Trade Policy Transitions: Three Eras of U.S. Trade Policy *

T. Renee Bowen[†] J. Lawrence Broz[‡] B. Peter Rosendorff[§]

August 28, 2021

Abstract

We analyze major transitions in U.S. trade policy using a two-factor, two-good, two-country model, where domestic policy is the outcome of political bargaining between two parties representing each factor owner—*globalists* and *protectionists*. The dominant party sets the agenda, but parties must agree to any change from the status quo. When domestic and foreign status quo tariffs are low and in the absence of transfers, the protectionist agenda-setter will offer high tariffs, agreed to by globalists in exchange for a share of tariff revenue—as was the case when the Republicans initiated the "Era of Restriction" after the Civil War. When the status quo trade policy is high unilateral (and foreign) tariffs, e.g., U.S. 1860-1931, a free trade bargain is available only if accompanied by sufficiently high domestic transfers to the protectionists. In the 1930s the globalist Democratic party offered the protectionist Republican party transfers to replace the benefits of the tariff, ushering in the "Era of Reciprocity with Redistribution." When transfers are too low, a consensus emerges for a "Retreat" from free trade, especially in the face of rising imports. We conclude that the recent rise of China as an exporter of capital-intensive manufactures is not sufficient to explain the unilateral imposition of tariffs by the U.S. beginning in 2018; domestic social transfers that are too low are also to be blamed. (222 words)

*The authors would like to thank Yue Wang and Xiameng Hua for excellent research assistance.

[†]UC San Diego and NBER; trbowen@ucsd.edu

[‡]UC San Diego; jlbroz@ucsd.edu

[§]NYU; peter.rosendorff@nyu.edu

1 Introduction

In 2018 the United States unilaterally imposed tariffs between 10% and 50% on imports from several countries and across a variety of goods. This marked a significant departure from the previous 75 years of trade-policy making, which had relied on a rules-based, multilateral system of reciprocity and persistently low tariffs. The retreat from global cooperation between 2016 and 2018 was furthered by the withdrawal of the U.S. from the proposed Trans-Pacific Partnership (TPP), renegotiation of the existing North American Free Trade Agreement (NAFTA/USMCA) and refusal to renew judges to the World Trade Organization's Appellate Body. The negative economic impacts were immediate. Handley and Kamal (2020) showed lower U.S. export growth as a result of the new U.S. tariffs, Kong and Weinstein (2020) estimated that investment growth would decline by 1.9 percentage points by 2020, and Fajgelbaum et al. (2019) estimated real income loss to the U.S. of $7.2 billion (to name a few studies). The direct economic effects of the tariffs could be expected, but the political economy forces leading up to them are not adequately accounted for in the extant literature. We seek a theoretical framework to shed some light on the interaction between the politics and economics leading to the recent unilateralism in trade policy, and consistent with other periods of transition.

We focus on the transitions between three distinct eras of U.S. trade policy—1860-1931, 1932-2015, and 2016 to the present. Irwin (2017) refers to the first two eras as *Restriction* and *Reciprocity* respectively. Throughout this paper we refer to the second era as *Reciprocity with Redistribution* to highlight the rise of the welfare state in this time. Figure 1 plots the evolution of average tariffs on dutiable imports in the United States from 1859 to 2021 in green.[1] The persistently high average tariffs (sometimes over 50%) in the Restriction era is clear, so too is the dramatic decline in tariffs in the Reciprocity with Redistribution era. The increase in average tariffs on dutiable imports as a result of U.S. trade policy since 2016 is visible, marking a possible shift

[1] U.S. average tariff data are from the Department of Commerce, Bureau of the Census, Historical Statistics of the the United States 1798-1970, and the U.S. International Trade Commission https://www.usitc.gov/documents/dataweb/ave_table_1891_2016.pdf The Index of Party Control is based on Lee (2016). It is the average of the Democratic Party's share of the total national popular vote for president (Congressional Quarterly Press 2021, Table 3-1), and House and Senate seats (Brookings Institution 2021, Table 1-20). We subtract 50 from the average to differentiate Republican Party majorities (red bars below the zero line) from Democratic Party majorities (blue bars above the zero line). Capital stock data for China and the U.S. are from the Penn World Table version 10.0 using the variable "rnna," capital stock at constant 2017 national prices based on investment in structures and equipment.

into a new period, which we call the *Era of Retreat*.

