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Designing Fiscal Instruments for Sustainable Forests

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Export Tariffs as a Policy Tool to Reduce Deforestation

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Introduction

Designing effective forest conservation strategies on a jurisdictional or national level in low-income countries is hindered by three factors: (1) a heavy reliance on (deforested) land as a relatively low-cost input to agricultural production, (2) high levels of food insecurity, and (3) a lack of political institutions to enforce conservation strategies. Jurisdictional (fiscal) policy strategies for forest conservation need to take these limits into account. For countries where all these factors coincide, the big challenge is to design forest conservation strategies that (i) promote a reduction in deforestation while at least maintaining (ii) the level of agricultural production and (iii) food price levels.

Fiscal policy instruments may be particularly suited to address some of these challenges. In the recent discussions around international efforts for forest conservation, fiscal policy instruments have received more attention, particularly in discussions on the structural drivers of deforestation and integrated or landscape approaches to forest conservation (UNEP 2015).

Export tariffs are one of the few fiscal policy instruments that appear implementable in countries with very weak institutional capacities. More complex fiscal policies such as land taxes or deforestation fees require functioning bureaucracies or land registries. In contrast, export taxes build upon readily existing export tax collection structures. Because of the limited number of tax-collection points, export tax collection becomes logistically manageable even in institutionally weak countries. Nevertheless, countries with advanced institutional capacity should first consider more direct approaches to reducing deforestation, such as explicit forest conservation.

Export tariffs on agricultural goods can be designed to strike a balance between conservation and economic objectives. Countries that simultaneously expand their agricultural exports and have high deforestation rates exploit their natural resources in an unsustainable way. Moderate export taxes would force the sector toward sustainable production without excessively harming business. The tariff revenue can be returned to the sector through the provision of government services—for example, in the form of land property rights or infrastructure.

Structural Impediments to Forest Conservation in Low-Income Countries

Only a few policy approaches discussed as part of international forest conservation efforts take the structural limitations of low-income countries into account. In this section, we discuss the specific structural characteristics of low-income countries that explain why forest conservation is particularly challenging in countries that (1) heavily rely on (deforested) land as a relatively low-cost input to agricultural production, (2) experience high levels of food insecurity, and (3) have weak political institutions.

FIGURE 8.1
AGRICULTURAL VALUE ADDED AS A PERCENTAGE OF GDP AND GDP PER CAPITA, 2016

Source: World Bank 2016.

Low-income countries rely on land as an input factor to the largest part of their economic activity. The agriculture sector is typically the largest contributor to gross domestic product in low-income economies, while in higher-income countries the economy is more diversified (see figure 8.1). These "Kuznet facts" (Kongsamut, Rebelo, and Xie 2001) imply that economic diversification—away from land-intensive economic activities—appears less plausible in agrarian countries where many households are near this threshold.

Low levels of economic diversification imply that economic growth is heavily dependent upon land-demanding agricultural activities. In low-income countries near the subsistence threshold, there are few economic alternatives to agricultural activities. As the low-income economy grows, the agriculture sector grows, and as demand for land increases, so do land prices. In the absence of economic diversification and hence different income sources, landowners are more likely to convert forested land to agricultural land.

In low-income countries, a globally exporting agriculture sector and a local food producing sector typically exist in parallel. In low-income countries, agricultural raw materials represent on average 11 percent of merchandise exports (World Bank 2020), a larger share than in any other income group. Low-income levels also tend to coincide with food insecurity (Rahman, Matsui, and Ikemoto 2013) and undernourishment (FAO 2013).

Agriculture in low-income countries is divided into two largely disconnected sectors (Henson, Brouder, and Mitullah 2000). A highly productive internationally exporting sector tends to coexist with a local food producing sector. Production in the internationally exporting sector is highly specialized on high-value markets in developed countries (for example, palm oil, cocoa, coffee), while the domestic food producing sector is shaped by artisanal production. Because of weak infrastructure, especially in remote areas, this sector is poorly connected to global markets. Hence, in these remote areas food supply shocks cannot be smoothed by imported supplies.

