



WIDER Working Paper 2016/173

Tax revenue implications of trade liberalization in low-income countries

Lovisa Moller*

December 2016

In partnership with



Abstract: Liberalizing trade has proven highly challenging for some low-income countries, as a large share of their tax extraction derives from trade taxation. After significant drops in tariff levels over the last 30 years, the recovery of lost revenues by other sources of taxation has been highly uneven among these countries. This study demonstrates that recovery has been significantly stronger in countries that have simultaneously initiated a process of democratization. An analysis of 35 low-income countries between 1975 and 2006 is presented. For each dollar lost in trade taxation, democratizing countries have been able to regain approximately 45 cents from other sources in the long run; however autocratic countries show no sign of recouping tax losses.

Keywords: trade liberalization, political regimes, taxation, development.

JEL classification: H2, H87, F13

Acknowledgements: I am grateful to UNU-WIDER for supporting the research. I thank Sarah Goff, Kenneth Heydon and Victor Laupente for their advice and encouragements. I would also like to thank the participants of the UNU-WIDER Symposium on Taxation and Revenue Mobilization in Developing Countries in March 2016 in Helsinki, Finland, for helpful comments and suggestions. All remaining errors are my own.

* ActionAid UK, London, United Kingdom, lovisa.moller@actionaid.org.

This study is an outcome of the Symposium on Taxation and Revenue Mobilization in Developing Countries organized by the International Centre for Taxation and Development (ICTD) and the United Nations University World Institute for Development Economics Research (UNU-WIDER). It is part of UNU-WIDER's research project on 'Macro-economic management (M-EM)'.

Copyright © UNU-WIDER 2016

Information and requests: publications@wider.unu.edu

ISSN 1798-7237 ISBN 978-92-9256-217-5

Typescript prepared by Sandra Rawlin.

The United Nations University World Institute for Development Economics Research provides economic analysis and policy advice with the aim of promoting sustainable and equitable development. The Institute began operations in 1985 in Helsinki, Finland, as the first research and training centre of the United Nations University. Today it is a unique blend of think tank, research institute, and UN agency—providing a range of services from policy advice to governments as well as freely available original research.

The Institute is funded through income from an endowment fund with additional contributions to its work programme from Denmark, Finland, Sweden, and the United Kingdom.

Katajanokanlaituri 6 B, 00160 Helsinki, Finland

The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of ActionAid, the Institute or the United Nations University, nor the programme/project donors.

1 Introduction

Trade taxation is generally an important source of government revenue in the early stages of economic development. The reduced use of tariffs implies a decreased usage of one of the least administratively demanding taxes to collect (Emran and Stiglitz 2005). Many of the world's richest countries have relied heavily on tariffs as a means of raising revenue to fund the establishment of their modern state bureaucracies. For example, tariffs reached high levels as a means of funding the civil war in the United States (O'Rourke 2000) and more than three-quarters of Australia's tax revenue stemmed from trade at the end of the 19th century (Levi 1988). This tax option is not as readily available today.

Reduced import tariffs were one of the key components in the International Monetary Fund's (IMF) and the World Bank's (WB) structural adjustment loans. More than 40 developing countries had already faced loan conditionality related to trade liberalization after the first decade of reforms (Greenaway and Milner 1991). By the late 1990s, low-income countries had lost about a third of their tariff revenues over the previous two decades (Baunsgaard and Keen 2010).

The world's poorest countries have experienced a drop in total tax revenues during the period of trade liberalization, from initial levels that were already alarmingly low (Baunsgaard and Keen 2010). Very low tax levels make the provision of public investments for growth and development insufficient, which harms both human development and private-sector growth (Sachs and McArthur 2005). Critics have questioned restrictions on the use of tariffs, as they risk weakening the revenue base of states that are already financially strained (Rodrik 1990; Stiglitz 2005). Stiglitz goes as far as arguing that globalization thereby has contributed to state failures (Stiglitz 2005). Due to the high reliance on trade taxation in low-income countries, the risks associated with lost revenue from trade are a particularly serious issue for these states (OECD 2005). In response to such concerns, the standard tax policy advice has been that trade taxes ought to be replaced with domestic consumption or income taxes. However, the implementation of alternative tax policies is challenging, as low-income countries tend to have a small domestic tax base, and tax administrations of lower capacities than countries at the later stages of economic development (OECD 2005).

This paper focuses on the impact of trade liberalization on the tax revenues of low-income countries. Previous studies on this topic have focused on economic factors, leaving the impact of differences in political regimes unexplored. This paper adds to the existing literature by studying the evidence of tax recovery after trade liberalization in low-income countries that have initiated a process of democratization, separately from the autocratic low-income countries. It thereby explores whether democratic transition can explain some of the varying experiences in the low-income country group. It demonstrates that the recouping of lost tariff revenue by other sources has been significantly stronger in low-income countries that have simultaneously initiated a process of democratization, *ceteris paribus*.

This paper proceeds as follows. Section two explores how trade liberalization can affect state revenues. Section three presents the alternatives to trade taxation that states face. Section four analyses the findings of previous studies of trade liberalization's tax revenue implications. Section five outlines how the regime type can affect a shift of the tax base. The empirical strategy is presented in section six and the results in section seven. Section eight concludes the paper.

2 Trade liberalization and state revenue

Low-income countries collected 16 per cent of GDP in taxes in the early 1980s, a figure that fell below 14 per cent in the late 1990s (Baunsgaard and Keen 2010). To put these figures into perspective, the member states of the Organisation for Economic Co-operation and Development (OECD), some of the world's wealthiest countries, had average tax levels of around one-third of GDP during the same period (OECD 2013).

Whilst the poorest countries' tax revenues have dropped, they have simultaneously become more involved in world trade. Total exports and imports as a share of gross domestic product (GDP) rose from 36 per cent in 1985 to 62 per cent in 2008 in the world's least developed countries (LDCs) (UNCTAD 2010). This development thus runs contrary to the general trend among more open economies, which tend to have larger government expenditures. Rapid shifts towards trade openness are associated with price convergence towards global market prices combined with a slower adaptation of wage levels, which risk having a detrimental impact on the poorest people in society (Basu 2007). Rodrik (1998) argues that the risk-reducing role that government expenditure can fill when external risk increases as a result of freer trade is a plausible explanation for the general link between openness and government revenue. If Rodrik's reading of the evidence is accurate, reduced government finances as countries become more globalized will impair the outlook of maintaining free trade. Revenue losses as a result of liberalization have previously caused rapid reversals of liberalizing policies in recent decades, of which the partial policy reversals in Senegal and Bangladesh in the late 1980s are two examples (Waglé 2011).

The tax revenue implications of trade liberalization are not a given. Trade liberalization intended to increase trading volume can both increase and reduce tax revenue from trade (Rodrik 1990). If tariffs have been used as an industry protective measure, or if quantitative restrictions banning imports above certain volumes have been in use, the liberalization process can increase total trade tax revenues by replacing quantitative restrictions with tariffs, or by reducing tariff rates. One example of such effects is the early liberalization process in Kenya, where the numerous bans on imports before the structural adjustment programme contributed to the initially increasing revenues from trade as a result of the programme (Greenaway and Milner 1991). Increased demand for imported goods can also off-set the revenue costs of liberalization by generating larger trading volumes to tax (OECD 2005), and reduced incentives to smuggle can widen the tax base (Greenaway and Milner 1991; Rodrik 1990). The relationship between tax rates, the elasticity of demand, and tax revenue is graphically expressed by the Khaldun-Laffer curve. From this follows the theoretical concept of a revenue-maximizing tariff; the tariff point at which both a reduction and an increase of the tariff will result in lowered trade tax revenues (Adams 1981). If the initial tariff is lower than the revenue-maximizing tariff, trade liberalization will result in tax revenue loss. Attempts to establish this threshold empirically have been carried out (e.g. Khattry and Rao 2002) but have also endured critique for being somewhat of a chimera (Baunsgaard and Keen 2010). In either case, there is no questioning of the fact that any continuing liberalization process will eventually reach the point when further trade liberalization will have a negative impact on trade tax revenue.

As trade volumes have increased, trade taxes' share of total tax revenue in low-income countries has fallen. The countries classified by the UN as Least Developed have experienced a drop in trade tax revenue from 39 per cent of total tax revenue in the early 1990s to 31 per cent in the early 2000s (UNCTAD 2010). Sindzingre (2007) discusses the drop in trade tax revenues in Sub-Saharan Africa as a negative effect of liberalization. However, such a finding does not in itself indicate a problem. As countries develop, trade taxation revenues tend to make up a decreasing share of the total taxes that the government collects. This relationship is known as Kuznets' hypothesis. For

high-income countries, trade taxation revenues had dropped to below one per cent of the total tax intake by the end of the 1990s (Khattry and Rao 2002). Richer countries hence rely on domestic sources of taxation to a much higher extent. But for a recouping of lost tariff revenue from other sources to be possible, the government needs to both have the administrative capacity and a minimum level of societal consent for such a shift of the tax base.

Trade taxation, along with taxation on corporate profits, has been the most stable source of tax revenues for the world's LDCs (UNCTAD 2009). The United Nations Conference on Trade And Development (UNCTAD) describes the reduction of dependency on trade taxes as exerting 'considerable pressure on Governments' in their quest for alternative revenue sources (UNCTAD 2009). Domestic taxation carries a higher administrative cost than trade taxation. When tariff dependency is reduced at the very early stages of economic development, which options are readily available for recouping the revenues lost?