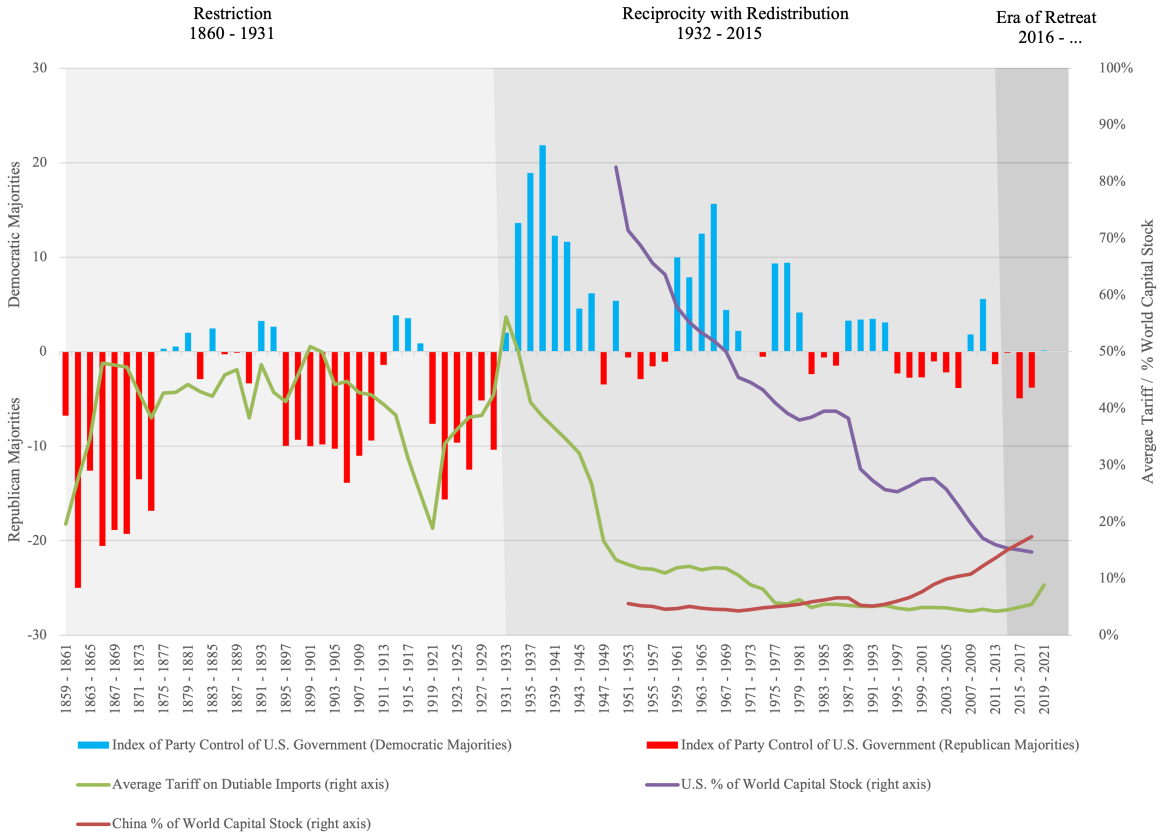

Figure 1: Party Majorities, Average Tariffs, U.S. and China Share of World Capital Stock, 1859-2021

These transitions are associated with changes in domestic political conditions and external economic fundamentals. Figure 1 also plots an index of political party control of the U.S. government for the period 1859-2019.[2] The blue bars represent Democratic majorities and red bars, Republican, and the transitions between trade policy eras are marked by significant changes in U.S. politics. We refer to *Parties*, *Process* and *Power Shifts* to describe the political features of the three eras in U.S. trade policy. As well-documented in Irwin (2017), the history of U.S. trade policy has been characterized by two major parties taking opposite stands on trade, one party representing the *globalists* and the other, the *protectionists*. Process refers to the institutional features that govern trade-policy setting. Congress is charged with setting U.S. trade policy; consequently tariffs are the outcome of negotiations between the globalist and protectionist

