Resource Allocation and Tariff Strategies: Rethinking VAT in the Context of Monopolistic Competition.*

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Abstract

We study optimal commodity taxation in an open economy with monopolistic competition and asymmetric fiscal capacity. In a two-country model, a supranational authority uses destination-based consumption taxes to finance public spending, correct market distortions, and redistribute across countries. We show that in the first-best, domestically produced goods are always subsidized, while cross-border tax differentials emerge based on relative labor valuations. In the second-best, when lump-sum transfers are unavailable, the optimal tax system resembles a pattern of asymmetric tariffs: goods from countries with lower marginal costs of public funds are subsidized, while more competitive trade directions are taxed. These results challenge the conventional neutrality of VAT under trade liberalization and suggest that differentiated tax treatment by origin can improve welfare. Our findings call for a reassessment of uniform VAT regimes, especially in economically asymmetric unions.

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1 Introduction

Over the past three decades, the architecture of global taxation systems has undergone substantial transformation, primarily in response to trade liberalization and the evolving

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structure of the international economy. A central feature of this transformation has been the widespread adoption of the Value-Added Tax (VAT), now one of the most prominent instruments for government revenue worldwide. Initially introduced in France during the 1950*s*, VAT gained global traction as countries sought to mitigate revenue losses resulting from reduced border tariffs, often prompted by the policy recommendations of institutions such as the World Trade Organization (WTO) and the International Monetary Fund (IMF).

Since the 1990*s*, VAT has been actively promoted as a more efficient alternative to customs duties and other indirect taxes. Its self-enforcing mechanism, which taxes value added at each stage of production without compounding effects, has made it particularly appealing (Ebrill et al., 2001). Framed as both neutral and efficient, VAT has been positioned to support trade liberalization while preserving fiscal capacity. As a result, most WTO member states, including both developed and developing economies, have integrated VAT into their fiscal systems. According to the OECD (2020), VAT now accounts for approximately 20% of total tax revenues in many advanced economies, having effectively replaced declining trade tax revenues in countries like Canada, Germany, and France. In these contexts, robust administrative capacity has enabled effective VAT enforcement, yielding favorable revenue outcomes.

In contrast, the implementation of VAT in developing countries has exposed significant structural and institutional challenges. Although the reform rationale, substituting VAT for trade taxes, was grounded in efficiency arguments, practical outcomes have often fallen short. As noted in Emran and Stiglitz (2005), many developing economies are dealing with large informal sectors, limited administrative infrastructure, and low tax compliance. These factors hinder VAT collection and may exacerbate inequality, especially when consumption taxes fall disproportionately on lower-income households. Moreover, where domestic production is limited and consumption patterns concentrate on essential goods, the VAT base is structurally narrow. Consequently, as the IMF (2019) acknowledges, the presumed fiscal gains from VAT have not consistently materialized in many low-income countries.

Concurrently, globalization and offshoring have profoundly reshaped global production structures. Driven by falling communication and transportation costs, multinational firms have increasingly shifted labor-intensive production from high-wage developed economies to lower-cost developing countries. This reorganization of global value chains has allowed firms to reduce costs, enhance profit margins, and provide cheaper goods to consumers in advanced economies. As Grossman and Rossi-Hansberg (2008a) emphasize, the outsourcing of tasks, rather than just final goods, has become a defining characteristic of the modern global economy, marking a deeper level of economic integration than envisaged in traditional

trade models.

While these developments have generated aggregate welfare gains, their distributional impacts have been significant and uneven. In developed economies, offshoring has contributed to the decline of manufacturing employment, regional economic stagnation, and wage polarization. For example, the United States experienced a nearly 40% reduction in manufacturing jobs between 1980 and 2017 (Bureau of Labor Statistics, 2017). Although technological change plays a role, empirical evidence strongly links trade exposure, particularly from China, to adverse labor market effects (Autor et al., 2013). Politically, these dynamics have fueled economic nationalism and skepticism toward globalization, as reflected in the 2016 and 2020 U.S. elections and the United Kingdom's Brexit referendum.

These structural and political shifts have prompted a critical reassessment of the policy orthodoxy surrounding trade liberalization and fiscal reform. A growing body of literature now contends that the benefits of globalization depend heavily on states' ability to manage adjustment costs, sustain fiscal capacity, and support economic resilience. Within this context, tariffs, once broadly considered inefficient, have reemerged as viable policy tools, especially in advanced economies facing industrial decline and budgetary pressures.

Advocates of selective tariffs argue that such instruments can serve multiple purposes. First, from a theoretical standpoint, the presence of market imperfections, including monopolistic competition, scale economies, and externalities, undermines the conventional argument against tariffs. Haufler and Pflüger (2004) demonstrate that tariffs can enhance welfare in models with monopolistic competition by influencing firm entry and correcting price distortions. This aligns with earlier work by Auerbach and Hines Jr. (2002), who contend that optimal commodity taxation in imperfectly competitive environments often requires nuanced border adjustments. Second, tariffs can be integral to industrial policy by enabling governments to protect strategic sectors, maintain national security, and preserve domestic employment. Rodrik (2018) argues that trade policy should not be framed as a binary between protectionism and free trade but rather as part of a broader toolkit for managing the complex risks and rewards of globalization.

Historically, tariffs have played a central role in the development strategies of industrialized countries. Bown and Irwin (2019) note that the original General Agreement on Tariffs and Trade (GATT) tolerated relatively high tariff levels, which were only gradually reduced through decades of multilateral negotiations. Similarly, the development trajectories of East Asian economies like South Korea and Taiwan combined selective protectionism with export promotion, defying conventional liberalization models. Even today, advanced economies such as the United States and European Union maintain tariff protections in sectors like aerospace, agriculture, and technology.

Furthermore, the VAT's application under the destination principle, which taxes goods in the country of consumption, creates implicit border adjustments similar in effect to tariffs. While these are WTO-compliant, they have significant distributional and strategic implications. Grossman and Rossi-Hansberg (2008a) highlights that such border tax adjustments affect relative prices and trade flows, especially when exporters are not subject to equivalent domestic taxes. Accordingly, VAT and tariffs function as interrelated elements of a broader fiscal-trade interface, whose outcomes are shaped by market structure and institutional capacity.

This evolving policy landscape raises important implications. First, it challenges the universal efficacy of VAT as a substitute for trade taxes. Second, it suggests that in economies with heterogeneous labor valuations, fiscal asymmetries, and imperfect competition, optimal taxation may require differentiated treatment of imports and domestic production. In this context, the paper investigates whether uniform VAT and zero-tariff policies remain optimal, or whether differentiated taxation by origin is justified under imperfect competition and fiscal asymmetries. Recent work by Aiura and Ogawa (2019, 2023), for example, shows that destination-based VAT systems can exacerbate inefficiencies when firm-level heterogeneity and cross-border shopping are present.

This paper contributes to the literature on international tax policy, VAT design, and trade reform in three key ways. First, it integrates the theory of optimal taxation with a two-country model of monopolistic competition, where countries differ in their labor endowments, production costs, and social valuation of public spending. In doing so, it extends the insights of Keen and Konrad (2013) on international tax coordination by showing how asymmetric fiscal needs can justify differentiated commodity taxation, even under harmonized VAT regimes. Second, it shows that the common practice of uniform VAT treatment under the destination principle can be suboptimal when trade flows interact with domestic distortions, a result that challenges the policy consensus reflected in many international reform templates. This resonates with empirical findings such as those by de la Feria and Walpole (2009), who emphasize that real-world VAT systems often deviate from theoretical neutrality due to administrative and political constraints. Third, the paper demonstrates, both analytically and numerically, that tariff-like instruments can be part of an optimal tax structure when the costs of public spending and labor valuations differ across countries. In doing so, this paper challenges Lockwood et al. (1994) that conclude that VAT is neutral under the destination principle in a symmetric setting, suggesting that tariffs are not not necessary. These findings call for a reassessment of VAT harmonization strategies and support a more flexible, context-sensitive approach to fiscal policy in a globalized economy.