3 Recouping taxes from domestic sources of taxation

World Bank estimates indicate that trade taxes have administrative costs in the range of one to three per cent of revenues collected, in contrast to approximately five per cent for Value Added Taxation (VAT) and 10 per cent for personal income taxation (Khattry and Rao 2002). Even if high tariffs might prove costly for a society at large, low administrative costs are a crucial consideration for low-income countries (Greenaway and Milner 1991).

Several macroeconomic factors further complicate domestic taxation in low-income countries. Di John (2010) highlights a high share of agriculture in the total production, a sizeable informal sector, numerous micro businesses, a small share of wage earnings in the total national income, and the small share of total consumer spending made in modern businesses as key limitations to domestic taxation. Khattry and Rao (2002) further highlight the tendency towards higher age-dependency ratios and the dependency on exports of primary commodities as factors that make low-income countries stand out from the rest. As many of these societal traits are highly correlated, setting the effect of one of these attributes apart from another can prove challenging. However, these different structural characteristics have been linked to challenges to raising revenue from domestic sources. Combined, they provide a reason for caution in presuming that what currently works in the world's richest countries is easily transferable to LDCs.

The revenues that are still raised from domestic sources in low-income countries tend to mainly be in the forms of personal income taxation, corporate taxation and VAT (Cottarelli 2011). These options will be discussed in turn.

Revenues from personal income taxation are correlated with the level of urbanization in developing countries (Tanzi 1987). One way to understand this correlation is that dependency on agricultural production makes estimations of individuals' earnings more administratively challenging than they would be in a more urbanized economy. Urbanization is also linked to increased opportunity for domestic taxation through increased demand for services, which improves consent to tax collection. Accounting standards and literacy rates are also positively correlated to the amount of income tax that a developing country government collects (Tanzi 1987). Tanzi's analysis does however not establish a link between the country's wealth level and this type of taxation.

Corporate income taxation is more important for developing countries compared to developed countries (Baunsgaard and Keen 2010). Wealthier developing countries tend to be capable of

raising a larger share of their gross product in taxes from corporations (Tanzi 1987). Besides the lower fiscal capacity in the poorer developing countries, a higher prevalence of micro corporations is also likely to be part of the explanation. Micro corporations are less formally defined, and are also prone to having an income far lower than any sensible tax threshold (Cottarelli 2011). The high importance of corporate taxation might therefore appear contradictory, but makes sense given the very low levels of total tax revenues in low-income countries.

The promotion of VAT as a substitute of trade taxation has been especially marketed towards low-income developing countries (Fjeldstad and Moore 2008). The IMF Fiscal Affairs Department has been one of the forces behind the introduction of VAT in developing country tax systems since the late 1970s (Keen, 2012). The idea has been to take this system of indirect taxation, which was initially only practised in a handful of countries outside of Europe, and to export it as a relatively fair form of taxation that requires limited administrative capacity (*ibid*). In the 1980s, few developing countries had a general sales tax (Tanzi 1987). Much has happened since. Around 80 per cent of Sub-Saharan countries now have some form of VAT in use, the source of approximately one-fourth of these countries' tax revenues (Keen 2012). But the suitability of introducing VAT into low-income countries has been a matter of debate. Emran and Stiglitz (2005) have stressed that the taxation of final consumption goods through the introduction of VAT can prove challenging if the informal sector is large, as this prevents a share of the goods from being taxed. Ebrill et al. (2001) have also demonstrated that VAT generates less tax revenue in countries with lower literacy rates. Further, goods such as agricultural production can prove to be highly difficult to tax in any other way than through export taxation (Tanzi 1987). Despite the critique, the IMF Fiscal Affairs Department argue that compared to the alternatives, VAT still holds more revenue potential (Cottarelli 2011).

Besides the three key alternative sources of taxation, social security taxation (a tax based on wages paid) and wealth taxation are also mentioned in the discussion regarding low-income country taxes. Neither of these generally make up a significant share of revenue among developing countries.

In sum, the structure of the economy and low levels of human capital can make a shift in the tax base towards domestic forms of taxation a severe challenge for low-income countries. Whether the countries that have liberalized their trade have managed to recoup the lost revenue from domestic sources is therefore a matter of much-needed empirical scrutiny.

4 Previous studies of the revenue effects of trade liberalization

Turning to empirical evaluations, different strategies for mapping the revenue effects of trade liberalization are evident in previous research on low-income countries. Khattry and Rao (2002) and Agbeyegbe et al. (2004) scrutinize the total revenue effects of opening up to trade more generally, whilst the empirical strategies of Baunsgaard and Keen (2010) and Waglé (2011) target the process of recouping taxes if and when a drop in trade tax revenues occur. The two strategies and the resulting findings will be discussed in turn.

Khattry and Rao (2002) argue that falling trade tax revenues are linked to declining tax revenues in low-income countries. The cross-tabulation of the aggregate trends among the poorest developing countries indicates a slight drop in both trade taxes and total taxes from the early 1980s to the late 1990s. The study hence highlights a troublesome correlation between reduced trade taxes and total taxes for the low-income country group as a whole. In the regression analysis that follows, liberalizing the effective trade tax rate is found to have a negative effect on the total tax revenues. Agbeyegbe et al. (2004) address the same issue, but focus their analysis on Sub-Saharan

Africa specifically. Neither trade dependency nor the effective import tax rate are here found to be associated with total taxes. Agbeyegbe et al. (2004) therefore conclude that tax revenues can be preserved during liberalization.

The sample selection, estimation technique and time period could all contribute to the discrepancy in results between the two studies.¹ However, neither of the studies indicates that liberalization has been linked to increasing tax revenues among low-income countries, as is the general trend among countries at large. Relying on economic growth and other indirect drivers of increased government revenues as a replacement for lost trade taxes hence appears uncertain at best. The most pressing concern for policy practitioners evaluating the revenue challenge that trade liberalization poses therefore ought to be whether low-income countries have generally managed to recoup lost trade tax revenues from other sources of taxation, if and when a drop has occurred. The correlation between reducing trade tax revenue and total revenues that Khattry and Rao (2002) present is a cause for concern, but the relationship is only addressed in tabulation form. The studies carried out by Baunsgaard and Keen (2010) and Waglé (2011) address this issue more explicitly, by quantitatively assessing how many cents of each dollar lost in trade tax revenue are regained from increases in domestic sources of taxation.

Baunsgaard and Keen (2010) find that countries generally recoup lost trade tax revenue from other sources, but that the replacement rate in the low-income country sample over the period 1975–2006 provides reason for concern. The low-income countries that are analysed display a poorer tax recovery rate than middle- and high-income countries. No statistically significant long-term replacement is found for the low-income sample. Though the extended time period of analysis has improved the outlook for this group of countries, compared to the results that the same authors presented in a previous version of the same study (Baunsgaard and Keen 2005), the widely varying outcomes among low-income countries indicate that the transition has been problematic in many cases (Baunsgaard and Keen 2010).

Waglé (2011) presents a slightly more optimistic view. Using highly similar model specifications and sample, though only focusing on data from 1982 onwards, Waglé (2011) suggests that the tax recovery in low-income countries has been more robust than Baunsgaard and Keen's (2010) study indicated. However, a long-term replacement is still only statistically significant in two out of five model specifications in Waglé's (2011) study. The overall ability to replace lost trade taxes with domestic taxation, dollar by dollar, appears to have been unstable, also judging by the results of this study. The uncertain results for the low-income group indicate that these countries' experiences are likely to have varied widely. Controls for differing macroeconomic conditions within the low-income country group have been carried out in these studies, including controls for trade volume, wealth levels and aid volumes. Other aspects of tax reform due to trade liberalization in low-income countries still warrant careful investigation. A growing literature covering the implications of regime type for taxation has been left unaddressed by these existing studies.

¹ Agbeyegbe *et al.* (2004) analyse a sample of Sub-Saharan countries' experiences during the period 1980–1996 using a generalized method of moments (GMM) framework, whilst Khattry and Rao (2002) include countries outside of the Sub-Saharan region such as Bangladesh and Nicaragua and analyse taxation during the years 1970–98, using a fixed effects regression framework.

5 Taxation in democracies and autocracies

En par with the trade liberalization process in low-income countries, a democratization process has been on-going since the late 1970s (Milner and Kubota 2005). Regime changes towards democracy in low-income countries have tended to further trade liberalization pursuits (Milner and Kubota 2005). In the light of Stiglitz's (2005) statement that globalization has contributed to state failures through the weakening of already strained state revenues, it is worth exploring whether the countries that have taken moves towards democracy, and thereby steps away from complete coercive capacity, have been affected differently by reductions in tariff revenues. Could the regime type differences among low-income countries explain some of the variation in trade taxation replacement rates? To inform such an analysis, this section will survey the existing literature on the implications that differences in regime type have for the ability to impose taxes.

