under different international tax regimes with and without non-tradeable goods. It has shown that the share of the international marginal cost of funds borne by the taxing country will depend on the relative importance of three different tax externalities and that this share might be less than, equal to, or larger than one. The establishment of a tax treaty eliminates the negative indirect tax externality associated with double taxation. Without non-tradeable goods the destination principle, but not the origin principle, eliminates all tax externalities and secures an efficient provision of public goods. This result no longer holds when we introduce non-tradeable goods. Furthermore, with non-tradeable goods we cannot generally say whether a regime with a tax treaty results in a better allocation of resources between public and private goods than a regime without a tax treaty and we cannot say whether the destination principle should be preferred to the origin principle. The destination principle is, however, likely to result both in less tax exporting and less tax competition, reducing both the negative direct tax externality and the positive indirect tax externality compared to the origin principle.

In recent years the focus of the international tax literature has been on the problem of tax competition. The results in this paper suggest that the apparently increasing problem of positive tax externalities between jurisdictions might be seen as a result of the bilateral tax treaties that eliminate double taxation and thus remove a negative tax externality that tended to counteract the positive externality arising from tax competition. As in other situations with more than one externality, we cannot be certain that eliminating one externality will improve the resource allocation.

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Chapter 5

Inequality, Segregation, and Redistribution*

Abstract

Mainstream economic theory predicts that countries with large inequalities in pre-tax income distribution will tend to be more redistributive than countries which are more equal in this respect. Empirical studies, however, offer no strong support for this theoretical prediction. In fact, a number of studies indicate that the opposite may be true, namely that countries which are more equal in terms of of pre-tax income distribution tend to be more redistributive than less egalitarian societies. The present paper offers an explanation to this puzzle. In a model of endogenous choice of location and endogenous aversion against inequality, we demonstrate that large pre-tax differences in income may lead to a residential segregation of rich and poor. Such segregation may reduce the social attachment between the groups in society, and reduce the willingness of the rich to make transfers to the poor. Conversely, societies with small pre-tax differences in income may be characterized by larger transfers and a less segregated population structure.

1 Introduction

A well known result from the optimal tax literature is that the optimal tax rate is increasing in the degree of inequality, see Sandmo (1976). The larger

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is the pre-tax income inequality between rich and poor, the larger is the gap in the pre-tax marginal utility of consumption between the two groups, and hence the larger should the welfare gains of redistributing income towards the poor be. If we believe that policies are guided by a welfare maximizing government, welfare economics predicts that larger inequality in pre-tax income distribution will be accompanied by larger transfers to the poor.

A similar prediction can be derived from standard median voter models of taxation, see for instance, Roberts (1977) and Meltzer and Richard (1981). In a society with large pre-tax income inequalities, the decisive voter will be poor relative to the average income. Assume that taxes are a positive function of income and transfers are distributed, say, on an equal per capita basis. In this case, the larger is the pre-tax income inequality in society, the lower is the decisive voter's tax price for any given transfer level. We should therefore expect to see more redistribution the larger is the pre-tax income gap between rich and poor.

Empirical studies, however, offer no strong support of the predicted positive relation between pre-tax inequality and redistribution. For instance, Perotti (1996: 172) in a survey of growth, income distribution and democracy, concludes that "there is ... very little evidence of a negative association between equality and fiscal variables in democracies." Even more surprising, a number of studies indicate that countries characterized by a high degree of pre-tax income equality in fact may be more redistributive than less egalitarian societies. One example is Persson (1995), who finds a negative correlation between government spending and the degree of pre-tax inequality. Another example is Bassett, Burkett and Putterman (1999) who find evidence of a negative relationship between inequality and transfers. Finally, Horstmann and Scharf (1999) observe that increasing income inequality in the U.S. and other developed countries has been accompanied by increased reliance on private provision of public goods, which tends to be less redistributive than public provision. In light of the prediction from both welfare economics and median voter models on this subject, these empirical results are puzzling.

There are certainly a number of reasons why pre-tax inequality may be associated with little redistribution. First, the causality may go the other way around, namely that the tax level determines pre-tax income distribution. A large share of de facto redistribution probably takes place through measures which equalize people's productivity, most importantly through government investments in health and education. Societies that, for some reason, vote for a large public sector may therefore experience small differences in pre-tax

income. Second, pre-tax inequality and redistribution may have a common cause. If for instance a society has strong preferences for equality, this might affect the wage bargaining process and therefore the pre-tax income distribution, as well as the choice of tax policy.

Alternatively, policies of redistribution may not be guided by a welfare maximizing government or the preferences of the less wealthy majority of the population. If people are selfish, and political power is distributed according to people's wallets, then there may well be less redistribution in more inegalitarian societies. Two articles which seek to explain the "redistribution puzzle", roughly speaking, along these lines, are Persson (1997) and Horstmann and Scharf (1999). Generally speaking, the argument offered in these two contributions is as follows. Cooperation between rich and poor in society entails some measure of redistribution. The rich dislike redistribution but cooperation generates some common benefit to both groups. From the viewpoint of the rich, if the income gap is modest the common benefit of cooperation dominates the cost of redistribution, and hence both groups will agree on the cooperative solution. If the income gap is large, on the other hand, the rich will oppose cooperation. Given that the rich group has sufficient political influence, the result may be limited redistribution.

The present paper offers an alternative explanation to the redistribution puzzle. In a model of endogenous choice of location and endogenous aversion against inequality, we demonstrate that large pre-tax differences in income may lead to segregation of rich and poor in terms of residency. Such segregation may reduce the social attachment between the groups in society, and reduce the willingness of the rich to make transfers to the poor. Conversely, societies with small pre-tax differences in income may be characterized by larger transfers and a less segregated population structure. The fundamental difference between our paper and the contributions by Persson and Horstmann and Scharf, is that while in our model, people dislike inequality, in the latter two, rich people do not care about the income level of the poor and can only be induced to give away money as a quid pro quo.

The present paper is organized as follows. Section 2 presents the model, and section 3 the results. Section 4 discusses policy implications, and section 5 concludes.

2 Model

There are two types of people in the economy; rich (R) and poor (P). Let the total number of people be given by:

$$L = L^R + L^P = 2 \tag{1}$$

where L^j is the number of people of type $j = R, P$. The rich have a higher pre-tax income than the poor, for instance due to a higher level of human capital, and are also politically more influential, for instance because the poor to a lesser extent use their right to vote. The pre-tax income levels are exogenously given, denoted by v^R and v^P for rich and poor, respectively. National income (I) is fixed and equal to unity; $I \equiv v^R L^R + v^P L^P = 1$. Taxes and transfers are lump sum and purely redistributive. Disposable income for the two groups, denoted by w^j, therefore also adds up to unity:

$$w^R L^R + w^P L^P = 1 \tag{2}$$

Per capita income $\omega \equiv (I/L)$ therefore equals $1/2$. The degree of inequality in disposable income can be measured as:

$$\epsilon = \ln\left(\omega / w^P\right) = \ln\left(1/2w^P\right) \tag{3}$$

The inequality measure ϵ is reduced as w^P goes up, taking the value zero for $w^R = w^P = 1/2$, i.e., full equality. Since we assign political power to the rich, $w^P \leq w^R$ always holds.

The are two regions in the model; West (W) and East (E). The two regions can be interpreted as different parts of the same city, different cities, urban and rural area, or different regions of a country. For some reason, such as better climatic conditions or better public services, people generally prefer to live in the West. The utility derived from living in the West for person i of type j is $\alpha_i^j \in (0, 1)$, which is uniformly distributed within each group of people. Due to for instance community zoning regulations, the cost of living in the West is higher than in the East. For analytical convenience, let this additional cost be exogenously given by ρ. This formulation generates in the simplest possible way a positive link between income inequality and

residential segregation. Living in the East as such creates neither extra utility nor extra costs. The budget constraint of type j in the West can be written as:

$$w^j = c_W^j + \rho \tag{4}$$

and in the East:

$$w^j = c_E^j \tag{5}$$

where c_k^j is the consumption of type j in region k. People value not only consumption and living in the West. They also value equality, or, equivalently, dislike inequality in society. Let the utility of an individual i of type j living in the West be defined as:

$$U_{iW}^j = \ln c_W^j + \alpha_i^j - (\beta_{iW})\,\epsilon \tag{6}$$

and in the East as:

$$U_{iE}^j = \ln c_E^j - (\beta_{iE})\,\epsilon \tag{7}$$

where the last term in these equations captures the disutility of inequality. This term is the product of the inequality measure introduced in (3) and β_{ik}, which measures the aversion against inequality experienced by a person i living in region k. We shall assume that β_{ik} is larger the larger is the number of poor people that live in one's home region. This is in accordance with sociological and psychological research, which demonstrates that social attachments are created between people who interact frequently and live close to each other, see for instance Baumeister and Leary (1995). Assuming that the aversion against inequality in region k is shared by everybody in that region, we define it as:

$$\beta_k = \mu L_k^P \tag{8}$$

where L_k^P is the number of poor people living in region k, and μ, an exogenous variable, determines the sensitivity of inequality aversion to changes in L_k^P. Although not modelled explicitely, we shall assume that a person's aversion against inequality in society is shaped during childhood. The reason could be that a person becomes more sensitive to inequality if she is exposed to poverty during these formative years and if she establishes social bonds to poor people. The L_k^P-term in (8) should therefore be interpreted as the number of poor people in the region in which one grew up. When a person becomes an adult, this inequality aversion is fixed and remains unchanged even if the number of poor in the neighbourhood is changed. Disutility of inequality is then determined uniquely by the inequality measure ϵ, which denotes inequality in society as a whole, which is also unaffected by locational choice. Since only adult persons make decisions about where to live, locational choices will therefore be unaffected by a person's aversion against inequality and the level of inequality as such.[1]

2.1 Location

The location equilibrium can found by setting (6) equal to (7) for a fixed aversion against inequality, i.e., $\beta_{iW} = \beta_{iE} = \bar{\beta}_i$. Using (4) and (5), we can then find:

$$\hat{\alpha}^j = \ln(\frac{w^j}{w^j - \rho}) \tag{9}$$

where $\hat{\alpha}^j$ defines the share of group j that chooses to live in the East, implying that the total number of type j people living in the East is:

$$L_E^j(w^j) = L^j \hat{\alpha}^j = L^j \left[\ln(\frac{w^j}{w^j - \rho})\right] \tag{10}$$

and where a share $\left(1 - \hat{\alpha}^j\right)$ lives in the West, implying:

$$L_W^j(w^j) = L^j \left(1 - \hat{\alpha}^j\right) = L^j \left[1 - \ln(\frac{w^j}{w^j - \rho})\right] \tag{11}$$

[1]The alternative assumption would be that people internalize the fact that their own well-being depends on who their neighbours are. Such a formulation would introduce strategic interaction between people, and make the characterization of the location equilibrium more complex.