A growing body of empirical literature shows that the quality of political institutions is a central parameter to forest conservation. Low-income countries that are specialized in resource extraction tend to exhibit weak scores in control of corruption and rule of law. Weak
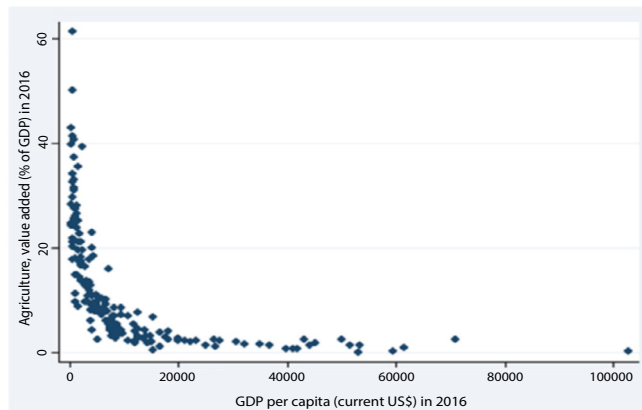
institutions directly limit the capacity of governments to enforce forest conservation or to implement internationally financed forest conservation projects (Karsenty and Ongolo 2012). Key elements regarding the quality of political institutions, such as the strength of rule of law (Corderí Novoa 2008), reliable land tenure rights (Arcand, Guillaumont, and Jeanneney 2008; Bohn and Deacon 2000), or the absence of corruption (Koyuncu and Yilmaz 2009) significantly impact whether a country is likely able to conserve its forests or not. The IPCC concludes that national forest conservation policies have had limited success in developing countries with insufficient institutional and regulatory capacities (Nabuurs et al. 2007).

Forest conservation cost is an important obstacle for countries with low domestic revenue mobilization. For example, de Souza Cunha et al. (2016) estimate that the international community would have to pay the Brazilian government between $1.09 and $3.25 per tonne of carbon dioxide. It can be assumed that this cost is much higher in low-income countries as a result of higher transaction costs. Given that institutionally weak countries tend to be equipped with a lower ability to collect taxes (Besley and Persson 2013), enforcement cost can be an important obstacle to better conservation.

Weak political institutions prevent the structural transformation of economies away from land-demanding on economic activities. Institutional quality is a central explanation for diverging patterns of long-run economic growth (Acemoglu, Johnson, and Robinson 2005). Herbst (2000) links the absence of sustained high rates of economic growth in many African countries to weak political institutions. This finding is supported elsewhere in the literature (Gennaioli and Rainer 2007; Nunn and Trefler 2013). Hence, weak institutions can function like a trap for low-income countries, preventing economic diversification and ultimately the emergence of less land-demanding types of economic activity.

Using Export Tariffs as a Policy Instrument for Forest Conservation

The literature documents both beneficial and harmful effects of export tariffs, with the net effect depending on country circumstances and complementary policy. Historically, there have been three main motivations for export tariffs on agricultural goods: (1) reducing domestic food prices during a supply crisis, (2) stimulating a domestic processing industry and structural change in general, and (3) raising revenue. Results are thus not immediately transferable to the use of export tariffs for the purpose of forest conservation as suggested here. Nevertheless, it is important to review the historical experience with export tariffs to avoid past mistakes. We will first consider the benefits of export tariffs and then discuss some risks.

Could export tariffs be a useful policy tool for low-income countries?

The theoretical economic literature shows that in specific circumstances export tariffs can bring economic benefits to countries. Export taxes are used as a source of public revenue (Bouët and Laborde 2010) and can be used to improve the terms of trade of a country, by raising the world prices of an export commodity (Kim 2010). Furthermore, they can reduce the domestic prices of commodities (Marks, Larson, and Pomeroy 1998), benefiting domestic production processes that rely on intermediate inputs to production (Bernhofen 1997; Corden 1972).