Levi's (1988) historical account of Western taxation establishes that the most economically efficient policy for taxation tends to be clearly subordinate to the most politically acceptable form of revenue collection. 'Rulers maximize revenue to the state, but not as they please' (Levi 1988: 184). The complex political process that a tax shift involves is affected by numerous factors, such as the state's history, the government's fiscal capacity, and the political institutions in place. Bräutigam (2008), like many political theorists approaching the issue of taxation, conceptualizes taxation as constrained by the capacity to tax and the consent to be taxed among the governed.

Coercion, or the ability to use force to implement policy, is less limited in dictatorships. Raising domestic taxes is likely to involve implementing unpopular policies, and democratic regimes are dependent on popular support. For such reasons, the ability of governments to raise taxes has often been considered to be more limited under democratic conditions (Cheibub 1998). Olson's (1993) reasoning also suggests that autocracies should be able to extract more taxes, as democracies can limit the coercive efforts to extract societal surplus. Coercion also plays a larger role in tax revenue collection in low-income countries (Moore 2008). But a common theme throughout Levi's (1988) analysis of the history of taxation is that the cost of coercing taxes should not be underestimated. Some types of taxes require voluntary compliance, or at least a minimal level of acceptance, if the revenue collection is going to be in any way cost efficient (Levi 1988).

Another way to conceptualize a government's ability to enforce taxes takes its starting point in people's consent to taxation. Theoretically, democratizing countries ought to have a higher level of consent to their policies as they are dependent on popular support, or at least an increasing selectorate, to enact policy. Levi (1988) stresses the linkage between an increased selectorate and income taxation. In the light of the first British experience of income taxation in 1799 and its repeal 17 years later, Levi concludes that '[s]uch intrusive and unpopular form of taxation could occur only when the Parliament and not the crown controlled tax policy' (Levi 1988: 176).

The European states' democratization processes have been associated with larger state administrations and increased rates of domestic taxation. But does the same relationship hold for the world's poorest states? Recent regime changes are taking place in a globalized world, where mass politics and concepts such as universal human rights are in stark contrast to the historical European experience, and this generates different political limitations. Ayooob (1995: 178) reasons that 'repression alone is no longer sufficient to maintain the fragile fabric of political unity within Third World states and to attain the goals of the state-making process.' In this view, the current wave of democratization is driven by a realization among political elites that their political survival rests on a perceived political participation (Ayooob 1995: 180). Though this stream of reasoning is distant from Levi's (1988), the implications for this paper's research question might still overlap. Thies' (2004) reading of Ayooob leads him to conclude that democracy, in the developing world

context, should be related to increased state building efforts, and thereby also greater ease in revenue collection.

Regime changes towards democracy can also make governments more fragile. When reasoning about tax changes, Keen (2012) makes the convincing point that political instability could reduce the incentives for the government to invest in administrative capacity. This could constitute a cause for concern regarding the newly democratizing countries, as they have been in the process of regime reformation since the late 1970s.

Empirical studies of democracy's impact on taxation display varying results. Cheibub (1998) analyses the taxation levels in developing and developed countries and finds no differences in extractive capacity between democracies and dictatorships, whilst Garcia and Haldenwang (2016) find that 'full autocracies' and 'full democracies' manage to collect a larger proportion of their GDP in taxes than 'hybrid' or 'anocratic' regimes. Fauvelle-Aymar (1999) and Thies (2004) have analysed developing countries separately. Fauvelle-Aymar's (1999) study determines that autocracies had higher levels of total taxation than democracies. Thies (2004) instead finds that democracy is related to an increased tax ratio in developing countries. The sample sizes are similar, above 80 countries, and both studies include a wide range of political, economic and regional control variables. Whilst Fauvelle-Aymar's (1999) study focuses solely on the 1980s, Thies' (2004) analysis is based on data for the years 1975–2000, which could account for the discrepancy in results. The shorter time span excludes the large amount of transitions that took place in the 1990s, which has been the main transition period for the 35 low-income countries that this paper analyses, as will be shown below. Hence, Thies' (2004) results might be more informative for this paper's research question.

In sum, whilst autocracies might be more able and willing to make use of coercion, consent to the expansion of domestic taxation ought to be easier to establish in democratizing countries. It is worth noting that the studies discussed above have focused on mapping the current level of taxation in different regime types, rather than mapping the ability to rapidly increase domestic resource mobilization. Which type of regime has been more capable of shifting the burden of taxation from trade to other sources still warrants further exploration. The following section describes the empirical strategy employed to explore this issue.

6 Empirical strategy

The capacities of autocracies and democratizing countries to recover lost trade taxation from other sources will be estimated replicating the estimation equation introduced by Baunsgaard and Keen (2005, 2010) and replicated by Waglé (2011). An additional estimation equation is also introduced, which enables the comparison of the two groups of countries within one model. The basis for the empirical analysis is an unbalanced panel of 35 low-income countries during the years 1975–2006.² A full list of the countries included in the sample, as well as sources and descriptive statistics for the variables used, are presented in the appendix. Below, the estimation of democratization and the taxation measurements are described, before turning to the estimation technique.

² The taxation data that this paper utilizes for its analysis has been produced for 42 low-income countries. The sample reduction to 35 countries is based on data availability. Countries for which the democracy rating and control variable data is available are included. The full time period with available taxation data is analysed.

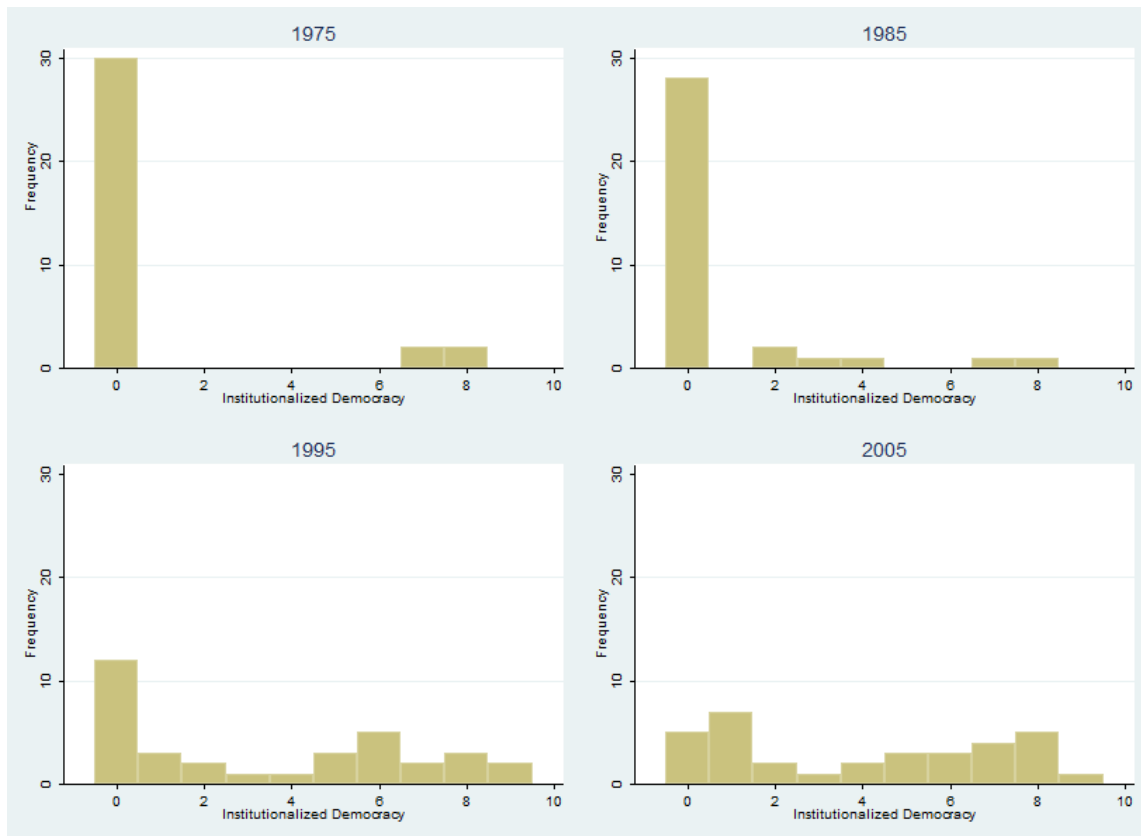
6.1 Estimating democratization

In order to establish whether countries with some democratic progress have been more successful in replacing declining tariff revenues with domestic sources of taxation, the 35 low-income countries are divided into two subsamples: ‘democratizing countries’ and ‘autocratic countries’.

The estimate used to capture the process of democratization is the Polity IV project’s indicator of Institutionalized Democracy (Marshall *et al.* 2014). The indicator is an additive eleven-point scale ranging from zero to ten. The Polity IV project is one of the most widely used measurements of democracy and captures different aspects of democratization that make up its subcomponents—political participation, openness of executive recruitment, competitiveness of executive recruitment, and constraints of the chief executive. Figure 1 displays how the democracy rankings have developed over the last decades and highlights the large increase in democratizing countries in the mid-1990s. Alternative indicators, such as the democracy classification proposed by Cheibub *et al.* (2010), were considered as controls, but a very limited number of low-income countries manage to live up to the democracy classification in these binary indicators, creating a democracy subsample that was deemed too small for the purpose of this analysis. The benefit of the Polity IV ranking is that it captures the gradual institutional shift towards democracy and thereby enables the analysis of the differences also among low-income developing countries, which tend to have lower democracy scores than developing countries at large.