Naturally, it suffices to focus on either $L_E^j(w^j)$ or $L_W^j(w^j)$: We choose $L_W^j(w^j)$. This function is convex in w^j, a fact which intuitively can be explained as follows: As the share of the population in the West goes up, those remaining in the East care ever less about moving to the West, and therefore need increasingly higher after tax income in order to do so. For future reference, we note that (10) and (11) can be expressed as:

$$w^j(L_W^j) \equiv \lambda^j = \frac{\rho e^{(L^j - L_W^j)/L^j}}{e^{(L^j - L_W^j)/L^j} - 1} \tag{12}$$

This equation implicitly characterizes the equilibrium distribution of people across regions, given the cost of living in the West and given the income distribution in society. From (12) it can be shown that L_W^j is zero for $w^j \leq e\rho/(e-1)$, and positive for $w^j > e\rho/(e-1)$, which can be interpreted as a reservation wage, below which no-one of type j will locate in the West.

2.2 Transfers

Transfers in the present model are voluntary gifts from the rich to the poor. Note that redistribution takes place only on a central level, i.e., not within regions. The level of transfers is determined by the median voter, who by assumption is rich. In practice, the median voter could be rich because rich people to a greater extent than poor people exercise their right to vote, or simply because there are more rich people than poor people in the economy. Since taxes and transfers are lump sum, the rich median voter perfectly controls the income distribution in the country. Alternatively, and perhaps more realistically, we may assume that it is politically unfeasible for the rich to tax the poor, so that the pre-tax income of the poor defines a minimum after-tax income for this group.

Using (1), (2), (4), (5), and (8), we can derive the optimal transfers for a rich person i living in region k from the first order conditions $\left(\partial U_{ik}^R/\partial w^P\right) = 0$ in (6) and (7), which yields:

$$w^P(L_W^P) \equiv \theta_W = \min\left[\left(\frac{\mu L_W^P}{1+\mu L_W^P}\right)\left(\frac{1}{L^P}\right)\left(1-\rho\left(2-L^P\right)\right), 0.5\right] \tag{13}$$

$$w^P(L^P - L_W^P) \equiv \theta_E = \min\left[(\frac{\mu(L^P - L_W^P)}{1+\mu(L^P - L_W^P)})(\frac{1}{L^P}), 0.5\right] \qquad (14)$$

Equations (13) and (14) describe the optimal disposable income for a poor person, as seen from the viewpoint of a rich voter living in, respectively, region West and East. The upper bound of θ_k is given by $w^P = 1/2$, which defines a perfectly equal distribution of disposable income in society. Increasing w^P beyond $1/2$ would unambiguously reduce the utility of a rich person, since her private consumption would go down and inequality go up.

The optimal transfers for a rich living in region k can be easily found as $(\theta_k - v^P)$. If we allow the rich to tax the poor, this expression may of course be negative. As seen from (13) and (14), a rich person living in region k will vote for larger transfers i) the higher is the sensitivity of inequality aversion to changen in L_k^P, i.e., the larger is μ; ii) the more poor people that live in her region, i.e., the higher is L_k^P; iii) for a given number of L_k^P, the smaller is the total population of poor (L^P) (since the tax cost of financing a given transfer then goes down), and; iv) in the case of (13), the lower is the cost of living in the West (ρ) (since a higher ρ increases the marginal utility of consumption for a rich person in the West, and therefore increases the marginal cost of giving money to the poor).

The equilibrium tax policy is affected by the regional affiliation of the median voter. As mentioned earlier, the decisive voter in the present model is assumed to be rich. For simplicity, let all rich people vote and a number $\gamma^P < L^R$ of the poor use their right to vote. Even if poor voters are in minority, they can choose whether to vote with the rich in the East or the West, and thereby in some cases determine the regional affiliation the rich median voter. Since the poor voters prefer a higher transfer than the rich, they will support the group of rich (i.e., Easteners or Westeners) that vote for the higher transfers. Tax policy is therefore given by:

$$\theta^* = \begin{array}{cccc} i) & \theta_W & if & L_W^R > L_E^R + \gamma^P \\ ii) & \theta_W & if & |L_W^R - L_E^R| < \gamma^P, \theta_W > \theta_E \\ iii) & \theta_E & if & |L_W^R - L_E^R| < \gamma^P, \theta_E > \theta_W \\ iv) & \theta_E & if & L_E^R > L_W^R + \gamma^P \end{array} \qquad (15)$$

Case i) applies if the rich in the West have a simple majority, and case iv) if the rich in the East have a simple majority. Case ii) or iii) applies if

neither the rich in the West nor in the East have simple majority. In this case, the poor have a decisive say, and will vote with the group of rich people that prefers the higher transfer level. In case the two groups of voters, those supporting higher transfers and those supporting lower transfers, are equally large, i.e., $|L_W^R - L_E^R| = \gamma^P$, we assume that the tax policy remains as it is, that is, either θ_W or θ_E. In other words, a majority vote is required to change the existing tax policy.

Tax policy depends on the regional distribution of people, and the regional distribution of people in turn depends on the distribution of disposable income in society, as given by (10) and (11). Setting $L_W^R = L_E^R + \gamma^P$ and using (1) and (12), the critical level of after-tax income of a rich person above which the rich in the West have a simple majority, can be found as:

$$\hat{w}_W^R = \frac{\rho e^{\left(1-\gamma^P/L^R\right)/2}}{e^{(1-\gamma^P/L^R)/2} - 1} \tag{16}$$

which, using (1) and (2), corresponds to a critical after-tax income of a poor person, below which the rich in the West have a simple majority, i.e., below which case *i*) in (15) applies:

$$\hat{w}_W^P = \frac{1 - \hat{w}_W^R \left(2 - L^P\right)}{L^P} \tag{17}$$

Similarly, setting $L_E^R = L_W^R + \gamma^P$ and using the same procedure as above, the critical level of after-tax income of a rich person above which the rich in the East have a simple majority, can be found as:

$$\hat{w}_E^R = \frac{\rho e^{\left(1+\gamma^P/L^R\right)/2}}{e^{(1+\gamma^P/L^R)/2} - 1} \tag{18}$$

and the corresponding critical level of income for the poor, above which the rich in the East have a simple majority, i.e., above case *iv*) in (15) applies:

$$\hat{w}_E^P = \frac{1 - \hat{w}_E^R \left(2 - L^P\right)}{L^P} \tag{19}$$

Note the following three features of (17) and (19). First, the level of $\hat{w}_k^P$ is decreasing in ρ. Intuitively, when the cost of living in the West goes up, a larger group of rich chooses to live in the East for any transfer level. The critical levels of $\hat{w}_k^P$ therefore go down.

Second, if poor people do not vote ($\gamma^P = 0$) they never have a decisive say in choice of tax policy, and hence $\hat{w}_E^P = \hat{w}_W^P = \hat{w}^P$. For, $\gamma^P > 0$, $\hat{w}_E^P > \hat{w}_W^P$, and the gap between (17) and (19) increases as γ^P goes up. A larger γ^P implies an increase in the political influence of poor people, which in turn increases the interval $w^P \in (\hat{w}_W^P, \hat{w}_E^P)$ for which the poor have a decisive say in the country's tax policy.

Third, in the relevant range of w^P, i.e., $w^P \leq 1/2$, $\hat{w}_k^P$ is a positive function of L^P. The reason is that an increase in the number of poor people automatically reduces the number of rich people, since the total number of people in the economy is fixed. When the number of rich people goes down, their disposable income for any level of w^P goes up. The tax level must therefore increase to induce a sufficient number of rich people to locate in the East, such that the rich in the West lose their simple majority vote, and the rich in the East gain the simple majority vote, i.e., $\hat{w}_k^P$ goes up.

3 Equilibrium

We present the outcome of the model using figures which represent different scenarios. The first three scenarios focus on different levels of cost of living in the West. Scenario 4 analyses a change in the number of poor voters. Scenarios 5 and 6 address the issue of group size, the former with a larger number of poor and the latter with a smaller number of poor relative to rich. Scenario 7 combines voting and group size, considering the case when poor people vote and their number is relatively large. Table 1 summarizes the values of the most important exogenous variables in the scenarios.

Table 1. Scenarios

	Scenarios						
	1	2	3	4	5	6	7
ρ	0.1	0.25	0.15	0.25	0.25	0.25	0.1
γ^P	0	0	0	0.25	0	0	0.6
L^P	1	1	1	1	1.5	0.75	1.25
L^R	1	1	1	1	0.5	1.25	0.75

In the figures, the number of poor people living in the West is measured on the horizontal axis, with the measure of the total number of poor people in the economy defining the length of the axis. The disposable income of a poor person is measured on the vertical axis. An equilibrium occurs at the intersection(s) of the location function (12), given by the λ^P-curve, and the relevant level of transfers, as given by (15).

The relevant interval of a transfer curve θ_k is marked with a bold pen, while the irrelevant part is drawn as a dashed line. The relevant transfer curve for the part of the λ^P-curve lying below the $\hat{w}_W^P$-line, is θ_W, since the rich in the West in this case have a simple majority. Similarly, for the part of the λ^P-curve lying above the $\hat{w}_E^P$-line, θ_E is the relevant transfer curve. For $w^P \in (\hat{w}_W^P, \hat{w}_E^P)$, the poor have a decisive say, and the tax policy is determined by $\arg\max(\theta_W, \theta_E)$.

An equilibrium analysis is certainly interesting per se. However, to shed light on the redistribution puzzle motivating this paper, we need to use the static model developed here to tell a dynamic story. We have argued earlier in the paper that the aversion against inequality is fixed at adult age, and that changes in tax policy take place as new generations enter the voting scene, and old generations exit. Changes in tax policy can therefore be expected to be a slow process. The movement of people is likely to be more flexible. Assume therefore that the economy is always on the λ^P-curve, and that $\dot{w}^P > 0$ for $\theta^* > w^P$, $\dot{w}^P < 0$ for $\theta^* < w^P$, and $\dot{w}^P = 0$ for $\theta^* = w^P$, where $\dot{w}$ denotes change in disposable income over time.