This paper contributes to this growing literature by developing a formal framework in which

a supranational authority sets commodity taxes in a two-country model characterized by monopolistic competition. The two countries differ in labor endowments, cost structures, and the social valuation of public spending. The model analyzes both the first-best setting, where lump-sum transfers are available, and the second-best scenario, where only commodity taxation is feasible. Results show that tariff-like differentials in taxation across trading directions can be optimal when asymmetries and market imperfections are present. Specifically, when the marginal cost of public spending in one country is lower than the social marginal utility of labor in the other, the optimal policy involves taxing the more competitive direction and subsidizing the less competitive one. These findings challenge the view that trade liberalization and VAT harmonization are inherently welfare-enhancing and underscore the need for context-sensitive fiscal and trade policies.

The remainder of the paper is organized as follows. Section 2 outlines the formal model, including consumer preferences, firm behavior, and market equilibrium. Section 3 characterizes the first-best allocation under full policy instruments. Section 4 examines the second-best scenario, focusing on the role of tariffs and tax asymmetries. Section 5 concludes with implications for global tax reform and trade policy design in an increasingly fragmented international economy.

2 Model

We build a two-country general equilibrium model with monopolistic competition, asymmetric fiscal capacity, and cross-border trade in differentiated goods. The model integrates consumer preferences, firm behavior, taxation, and government budget constraints in a unified framework governed by a supranational planner. The primary purpose is to analyze how optimal tax policy varies with cross-country differences in labor valuation, production cost, and fiscal efficiency.

The countries—labeled North (developed) and South (developing)—trade goods across multiple industries. The supranational authority uses destination-based consumption taxes to fund public goods and correct market distortions. By embedding a Dixit and Stiglitz (1977) structure and fiscal asymmetry, the model captures key frictions relevant to international tax coordination.

We now describe each component of the model in detail.

2.1 Consumers and Preferences

Each country $k \in \{N, S\}$ is populated by a representative consumer endowed with L_k units of time. Time can be allocated either to leisure — captured through consumption of a numeraire good ℓ_k— or to labor, supplied to firms producing differentiated goods. Each consumer in country k earns a wage —ω_k— per unit of time supplied and faces destination-based ad valorem taxes on all goods consumed. Labor markets are perfectly competitive and country-specific—there is no migration.

Consumer preferences are given by:

$$U_k(\ell_k, \{Y_{jk}^i\}) = \delta_k^0 \ell_k + \sum_{j \in \{N,S\}} \sum_{i=1}^{I} \frac{\delta_{jk}^i}{1 - 1/E_{jk}^i} \left(Y_{jk}^i\right)^{1-1/E_{jk}^i}, \tag{1}$$

where:

- δ_k^0 is the utility weight on the numeraire,
- $\delta_{jk}^i > 0$ reflects the importance of industry i goods from origin j in the preferences of country k,
- $E_{jk}^i > 1$ is the elasticity of substitution between industries, it governs how easily consumers can shift consumption across industries when relative prices change.
- Y_{jk}^i is a CES aggregator:

$$Y_{jk}^i = \left(\int_0^{n_{jk}^i} q_{jk}^i(f)^{\rho_{jk}^i} df \right)^{1/\rho_{jk}^i}, \quad 0 < \rho_{jk}^i < 1. \tag{2}$$

The parameter ρ_{jk}^i governs the elasticity of substitution between varieties of goods in industry i, produced in country j , and consumed in country k ; it shows how much each variety is differentiated. A lower level of ρ_{jk}^i implies stronger perceived differentiation among varieties, and a higher level of ρ_{jk}^i implies easier substitution among varieties.

Consumers face the budget constraint:

$$\sum_{j,i} (1 + t_{jk}^i) \int_0^{n_{jk}^i} p_{jk}^i(f) q_{jk}^i(f) df = (1 - t_k^0)\omega_k(L_k - \ell_k) + T_k, \tag{3}$$

where T_k is a transfer distributed by government as lump-sum to each consumer in country k.

First-order conditions yield:

$$p_{jk}^{i}(f) = \frac{\delta_{jk}^{i}(1-t_{k}^{0})\omega_{k}}{\delta_{k}^{0}(1+t_{jk}^{i})} \left(Y_{jk}^{i}\right)^{-1/E_{jk}^{i}} \rho_{jk}^{i} q_{jk}^{i}(f)^{\rho_{jk}^{i}-1}, \tag{4}$$

where,

- $q_{jk}^{i}(f)^{\rho_{jk}^{i}-1}$ implies that the demand curve is downward-sloping: higher quantities reduce marginal willingness to pay.
- $\left(1+t_{jk}^{i}\right)$ in the denominator reflects how taxes reduce the producer's effective demand, leading to lower prices and quantities.
- $\frac{\left(1-t_{k}^{0}\right)\omega_{k}}{\delta_{k}^{0}}$, this term captures the marginal utility of income (or purchasing power) of the representative consumer in country k, adjusted for labor taxation and their valuation of the numeraire good. It is a scaling factor for demand and influences how much consumers are willing to pay for differentiated goods. When it is high, consumers can and want to spend more on differentiated goods, raising their willingness to pay. When it is low, either because labor is taxed heavily or consumers value the numeraire highly, their demand for differentiated goods is more elastic (sensitive to price).

2.2 Firms and Market Structure

Each firm produces a unique variety under monopolistic competition and faces fixed and variable labor costs. Exporting entails additional fixed costs.

Let:

- c_{j}^{i} be the marginal labor cost in country j,
- F_{jk}^{i} the fixed cost of producing in j and selling in k,
- ω_{j} the nominal wage in j.

Therefore, the total cost paid by each firm :

$$C_{jk}^{i}(x) = \omega_{j}(c_{j}^{i}x + F_{jk}^{i}). \tag{5}$$

Let us assume that one unit of the numeraire is produced under constant return to scale and perfect competition by using one unit of labor. We further assume that this numeraire is

not part of international trade. [1] These two assumptions simplify the model and help focus on real variables; they remove nominal rigidities and center analysis on real distortions. We therefore able to set $w_N = w_S = 1$, and normalize the price of the numeraire.

Firms choose q^i_{jk} to maximize profits:

$$\Pi^i_{jk}(q^i_{jk}(f)) = p^i_{jk}(f)q^i_{jk}(f) - \left(c^i_j q^i_{jk}(f) + F^i_{jk}\right). \tag{6}$$

First-order condition allows to derive the optimal monopoly price as following:

$$p^i_{jk}(f) = \frac{c^i_j}{\rho_{ijk}}. \tag{7}$$

all companies in the same industry i, producing in country j and exporting to country k, sell at the same price, regardless of variety.

Assuming free entry in our model, therefore each firm has zero profits. (7) into (6) and free entry assumption lead to:

$$q_{ijk} = \frac{F^i_{jk}}{c^i_j} \cdot \frac{\rho_{ijk}}{1 - \rho_{ijk}}. \tag{8}$$

A lower level of ρ^i_{jk}, signifies a high level of monopoly power by firms, that is, a high markup. The firm can and would charge a high price —that departs from the marginal cost c^i_j— for each unit of good sold. Quantities, on the other hand, decrease and fall down from what would have been optimally produced under perfect competition.

In the context of monopolistic competition with free entry, firm output increases with fixed costs due to the zero-profit condition. Since each firm must cover its fixed production and entry costs from variable profits, higher fixed costs require firms to operate at a larger scale to break even. As a result, equilibrium output per firm rises with fixed costs. This relationship reflects a core feature of Dixit and Stiglitz (1977) framework, where firm size adjusts endogenously to ensure zero economic profits in the long run.

[1] The numeraire is often conceptualized as a non-tradable service or good (e.g., local haircuts, real estate services, construction) whose international exchange is either impossible or prohibitively costly. This assumption is standard in international trade and tax competition models, particularly those that aim to simplify general equilibrium dynamics while isolating the effects of tax policy on traded goods (Atkeson and Burstein, 2008, Grossman and Rossi-Hansberg, 2008b).

2.3 Supranational Authority and Public Sector

A central planner in each country k, collects labor taxes—$t_k^0(L_k - \ell_k)$— and commodity taxes under the destination principle — $t_{jk}^i p_{jk}^i q_{jk}^i n_{jk}^i$ — to finance a given level of public goods g_k and to correct monopolistic distortions.

