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# NOTES

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## **Fiscal Revenue Mobilization and Digitally Traded Products: Taxing at the Border or Behind It?**

Tibor Hanappi, Adam Jakubik, and Michele Ruta

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Tibor Hanappi, Adam Jakubik, and Michele Ruta\*

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# Fiscal Revenue Mobilization and Digitally Traded Products: Taxing at the Border or Behind It?

Tibor Hanappi, Adam Jakubik, and Michele Ruta  
September 2023

Digitalization has the potential to bring great economic benefits, but it is also creating new challenges. This note focuses on trade in digitized products, its fiscal revenue implications, and the appropriate role for domestic and border tax instruments in this context. As digitized trade increases, in part replacing physical trade, developing countries that rely on tariff revenue to support fiscal capacity will face the difficult question of how best to tax these new trade flows and maintain fiscal balances. This note shows that, independently of the future trajectory of trade in digitized products, broad-based nondiscriminatory value-added taxes are preferable to tariffs both from an economic efficiency and from a revenue standpoint. These taxes are also easier to implement and administer. In this context, the World Trade Organization (WTO) moratorium on customs duties on electronic transmission can help to effectively channel developing countries' tax reform efforts in a more efficient direction. This transition would require further investment by the global community in modernizing the tax and customs infrastructure of developing countries to adequately meet revenue needs in the digital era.

## Introduction

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**Digitalization has wide ranging benefits, but it also creates tax policy challenges: tax bases are more mobile and can erode easily.** Tax policy is more complex in the digital age (OECD 2021). Digitalization has led to growing concerns about tax base erosion, profit shifting, and the resulting distribution of corporate tax bases across jurisdictions, which has prompted multilateral efforts to reform international tax rules. In addition, digitalization poses a challenge for recording and administering domestic taxes on (cross-border) transactions in digital services and e-commerce, and it has income tax implications arising from increased cross-border telecommuting. In this note, the authors focus on one aspect of digitalization at the focus of recent policy discussions: the transformation of trade in *digitizable products* such as books and records, increasingly conducted via electronic transmissions instead of physical goods crossing borders (for example, e-books, digital music).

**Recognizing the many new opportunities created through digitalization, WTO members agreed in 1998 not to impose customs duties on electronic transmissions (the so-called “moratorium”).** Although the term “electronic transmissions” (ETs) is not defined, and some members have requested clarification of its scope (WTO 2021), it is thought to encompass anything from software, emails, and text messages to digital music, movies and videogames, and blueprints for additive manufacturing. This moratorium is not permanent; it is normally extended at two-year intervals at WTO Ministerial Conferences (MCs). It is currently in force until MC13 to be held in February 2024. Some members, for example, India, Indonesia, and South Africa, have argued that the moratorium should be reconsidered, to allow greater policy space in determining the tax base for fiscal revenues, support domestic industries, and pursue other regulatory objectives; others, including the EU

and Group of Seven countries, say a permanent moratorium is needed to reduce trade policy uncertainty in the affected industries.<sup>1</sup> Many developing countries have not formulated an explicit position.

**This note presents an analysis of the fiscal implications of domestic and border tax instruments on ETs as a contribution to the discussions on the renewal of the WTO moratorium.** While current discussions appropriately go beyond the fiscal implications of the WTO moratorium, this issue is central to properly evaluate the merits of different policy proposals. To this end, the authors provide a quantitative and qualitative comparison of domestic and border tax policies with respect to ETs. First, the authors estimate the portion of trade in digitizable products conducted electronically. Second, within a purely static modeling framework, the authors present upper bound estimates of the revenue potential stemming from tariffs versus a value-added tax (VAT) on digitized flows.

**Results suggest that VATs are preferable to border taxes on ETs.** First, the VAT, which is broad-based and excludes intermediate inputs, is more economically efficient. In contrast to a tariff, a VAT is able to raise revenue without significantly distorting consumption and production decisions and thus with minimal impact on output and welfare. Moreover, there is extensive accumulated experience with implementing and administering VAT in countries of all income groups, while little is known about implementing ET tariffs. Second, the maximal revenue potential of VAT on trade in digitized goods, based on a static analysis, is about 150 percent higher than that of tariffs at current rates. This difference is largest for high-income countries due to their large share of global imports combined with low tariffs relative to VAT rates. Upper and lower middle-income countries are heterogeneous, with revenue potential roughly the same for the former group and VAT ahead in the latter group. Low-income countries have low revenue potential for both instruments due to low imports in digitized products.

**The WTO moratorium can provide a commitment device to promote a more efficient taxation system—this commitment should be complemented by further investment in modernizing tax and customs infrastructure in developing countries.** Higher efficiency and revenue potential make VAT the preferred instrument to tax ETs, so the moratorium on customs duties on ETs can help channel developing countries' tax reform efforts in a more efficient direction. As obtaining maximal revenue is conditional on the necessary tax infrastructure being in place, investment is best directed at updating and enhancing domestic VAT infrastructure rather than at implementing customs duties on ETs. Three main reasons account for this: (1) greater economic efficiency, as VAT creates less distortions per dollar raised; (2) easier administration, as VAT builds on existing tax infrastructure that can be adapted to handle digital trade; and (3) easier implementation, because attempting to capture all ETs "at the border" is impractical. A priority going forward is to carefully plan the support by the global community to ensure that developing countries can invest in modernizing their tax systems and infrastructure to adequately meet revenue needs in the digital era.

## Literature Review

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**As developing countries continue to improve domestic revenue mobilization, IMF policy advice has been to reduce tariffs at the appropriate pace—tariffs are a volatile source of revenue that can offset the benefits of trade.** The IMF has a mandate to facilitate the expansion and balanced growth of international trade, and its policy advice—while tailored to country specific circumstances—is to maintain open, stable, and transparent trade policies. Especially for emerging market economies and low-income countries, where trade barriers remain relatively high, this has meant promoting more efficient domestic revenue sources and further

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<sup>1</sup> Group of Seven Trade Ministers issued the following statement in October 2021: "Electronic transmissions—including the transmitted content—should be free of customs duties, in accordance with the WTO Moratorium on Customs Duties on Electronic Transmissions. We support a permanent prohibition of such duties." India and South Africa have called for the moratorium to be reconsidered (WTO 2020a), and Indonesia has called for it to be terminated (WTO 2022).

reducing reliance on trade taxes.<sup>2</sup> The IMF also advises on the pace of reforms and their sequencing with other aspects of the overall reform packages and provides customs-related technical assistance (IMF 2023a).

**Studies of the potential economic impacts of the moratorium have been scarce to date and focused primarily on the fiscal impacts. Even so, results have been mixed.**

- **An early assessment by the WTO shows little fiscal impact of the moratorium.** WTO (2016) observes that tariff revenue collected from digitizable products has decreased over time, from \$1.2 billion in 2000 to \$823 million in 2014, presumably because physical trade in these goods has increasingly been displaced by digital trade over ETs.<sup>3</sup> This amounts to a negligible 0.26 percent of total tariff revenues in 2014.
- **Some studies have found significant impacts for certain developing countries.** UNCTAD (2017) and Banga (2019) have argued that developing countries face a significant loss of potential revenue due to the moratorium. Assuming that tariffs on ETs can be collected and that the rates would reflect current tariff commitments on digitizable products, the latter study estimates more than \$10 billion per annum of foregone revenue for developing countries excluding least developed countries (LDCs), \$1.5 billion for LDCs, and an order of magnitude less to high-income members. Banga (2022) updates these figures and estimates that over 2017–20 developing countries excluding LDCs had foregone \$12 billion per annum and LDCs \$2 billion per annum.<sup>4</sup>
- **Others argue that the policy space remains adequate for most countries despite the WTO moratorium.** Evenett and Fritz (2022) critique the aforementioned estimates by highlighting that only a handful of the developing economies included in the United Nations Conference on Trade and Development (UNCTAD) studies finance more than 20 percent of their budgets through tariff revenue; and half of the top 10 tariff-dependent developing economies are not WTO members and hence are not constrained by the moratorium, yet they do not impose customs duties on ETs. Of those that are WTO members, most set their tariffs below the maximum tariff (“bindings”) permitted by their WTO commitments; raising most favored nation (MFN) tariffs in LDCs by just 0.75 percent would more than offset the estimated revenue loss, which illustrates that any impact is small relative to actual tariff revenues. Andrenelli and López González (2019) also observe that foregone revenue estimates are typically small relative to overall government revenue.