Export tariffs can be used to support the national processing industry. Especially, differential export taxing schemes (Bouët, Estrades, and Laborde 2014) tax raw commodities to support the development of the national processing industry and thus foster a structural transformation of

the economy (Just, Schmitz, and Zilberman 1979). Goodland and Daly (1996) confirm this theory empirically by analyzing the use of export bans on tropical logs in Indonesia in 1985. Furthermore, Solberg et al. (2010) empirically support this idea with the example of the logging and wood processing industry in Russia.

Exporting countries faced with monopsonistic market powers can use export taxes to increase domestic welfare. Export taxes can be welfare-increasing in larger countries hosting international trading firms with monopoly or oligopoly powers over certain goods (Eaton and Grossman 1986; Rodrik 1989). Deardorff and Rajaraman (2005) find that exporting countries faced with monopsonistic market powers can use export taxes to increase welfare domestically.

Export tariff revenues can be used to finance public infrastructure. Jones and O'Neill (1994) show that export taxes on agricultural commodities can be used to finance public infrastructure as an input to the manufacturing sector, which then causes a relocation of labor from the rural to the urban area and thus decreases deforestation. Furthermore, Schulz (1996) finds that policies that disincentivize trade can be used to make the harvest less profitable and thus protect the resource stock.

Risks associated with the use of export tariffs

Using export tariffs to induce a structural transformation of the economy may affect productivity negatively. Export tariffs can have negative impacts in terms of efficiency losses to the domestic economy (Kishor, Mani, and Constantino 2004). Several authors are skeptical about the potential of differential export taxes to induce structural change (Bates 1981; Mwabu and Thorbecke 2004; Rattsø and Torvik 2003; Warr 2001) and argue that, on the contrary, by reducing wages and thus national savings, incentives to invest are curtailed, which is likely to lead to slower growth in productivity.

Distortionary trade policies may be a risk for the agriculture sector. Dennis and Iscan (2011) argue empirically that distortionary agricultural policies slow down the reallocation rate of labor from agriculture to other sectors. However, they use the general index on distortionary agricultural policies of Kym and Ernesto (2013) and thus cannot actually draw any isolated conclusions on export taxes.

Export tariffs may not always result in the desired effect on the processing industry. Hasan, Reed, and Marchant (2001) and Marks, Larson, and Pomeroy (1998) analyzed an export tax that was used in the palm oil sector in Indonesia and found that it did not have the desired effect on the processing industry.[1] Local circumstances and existing policy schemes must be carefully analyzed on a country level to fully understand possible secondary effects, including interactions with other policies or country-specific characteristics of the internationally exporting agriculture sector or the land market.

Historical experiences with export tariffs

Post-independence, a range of African countries imposed export tariffs on agricultural commodities to reach a quick diversification and industrialization of their economies (Sarris 1994; Young 1986). This economic diversification was to be funded through export tariffs (Killick

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1   Despite this, the palm oil industry has still been one of the fastest growing industries in Indonesia over the last decades.

1993). The export tariff policy was accompanied by an import substitution policy, which aimed to support domestic industries (Mkandawire and Soludo 1998).

In the 1970s and 1980s, export tariffs were a recurrent agricultural policy tool. In Chile, Colombia, Costa Rica, Ethiopia, Malaysia, Mexico, the Philippines, Sri Lanka, and Tanzania, they contributed up to 5 percent of public income (FAO 1994). In Madagascar, income from export tariffs constituted 30 percent of the government revenue in 1983 (Anderson and Masters 2009).

The use of restrictive export policies in African countries failed to achieve economic diversification in the post-independence period. Kherallah et al. (2002) argue that the oil price shocks in the 1970s led to a sudden increase in fertilizer costs. Governments in a range of Sub-Saharan African countries responded by subsidizing fertilizers. However, owing to the oil-price shock, foreign exchange rates were mostly overvalued, which harmed producers in the exporting sector because of lower real prices.[2]

Droughts and unsuitable policy design worsened the agriculture sector crisis. When various Sub-Saharan African countries were then hit by severe droughts, agricultural output levels declined. Furthermore, some marketing boards imposed pan-territorial pricing schemes (Rugambisa 1994) to avoid disadvantaging producers in remote areas with transport costs. As a reaction, larger producers shifted production to crops that were not part of the unitary pricing schemes (Masters 1994), which limited the tax base for governments. In the late 1970s, the fiscal policies in the agriculture sector of a range of African countries had led to decreasing terms of trade as well as a fiscal and balance of payments crisis.