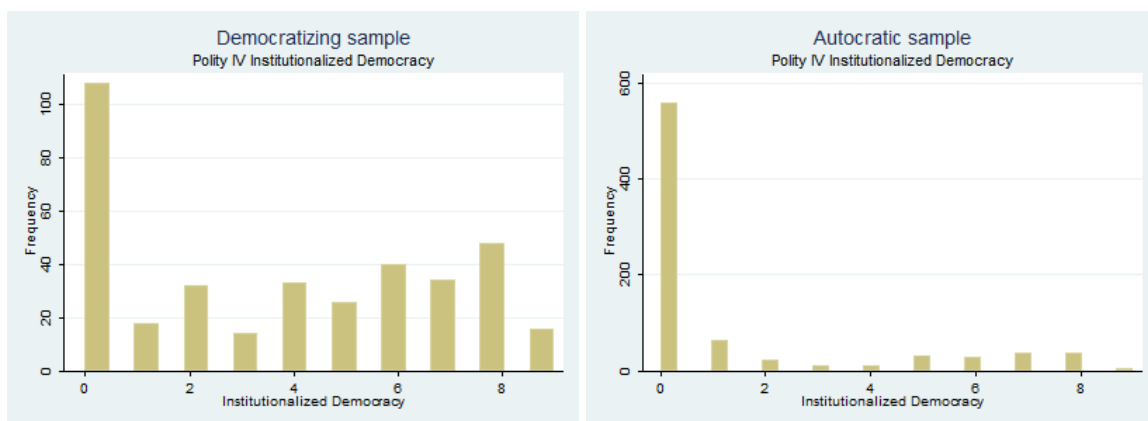
Countries are classified based on whether they have had more years marked by steps towards democratization or more years as complete dictatorships, during the period 1975–2006. The 25 countries that have been complete autocracies during most of these years, corresponding to a zero score on the democracy indicator, are included in the ‘autocratic countries’ group. Ten countries have had a democracy score of one or more during most of the time period and are classified as the ‘democratizing countries’ group. Figure 2 illustrates the differences in democracy rankings between the two subsamples.

Figure 1. Democracy rankings, 35 low-income countries



Source: author's illustration based on data from Marshall et al. (2014).

Figure 2. Democracy rankings per subsample, 1975–2006



Note: The median ranking in the democratizing sample is 4, whilst the median ranking in the autocratic sample is 0.

Source: author's illustration based on data from Marshall et al. (2014).

6.2 Taxation

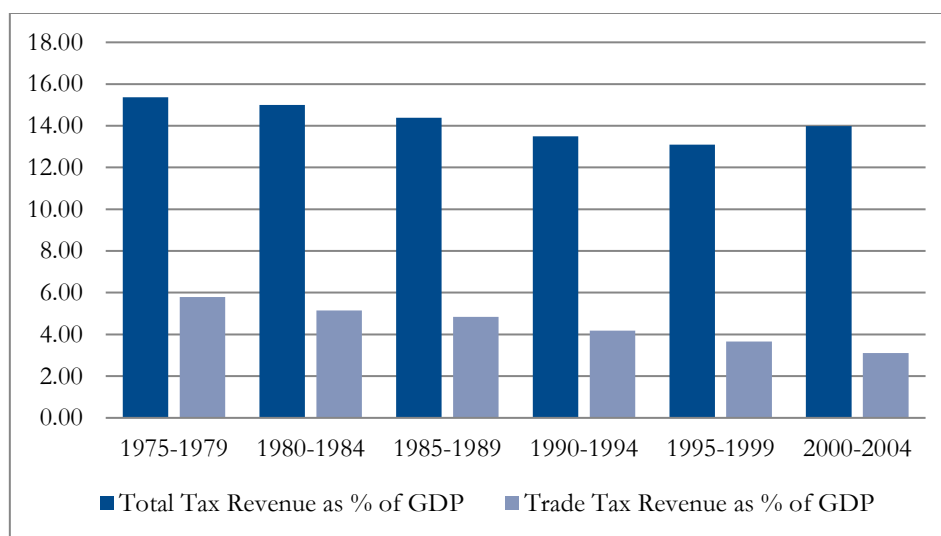
The levels of trade taxation and domestic taxation are explored. Domestic taxation is defined as all forms of tax intake that are not related to trade, from which it follows that the sum of the trade taxation and the domestic taxation will be the total tax intake for a given country in a given year. Internally compiled IMF data is utilized, which provides more reliable estimates of trade taxation and domestic taxation than the data publicly available (Baunsgaard and Keen 2010). The data is

based on the IMF Government Finance Statistics (GFS), with adjustments based on additional information available in the IMF Article IV consultation reports (Baunsgaard and Keen 2010).

Figure 3 displays the mean levels of trade taxation and total taxation over time for the 35 low-income countries. On average, these countries have experienced a 40 per cent drop in trade tax revenue from the late 1970s to the early 2000s. Figures 4 and 5 provide an overview of the data for the two subsamples. The autocratic countries and the democratizing countries both had their highest trade tax revenues of above six per cent of GDP on average, before both groups dropped to around 3 per cent of GDP towards the end of the time period. Though there is no significant difference in total tax revenues between the two groups initially, there is a clear discrepancy towards the early 2000s. The democratizing sample appears to have upheld their total revenues on average, whilst the autocracy group's total tax levels have dropped from a level that was already worryingly low.

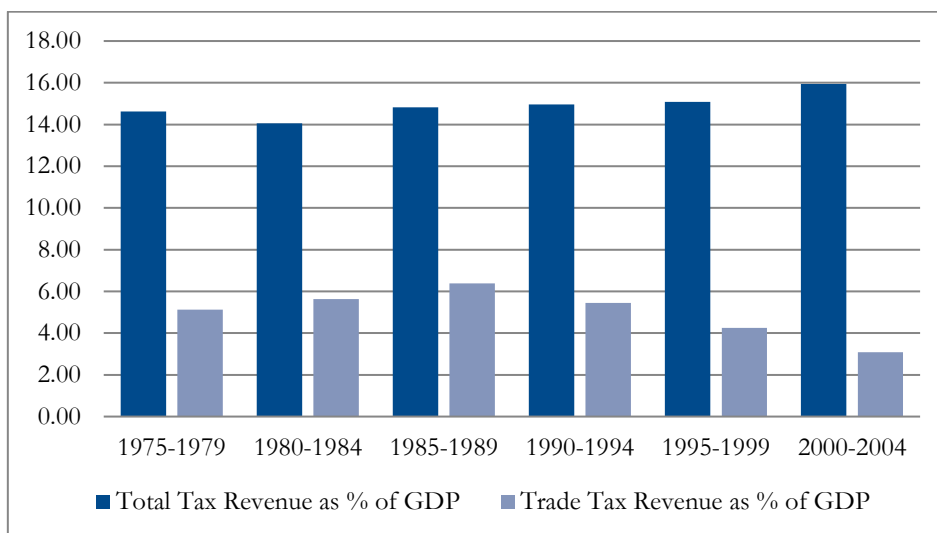
The tables display an interesting difference between autocracies and democratizing countries, though several factors could impact on the patterns that are displayed. As the average tax levels do not display the transitions at a country level, the countries that experienced increases in domestic taxation might be different from those with falling trade tax revenues. Underlying factors, such as differing developments of urbanization or wealth, could also account for the differences between the two country groups and explain the shifts at the country level. Next, a more sophisticated estimation technique is therefore introduced.

Figure 3. Total tax revenue and trade tax revenue compared, full sample



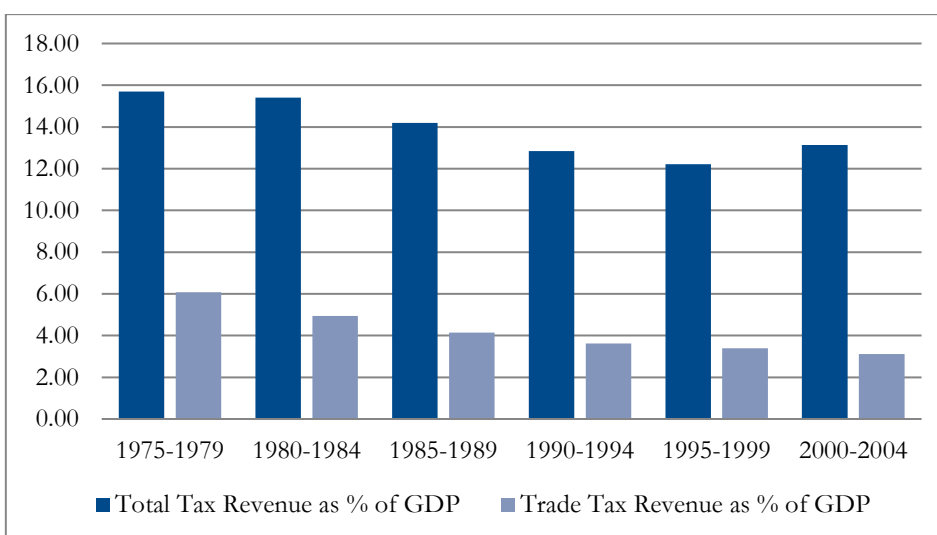
Source: author's illustration based on data from Baunsgaard and Keen (2010).