**A different approach to evaluate the WTO moratorium has been to consider the dynamic effects of potential policy choices, beyond aforementioned “first-round” effects.** Analysis based on general equilibrium modeling allows for simulating the effect that imposing customs duties might have on supply and demand conditions in each sector, through the dynamic adjustment of prices, capital and labor, and hence on macroeconomic outcomes such as investment, employment, fiscal revenue, and growth. Makiyama and Narayanan (2019) use such a model to show that the net effect of imposing customs duties on ET and reciprocal tariff increases by trading partners results in negative impacts on investment, employment, growth and tax revenue.<sup>5</sup> In the case of India, the net loss of tax revenue is estimated at about \$2 billion. WTO (2020b)

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<sup>2</sup> A large informal sector creates challenges for the implementation of tariffs and VAT, but the VAT provides incentives to formalize in order to benefit from input credits.

<sup>3</sup> Using a list of 30 HS 6-digit subheading and applied tariff rates.

<sup>4</sup> Since the scope of the moratorium is not formally defined, these studies rely on a set of 49 HS 6-digit subheadings (UNCTAD 2017 uses 38) comprising digitizable products in five categories (printed matter, music and video downloads, software and video games). In addition, the impact of 3D printing is considered, since electronic transmissions (ETs) can be used to export blueprints for products manufactured locally using this technology. Estimates rely on a counterfactual growth in trade in digitizable products (had these products not been converted into ETs) calculated based on the average growth rate in their trade during 1998–2010 and assuming each product is taxed at their respective maximum permitted tariff.

<sup>5</sup> Four services sectors are identified as impacted by the removal of the moratorium: wholesale and retail trading, recreational and other services, communications, and business services.

use another computable general equilibrium model and find that imposing customs duties on ETs raises total tariff revenue by only 0.15 percent in developing countries and 0.25 percent in LDCs, and reduces imports by 2.6 to 3.1 percent in developing countries and 10.4 to 11.7 percent in LDCs.

## Digitalization and Trade

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### **Trade through digital channels has several unique benefits beyond the traditional gains from trade.**

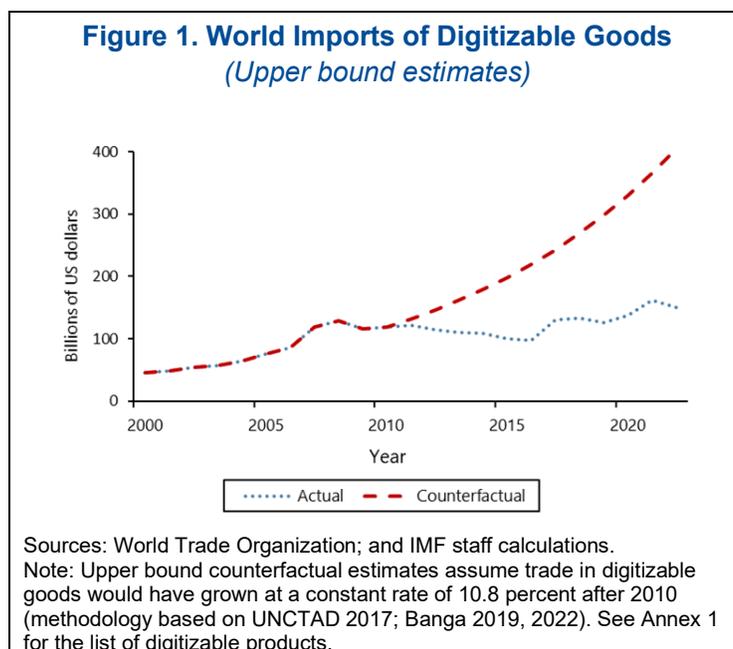
Digital trade, as with other forms of trade, contributes to welfare gains by enabling more efficient production through specialization according to comparative advantage, lowering the cost of production through economies of scale when serving global markets, and increases the variety of goods and services available to consumers. Beyond this, digital inputs are special inputs since their increased availability and usage contributes to the digitalization of all aspects of the economy, ranging from services provision to manufacturing production to agriculture. This enables more efficient processes that can boost firms' productivity, which can benefit consumers through lower prices. Digital technologies also promote increased interconnectivity, communication, and hence the transmission of existing knowledge and technology as well as innovation, and thereby contributes to productivity growth and richer consumption variety. Lastly, digital inputs foster inclusion by reducing trade barriers for small firms and women-led businesses (WTO 2018; WTO–WBG 2020).

**Certain digitizable products have been at the forefront of the technological transformation, and their consumption has shifted increasingly from physical goods into digital equivalents, traded over the internet.** The number of people using the internet globally has risen from about 400 million in 2000 to 1 billion in 2005 and to almost 5 billion in 2020 (WBG 2022). This has meant an exponential increase in consumers who have gained access to a global electronic marketplace for goods and services. This trend is underpinned by the proliferation of internet connected devices, with the number of devices per household continuing to grow, the hours spent with mobile devices growing, and download speeds continuing to improve. All these factors combined have contributed to shifts in consumption patterns where *digitizable goods* (physical goods, for example, books, physical recordings of music and films, and games, which can be digitized and consumed on electronic devices) are being substituted by consumers for digital products (for example, e-books, digital music and videos, and downloadable or online games) which are provided through *electronic transmissions*.

### **Two key elements are required to quantify potential tax revenues implications of the WTO moratorium.**

- **First, a “working definition” of the scope of products affected by the moratorium.** Since no official definition of the scope of the moratorium exists, the authors adopt as a “working definition” the list of digitizable products used in a recent WTO (2020b) study, which encompasses four categories: photographic and cinematographic film; print matter; media for sound, video, software, or other phenomena; and video games (Annex 1). The goal of the authors' quantification is to provide an approximate measure of revenue implications, but importantly, beyond direct revenue impacts, policy recommendations depend on economic theory of efficient taxation, and practical considerations, such as administration and implementation.

- Second, an estimate of trade in digitized products covered by the moratorium.** Although trade in physical products that have digitized equivalents is recorded in customs statistics, trade in digitized products is not recorded at the desired level of disaggregation in official statistics and must therefore be estimated.<sup>6</sup> For simplicity and comparability across studies, the authors adopt the methodology of UNCTAD (2017) and Banga (2019, 2022) to estimate these flows assuming a constant growth rate of trade in these products to construct a counterfactual. Digitized trade is then defined as the difference between the actual import of digitizable products and the constructed counterfactual



imports of the same products (Figure 1; see Annex 2 for details). These estimates should be seen as an upper bound of trade impacted, in line with the aim of estimating *maximal* revenue implications, because the constant growth rate assumption adopted in that study exceeds average GDP growth over this period and ignores issues of administrative capacity and legal obligations, described below, which reduce the portion of these trade flows on which customs duties could potentially be collected.

**Additional considerations may further reduce the magnitude of trade flows on which customs duties can be levied.** Although the authors’ trade flow estimates are based on consumption trends, a portion of this consumption may not be dutiable. For example, the treatment of streaming services and subscription-based services where ownership does not change hands is ambiguous. Existing rules governing the trade in services which limit the ability to discriminate against foreign providers may in practice limit the revenue potential of customs duties on electronic transmissions. These potentially include national treatment (NT) and MFN clauses in the WTO General Agreement on Trade in Services (GATS) and other agreements (for example, bilateral tax treaties) that cover intellectual property fees. Likewise, the expanding network of commitments on digital services in regional trade agreements has a similar limiting effect (Andrenelli and López González, forthcoming). Considering these additional factors would only strengthen the authors’ policy conclusions. Hence, in what follows, the authors will focus on the theoretical *maximum revenue potential*, which assumes these factors do not come into play.

