The Economic Structure of International Trade-in-Services Agreements

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The existing economics literature on international trade agreements focuses on tariff agreements covering trade in goods and explains core features of the General Agreement on Tariffs and Trade (GATT). Tariffs play almost no role in services markets, however, and the literature cannot account for the strikingly different approach to trade liberalization in agreements such as the World Trade Organization's General Agreement on Trade in Services (GATS). We develop a model through which key features of GATS, including its emphasis on "deep integration" can be understood. And we use this model to suggest that there may also be a middle ground for services trade liberalization between the GATS deep-integration approach and the traditional "shallow-integration" approach of GATT.

I. Introduction

The substantial literature on the economics of international trade agreements has enjoyed success in illuminating many features of real world

trade agreements, but its focus has been almost entirely on trade in goods.[1] Given the limited historical importance of trade in services and the limited attention to services trade in international agreements, this focus made sense until recently. The importance of trade in services has grown rapidly over the past several decades, however, culminating in the General Agreement on Trade in Services (GATS) in 1994. In the years since, trade in services has continued to expand at a rapid clip. The latest World Trade Organization (WTO) statistics put the value of US services exports at $853 billion in 2019, a figure roughly half the size of US merchandise exports (WTO 2020). A similar picture holds for the European Union (EU), where commercial services exports are estimated to exceed $2 trillion. Given the importance of services trade today, the need for the literature to consider trade-in-services agreements has become more pressing. This paper takes a first step toward filling this lacuna.

The General Agreement on Tariffs and Trade (GATT) is the central WTO agreement covering goods trade, while GATS is the WTO agreement covering services trade. There are striking differences between GATT and GATS that cry out for explanation. We catalog these differences and ask why they exist. Our answer builds from the terms-of-trade theory of trade agreements, a theory that can account for many of the core features of GATT (Bagwell and Staiger 2002). We show that the broad differences between GATT and GATS can be explained when this theory is augmented with a set of restrictions, motivated by salient features of services trade, on the policy instruments available to governments. This is the main positive message of our paper.

GATT has been highly successful in facilitating the liberalization of goods trade among its member governments. GATS, on the other hand, has been much less successful in liberalizing services trade (Francois and Hoekman 2010). What explains this difference in success? Both agreements seek to expand market access but take fundamentally different approaches. GATT was designed with "shallow integration" in mind, achieving an expansion in market access primarily through negotiated reductions in tariffs. In contrast, GATS reflects an orientation toward "deep integration," whereby the negotiated change or removal of domestic regulations and other nontariff barriers (NTBs) to trade in service sectors is seen as the primary method of expanding market access. The latter approach raises significantly greater challenges for negotiators seeking to expand market access. Copeland and Mattoo (2008, 104) put it this way:

> Many trade barriers in the service sector are a side effect of domestic regulations that have legitimate purposes. For example,

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[1] See the relevant chapters in Bagwell and Staiger (2016) for recent comprehensive reviews.

because of issues in asymmetric information, doctors must be certified to protect patients, engineers need certification to ensure that bridges they build do not collapse, and insurance companies have to be regulated to ensure their solvency. However, these same rules can be manipulated to protect local suppliers. For example, a rule requiring that an engineer graduate from a domestic university might ensure that quality standards are met, but would prevent consumers from having access to the services of highly qualified foreign engineers. The regulatory apparatus may therefore serve the dual purpose of responding to market failures and protecting local suppliers at the expense of consumers.

Our model helps to explain the deep-integration focus of GATS, while at the same time clarifying the underlying problems that a trade-in-services agreement must solve. A clear understanding of these problems can then inform the consideration of alternative design approaches for services trade agreements. We use the model to ask whether a shallow-integration approach more in line with that taken by GATT might be possible in a trade-in-services agreement. Surprisingly, we find that a shallow-integration approach, suitably modified to fit the needs of the services trade context, may be possible. This is the main normative message of our paper.

To provide some intuition for our results, it is helpful first to review the logic of shallow integration that emerges from the terms-of-trade theory when applied to agreements on trade in goods. That logic begins from the observation that a trade agreement must address an international inefficiency that exists under noncooperative (Nash equilibrium) policy choices if the agreement is to generate mutual gains for the participants. The argument then proceeds by noting that terms-of-trade manipulation is the source of international inefficiencies in Nash policy choices; that tariffs are the first-best instruments for manipulating the terms of trade, and hence with tariffs unconstrained no other policies in the Nash equilibrium will be distorted for this purpose; and that therefore in the Nash equilibrium tariffs are too high, making trade volumes too low, but there are no other policy distortions from an international perspective. From this starting point, it is then natural that a trade agreement might focus on lowering tariffs as a means of expanding market access and trade volumes to efficient levels, while putting in place various rules to prevent governments from backsliding on the market access commitments implied by their negotiated tariff bindings with new protective nontariff (e.g., behind-the-border) measures. As we describe more fully below, this logic fits nicely with the basic structure of GATT's shallow-integration approach.

Why does the same logic not apply to trade in services? An immediate answer arises with respect to services trade that necessitates the establishment by the foreign service provider of a commercial presence in the importing

country—"mode 3" services in the terminology used by GATS—which is the central focus of GATS commitments and the main concern of our paper. "Imports" of such services do not cross international borders, and so tariffs collected at the border are by definition unavailable to governments. Other policies can in principle replicate the effects of tariffs, and below we exploit the potential use of these alternative policies to derive initial results, but we argue that as a practical matter these alternative policies are also unavailable to governments. This has an important implication: without a tariff to manipulate its services terms of trade, an importing government will, in the Nash equilibrium, tend to spread protective distortions widely across the policy instruments that it does wield in the service sector, thereby "contaminating" many of its Nash policies with internationally inefficient terms-of-trade motives. As we demonstrate below in a terms-of-trade model augmented to highlight the consequences of limitations on policy instruments, this implication goes a long way toward accounting for the broad differences between the structures of GATT and GATS.

Does this then mean that shallow integration is impossible for services? Not necessarily. Our model suggests that a shallow-integration approach is possible in principle for services, but only if certain changes are first made to the structure of GATS to move it closer to the structure of GATT. More specifically, in spite of the limited policy instruments in our augmented terms-of-trade model, we suppose that governments initially agree to a set of blanket rules along the lines of certain rules applicable to trade in goods under GATT/WTO law. We find that these rules would induce governments to eliminate distortions in their behind-the-border instruments and divert them into a narrow set of fiscal—but not regulatory—measures or perhaps into a single preferred regulatory measure. And with international policy inefficiencies concentrated in such a limited set of instruments, we show that governments could then use negotiations over them to establish market access commitments in service sectors without the need to directly negotiate over a wide range of domestic regulatory measures, much as GATT has used negotiated commitments on tariffs in the goods sector. We interpret these findings as pointing toward the possibility of a "two-step" approach to liberalizing trade in services.

Our findings also highlight two important impediments that would have to be overcome for such a "shallow-integration" approach to services liberalization to succeed and that may help account for the broad differences between GATT and GATS. The first relates to the different sets of initial distortions that GATT and GATS had to confront and the distinct impacts that would be triggered as a result of these differences when countries adopt a set of blanket rules, the first step in the two-step approach that we describe above. These impacts would likely be more disruptive to the status quo in the context of GATS than they were in GATT. The second concerns the current data limitations on trade in services and

the difficulties this poses for effective implementation of the set of rules that our results suggest would be required for successful shallow integration of services trade. We discuss these issues in depth.

The rest of the paper proceeds as follows. Section II reviews stylized facts about GATT and GATS, highlighting the substantial differences in their basic architecture. Section III introduces a model of mode 3 services trade, characterizes optimal policy intervention when governments have available an expansive set of service-sector policy instruments, and confirms in this environment that the logic of GATT-like shallow integration should have carried over directly to GATS. Section IV then augments this model with an assumption that governments have a more limited set of policy options, shows that the broad differences between GATT and GATS can be understood from the perspective of this augmented model, and employs the augmented model to establish that a shallow-integration approach more in line with that taken by GATT might nevertheless be possible in a trade-in-services agreement. Section V concludes.

II. GATT versus GATS

GATT was first negotiated in 1947 and is now subsumed in the WTO, along with several additional treaties pertaining to trade in goods. GATS is a more recent development that dates back only to the creation of the WTO in 1994. The legal structure of GATS looks dramatically different from both the early GATT and the broader set of WTO disciplines in goods markets.

A. GATT

GATT members are under no general obligation to eliminate tariffs but can choose to open their markets through reciprocal tariff reductions ("bindings") negotiated on a product-by-product basis. GATT protects these reciprocal commitments with rules to prevent the substitution of alternative protectionist measures, such as a prohibition on quantitative restrictions and a "national treatment" rule outlawing discriminatory domestic taxation and regulation.