Bretton Woods institutions pushed a range of low-income countries toward abolishing all types of distortionary trade policies. The Washington Consensus (Williamson 1990) marked a period where the Bretton Woods institutions advised developing countries to liberalize their trade policies. Consequently, they significantly reduced existing export tariffs (Reichert et al. 2009; Williamson 1993). In Benin, for instance, most export tariffs were suppressed in 1993 (WTO 2004).

Export tariffs are still used and introduced today and there is a potential for further increases. While export tariffs have been abolished to increase economic efficiency and reap gains of trade, they are still in use and some countries have introduced them recently. Table 8.1 shows how export tariffs have been used in agrarian, lower-income countries with weak institutions, but currently only low levels of export tariffs are used for major cash crops. This table first illustrates that there is some legal space allowing for export tariffs. Furthermore, it shows that already countries see a benefit in export tariffs and do not consider them economically destructive. And finally, the table shows that export tariffs are currently at very low levels, so they could be increased without becoming prohibitive.

Recently, export tariffs have been reintroduced to stabilize domestic food supply. Export tariffs were reintroduced to stabilize the national food supply during food price crises that unfolded in a range of low-income and lower-middle-income countries in 2005 (OECD 2014). This was, for instance, the case for rice in Bangladesh, Brazil, Cambodia, Egypt, China, Madagascar, India, Nepal, Thailand, and Vietnam; and for wheat in Argentina, India, Kazakhstan, Nepal, and Pakistan (Bouët and Laborde 2010). Especially in the context of WTO negotiations (Anania 2013), but also in other trade agreements (such as the European Partnership Agreements), least-

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2   In many instances, less than half of the world market prices.

developed countries insisted on the right to use export tariffs to react to food or environmental crises (Reichert et al. 2009).

TABLE 8.1
EXPORT TAXES IN AGRARIAN, LOWER-INCOME COUNTRIES WITH WEAK INSTITUTIONS

COUNTRY	COMMODITY (LEVEL, DATE OF INTRODUCTION)
Benin	Cocoa beans, crude oil, minerals, gold (3%, 2000)
Burkina Faso	Poultry, sheep, cattle, leather, fur
Burundi	Green coffee (31%, 1992), vegetables, seeds, flour, cereal (15%, 1992); tea (6%, 1992), leather and fur (3%, 1992) (*has set them equal to 0 in 2003*)
Cambodia	Wood (10%, 2011; 15%, 2012), marble granite and stone (10%, 2012), petroleum (10%, 2010), rubber (10%, 2012)
Cameroon	Ayou wood (CFAF 4,000/m^3, 2015), other wood species (CFAF 3,000/m^3, 2015), cocoa (CFAF 25/kg, 2006); coffee (CFAF 25/kg, 2006)
Central African Republic	Gold (1%), diamonds (4%), tree trunks (10.5%), processed wood (4.5%)
Chad	Dried fish (2%), cattle (2%), Arabic gum tree (0.5%), cotton (0.5%), palm oil (0.5%), tobacco (0.5%), soap (0.5%), rubber (0.5%), leather (0.5%), butter (0.5%), raw tobacco (0.5 %), raw wood (0.5%)
Congo, Dem. Rep.	Green coffee (1%), mineral products (10%), mineral oil (5%), electric power (5%), logs (10%), edged timber (5%), water (5%), metals (2%), different timber types (2%), unrefined mineral oil (1%), gold and diamonds (4%, replacing 10% on mineral in general)
Congo, Rep.	Wood (1%, 2005); trunk wood (15%, 2004)
Côte d'Ivoire	Cocoa (28.7%, 2001; 38.4%, 2004); coffee (2%, 2001; 10.3%, 2004); cotton (0%, 2001; 3.2%, 2004)
Myanmar	Grains and rice (5%, 2011)
Sudan	Arabic gum tree (10%, 1993)