<sup>6</sup> Digitally delivered trade should be recorded as part of services trade statistics, as described in the WTO–OECD–IMF–UNCTAD *Handbook on Measuring Digital Trade*, whose measurement framework is in line with BPM6 and IMTS 2010 (WTO–OECD–IMF–UNCTAD 2023).

## Tariffs and VAT on Digitized Products

**Tariffs contribute substantially to tax revenues in some contexts—however, revenues from tariffs should not be viewed in isolation.**

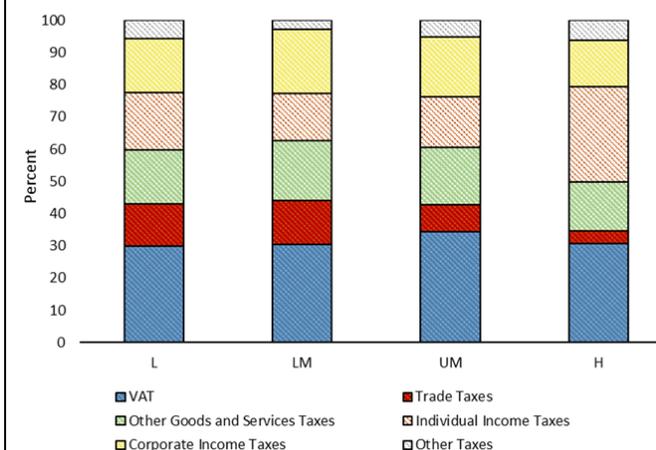
In non-digital contexts, tariffs are sometimes seen as a convenient revenue source because they are levied on specific physical goods as they cross the border. If customs border controls are in place, authorities can tax (international) transactions of physical goods at relatively low administrative and compliance costs, compared to other forms of taxation such as income taxes or domestic consumption taxes. Because of their convenience, it is no surprise that the share of trade taxes in overall tax revenue is inversely related to development level (Figure 2). However, *efficient* tax design needs to consider alternative approaches to raising a given amount of revenue based on the relative economic distortions introduced by different measures, taking administrative constraints (Keen and Slemrod 2017) as well as compliance and enforcement (Slemrod 2019) into account.

**Taxation of ETs should consider different policy options to ensure that the tax policy mix is efficient, accounting for administrative and compliance constraints.**

A general principle is that tax policies should be designed to raise revenue efficiently. This would imply that a certain policy mix should generate the desired level of government funding—depending on political preferences—while minimizing negative impacts on welfare. Taxes can have negative welfare effects by changing the price signal faced by economic agents such as firms and households, thereby inducing them to change their production and consumption behavior, and (potentially) leading to lower overall output and welfare levels. Evaluating the impact of the WTO moratorium on (long-term) fiscal outcomes requires an understanding of the optimal tax mix—in the sense of minimizing efficiency losses—with and without the option of levying tariffs on ETs.

**To study the fiscal implications of different tax instruments on ETs, the following analysis focuses on consumption taxes levied either at the border or domestically.** In principle, several different tax reforms could yield efficiency gains by shifting revenue collection away from tariffs onto other taxes, depending on the structure of the current tax system. However, since such a broader assessment would have to be, by necessity, country specific, the following analysis focuses on domestic consumption taxes such as the VAT, as the closest potential substitute for tariffs. Other tax policy options, which are sometimes brought up in the debate about tax challenges arising from digitalization, include digital services taxes (DSTs), withholding taxes (WHTs) on royalties and technical service fees or destination-based taxes on corporate income. These alternative policy options are not subject to the quantitative assessment presented in the next section as, similarly to tariffs, they distort production and consumption decisions (see IMF 2023b, for a discussion).

**Figure 2. Tax Mix by Income Group in 2021**



Sources: IMF; and IMF staff calculations.

Note: H = High Income; L = Low Income; LM = Lower-Middle Income; UM = Upper-Middle Income.

## General efficiency and administrative issues

**The VAT is widely seen as an efficient way to raise revenue, especially if it has a broad base comprising all final consumption and a single standard rate** (De Mooij and Swistak, 2022). It relies on fractional tax collection on the value added at every production stage including business-to-business (B2B) and business-to-consumer (B2C) transactions. When businesses use intermediate inputs, the VAT paid on those inputs is credited to ensure that only the value added in each production stage is taxed. In most countries standard VAT rates are typically between 15 and 20 percent. Two key principals of a properly implemented VAT are the following:

- **VAT should be based on the destination principle** where imports are taxed at the border and exports are zero-rated. Under a destination-based VAT consumers have no incentive to favor imported or domestically produced products, while exporters compete on an equal basis with foreign producers; such an approach is not only economically efficient, as it avoids distortions, but also fully aligned with WTO rules on National Treatment and subsidies.
- **Crediting of input VAT ensures that tax is levied only on domestic final consumption**, thereby avoiding cascading effects, which would arise if tax were imposed at several successive stages in a supply chain without crediting. Under a VAT, such efficiency costs can generally be avoided, as they would only arise to the extent that the VAT administration is not fully operational, for example, if there are time lags (or other imperfections) in the refunds granted for input VAT.

**In contrast, tariff rates vary by product and country, and include intermediate inputs, implying significant efficiency costs.** Tariffs are levied on specific products at the border, often with the stated aim to protect local firms by making imports more expensive. Since they do not discriminate between intermediate inputs and final consumption (as the VAT does), they directly increase the costs of inputs sourced from abroad, thus leading to cascading effects. Such effects can create significant distortions, biasing business decisions towards other intermediate inputs, for example, by using more labor than capital inputs in production, or foregoing the use of internationally traded digitized products. As a result, production decisions are distorted, and the economy suffers from efficiency losses.

**The cost of tariffs falls largely on domestic firms and consumers, even in larger countries.** In theory, the ability to shift the cost of protection onto foreigners is related to a country's ability to affect the world price, that is, its import market power.<sup>7</sup> However, tariff incidence is ultimately an empirical question: smaller economies have relatively little market power, but recent empirical work has shown that even large economies can experience almost complete pass-through of tariffs, implying that domestic firms and consumers bear the entirety of the cost (Amiti, Redding, and Weinstein 2020; Fajgelbaum and others 2020; Cavallo and others 2021).

**Tariffs and VAT are separate tax instruments that can be combined and levied on the same cross-border transaction, but such duplication would reduce efficiency for no fiscal purpose.** The VAT base should in principle include tariffs and excise duties to accurately reflect the value of final consumption for VAT purposes (Williams 1996). If the combined tax burden is perceived as too high, it is preferable to reduce tariffs rather than the VAT, based on administrative and economic reasons. Approaches include exempting goods from VAT if they are subject to tariffs (although there is no policy rationale to prefer tariffs to VAT) or to calculate VAT on

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<sup>7</sup> This is captured by the inverse of the demand elasticity and foreign export supply elasticities faced. However, trade agreements such as the General Agreement on Tariffs and Trade/World Trade Organization rounds and subsequent accessions have helped mitigate the potential for this externality through binding tariff commitments that are inversely related to import market power (Bagwell and Staiger 2011; Jakubik, Keck, and Piermartini 2022).

prices net of any applicable tariffs. However, both alternatives would significantly increase administrative costs, for no fiscal purpose, while also incurring additional efficiency costs as discussed above.

**The rise of digital trade has made border collection more difficult, affecting government revenues as well as economic efficiency.** Tax instruments that are potentially applied to cross-border transactions include tariffs, excise duties, and VAT. The same challenge arises for all those tax types: the increasing supply of intangibles, for example, the rise of digitally traded products, makes border tax collection difficult. Digitization of trade leads to foregone tariff and tax revenue, potentially affecting any tax levied on cross-border transactions. The practical advantages of tariffs, which were relatively simple and less costly to collect when trade was mostly in physical goods, disappear when goods are digitized and traded as digitized products. In addition, tax systems become less neutral if certain cross-border trade is not captured, for example, when domestic advertisement providers are subject to VAT while online supply through foreign digital platforms escapes taxation. As a result, domestic businesses could lose competitiveness relative to lower-taxed foreign firms operating mostly in digital markets.