This basic approach of GATT may be termed "tariffication." The effort was not simply to reduce tariffs but to channel all remaining trade protection into tariffs by precluding the use of other policy instruments for protectionist objectives (Bagwell and Sykes 2004). The basic approach of GATT may also be termed "shallow integration," by which we mean that detailed product-by-product negotiations are focused on a single border instrument—tariffs—and do not extend to behind-the-border measures (such as domestic taxes and regulations). The latter measures are instead subject to across-the-board rules that apply in all goods markets, such as the aforementioned national treatment obligation. Goods market obligations

have evolved considerably through the years and now extend to several additional WTO treaty instruments, but the general approach in goods markets remains overwhelmingly one of shallow integration.[2]

B.   GATS

The structure and approach of GATS are profoundly different. To aid in understanding the differences, it is useful to begin by setting out the "modes" of services trade and the attendant focus of GATS commitments within that framework.

GATS defines four modes of trade. "Mode 1" trade involves the cross-border sale of a service from the exporting country to a consumer in the importing country—an American buys an insurance policy from a Swiss insurer, for example. "Mode 2" involves the consumption of a service in the exporting country by a national of another importing country—a tourist goes to France and gets a haircut. These transactions generally do not pass through port facilities or come to the attention of customs inspectors, making it difficult for governments to observe them. As a result, governments generally do little to tax or otherwise regulate mode 1 and mode 2 trade, and they are not a major focus of GATS.

"Mode 3" trade involves the establishment of a commercial presence in the importing nation by a foreign service provider—a foreign bank or law firm opens a domestic branch office, for example. Importing governments have much more capacity to restrict or regulate services trade when it involves the establishment of local offices within their territory, and such restrictions are commonplace. "Mode 4" trade occurs when a foreign supplier not only establishes a commercial presence in the importing nation but also employs foreign nationals in its operations. Mode 4 thus touches on immigration policy, where most nations also regulate extensively.

Accordingly, the bulk of the important barriers to trade in services before GATS were concentrated in modes 3 and 4, and GATS negotiations have focused on those barriers. Progress in mode 4 has been limited because of the political sensitivity of immigration issues, and existing mode 4 commitments are largely limited to permission for the temporary presence of highly skilled managers and executives. We therefore focus our attention on mode 3, where most of the important sectoral commitments in GATS can be found. A further justification for our focus on mode 3 lies

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[2] The WTO's Agreement on Technical Barriers to Trade (TBT Agreement) requires that all covered product regulations obey certain general principles, including an obligation to ensure that they are not more trade restrictive than necessary to achieve a legitimate regulatory objective. The WTO's Agreement on Sanitary and Phytosanitary Measures (SPS Agreement) requires that covered measures (mostly relating to foodstuffs and agricultural practices) be based on a scientific risk assessment where possible. An important exception is found in the WTO's Agreement on Agriculture, where product-by-product negotiations on subsidies have taken place.

in its relative empirical importance. Although the compilation of global data on services trade by GATS mode is still in its infancy, a recent Eurostat study finds that 69% of EU services exports occur via mode 3, while only 4% occur via mode 4 (Cernat 2017).

In contrast to GATT, tariffication is not central to GATS because conventional tariffs imposed at the border play a negligible role in services markets. Indeed, with respect to mode 3 (and mode 2 and 4) trade, tariffs are unavailable by definition because the service transactions do not cross any border. Also unlike GATT, GATS does not try to channel trade protection into any particular policy instrument, and GATS members retain the flexibility to use quantitative restrictions, discriminatory tax and regulatory policies, and so forth.

Nevertheless, members may choose to negotiate constraints on the use of various trade-restrictive instruments sector by sector, much as they may choose to negotiate tariff bindings under GATT. Accordingly, with respect to each service sector under GATS, member governments elect whether to make any "commitments" or not. Absent any commitment, members can use quantitative restrictions, discriminatory tax and regulatory policies, and the like as they wish. In sectors where commitments are made, members negotiate and memorialize their trade-restrictive policies, divided into schedules of market access restrictions and exceptions to national treatment.[3] Any market access or national treatment restriction that is not properly scheduled is effectively "waived" and cannot be employed in the future. Over time, members may negotiate further changes in these schedules to enhance market access on a reciprocal basis and may pursue sector-specific negotiations over problematic regulatory policies.

Plainly, the approach of GATS goes beyond the predominantly shallow-integration strategy of GATT. Generally applicable disciplines are few, and instead members can and do negotiate over a variety of sector-specific behind-the-border measures, often involving regulation. In this respect, although still in its relative infancy, GATS may be characterized as a "deep-integration" agreement by comparison to GATT.

III. Optimal Policy Intervention for Mode 3 Services Trade

As our discussion above indicates, mode 3 services trade has several characteristics: (1) the need for foreign capital to locate in the importing country and establish a commercial presence, (2) the frequent existence

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[3] Market access restrictions include, among other things, limitations on the number of service providers in a sector, limitations on the value or quantity of transactions, ceilings on the number of persons that may be employed in a sector, restrictions on the type of legal entity that may supply services, and limits on the percentage of foreign ownership in the sector as a whole or in individual service suppliers.

of market failures that offer a legitimate purpose for domestic regulations, and (3) a lack of readily available tariff-like instruments. We begin this section with a model of optimal policy intervention in a setting that incorporates features 1 and 2 but excludes feature 3 by assuming that a tariff-equivalent instrument is available to the importing country. Our purpose is to establish that features 1 and 2 cannot account for the differences between GATT and GATS that we described above. This finding motivates our focus in section IV on feature 3 as the key to understanding these differences.

Because a tariff is by definition unavailable for imports of mode 3 services, since they do not cross a border, we imagine for purposes of this section that a discriminatory sales tax levied on foreign service providers and collected at the point of sale could serve as a tariff-equivalent instrument. We argue below that transaction costs preclude such an instrument in practice, but for now we assume that problem away and refer to the discriminatory sales tax as a "tariff."

A.   Model

We consider a variant of the canonical two-country, two-sector, general equilibrium perfectly competitive neoclassical trade model. We interpret sector x as a good and sector y as a mode 3 service, with the domestic country importing service y from the foreign country in exchange for exports of good x. Goods and services are produced with capital and labor. The labor endowment in the domestic country is given by $\bar{L}$, while in the foreign country it is given by $\bar{L}^*$, and the domestic and foreign capital endowments are given by $\bar{K}$ and $\bar{K}^*$, respectively. To focus on the standards choices made by the domestic country government, we assume that the foreign country does not consume services, and so it produces y only for export.

We assume that all production of services must occur in the location where consumption takes place; hence, to deliver imported services to domestic consumers, foreign capital must locate in the domestic country and establish a commercial presence there, consistent with mode 3 services trade. In the appendix (available online), we develop the model for the case where mode 3 service providers also engage in mode 4 service trade, bringing foreign labor to the domestic country in addition to foreign capital to produce services for the domestic market. But here we consider the case of a pure mode 3 service, by assuming that foreign service providers combine foreign capital with domestic labor to deliver services to domestic consumers.[4] As the foreign country does not consume services itself,

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[4] Along this dimension there is an analogy between mode 3 delivery of services and the delivery of goods by foreign direct investment (FDI), though the analogy is not exact: FDI is typically thought to be an alternative to exporting that goods-producing firms select—or

this assumption implies that the foreign country is a Ricardo-Viner economy, with its endowment of labor $\bar{L}^*$ specific to the production of good x and with capital allocated frictionlessly across the foreign country goods and (exported) service sectors in the amounts K_x^* and K_y^*, respectively. We use L_{y*} to denote the domestic labor that is hired by foreign service providers to produce y for domestic consumers, and we use L_y and K_y to denote the labor and capital employed by domestic service providers, with L_x and K_x the labor and capital employed by the domestic country in the production of good x.

We allow the domestic government to impose separate standards $s_y \in [0, 1]$ and $s_{y*} \in [0, 1]$ on domestic and foreign service providers in its markets. To meet the standard, service providers must incur a per-unit compliance cost, which includes the cost of establishing conformity with the standard. These costs, of course, are not immutable. And while it is natural that governments would adopt standards that favor local service providers and lead to higher costs of compliance for foreign service providers, it is also possible that government investment in the efficient design and implementation of a given standard could help to bring down these extra costs of compliance for foreign suppliers. To capture these considerations, we let $q_y(L_y, K_y)$ and $q_y^*(L_{y*}, K_y^*)$ represent the constant-returns-to-scale production functions of the "raw" unregulated service, and we assume that the delivered quantity of services meeting a given level of standard is $Q_y(s_y, L_y, K_y) \equiv (1 - \kappa(s_y)) \times q_y(L_y, K_y)$ for domestic service providers and $Q_y^*(s_{y*}, K_\mathrm{I}, L_{y*}, K_y^*) \equiv (1 - \kappa^*(s_{y*}, K_\mathrm{I})) \times q_y^*(L_{y*}, K_y^*)$ for foreign service providers, where κ is an increasing and convex function with $\kappa(0) = 0$ and $\kappa(1) = \bar{\kappa} > 0$, and where $\kappa^*(s_{y*}, K_\mathrm{I}) \equiv \kappa(s_{y*}) + \varphi(K_\mathrm{I})$ with φ a decreasing and convex function with $\varphi(0) = \bar{\varphi} > 0$ and $\varphi(\infty) = 0$, with $\bar{\kappa} + \bar{\varphi} \le 1$. According to these assumptions, a fraction of the factors of production used in producing the service are used up in meeting the standard—$\kappa(s_y)$ for domestic service providers and $\kappa^*(s_{y*}, K_\mathrm{I})$ for foreign service providers—with this fraction increasing in the level of the standard. At the same time, if the domestic government invests nothing to reduce the cost of compliance with its standard for foreign service providers ($K_\mathrm{I} = 0$), then for any given standard s, foreign service providers would face a higher cost of compliance than would domestic service providers facing the same standard ($\kappa^*(s, K_\mathrm{I} = 0) - \kappa(s) = \bar{\varphi} > 0$). But this extra cost of compliance can be reduced or even eliminated if the domestic government makes a sufficiently large investment to do so ($\kappa^*(s, K_\mathrm{I}) - \kappa(s) = \varphi(K_\mathrm{I}) \to 0$ as $K_\mathrm{I} \to \infty$).