Figure 4. Total tax revenue and trade tax revenue compared, democratizing countries subsample



Source: author's illustration based on data from Baunsgaard and Keen (2010).

Figure 5. Total tax revenue and trade tax revenue compared, autocratic countries subsample



Source: author's illustration based on data from Baunsgaard and Keen (2010).

6.3 Estimation technique

Estimates of both short-term and long-term replacement rates of domestic taxation are conducted using a fixed effects regression analysis framework. Following previous studies released by the IMF (Baunsgaard and Keen 2005, 2010) and the World Bank (Waglé 2011), I estimate the expected level of domestic taxation using the model specification:

$$D_{it} = \alpha_i + \beta_0 D_{i,t-1} + \beta_1 T_{it} + \beta_2' X_{it} + \mu_t + \varepsilon_{it} \quad (1)$$

where taxes raised from domestic sources (D_{it}) are expressed as a function of domestic revenues during the previous year ($D_{i,t-1}$), trade tax revenues (T_{it}), control variables linked to revenue mobilization (X_{it}), controls for country- and time-specific effects (α_i , μ_t), and an error term (ε_{it}).

The included controls are measurements of import and export dependency, wealth levels, inflation, aid, and dependence on agriculture. The main studies that motivate these controls are Tanzi (1987) and Rodrik (1998), both discussed above. Previous studies have also highlighted that aid has had a reducing effect on the tax effort (e.g. Bräutigam and Knack 2004) and that high inflation has been associated with reduced tax revenues (e.g. Agbeyegbe et al. 2004).

The model will be used to estimate whether reduced trade tax revenues have been associated with increasing domestic taxation. A negative and statistically significant trade taxation coefficient, β_1 , would imply that as trade taxation revenues have fallen, domestic taxation revenues have been increasing, controlling for other variables. Stating the recovery of taxes as a positive number, the short-term replacement (*STR*) when a reduction in trade tax revenues occurs is hence estimated by

$$STR = -\beta_1 \quad (2)$$

As a lag of the dependent variable is included in the model specification, this allows for estimates of the long-term adjustment of domestic taxation in response to lowered trade taxation revenues. The long-term replacement (*LTR*) when a decrease in trade tax revenues occurs is captured by the expression

$$LTR = \frac{-\beta_1}{1-\beta_0} \quad (3)$$

(Baunsgaard and Keen 2010: 566).³

Three regression analyses constitute the main empirical evidence of this paper. First, the regression model outlined above will be applied to the democratizing countries and the autocratic countries separately, which allows all coefficients to vary between the two samples. The reasons behind this strategy draw on Baunsgaard and Keen (2010: 569), who make a convincing case for the fact that low-, middle- and high-income countries need to be analysed separately. Simple country fixed effect controls can capture differences in the average levels of domestic taxation, but including countries of different income groups in the same study leaves out the possibility that the relationship between trade taxation and domestic taxation has taken a different shape in these different categories of countries (Baunsgaard and Keen 2010). Following a similar logic, differing capacities between political regimes to hastily increase domestic taxation levels could set the low-income countries that are able to recoup revenues apart from the rest.

The third regression analyses the data from all 35 countries simultaneously. A slightly altered model specification is used for this regression. It is designed to allow for variation in the coefficient estimating trade taxation's effect on domestic taxation between the two regime types, whilst all other coefficients are kept the same for both groups of countries. A dummy variable (*DEMO*) is

³ This expression is not further addressed by Baunsgaard and Keen (2010), but can be derived considering the geometric series that the effect of a change in *T* has on the estimates of *D* for the following years, holding other variables constant. The part of the effect that is carried forward is multiplied by β_0 for each subsequent year. This geometric progression that arises converges towards the sum formula $1/(1-\beta_0)$ as time goes to infinity, for all $|\beta_0| < 1$. The expression for estimation of the long-term effect is the product of the given sum formula and the short-term effect, $-\beta_1$.

introduced and coded 1 if the country belongs to the democratizing sample and 0 otherwise. The model specification is then

$$D_{it} = \alpha_i + \beta_0 D_{i,t-1} + \beta_1 T_{it} + \beta_2 DEMO + \beta_3 T_{it} * DEMO + \beta_4' X_{it} + \mu_t + \varepsilon_{it} \quad (4)$$

For this model specification, the short-term replacement (*STR*) following a drop in trade tax revenue is captured by

$$STR = -(\beta_1 + \beta_3 * DEMO) \quad (5)$$

Similarly, the long-term effect estimate is also adjusted to account for the interaction term

$$LTR = \frac{-(\beta_1 + \beta_3 * DEMO)}{1 - \beta_0} \quad (6)$$

In sum, three regression analyses and subsequent calculations of the short- and long-term effects of a drop in trade taxes will be carried out. First, the recovery of lost trade taxation from other sources is analysed for democratizing and autocratic low-income countries separately. Second, all 35 countries are analysed simultaneously, where only the trade taxation coefficient is allowed to vary between the two regime types. If recouping of lost trade taxes is evident in the short- and long-term for the democratizing countries, regardless of which model specification is used, this would provide firm evidence that this group of countries have managed to replace lost trade revenue with other tax sources. The following section presents the results of the three tests.

7 Results

The results from the three regression analyses and the subsequent calculations of replacement rates are presented in Table 1. I will first comment on the coefficients generated by the regression analyses, before turning to the calculations of how much lost tariff revenue has been recovered from other sources.

Column 1 reports the results for the democratizing country sample, whilst column 2 reports the results for the autocratic countries.⁴ The coefficient of main interest is the coefficient for trade tax revenues. A negative coefficient indicates that domestic taxation levels have tended to rise as trade taxation levels have fallen, controlling for other variables. The difference between the two groups is evident. The coefficient is negative and statistically different from 0 for the democratizing countries, whilst no relationship is prevalent among the autocratic countries.

The control variable coefficients are generally as would be presumed, though the effects of the controls differ slightly for the two groups. Imports and exports are positively associated with domestic taxation for the democratizing sample, whilst no effect is evident for the autocratic countries. The effect of GDP p.c. is more puzzling.⁵ It appears that democratizing countries with

⁴ The model specification for these two regression analyses is the same, see equation 1 in the previous section.

⁵ Previous studies have however presented varying results regarding the relationship between wealth levels and domestic taxation when specifically looking at countries at the early stages of economic development. Tanzi (1987:224) does not find any link between the country wealth level and income taxation and Thies (2004:66) establishes a negative relationship between GDP p.c. and total taxation when controlling for macroeconomic and political factors, including democracy.

higher wealth levels have collected less of their GDP in domestic taxation among the democratizing countries, controlling for the effects of the other explanatory variables. Again, no effect is evident for the autocratic countries. The effects of inflation levels and aid are not significant. Increased dependence on agriculture is negatively associated with domestic taxation for the autocratic countries, though no effect is evident in the democratizing country sample.

Column 3 presents the results for the analysis of all 35 low-income countries.⁶ The democracy dummy is positive and significant at the 0.01 level. Controlling for other variables, countries that have initiated a democratizing process have been able to collect around 3.2 per cent more of their gross product in domestic taxes, in line with Thies' (2004) findings. Turning to the main question of interest for this paper, there is no evident association between falling trade taxes and increasing domestic taxation for the autocratic countries. However, the interaction term between trade taxes and democracy is negative and significant, providing evidence of a replacement for the democratizing countries. The relationship between domestic taxation and the control variables is as expected, with increased trade volumes impacting positively and increased agricultural dependency impacting negatively on the domestic tax extraction. An effect of GDP p.c. is no longer evident.

The key empirical result is the outcomes of the replacement rate calculations. A replacement rate of one hundred cents per trade tax revenue dollar lost would indicate a complete recovery rate, controlling for other variables. In contrast, nil cents replacement per dollar lost would indicate a complete lack of recovery. In that case, each trade tax reduction would cause an identical drop in total tax revenues, when the effects of shifts in control variables such as the level of urbanization have been accounted for. Two estimates for each political regime are provided in Table 1.

For the democratizing countries, a significant recovery of lost tariff revenue is evident both in the short and long term. The results indicate a short-run replacement of 12 to 24 cents and a long-run replacement of 45 to 46 cents per dollar lost. Taking the measurement errors into account, we can be 95 per cent confident that the long-term replacement is between 4.8 and 84 cents.

The autocratic countries display far more worrying results. The short-term dollar-for-dollar replacement among the autocratic countries is estimated at an additional loss of 1.3 to 1.6 cents, although the estimate is not statistically different from a complete lack of replacement. The long-term estimate is an additional loss of between 4.7 and 6.2 cents per dollar in trade taxation, again not statistically significant. The results for the autocratic countries are in line with the first glance of the data that Figure 5 above displayed. The drop in the total tax extraction among these countries appears to have been associated with the drop in tariff revenues, which have not been recouped.