**While the practical advantages of tariffs disappear when products are digitized, VAT administration has been adapted successfully to the challenges of digitalization** (Brondolo and Konza 2021). The increasing challenges associated with the enforcement of border taxes on digital transactions are eroding the practical advantages of tariffs, which were relatively simple and less costly to collect when trade was mostly in physical goods. VAT administration, on the other hand, has been adapted successfully to the challenges of digitalization, as authorities in advanced economies sought to secure their domestic tax bases (see Box 1 and selected country approaches in Annex 3).

#### **Box 1. VAT on Digital Trade: Experiences in Emerging Market and Developing Economies**

**Countries have adopted different administrative approaches to ensure that digitally traded products continue to be taxed under the VAT,** notwithstanding the fact that digitalization made border tax collection more difficult. While existing approaches differ across many dimensions, Annex 3 provides an overview of the main features of current VAT legislation in a selection of emerging market and developing economies.

**To collect VAT on business-to-business (B2B) supplies of imported digital products, countries typically require resident businesses to apply the reverse charge method.** Based on this method resident businesses are required to charge VAT on digital imports as if they were the supplier. If the imported digital products are used as intermediate inputs in the production of final (taxable) goods or services, the resident business receives credits for its input VAT. Avoidance risks are thus relatively low in the B2B case because the reverse charge method creates incentives for importers to identify their immediate counterparts and claim input VAT.

**Vendor collection is the most common approach to tax business-to-consumer (B2C) supplies of imported digital products under the VAT.** Under this approach non-resident suppliers are liable for the VAT charge and required to register if their local sales exceed a certain threshold. In many cases simplified registration processes have been developed to increase voluntary compliance, given that the inherent incentive to comply is lower than in the B2B case (since final consumers cannot claim VAT credits).

**To implement vendor collection on remote supplies to domestic consumers, the scope of the measures should be clearly defined in the VAT legislation.** However, different approaches exist across countries. For example, the OECD VAT guidelines propose a broad definition of in-scope products, essentially including all intangible goods and services, thereby removing the need for a prescriptive list (OECD 2017a, 2017b). In South Africa the VAT legislation from 2014 originally limited the scope to electronic services defined on a prescribed list, however, this approach was changed in 2019 to include all supplies that meet a certain definition. Alternatively, some countries—for example, Indonesia—have opted for a list of in-scope companies. This

### Box 1. VAT on Digital Trade: Experiences in Emerging Market and Developing Economies (continued)

approach has proven to be more challenging because it tends to create distortions across companies and requires authorities to issue regular updates on the companies included on the list.

**Alternatively, some countries have adopted withholding regimes, making financial intermediaries responsible for the collection of VAT on payments for digital imports.** This approach has been adopted as a backstop, for example, in Chile, Colombia, and Costa Rica, where financial intermediaries are required to withhold VAT on remote B2C supplies if nonresident suppliers do not comply with their obligations under the vendor collection regime.

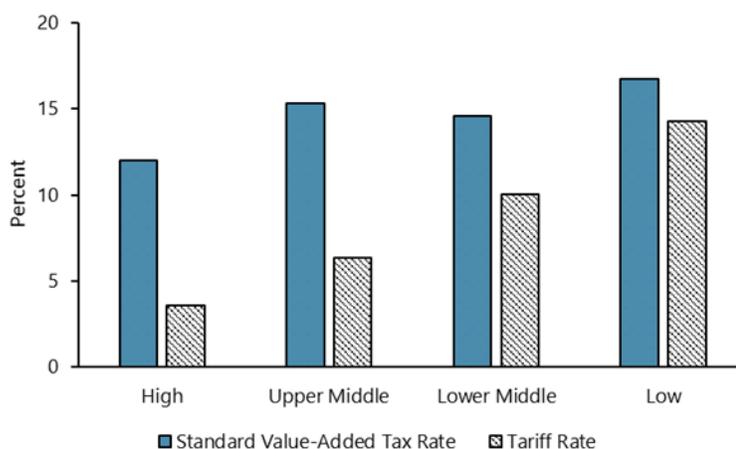
**Digital platforms are being leveraged to improve VAT collection on digital trade.** While some countries require digital platforms to share relevant tax information with the authorities (for example, Chile), others have implemented full liability regimes whereby platforms are liable to collect the VAT on inbound supplies made through them (for example, Mexico and Türkiye). Other approaches exist as well, for example, in India, where platforms are required to collect tax at source at 1 percent of the value of taxable supplies made through it by other suppliers.

### Rate structure across country groups

**Standard VAT rates are higher than tariffs across all country groups, but a direct comparison is not informative because final consumption shares should be considered.**

Based on unweighted averages, VAT rates are above tariffs for the set of digitizable products and the gap is largest in high-income countries and lowest in low-income countries (Figure 3). Tariffs and VAT rates have for the most part remained steady over the past two decades (Annex 2). In general, VAT is levied based on a standard rate ( $\tau_{c,t}^{VAT}$ ) that is applicable to all goods and services, however, some countries also apply reduced rates to specific products, for example, goods that are considered basic needs.<sup>8</sup> Estimating revenue potential of a VAT on digitizable products requires taking into account the

**Figure 3. Standard VAT Rates and Tariff Rates on Digitizable Products (2021)**

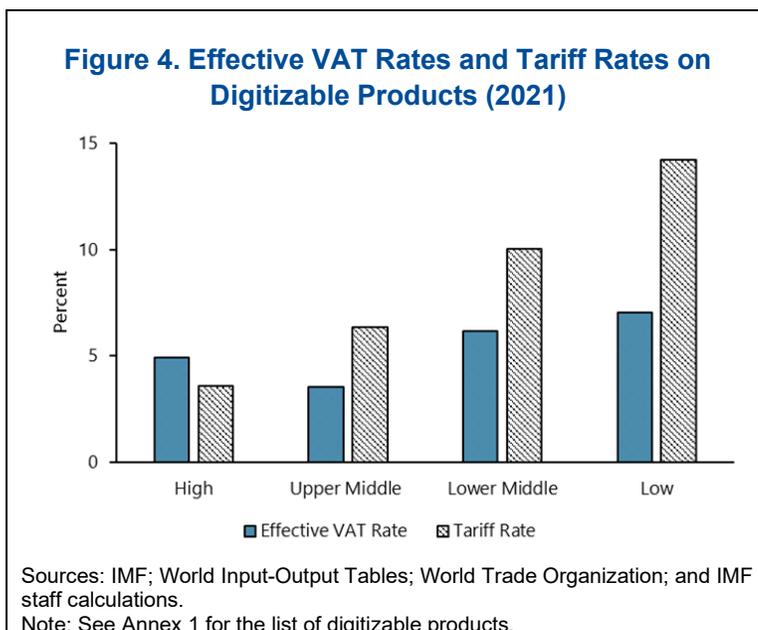


Sources: IMF; World Trade Organization; and IMF staff calculations.  
Note: See Annex 1 for the list of digitizable products.

<sup>8</sup> Standard value-added tax (VAT) rates are based on the IMF Fiscal Affairs Department tax database, which has (near) global coverage and is updated every year based on several internal and external sources (including International Bureau of Fiscal Documentation, PricewaterhouseCoopers International Limited, and KPMG International Limited). For the purpose of the current estimates, it is assumed that the standard VAT rate is applicable to all products.