Therefore, the global budget constraint of the social planner is given by:

$$\sum_k \left[t_k^0(L_k - \ell_k) + \sum_{j,i} t_{jk}^i p_{jk}^i q_{jk}^i n_{jk}^i \right] = \sum_k (g_k + T_k). \tag{9}$$

2.4 General Equilibrium Conditions

Having determined equilibrium output quantities q_{jk}^i and aggregators Y_{jk}^i, we now give a characterization of the numeraire (l_k), numbers of firms (n_{jk}^i), producer prices (p_{jk}^i) and wage rates (ω_k) at equilibrium, for given fiscal instruments $\left(T_k, t_k^0, \left(t_{jk}^i\right)_{i,j}\right)_k$ that satisfy the budget constraint of the supranational authority. In this framework, an equilibrium consists of allocations satisfying:

- Household budget constraint given by

$$\sum_{j,i} \left(\frac{1 + t_{jk}^i}{1 - t_k^0} \right) p_{jk}^i q_{jk}^i n_{jk}^i = L_k - l_k + \frac{T_k}{1 - t_k^0}.$$

- Firm pricing and entry given by (7) and (8)

- Labor market constraint in each country of production j:

$$L_j - l_j = g_j + \sum_{i,k} n_{jk}^i (c_j q_{jk}^i + F_{jk}^i). \tag{10}$$

The previous equations can be transformed by changing the instruments $\left(T_k, t_k^0, \left(t_{jk}^i\right)_{i,j}\right)_k$ into new ones $\left(\tilde{T}_k, \left(\tilde{t}_{jk}^i\right)_{i,j}\right)_k$ where $\tilde{T}_k = \frac{T_k}{1-t_k^0},\ \forall k$ and $\tilde{t}_{jk}^i = \frac{t_{jk}^i}{1-t_k^0},\ \forall i$.

The linear tax on labor is redundant, equivalent to a uniform tax on all goods. So we can always find an indirect tax and a lump-sum transfer that reduce the three previous instruments $\left(T_k, t_k^0, \left(t_{jk}^i\right)_{i,j}\right)_k$ to two $\left(\tilde{T}_k, \left(\tilde{t}_{jk}^i\right)_{i,j}\right)_k$.

3 First-Best Optimum

In this section, we analyze the first-best scenario in which the planner has access to the full set of policy instruments, including lump-sum transfers. Our goal is to derive the optimal commodity tax structure when the planner can fully internalize monopolistic distortions and redistribute resources across countries without facing fiscal constraints. This setup serves as a benchmark for evaluating the efficiency of different tax instruments in an open economy with asymmetric valuations of labor and public spending. By solving for the planner's optimal allocation and pricing rules, we uncover how market power and fiscal asymmetries interact to determine optimal taxes and subsidies across trade directions.

3.1 Planner's Objective and Constraints

Let β_k denote the planner's welfare weight on country k, it represents the planner's relative valuation of welfare in country k.[2] δ_k^0 represent the marginal utility of the numeraire in country k; a high value of δ_k^0 means consumer in country k dislikes working, thus, this implies that labor supply is costly in welfare terms: any distortion that induces more labor has a high welfare cost.[3] The planner chooses the mass of firms n_{ijk} and quantity per firm q_{ijk} to maximize total welfare:

$$\sum_{k\in\{N,S\}} \beta_k U_k \left(l_k, \left(Y_{jk}^i\right)_{i,j} \right) = \sum_{k\in\{N,S\}} \beta_k \left[\delta_k^0 l_k + \sum_{j\in\{N,S\}} \sum_{i=1}^{I} \delta_{jk}^i \frac{\left(Y_{jk}^i\right)^{1-1/E_{jk}^i}}{1-1/E_{jk}^i} \right], \tag{11}$$

subject to the labor market constraint (10) in each country.

[2] β_k acts as a redistributive preference parameter; a high value of β_k means implies that the supranational planner is more willing to allocate resources in favor of country k, subsidized goods in country k; favor policies that improve consumption and leisure in k, even at the expense of the other country.

[3] Since leisure is tied to the numeraire good (produced one-to-one with labor), δ_k^0 also captures how much consumers value income (purchasing power) in country k; a higher δ_k^0 raises the weight on leisure in country k, which makes the planner less willing to tax consumption in that country, since taxation indirectly pushes consumers to work more; in that case, the planner is more inclined to subsidize consumption if market power distorts prices upward.

3.2 Optimal Quantities and Entry

Replacing ℓ_k and Y_{jk}^i in the utility function by their values from the labor market constraint and the goods' aggregator equation give the following problem:

$$\max_{\left(n_{jk}^i, q_{jk}^i\right)_{i,j,k}} \sum_{k\in\{N,S\}} \beta_k \left[\delta_k^0 \left(L_k - g_k - \sum_{j\in\{N,S\}} \sum_{i=1}^{I} n_{kj}^i \left(c_k^i q_{kj}^i + F_{kj}^i \right) \right) + \sum_{j\in\{N,S\}} \sum_{i=1}^{I} \delta_{jk}^i \frac{\left(n_{jk}^i (q_{jk}^i)^{\rho_{jk}^i} \right)^{1-1/E_{jk}^i}}{1-1/E_{jk}^i} \right].$$

The first-order conditions allow us to obtain the optimal quantities produced :

$$\left(q_{jk}^i\right)_{opt} = \frac{F_{jk}^i}{c_j^i} \frac{\rho_{jk}^i}{1-\rho_{jk}^i} \tag{12}$$

Equation (12) is the zero-profit condition under monopolistic competition with free entry, adjusted by the planner in the first-best to correct for market distortion. So, $\frac{F_{jk}^i}{c_j^i}$ gives the baseline production scale needed to cover the fixed cost. Higher fixed costs or lower marginal costs require a larger output per firm to break even; and $\frac{\rho_{jk}^i}{1-\rho_{jk}^i}$ captures the markup structure from Dixit-Stiglitz monopolistic competition; a lower (resp. Higher) ρ_{jk}^i means that firms have high (resp.low) markup and therefore produce less (resp. more); this term ensures firms produce enough to recover their fixed costs at the planner-corrected price level.

The optimal number of varieties is therefore given by:

$$\left(n_{jk}^i\right)_{opt} = \left(\frac{\rho_{jk}^i}{c_j^i} \right)^{E_{jk}^i \rho_{jk}^i \left(1-1/E_{jk}^i\right)} \left(\frac{1-\rho_{jk}^i}{F_{jk}^i} \right)^{E_{jk}^i (1-\rho_{jk}^i + \rho_{jk}^i/E_{jk}^i)} \left(\frac{\beta_k \delta_{jk}^i}{\beta_j \delta_j^0} \right)^{E_{jk}^i} \tag{13}$$

Equation (13) is made up of three terms:

- Cost and market structure term, $\left(\frac{\rho_{jk}^i}{c_j^i} \right)^{E_{jk}^i \rho_{jk}^i \left(1-1/E_{jk}^i\right)}$: more firms enter when marginal production costs (c_j) are low and competition (ρ_{jk}^i) is strong.
- Fixed costs and returns to scale term, $\left(\frac{1-\rho_{jk}^i}{F_{jk}^i} \right)^{E_{jk}^i (1-\rho_{jk}^i + \rho_{jk}^i/E_{jk}^i)}$: lower fixed costs and higher markups make it easier for more firms to enter. This term reflects the zero-profit condition; each firm must be large enough to recover its fixed cost, and this limits how many firms can enter.

- Demand and redistribution term, $\left(\frac{\beta_k \delta_{jk}^i}{\beta_j \delta_j^0}\right)^{E_{jk}^i}$: this term reflects the planner's incentive to redistribute production to serve countries that value consumption more and where labor is less socially costly.[4]

3.3 First-Best Tax Rates

At the first-best, lump-sum transfers T_k are available. The optimal ad valorem tax t_{jk}^i applied to a good produced in country j, consumed in k, and belonging to industry i is derived by equating marginal rates of substitution and marginal costs:

(13) and (7) in the inverse demand function (4) allow to describes the tax vector that characterize the first-best at equilibrium:

$$t_{jk}^{i,*} = -1 + \rho_{jk}^i \cdot \frac{\beta_j \delta_j^0}{\beta_k \delta_k^0}, \tag{14}$$

The quantity of the numeraire ℓ_j purchased by each consumer in each country j is then derived from the labor constraint equation (10) in each country. And the level of the lump sum transfer T_k in each country k is obtain from the consumer budget constraint (3).