Turning to the goods sector x, we assume that domestic production is given by $Q_x(s_y, s_{y*}L_x, K_x)$, where Q_x exhibits constant returns to scale in L_x

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and K_x and is (weakly) increasing in s_y and s_{y*}. Accordingly, we are allowing the presence of low-quality services in the domestic country to impose a (negative) cross-sector externality on the domestic production of goods, as when a contractor's faulty wiring in a single warehouse puts neighboring businesses at risk for fire; as a consequence, total factor productivity in the domestic x sector rises with the level of service-sector standards. By assumption, this externality does not cross international borders. Foreign production of good x is then given simply by the constant-returns function $Q_x^*(\bar{L}^*, K_x^*)$.

Finally, with C_i and C_i^* denoting domestic-country and foreign-country consumption of $i \in \{x, y\}$, we specify domestic- and foreign-country welfare. We allow for the possibility that production of the service in the domestic country generates a negative "eyesore" externality (e.g., the noise associated with construction services) that does not itself affect production and is not internalized by individual consumers and hence does not affect demands, but that detracts in a separable way from aggregate domestic country welfare; again by assumption, this externality does not cross international borders. To capture this, we let $\theta(s)$ denote the reduced utility from the eyesore externality associated with each unit of (raw) service production at the standard level s, with θ decreasing and convex in s, and with the total utility cost from the eyesore externality under the standards s_y and s_{y*} then given by $Z(s_y, s_{y*}, q_y, q_y^*) \equiv \theta(s_y) \times q_y + \theta(s_{y*}) \times q_y^*$. With the domestic country's direct utility from consumption given by $U(C_x, C_y)$, where U is increasing in both of its arguments, domestic welfare is then given by $W(C_x, C_y, s_y, s_{y*}, q_y, q_y^*) \equiv U(C_x, C_y) - Z(s_y, s_{y*}, q_y, q_y^*)$. Hence, the domestic country derives greater welfare out of a given level of consumption C_x and C_y when domestic and foreign service providers meet a higher standard (i.e., when s_y and/or s_{y*} is higher) as a result of diminished eyesore externalities generated by service-sector production (through $Z(\cdot)$). By contrast, foreign welfare is given simply by the increasing function $W^*(C_x^*)$.

What is the role of service-sector standards in the model? At a broad level, we have in mind that service quality may be undersupplied by the market, either because of imperfect information between consumers and service providers, as in Shapiro's (1986) analysis of occupational licensing, or because of negative externalities associated with low-quality services. Standards can then ensure a minimum quality level, with higher standards s_y and s_{y*} in the service sector raising the total factor productivity of domestic firms in the goods sector and allowing domestic consumers to derive greater welfare from a given level of consumption C_x and C_y, but also restricting entry and reducing supply from the service providers to which the standard applies.[5]

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[5] See Kleiner (2000) and Sappington (2005) for helpful reviews of the economics literature on occupational licensing and quality regulation in the service sector.

B. Efficient Policies

We first characterize efficient policies. To this end, we consider the global planner's problem of choosing standards and domestic and foreign economic magnitudes to maximize domestic-country welfare subject to maintaining foreign-country welfare at a level that is at least as great as an arbitrarily fixed (feasible) level.

The global planner chooses $[s_y, s_{y*}, C_x, C_y, L_x, L_y, L_{y*}, K_x, K_y, K_I, C_x^*, K_x^*, K_y^*]$ to solve

$$\max U(C_x, C_y) - Z(s_y, s_{y*}, q_y(L_y, K_y), q_y^*(L_{y*}, K_y^*)) \tag{1}$$

subject to $\quad W^*(C_x^*) \geq \bar{W}^*,$

$$C_x \leq Q_x(s_y, s_{y*}, L_x, K_x) - \left(C_x^* - Q_x^*(\bar{L}^*, K_x^*)\right),$$

$$C_y \leq Q_y(s_y, L_y, K_y) + Q_y^*(s_{y*}, K_I, L_{y*}, K_y^*),$$

$$L_x + L_y + L_{y*} \leq \bar{L},$$

$$K_x + K_y + K_I \leq \bar{K}, \quad \text{and}$$

$$K_x^* + K_y^* \leq \bar{K}^*.$$

As we show in the appendix, the associated Lagrangean yields the first-order necessary conditions for an (interior) optimum, which imply that the solution to the global planner's problem can be implemented in a perfectly competitive market economy where the foreign country maintains a policy of free trade and where the domestic country implements a Pigouvian tariff on imported services τ and a nondiscriminatory Pigouvian sales tax on domestically produced and imported services t, set at the levels

$$\tau = \theta(s_{y*}) - \theta(s_y) \quad \text{and} \quad t = \theta(s_y), \tag{2}$$

and standards s_y and s_{y*} and a level of compliance-cost-reducing investment K_I that satisfy

$$-q_y \times \theta'(s_y) = -\left(P_y^c \times \frac{\partial Q_y}{\partial s_y} + P_x \frac{\partial Q_x}{\partial s_y}\right),$$

$$-q_y^* \times \theta'(s_{y*}) = -\left(P_y^c \times \frac{\partial Q_y^*}{\partial s_{y*}} + P_x \frac{\partial Q_x}{\partial s_{y*}}\right), \tag{3}$$

$$P_y^c \times \frac{\partial Q_y^*}{\partial K_I} = r,$$

where primes denote derivatives and where we have expressed the Pigouvian sales tax and import tariff in specific terms assessed per unit of raw service. Here, P_y^c is the consumer price of services in the domestic economy under the efficient Pigouvian sales tax and tariff, P_x denotes the domestic (and world) price of x, and r is the rental rate on capital in the domestic economy.

The need for a Pigouvian import tariff may seem surprising, but it simply reflects the fact that (1) a tariff is equivalent to a discriminatory sales tax on imports and (2) Pigouvian intervention requires that different sales taxes must be applied to domestically produced and imported services whenever the levels of their associated eyesore externalities are different (i.e., whenever $\theta(s_{y*}) \neq \theta(s_y)$) under the efficient standards. The conditions for efficient standards and compliance-cost-reducing investment are intuitive: according to equation (3), the efficient standards are set where the marginal benefit associated with the reduced eyesore externality that results from a slightly higher standard (the left-hand side of the first two expressions in eq. [3]) is equal to the marginal cost of the higher standard in terms of the lost service-sector output valued at domestic consumer prices offset by the value of any increase in goods-sector output as a result of the cross-sector externality (the right-hand side of the first two expressions in eq. [3]); and the efficient level of compliance-cost-reducing investment equates the domestic cost of a unit of capital with the marginal value that such an investment brings, namely, the additional output of foreign service providers that will be generated by a given quantity of raw services owing to the increase in K_I, valued at domestic consumer prices.

A useful special case arises when the cross-sector externality is absent, so that $\partial Q_x / \partial s_y \equiv 0$ and $\partial Q_x / \partial s_{y*} \equiv 0$. In this case, equations (2) and (3) simplify to

$$\tau = 0 \quad \text{and} \quad t = \theta(s_y) \tag{4}$$

and

$$-\theta'(s_y) - P_y^c \times \kappa'(s_y) = 0 = -\theta'(s_{y*}) - P_y^c \times \kappa'(s_{y*}),$$
$$P_y^c \times q_y^* \times (-\varphi'(K_I)) - r = 0, \tag{5}$$

respectively, where we have used $Q_y \equiv (1 - \kappa(s_y)) \times q_y$ and $Q_y^* \equiv (1 - \kappa(s_{y*}) - \varphi(K_I)) \times q_y^*$ and the fact that the top line of equation (5) implies that the efficient standard is nondiscriminatory ($s_y = s_{y*}$). As equations (4) and (5) indicate, in the absence of cross-sector externalities, the efficient domestic-country tax policy amounts to free trade and a nondiscriminatory Pigouvian sales tax on services to internalize the eyesore externality, combined with a nondiscriminatory standard that equates

the benefit from the marginal eyesore reduction with its marginal cost and an investment in compliance-cost reduction that equates the marginal benefits and costs of this investment.