The dynamics of redistribution can be interpreted in the following way. The locational choice of parents determines the environment in which their children grow up. If children grow up in a different environment (in terms of the number of poor people in the neighbourhood) than their parents, they will develop a different aversion against inequality. Consequently, when these children reach adult age, their vote on tax policy will differ from that of their parents. As long as the distribution of people across regions changes, the inequality aversion in the population as a whole will change. This process continues, until an equilibrium is reached, where the environment is stable over time, involving a stable tax policy and a stable regional distribution of people.

3.1 Scenario 1: "Low" costs of living in the West

As is evident from Table 1, the first three scenarios focus on the cost of living in the West. We assume here that poor people do not vote, which, as discussed earlier, implies $\hat{w}_W^P = \hat{w}_E^P \equiv \hat{w}^P$. First, assume that the cost of living in the West is "low"; $\rho = 0.1$. Since living in the West is relatively inexpensive, and since poor people do not vote, in this scenario it is always true that $w^P < \hat{w}^P$ (not illustrated in the figure), and so case i) in equation (15) applies. Since in this case the θ_E-curve, which illustrates the equilibrium transfer levels given that the median voter lives in the East, is never relevant, it is dashed in Figure 1.

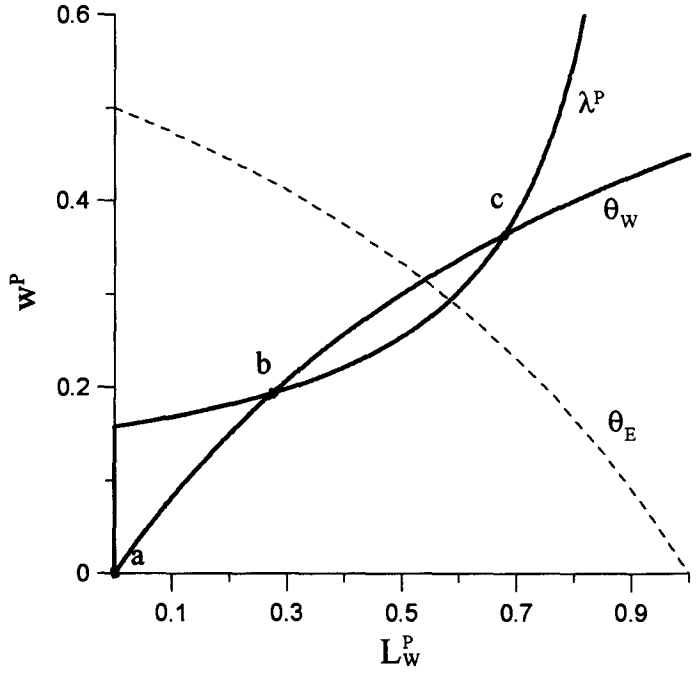

Figure 1: The "low cost" scenario

There are three equilibria in scenario 1; a, b, and c. Points a and c are stable equilibria, b is unstable. To see why b is unstable, consider a small movement away from b, say an increase in w^P, with L_W^P constant. At this higher income, more poor people will choose to locate in the West. The new location equilibrium can be found on the λ^P-curve corresponding to the

higher level of w^P. This point, however, lies below the θ_W-curve, implying that at this higher level of L_W^P, the rich wish to offer the poor an even higher income. This in turn stimulates further relocation of poor people into the West, and hence a movement further away from b, in the direction north-east. Similarly, a small reduction in w^P, with b as point of departure, leads the economy away from b, in the direction south-west.

Equilibrium a is a corner solution, characterized by a highly unequal distribution of after tax income and a highly segregated population structure. If we do not allow the rich to tax the poor, this corner solution would be given by $w^P = v^P \geq 0$, $L_W^P(v^P) \geq 0$, which exists if $v^P < w^P(b)$, where $w^P(b)$ is the disposable income of the poor associated with equilibrium b. Equilibrium c is an interior solution, characterized by a highly equal distribution of after tax income and population structure.[2]

The model thus illustrates how two structurally similar countries may end up in two radically different situations, with respect to redistribution and segregation, depending on which of the two equilibria the economy co-ordinates on. How may the model shed light on the distribution puzzle? To answer this question, consider two countries, 1 and 2. The two countries are identical in all respects, except that country 1 has a more equal pre-tax income distribution; $v^{P1} > v^{P2}$, where superscripts 1 and 2 indicate the two countries. Assume that transfers in country 2 are not sufficiently high to compensate its poor population for its lower pre-tax income: Pre-tax income differences in income are therefore reflected also in post-tax differences in income, and so $w^{P1} > w^{P2}$. We can interpret the initial condition as describing a situation before the establishment of the welfare state, when the means of redistributing income were not fully developed. Alternatively, we can think of the difference in pre-tax income distribution as being caused by a shock in one or both of the economies, a shock which has yet to be compensated fully by redistributive policies.

Assume that the difference is such that $w^{P1} > w^P(b) > w^{P2}$, and therefore a pattern of residency $L_W^{P1} > L_W^P(b) > L_W^{P2}$. Since $\theta^* > w^{P1}$, then $\dot{w}^{P1} > 0$, and since $\theta^* < w^{P2}$, then $\dot{w}^{P2} < 0$. In words, country 1, the more egalitarian society, will over time move along the λ^P-curve to equilibrium c, where there is a lot of income redistribution taking place, and country 2, the less egal-

[2]It can be shown that a reduction in ρ, by increasing the disposable income of the rich and therefore their willingness to transfer money to the poor, moves the egalitarian equilibrium c north-east in the diagram, i.e., towards greater equality.

itarian society, will move to a corner solution, equilibrium a, with zero, or even negative redistribution to the poor. This dynamic interpretation of the model therefore predicts that societies which are more egalitarian in terms of pre-tax income distribution, over time may become more redistributive than less egalitarian societies. Redistribution may in this way increase, rather than reduce, differences in income distribution between countries.

3.2 Scenario 2: "High" costs of living in the West

In Scenario 1 we assumed that the cost of living in the West was sufficiently low to ensure that the median voter was always located in the West. As can be seen from (16) to (19), however, for $\rho > 0.2$, $\hat{w}^P < 0.5$. Figure 2 replicates Figure 1 in all respects except one; the cost of living in the West is increased to $\rho = 0.25$.

The higher costs of living in the West extends the range of w^P for which no poor people live in the West. Naturally, it also makes it more expensive for rich people to live there, which explains why the $\hat{w}^P$-line has shifted downwards relative to scenario 1 (where the $\hat{w}^P$-line was beyond the relevant range of w^P and therefore not included in the figure). A higher ρ also results in a flatter θ_W-curve. This is because a higher cost of living in the West reduces the disposable income of rich people living there. For any given number of poor people in the West, the drop in the disposable income of this group of rich reduces their willingness to transfer money to the poor.

The single value of λ^P for which θ_W applies, is $\lambda^P = 0$. All positive values of λ^P lie above the $\hat{w}^P$-line, and for these values, θ_E is the relevant transfer curve. In this scenario, too, there are three equilibria. As before, there is an "inequality" corner solution, equilibrium a, where the median voter lives in the West, surrounded only by fellow rich people. If the pre-tax income of the poor defines a minimum level of income from this group, the "inequality" equilibrium will be given by $w^P = v^P \geq 0$. Second, there is a highly redistributive, interior solution c where the median voter lives in the East. The cutoff level of w^P below which case i) in (15) applies, and above which case iv) applies, is given by $w^P = \hat{w}^P$. At this point, there is an equal number of votes for the two tax policies θ_W and θ_E, and the existing tax policy survives. Hence, as opposed to Scenario 1, point b here is not an equilibrium.

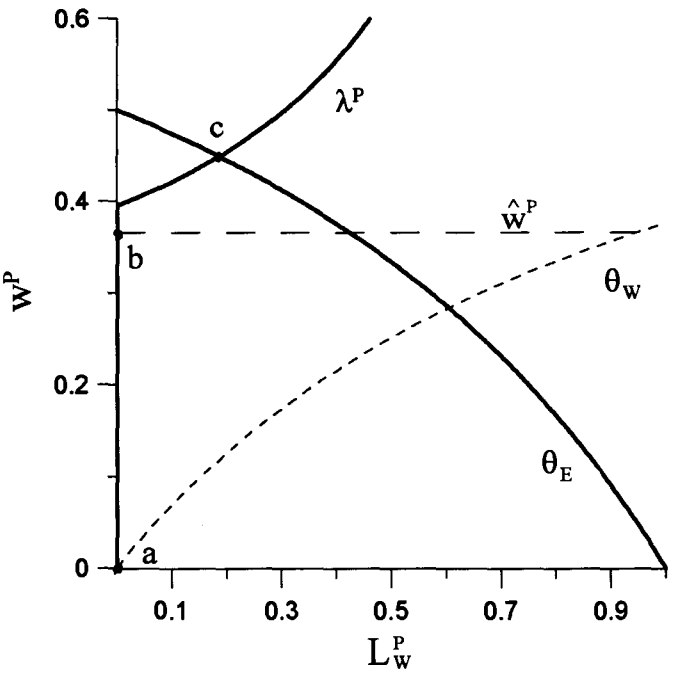

Figure 2: The "high cost" scenario

3.3 Scenario 3: "Intermediate costs" of living in the West

In the present scenario, we maintain the assumptions made above, except that the cost of living in the West is "intermediate", namely $\rho = 0.15$. As is evident from Figure 3, in this case there is a unique equilibrium, the maximum inequality one at a.

The fact that in the present case there is a unique equilibrium is interesting, since both the "low cost" and the "high cost" scenarios described above were characterized by multiple equilibria. In the "low cost" scenario 1 the egalitarian equilibrium c was supported by the fact that redistribution to the poor would spur a large number of poor people to move to the region of the rich median voter, in this case the West. Having an increasing number of poor people nearby, the aversion against inequality experienced by the decisive voter will be strengthened, inducing her to vote for increasing transfers to the poor.