Applying Export Tariffs Combined with Public Investments in the Context of International Collaboration on Forest Conservation

Agricultural export tariffs could be used as an effective and realistic tool for forest conservation when embedded in a comprehensive policy mix. Export tariffs reduce the incentive to exploit natural resources in an unsustainable way. At the same time, they slow one of the few thriving businesses in low-income economies. The revenues of the tariffs and possible support by the international community, however, provide an opportunity to invest in agricultural productivity. This would reduce the land intensity of agriculture without reducing business opportunities or creating unwanted side effects like rising food prices.

Two agriculture sectors and the role of elasticity of demand

The Borlaug hypothesis and Jevons paradox postulate opposing effects of agricultural productivity on land use. The agronomist Norman Borlaug developed the hypothesis that an increase in agricultural productivity will decrease land use for agricultural production and thus deforestation. The argument is that increasing productivity will reduce the amount of land needed to produce the same amount of goods. The economist William Jevons, by contrast, observed the opposite effect, which seems to be a paradox: As agricultural productivity increases, more resources are used. The reason is that the increased productivity makes production more profitable. Production is thus expanded, and more resources are used. In an agricultural context, this means that land use, and hence deforestation, increases. There is empirical evidence for both the Borlaug hypothesis and the Jevons paradox, even though they draw opposing conclusions.

Whether deforestation increases or decreases as agricultural production increases depends on the elasticity of demand. The apparent puzzle described above can be resolved, when considering the elasticity of demand. As Hertel (2012) and Schwerhoff and Wehkamp (2018) show, the Borlaug hypothesis applies when the elasticity of demand is low and the Jevons paradox occurs when it is high. When the market for agricultural products is limited, it is not meaningful to extend production because the goods cannot be sold. When there is a large international market, the agriculture sector can expand rapidly after a productivity increase. There is thus no automatic link between agricultural productivity and deforestation. The link can be weakened by managing effective demand.

Export tariffs on agricultural products can be designed to manage effective demand and avoid a Jevons paradox. Increasing agricultural productivity in developing countries is often highly desirable in many respects. It can improve food security and reduce food prices. However, it can have the undesired side effect of accelerating deforestation. For this reason, Schwerhoff and Wehkamp (2018) distinguish between the agriculture sector, which produces staple foods for the domestic market, and the agricultural export sector. Increasing the productivity of agriculture has obvious benefits. Export tariffs have the purpose of managing effective demand for the export sector, to control the negative side effect.

Four stakeholders in low-income countries

Forest conservation involves multiple stakeholder groups that all need to endorse the respective policies. To be successful, a fiscal forest conservation policy needs to satisfy the interests of all political stakeholders. The four relevant stakeholder groups are domestic consumers, producers, the domestic government, and the international community.

Agricultural market stakeholders are unlikely to accept a conservation policy that reduces their status quo welfare. It is expected, for example, that domestic consumers are unwilling to accept rising food prices. Producers exporting agricultural goods will likely protest any policy that reduces their business opportunities. They may, however, accept a policy that provides them with better infrastructure in exchange for higher export tariffs.

Given other policy priorities, many domestic governments will not be interested in spending more on forest conservation. A conservation strategy based on improving agricultural productivity with the objective of allowing more production on less land to reduce deforestation will thus have to compensate governments for the increased cost. The international community, by contrast, has funds available for forest conservation and could compensate the government for expenses aimed at reducing deforestation.

Combining export tariffs with public investments to reduce deforestation and satisfy all stakeholders

A policy of agricultural intensification through improved infrastructure could satisfy all relevant stakeholders and conserve forests. Public investments can be made toward publicly provided institutions and infrastructures. These public investments can boost productivity and allow agricultural producers in both sectors to increase land intensity. One relevant public investment is electrification (Assunção, Lipscomb, and Mobarak 2015; Lipscomb, Mobarak, and Barham 2013). Many low-income countries have weak electrification in rural areas. Providing electricity by extending the national grid or establishing local grids gives farmers the opportunity to intensify production. Electricity can be used for processing machinery and pumps for irrigation, for example. Providing land tenure rights is known to increase agricultural investment (Abdulai, Owusu, and Goetz 2011; Bambio and Agha 2018; Robinson, Holland, and Naughton-Treves 2014). When farmers have formal proof of their land ownership, they can invest without fear of expropriation. Well-designed transport infrastructure (which avoids giving easier access to forests) can also aid in facilitating doing business.