C. *Optimal Unilateral Policies*

We next consider the optimal unilateral policies. We assume that the foreign country maintains a policy of laissez-faire (which, as we have demonstrated above, is consistent with efficiency) and focus on the domestic country's unilaterally optimal policies. These policies can be characterized as the solution to the domestic-country planner's problem, once the appropriate international constraints faced by the planner are introduced.

A first international constraint faced by the domestic country planner is the foreign-country inverse import demand curve for x, which reflects the foreign country's balanced trade condition. Recalling that we are considering here the case of a pure mode 3 service import, where foreign service providers combine foreign capital with domestic labor to deliver services to domestic consumers, this condition defines the level of foreign-country import demand, M_x^*, that is consistent with a given level of foreign exports of capital K_y^* for mode 3 delivery of services to the domestic market. We show in the appendix that this constraint—and the relationship between M_x^* and K_y^* that it defines—can be used to write $q_y^* = \tilde{q}_y^*(L_{y^*}, M_x^*)$, where we use the notation $\tilde{q}_y^*$ to distinguish the function $\tilde{q}_y^*(L_{y^*}, M_x^*)$ from the function $q_y^*(L_{y^*}, K_y^*)$. We can then also define $\tilde{Q}_y^*(s_{y^*}, K_I, L_{y^*}, M_x^*) \equiv (1 - \kappa^*(s_{y^*}, K_I)) \times \tilde{q}_y^*(L_{y^*}, M_x^*)$. A second international constraint faced by the domestic-country planner is the international market-clearing condition $E_x = M_x^*$, where we use E_x to denote the domestic-country export supply of x.

Armed with these two international constraints, we can now state the domestic-country planner's problem. This planner chooses $[s_y, s_{y^*}, C_x, C_y, E_x, M_x^*, L_x, L_y, L_{y^*}, K_x, K_y, K_I]$ to solve

$$\max U(C_x, C_y) - Z(s_y, s_{y^*}, q_y(L_y, K_y), \tilde{q}_y^*(L_{y^*}, M_x^*)) \qquad (6)$$

$$\text{subject to} \quad C_x \leq Q_x(s_y, s_{y^*}, L_x, K_x) - E_x,$$

$$C_y \leq Q_y(s_y, L_y, K_y) + \tilde{Q}_y^*(s_{y^*}, K_I, L_{y^*}, M_x^*),$$

$$L_x + L_y + L_{y^*} \leq \bar{L},$$

$$K_x + K_y + K_I \leq \bar{K},$$

$$E_x = M_x^*.$$

In the appendix, we show that the solution to the domestic-country planner's problem can be implemented in a perfectly competitive market economy with a tariff τ on imported services, a nondiscriminatory sales tax t on domestically produced and imported services, and a discriminatory wage subsidy χ offered to foreign service providers that hire local labor, set at the levels

$$\tau = \left(\theta(s_{y^*}) - \theta(s_y)\right) + \left(1 - \kappa^*(s_{y^*}, K_{\mathrm{I}})\right) \times P_{y^*}^q \times \frac{1 + \left(\frac{\partial^2 q_y^*}{\partial L_{y^*}\partial K_y^*}\frac{\partial K_y^*}{\partial p^w}\frac{L_{y^*}}{M_x^*}\right)}{\eta^* - \left(\frac{\partial^2 q_y^*}{\partial L_{y^*}\partial K_y^*}\frac{\partial K_y^*}{\partial p^w}\frac{L_{y^*}}{M_x^*}\right)},$$

$$t = \theta(s_y),$$

$$\chi = \left[\tau - \left(\theta(s_{y^*}) - \theta(s_y)\right)\right] \times \frac{\partial q_y^*}{\partial L_{y^*}}, \tag{7}$$

and standards s_y and s_{y^*} and a level of compliance-cost-reducing investment K_{I} that satisfy

$$-q_y \times \theta'(s_y) = -\left(P_y^c \times \frac{\partial Q_y}{\partial s_y} + P_x \frac{\partial Q_x}{\partial s_y}\right),$$

$$-q_y^* \times \theta'(s_{y^*}) = -\left(P_y^c \times \frac{\partial Q_y^*}{\partial s_{y^*}} + P_x \frac{\partial Q_x}{\partial s_{y^*}}\right), \tag{8}$$

$$P_y^c \times \frac{\partial Q_y^*}{\partial K_{\mathrm{I}}} = r,$$

where all prices are evaluated under the unilaterally optimal policies, the wage subsidy is expressed in specific terms, we have again expressed the Pigouvian sales tax and import tariff in specific terms assessed per unit of raw service, and in writing equation (8) we have used the fact that $\partial \tilde{Q}_y^*/\partial s_y^* = \partial Q_y^*/\partial s_y^*$ and $\partial \tilde{Q}_y^*/\partial K_{\mathrm{I}} = \partial Q_y^*/\partial K_{\mathrm{I}}$. Here, with $P^w \equiv P_x/P_{y^*}^q$ defined as the "world" relative price of x to y at which the two countries trade goods for services (i.e., the ratio of the price received by domestic exporters of x to the price received by foreign exporters of y), $p^w \equiv P^w/(1 - \kappa^*(s_{y^*}, K_{\mathrm{I}}))$ is the raw world relative price of x to y at which the two countries trade, and η^* is the elasticity of foreign export supply with respect to the world price. The efficiency properties of the unilaterally optimal policies can be evaluated by comparing the expressions in equations (7) and (8) with those in equations (2) and (3).

To interpret the unilaterally optimal policies, we note first that in the case of a small domestic economy where $\eta^* \to \infty$, the unilateral tariff collapses to the efficient level $\tau = \theta(s_{y*}) - \theta(s_y)$, the unilateral wage subsidy goes to zero as efficiency requires, and the nondiscriminatory sales tax on domestically produced and imported services and the standards and level of compliance-cost-reducing investment are all efficient as well.[6] Hence, if there are inefficiencies in the domestic government's unilateral policy choices, they must be associated with its ability to exercise monopsony power on international markets and manipulate world prices and the terms of trade, which requires a finite η^*. And for η^* finite, policy inefficiencies do indeed arise.

The tariff is increased above its efficient level to exploit the domestic country's power over the terms of trade, along the lines suggested by Johnson's (1953) optimal tariff.[7] And a wage subsidy is offered to foreign service providers who hire domestic labor, reflecting the fact that with $t = \theta(s_y)$ and $\tau > \theta(s_{y*}) - \theta(s_y)$, the value to the domestic economy of another worker hired by a foreign service provider $((P_y^c - \theta(s_{y*}))(\partial Q_y^*/\partial L_{y*}) = (P_{y*}^q + t + \tau - \theta(s_{y*}))(\partial Q_y^*/\partial L_{y*}))$ is greater than the value to the foreign service provider itself $(P_{y*}^q(\partial Q_y^*/\partial L_{y*}))$, and the wage subsidy then ensures that foreign service providers produce imported services with a labor-capital combination that reflects this greater value.[8] Note, however, that conditional on domestic prices, the unilateral choices of all other policies remain at their efficient levels: the nondiscriminatory sales tax on services is set at its efficient level, and, most importantly for our purposes, the standards imposed on domestic and foreign service providers and the level of compliance-cost-reducing investment are all set at efficient levels, as a comparison of equations (3) and (8) confirms.

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[6] It is not immediately clear from eq. (7) that $\tau \to \theta(s_{y*}) - \theta(s_y)$ as $\eta^* \to \infty$, because $\eta^* \to \infty$ also implies that $\partial K_y^*/\partial p^w \to -\infty$. But in the appendix, we establish that this is indeed the case.

[7] The optimal tariff formula for mode 3 service imports in eq. (7) differs in two ways from the classic formula derived by Johnson (1953) in the context of imported goods. A first difference is the term $\theta(s_{y*}) - \theta(s_y)$, which is needed to address the eyesore externality in our setting and is absent from Johnson's formula because he does not consider externalities of this kind. A second difference is the term $(\partial^2 q_y^*/\partial L_{y*}\partial K_y^*)(\partial K_y^*/\partial p^w)(L_{y*}/M_x^*)$, which is negative and therefore has the effect of lowering the optimal tariff somewhat; this term adjusts the optimal tariff for the contribution of local labor to the production of mode 3 services, and it is absent from Johnson's formula because he considers trade in goods. When both of these differences are shut down, and when the tariff is expressed in ad valorem terms assessed per unit of service (rather than raw service) consumed, Johnson's classic formula for the optimal tariff, namely, $\tau = 1/\eta^*$, obtains.

[8] Intuitively, the combination of a tariff on the imports of mode 3 services and a subsidy to the domestic labor content of mode 3 services described in eq. (7) achieves a Johnson-like optimal tax on the imports of foreign capital involved in mode 3 service delivery to the domestic market.