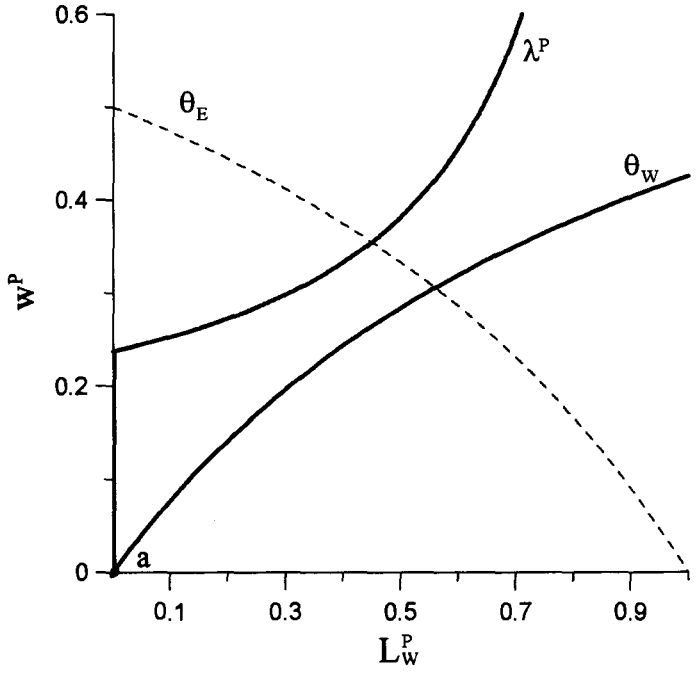

Figure 3: The "intermediate cost" scenario

In the "high cost" scenario 2, the egalitarian equilibrium c was supported by a slightly different mechanism. Redistribution to the poor would spur a large number of *rich* people to move to the region where the largest number of poor people live, that is the East. With the extent of redistribution being sufficiently large, the majority of rich would then be located in the East, which would uphold the highly redistributive regime.

Intuitively, in the present scenario, higher costs of living in the West relative to Scenario 1 makes it less likely that a large number of poor people will join the majority of rich people living in the West. Hence, the forces supporting the egalitarian equilibrium in Scenario 1 are weakened. At the same time, lower costs of living in the West than in Scenario 2, implies that the forces upholding the egalitarian equilibrium in the "high cost" case are also weakened: Redistribution will not induce a large number of rich people to join the poor majority in the East. The result is a situation where social segregation and income inequality is a necessary outcome.

3.4 Scenario 4: When poor people vote

So far we have assumed that poor people do not vote. Even if the poor voters are in a minority, they will affect whether the median voter is a rich person in the East or in the West. Poor voters will support the group of rich, Easteners or Westeners, that vote for the higher transfer level. Figure 4 below replicates Figure 2, i.e., the "high cost" scenario, in all respects except that half of the poor population votes, i.e. $\gamma^P = 0.25$. With poor people voting, $\hat{w}_W^P \neq \hat{w}_E^P$, and in the interval $w^P \in (\hat{w}_W^P, \hat{w}_E^P)$, the poor may form a majority coalition with the rich in the West or the East. Since $\theta_E > \theta_W$ in the relevant range of λ^P, the vote of the poor will go in favor of θ_E.

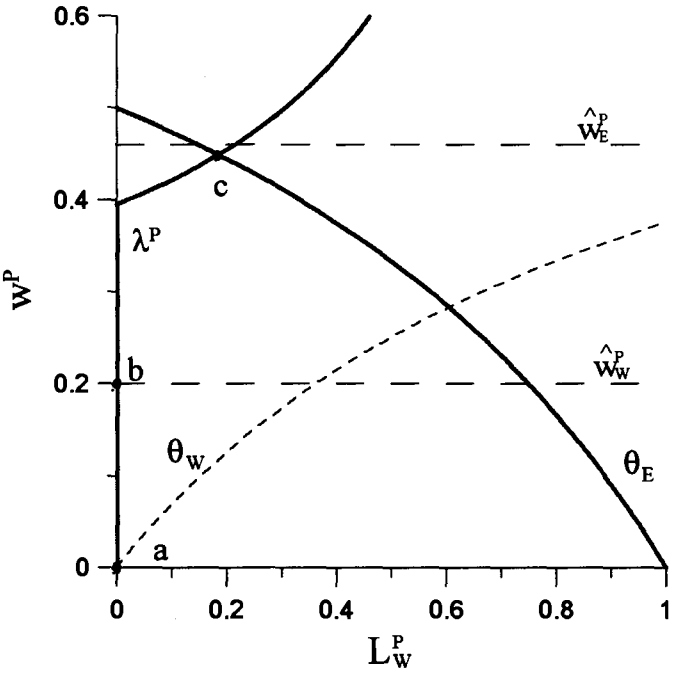

Figure 4: When poor people vote

There are two things to note about Figure 4 relative to Figure 2. First, in Figure 4 the poor have a decisive say in determining the tax policy in the egalitarian equilibrium c; together with the rich in the East, they form a majority coalition voting for θ_E. Second, and perhaps more substantial, $\hat{w}_W^P$ in Figure 4 is lower than in Figure 2. Intuitively, since the poor will vote

with the rich in the East, a smaller number of rich in the East is necessary in order to secure a majority for θ_E. Hence, for a fairly low level of taxes, implying a fairly low w^P, the number of rich people located in the East will be such that the majority vote is in favor of θ_E. Interpreted in a dynamic perspective, the model therefore gives the plausible prediction that societies in which poor people to a larger extent use their right to vote, are more likely to be redistributive than societies in which poor people to a lesser extent exercise this right.

Note that if the number of poor voters is sufficiently large, the egalitarian equilibrium c will be the only surviving one in this scenario. From (17) it can be shown that for $\gamma^P > 0.42 \Rightarrow \hat{w}_W^P < 0$, which means that the poor always have a decisive vote in determining tax policy. Clearly, their vote will be in favor of θ_E. Irrespective of the starting point, then, the economy will over time move to the egalitarian solution.

3.5 Scenario 5: A larger group of poor

In the present scenario, we modify Scenario 2 by increasing the number of poor relative to rich in society. Keeping the total population constant, let $L^P = 1.5$, and $L^R = 0.5$. We are therefore considering a society with a smaller rich class and a larger class of poor people than before.

The most important thing to note with the present scenario, is that with a larger group of poor relative to rich, the egalitarian equilibrium c disappears. The only stable equilibrium here is the inegalitarian solution a. The are two reason for this change relative to Scenario 2. First, as discussed earlier, for any level of w^P, a smaller group of rich is also a richer group of rich, and therefore to a greater extent cluster in the West. This is captured by the increase in the $\hat{w}^P$-line relative to Scenario 2. Second, a larger poor population also means that the tax price of achieving any given level of w^P goes up. The willingness to pay taxes therefore goes down, which is reflected in the flatter θ_k-curves relative to Scenario 2. These two reasons in combination result in the elimination of equilibrium c.

3.6 Scenario 6: A smaller group of poor

The present scenario reduces the number of poor people relative to Scenario 2; $L^P = 0.75$, and $L^R = 1.25$. Qualitatively speaking, the situation is as in Scenario 2; there are two stable equilibria, a and c. The corner solution a is

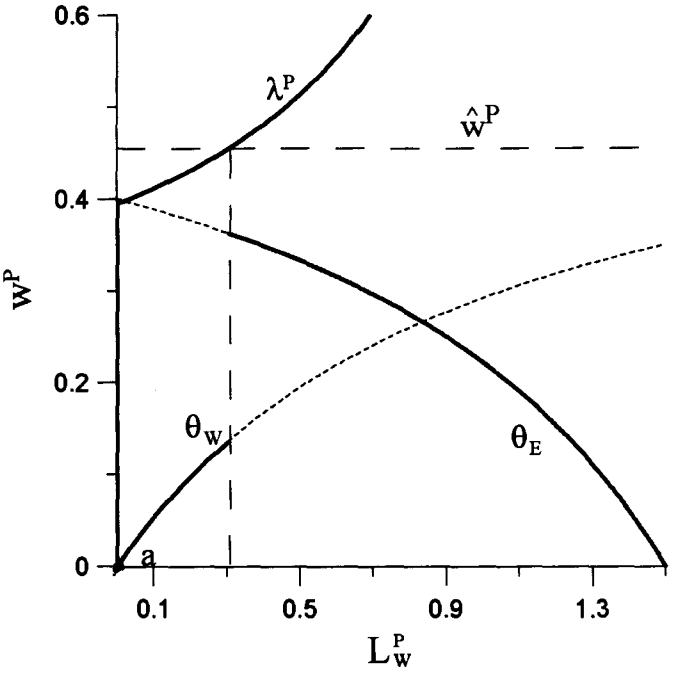

Figure 5: A larger group of poor

naturally unaffected by group size. The egalitarian solution c is even more egalitarian than in Scenario 2, since both the λ^P-curve and the θ_E-curve are steeper. Note also that $\hat{w}^P$ is lower, the mechanisms behind this shift being described in the previous Scenario. In a dynamic context, this means that for a wider range of pre-tax income inequality, the economy will move in the direction of the egalitarian solution.

3.7 Scenario 7: Poor voters, and large poor group

In this scenario, we return to the case where the cost of living in the West is low, i.e., Scenario 1, but change two things. First, the group of poor is larger; $L_P = 1.25$ and $L_R = 0.75$. Second, we assume that a number of poor people, $\gamma^P = 0.6$, use their right to vote.

Compared to scenario 1, the most important effect of these modifications is that $\hat{w}_W^P$ has gone down.[3] This is true even though the number of poor

[3] In the present scenario, $\hat{w}_E^P > 0.5$ and is therefore not included in Figure 7.

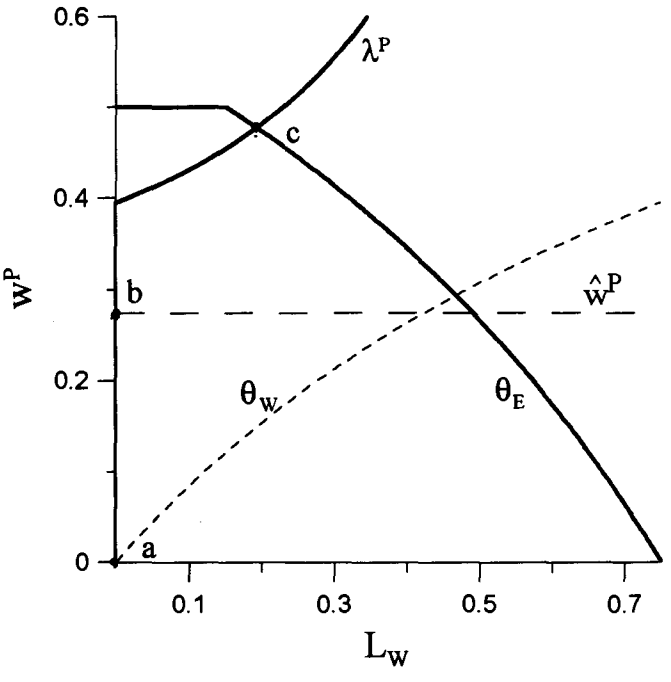

Figure 6: A smaller group of poor

people has increased relative to Scenario 1, which from earlier discussion we know tends to increase $\hat{w}_W^P$. This effect is however dominated by the fact that a number of poor people vote, which reduces the level of $\hat{w}_W^P$.