In order to further test the robustness of the results, the same tests are carried out on an alternative sample of countries at the earliest stages of development. The United Nations take further factors than income level into account when classifying which developing countries are at the earliest stages of economic development, whilst the IMF classification of low-income countries is solely based on wealth level. Fifty countries were classified by the United Nations as LDCs in 2006 (UNCTAD 2006), the last year covered by the taxation data set employed in this analysis. These countries have been defined as least developed not only in terms of their low wealth levels, but also as a result of weak human assets and high economic vulnerability. For example, Ghana and India, which have been included in this paper's sample of democratizing countries, are not classified as LDCs. On the other hand, middle-income countries that have not experienced signs

⁶ The model specification is defined in equation 4 in the previous section.

of democratization during most of the sample period, such as Mauritania and Vanuatu, are included on the LDC list. To control for whether the results found in this study are sensitive to changing the sample in accordance with the UN definition, the study is replicated on the 27 LDCs with available data. The full analysis is presented in the appendix. The replacement rates for democratizing countries are still positive and statistically significant, whilst the autocratic countries show no sign of replacement, which further confirms the findings in the main analysis.

Table 1. Determinants of domestic tax revenue

	(1) Democratizing countries	(2) Autocratic countries	(3) Full sample
<i>Independent variables</i>			
Domestic Tax Revenue t-1	0.478*** (0.0680)	0.744*** (0.0356)	0.721*** (0.0307)
Trade Tax Revenue	-0.237** (0.0768)	0.0159 (0.0442)	0.0130 (0.0376)
Democracy			3.188*** (0.726)
Trade Tax Revenue * Democracy			-0.137* (0.0692)
Imports and Exports	0.0613*** (0.0169)	0.0114 (0.00875)	0.0241*** (0.00733)
GDP p.c. (ln)	-4.080*** (1.190)	-0.566 (0.621)	-0.831 (0.586)
Inflation (ln)	-0.0620 (0.0998)	-0.0179 (0.153)	-0.0163 (0.116)
Aid	0.00188 (0.0266)	-0.00572 (0.0104)	-0.00643 (0.00989)
Share of agriculture in GDP	-0.0447 (0.0277)	-0.0400** (0.0768)	-0.0367** (0.0147)
<i>Calculations</i>			
Short-term replacement, Democratizing countries	0.237** (0.0768)		0.124** (0.0569)
Long-term replacement, Democratizing countries	0.455*** (0.175)		0.446** (0.203)
Short-term replacement, Autocratic countries		-0.0159 (0.0442)	-0.0130 (0.0376)
Long-term replacement, Autocratic countries		-0.062 (0.175)	-0.0467 (0.136)
Observations	229	525	754
Countries	10	25	35
R-squared	0.928	0.876	0.885

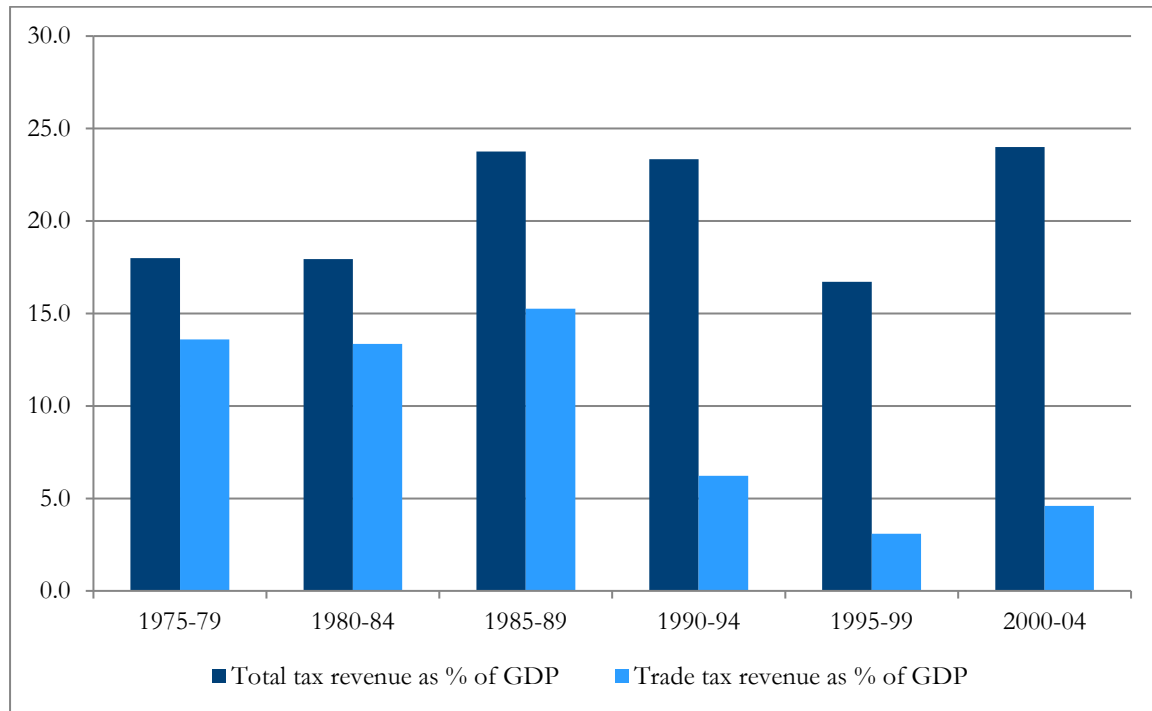
Note: The results of regression analyses controlling for country and time effects are presented. The dependent variable is domestic tax revenue. Robust standard errors, clustered by country, in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on data from Baunsgaard and Keen (2010) and Marshall et al. (2014). Definitions and sources of the variables included in the analysis are listed in the appendix.

The largest recouping of lost trade revenue in this study was achieved by The Gambia, which also displays the largest drop in trade tax revenue levels. An abrupt shift away from trade taxation to domestic revenue sources occurred in the early 1990s, before the July 1994 military coup (see

Figure 6). The Polity IV estimate of the level of Institutionalized Democracy in The Gambia before the coup is high (between 7 and 8), lending further support to the hypothesis of the importance of partial democratic transition.⁷

Figure 6. Tax revenue in The Gambia

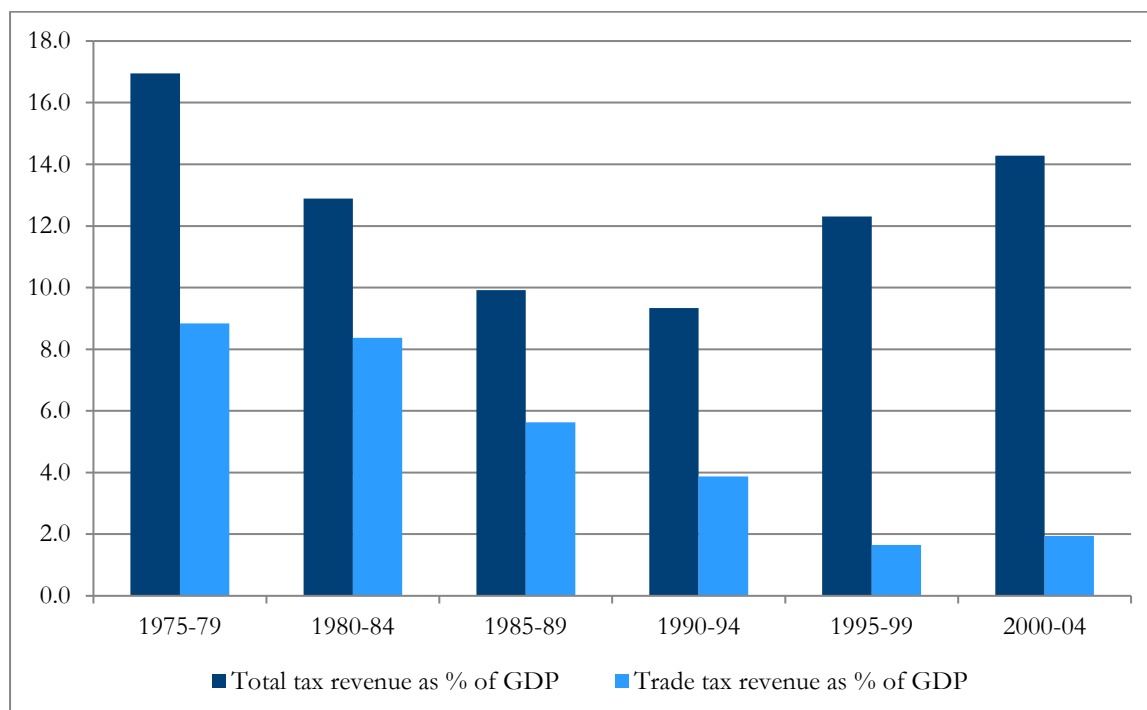


Source: author's illustration based on data from Baunsgaard and Keen (2010).

The second largest drop in trade tax levels occurred in Benin. Whilst the trade tax levels started falling in the 1980s, the recovery is not evident until the latter part of the 1990s (see Figure 7). The revenue recovery hence takes place after the adoption of a new constitution and the abolition of Marxism-Leninism. Since 1991 Benin has received Polity IV estimates of between 6 and 7. The breakdown of domestic tax revenue sources provided by the ICTD Government Revenue Dataset (Prichard et al. 2014) indicates that one type of tax revenue singlehandedly generated the recouping of lost trade taxes. Sales tax revenues in Benin have increased from levels around 1 per cent of GDP throughout the 1990s to levels ranging between 5 and 7.5 per cent in the 2000s.