In the special case where the cross-sector externality is absent, the solution to the domestic-country planner's problem simplifies to

$$
\tau = \left(1 - \kappa^*(s_{y^*}, K_{\mathrm{I}})\right) \times P_{y^*}^q \times \frac{1 + \left(\dfrac{\partial^2 q_y^*}{\partial L_{y^*} \partial K_y^*} \dfrac{\partial K_x^*}{\partial p^w} \dfrac{L_y^*}{M_x^*}\right)}{\eta^* - \left(\dfrac{\partial^2 q_y^*}{\partial L_{y^*} \partial K_y^*} \dfrac{\partial K_y^*}{\partial p^w} \dfrac{L_y^*}{M_x^*}\right)},
$$

$$
t = \theta(s_y),
$$

$$
\chi = \tau \times \frac{\partial q_y^*}{\partial L_{y^*}},
$$

(9)

$$
-\theta'(s_y) - P_y^c \times \kappa'(s_y) = 0 = -\theta'(s_{y^*}) - P_y^c \times \kappa'(s_{y^*}),
$$

$$
P_y^c \times q_y^* \times (-\varphi'(K_{\mathrm{I}})) - r = 0.
$$

(10)

A comparison of equations (9) and (10) with equations (4) and (5) confirms that the inefficiencies in unilateral policy choices are confined to the tariff and the discriminatory wage subsidy.

We summarize with a proposition.

PROPOSITION 1. The domestic government's unilateral policy choices in the presence of mode 3 service imports are characterized by an import tariff that is inefficiently high and a discriminatory subsidy to the hiring of local labor by foreign service providers in the domestic economy that is also inefficient; but conditional on domestic prices, all other policies—the nondiscriminatory sales tax, the standards imposed on domestic and foreign service providers, and the level of compliance-cost-reducing investment—remain at their efficient levels.

Proof. See the appendix.

In the appendix, we extend the model to consider mode 3 service imports that involve the hiring of foreign labor (mode 4 as well). There we consider the opposite extreme to the pure mode 3 services considered here: we assume that, rather than hiring only local (domestic) labor, mode 3 service providers hire only foreign labor. In that setting we find that the unilateral incentive to offer a discriminatory wage subsidy to foreign service providers goes away, but the other features of unilaterally optimal intervention remain. In particular, we prove a second proposition.

PROPOSITION 2. When the domestic country's service imports are delivered through a combination of mode 3 (commercial presence) and mode 4 (movement of natural persons) with no hiring of local labor, the domestic government's unilateral policy choices are characterized by an import tariff that is inefficiently high; but conditional on domestic prices, all other policies—the nondiscriminatory sales tax, the standards

imposed on domestic and foreign service providers, and the level of compliance-cost-reducing investment—remain at their efficient levels.

Proof. See the appendix.

The conclusion from propositions 1 and 2 is negative. The features of mode 3 services trade that we have incorporated into the model cannot account for a key difference in GATS relative to GATT—namely, GATS's focus on negotiations to liberalize behind-the-border regulatory measures—because according to the model, even without negotiations those measures would be set efficiently in light of the prevailing domestic prices. Simply put, incorporating these features into the model does not change a basic fact: the unilateral policy choices of the domestic country are inefficient because of its incentive to exploit its monopsony power and manipulate the terms of trade, which it accomplishes with its tariff (possibly combined with additional discriminatory tax instruments), not with its choice of standards.

When viewed alongside analogous results from the economics-of-trade-agreements literature derived in the context of trade in goods (see, e.g., Bagwell and Staiger 2001 and Staiger and Sykes 2011), propositions 1 and 2 carry with them a further implication. Despite a variety of special features that distinguish mode 3 services trade from goods trade, as long as the importing country can levy a tariff-equivalent instrument on foreign service providers in the domestic market, as we have assumed here, the purpose of a trade-in-services agreement is to solve the same terms-of-trade-driven problem that arises in the context of goods trade, with the tariff-equivalent instrument levied on foreign service providers playing the role that import tariffs play in the context of goods trade. This suggests, in turn, that the logic of GATT-like shallow integration should have carried over directly to GATS.

Why, then, is the structure of GATS so different from the structure of GATT? We next explore how the missing tariff instrument inherent in the nature of mode 3 service imports can illuminate the observed differences between GATT and GATS.

IV. GATT, GATS, and the Missing Tariff Instrument

In this section, we consider a more parsimonious model of trade in services to explore the implications of a missing tariff instrument for the design of international trade-in-services agreements. We assume a quasilinear preference structure in order to justify a partial equilibrium, industry-level analysis of services trade; and in keeping with our partial equilibrium focus, we shut down cross-sector externalities. Above, we report results from a version of our general equilibrium model where the cross-sector externality is absent. Our assumption of quasilinear preferences leads to a special case

of that version of the model, where the service industry is characterized by negatively sloped industry demand curves and positively sloped industry supply curves and where measures of industry surplus are then given by consumer and producer surplus plus tax revenues, minus the eyesore externality and the cost of investments in design and implementation of the standards. In such a partial equilibrium setting, with labor in infinitely elastic supply to the industry under consideration in each country, whether foreign service providers hire only local domestic labor (pure mode 3 service imports) or bring in foreign labor (mode 3 plus mode 4 service imports) is irrelevant for welfare in the two countries, so we need not specify this detail of the model, and the results we derive below will apply to either case. Below, we refer simply to mode 3 services, and we refer to the model as the "benchmark model."[9]

A.   A Benchmark Model

In section III, we minimized the role of prices in our development of the model and instead adopted a primal approach whereby the planner chooses the allocation directly and then implements the chosen allocation in a market economy with the appropriate policy instruments, under the assumption that the planner faces no constraints on the available policy instruments. As our focus in this section is precisely on the impact of constraints on the set of policies available to governments, we develop our benchmark model with a focus on policies, rather than allocations, and on the implications of those policies for prices and market quantities.

As before, we assume that the service y is demanded only in the domestic country, and we now represent this demand with the general downward-sloping demand curve $D(P_y^c)$, where D is a decreasing function. Note that services sell in the domestic country at the same price P_y^c regardless of the standard to which they are produced, reflecting the fact that individual consumers do not differentiate across units of the service on the basis of the eyesore externality that it generates when it is consumed. Turning to supply, we continue to assume that all services must be produced in the domestic country where they are consumed, and we assume that for any regulatory standards s_y and s_{y*}, the quantity of services supplied by domestic and mode 3 foreign service providers is given, respectively, by the general upward-sloping supply curves $S_y(P_y^q - \kappa(s_y))$ for $P_y^q \geq \kappa(s_y)$ and $S_{y*}(P_{y*}^q - \kappa^*(s_{y*}, K_I))$ for $P_{y*}^q \geq \kappa^*(s_{y*}, K_I)$. The functions $\kappa(s_y)$ and $\kappa^*(s_{y*}, K_I)$ are defined as before and capture the costs (in units of the numeraire) of meeting the standards for the domestic and foreign

service providers, respectively, where now these costs "shift up" the respective supply curves S_y and S_{y*}.

For the moment, we assume, as in the previous section, that in addition to the nondiscriminatory sales tax on services t, a tariff τ can be imposed on imports of mode 3 services, and we also now introduce the notation τ^* to represent a foreign export tax on mode 3 services.[10] With all taxes set at nonprohibitive levels, the relationship between prices is given by

$$P_y^q + t = P_y^c = P_{y*}^q + t + \tau + \tau^*. \tag{11}$$

We also define $P_y^w \equiv P_{y*}^q + \tau^*$, the "world" price of the foreign service provided in the domestic market (i.e., the price outside the foreign market at which this service would be available for sale from foreign service providers). Note that equation (11) implies

$$P_y^w = P_y^q - \tau. \tag{12}$$

The market-clearing condition $D = S_y + S_{y*}$ determines equilibrium in this market. Using the pricing relationships in equations (11) and (12), this condition determines the market-clearing world price for the service as a function of the tax and regulatory policies:

$$\hat{P}_y^w = \hat{P}_y^w \big(\overset{(-)}{\tau}, \overset{(+)}{\tau^*}, \overset{(-)}{t}, \overset{(+)}{s_y}, \overset{(+)}{s_{y*}}, \overset{(+)}{K_{\mathrm{I}}} \big). \tag{13}$$

With equations (11) and (12), we may also derive expressions for the market-clearing levels of each of the local prices in the domestic market:

$$\hat{P}_y^c = \hat{P}_y^c \big(\overset{(+)}{\tau+\tau^*}, \overset{(+)}{t}, \overset{(+)}{s_y}, \overset{(+)}{s_{y*}}, \overset{(+)}{K_{\mathrm{I}}} \big),$$

$$\hat{P}_y^q = \hat{P}_y^q \big(\overset{(+)}{\tau+\tau^*}, \overset{(-)}{t}, \overset{(+)}{s_y}, \overset{(+)}{s_{y*}}, \overset{(+)}{K_{\mathrm{I}}} \big), \quad \text{and} \tag{14}$$

$$\hat{P}_{y*}^q = \hat{P}_{y*}^q \big(\overset{(-)}{\tau+\tau^*}, \overset{(-)}{t}, \overset{(+)}{s_y}, \overset{(+)}{s_{y*}}, \overset{(+)}{K_{\mathrm{I}}} \big).$$

Finally, we can define the market-clearing world price of the raw foreign service—before bringing it into compliance with the prevailing domestic