Proposition 1 (Proposition 1: First-Best Optimal Taxation Structure)**.** *Let t_{jk}^i denote the ad valorem tax on goods produced in j and consumed in k. Then:*

1. ***Domestically produced and consumed goods are subsidized:***

$$t_{jj}^{i,*} = -1 + \rho_{ijj} < 0$$

   This corrects monopolistic distortions and restores marginal cost pricing.

2. ***Subsidy Increases with Market Power:*** *Industries with stronger monopolistic power (lower ρ_{jk}^i) receive larger subsidies.*

3. ***Cross-Border Subsidies Depend on Fiscal Asymmetry:*** *There always exists at least one cross-border direction $j \to k$ such that $t_{jk}^i < 0$. In particular, if the marginal social valuation of labor income (or leisure) in the origin country is lower than the one*

[4] $\beta_k \delta_k^0$ measures how much welfare is gained in country k by increasing consumption of goods produced in country j; $\beta_j \delta_j^0$ measures the social cost of labor used to produce those goods. Therefore, $\frac{\beta_k \delta_k^0}{\beta_j \delta_j^0}$ can be seen as the planner's marginal cost-benefit ratio for allocating labor to produce variety from country j for country k.

in the destination, then imports from j to k are subsidized:

$$\text{if} \quad \beta_j \delta_j^0 \leq \beta_k \delta_k^0 \text{ then} \quad t_{jk}^{i,*} \leq 0.$$ [5]

4. ***Directional Tax Asymmetries:***

$$t_{jk}^{i,*} \neq t_{kj}^{i,*}$$

Even under symmetric market structure, taxes differ by trade direction due to fiscal asymmetries.

In monopolistic competition, firms charge prices above marginal cost, this causes consumers to under-consume relative to the efficient level. Therefore, for domestically produced and consumed goods, a subsidy reduces the consumer price, moving the consumer price back to marginal cost, thus correcting this distortion (Reinhorn, 2012 concludes the same in a close economy model).[6] The term $\frac{\beta_j \delta_j^0}{\beta_k \delta_k^0}$ reflects how the planner values a unit of labor or revenue in country j compared to country k, it allows the planner to redistribute demand and production toward where public goods can be financed more cheaply or where labor is less socially valuable, improving global welfare. The previous result also shows that taxes are not symmetric across trade directions (i.e., exports from j to k are treated differently than exports from k to j). Indeed, even if both countries have the same market structure, they can, for example, differ in marginal valuation of labor/leisure. These asymmetries justify different tax treatment, the planner using tax policy to reallocate production and consumption efficiently across borders.

4 Zero Lump-Sum Taxes

In this section, we examine the second-best optimum when lump-sum transfers are no longer available. This constraint introduces fiscal distortions even in the planner's solution, as taxes must now simultaneously raise revenue and correct market inefficiencies.

Although lump-sum taxes are efficient since they minimize distortionary effects on individual behavior as they do not influence labor supply or consumption decisions, such instruments will not be used in this section for several reasons. First, a primary challenge associated

[5] If $\beta_j \delta_j^0 \geq \beta_k \delta_k^0$, then goods in the cross-border direction $j \to k$ may be taxed depending on the relative size of the markup ρ_{jk}^i.

[6] Indeed, with the formulae of the commodity tax given by (14), the consumer price is given by $\left(1 + t_{jj}^i\right) p_{jj}^i = c_j$.

with lump-sum taxes is their regressive nature. Such taxes disproportionately burden lower-income individuals, raising significant equity concerns. This fundamental issue conflicts with the principle of vertical equity, which posits that those with greater ability to pay should contribute more. Second, to use lump-sum instruments, the government should apply a system that correctly reveals some hidden information, such as endowments and preferences (Myles, 1995).

4.1 Planner's Problem with No Transfers

Having established the first-best benchmark, we now turn to a more realistic and constrained environment: one in which lump-sum transfers are unavailable. This second-best setting reflects the political or informational limitations that prevent governments from implementing non-distortionary taxes. The planner must now finance public spending g_k in each country, and combat monopolistic distortions, solely through distortionary commodity tax, which introduces an inherent trade-off between efficiency and revenue generation. We examine how this constraint reshapes the structure of optimal taxation, and in particular, how it gives rise to asymmetric, tariff-like tax policies, even under a destination-based VAT system. This section highlights the redistributive logic behind differentiated tax treatment across countries and industries.

4.2 Modified Optimal Tax Rule

In contrast to the first-best formula (14), the constrained optimum yields a modified structure, as the planner internalizes the revenue needs of each country.

The exact tax rule under zero transfers depends on the marginal cost of public funds in each country. Denote this marginal costs by λ_k; it reflects the distortionary cost of raising public revenue without lump-sum transfers.[7] The planner maximizes:

$$\sum_{k\in\{N,S\}} \beta_k U_k = \sum_{k\in\{N,S\}} \beta_k \left(\delta_k^0 \ell_k + \sum_{j\in\{N,S\}} \sum_{i=1}^{I} J_{jk}^i \frac{\left(n_{jk}^i\right)^{1-1/E_{jk}^i}}{1-1/E_{jk}^i} \right) \tag{15}$$

subject to labor market constraints (10) in both countries and to the two consumers' budget

[7] λ_k measures how costly it is (in welfare terms) for the planner to raise an additional unit of revenue (in country k) via distortionary taxation when limp-sum transfers are unavailable. A higher λ_k means public funds are more costly to raise in country k (more distortionary effects from taxation) and a lower λ_k implying public funds are less costly to raise —less distortionary effect from taxation.

constraints (3); with

$$J^i_{jk} \equiv \delta^i_{jk} \left(q^i_{jk}\right)^{\rho^i_{jk}\left(1-\frac{1}{E^i_{jk}}\right)}.$$

J^i_{jk} acts as a weight on the mass of varieties n^i_{jk} in consumption utility, indicating that adding more firms producing in country j and selling in country k contributes more to welfare ; it captures the value that the supranational planner gives to each additional unit of good produced in country j and consumed in country k when the substitution effect and consumer preferences are taken into account.

The supranational authority then chooses the numeraire $(\ell_k)_k$ and the masses of firms $\left(n^i_{jk}\right)_{i,j,k}$ that maximize (15) subject to labor market equilibrium in both countries and to the implementability constraints.

First-order conditions lead to the following,

$$\left[\left(1-\frac{1}{E^i_{jk}}\right)\left(\lambda_k-\beta_k\delta^0_k\right)\frac{\rho^i_{jk}}{\delta^0_k}J^i_{jk}+\beta_k J^i_{jk}\right]\left(n^i_{jk}\right)^{-\frac{1}{E^i_{jk}}}=\lambda_j D^i_{jk}. \tag{16}$$

where, $D^i_{jk}=c^i_j q^i_{jk}+F^i_{jk}$ is the total cost (expressed in units of labor) associated with the production of q^i_{jk} units of goods.

Some computation allow to derive the optimum number of firms in the second-best as given by:

$$n^i_{jk}=\left[\frac{J^i_{jk}}{\delta^0_k D^i_{jk}}\frac{\left(1-\frac{1}{E^i_{jk}}\right)\rho^i_{jk}\left(\lambda_k-\beta_k\delta^0_k\right)+\beta_k\delta^0_k}{\lambda_j}\right]^{E^i_{jk}} \tag{17}$$

Equation (17) reveals how the planner endogenously adjusts the number of varieties in each trade direction based on the interaction between consumption utility, fiscal distortions, and production costs. The numerator captures the marginal welfare benefit of adding a new variety, driven by consumer preferences, the planner's redistributive weight on the consuming country, and a Ramsey-type adjustment that internalizes the distortionary cost of raising revenue through commodity taxes. The denominator reflects the social cost of supplying one more variety, incorporating both production inputs and the shadow price of labor in the origin country. The elasticity parameter magnifies how rapidly the marginal utility of new varieties diminishes.