As in scenario 1, there are two stable equilibria; the low-redistribution equilibrium a and the high redistribution equilibrium c. The most interesting feature of the present scenario is that the poor minority shifts its allegiance on the path from point b to point c. To see this, note first that, as before, the rich in the West determine the tax policy below the $\hat{w}_W^P$-line. Above this line, however, poor voters have a decisive say. They will lend their support to the group of rich voting for the higher transfers. Moving along the λ^P-curve, we see that θ_E wins the majority vote between point b and d, the latter indicating the point at which the θ_E-curve and the θ_W-curve intersect. To the right of point d, θ_W wins the vote. Clearly, since the λ^P-curve intersects the transfer curves to the right of point d, poor people in the egalitarian equilibrium support the rich in the West.

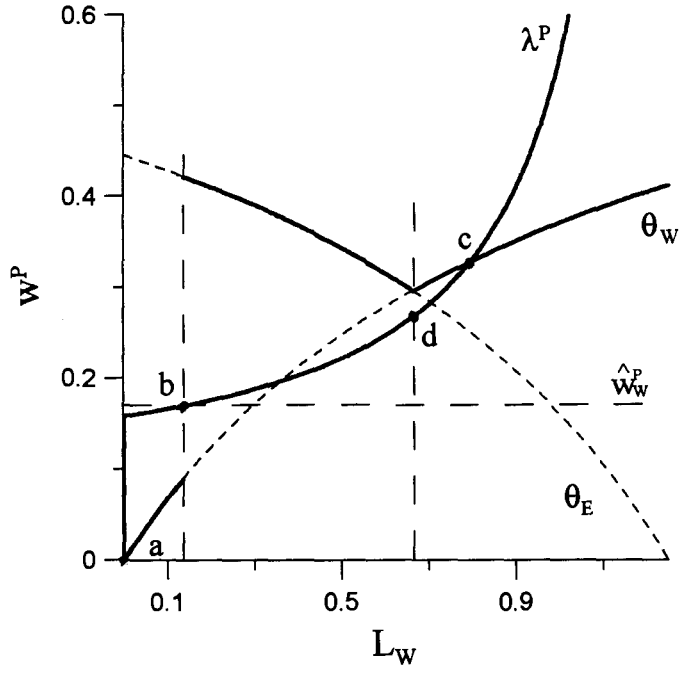

Figure 7: Poor voters, and a large group of poor

4 Policy implications

While redistributive policies are assumed to be determined by majority vote, there may be other policies which, to a larger degree at least, are at the discretion of the government. It may therefore be relevant to consider which policy implications we can derive from the model. In a situation of multiple equilibria, given that a country is at, or heading towards, the inequality equilibrium a, and given that the government wishes to achieve a more equal distribution of income, three policy measures may be employed. First, the government may introduce policies which reduce the gap in pre-tax incomes between the two groups, for instance in the form of education policies aimed at improving the productivity of the poor, or perhaps by encouraging central wage bargaining. Assume that v^P defines a disposable income floor for the poor. If the government mangages to increase v^P to a level such that $w^P > w^P(b)$, the forces of location and voluntary redistribution will over time move the economy towards the desired equilibrium c. Once the economy has

reached c, there are strong forces that keep it there. The economy is therefore no longer dependent on policies which equalize pre-tax income levels in order to uphold this situation. Note however that if there is an absolute floor of disposable income of the poor, such as zero, an increase in v^P may be offset by a similar increase in the taxation of the poor, making such a policy futile.

Second, the government could attempt to integrate more poor people with the majority of rich. In Scenario 1, this may be achieved by a (temporary) subsidy of housing for the poor in the West, and in Scenario 2 by a similar subsidy in the East. Third, as we have seen in Scenario 4, encouraging more poor people to vote may change the direction in which the economy is moving, towards c. Indeed, if a sufficient number of poor people vote, the egalitarian outcome is a unique equilibrium.

5 Conclusion

The optimal tax literature and median voter models predict that countries with more inequality in pre-tax income distribution will redistribute more than countries which are more egalitarian in this respect. Empirical research, however, lends little support to this prediction. In fact, some empirical studies indicate that the reverse may be true, namely that more egalitarian societies, in pre-tax terms, redistribute more than less egalitarian societies. The present paper offers an explanation to why this might be the case.

We argue that income inequality may lead to social segregation between rich and poor in society. In the model, income inequality tends to geographically separate rich from poor. Segregation may weaken the feeling of solidarity of the rich for the poor, and therefore reduce their willingness to vote for redistribution of income. In such an economy, multiple equilibria may exist; one equilibrium characterized by a large degree of geographical segregation between rich and poor, and where redistribution is low (or even negative), and another equilibrium characterized by a more equal distribution of after tax income and where rich and poor are geographically more integrated.

Depending on the starting point, which we may interpret as a pre-welfare state of the world, two economies may be pulled in different directions. An economy starting out with a pre-tax distribution of income which is slightly more unequal than a critical level, may be pulled towards the equilibrium characterized by a high degree of segregation between rich and poor, and

where redistribution is very limited, whereas an economy starting out with a slightly more equal pre-tax income distribution, may move in the opposite direction, involving more integration of groups in society and a more equal distribution of disposable income. Hence, the model offers an explanation to why there may exist a positive correlation between pre-tax equality and redistribution.

Our model also demonstrates that regional differences in the cost of living affect the model in rather interesting ways. Multiple equilibria exist when the costs of living in the more "prestigious" region, the West, are either "high" or "low". For "intermediate" costs of living in this region, however, only the equilibrium characterized by inequality and segregation survives. The propensity of poor people to vote also matters. An increase in the number of poor voters makes the existence of an egalitarian equilibrium more likely, and increases the likelihood that the economy will settle on this equilibrium. When group size is considered, we find that the larger is the group of rich relative to that of the poor, the more likely it is that the outcome will be of the egalitarian kind. A similar conclusion is reached when analyzing an increase in the number of poor voters.

Let us conclude by offering some suggestions for future research. First, the present model only considers central redistribution. Opening up for local redistribution would place the model closer to the fiscal federalism literature, allowing us to analyze issues such as tax competition between regions, and the relation between local and central redistribution. Second, for analytical simplicity, we have chosen to keep the cost of living exogenous in this model. Obviously, endogenizing the market for housing in the two regions would add to the realism of the model, but equally obvious, such an extension involves increased analytical complexity. Finally, the issue of dynamics could be explicitly addressed by analyzing the evolution of altruism and locational choice in, say, an overlapping generations model.

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Chapter 6

Redistribution and the Size of Jurisdictions *

Abstract

This paper analyses the relationship between the size of jurisdictions and the degree of redistribution. A simple political economy model with cross-border shopping and limited and impure altruism is developed in order to study how the size of jurisdictions affects both the cost of redistribution and the political objectives of such policies. An increase in the size of jurisdictions is shown to decrease the degree of tax competition, but it also reduces the weight given to minority interests by the majority. The number of jurisdictions that maximizes global welfare is given by a trade-off between these two forces.

1 Introduction

Questions about enlargement or separation of political and economic units are at the core of the political debate in many countries and regions. One issue that should be considered in this context is how a change in the size of jurisdictions might affect redistributive policies and the income distribution.[1]

Economic theory suggests that enlargement of political units would increase the degree of redistribution. An important, and robust, result in the

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[1]The term jurisdictions will in this paper refer to countries or to states within a federation that have responsibility for redistribution within their territory. In the text we will use the terms country and jurisdiction interchangeably.

fiscal federalism literature is that redistribution at the state level creates interjurisdictional tax externalities and inefficient resource allocation. An implication is therefore that redistribution should be organised as centralized as possible (e.g. Musgrave 1959, Oates 1972 and Dixit and Londegan 1998).[2] Similarly, the literature on international taxation has shown how interjurisdictional tax externalities and tax competition might result in a too low level of redistribution and that tax competition could be reduced if all countries cooperated (e.g. Zodrow and Mieszkowski 1986, Wilson 1986, Sinn 1990). This literature also implies that the cost of redistribution could be higher with many small jurisdictions than with few big jurisdiction. For example cross-border trade would be a bigger problem with small jurisdictions because a larger part of the population would live closer to the border.[3] If these theories are correct, we would expect that centralization of fiscal policy, or unification of sovereign countries, would result in increased redistribution.

Arguments for why decisions should be decentralized, and why the size of jurisdictions should be limited have a long history. Plato argued that the number of individuals in a city-state should be exactly 5040 (Plato 1994, 737e). His argument was mainly based on the requirements of direct democracy. Economists have focused on the provision of public goods in discussing the optimal size of jurisdictions. A recent article by Alesina and Spolaore (1997) analyses the trade-off between economies of scale in public goods provision and heterogeneity of preferences in determining the optimal size and number of countries. They argue that larger jurisdictions might reduce the per capita cost of some publicly provided goods, but that they also increase the heterogeneity of preferences in the population. Ellingsen (1998) develops a related model, but focuses on the inter-regional externalities in the provision of public goods. Integration solves this problem, but Ellingsen argues that a centralized government entails other cost associated with a neglect of minority interests. Again it is inter-regional heterogeneity of preferences that makes the case for decentralization. The model developed in the present

[2] An exception is Pauly (1973) who points out that if redistribution is viewed as a spatially limited social good, decentralization might serve to accommodate different tastes regarding income equality. The present paper attempts to show that decentralization might be desirable even when inequality aversion does not differ between jurisdictions.

[3] In a world with both small and large countries the relationship between the size of jurisdictions and redistribution becomes more complex. Kanbur and Keen (1993) have shown that small countries in some cases might have lower taxes and a higher provision of public goods than large countries.

paper is related to the papers by Alesina and Spolaore and Ellingsen in its focus on the trade-off between inter-jurisdictional externalities and minority interests, however, both the nature of the externalities and the mechanism underlying the neglect of minority interests are different. In particular this paper studies a pure redistribution problem without any public goods, and heterogeneity of preferences play no part in the argument.