[10] A foreign export tax played no explicit role in the (global or domestic-country) planner's problem analyzed in the previous section, so we did not introduce notation for it there. In the present setting, the introduction of a foreign export tax facilitates a more standard development of the model. On the other hand, unlike in the previous section, here we do not endow the domestic country with a separate discriminatory wage tax/subsidy instrument. The reason is that, as a result of the partial equilibrium nature of the benchmark model, there is a one-to-one mapping between the hiring of labor by mode 3 service providers and the output of mode 3 services, and so in this model a discriminatory wage tax levied on local labor hired by foreign mode 3 service providers would be equivalent to a discriminatory production/sales tax, i.e., a tariff, on those service providers.

regulatory standard—and the associated foreign-producer price of the raw service (which differs from the world price when $\tau^* \neq 0$):[11]

$$\hat{p}_y^w \equiv \hat{P}_y^w - \kappa^*(s_{y*}, K_I) = \hat{p}_y^w(\overset{(-)}{\tau}, \overset{(+)}{\tau^*}, \overset{(-)}{t}, \overset{(+)}{s_y}, \overset{(-)}{s_{y*}}, \overset{(+)}{K_I}), \quad \text{and}$$

$$\hat{p}_{y*}^q \equiv \hat{P}_{y*}^q - \kappa^*(s_{y*}, K_I) = \hat{p}_{y*}^q(\overset{(-)}{\tau+\tau^*}, \overset{(-)}{t}, \overset{(+)}{s_y}, \overset{(-)}{s_{y*}}, \overset{(+)}{K_I}).$$

(15)

We note three features of the derivative properties of these price functions, which all follow from the assumed properties of the demand and supply functions. First, only the world prices $\hat{P}_y^q$ and $\hat{p}_y^w$ depend on the individual domestic and foreign tariffs τ and τ^*: all local prices depend only on their sum $\tau + \tau^*$. This is a familiar property, and as will become clear, it ensures that efficiency pins down $\tau + \tau^*$ but not the individual levels of τ and τ^*.[12] Second, an increase in the standard s_{y*} applied to foreign service providers raises the world price of services $\hat{P}_y^w$ but lowers the world price of raw services $\hat{p}_y^w$. The reduction in the world price of raw services associated with an increase in s_{y*}—and the international shifting of the incidence of some of the cost of the higher standard onto foreign service providers that this implies—features prominently in what follows. Hence we refer to $\hat{p}_y^w$ as "the terms of trade" in services, noting that for any s_{y*} and K_I there is a one-to-one correspondence between $\hat{P}_y^w$ and $\hat{p}_y^w$, as the top line of equation (15) indicates. And third, note that the market-clearing output of foreign service providers, and hence the volume of mode 3 service imports, is given by $S_{y*}(\hat{p}_{y*}^q)$. As the bottom line of equation (15) then confirms, in this model a decrease in the standard s_y, or an increase in the standard s_{y*} or decrease in the investment in compliance-cost reduction for foreign service providers K_I, acts as an NTB to trade in mode 3 services.

   In the appendix, we show that domestic and foreign welfare can be written as $W(s_y, s_{y*}, K_I, \hat{P}_y^c, \hat{P}_y^q, \hat{p}_y^w)$ and $W^*(\hat{P}_{y*}^q, \hat{p}_y^w)$, respectively, and that with the derivatives of welfare with respect to the world price satisfying $W_{\hat{p}_y^w} = -S_{y*}(\hat{p}_{y*}^q)$ and $W^*_{\hat{p}_y^w} = S_{y*}(\hat{p}_{y*}^q)$ and hence $W_{\hat{p}_y^w} + W^*_{\hat{p}_y^w} = 0$, it follows that world welfare can be written as $V \equiv W + W^* = V(s_y, s_{y*}, K_I, \hat{P}_y^c, \hat{P}_y^q)$. The fact that the world price $\hat{p}_y^w$ drops out of the expression for world welfare confirms that efficiency pins down $\tau + \tau^*$ but not the individual levels

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[11] Our benchmark model assumes that compliance with the standard is met by drawing resources from the (numeraire) outside good. Hence, there is a distinction between the price of the raw service and the price of the service once it has been brought into compliance with the standard. But unlike in our general equilibrium model of the previous section, where compliance with the standard is met by drawing resources from the service sector y, in our benchmark model the raw quantity of service supply is the same as the quantity of service supply meeting the standard, so there is no need to introduce separate notation for raw quantities.

[12] This is true of the general equilibrium model in the previous section as well, which is why we could for simplicity ignore the foreign tariff policy in our analysis there and effectively set $\tau^* \equiv 0$ without loss of generality.

of τ and τ^*. And as we confirm in the appendix, the efficient policies maximize V and are characterized by

$$\tau + \tau^* = 0 \quad \text{and} \quad t = \theta(s_y) \tag{16}$$

and

$$-\theta'(s_y) - \kappa'(s_y) = 0 = -\theta'(s_{y*}) - \kappa'(s_{y*})$$
$$S_{y*} \times (-\varphi'(K_I)) - r = 0. \tag{17}$$

As equations (16) and (17) indicate, efficient policies in our benchmark model correspond to those in equations (4) and (5), with the only difference being that in our benchmark model we have measured the compliance costs in units of the (numeraire) outside good rather than in units of the service y, and hence the price P_y^c present in equations (4) and (5) is absent from equations (16) and (17). In particular, under efficient intervention, trade in services is free, standards are nondiscriminatory $(s_y = s_{y*})$ and set at the level that equates their marginal benefit with their marginal cost $(-\theta'(s_y) = \kappa'(s_y))$, compliance-cost-reducing investment occurs at the level that equates the marginal benefit of such investment with its marginal cost $(S_{y*} \times (-\varphi'(K_I)) = r)$, and the nondiscriminatory sales tax is set at that Pigouvian level $t = \theta(s_y)$.

B. The Benchmark Model with a Missing Tariff Instrument

Having developed the basic elements of the benchmark model, we now revisit our assumptions on available policy instruments. Specifically, though import tariffs are by definition not available in the context of mode 3 services trade, we have assumed thus far that each country has access to a tariff-equivalent policy: a discriminatory tax collected at the point of sale from foreign service providers in the domestic market. And yet, while sales taxes on services collected on a nondiscriminatory basis from all providers are not uncommon, examples of sales taxes that discriminate against foreign service providers are difficult to find.[13] There are many reasons why the transaction costs associated with such discriminatory sales taxes may be prohibitively high relative to the transaction costs associated

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[13] In the United States, e.g., Hendrix and Zodrow (2003) describe a wide variation across states in the contemporary pattern of services taxation, and the broad-based feasibility of the taxation of services, including the exemption of select services from taxation that might arguably reflect Pigouvian "merit good" consideration, is well illustrated by a proposal to broaden the taxation of services in the state of Florida that they describe. But none of these examples fit the description of discriminatory taxes against foreign service providers.

with nondiscriminatory sales taxes, and we simply introduce this feature as an exogenous constraint here.[14]

Formally, we now introduce the following policy constraint into the benchmark model:

$$\tau \equiv 0 \equiv \tau^*. \qquad \text{(assumption 1)}$$

Under assumption 1, the domestic country still has a rich set of service-sector policy instruments, which include a nondiscriminatory sales tax, separate and potentially discriminatory regulations applied to domestic and foreign service providers, and the level of compliance-cost-reducing investment for foreign service providers; but it no longer has access to a tariff-equivalent policy instrument for mode 3 service-sector intervention.

Note from equations (16) and (17) that there is no role for tariffs in the efficient policy intervention, and hence assumption 1 will not alter the characterization of efficient intervention above. But as we next demonstrate, the introduction of such a constraint has a substantial effect on the world that, according to the benchmark model, GATS negotiators would have confronted.

In particular, as we confirm in the appendix, with its tariff instrument missing the unilaterally optimal policy intervention of the domestic country is now characterized by

$$t - \theta(s_y) = \frac{\Theta}{S_y' + S_{y*}'} > 0, \qquad (18)$$

$$-\theta'(s_y) - \kappa'(s_y) = \frac{\Theta}{S_y' + S_{y*}'} \times \frac{S_y' \times \kappa'(s_y)}{S_y} > 0,$$

$$-\theta'(s_{y*}) - \kappa'(s_{y*}) = \frac{-\Theta}{S_y' + S_{y*}'} \times \frac{S_y' \times \kappa'(s_{y*})}{S_{y*}} < 0, \qquad (19)$$

$$S_{y*} \times (-\varphi'(K_I)) - r = \frac{\Theta}{S_y' + S_{y*}'} \times S_y' \times (-\varphi'(K_I)) > 0,$$

where $\Theta \equiv S_{y*} - S_{y*}' \times (\theta(s_y) - \theta(s_{y*}))$, and where under the unilaterally optimal domestic policies $\Theta > 0$. Evidently, without its tariff-equivalent policy instrument, the domestic country must turn to its other policies as second-best means to manipulate the terms of trade. And as a comparison

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[14] For example, ownership structures can be altered after entry, and so in order to collect sales taxes at different rates from domestic and foreign service providers, the reported nationality of ownership would have to be certified on an ongoing basis, an administrative task that could be especially costly in light of the small scale of many service providers. More generally, discriminatory sales taxes would create additional opportunities for tax avoidance and give rise to the associated costs of preventing such behavior.

of equations (18) and (19) with equations (16) and (17) reveals, to this end the domestic country will set its nondiscriminatory sales tax above the Pigouvian level ($t > \theta(s_y)$), impose a lower-than-efficient standard on domestic service providers ($-\theta'(s_y) > \kappa'(s_y)$) and a higher-than-efficient standard on foreign service providers ($-\theta'(s_{y*}) < \kappa'(s_{y*})$), and make smaller-than-efficient compliance-cost-reducing investments in the design and implementation of the standard applied to foreign service providers ($S_{y*} \times (-\varphi'(K_I)) > r$). We summarize with the following proposition.