[2]See Foonote 1 for descriptions and sources of the data in Figure 1.

parties.[3] This bargaining is done in the shadow of an existing status quo, and given the checks and balances in the U.S. political system, movements from the status quo are rare. Power shifts refer to the pivotal moments in history where agenda-setting power changed hands. As can be seen in Figure 1, from 1861 to 1932, the Republican party dominated American politics. This rise to power was precipitated by the Civil War, but after World War II the Democratic Party emerged as the leader. Since the 1990s, neither party has been dominant.

These political features interact with the economic fundamentals to determine major shifts in U.S. trade policy. Figure 1 shows the fraction of the world capital stock (a key economic fundamental) held by the U.S. and China (in purple and red, respectively) for the period 1953-2019 (largely an era of low foreign tariffs, another key economic fundamental).[4] The dramatic decline in U.S. capital share is coupled with the steady increase in China's share, and China overtakes the United States in 2016.

Motivated by the facts presented in Figure 1, trade policy transitions are explained by the interaction of global economic conditions, the interests of the agenda setter in U.S. politics, and the status quo trade policy. To this end, we study a game between two countries (or one and "the rest of the world"). In each country, there are two industries each producing a good using a sector-specific factor. Given our assumption on endowments, one sector is import-competing and one is an exporter. Each factor owner is represented by a party—the *globalist* party represents the owners of the factor used in exports, and the *protectionist* represents owners of the factor used in the import-competing sector. Given the structure of the model with two countries, two goods, two factors and two parties, we refer to this as a $2 \times 2 \times 2 \times 2$ model in the spirit of extending the Hecksher-Ohlin model to include politics. For tractability we adopt a partial equilibrium economic structure as in Grossman and Helpman (1994, 1995) and quadratic preferences as in Maggi and Rodríguez-Clare (2007).

The simple economic model allows us to derive single-peaked preferences over the single-dimensional unilateral tariff. We first show that with a unilateral trade policy, the globalist party has a lower (positive) ideal tariff than the protectionist party. Moreover, it is immediate from the model that the globalists strictly prefer free trade to unilateral trade policy while the protectionists have opposite preferences. The only way to enact free trade is with transfers.

[3] See Bowen and Broz (2020) for a summary of the importance of Congressional leadership in setting U.S. trade policy.

[4] See Figure 6 below for the history of the average tariffs of the U.S.'s major trading partners.

As Grossman and Helpman (1994) point out, most international economists blame "politics" as the reason free trade is preached but not practiced. Conventional economic wisdom suggests that any shift to free trade should be achievable with sufficient transfers to compensate the losers of liberalization. This compensation is through the standard modes of social transfers—health insurance, social security, and other more directly trade-related payments, such as Trade Adjustment Assistance (TAA). Trade policy of course is not set by a benevolent social planner who can dictate such transfers. It is the consequence of a complex interplay between political actors, institutions (formal and informal), and economic fundamentals.[5] We seek to capture one aspect of this by modeling the negotiation between domestic political actors to determine politically feasible transfers.

Following the agenda-setting model of Romer and Rosenthal (1978), policy is set by consensus between the two parties, and the status quo prevails if there is no agreement. There are two regimes that parties can propose and vote for—unilateral trade policy (a tariff on imports), or reciprocal free trade (where tariffs at home and abroad fall, and perhaps with domestic transfers from the exporting industry to the import-competing industry). Under unilateral policy, the agenda setting party proposes a tariff rate, which the responder must either accept or reject. Rejection implies the status quo policy prevails. Transfers are a part of the status quo when the status quo is free trade.