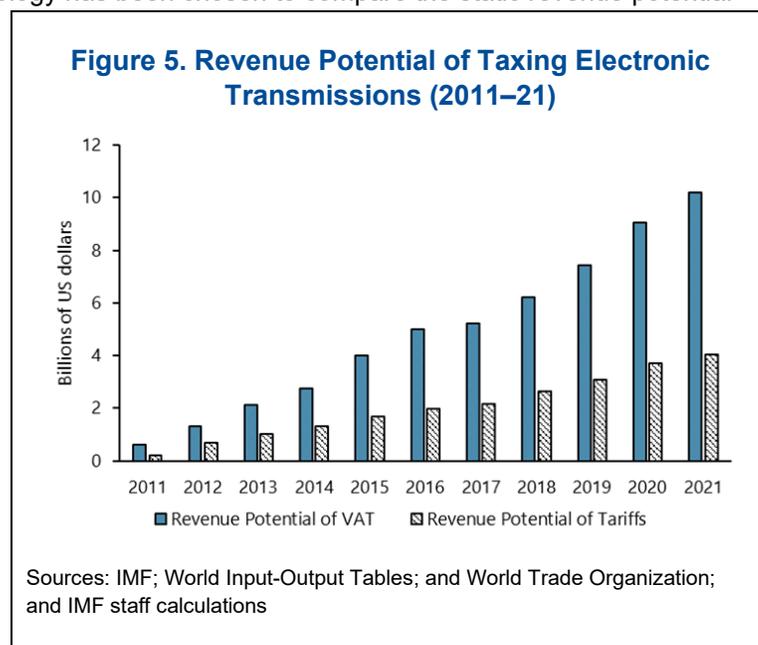
shares of intermediate and final consumption. To address this issue, the authors use final consumption shares computed at the sector level to obtain “effective” VAT rates (see Annex 2 for details).

**Effective VAT rates are significantly lower than standard rates and, excluding high-income countries, are also lower than tariff rates (Figure 4).** Comparing effective VAT rates to tariffs provides better guidance to the revenue potential associated with different policy options. In contrast to Figure 3, the pattern, based on unweighted averages within four country groups, now changes, as effective VAT rates tend to be much smaller: Only in high-income countries are effective VAT rates still (slightly) higher than tariffs; in the other three country groups the gap reverses and tariffs are higher. The difference between tariffs and effective VAT rates is largest in low-income countries, mostly because tariffs are comparatively high in these countries. However, effective VAT rates are not far apart across all country groups, ranging between 3.5 percent and 7 percent on average across country groups.



## Revenue Effects of Tariffs versus VAT on Electronic Transmissions

**This section assesses the maximum revenue potential of tariffs or VATs on ETs of digitized products subject to several caveats.** First, the methodology has been chosen to compare the static revenue potential associated with of two policy approaches—tariffs and VAT—across a global sample of countries, taking the current rate structure as given. The two policy approaches are presented as mutually exclusive options for illustrative purposes and to strengthen the case for efficient tax design. Second, actual imports of digitized products are not observed in the trade data; the upper bound estimate used here builds only on a counterfactual (upper bound) growth projection. The actual size of these imports is unknown. Third, the country-specific features of current VAT legislation (see Annex 3) are not modeled in detail for the purposes of the current exercise. Therefore, it remains unknown how much of the VAT revenue potential is currently being realized by any given country. Accordingly, the premise of the assessment is only to compare maximum revenue potentials across the two policy options, without informing the incremental gain in VAT revenue that could be mobilized if all digitized products were to be taxed under current rates.



**The maximum revenue potential associated with tariffs and VAT is estimated using a static approach, holding current rates and demand constant.** Note that, although it is possible to jointly raise tariffs and VAT rates, this policy option is clearly inferior due to efficiency losses and higher administrative costs.<sup>9</sup> Recall that ETs are estimated to be the difference between observed imports of digitizable products ( $M_{c,t,p}^{Observed}$ ), denoted by  $p$  (belonging to industry  $i$ ), by country  $c$  in year  $t$  and the upper bound of counterfactual imports of  $M_{c,t,p}^{Counterfactual}$ . Revenue potential can be estimated at the product level assuming that digital trade is taxed at effective VAT rates ( $\varepsilon_{c,t,i}^{VAT}$ ) or MFN tariff ( $\tau_{c,t,p}^{MFN}$ ). Revenue potential is then defined as follows:

Tariff revenue potential:  $\tau_{c,t,p}^{MFN} \times (M_{c,t,p}^{Counterfactual} - M_{c,t,p}^{Observed})$

VAT revenue potential:  $\varepsilon_{c,t,i}^{VAT} \times (M_{c,t,p}^{Counterfactual} - M_{c,t,p}^{Observed})$

**At the global level, VAT on ETs would yield about 150 percent more potential revenue than tariffs (Figure 5).** Aggregated revenue potential of both tariffs and VAT has increased over the past decade, as trade in digitized products has accelerated. Given the authors' assumptions the estimated revenue potential is clearly an upper bound. First, the authors' assumptions on the growth of trade are an upper bound. In addition, the authors assume that ETs can be fully captured either by tariffs or through the VAT.<sup>10</sup> The estimated revenue potential from taxing the same imports of digitized products was about \$0.6 billion for tariffs compared to \$1.2 billion for VAT in 2012; this has grown to around \$10 billion for VAT and \$4 billion for tariff by 2021, a difference of about 150 percent. Disaggregating global revenue potential to the country-product level suggests that the increasing gap is driven by an increasing share of digitized products that would be subject to relatively low tariffs, given that VAT rates remained broadly constant over time. Taken together, both economic efficiency and greater revenue potential point to VAT as the first best policy option.

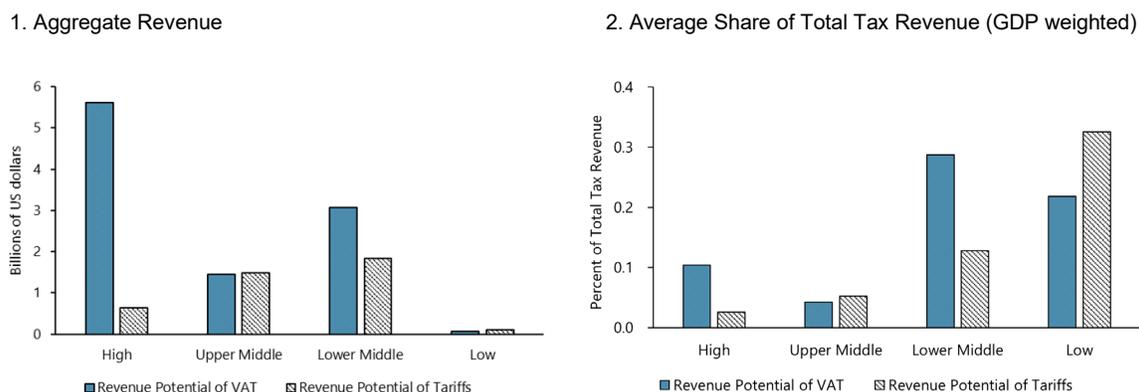
**A closer look at the disaggregated results reveals different patterns of potential revenue for countries at different income levels (Figure 6, panel 1):**

- High-income countries import the largest share of world digitized products and tend to have (very) low tariffs. Given that VAT rates are typically about 15 to 20 percent in these countries, this suggests a significant revenue potential from VAT.
- Middle-income countries import smaller shares of digitized products in a variety of different sectors, and they tend to impose relatively high tariffs on some of the products captured in the analysis. Taken together, this implies that revenue potential from tariffs varies strongly across countries in this group. On average, the authors find that the revenue potential from tariffs and VAT is roughly the same for upper middle-income countries, while VAT revenue potential dominates for lower middle-income countries. Digitized imports into lower middle-income countries tend to be for final consumption, for example, due to imports of audiovisual and gaming products, whereas digital trade imported to upper middle-income countries is relatively more concentrated in intermediate inputs, which do not necessarily contribute to final domestic consumption and thus VAT revenue. This pattern is responsible for the significantly larger VAT revenue potential, compared to tariffs, estimated in lower middle-income countries.
- Low-income countries import very little digital trade, and the revenue potential is therefore comparatively low for the time being. The VAT and tariff revenue potential tend to be similar, although the latter tends to be slightly higher due to the higher tariffs in low-income countries.