Proposition 3. When the domestic government lacks a tariff-equivalent policy that can be applied to mode 3 foreign service providers, its unilateral policy choices are characterized by a nondiscriminatory sales tax on services set above the Pigouvian level, a lower-than-efficient standard on domestic service providers and a higher-than-efficient standard on foreign service providers, and smaller-than-efficient compliance-cost-reducing investments in the design and implementation of the standard applied to foreign service providers.

Proof. See the appendix.

If we think of noncooperative policies as those policies that would be unilaterally optimal for a government, then proposition 3 describes, according to our benchmark model augmented with assumption 1, the world that GATS negotiators would have confronted, as reflected in the unilaterally optimal policy interventions described by equations (18) and (19). And as a positive matter, if equations (18) and (19) describe the starting point from which governments would have considered the design of a trade-in-services agreement, the strategy of borrowing heavily from the design features of GATT—and therefore focusing market access negotiations on a single policy instrument while putting in place various rules to prevent governments from backsliding on the market access commitments implied by their negotiated bindings with new protective behind-the-border measures—no longer seems like an obvious and natural, or even viable, way to proceed, so much so that it seems plausible that this strategy may not have even occurred to GATS negotiators.[15] Rather, with equations (18) and (19) as their starting point and facing evident behind-the-border policy distortions spread throughout the domestic service market, a decision to adopt a deep-integration approach

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[15] We use the term "market access" informally here in order to tie in with the language present in trade agreements (e.g., GATT and GATS), but see Bagwell and Staiger (2002) for a formalization of this term within the context of the terms-of-trade theory. In essence, a market access commitment in a trade agreement is a commitment to conditions of competition between foreign exporting and domestic import-competing firms and can be interpreted in the context of our benchmark model as a commitment to a given level of sales volume by foreign service providers in the domestic market (i.e., a given level of domestic import volume) at a given foreign-service-provider price.

to services liberalization seems almost inevitable.[16] Hence, according to our benchmark model augmented with assumption 1, the lack of an effective tariff or tariff-equivalent policy instrument for mode 3 service-sector intervention can go a long way in accounting for the striking differences in the architecture of GATS and GATT.

Of course, to be effective, deep integration requires that governments are able to distinguish accurately in their negotiations between inefficient regulatory standards and standards that serve a legitimate public purpose (and the same goes for domestic taxes), a task that, as we have observed, was largely avoided with the shallow-integration approach of GATT. It is therefore relevant to ask a normative question: Taking the benchmark model augmented with assumption 1 as the starting point, in principle could a modified GATT-like shallow-integration approach to service-sector liberalization be made to work?

To investigate this question, we suppose that, before their market access negotiations, governments first agree to some across-the-board rules that apply whether or not the services in question are subject to negotiated market access commitments. We focus on three such rules, analogs of which figure prominently in GATT. To keep focused on the main points, in what follows we maintain our focus on the policies of the domestic country only. But it should be kept in mind that with the addition of a second mirror-image service industry where the roles of the domestic and foreign country are reversed, the rules and the subsequent market access negotiations that we consider would imply symmetric policy commitments for both countries.

Consider first the impact of governments adopting a national treatment (NT) rule that prohibits regulation—but not taxation—that discriminates against the sales of foreign service providers in the domestic market, implying the restriction $s_y \geq s_{y*}$. After the introduction of the NT rule but before any negotiated market access commitments, it is straightforward to show that the unilaterally optimal policies of the domestic government are

$$t - \theta(s_y) = \frac{S_{y*}}{S'_y + S'_{y*}} > 0, \tag{20}$$

$$-\theta'(s_y) - \kappa'(s_y) = 0 = -\theta'(s_{y*}) - \kappa'(s_{y*}), \quad \text{and}$$

$$S_{y*} \times (-\varphi'(K_I)) - r = \frac{S_{y*}}{S'_y + S'_{y*}} \times S'_y \times (-\varphi'(K_I)) > 0. \tag{21}$$

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[16] For a history of the international negotiations that led to GATS, see Marchetti and Mavroidis (2011).

Evidently, as the first line of equation (21) reveals, by eliminating the possibility of setting discriminatory standards against foreign service providers, the NT rule works to ensure that standards will in fact remain at their efficient levels when discriminatory sales taxes/tariffs are unavailable to the domestic government, even though the choice of the level of the standard is left to the discretion of the domestic government.[17] Intuitively, if discriminatory sales taxes are unavailable for terms-of-trade manipulation and nondiscriminatory sales taxes become the only fiscal policy available for this purpose, the use of discriminatory standards becomes an attractive weapon to add to the terms-of-trade manipulation arsenal, as we have emphasized and as equation (19) confirms; but when the application of discriminatory standards is made off-limits under the NT rule, the use of nondiscriminatory standards for this purpose relative to nondiscriminatory sales taxes loses its luster, and standards become immune to terms-of-trade manipulation motives, just as is true for discriminatory standards when discriminatory sales taxes are available.

Consider next the impact of governments adopting as well in their trade-in-services agreement a rule akin to aspects of the TBT Agreement, under which the governments are obligated to ensure that, whatever nonprotectionist objectives they choose to pursue with their standards, they do so with regulations that are no more trade restrictive than necessary to achieve these objectives.[18] In terms of our benchmark model, we can impose and interpret a "TBT rule" as committing the domestic government to make an efficient investment in the design and implementation of its chosen standard as these features relate to the compliance cost faced by foreign service providers (i.e., efficient choices for K_I), where efficiency is assessed conditional on prevailing domestic prices.[19] If the trade-in-services agreement were to include an NT rule and a TBT rule, as we have described these rules, then it is direct to show that, after the introduction of these rules but before any negotiated market access commitments, the unilaterally optimal policies of the domestic government are

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[17] Staiger and Sykes (2011) make the analogous point in the context of goods trade.

[18] Under the TBT Agreement, governments have broad latitude to pursue nonprotectionist objectives relating to health, safety, the environment, consumer protection, and the like. But they are subject to an array of across-the-board rules designed to ensure transparency, that the means chosen to achieve these objectives are reasonable, and that the rules do not impose unnecessary costs on trade.

[19] Nothing in the TBT Agreement creates an obligation in precisely these terms, but in broad brush this characterization captures the essence of what important aspects of the agreement seek to achieve. It seeks to ensure that regulatory standards are cost justified and are "necessary" to the attainment of some legitimate regulatory objective, both as to the substance of regulation and as to the measures used to ensure conformity. And the Appellate Body has interpreted the "necessary" requirement (in a case involving GATT Art. XX) to preclude an enforcement system that shifts most of the enforcement costs to foreigners (see WTO 2001).

$$t - \theta(s_y) = \frac{S_{y*}}{S'_y + S'_{y*}} > 0, \tag{22}$$

$$-\theta'(s_y) - \kappa'(s_y) = 0 = -\theta'(s_{y*}) - \kappa'(s_{y*}), \quad \text{and}$$

$$S_{y*} \times (-\varphi'(K_I)) - r = 0. \tag{23}$$

Evidently, even in the presence of the TBT rule, the NT rule continues to ensure that the domestic government chooses efficient standards, and therefore in the presence of these two rules the distortions in unilateral service-sector policies would be limited to the remaining "commercial measures"/fiscal instruments of governments: at the start of market access negotiations, there would be no distortions in regulatory choices $(s_y, s_{y*}, \text{and } K_I)$.[20]

Finally, while the NT and TBT rules will deliver efficient unilateral regulatory choices as long as the domestic government is also unconstrained in its choice of domestic sales tax, this will no longer be true if the sales tax is reduced through market access negotiations, as efficiency would dictate. Rather, once the domestic sales tax is bound at its efficient Pigouvian level $t = \theta(s_y)$ in a market access negotiation, it is straightforward to show that in the presence of the NT and TBT rules the domestic government would, after the negotiations, choose to raise its standard above the efficient level and thereby restrict trade volume as a means of manipulating the terms of trade. Hence, if governments are to achieve efficient policies without negotiating directly over regulatory standards, they will need to put in place an additional rule beyond the NT and TBT rules to prevent backsliding on the market access commitments implied by their negotiated bindings with the substitution of new protective behind-the-border measures.