The combination of export tariffs and public investments can reduce deforestation while keeping agricultural production stable. The provision of public services is complementary to private capital investments of farmers and thus incentivizes production growth and increasing land use intensity. The export tariffs check this development to ensure that the expansion is limited and does not trigger additional deforestation. The idea of the export tariffs is thus not to downscale the agricultural production but to shift it from land-intensive production to capital-intensive production. Given that developed countries have a much more capital-intensive agricultural production than developed countries, the technology for such a shift is well established. In a modeling study, Schwerhoff and Wehkamp (2018) provide a formal proof that the combination of higher export tariffs and public investments can achieve a combination of equal production with less deforestation. See figure 8.2, panel a, for an illustration of the balancing effects in the exporting sector.

The combination of export tariffs and public investments can also keep domestic food prices stable. Producers supplying the domestic food market benefit from the public investments to agricultural producers, but so do the exporters. However, the exporting farmers face a counteracting pressure in the form of the export tariffs. This ensures that the exporting producers do not expand at the expense of the producers for the domestic market. In combination, the two

policies support the domestic food producers so prices will not increase. The effect of the policy on the domestic market is illustrated in figure 8.2, panel b.

FIGURE 8.2
EFFECT OF EXPORT TARIFFS AND PUBLIC INVESTMENTS AS A FOREST CONSERVATION POLICY TOOL

A. EFFECT OF A COMBINATION OF EXPORT
TARIFFS AND PUBLIC INVESTMENTS ON THE
INTERNATIONALLY EXPORTING SECTOR

B. EFFECT OF A COMBINATION OF EXPORT
TARIFFS AND PUBLIC INVESTMENTS ON THE
DOMESTIC FOOD PRODUCING SECTOR
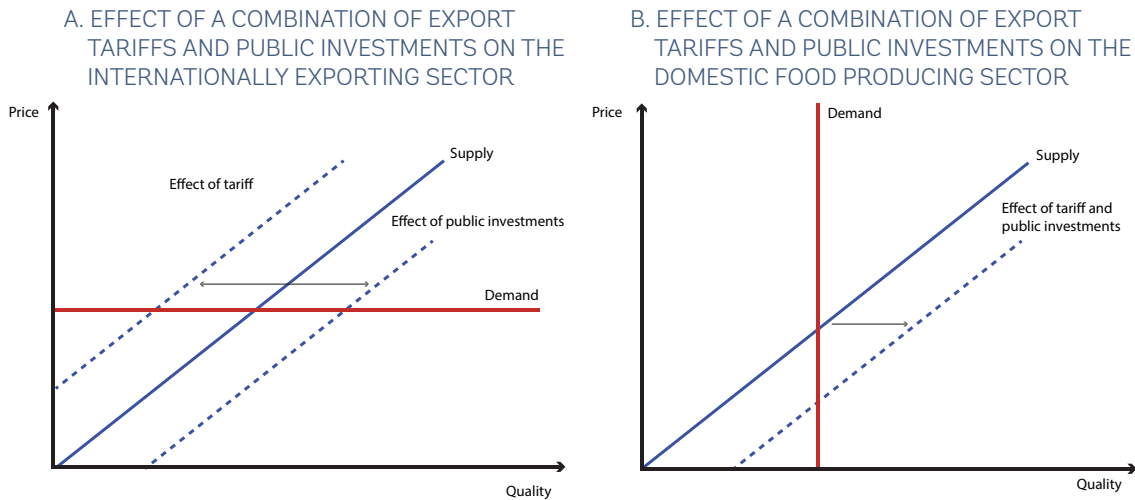
Note: D = demand for food, S = supply of food, P = food price, Q = food quantity.