<sup>9</sup> As discussed in the previous section, if both instruments are combined, the VAT base typically captures the total value of final consumption, including underlying tariffs and excise duties, which can lead to excessively high combined tax rates, and in this case economic theory would suggest reducing tariffs, rather than VAT rates, due to the associated efficiency gains.

<sup>10</sup> The direct comparison of effective VAT rates and tariffs in Figure 3 is independent of the value of ETs, implying that it can provide information on the relative revenue potential irrespective of assumption about the growth pattern of ETs over time.

**Figure 6. Static Revenue Potential from Taxing Electronic Transmissions by Country Group (2021)**



Sources: IMF; World Input-Output Tables; and World Trade Organization; and IMF staff calculations.

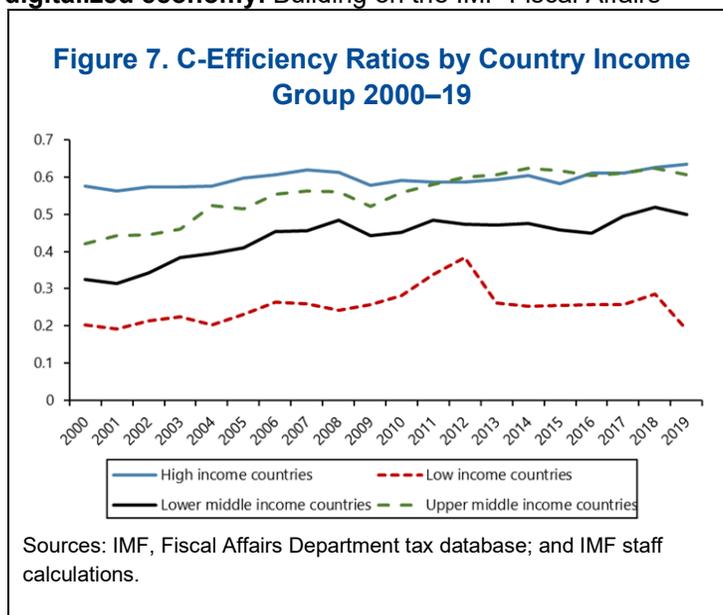
**As a share in total revenue, static revenue estimates are relatively low for both policy instruments, ranging between zero and 4.6 percent across all countries covered (Figure 6, panel 2).** Revenue potential as a share in total revenue tends to be higher in lower middle- and low-income countries, suggesting that policy action could be relatively more impactful in these countries. Despite the relatively high tariffs, the largest differences in revenue potential in favor of the VAT are observed amongst lower middle-income countries (up to 4.6 percent of total tax revenue). In low-income countries statutory tariff rates are among the highest in the sample (Figure 4), which explains the higher static revenue estimates for tariffs relative to VAT. However, the (GDP-weighted) average difference between the revenue potential of VAT and tariffs is still only –0.1 percent of total revenue in this group. For Group of Twenty economies the static revenue potential of the VAT tends to be higher than or at least equal to that of tariffs. Among the entire sample of lower middle- and low-income countries, only five countries are estimated to have a significantly higher static revenue potential under tariffs (that is, a difference of more than 0.1 percentage points in terms of total revenue). Given the modest size of the estimated revenue potentials, a stronger emphasis on efficiency, which ultimately drives medium- and long-term revenue, seems warranted.

**Available country-specific estimates suggest that revenue gains from VAT on digital products are expected to increase incrementally over time.** A recent summary of country-specific experiences with VAT reforms targeted at digital flows suggests that, in the short term, annual revenue gains in emerging market and developing economies<sup>11</sup> range from about 0.03 percent of GDP (Chile, South Africa) to about 0.08 percent (Thailand). However, these initial revenue gains are expected to become larger over time through indirect effects on compliance, as more information can be gathered by expanding reporting obligations of digital platforms (OECD–WBG–ATAF 2023).

<sup>11</sup> Note that these revenue gains stem from all imports of digital products, that is, not only ETs as defined for the purposes of the WTO Moratorium.

**Improving VAT administration and compliance is crucial to increase revenues collected from domestic consumption in the context of an increasingly digitalized economy.** Building on the IMF Fiscal Affairs

Department database, C-efficiency ratios can be calculated and summarized by income group (Figure 7). This indicator shows the extent to which countries could raise more VAT revenue by, on the one hand, reducing the number of preferential rates (that is, the policy gap) and, on the other hand, improving compliance by businesses and consumers.<sup>12</sup> For example, technological capabilities of tax authorities can increase compliance when some digital transactions may have escaped the tax net. As shown in the figure, C-efficiency is still relatively low in low- and lower middle-income countries, compared with others. This trend suggests that significant revenue gains could be realized in these countries by improving VAT policy design and investing in VAT administration and compliance measures.



## Policy Discussion and Conclusion

**Tax systems need to adapt to the increasing digitalization of economic activity, including in international trade—the costs and benefits of the WTO moratorium can be looked at from the perspective of efficiency of digital tax reforms.** This note compares two specific policy options to mobilize tax revenue from trade in digitized products: discriminatory measures such as tariffs and broad-based nondiscriminatory measures such as the VAT.<sup>13</sup> The analysis shows that the VAT is not only less distortionary and thus more efficient, it can also generate higher revenues. Specifically, the static revenue estimates covering a large number of advanced, emerging market, and developing economies show that for the world as a whole the VAT revenue potential raised from digitized trade at current rates is 150 percent higher than potential tariff revenue and about the same magnitude or higher for country groups at all income levels. Building on the IMF’s existing framework for technical assistance, these revenue streams could be mobilized through the VAT by investing in administrative capacity to better capture digitized flows and increase coverage and compliance (see IMF 2022a, 2022b, 2023c). Finally, going beyond the static revenue gains, investment in a well-functioning VAT system has been shown to have long-term benefits in terms of raising tax revenue efficiently. These findings point to the WTO moratorium on custom duties on ETs as one example of a commitment device to help countries focus reform efforts to implement first best policies. Such efforts need to be complemented by global policy coordination and support for developing countries to modernize their tax systems.

<sup>12</sup> The C-efficiency ratio is an indicator of the departure of the VAT from a perfectly enforced tax levied at a uniform rate on all final consumption (Keen 2013), comprising a compliance, as well as a policy-related gap. The former captures revenue reductions from policies such as incomplete coverage of the tax base and the use of non-uniform VAT (special rates); the latter reflects the effectiveness of administration and taxpayer compliance.

<sup>13</sup> More than 160 countries worldwide have implemented a VAT, with several recent adopters including Angola, Bahrain, Bangladesh, and Saudi Arabia, (De Mooij and Swistak, 2022). For the remaining countries, it is recommended to introduce a VAT.