While equation (13) reflects the pure efficiency solution under full instruments, where the planner places firms based on costs, preferences, and welfare weights, equation (17) shows how these same decisions are distorted in a second-best world, where financing needs and tax distortions matter. Entry becomes not just a question of "who values this good?" but

also "who can produce it cheaply in fiscal terms?" and "can we raise revenue without hurting welfare too much?" This comparison underscores the paper's main insight: in the real world, optimal trade and tax policy must reflect fiscal asymmetries and market imperfections, not just production costs and consumer preferences.

The optimal tax in the second-best optimum is therefore given by the following equation:

$$\tau_{jk}^{i} = \frac{\lambda_j \rho_{jk}^{i}}{\beta_k \delta_k^0 + \left(1 - 1/E_{jk}^{i}\right) \rho_{jk}^{i} \left(\lambda_k - \beta_k \delta_k^0\right)} \tag{18}$$

or equivalently

$$\frac{1}{\tau_{jk}^{i}} = \frac{\beta_k \delta_k}{\lambda_j \rho_{jk}^{i}} + \left(1 - 1/E_{jk}^{i}\right) \frac{\lambda_k - \beta_k \delta_k^0}{\lambda_j} \tag{19}$$

Equation (18) expresses the inverse of the optimal tax rate, $\frac{1}{\tau_{jk}^{i}}$, as a weighted sum of two distinct components. This decomposition provides valuable economic intuition by separating the redistributive efficiency motive from the corrective pricing objective.

The first term, $\frac{\beta_k \delta_k}{\lambda_j \rho_{jk}^{i}}$, captures the redistributive pressure tied to the value of labor in the consuming country k and the fiscal capacity of the producing country j . A high social marginal utility of leisure in the consuming country (high $\beta_k \delta_k^0$) implies that labor is valuable and taxing consumption should be avoided; this pushes the term up and thus lowers τ_{jk}^{i}, potentially even below 1 (i.e., implying a subsidy). Conversely, a high marginal cost of public spending in the producing country (high λ_j) increases the fiscal burden of using labor to produce goods, discouraging subsidies. This term also inversely depends on ρ_{jk}^{i}, meaning goods with stronger monopoly power (lower ρ_{jk}^{i}) justify larger corrections through lower taxes or greater subsidies. The second term, $\left(1 - 1/E_{jk}^{i}\right) \frac{\lambda_k - \beta_k \delta_k^0}{\lambda_j}$, reflects the Ramsey component of the tax, the extent to which distortionary taxation should fall on goods with more inelastic substitution possibilities. It is only activated when $\lambda_k \neq \beta_k \delta_k^0$, that is, when there is a wedge between the social value of leisure and the fiscal cost of public spending in the consuming country. If , $\lambda_k > \beta_k \delta_k^0$ meaning it is costly to finance public goods in country k, this term contributes positively, increasing the tax burden on goods with greater substitution elasticity (as captured by E_{jk}^{i}). Again, ρ_{jk}^{i} amplifies this effect, since goods with more market power respond differently to tax-induced price changes.

Overall, this expression makes clear that the optimal tax rate is lower (or more likely to be a subsidy) when: (1) Labor is highly valuable in the consuming country k (large $\beta_k \delta_k^0$); (2) The producing country j has low fiscal capacity (small λ_j), (3) good produced in country j and consumed in country k has strong monopoly power (small ρ_{jk}^{i}). It also shows that

Ramsey-type taxes emerge when public spending is more costly in the consuming country than the value of leisure, and that this interacts with the degree of substitutability and market power of the good. This version of the formula thus neatly separates the redistributive motive (first term) from the efficiency-corrective and Ramsey pricing motive (second term), highlighting the complexity of designing optimal commodity taxes in open, asymmetric economies with monopolistic competition.

If the two countries are symmetric, then equation (18) writes:

$$1 - \frac{\rho^i_{jk}}{\tau^i_{jk}} = \left(1 - \frac{1}{\lambda}\right)\left(1 - \rho^i_{jk} + \rho_{jk}/E^i_{jk}\right). \tag{20}$$

Equation (20) reveals that the optimal commodity tax under symmetric conditions reflects a combination of two classical principles: a correction for monopolistic pricing and a Ramsey-type adjustment for efficient revenue generation. When lump-sum taxation is available (i.e., $\lambda = 1$), the optimal tax simplifies to $\tau^i_{jk} = \rho^i_{jk}$, meaning that taxes exactly offset monopoly markups and restore efficiency, firms behave as if they were in perfect competition. Conversely, under perfect competition ($\rho^i_{jk} = 1$), the markup correction disappears, and the optimal tax reduces to a standard Ramsey rule: $\left(1 - \frac{1}{\lambda}\right)\left(1 - \frac{1}{E^i_{jk}}\right)$. This implies that goods with lower demand elasticities should bear a higher tax burden, minimizing the excess burden of taxation. Hence, the formula in (20) integrates two policy objectives: (1) correcting price distortions arising from market power, and (2) financing public spending in a least-distortive manner. As the marginal cost of public funds λ increases, reflecting more constrained fiscal capacity, the optimal tax shifts emphasis toward Ramsey-type taxation, even at the expense of efficiency in pricing. This trade-off becomes especially relevant when lump-sum instruments are unavailable, as further explored in the second-best case.

Lemma 1. *: for every country $j, k \in \{N, S\}$:*

- *for all i, j, k such that $\rho^i_{jk} \leq \frac{\lambda_k}{\lambda_j}$, there is $k \in \{N, S\}$, $\lambda_k > \beta_k \delta^0_k$*
- *for all j, k such that $\lambda_j = \lambda_k = \lambda$, there is $k \in \{N, S\}$, $\lambda > \beta_k \delta^0_k$.*

Proof. See appendix A □

Lemma 1 formalizes a necessary condition for the feasibility of optimal taxation in the second-best setting. In the absence of lump-sum transfers, commodity taxes must serve a dual role: they must simultaneously finance public expenditures and correct distortions arising from monopolistic competition. This dual objective inherently creates a tension, since correcting markup-induced inefficiencies typically calls for subsidization, while financing public goods

often requires positive taxation. Lemma 1 demonstrates that these goals cannot be reconciled universally: it is not possible to subsidize all consumption directions without violating the planner's aggregate resource constraint. Hence, at least one country must operate in a fiscally constrained position, with a marginal cost of public funds exceeding the planner's valuation of labor income (i.e., $\lambda_k > \beta_k \delta_k^0$).

This result underscores a fundamental aspect of constrained optimal policy: the assignment of net tax incidence across countries is endogenous to the model. The planner must determine which jurisdiction can bear the fiscal burden with the least welfare cost. Countries with a lower λ_j, that is, those where public funds are cheaper to mobilize, become natural candidates for tax relief or export subsidization, while those with higher fiscal costs are optimally taxed more heavily, even on imports. This mechanism reflects an endogenous form of fiscal burden-shifting, where trade taxation is not used to protect domestic producers, but to reallocate the distortions associated with public finance toward jurisdictions better equipped to absorb them.

Even in symmetric settings, the lemma implies that uniform subsidization is not feasible unless the marginal cost of public funds exceeds the marginal utility of labor in both countries. Therefore, unless both countries possess sufficient fiscal slack, uniform neutrality in VAT cannot be sustained. This insight is critical, as it suggests that even within harmonized VAT regimes, such as those in the European Union, directional differentiation in tax treatment may be necessary when lump-sum transfers are unavailable and fiscal asymmetries persist.

More broadly, Lemma 1 anticipates the emergence of asymmetric, tariff-like tax structures in optimal policy, which are further formalized in Proposition 2. These structures do not arise from protectionist motives but from the planner's attempt to balance efficiency and redistribution under second-best constraints. As such, the lemma provides a theoretical foundation for reinterpreting destination-based VAT as a potentially redistributive instrument, rather than a purely neutral one.