In stark contrast to the recommendations of the fiscal federalism literature, considerable redistribution takes place at state and local level (Ladd and Doolittle 1982). This paper claims that a more realistic characterization of peoples motivation to help and the nature of altruism might explain this apparent paradox. In particular we shall argue that the size of jurisdictions affects the feeling of solidarity between their members and thus the outcome of the political process. There could be several reasons why the governments in small countries would take more account of minority interests. In this paper we focus on how two features of social psychology; *limited altruism* and *impure altruism*, might explain why the median voter is less motivated to take into account the interest of a minority in large jurisdictions. Several studies in social psychology suggest that people are limited altruists in the sense that our ability to care about other people is limited. People tend to establish bonds to, identify with, and care about, a restricted number of people (see Baumeister and Leary 1995 for an overview). What the determinants of our compassion are is obviously a very complex issue. However our loyalties are not accidental. Our loyalties towards others, and our willingness to help them, are typically the result of some type of interaction. In particular, frequent contact and proximity seem to be important factors in creating social attachments (Baumeister and Leary 1995).

The economics literature has discussed a phenomenon called impure altruism or the warm glow effect (Becker 1974, Andreoni 1989, Harbaugh 1998). This effect refers to the fact that people's willingness to help, at least partly, is motivated by the pleasure, or warm glow feeling, that the act of helping gives and not by an interest in the welfare of others as such. If people are motivated solely by the warm glow feeling, they only derive utility from the welfare of other people to the extent that they contribute to it. The warm glow effect could be interpreted as capturing the intuitive idea that it is less costly to help people we care about, because we derive utility from the fact that our contributions benefit these people.

In this paper we will assume that people's altruism is both limited and impure. In other words, we assume that the warm glow effect is associated

with helping people we identify with and care about. In this case there is a reason to believe that the motivation to help others might be decreasing in the size of the jurisdiction. As a jurisdiction becomes larger, a smaller share of a person's net contribution to the tax system benefits, or harms, those one cares about. The warm glow motivation to take account of minority interests is therefore decreasing in the size of jurisdiction. Neither limited altruism nor impure altruism alone is sufficient to establish this negative relationship between the size of jurisdictions and the willingness to help minorities. If we derived a warm glow feeling from helping anybody, it would not matter for our motivation who we helped. Similarly, if we were limited, but not impure, altruists, we would derive utility simply from the welfare of those we cared about and it would not matter whether we or someone else helped them.

To see why the nature of altruism is important for redistributive policy it is useful to note that such policies typically are determined through democratic procedures. In a representative democracy redistributive policies that secure the welfare of minorities require the voluntary support of a majority of its citizens. Obtaining such support is only possible if there exists a feeling of identification on the part of the citizens and strong alliances between them. Many western societies are characterized by a relatively affluent majority and a marginalized minority of unemployed, unskilled, disabled or old. Transfers from the rich majority to the poor minority will typically depend on the majority's feeling of solidarity with, and responsibility for, the minority. One particular danger therefore lies in the alienation between rich and poor individuals.

The rest of this paper is organized as follows. In section 2 a simple political economy model with cross-border shopping and limited and impure altruism is developed to study how the size of jurisdictions affects both the cost of redistribution and the political objectives of such policies. Section 3 analyses the relationship between the number of jurisdictions and global welfare and section 4 offer some concluding remarks.

2 The Model

This paper analyses the relationship between number of jurisdictions and the degree of redistribution in a model with two types of people; rich and poor. There is only one factor of production, capital, and one final good. The production technology exhibits constant returns to scale and one unit

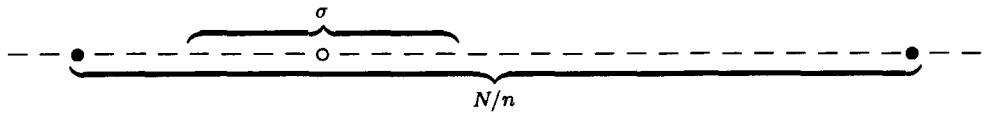
of capital produces one unit of the final good. There is perfect competition in the final goods markets and the return to capital is equal to the producer price of the final good which is normalized to unity. Rich people are endowed with one unit of capital and the return to capital is their only source of income. Their pre-tax income is therefore equal to unity. Poor people have no income, but receives an in-kind transfer from the government. This transfer is financed by a unit tax on all final goods sold within its territory. Differences in tax rates therefore creates incentives for cross-border shopping.[4] However, cross-border shopping is limited by transportation costs and we assume that these costs are increasing in the distance from the border.

Individuals are assumed to be uniformly distributed along the circumference of a circle and each person occupies one unit of space. There are R capital owners and P poor people in the world and the length of the circumference is therefore given by $N = R + P$. The world is divided into n equally sized jurisdictions that can be thought of as countries. The size of each country, or equivalently the number of people in each country, is accordingly N/n. We assume that rich and poor people are evenly distributed between jurisdictions so there are R/n rich people and P/n poor people in each jurisdiction. This assumption ignores one of the most important problems of international redistribution, namely that poor people and rich people tend to live in different parts of the world. Another important simplification is that we assume that people cannot change residence, e.g. move closer to the border or to another country.

2.1 Limited and impure altruism

All individuals are assumed to be limited altruists in the sense that they care about the welfare of some, but not all, other individuals. Furthermore, individuals are assumed to care about those people that are 'closest' to them in some relevant sense. In this paper we attempt to capture this feature by assuming that all individuals care about the σ number of people that are closest to them geographically. We can illustrate this by looking at a person living at a point o on the circumference

[4] Cross-border shopping could in this model be seen as a way to represent the more general problem of tax competition.



This person cares about the $\sigma/2$ people closest to her on each side. Assuming that rich and poor people are evenly distributed within any segment on the circumference, a person will care about $\sigma\frac{R}{N}$ rich individuals and $\sigma\frac{P}{N}$ poor individuals. If a person lives close to the border some of those she cares about will be foreigners. We observe that a person who does not care about any foreigners will care about a fraction $\sigma\frac{n}{N}$ of the people in the country and that this fraction is decreasing in the size of the country.

We also assume that people are impure altruists in the sense that they only derive utility from the welfare of those they care about if they contribute to their welfare. If a person is rich she contributes to the welfare of poor persons by financing the transfers the poor receives and she gets a warm glow feeling when these transfers go to poor people she cares about. If a person is poor, her net contribution will be negative, and she will care about the fact that people she care about are taxed in order to finance her transfers. To represent impure altruism we assume that the weight a person of one type gives to the welfare of persons of the other type is proportional to the share of her net contribution to the tax system that goes to people she cares about.[5]

The welfare of a rich person will depend on where she buy's here final goods and it is therefore necessary to distinguish between the utility of people buying final goods in their home country and those who engage in cross-border shopping. We start by characterizing the utility of a rich person k who buys her goods, and pays her taxes, in the country i where she is a citizen. For analytical convenience we assume her utility function is given by

$$U^k_{Ri} = v(c^k_{Ri}) + \alpha^k_{Ri}(n)v(c_{Pi}) \tag{1}$$

where the subscript denotes the type of person and her country of residence. The first element on the right hand side, $v(c^k_{Ri})$, is the utility the

[5]People also care about some individuals of the same type. However, since people are impure altruists they do not derive any utility from the welfare of those they do not help.

person gets from private consumption, c^k_{Ri}. We assume that $v' > 0$ and $v'' < 0$. Since the income of a rich person is equal to unity and the price of the final good in country i is equal to $(1 + t_i)$, we know that $c^k_{Ri} = \frac{1}{1+t_i}$. The second element on the right hand side is the utility the person derives from the welfare of the poor. The utility a poor person in country i gets from private consumption is given by $v(c_{Pi})$, where c_{Pi} is the private consumption of a poor person in that country and is equal to the government transfer, i.e. $c_{Pi} = T_i$. The expression $\alpha^k_{Ri}(n)$ can be interpreted as the weight placed on the welfare of the poor and it captures the idea of limited and impure altruism. It is given by

$$\alpha^k_{Ri}(n) = \mu \frac{\sigma^k_{Ri}}{P/n} \tag{2}$$

The constant μ is a measure of altruism and we assume that $\mu \leq 1$. To capture the idea that people only derive utility from helping people they care about, this measure is multiplied with the share of her tax money that goes to people she cares about. This share is given by $\frac{\sigma^k_{Ri}}{P/n}$, where σ^k_{Ri} is the number of poor people in country i that a rich person k cares about *and* helps, and P/n is the number of people that receive transfers in the jurisdiction. The number σ^k_{Ri} will be equal to $\sigma\frac{P}{N}$ unless the person lives close to the border and will be equal to $\frac{\sigma}{2}\frac{P}{N}$ for persons living at the border. For $\sigma^k_{Ri} = \sigma\frac{P}{N}$ we have that the weight given to the welfare of the poor can be written as $\alpha(n) = \mu\sigma\frac{P/N}{P/n} = \mu\sigma\frac{n}{N}$. We observe that $\alpha(n)$ is a decreasing function of the size of countries, or equivalently, an increasing function of n.

The utility of a rich person k, living in country i and buying her goods in the closest jurisdiction j, is given by

$$U^k_{Ri} = v(c^k_{Ri}) + \alpha^k_{Rj}(n)v(c_{Pj}) \tag{3}$$

This utility function differs from (1) in two ways. First, the person spends some of her pre-tax income on transportation costs. The transportation cost for a person located at a distance d_k from the closest border is given by cd_k where c can be interpreted as the unit transportation cost. Since all countries are identical we assume that the unit tax and the transfer to the poor is the same in all foreign countries and they are denoted by t and T. The price of the final good in country j is therefore $(1 + t)$ and private consumption is

accordingly given by $c^k_{Ri} = (1 - cd_k)/(1 + t)$. Since the rich person in this case only pays taxes in country j, her tax payments will only benefit poor people in that jurisdiction. The utility she derives from helping others will therefore depend on the share of poor people she cares about in country j and their welfare, given by $v(c_{Pj})$. Where the private consumption of the poor in country j is given by $c_{Pj} = T$. The weight she gives the welfare of the poor in country j, is therefore given by

$$\alpha^k_{Rj}(n) = \mu \frac{\sigma^k_{Rj}}{P/n} \tag{4}$$

where σ^k_{Rj} is the number of poor people in jurisdiction j that person k cares about. This number is equal to zero if the person lives far from the border (i.e. when $d_k > \frac{\sigma}{2}$) and is equal to $\frac{\sigma}{2}\frac{P}{N}$ if she lives at the border.