If the status quo is a unilateral domestic tariff, either party, as agenda setter, will set its ideal trade policy as long as the status quo tariff is very high or very low. Once an intermediate status quo tariff is in place it remains. This generates stable unilateral tariffs as observed in the Restriction Era. An economic or political shock would potentially generate a preference for both parties to shift from new status quo, and a new policy would require agreement. Free trade is selected if and only if the *foreign* tariff is sufficiently high. If there is enough surplus to be gained by reciprocal free trade, the globalists benefit enough to compensate the losses to the protectionists via transfers. This is consistent with the observed multilateralism and system of transfers emergent in the Reciprocity and Redistribution Era.

When the status quo is free trade, both parties prefer to revert to unilateral policy if domestic transfers are relatively low and the foreign export sector endowment expands.

[5]Some features of the political process have been captured in previous work (Stigler 1971, Hillman and Urspring 1988, Magee, Brock, and Young 1989, Grossman and Helpman 1994). We enrich this literature by adding political bargaining with a status quo.

Protectionists are not receiving sufficient transfers to incentivize openness, and would prefer a tariff. When the foreign export sector endowment expands, the constraint on transfers gets slacker; by switching to a tariff the globalists benefit from paying less in transfers and gain a share of the tariff revenue. Both prefer a return to unilateralism. To keep the exporters at the current level of well-being, and as a rising export power abroad emerges, tariffs are the result of the domestic policy bargain. Notably, the model predicts bi-partisan consensus for a return to protectionism, consistent with what has emerged in U.S. politics since the mid-2010s.

Crucially, the expansion of the foreign trade sector *alone* is not sufficient to explain a reversion to protectionism; insufficient transfers are equally important. The inability to forge a political coalition to maintain free trade leads us to denote the current era as the *Era of Retreat*. The model suggests that unilateralism is not an inevitable result of a large increase in foreign imports. If the status quo transfers were sufficiently flexible to respond to an increase in the foreign capital stock, it may have been possible to avoid the retreat. This conclusion is not surprising given that state-contingent mandatory policies have been shown to ensure efficiency in a dynamic setting (Bowen et al. 2017).

In essence, bargaining in the shadow of a status quo ensures that any agreement must be a Pareto improvement that favors the agenda setter. This Pareto improvement takes into account domestic economic conditions, but also the foreign economic and policy environment. Under some conditions, unilateral liberalization results – domestic transfers to facilitate free trade are available. However when foreign tariffs are sufficiently low, there may not be a sufficient surplus to be gained by the agenda-setter from a move to free trade, and hence there is no feasible value of transfers that can induce it. Political bargaining between the globalist and protectionist parties within an institution that requires Pareto improvements relative to the status quo in the face of aggregate economic conditions determines both trade policy and any associated transfers.

2 Politics of Trade Policy

Our work joins a rich theoretical literature studying the political economy of trade policy.[6] The seminal work of Grossman and Helpman (1994, 1995) models policy determined by a unitary government that gives weight to aggregate income, trade

[6] Johnson (1954), Bagwell and Staiger (1990), Baldwin (1987), Hillman (1982).

tax revenues, total consumer surplus and lobbying contributions, moving beyond pure social welfare optimization. The model we present can be viewed as Grossman and Helpman (1995) with two industries, where all industries and voters are organized, and where trade policy orientation (unilateral versus free trade) is determined by a political process similar that of Romer and Rosenthal (1978)—bargaining between two policymakers with divergent interests, in the shadow of a status quo. The status quo determines bargaining weights between the two industries, and, in this sense, endogenizes the weight on welfare that appears in the government optimization problem (Grossman and Helpman 1994, 1995, Maggi and Rodríguez-Clare 2007). In our model if the status quo tariff is the welfare optimum, then there is no movement away from it during bargaining and hence the outcome is as if all weight was attributed to welfare. If the status quo tariff favors the import competing sector (above the welfare optimum), this implies a higher weight on import-competing interests, and vice versa. In our model trade policy shifts can be generated by changes in either endowments or the identity of the agenda-setting party.