## Annex 1. List of HS 6-digit Subheadings of Digitizable Products

No.	HS code	Valid		Description
		From	To	
<b>Photographic and Cinematographic Films</b>				
1	370510	-	2016	For offset reproduction
2	370520	-	2006	Microfilms
3	370590	-	2016	Other
4	370610	-	-	Of a width of 35 mm or more
5	370690	-	-	Other
<b>Printed Matter</b>				
6	482110	-	-	Printed
7	490110	-	-	In single sheets, whether or not folded
8	490191	-	-	Dictionaries and encyclopedias, and serial instalments thereof
9	490199	-	-	Other
10	490210	-	-	Appearing at least four times a week
11	490290	-	-	Other
12	490300	-	-	Children's picture, drawing or coloring books
13	490400	-	-	Music, printed or in manuscript, whether or not bound or illustrated
14	490510	-	-	Globes
15	490591	-	-	In book form
16	490599	-	-	Other
17	490600	-	-	Plans and drawings for architectural, engineering, industrial, commercial, topographical, or similar purposes, being originals drawn by hand; handwritten texts; photographic reproductions on sensitized paper and carbon copies of the foregoing
18	490700	-	-	Unused postage, revenue, or similar stamps of current or new issue in the country in which they have, or will have, a recognized face value; stamp-impressed paper; banknotes; cheque forms; stock, share or bond certificates and similar documents of title
19	490810	-	-	Transfers (decalcomanias), vitrifiable
20	490890	-	-	Other
21	490900	-	-	Printed or illustrated postcards; printed cards bearing personal greetings, messages, or announcements, whether or not illustrated, with or without envelopes or trimmings
22	491000	-	-	Calendars of any kind, printed, including calendar blocks
23	491110	-	-	Trade advertising material, commercial catalogues, and the like
24	491191	-	-	Pictures, designs, and photographs
25	491199	-	-	Other
<b>Sound &amp; Media</b>				
26	852349	2012	-	Other

27	852380	2007	-	Discs, tapes, solid-state non-volatile storage devices, "smart cards" and other media for the recording of sound/of other phenomena, whether/not recorded, incl. matrices and masters for the production of discs, but excl. products of Ch.37., other n.e.s.
28	852410	-	2006	Gramophone records
29	852421	-	1995	Records, tapes and other recorded media for sound, or other similarly recorded phenomena, of a width not exceeding 4 mm
30	852422	-	1995	Records, tapes and other recorded media for sound or other similarly recorded phenomena, of a width exceeding 4 mm but not exceeding 6,5 mm
31	852432	1996	2006	For reproducing sound only
32	852439	1996	2006	Other
33	852451	1996	2006	Of a width not exceeding 4 mm
34	852452	1996	2006	Of a width exceeding 4 mm but not exceeding 6.5 mm
35	852453	1996	2006	Of a width exceeding 6.5 mm
36	852460	1996	2006	Cards incorporating a magnetic stripe
37	852499	1996	2006	Other
<b>Software</b>				
38	852431	1996	2006	Data processing software on CD-ROMs for reproducing phenomena other than sound or image
39	852440	1996	2006	Computer software, magnetic tapes for reproducing phenomena other than sound or image
40	852351	2007	-	Flash memory cards or flash electronic storage cards, Semiconductor media, solid-state non-volatile storage devices, for the recording of sound/of other phenomena, but excl. products of Ch. 37.
41	852352	2007	-	'Smart cards'
42	852359	2007	-	Other semi-conductor media, for the recording of sound/of other phenomena, but excl. products of Ch. 37., other than "Smart Cards" and Solid-state non-volatile storage devices, proximity cards and tags
43	852491	1996	2006	For reproducing phenomena other than sound or image
44	854212	1996	2001	Cards incorporating an electronic integrated circuit ("smart" cards)
<b>Video Games</b>				
45	950450	2012	-	Video game consoles and machines, other than those of subheading 950430
46	950430	-	-	Games; operated by coins, banknotes, bank cards, tokens or by other means of payment, other than billiard articles and accessories, and automatic bowling alley equipment
47	950440	-	-	Games; playing cards
48	950490	-	-	Games; articles for funfair, table or parlor games, including pintables, special tables for casino games, automatic bowling alley equipment, n.e.c. in heading 9504
49	950410	-	2011	Video games of a kind used with a television receive

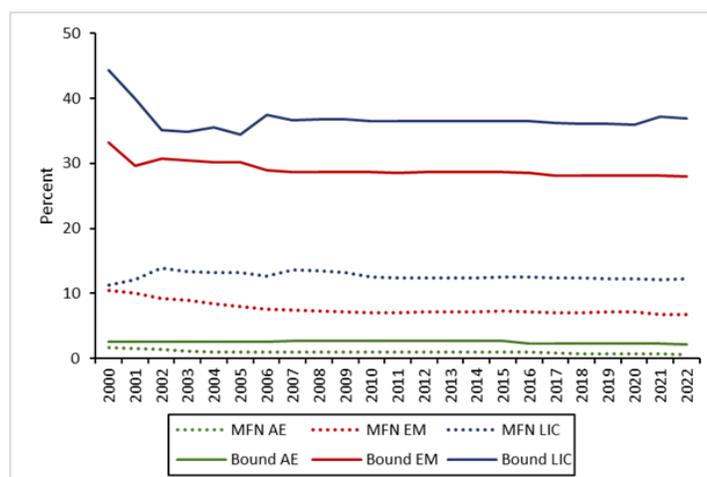
Source: World Trade Organization (2020b).

## Annex 2. Data and Trade Estimates

**Data on MFN tariffs, bound tariffs, and imports are sourced from WTO Integrated Database and Consolidated Tariff Schedules Database and include all WTO members (Figure 9).**

Since these data are originally reported in several different HS versions, the authors first converted them into a single Harmonized Commodity Description and Coding System (HS) version using United Nations conversion tables. For country-HS dyads where reporting gaps exist, the authors estimate missing data starting from the first data year available. In the case of tariffs, the authors assume the missing tariff is equal to the first available prior datapoint, and when there is none (for example, if only imports were reported in the earlier years), the authors use the next available datapoint. In the case of imports, the authors linearly interpolate where gaps exist and fill forward missing values in subsequent years using a moving average ( $0.5M_{t-1} + 0.3M_{t-2} + 0.2M_{t-3}$  where available, otherwise  $0.6M_{t-1} + 0.4M_{t-2}$  or  $M_{t-1}$ ). The authors generate counterfactual imports by assuming post-2010 imports grow at the average annual growth rate in digitizable products over 2000–10 (10.8 percent).

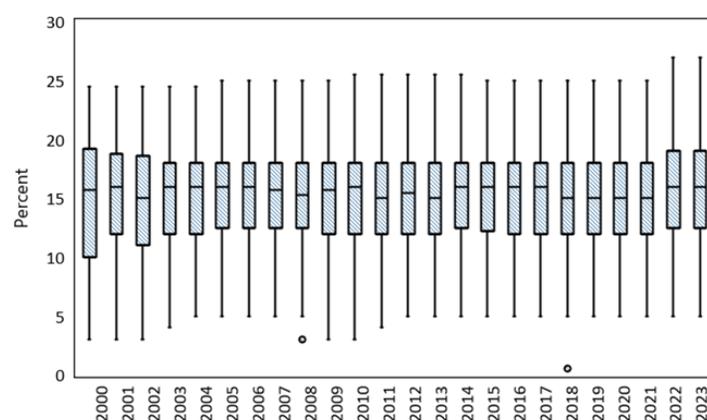
**Figure 9. Applied MFN and Bound Tariff Rates by Income Group (2000–22)**



Sources: World Trade Organization Integrated Database and Consolidated Tariff Schedules Database; and IMF staff calculations.  
Note: AE = advanced economy; EM = emerging market economy; LIC = low-income country; and MFN = most favoured nation.