Proposition 2 (Directional Subsidies and Fiscal Asymmetry)**.** *At the second-best optimum, where in each country the social marginal utility of labor is lower than the marginal cost of public funds (i.e., $\beta_k \delta_k^0 < \lambda_k$), the following statements hold:*

1. ***Subsidies toward fiscally efficient origins:***
   If $\lambda_k < \lambda_j$ and $\lambda_k < \beta_j \delta_j^0$, then goods produced in country k and consumed in country j are subsidized, i.e., $\tau_{jk}^i < 1$.

2. ***Subsidies toward fiscally constrained destinations:***

If $\lambda_j < \beta_k \delta_k^0$, then goods produced in country j and consumed in country k are subsidized, i.e., $\tau_{kj}^i < 1$.

3. ***Directional asymmetry:***
   The optimal tax schedule is asymmetric across trade directions, i.e., $\tau_{jk}^i \neq \tau_{kj}^i$, even under symmetric trade structures.

4. ***Feasibility constraint (from Lemma 1):***
   It is not possible for all trade directions to be subsidized simultaneously. At least one trade direction must bear a positive tax rate.

Proof. See appendix B □

Proposition 2 reveals that in a world with fiscal asymmetries and monopolistic competition, optimal tax policy requires taxing or subsidizing goods based not just on their characteristics or market structure, but also on the fiscal efficiency of the producing and consuming countries. If it is cheaper to raise revenue in the origin country (low λ_j), then producing and exporting from there is optimal, even if the good is consumed elsewhere. Hence, subsidizing imports from such countries can increase global efficiency by allocating production where it has the lowest fiscal distortion. This highlights an important conceptual shift: border tax adjustments, like VATs or tariffs, may not only be about trade protection or neutrality, they can be part of a broader inter-regional fiscal optimization strategy.

Proposition 2 also reveals that even under a destination-based VAT system, which is conventionally seen as neutral in international trade, tax asymmetries emerge endogenously, mimicking tariffs. These are not politically motivated trade barriers, but efficient responses to underlying asymmetries in fiscal capacity and labor valuation. This challenges the standard orthodoxy in international tax design, which assumes VAT systems under the destination principle are trade-neutral.

4.3 Numerical analysis

In this section, we will analyze how the supranational authority aims to achieve its three objectives: combating monopolistic distortions, ensuring a predetermined level of public spending in each country, and facilitating redistribution. We will examine these goals under different conditions, particularly in relation to variations in the degree of monopolistic competition and differences in marginal and fixed costs between countries.

Simulations are performed in the context of an industry ($i = 1$). There are six endogenous variables to consider; four taxes $\tau_{jk} := 1 + t_{jk},\ \forall j, k \in \{N, S\}$ and two social marginal costs of public spending, $\lambda_j,\ j \in \{N, S\}$. In addition, commodity taxes are applied under the destination principle; therefore, the relevant comparisons between the taxes applied to individual goods are those applied to goods consumed in the same country.

To perform this analysis, we progressively improve the level of monopolistic competition within a symmetric framework. (Figure 1). Then we will perform the same analysis in asymmetric examples where the only source of asymmetry is differences in fixed and marginal costs (Figure 2). Initial values of λ_k are chosen to satisfy labor market equilibrium in both countries.

In the symmetric scenario, we start by establishing equal conditions in both countries: firms encounter identical costs and experience the same degree of monopolistic competition, while the marginal cost of public spending is uniform across the two countries. Following this initial set-up, we will introduce a minor adjustment to the level of monopolistic competition.

Figure 1 illustrates the dynamic implications of increasing firm-level competition in one country (specifically, country N) on optimal tax policy under a destination-based VAT regime, where lump-sum transfers are unavailable. This simulation captures the second-best setting of the model, wherein the supranational planner faces both market distortions due to monopolistic competition and cross-country asymmetries in fiscal capacity and labor valuation.

In this numerical experiment, the elasticity of substitution among varieties produced in country N (ρ^i_{NN} and ρ^i_{NS}) is gradually increased, holding all other structural parameters constant. The resulting general equilibrium effects are highly asymmetric across countries and trade directions.

The top-left panel of Figure 1 demonstrates that as firm-level competition in N rises, the marginal cost of public funds (λ) falls in both countries, but more markedly in S. This occurs because enhanced competition in N increases output and firm entry, expanding the tax base and improving allocative efficiency. However, as production in N intensifies, it imposes greater demands on domestic labor, which raises the social marginal utility of leisure in N. This growing divergence between λ and $\beta_k \delta^0_k$ across countries introduces a fiscal asymmetry that reshapes optimal tax treatment across trade flows.

Subsequent panels show a sharp increase in the number of firms producing in N, both for domestic consumption and for export. In contrast, firm proliferation from S either stagnates or declines. The planner internalizes this asymmetry, recognizing that the competitive expansion in N allows for increased tax revenue with lower distortion, while labor in S

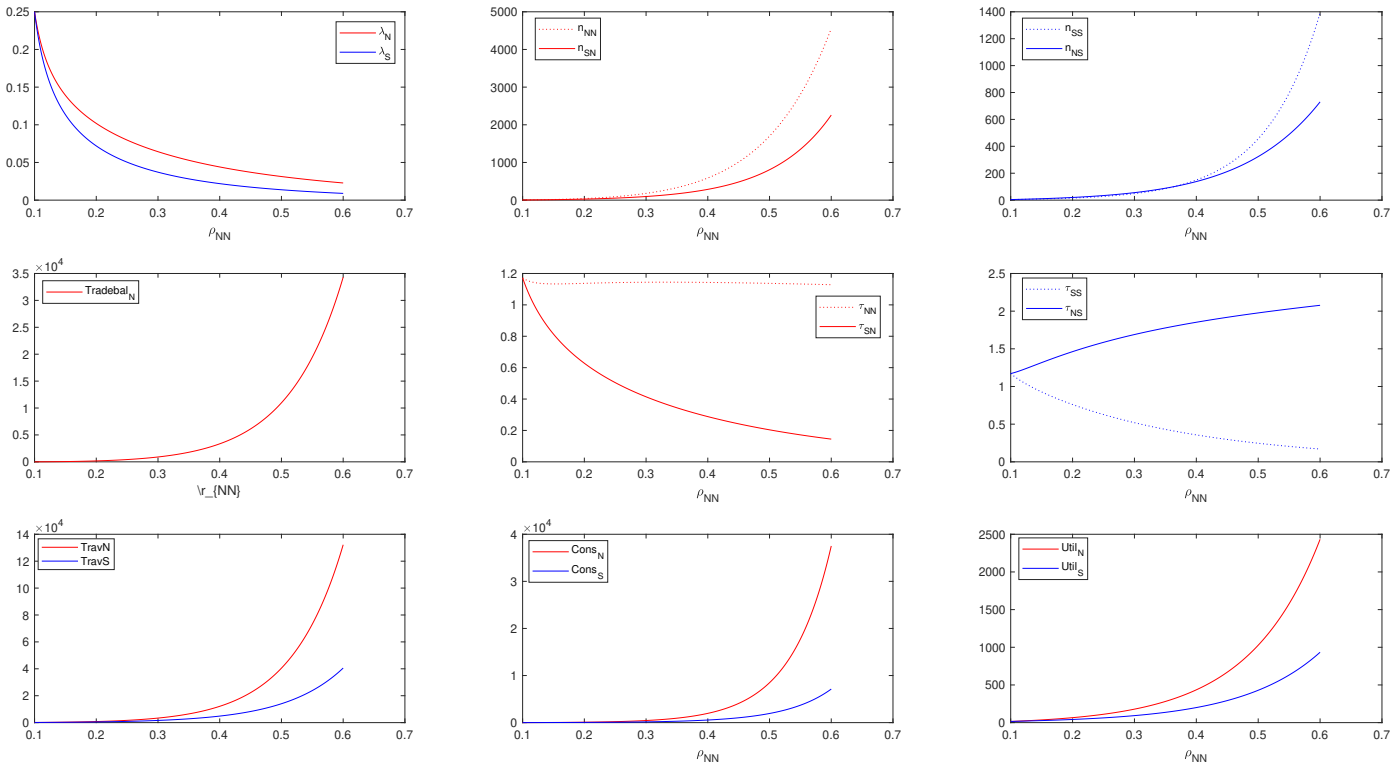

Figure 1: Effect of an increase in the degree of perfect competition of Firms producing in country N.