While status quo effects have a long tradition in the broader political economy literature. A status quo can generate "gridlock" (Dziuda and Loeper 2016), but can also increase the provision of public goods through increasing the bargaining power of the responding party (Bowen, Chen, and Eraslan 2014). The status quo policy endogenizes the bargaining weights and like Milner and Rosendorff (1996, 1997), equilibrium trade policy changes with the status quo. Cole, Lake, and Zissimos (2021) model a contest function with pro- and anti-trade interests where a status quo plays a role in the bargaining over the ratification over a free trade agreement. While the focus of Milner and Rosendorff (1997) and Cole, Lake, and Zissimos (2021) is the externality generated by ratification uncertainty, here we emphasize the interaction between social transfers and endowments in determining trade policy.

Empirical researchers have long studied how constituent interests and political parties affect U.S. trade policy (Fetter 1933, Schattschneider 1935, Eichengreen 1986, Irwin 1996, Bailey and Brady 1998, Weller 2009, Milner and Tingley 2015). Scholars have also shown that the trade policymaking *process* affects outcomes (Haggard 1988, O'Halloran 1994, Lohmann and O'Halloran 1994, Bailey, Goldstein, and Weingast 1997, Gilligan 1997, Hiscox 1999, Irwin and Kroszner 1999, Goldstein and Gulotty 2014). Our model incorporates interests, parties, and process, as well as the relative factor endowments of the U.S. and its trading partners, and the global trading conditions in effect.

The rest of the paper is organized as follows. Section 3 provides a brief historical account of the political economy of tariff setting during the three phases. In Section 4 we analyze our stylized $2 \times 2 \times 2 \times 2$ model of a global economy and the bargaining game between the globalists and protectionist parties. In Section 5 we interpret the three phases in the context of the model and Section 6 concludes.

3 Party Positions, Political Process, and Power Shifts

To contextualize our model, we highlight three historical features of the American political economy landscape that have created remarkable stability in U.S. trade policy: (1) two major political parties that typically take opposing views on trade policy reflecting industry interests, (2) checks and balances in the political system that impart a status quo bias to policy, and (3) political realignments, shifting power of the trade policy agenda. We call these three features of American politics, *Party Positions*, *Political Process*, and *Power Shifts*, and we use them to characterize the transitions between eras in trade policy. We draw heavily from the magisterial history of U.S. trade policy by Irwin (2017) throughout this section.

3.1 Party Positions

According to Irwin (2017, 21), "For most of U.S. history, American politics has been dominated by two political parties, each taking a different stand on trade policy." For over a century after the formation of the modern party system in the 1830s, Democrats ran on a platform of low tariffs, reflecting the economic interests of the agrarian South, which produced cotton and tobacco for export. Republicans, representing the interests of the industrial North, advocated high tariffs to protect U.S. manufacturing from low-cost imports. These positions—Democrats reliably advocating low tariffs, Republicans consistently advocating high protective tariffs—were persistent.

In the 1960s, social upheaval associated with the civil rights movement caused the South to flip from being a Democratic Party stronghold to being dominated by Republicans (Kuziemko and Washington 2018). Democrats, in turn, shifted to representing a multi-ethnic urban coalition centered in the North. Subsequently, the parties reversed their traditional trade policy positions and, from the early 1990s to 2016, Democrats consistently advocated for protectionism while Republicans reliably supported reciprocal free trade agreements (Karol 2000). As Irwin (2020, 32) notes, "the regions of the

country did not change their trade policy views, but the parties changed which regions of the country they represented." The election of a protectionist Republican president in 2016 marked a shift of the Republican Party back to protectionism. Coupled with continued trade skepticism within the Democratic Party, this initiated a bi-partisan retreat from trade openness.

Notably, the label of the party representing a particular industry may change, but the trade orientation of the party follows the trade orientation of the industry (or factor) that it represents. The Democratic Party may be the "globalist" party and the Republicans the "protectionist" party, or vice versa, depending on the economic geography of party representation. In the model we present, party preferences for trade are driven by these factor-based motivations.