Export tariff revenues can be used to cover the costs of public investments. The model analysis in Schwerhoff and Wehkamp (2018) shows that a decrease in deforestation can be achieved while maintaining the output level of exporters and the food prices at least stable. So, what will be the effect of this policy on government finances? Many developing countries cannot afford additional spending to reduce deforestation. The modeling analysis shows that the combination of the instruments increases tariff revenue in a concave way (as a result of decreasing returns to government-provided capital), while the cost of the policy increases linearly. This means that for low ambition levels, the additional tariff revenue could fully cover the cost of the public investments.

REDD+ funds could be used to compensate the government for a highly ambitious forest protection policy. The concave increase in tariffs means that for ambitious levels of forest protection, the tariff revenue might fall short of the required investments into public services. However, the REDD+ program demonstrates that the international community is willing to support countries that reduce deforestation effectively. The REDD+ funds could thus be used to cover the additional cost of the policy for the government. This would keep the policy revenue neutral for the government. As productivity in agricultural production increases over time, the policy would become increasingly self-financing.

The policy package is designed so that all stakeholders participate in the benefits of the policy. While exporters of agricultural products are typically politically influential, food price increases have sparked widespread protests. A policy package designed to reduce deforestation thus needs to convince all involved stakeholders that they can benefit. The policy is thus designed to achieve a win-win situation. The win-win situation is possible because in many rural areas there is an inefficiently low supply of productive public goods. Improving production efficiency generates an overall welfare gain. While the policy will still require political will to be successful, it is designed to address the most important political economy forces.

Conclusion

There are structural challenges to forest conservation in low-income countries. Reducing deforestation in low-income countries is particularly difficult due to three structural characteristics: (1) heavy reliance on (deforested) land as a relatively low-cost input to agricultural production, (2) high levels of food insecurity, and (3) weak political institutions to enforce such strategies.

Export tariffs combined with public investments could represent a policy mix to reduce deforestation in low-income countries. Export tariffs appear to be one of the few fiscal policy instruments tolerated by WTO rules that appear implementable in institutionally weak low-income countries. The analysis in this chapter furthermore shows that export tariffs combined with public investments could reduce deforestation without reducing agricultural production levels or increasing food price levels.

Historical experiences with export tariffs point to the risks associated with secondary economic effects. While theoretical and empirical literature on the use of export tariffs points to the potential beneficial effects of export tariffs, local market structures and characteristics must be considered when assessing the likely economic impact of using export tariffs as a forest conservation policy instrument. Experience with export tariffs shows that the concrete implementation of the proposed policy mix requires a careful analysis of the compatibility with existing policies on the country level and a better understanding of the causes of failure of similar policies in the past.

Implementing the proposed policy mix could be complicated by the practical administrative obstacles. Depending on how taxes are collected in a country, implementing the policy mix could be challenged by a lack of interministerial collaboration. In many instances, the agriculture ministry would have to collaborate with the ministry of finance or tax collection authorities. At the same time, these administrative obstacles are likely to be lower than for many other options because export tariffs are already collected in many places—even in institutionally weak low-income countries. Also, coordinating and implementing public investments can be challenging if an administration doesn't have sufficient planning and project coordination capacities.

Policy implementation would require an in-depth country analysis and customization of the policy mix. As the different model calibration scenarios studied in Schwerhoff and Wehkamp (2018) show, the effect of the proposed policy mix crucially depends on country-specific parameters, such as the size of the domestic agriculture market relative to the international export market, elasticities of demand and supply, elasticity of demand for forestland relative to domestic food prices, whether there are options to invest the tariff revenues in public investments that would allow to "satisfy all relevant stakeholders" and will have the desired effect, or getting budgetary support from the international community. Hence, before policy implementation could be considered, additional analysis and country-specific customization would be necessary. As Subramanian (1992) points out, there are a lot of uncertainties when it comes to the effects of trade policies and care needs to be taken to avoid unintended negative side effects.

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