Note: Initially $\beta_N = \beta_S = 0.5$; $F_{j,k} = 10$; $E_{j,k} = 3$; $\rho_{j,k} = 0.1$; $c_j = 0.5$; $\delta_k^0 = 0.01$, $\forall j, k \in \{N, S\}$. We define the initial values of the marginal costs of public spending as follow $\lambda_N = \lambda_S = 0.25$. The above figure represents change on some variables due to change of ρ_{NN} and ρ_{NS}, we did 500 iterations and the step of each iteration is 0.001.

becomes underutilized.

The most striking result is the directional asymmetry in tax policy. The second row of Figure 1 shows that country N begins to subsidize imports from S while imposing only a mild tax on domestic production. Conversely, country S taxes imports from N heavily and subsidizes its own domestic goods. These policy choices reflect a second-best effort to shift the burden of production toward the fiscally less constrained country (country S) and to reallocate labor accordingly. In effect, the VAT system begins to function like a system of asymmetric tariffs. This endogenous emergence of tax wedges across trade directions—even under a destination-based VAT—underscores the paper's central theoretical claim: when market power and fiscal asymmetries coexist, uniform VAT treatment is no longer efficient.

The final panels further emphasize the redistributive logic of the planner's strategy. Country

N experiences a trade surplus, increased consumption, and a growing number of firms. However, the rising valuation of leisure in N and the planner's redistributive mandate lead to preferential tax treatment for imports from S. This reduces distortions where fiscal capacity is tighter and reallocates economic activity toward the more socially efficient margin.

To sum up, Figure 1 demonstrates that tax policy in an open economy with monopolistic competition and fiscal asymmetries must be inherently directional. The planner's optimal response to rising competition in one country is to tax the more competitive trade direction and subsidize the less competitive one. Such policies replicate the effects of trade tariffs within a VAT framework, revealing that neutrality under the destination principle does not hold in the second-best. This finding has profound implications for the design of VAT in economically asymmetric unions and challenges the case for uniform consumption tax regimes.

Figure 2 complements the insights from Figure 1 by analyzing how increasing competition among firms in country S reshapes tax policy and macroeconomic equilibrium. Unlike 1, the starting point here is asymmetric: country S faces higher fixed production costs, which results in initially lower productivity and a higher required scale per firm. This structural disadvantage makes labor relatively more abundant in S and lowers the marginal cost of public funds in country S (λ_S) compared to the one in country N (λ_N).

As competition intensifies in S (ρ^i_{SS} and ρ^i_{SN} increase), firms in S begin to operate under tighter margins. The increased number of varieties and output per firm raises the demand for labor in S, thereby increasing λ_S over time. However, this shift occurs more slowly than in Figure 1, where the productivity shock directly amplified output in the initially advantaged country.

The panels show that entry of firms from S accelerates as competition rises. This translates into higher exports to N, reducing country S's trade deficit and enabling greater consumption and utility in country S. However, the effect on country N is more muted. While it benefits from cheaper imports, country N's own firm entry slows, and domestic production partially contracts. This reflects a reallocation of production toward the country where labor had initially been underutilized.

Taxation patterns mirror the shifts observed in production and consumption. Initially, S imposes lower taxes on its domestic goods and exports due to its lower fiscal pressure. As competition increases and λ_S rises, taxes on goods produced in S begin to climb, particularly for those consumed in N. Conversely, N initially imposes higher taxes on imports from S to protect domestic production, but these taxes are progressively reduced as S becomes more productive.

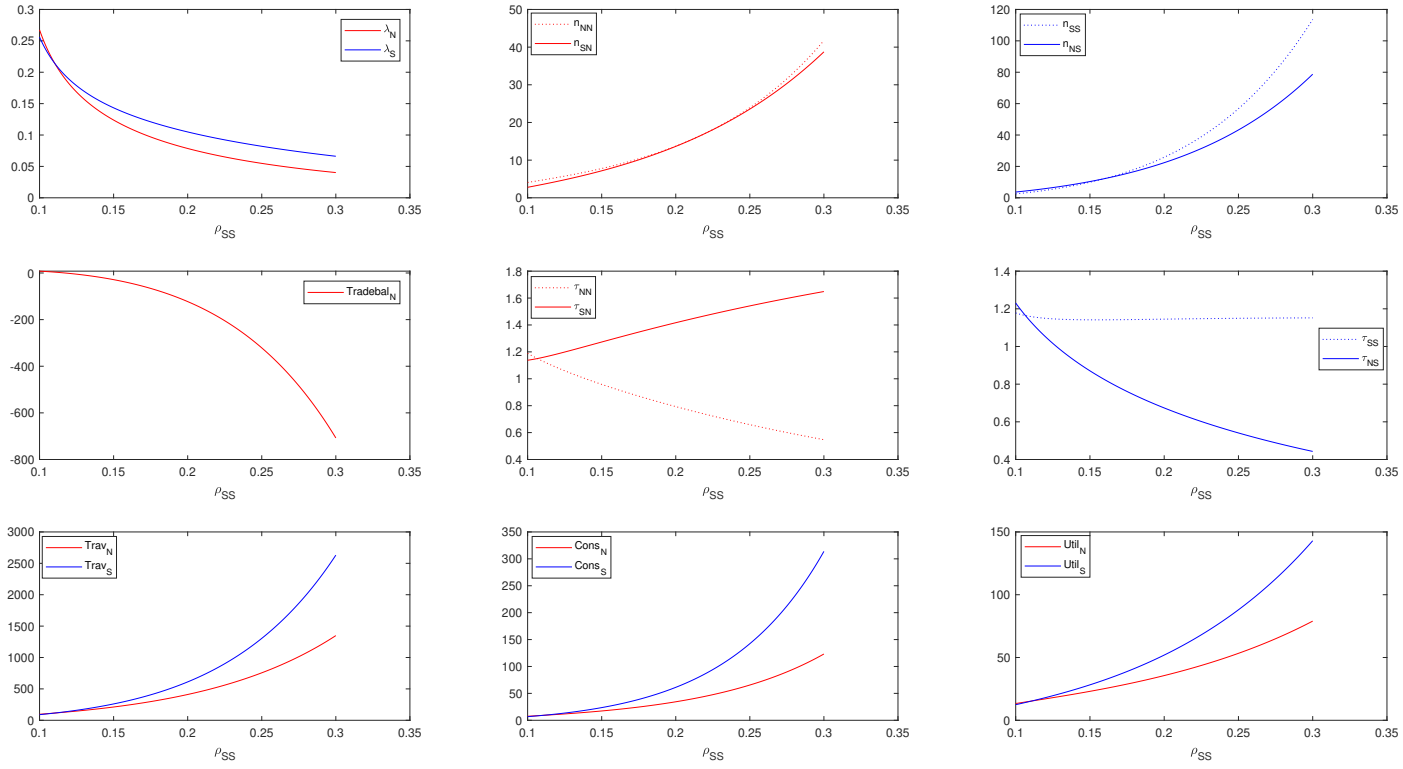

Figure 2: Effect of an increase of the degree of perfect competition of firms producing in country S

Note: We from an initial asymmetric point defined by $c_N = c_S = 0.5$; $\beta_N = \beta_S = 0.5$; $F_{NN} = F_{NS=10}$; $\beta_k = 0.5$; $\delta_k^0 = 0.01$; $\rho_{jk} = 0.1$; $E_{jk} = 3$; $F_{NN} = 10$; $F_{NS} = 10$; $F_{SS} = 12$; $F_{SN} = 12$. In addition, $\lambda_N = 0.2675$; $\lambda_S = 0.2560$. The initial value of λ_N and λ_S are taken to ensure a positive value of public spending (g_N, g_S) in each country. The above figure represents change on some variables due to change of ρ_{SS} and ρ_{SN}, we did 200 iterations and the step of each iteration is 0.001.