⁷ More detailed quantities analysis of this transition is hindered due to the lack of pre-1990 data in e.g. the ICTD Government Revenue Dataset.

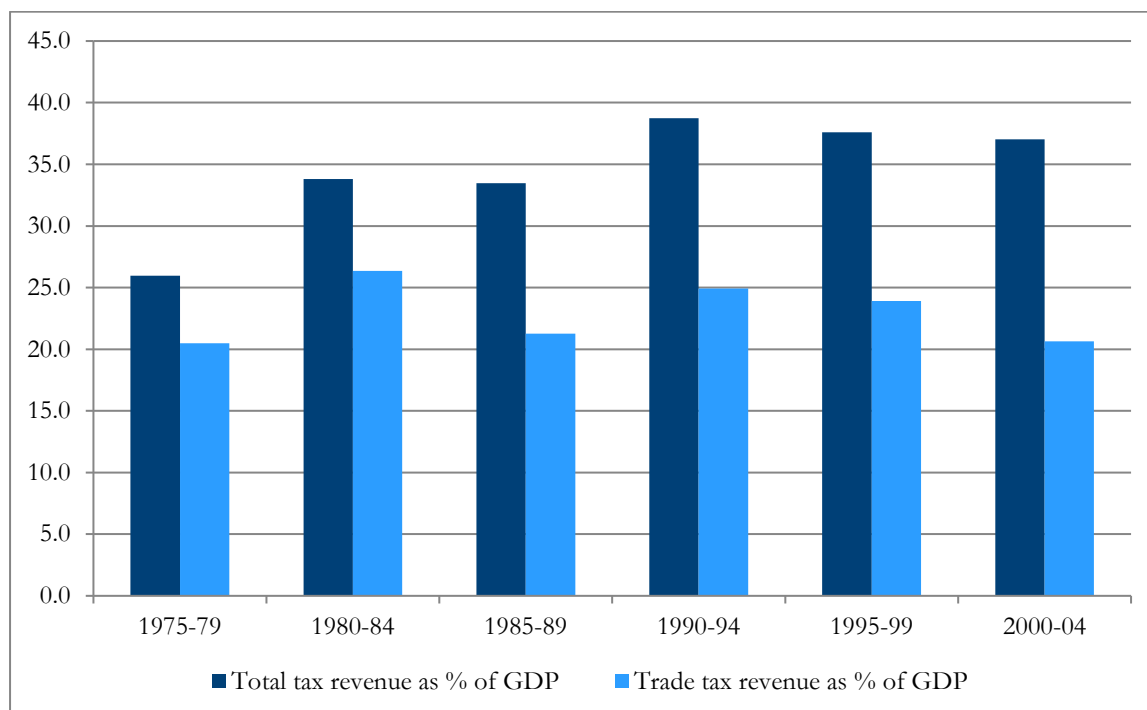
Figure 7. Tax revenue in Benin



Source: author's illustration based on data from Baunsgaard and Keen (2010).

The third largest recovery of lost trade taxation from other sources is not part of the democratizing sample in this study. Lesotho's dependence on trade taxes dropped by more than 5 per cent of GDP from the early 1980s to the early 2000s (see Figure 8). Domestic sources of taxation have grown in significance during the same period, although it is worth noting that Lesotho is still heavily dependent on trade taxes as a source of state income. The expansion of the domestic tax base took place both before and after the period of constitutional rule that commenced in 1993. In contrast to the Benin example, the partial shift towards reliance on domestic taxation in Lesotho relies on several different forms of taxation. An increased reliance on income tax is evident when studying the ICTD Government Revenue Dataset breakdown. Individual income tax contributions have played the largest part, with an increase from 2–3 per cent of GDP in the early 1980s to levels around 6–7 per cent of GDP in the mid-2000s. This increase took place both before and after the period of constitutional rule was initiated.

Figure 8. Tax revenue in Lesotho



Source: author's illustration based on data from Baunsgaard and Keen (2010).

8 Conclusion

Previous studies have highlighted that developing countries with the lowest GDP levels have had highly differing success in recouping tax revenue from other sources when trade has been liberalized. This paper places the process of recouping lost trade taxes within its political context. It addresses whether there is reason for greater concern regarding newly democratizing countries' ability to raise domestic tax revenue to make up for lost trade revenue, compared with their more authoritarian counterparts. The answer is a clear 'no'.

For each dollar lost in trade taxation, democratizing low-income countries have been able to regain approximately 45 cents from other sources. This estimate excludes the indirect effects that increased trading volumes and increased growth have had on tax revenues. The low-income countries that have initiated a democratization process parallel to liberalizing trade have also been able to collect a larger share of their gross product in domestic taxes overall. All in all, the low-income countries that have taken steps towards democracy have strengthened their total tax extraction over the period of trade liberalization. Increasing trade volumes and higher levels of urbanization appear to have further contributed to this development.

Autocratic low-income countries appear to have had more difficulty recouping lost trade tax revenues. This is especially worrying as this group of countries has experienced declining total tax levels over the 1980s and 90s. The mechanisms behind the association between democratization and a rapid strengthening of the domestic tax base for low-income countries would need to be analysed further before the exact policy implications of this association is fully understood, although the results *prima facie* provide a cause for concern for autocratic low-income countries' ability to uphold tax revenues as they liberalize trade.

This paper addresses the recouping of lost trade taxation from domestic sources at large, though future research may wish to analyse the effect of democratization on the ability to increase different kinds of domestic taxation, to improve understanding of the underlying mechanisms at play. A disaggregation of VAT, corporate taxation, and personal income taxation would be of specific interest. This paper provides examples based on Benin's and Lesotho's experiences, but a more in-depth analysis could highlight whether the effect of democratization has impacted more strongly on the ability to extract taxes from corporations or citizens more specifically. Increased dependency on broad taxation might have spurred democratic development (Gervasoni 2010), or greater political constraints might have impacted positively on investment (Henisz 2000).

References

- Adams, R. D. (1981). 'Tax Rates and Tax Collections: The Basic Analytics of Khaldun-Laffer Curves'. *Public Finance Review*, 9(4): 415–30.
- Agbeyegbe, T., J.G. Stotsky, and A. Woldemariam (2004). 'Trade Liberalisation, Exchange Rates, and Tax Revenue in Sub-Saharan Africa'. Working Paper WP/04/178. Washington, DC: International Monetary Fund.
- Ayoob, M. (1995). *The Third World Security Predicament: State Making, Regional Conflict, and the International System*. Boulder, CO: Lynne Rienner.
- Basu, K. (2007). 'Globalization, Poverty and Inequality: What Is the Relationship? What Can Be Done?'. In M. Nissanke, and E. Thorbecke (eds), *The Impact of Globalization on the World's Poor*. New York: Palgrave Macmillan.
- Baunsgaard, T., and M. Keen (2005). 'Tax Revenue and (or?) Trade Liberalisation'. Washington, DC: International Monetary Fund.
- Baunsgaard, T., and M. Keen (2010). 'Tax Revenue and (or?) Trade Liberalisation'. *Journal of Public Economics*, 94 (9–10): 563–77.
- Bräutigam, D. (2008). 'Introduction: Taxation and State-building in Developing Countries'. In D. Bräutigam, O-H Fjeldstad, and M. Moore (eds), *Taxation and State Building in Developing Countries: Capacity and Consent*. Cambridge: Cambridge University Press.
- Bräutigam, D.A., and S. Knack (2004). 'Foreign Aid, Institutions, and Governance in Sub-Saharan Africa'. *Economic Development and Cultural Change*, 52(2): 255–85.
- Cheibub, J.A. (1998). 'Political Regimes and the Extractive Capacity of Governments: Taxation in Democracies and Dictatorships'. *World Politics*, 50: 349–76.
- Cheibub, J.A., J. Gandhi, and J.R. Vreeland (2010). 'Democracy and Dictatorship Revisited'. *Public Choice*, 143: 67–101.
- Cottarelli, C. (2011). 'Revenue Mobilisation in Developing Countries'. IMF Policy Paper, March 8, 2011. Washington, DC: International Monetary Fund.
- Di John, J. (2010). 'The Political Economy of Taxation and Resource Mobilisation in Sub-Saharan Africa'. In Vishnu Padayachee (ed.), *The Political Economy of Africa*. London: Routledge.
- Ebrill, L., M. Keen, J. Bodin, and V. Summers (2001). *The Modern VAT*. Washington, DC: International Monetary Fund.
- Emran, M.S., and J.E. Stiglitz (2005). 'On Selective Indirect Tax Reform in Developing Countries'. *Journal of Public Economics*, 89: 599–623.