The utility of a poor person k living in country i is given by

$$U^k_{Pi} = v(c_{Pi}) + \alpha^k_{Pi}(n)v(c_{Ri}) \tag{5}$$

where the utility that the poor person derives from private consumption is $v(c_{Pi})$ where $c_{Pi} = T_i$. The welfare of rich people only enters into the utility function of a poor person if she cares about them *and* they pay taxes in country i. The welfare of the rich is given by $v(c_{Ri})$ where $c_{Ri} = \frac{1}{1+t_i}$. The weight given to the welfare of the rich by a poor person k is given by

$$\alpha^k_{Pi}(n) = \mu \frac{\sigma^k_{Pi}}{R/n} \tag{6}$$

where σ^k_{Pi} is the number of rich persons that the poor person k cares about *and* pay taxes in country i and R/n is the number of rich in country i. If a poor person only cares about people living in the jurisdiction where she lives and all those she cares about buy their goods in country i, the weight given to the welfare of the rich is given by number will be equal to $\alpha(n) = \mu\sigma\frac{R/N}{R/n} = \mu\sigma\frac{n}{N}$. We observe that this weight is equal to the weight given to the welfare of the poor by rich people who does not engage in cross-border shopping and only cares about poor people in their own country.

2.2 Cross-border shopping and tax competition

The only source of revenue for the government is a unit tax on final goods bought within its jurisdiction. To simplify, we assume that the transfer to the poor is given in kind and that only rich people buy goods and pay taxes. Inter-jurisdictional differences in taxes give rich people in the high tax country an incentive to buy their goods in the low-tax country. However, cross-border shopping is costly and the cost is increasing with the distance to the closest border. As noted above we assume that the transportation cost is a linear function of the distance to the closest border.

A rich individual in country i chooses where to buy her goods so as to maximizes her utility. The number of rich people, R_i, buying their goods in country i is given by observing that a rich person k located at the distance $\bar{d}_i$ from the closest jurisdiction, j, is indifferent between shopping at home or abroad when

$$v(\frac{1}{1+t_i}) + \alpha^k_{Ri}(n)v(T_i) = v(\frac{1-c\bar{d}_i}{1+t}) + \alpha^k_{Rj}(n)v(T) \tag{7}$$

This expression gives us $\bar{d}_i$ as a function the tax rate in foreign jurisdictions and the tax rate in country i, i.e. $\bar{d}_i = \bar{d}(t, t_i)$, where $\frac{\partial \bar{d}_i}{\partial t} \leq 0$ and $\frac{\partial \bar{d}_i}{\partial t_i} \geq 0$. Furthermore, we know that $\bar{d}_i = 0$ when $t = t_i$. For $\bar{d}_i > 0$, the rich people in country i who live within $\bar{d}_i$ of the closest border will buy goods in neighboring countries, and for $\bar{d}_i < 0$ the rich people in other countries who live within $(-\bar{d}_i)$ of country i will buy their goods in country i. Since every jurisdiction have two borders, and using the fact that all jurisdictions are symmetrical, we have that the number of rich people who buy their goods in country i is given by

$$R_i = \frac{R}{n} - 2\bar{d}_i\frac{R}{N} \tag{8}$$

where R/n is the number of rich people in each country and $2\bar{d}_i\frac{R}{N}$ is the number of rich people living within the distance $\bar{d}_i$ of the closest border. We can illustrate the cross-border trade by the following two figures. If $t_i > t$ we

have

and if $t_i < t$

where • indicates the borders between country i and the two adjacent states. The tax base of a country i, X_i, is equal to R_i when some of its residents buy their final goods abroad. However, when the foreigners buy their goods in country i, $R_i \neq X_i$. This is because people who buy their goods in another country spend some of their income on transportation cost. The average transportation cost for foreigners buying goods in country i is equal to $\frac{c\bar{d}_i}{2}$. We therefore have that country i's tax base is given by

$$X_i = \begin{array}{ll} \frac{R}{n} - 2\bar{d}(t,t_i)\frac{R}{N} & if \quad t_i > t \\ \frac{R}{n} & if \quad t_i = t \\ \frac{R}{n} - 2\bar{d}(t,t_i)\frac{R}{N}(1-\frac{c\bar{d}_i}{2}) & if \quad t_i < t \end{array} \tag{9}$$

The tax base is in other words a function, $X_i = X(t,t_i)$, of the unit tax in foreign jurisdictions and the unit tax in country i. When all countries have the same unit tax, the tax base of each country is equal to R/n. The elasticity of the tax base in country i is given by $\varepsilon_i(n) = -\frac{t_i}{X_i}\frac{\partial X_i}{\partial t_i}$ and we observe that $\varepsilon_i'(n) > 0$, i.e. the elasticity of the tax base is an increasing function of the number of countries or equivalently a decreasing function of the size of jurisdictions. The reason is simply that in small countries a larger share of the population will live close to a border.

Each jurisdiction have an incentive to lower its tax in order to attract some of the consumers from the neighboring jurisdictions. This tax competition creates a positive tax externality in the sense that an increase in the tax rate in one country increases the tax revenue in other countries. It is a well-known result from the international tax literature that such tax competition might result in less redistribution and underprovision of public goods compared with the cooperative solution.

2.3 The government's optimization problem

Since each country determines its tax policy through majority voting, the government's objectives will be determined by who the median voter is and the weight the median voter attaches to the welfare of the minority. If the number of rich people is higher than the number of poor people, any transfer to the poor must be a result of some kind of benevolence on the part of the rich. Similarly, if there is a majority of poor people, then the degree of redistribution will be restrained by their concern for the rich minority. To describe the government's optimization problem, we need to distinguish between the situation where the poor have a majority and the situation where the median voter is rich.

When $R > P$, the median voter will be a rich person since rich persons always prefer a lower tax level than poor persons.[6] Since the preferences of rich people depend on who they care about and whether they buy their goods at home or not, we need to identify the group of rich that will be the median voter. We assume that the group of rich people who prefer the highest level of transfers will be the median voter, since this group will get the support of the poor voters.[7] We know that people who live close to the border and care about poor people in neighboring countries, will prefer lower taxes than those who only care about poor people in country i. Furthermore, rich people who buy their goods in another country can only be better off by a reduction in the tax level in the country where they live. The rich people who do not engage in cross-border shopping and who only care about poor people in the country where they live, is therefore the group of rich people that prefer the highest tax and transfer level. In this situation the median voter's preferences, and the government's objective function in country i, is thus given by

$$W_i = v(c_{Ri}) + \alpha(n)v(c_{Pi}) \tag{10}$$

where $\alpha(n) = \mu\sigma\frac{n}{N}$, is that weight given to the welfare of the poor by the median voter. This weight will be the same in all jurisdictions. We also observe that $\alpha'(n) = \mu\frac{\sigma}{N} > 0$, i.e. that the weight is increasing in the number

[6] This follows from the assumption that $\mu < 1$.

[7] This follows from the fact that the weight these people put on the interests of the poor is lower.

of jurisdictions. Furthermore, we have that $c_{Ri} = 1/(1+t_i)$ and $c_{Pi} = T_i$. The government's revenue function in country i is given by

$$\Pi_i = t_i \frac{X(t,t_i)}{1+t_i} \tag{11}$$

where $\frac{X(t,t_i)}{1+t_i}$ is the total amount of the final good purchased in country i. Country i chooses a unit tax, t_i, on the final good and a lump-sum transfer to the poor, T_i, so as to maximize the median voter's utility function subject to the requirement that

$$\frac{t_i}{1+t_i} X(t,t_i) - \frac{P}{n} T_i \geq 0 \tag{12}$$

i.e. that government expenditures do not exceed government incomes. The Lagrangian of this problem can be written as

$$L_i = v(c_{Ri}) + \alpha(n) v(c_{Pi}) + \lambda_i \left[\frac{t_i}{1+t_i} X_i - \frac{P}{n} T_i \right] \tag{13}$$

The first order conditions of this problem can be written as

$$\frac{\partial L_i}{\partial t_i} = \frac{-1}{(1+t_i)^2} v'(c_{Ri}) + \lambda_i \left[\frac{1}{(1+t_i)^2} X_i + \frac{t_i}{1+t_i} \frac{\partial X_i}{\partial t_i} \right] = 0 \tag{14}$$

$$\frac{\partial L_i}{\partial T_i} = \alpha(n) v'(c_{Pi}) - \lambda_i \frac{P}{n} = 0 \tag{15}$$

$$\frac{\partial L_i}{\partial \lambda_i} = \frac{t_i}{1+t_i} X_i - \frac{P}{n} T_i = 0 \tag{16}$$

from (15) we get that $\lambda_i = \frac{\alpha(n) v'(c_{Pi})}{P/n}$. Because all countries are identical and are located symmetrically, we know that in equilibrium the unit tax will be the same in all countries and that $X_i = R/n$. Using this and substituting into (14) gives

$$\frac{v'(c_{Ri})}{v'(c_{Pi})} = \alpha(n)\frac{R}{P}[1-(1+t_i)\varepsilon(n)] \tag{17}$$

where $\varepsilon(n) = -\frac{t_i}{X_i}\frac{\partial X_i}{\partial t_i}$ is the elasticity of the tax base and is the same for all countries in equilibrium. The expression on the left-hand side is the ratio between the marginal utility of consumption of the rich and of the marginal utility of consumption of the poor. This ration can be interpreted as a measure of the degree of redistribution. Since $v" < 0$ we know that this measure is increasing in the tax rate. If the two groups have the same after tax income the measure is equal to one, if the rich have the highest after tax income the measure is less than one, and if the poor have the highest after tax income the measure is above one. Without any redistribution the measure is equal to zero, assuming that the marginal utility of consumption goes to infinity when consumption goes to zero.

By studying the right hand side of (17) we observe that the degree of redistribution is increasing in the weight given to the welfare of the minority, $\alpha(n)$, and this weight is an increasing function of the share of their tax money that goes to people they care about. We also see that the degree of redistribution is decreasing in the elasticity of the tax base $\varepsilon(n)$ because a higher elasticity increases the cost of redistribution. Furthermore, we observe that redistribution is increasing in R/P, because a higher share of rich people reduces the tax cost of financing a given level of transfer to the poor. From (17) we can derive the optimal unit tax when the rich are in majority, t_R^*. In general this tax will be a function, $t_R^* = t_R(\alpha(n), \varepsilon(n))$, of the weight given to minority interests, $\alpha(n)$, and the elasticity of the tax base, $\varepsilon(n)$. The equilibrium tax rate will therefore be higher the more the rich majority care about the minority of poor and lower the more elastic the tax base is.