In both countries, the supranational planner enacts tax policies that mirror the logic of second-best Ramsey taxation with monopolistic distortions: more competitive (higher-output) directions are taxed, while less competitive trade flows are subsidized. The goal is to reallocate global production toward the margin where it yields the highest welfare-adjusted fiscal return.

Together, Figures 1 and 2 provide robust numerical support for the paper's central claim: under fiscal asymmetry and monopolistic competition, VAT can no longer be designed as a uniform, origin-agnostic instrument. Instead, it must accommodate directional wedges that reflect underlying economic structure and fiscal capacity. The resulting tax differentials mimic tariff-like mechanisms, emerging not from protectionist intent but from welfare-maximizing policy design. Figures 1 and 2 demonstrate that tax policy in an open economy with monopolistic competition and fiscal asymmetries must be inherently directional. The planner's optimal response to rising competition in one country is to tax the more competitive trade direction and subsidize the less competitive one. Such policies replicate the effects of trade tariffs within a VAT framework, revealing that neutrality under the destination principle does not hold in the second-best. This finding has profound implications for the design of VAT in economically asymmetric unions and challenges the case for uniform consumption tax regimes.

5 Conclusion

This paper provides a novel characterization of optimal commodity taxation in an open economy with monopolistic competition and asymmetric fiscal capacities. By introducing a two-country general equilibrium framework governed by a supranational planner, we reconcile VAT design with fiscal efficiency and cross-country heterogeneity. Our main contribution is to show that, even under destination-based VAT systems—widely regarded as neutral in trade contexts—optimal taxation generates tariff-like differentials when lump-sum transfers are unavailable and fiscal asymmetries prevail.

In the first-best, commodity taxes correct monopolistic markups and facilitate redistribution across countries. However, in the more realistic second-best setting, where transfers are not feasible, the optimal tax system necessarily departs from uniform VAT. We demonstrate that trade direction asymmetries in taxation—effectively resembling discriminatory tariffs—emerge endogenously as part of a welfare-maximizing policy. Specifically, goods imported from countries with lower marginal costs of public funds are subsidized, while more competitive trade directions are taxed. These results challenge the long-standing neutrality

presumption of VAT under trade liberalization and offer a reinterpretation of border tax adjustments as instruments of redistributive fiscal policy.

Our analysis carries two broad implications. First, it calls into question the optimality of harmonized VAT regimes within economically diverse unions, such as the EU, where fiscal constraints and labor valuations differ widely. Second, it suggests that differentiated consumption taxes, even within WTO-compliant VAT frameworks, may improve welfare when designed to internalize cross-country distortions and constraints.

Future research should extend this framework to incorporate decentralized fiscal authorities, endogenous public good provision, and political constraints on tax design. Nonetheless, our results underscore a fundamental insight: in a world marked by both market imperfections and fiscal asymmetries, the case for VAT uniformity is not only weak, it may be welfare-reducing.

6 Appendix

A Lemma 1

Proof. From the two resource constraints, we have

$$\sum_k g_k + \sum_j \sum_k \sum_i n^i_{jk} D^i_{jk} = \sum_j \sum_k \sum_i H^i_{jk} q^i_{jk} \left(n^i_{jk}\right)^{1-1/E^i_{jk}}$$

Some computations and using equation (16), we obtain

$$\sum_k g_k = \sum_j \sum_k \sum_i n^i_{jk} \rho^i_{jk} D^i_{jk} \frac{\beta_j \delta^0_j}{\beta_k \delta^0_k} \left[\frac{1}{\frac{\lambda_k/\beta_k\delta^0_k}{\lambda_j/\beta_j\delta^0_j}\left(1-1/E^i_{jk}\right)\rho^i_{jk} + \frac{\beta_j\delta^0_j}{\lambda_j}\left(1-\rho^i_{jk}+\rho^i_{jk}/E^i_{jk}\right)} - \frac{\beta_k\delta^0_k}{\beta_j\delta^0_j}\frac{1}{\rho^i_{jk}} \right]$$

If $\lambda_k < \beta_k\delta^0_k$ and $\lambda_j < \beta_j\delta^0_j$, then $\frac{\lambda_k/\beta_k\delta^0_k}{\lambda_j/\beta_j\delta^0_j} < \frac{\beta_j\delta^0_j}{\lambda_j}$ and $\frac{\lambda_j/\beta_j\delta^0_j}{\lambda_k/\beta_k\delta^0_k} < \frac{\beta_k\delta^0_k}{\lambda_k}$; therefore we have

$$\begin{aligned} \sum_k g_k \quad &< \quad \sum_j \sum_k \sum_i n^i_{jk} \rho^i_{jk} D^i_{jk} \frac{\beta_j\delta^0_j}{\beta_k\delta^0_k} \left[\frac{1}{\frac{\lambda_k/\beta_k\delta^0_k}{\lambda_j/\beta_j\delta^0_j}} - \frac{\beta_k\delta^0_k}{\beta_j\delta^0_j}\frac{1}{\rho^i_{jk}} \right] \\ \iff \qquad & \sum_k g_k < \sum_j \sum_k \sum_i n^i_{jk} \rho^i_{jk} D^i_{jk} \left[\frac{\lambda_j}{\lambda_k} - \frac{1}{\rho^i_{jk}} \right] < 0 \end{aligned}$$

□

B Proposition

Proof. We can re-write (18) as

$$\tau_{jk}^{i} = \frac{1}{\frac{\beta_k \delta_k^0}{\lambda_j}\left(\frac{1}{\rho_{jk}^{i}} - 1 + \frac{1}{E_{jk}^{i}}\right) + \frac{\lambda_k}{\lambda_j}\left(1 - \frac{1}{E_{jk}^{i}}\right)}$$

and

$$\tau_{kj}^{i} = \frac{1}{\frac{\beta_j \delta_j^0}{\lambda_k}\left(\frac{1}{\rho_{kj}^{i}} - 1 + \frac{1}{E_{kj}^{i}}\right) + \frac{\lambda_j}{\lambda_k}\left(1 - \frac{1}{E_{kj}^{i}}\right)}$$

1. if $\beta_k \delta_k^0 \leq \lambda_k \leq \lambda_j$, then $\rho_{jk}^{i} \leq \tau_{jk}^{i} \leq \rho_{jk}^{i} \frac{\lambda_j}{\beta_k \delta_k^0}$.

   - if $\lambda_k \leq \beta_j \delta_j^0$, then $\tau_{kj}^{i} \leq \rho_{kj}^{i}$. Therefore, $t_{kj}^{i} < 0$.
   - if $\beta_j \delta_j^0 \leq \lambda_k$, then $\rho_{kj}^{i} \frac{\lambda_k}{\lambda_j} \leq \tau_{kj}^{i} \leq \rho_{kj}^{i} \frac{\lambda_k}{\beta_j \delta_j^0}$.

2. if $\lambda_j \leq \beta_k \delta_k^0 \leq \lambda_k$, then $\tau_{jk}^{i} \leq \rho_{jk}^{i}$ and therefore $t_{jk}^{i} < 0$.

   - if $\beta_j \delta_j^0 \leq \lambda_k$, then $\rho_{kj}^{i} \leq \tau_{kj}^{i} \leq \rho_{kj}^{i} \frac{\lambda_k}{\beta_j \delta_j^0}$
   - if $\lambda_k \leq \beta_j \delta_j^0$, then $\tau_{kj}^{i} \leq \rho_{kj}^{i}$ and therefore $t_{kj}^{i} < 0$.

3. if $\beta_k \delta_k^0 \leq \lambda_j \leq \lambda_k$, then $\rho_{jk}^{i} \frac{\lambda_j}{\lambda_k} \leq \tau_{jk}^{i} \leq \rho_{jk}^{i} \frac{\lambda_j}{\beta_k \delta_k^0}$

   - if $\beta_j \delta_j^0 \leq \lambda_k$, then $\rho_{kj}^{i} \leq \tau_{kj}^{i}$
   - if $\lambda_k \leq \beta_j \delta_j^0$, then $\rho_{kj}^{i} \frac{\lambda_k}{\beta_j \delta_j^0} \leq \tau_{kj}^{i} \leq \rho_{kj}^{i} \frac{\lambda_k}{\lambda_j}$

□

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