**Data on standard VAT rates are sourced from the IMF Fiscal Affairs Department tax database (Figure 10) but using statutory VAT rates is not informative about the revenue potential stemming from digital trade.** In the case of tariffs, the approach to estimate revenue potential is comparatively easy: tariff rates vary by product and are simply applied to inbound transactions. In contrast, the estimation approach for the VAT involves, by necessity, further assumptions to account for the inherent crediting mechanism. Under the destination principle, adopted by most modern VAT systems, the VAT is levied only on final (domestic) consumption. This effect is achieved by taxing imports at the border while zero-rating exports. Since importers can credit input VAT against VAT collected on their sales including (zero-rated)

**Figure 10. Standard VAT Rates (2000–23)**

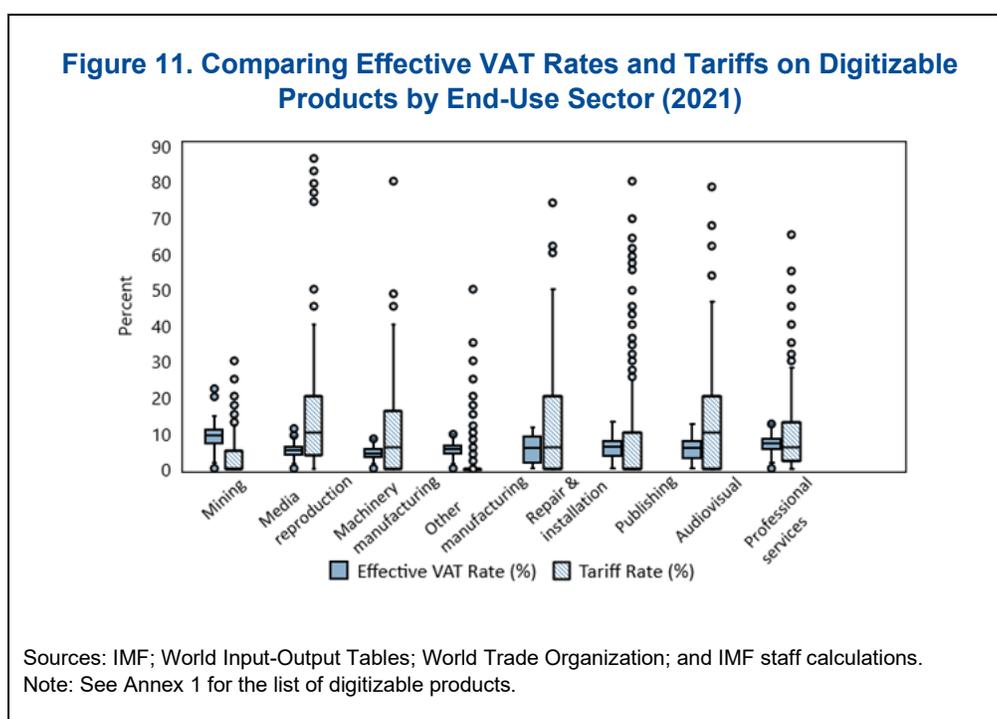


Sources: IMF, Fiscal Affairs Department tax database; and IMF staff calculations.

re-exports, the estimated revenue potential has to be adjusted by the share of digital trade imports that is not going into final consumption, for example, in case of intermediate goods and services that are re-exported. Building on an estimate of the final consumption shares at the sector level, discussed below, this approach ensures that only the share of the value that ends up in final domestic consumption is captured.

**Final consumption shares are computed at the sector level to obtain “effective” VAT rates.** Effective VAT rates ( $\varepsilon_{c,t,i}^{VAT}$ ) are calculated taking into account the share ( $\sigma_{c,t}^i$ ) of each transaction that is dedicated to final consumption:  $\varepsilon_{c,t,i}^{VAT} = \tau_{c,t}^{VAT} \times \sigma_{c,t}^i$  (allowing for variation across countries ( $c$ ), years ( $t$ ) and sectors ( $i$ )). Final consumption shares are computed based on global inter-country input-output tables for the years 2000 to 2014 from the World Input-Output Database as described by Timmer and others (2015). These data cover 56 industrial sectors, as defined by the ISIC revision 3 classification, across 43 countries and a (residual) rest of the world category. It is organized as a global input-output table, constructed using national supply and use tables, in which the origin and destination of imports and exports are made explicit. Given this detailed data structure, it is possible to calculate shares ( $\sigma_{c,t}^i$ ) using final consumption and total output within each end-use sector, country, and year.<sup>14</sup>

**Matching each digitizable product with its associated industrial sectors allows for a comparison of effective VAT rates with tariffs at the product level (Figure 11).** While trade flows are typically classified based on HS codes, final consumption shares are defined at the sector level. However, using UN concordance tables it is possible to match products to end-use sectors such that the effective level of taxation can be directly compared accounting for the underlying rates as well as the specific features of the VAT.<sup>15</sup> In fact, the effective rates, shown in Figure 11, are independent of the magnitude of the (estimated) digitized trade flows, which are discussed in the previous section and will be brought into the analysis in the next section. The figure shows that tariff rates are much more dispersed than effective VAT rates, and often considerably higher. Effective VAT rates tend to be more condensed and typically clustered around 5 to 10 percent, with only very few observations nearing zero.



<sup>14</sup> Note that final consumption shares are imputed for countries where data are missing, based on sector-year specific averages across country-income groups. Since only a few low-income countries are covered in the World Input-Output Database, the values observed for the rest of the world, at the sector-year level, are used to impute missing data points in low-income countries. For years 2015 to 2021 it is assumed that the last observed share continues to apply.

<sup>15</sup> Measurement would benefit from cross-classification tables between traded products and industries of production with up-to-date definitions and granularity.

## Annex 3. VAT on Digital Trade: Selected Design Features

Country	Threshold	Scope of Digital Products	Collection Method	Reverse Charge for B2B	Digital Platforms
Chile (2021)	None	Inbound supplies of digital entertainment content; provision of software, computing platforms or infrastructure	Vendor collection (withholding by financial intermediaries as backstop)	Yes	Information sharing obligation
Colombia (2019)	None	Inbound supplies of services and intangibles performed through electronic commerce	Vendor collection (withholding by financial intermediaries as backstop)	Yes	Full liability regime
Costa Rica (2019)	None	Inbound supplies of services and intangibles—anything other than goods or real property	Vendor collection (withholding by financial intermediaries as backstop)	Yes	Full liability regime
India (2017)	No threshold for nonresidents; For Indian residents: INR 1 or 2 million turnover (depending on the state)	Services mediated over the internet involving minimal human intervention: including streaming, downloads of music, e-books, films; cloud-based or downloadable software; online gambling and advertising (among others)	Vendor collection	Yes	Digital platforms are required to collect tax at source at 1 percent of the value of taxable supplies made through it by other suppliers.
Indonesia (2020)	Annual turnover IDR 600 million, or 50 million monthly revenues; and 12,000 users annually or 1,000 users monthly	Foreign digital service providers and intermediaries included on a government list, including services sent through the internet with minimal human intervention and not limited to software-based services, multimedia, or data.	Vendor collection	Yes	Foreign and domestic operators of digital platforms supplying products to Indonesian customers (B2B or B2C) that are meeting the threshold could be appointed as VAT collector by authorities.
Kenya (2020)	None	Electronic services as defined on a prescribed list	Vendor collection	Vendor collection by nonresident B2B suppliers of electronic services; reverse charge applies only in B2B purchases used in	Digital platforms must levy VAT on electronic services delivered through the platform by nonresident suppliers

				production of non-taxable supplies	
Mexico (2020)	None	Defined digital supplies such as downloads, access to content (excluding e-books and electronic versions of newspapers and magazines)	Vendor collection	Yes	Full liability regime
South Africa (2014)	ZAR 1 million	Electronic services defined as all services supplied by means of an electronic agent, electronic communication, or the internet (including some exceptions)	Vendor collection	Vendor collection by non-resident B2B suppliers of electronic services; reverse charge applies only in B2B purchases used in production of non-taxable supplies	Digital platforms must levy VAT on electronic services delivered through the platform by nonresident suppliers
Thailand (2021)	THB 1.8m (more than USD 55,000) per annum	Services including intangible property delivered through the internet, where the service is performed automatically through information technology	Vendor collection	Yes	Digital platform operators are obliged to pay the VAT on behalf of the foreign businesses using the platform, assuming the duties and responsibilities of the foreign businesses.
Türkiye (2018)	None	Electronic services	Vendor collection	Yes	Full liability regime
Vietnam (2020)	None	Download or streaming media, apps, e-books and online journals, e-learning, software-as-a-service provisions, gaming, and online gambling	Withholding by financial intermediaries	Yes	Foreign businesses must register for VAT directly with the tax authority or authorize a representative in Vietnam to do so on their behalf. Otherwise, VAT will be withheld by Vietnamese counterparties, commercial banks or payment service providers who facilitate the offshore payment.
Sources: EY Worldwide VAT, Goods and Service Tax, and Sales Tax Guide; IMF 2021; OECD 2022; and technical assistance reports.					

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