When $P > R$ the median voter is a poor individual. We assume that the group of poor people who prefer the lowest level of transfers will be the median voter, since they get the support of the rich voters. The poor people who only care about rich people that live in country i and do not engage in cross-border shopping, will place most weight on the welfare of the rich. This group is therefore the group of poor persons that will prefer the lowest transfers. The median voter preferences, and the government's objective function in country i, is then given by

$$W_i = v(c_{Pi}) + \alpha(n)v(c_{Ri}) \tag{18}$$

where the weight given to minority interests, $\alpha(n)$, as well as c_{Pi} and c_{Ri}, are the same as when the rich was in majority. The government is faced with the budget restriction given by (12) and the Lagrangian for the governments optimization problem is therefore given by

$$L_i = v(c_{Pi}) + \alpha(n)v(c_{Ri}) + \lambda_i \left[\frac{t_i}{1+t_i} X_i - \frac{P}{n} T_i \right] \tag{19}$$

The first order conditions of the government optimization problem are given by

$$\frac{\partial L_i}{\partial t_i} = \frac{-\alpha(n)}{(1+t_i)^2} v'(c_{Ri}) + \lambda_i \left[\frac{1}{(1+t_i)^2} X_i + \frac{t_i}{1+t_i} \frac{\partial X_i}{\partial t_i} \right] = 0 \tag{20}$$

$$\frac{\partial L_i}{\partial T_i} = v'(c_{Pi}) - \lambda_i \frac{P}{n} = 0 \tag{21}$$

$$\frac{\partial L_i}{\partial \lambda_i} = \frac{t_i}{1+t_i} X_i - \frac{P}{n} T_i = 0 \tag{22}$$

from (21) we get that $\lambda_i = \frac{v'(c_{Pi})}{P/n}$. Using symmetry of the equilibrium solution, we can substitute into (20) and get

$$\frac{v'(c_{Ri})}{v'(c_{Pi})} = \frac{R}{P} \frac{[1-(1+t_i)\varepsilon(n)]}{\alpha(n)} \tag{23}$$

from (23) we can derive the optimal tax rate when the poor are in majority, t_p^*, as a function of the weight given to minority interests, $\alpha(n)$, and the elasticity of the tax base, $\varepsilon(n)$, i.e. $t_p^* = t_P(\alpha(n), \varepsilon(n))$. We observe that the degree of redistribution also in this case is decreasing in the elasticity of the tax base. This is what we would expect, since a more elastic tax base makes redistribution more costly. However, while the degree of redistribution

was increasing in the weight put on minority interests when the rich were in majority, it is now a decreasing function of this weight. This reflects the fact that the exploitation of the rich minority is checked partly by the possibility of cross-border shopping, but also by the concern the majority feels for the welfare of the minority group. As in the case where the $R > P$, we observe that redistribution is increasing in R/P because it reduces the tax cost of financing transfers. If $\alpha(n)$ is sufficiently small compared to $\varepsilon(n)$ we could in this case get a solution where the poor have a higher after tax income than the rich, i.e. that $\frac{v'(c_{Ri})}{v'(c_{Pi})} > 1$. Clearly, this solution presupposes that the rich cannot pretend to be poor. If this were not the case, the maximum level of redistribution would be given by $v'(c_{Ri}) = v'(c_{Pi})$.

3 The Optimal Number of Jurisdictions

We are interested in studying how the degree of redistribution and global welfare are affected by the size, or equivalently the number, of jurisdictions. In order to do this, we ask what number of jurisdictions would be optimal from the perspective of an utilitarian global planner. The global planner should primarily be seen as a device that introduces a moral perspective and not as an actual entity. However, if we think of jurisdictions as states within a federation, or counties within a nation-state, we could view the global planner as a constitutional assembly with the power to determine the number of states or counties.

We assume that redistribution has to take place within sovereign jurisdictions and that the only policy instrument the global planner has to her disposal is the delimitation of fiscal jurisdiction. The global planner can in other words determine the number of jurisdictions, n, but has to leave the determination of the tax policy to the discretion of the majority in each country.[8] There are two reasons why the decentralized choice of tax policy

[8]It should be noted that this paper analyses political rather than economic integration. Economic integration typically involves increased inter-jurisdictional mobility of factors and commodities. In this model economic integration could be interpreted as a reduction in c, the transportation cost. It is easy to see that economic integration might not be an improvement from the point of view of the utilitarian global planner since it increases the positive tax externalities between jurisdictions. If the rich are in majority we would want to set c prohibitively high since this would transform the unit tax on capital into a lump-sum tax. However, if the poor people have the majority, we might want a lower c in order to prevent the poor from exploiting the rich minority.

might differ from the tax policy that would maximize global welfare. First, the objective function of the government in each country is not given by an utilitarian welfare function, but by the preferences of the median voter. Secondly, when there is more than one country there will be tax externalities between the jurisdictions. These externalities would be internalized by the global planner.

We assume that the global planner is concerned with global welfare in the sense that she wants to maximize the sum of utility in the world. The objective function of the global planner is therefore given by

$$W = Rv(c_R) + Pv(c_P) \tag{24}$$

where $c_R = \frac{1}{1+t^*}$ is the consumption level of the rich. From the governments' budget restriction (12) we have that the consumption level of the poor is given by $c_P = T^* = \frac{t^*(n)}{1+t^*(n)}\frac{R}{P}$. If the global planner could determine the tax policy in each jurisdiction, she would set the unit tax so as to equalize the consumption level of the rich and the poor, i.e. $c_R = c_P$. This first best solution is achieved when the unit tax is equal to $t^* = \frac{P}{R}$ and the transfer is equal to $T^* = \frac{R}{N}$. However, we have assumed that the global planner is restricted to choose n. We have seen that the solution to the median voter optimization problem gives the optimal unit tax under the two regimes as a function of the weight put on the welfare of minorities and of the elasticity of the tax base. Both of these variables are functions of the number of countries, n. The equilibrium unit tax, $t^*(n)$, is given by

$$t^*(n) = \begin{array}{ll} t_R(\alpha(n), \varepsilon(n)) & if \quad R > P \\ t_P(\alpha(n), \varepsilon(n)) & if \quad R < P \end{array} \tag{25}$$

where we know that $\alpha'(n) > 0$ and that $\varepsilon'(n) > 0$. Furthermore we have that $\frac{\partial t_R^*}{\partial \alpha(n)} > 0$, $\frac{\partial t_P^*}{\partial \alpha(n)} < 0$, $\frac{\partial t_R^*}{\partial \varepsilon(n)} < 0$ and $\frac{\partial t_P^*}{\partial \varepsilon(n)} < 0$. The optimization problem of the global planner is therefore to choose n so as to maximize

$$W = Rv(\frac{1}{1+t^*(n)}) + Pv(\frac{t^*(n)}{1+t^*(n)}\frac{R}{P}) \tag{26}$$

The first order condition of this problem looks like this

$$\frac{\partial W}{\partial n} = \frac{-R}{(1+t^*)^2}\frac{dt^*}{dn}v'(\frac{1}{1+t^*}) + \frac{R}{(1+t^*)^2}\frac{dt^*}{dn}v'(\frac{t^*(n)}{1+t^*(n)}\frac{R}{P}) \leq 0 \qquad (27)$$

where $\frac{dt^*}{dn}$ will depend on whether the rich or the poor are in majority. From (27) we can in principle derive the optimal number of countries, n^* that maximize global welfare. Ideally the global planner wants to set n such that $t^*(n) = \frac{P}{R}$. However, there might not be any n for which the first best solution is achieved. The optimal n will then be a corner solution.

The optimal number of jurisdictions will depend on whether the capital owners or the poor are in majority. When $P > R$, an increase in the size of countries will increase the degree of redistribution both because it makes it more difficult for the capital owners to escape taxation and because it increases the tendency of the majority to neglect the interests of the capital owners. We observe that for $n = 1$ the poor will have a higher after-tax income than the rich because the unit tax effectively is a lump-sum tax. The global planner might therefore want to set $n > 1$ in order to restrain the exploitation of the capital owner. This result echoes that of Buchanan and Brennan (1980) who argue that inter-regional tax externalities, due to tax competition, are beneficial since they make taxation more costly and thus impose restrictions on the tax authority. However, the global planner will not set n so high that $\frac{v'(c_{Ri})}{v'(c_{Pi})} < 1$.

When $R > P$ the median voter is a rich person. In this situation an increase in the size of jurisdictions has two counteracting effects. First, it reduces the cost of redistribution by reducing the international tax externalities associated with cross-border shopping. However, an increase in the size of jurisdictions will also reduce the weight given to minority interests by the median voter. Since the unit tax in this situation always will be lower than, or equal to, the first best optimum, the global planner simply chooses the number of jurisdictions that maximizes $t_R(\alpha(n), \varepsilon(n))$.

The debate about unification and enlargement of political units has focused on the problem of tax competition and the economic literature has shown that countries might gain from unification since tax externalities might be eliminated. However, the analysis presented above has shown that an increase in the size of jurisdictions also might reduce the motivation to take the welfare of minorities into account and undermine the solidarity that is essential for the support of the welfare state. There might therefore be sit-

uations where an enlargement of political units might reduce the degree of redistribution.

4 Concluding remarks

This paper has shown that a territorial delimitation of fiscal jurisdiction, and decentralization of tax policy, might be justified even when the sole purpose of fiscal policy is to redistribute between rich and poor and when the cost of redistribution is increasing in the number of jurisdictions. The basis for this result has been the assumption that people are limited and impure altruists and that the size of jurisdictions therefore affects the motivation to take account of minority interests.

David Hume (1777, 145-146) is well know for his claim that questions of distributive justice only arise under conditions of moderate scarcity. However, Hume also argued that limited benevolence is part of the circumstances of justice and this paper illustrates the importance of this factor in evaluating the delimitation of fiscal jurisdictions. The relationship between minority interests and country size established in this paper can also be seen as a contribution to an important discussion in contemporary normative theory. Many writers on international justice have been concerned with the apparent tension between cosmopolitan moral theories and the existence of nation-states with responsibility for redistribution within their territory. This paper reduces this tension by showing how a delimitation of jurisdictions can be justified even within cosmopolitan moral theories. From the point of view of the global planner, state borders can be seen as convenient ways of allocating responsibilities that themselves derive from universal principles like the utilitarian principle. Robert Goodin (1995, p. 282) makes the same point when he argues that "a great many general duties point to tasks that, for one reason or another, are pursued more effectively if they are subdivided and particular people are assigned special responsibility for particular portions of the task". Often this has to do with the advantage of specialization and division of labour (Shue 1988). At other times, it has to do with lumpiness in the information required to do a good job, and the limits on people's capacity for processing requisite quantities of information about a great many cases at once. This paper has focused on the nature of altruism and shown that it makes sense from a utilitarian point of view to let people who care about each other's welfare be responsible for each other's welfare. This might seem like

an obvious point, but it is often neglected in discussions about enlargement and separation of jurisdictions.

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