Suppose, then, that in addition to the NT and TBT rules, a nonviolation (NV) doctrine is adopted, under which a service-exporting government could seek redress if some change in domestic policy by an importing government, even though not specifically prohibited by the trade-in-services agreement, nevertheless curtails trade in a manner that upsets the reasonable market access expectations associated with sales tax commitments. If we use the phrase "market access" to denote the domestic import volume at a given terms of trade (see also n. 15), then we can think of the NV rule as implying that, once the domestic government makes a market access commitment by binding its sales tax, it will be dissuaded from making any subsequent changes to its full set of policies that

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[20] For K_I, the claim of efficiency is conditional on prevailing domestic prices, because it is conditional on the volume of trade $S_{y*} = D(P_y^c) - S_y(P_y^q - \kappa(s_y))$.

together would have the effect of reducing the volume of service imports it demands at a given terms of trade.

Here we follow Staiger and Sykes (2011, 178) and formalize the NV doctrine as a "market-access preservation rule" defined in terms of the raw (unregulated) service. A key observation is that, if the NV rule prevents the domestic government from making unilateral postagreement changes in its policies in a way that would alter its demand for imported raw services at the terms of trade implied by its negotiated market access commitments, then the market-clearing output of foreign service providers in the domestic market, and therefore the trade volume in mode 3 services S_{y*} and the terms of trade $\hat{p}_y^w$, cannot be altered by any postagreement changes in domestic policies allowable under the NV rule either. And without the ability to manipulate the terms of trade with its remaining (unconstrained) policy instruments, the incentive for the domestic government to introduce distortions in these policy instruments once its sales tax is constrained in a market access agreement is removed. We summarize with a final proposition.

PROPOSITION 4. When the domestic government lacks a tariff-equivalent policy that can be applied to mode 3 foreign service providers, it exerts its power over the terms of services trade in the noncooperative equilibrium by distorting all of its (behind-the-border) policies; the purpose of a trade-in-services agreement is to remove the terms-of-trade-driven distortions from all of the domestic policies and raise trade volumes, and a deep-integration approach therefore seems natural. Nevertheless, a GATT-like shallow-integration approach to services trade liberalization, which relies on across-the-board NT, TBT, and NV rules combined with market access negotiations to bind the levels of taxation of services, could in principle be used by governments to negotiate from inefficient noncooperative policies to the efficiency frontier.

Proof.   See the appendix.

If one accepts the restriction described by assumption 1 as a reflection of real world policy frictions, then proposition 4 can be interpreted as pointing toward a possible "two-step" path forward for liberalizing trade in services. In a first step, governments would agree to a set of blanket rules along the lines of the NT, TBT, and NV rules contained in GATT. According to our findings, in ruling out discriminatory and unnecessarily trade-restrictive regulatory choices, such an agreement would induce governments to remove protectionist elements from their standards and regulatory policies in the service sector, yielding potentially important market-access-liberalizing implications. Concurrently, governments could adjust their policies over the available nondiscriminatory fiscal instruments. And then, in a second step, the focus of services-sector liberalization could switch to negotiations over these fiscal instruments to establish (in concert with the NT, TBT, and NV rules) the additional market access commitments needed to arrive at the efficiency frontier.

*C.   Two-Step Shallow Integration versus Deep Integration:
      Practical Challenges*

Note that the first step described by proposition 4 would effectively ask governments to give up all of their discriminatory and unnecessarily trade-restrictive regulatory instruments in each service sector at the outset of the negotiating process and to limit their market intervention to non-discriminatory fiscal instruments. This is much more demanding politically than what was required at the outset of GATT, under which governments were allowed to maintain protective tariffs, subject to negotiated reduction, and were simply asked not to substitute new forms of protection as tariffs came down. This observation suggests that, as a practical matter, the basic two-step approach described in proposition 4 might be infeasible.

But under a straightforward extension of our model to include multiple regulatory policies, and with s_y and s_{y*} reinterpreted as vectors of domestic regulations applied respectively to domestic and foreign service providers in the domestic market, proposition 4 could also suggest a modified two-step approach that might have somewhat greater political appeal. In particular, in the first step, governments would explicitly exempt one or a narrow set of preferred discriminatory nonfiscal policies (preferred, e.g., on grounds of transparency, such as a discriminatory entry quota) from a set of agreed blanket rules along the lines of the NT, TBT, and NV rules contained in GATT that would otherwise apply. This step would supply an analog to the push for tariffication at the outset of GATT.[21] Then, in the second step, the focus of service-sector liberalization could switch to negotiations over fiscal instruments and the permissible discriminatory policies to establish (in concert with the NT, TBT, and NV rules) the additional market access commitments needed to reach the efficiency frontier.

Even this modified two-step approach would face several political and practical challenges. First, our shallow-integration analysis implicitly assumes that an NT requirement for regulatory measures is implementable and cannot be circumvented by legal artifice. The GATS NT obligation (when it applies) requires a member to afford "treatment no less favourable than it accords to its own like services and service suppliers" (see GATS Art. XVII(1)). If governments can manipulate the concept of "likeness" excessively, they may be able to discriminate in regulatory standards between closely competing foreign and domestic service suppliers, and an NT obligation may accomplish little (see Mattoo 2000). Little law exists on the concept of "likeness" in service sectors, and it is difficult to assess how serious this problem might be in practice (see WTO 2016).

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[21] To bear close resemblance to tariffication under GATT and preserve the flavor of shallow integration, the preferred instrument(s) must be the same across all service industries. If they were allowed to vary widely across service industries, things would begin to look much more like the deep-integration approach of GATS.

Second, we have implicitly assumed that governments have access to the data they would need to implement an effective NV rule. This requires that governments have the ability to detect when a noncontracted policy measure is used by a trading partner in a way that denies market access, a task that ultimately comes down to being able to measure and monitor changes in import volumes and prices with reasonable accuracy. As Maurer et al. (2008) discuss, detailed data on mode 3 services trade can be found in the Foreign Affiliates Trade in Services (FATS) statistics, but until recently the United States was the only country compiling FATS statistics. This is starting to change (see the efforts described in Cernat 2017), but as Maurer et al. (2008, 164) conclude, with respect to mode 3 service trade, "the lack of data reliability and inter-country comparability is almost a general rule."

The fragmentary nature of the data on mode 3 service trade could represent a significant roadblock in the way of a shallow-integration approach for services trade liberalization and could, as a result, help explain the broad differences in the approach to integration taken by GATT and GATS. After the entry into force of GATS, there have been increasing calls for detailed and comprehensive data on trade in services, however, and efforts are under way to develop and collect such data. While successful efforts to compile these data would no doubt provide a valuable input into deep-integration bargaining under the current GATS structure, such efforts might also facilitate consideration of alternative shallow-integration approaches.

Finally, as we have noted, distortions at the outset of GATT were concentrated in tariffs, and the primary challenge with respect to other instruments was to prevent backsliding by freezing the status quo ante using rules of general applicability such as the NT obligation. At the outset of GATS, however, our analysis suggests that policy distortions would have been widespread. Under the two-step approach described above, GATS members subject to rules of general applicability (NT and TBT) would thus be obliged to modify a broad set of regulatory measures. Inevitably, disputes would arise over whether the remaining measures respected the applicable general rules. The potential volume of litigation could be highly costly politically, economically, and in relation to the adjudicatory resources of the WTO system.

The obvious alternative to the promulgation of general rules applicable to all sectors, and the litigation that would likely ensue, is to negotiate regulatory reform sector by sector, allowing for a degree of specificity and precision in commitments that would greatly diminish the scope for disputes—in other words, deep integration. Although this sector-specific approach to behind-the-border measures under GATS entails considerably greater burdens on negotiators, the reduction of disputes and litigation provides a substantial offsetting benefit. Thus, starting from a situation of

widespread distortions in service sectors, deep integration may have seemed the best option. The modified two-step approach described above, however, where in the first step governments explicitly exempt a narrow set of discriminatory nonfiscal policies from a set of agreed blanket rules that would otherwise apply, might offer an attractive middle ground.

V.   Conclusion

Our benchmark model abstracts from a number of complications that are likely to be important features of the world in which real trade agreements operate, such as firms that wield market power and governments that possess private information. In the context of goods trade, some of these features have been shown to qualify the case for shallow integration (Ederington and Ruta 2016; Lee 2016). For our purposes here, however, the important question is whether any of these qualifications would have more force in the context of services trade.

In this regard, the most salient alternative to the account we have put forth in this paper may come from the "offshoring" model developed by Antràs and Staiger (2012). Antràs and Staiger show that the case for shallow integration is undermined when international prices are determined by bilateral bargains between individual buyers and sellers, rather than by anonymous industry-wide market-clearing conditions, as in the standard terms-of-trade theory. And they observe that in light of its often highly specialized nature, services trade may represent a sector where this form of price determination is especially prevalent. These two accounts have distinct normative implications: according to the offshoring model of Antràs and Staiger, the deep-integration approach of GATS is an inevitable consequence of the nature of price determination for services trade, while according to the account we have provided here, the possibility of shallow integration for services trade exists. We view the task of distinguishing between the relevances of these and other (possibly complementary) explanations of the striking differences between GATT and GATS as an important avenue for future research.

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