- Fauvelle-Aymar, C. (1999). 'The Political and Tax Capacity of Governments in Developing Countries'. *Kyklos*, 52(3): 391–413.
- Fjeldstad, O-H., and M. Moore (2008). 'Tax Reform and State-building in a Globalised World'. In D. Bräutigam, O-H Fjeldstad, and M. Moore (eds), *Taxation and State Building in Developing Countries: Capacity and Consent*. Cambridge: Cambridge University Press.
- Garcia, M. M., and C. Haldenwang (2016). 'Do Democracies Tax More? Political Regime Type and Taxation'. *Journal of International Development*, 28(4): 485–506.
- Gervasoni, C. (2010). 'A Rentier Theory of Subnational Regimes: Fiscal Federalism, Democracy, and Authoritarianism in the Argentine Provinces'. *World Politics*, 62(02): 302–40.
- Greenaway, D., and C. Milner (1991). 'Fiscal Dependence on Trade Taxes and Trade Policy Reform'. *The Journal of Development Studies*, 27(3): 95–132.
- Henisz, W.J. (2000). 'The Institutional Environment for Multinational Investment'. *Journal of Law, Economics and Organization*, 16(2): 334–64.
- Keen, M. (2012). 'Taxation and development – again'. IMF Working Paper 12–220. Washington, DC: International Monetary Fund.
- Khattry, B., and J. Mohan Rao (2002). 'Fiscal Faux Pas?: An Analysis of the Revenue Implications of Trade Liberalisation?'. *World Development*, 30(8): 1431–44.
- Levi, M. (1988). *Of Rule and Revenue*. Los Angeles, CA: University of California Press.
- Marshall, M.G., K. Jagers, and T.R. Gurr (2014). *Polity IV Project: Political Regime Characteristics and Transitions, 1800–2013*. Maryland: University of Maryland.
- Milner, H.V., and K. Kubota (2005). 'Why the Move to Free Trade? Democracy and Trade Policy in the Developing Countries'. *International Organization*, 59(01): 107–43.
- Moore, M. (2008). 'Between coercion and contract: competing narratives on taxation and governance'. In D. Bräutigam, O-H. Fjeldstad, and M. Moore (eds), *Taxation and State Building in Developing Countries: Capacity and Consent*. Cambridge: Cambridge University Press.
- O'Rourke, K.H. (2000). 'Tariffs and Growth in the Late 19th Century'. *The Economic Journal*, 110(463): 456–83.
- OECD (2005). *Trade and Structural Adjustment: Embracing Globalization*. Paris: OECD Publishing.
- OECD (2013). *Revenue Statistics 2013*. Paris: OECD Publishing.
- Olson, M. (1993). 'Dictatorship, Democracy, and Development'. *American Political Science Review*, 87(3): 567–76.
- Prichard, W., A. Cobham, and A. Goodall (2014). 'The ICTD Government Revenue Dataset'. ICTD Working Paper 19. Available at: <http://ssrn.com/abstract=2496442> version Dec 2015.
- Rodrik, D. (1990). 'How Should Structural Adjustment Programs Be Designed?'. *World Development*, 18(7): 933–47.
- Rodrik, D. (1998). 'Why Do More Open Economies Have Bigger Governments?'. *Journal of Political Economy*, 106: 997–1032.
- Sachs, J.D., and J.W. McArthur (2005). 'The Millennium Project: A Plan for Meeting the Millennium Development Goals'. *The Lancet*, 365(9456): 347–53.
- Sindzingre, A. (2007). 'Financing the Developmental State: Tax and Revenue Issues'. *Development Policy Review*, 25(5): 615–32.

- Stiglitz, J.E. (2005). 'The Overselling of Globalisation'. In M.M. Weinstein (ed.), *Globalization: What's New?* New York: Columbia University Press.
- Tanzi, V. (1987). 'Quantitative Characteristics of the Tax Systems of Developing Countries'. In ID. Newbery and N. Stern (eds), *The Theory of Taxation for Developing Countries*. Oxford: Oxford University Press.
- Thies, C.G. (2004). 'State Building, Interstate and Intrastate Rivalry: A Study of Post-Colonial Developing Country Extractive Efforts, 1975–2000'. *International Studies Quarterly*, 48(1): 53–72.
- UNCTAD (2006). 'The Least Developed Countries Report 2006: Developing Productive Capacities'. New York, Geneva: United Nations.
- UNCTAD (2009). 'The Least Developed Countries Report 2009: The State and Development Governance'. New York, Geneva: United Nations.
- UNCTAD (2010). 'The Least Developed Countries Report 2010: Towards a New International Development Architecture for LDCs'. New York, Geneva: United Nations.
- Waglé, S. (2011). 'Coordinating Tax Reforms in the Poorest Countries: Can Lost Tariffs be Recouped?' Policy Research Working Paper 5919. Washington, DC: World Bank.

Appendices

Appendix A. Data specification

Variable	Measured	Compiled by
Domestic Tax Revenue [D_{it}]	as % of GDP	Baunsgaard and Keen (2010)
Trade Tax Revenue [T_{it}]	as % of GDP	Baunsgaard and Keen (2010)
Imports and Exports	as % of GDP	IMF International Financial Statistics database
GDP p.c. (ln)	in constant (2000) USD	World Bank World Development Indicators
Inflation (ln)	the annual change in CPI	IMF International Financial Statistics database
Aid	as % of GNI	World Bank World Development Indicators
Share of agriculture in GDP	as % of GDP	World Bank World Development Indicators
Democracy [$DEMO$]	Dummy indicating a majority of years during sample period with a Polity IV Institutional Democracy score of 1 or higher.	Author, based on Polity IV Institutionalized Democracy ('DEMOC')

Source: The data is derived from Baunsgaard and Keen (2010), except for the Polity IV data, which is derived from and Marshall et al. (2014).

Appendix B. Summary of the data

Variable	Observations	Mean	Std. Dev.	Min	Max
Domestic Tax Revenue [D_{it}]	982	10.09	4.94	0.86	30.37
Domestic Tax Revenue t-1 [D_{it-1}]	971	10.06	4.94	0.86	30.37
Trade Tax Revenue [T_{it}]	984	4.26	4.19	0.04	33.33
Imports and Exports	1075	57.21	29.20	6.32	174.96
GDP p.c. (ln)	1083	5.76	0.55	4.52	7.25
Inflation (ln)	922	2.24	1.14	-4.02	7.00
Aid	1088	11.05	9.54	0.05	94.92
Share of agriculture in GDP	1046	34.04	12.38	4.21	74.27
Democracy [$DEMO$]	1120	0.29	0.45	0	1

Source: author's calculations based on data from Baunsgaard and Keen (2010) and Marshall et al. (2014).

Appendix C. Sample

<i>Country</i>	<i>Years without missing observations</i>	<i>Subsample</i>
Bangladesh	19	Democratizing
Benin	13	Democratizing
Bhutan	18	Autocratic
Burkina Faso	20	Autocratic
Burundi	29	Autocratic
C.A.R.	15	Autocratic
Cameroon	28	Autocratic
Chad	13	Autocratic
Congo, Rep. of	14	Autocratic
Côte d'Ivoire	25	Autocratic
Ethiopia	20	Autocratic
Gambia	23	Democratizing
Ghana	27	Democratizing
Haiti	10	Autocratic
India	30	Democratizing
Indonesia	29	Autocratic
Kenya	29	Autocratic
Lesotho	29	Autocratic
Madagascar	22	Autocratic
Malawi	25	Autocratic
Mali	6	Autocratic
Mozambique	21	Autocratic
Nepal	30	Democratizing
Niger	15	Autocratic
Nigeria	25	Autocratic
Pakistan	27	Autocratic
Papua New Guinea	20	Democratizing
Rwanda	25	Autocratic
Senegal	18	Democratizing
Sierra Leone	25	Autocratic
Tanzania	12	Autocratic
Togo	20	Autocratic
Uganda	23	Autocratic
Zambia	21	Democratizing
Zimbabwe	28	Democratizing

Source: author's calculations based on data from Baunsgaard and Keen (2010) and Marshall et al. (2014).

Appendix D. Robustness check, LDC sample

	(1)	(2)	(3)
	Democratizing countries	Autocratic countries	Full sample
<i>Independent variables</i>			
Domestic Tax Revenue t-1	0.605*** (0.0544)	0.678*** (0.0553)	0.672*** (0.0515)
Trade Tax Revenue	-0.149** (0.0560)	-0.0262 (0.0457)	-0.0286 (0.0461)
Democracy			0.568 (0.403)
Democracy * Trade Tax Revenue			-0.200*** (0.0603)
Imports and Exports	0.0692* (0.0335)	0.0200*** (0.00417)	0.0218*** (0.00444)
GDP p.c. (ln)	-7.447* (3.411)	0.442 (0.469)	0.323 (0.517)
Inflation (ln)	-0.0459 (0.147)	0.120 (0.134)	0.0658 (0.103)
Aid	0.00921 (0.0125)	-0.00518 (0.00924)	-0.00177 (0.00944)
Share of agriculture in GDP	-0.0879 (0.0476)	-0.0432** (0.0180)	-0.0433** (0.0174)
<i>Calculations</i>			
Short-term replacement, Democratizing countries	0.149** (0.0560)		0.228*** (0.0675)
Long-term replacement, Democratizing countries	0.378** (0.147)		0.695*** (0.127)
Short-term replacement, Autocratic countries		0.0262 (0.0457)	0.0286 (0.0461)
Long-term replacement, Autocratic countries		0.0815 (0.136)	0.0871 (0.135)
Observations	124	396	520
Countries	6	21	27
R-squared	0.955	0.871	0.884

Note: The results of regression analyses controlling for country and time effects are presented. The dependent variable is domestic tax revenue. *** p<0.01, ** p<0.05, * p<0.1.

Source: author's calculations based on data from Baunsgaard and Keen (2010) and Marshall et al. (2014). Definitions and sources of the variables included in the analysis are listed in the appendix.