3.2 Political Process

The framers of the U.S. Constitution designed the lawmaking process to make it very difficult to enact significant policy changes or reversals. Lawmaking power is dispersed across three bodies—the House of Representatives, the Senate, and the Executive—each represented by a different constituency and each required to approve any new legislation before it becomes law.[7] By creating three "veto points" in the lawmaking process, the framers built a strong status-quo bias into the political system.[8]

The U.S. Constitution grants Congress the authority to set tariffs and regulate foreign commerce, so analysis of trade policy must begin with the legislative branch (O'Halloran 1994). At various points in time, Congress has delegated significant aspects of this constitutional authority to the executive branch (Lohmann and O'Halloran 1994). One prominent form of this delegation was the landmark Reciprocal Trade Agreements Act of 1934 (RTAA), which authorized the president to negotiate agreements to reduce tariffs with other countries (Irwin and Kroszner 1999, Bailey, Goldstein, and Weingast 1997). Since 1934, Congress has delegated broad powers to the president, but it has not abdicated its prerogative over trade policy. In fact, Congress has more vigorously asserted its authority in recent trade legislation by imposing substantial limitations on the president's authority (Linarelli 1995). Because of the importance of agreement between parties in Congress, trade policy-setting is modeled as

[7] See Persson, Roland, and Tabellini (1997) for a formalization of separation of powers with checks and balances.

[8] See Tsebelis (2002), Henisz and Mansfield (2006) for a formalization of veto point theory and the measurement of veto points across different political systems.

political bargaining game between two parties representing the globalist and protectionist interests. Partisan differences make significant policy change rare resulting in a bias towards the status quo.

3.3 Power Shifts

"Power Shifts" are large, durable changes in the balance of electoral power between the two major political parties. Political scientists call them "realignments" (Key 1959). Power shifts are usually associated with cataclysmic national events, like the Civil War (1861-1865) and the Great Depression (1929-1933), which discredit the policies of the previously dominant party and usher in significant policy changes under the new dominant party (Mayhew 2000). According to (Irwin 2020, 32), "the Civil War redistributed political power away from the South and toward the North and led to a political realignment in favor of the Republican Party and against the Democratic Party. Because Republicans from the North favored protective tariffs, the primary goal of trade policy shifted from revenue to restriction, and the average tariff rose accordingly." The Great Depression, in turn, acted as the catalyst that moved the Democrats from minority to majority status, where they remained for the next five decades. In this era, Democrats enacting an ambitious set of policies that expanded state intervention in the economy, laid the foundations of the modern welfare state, and embraced international economic cooperation. In short, power shifts—which can be interpreted as changes in agenda-setting power—allow for major changes in trade policies away from the status quo.

4 Factor-Based Political Economy of Trade

We build a simple political economy of trade model consistent with three features discussed in the previous section. First, stable representation of industries by parties is induced by the geographic concentration of factors used predominantly in each industry—agriculture in the South and manufacturing in the North. Consistent with this, we include a role for the level of factor endowments in each industry and in each country. Second, policymaking is driven by domestic bargaining between a dominant exporting industry and a dominant import-competing industry. The focus on dominant industries is consistent with Kim and Osgood (2019) who highlight that a minority of large and highly productive firms account for almost all global engagement. Bargain-

ing occurs in the shadow of a status quo, which results in persistent policies. The third feature is power shifts or party turnover. This results in either party having agenda-setting power.

The two-country, two-good, two-factor model of the global economy we present is reminiscent of the Heckscher-Ohlin $2 \times 2 \times 2$ model (Vanek 1968). To simplify incorporation of political economy factors, we begin with a partial equilibrium framework closest to Maggi and Rodríguez-Clare (2007). We depart from these authors by introducing bargaining over trade policy between two political parties representing the interests of the two dominant factor owners. In this sense the model we outline can be thought of as a $2 \times 2 \times 2 \times 2$ model.

4.1 Economy

The stylized global economy consists of two countries $I \in \{A, B\}$. Each country produces two goods $i \in \{a, b\}$ and a numeraire good denoted by zero. Good zero is freely traded, and supply in each country is such that the world price is 1. Country A is endowed with γ_A units of good a and $1 - \gamma_A$ units of good b. Similarly, Country B is endowed with γ_B units of good b and $1 - \gamma_B$ units of good a.The endowment γ_I is greater than a half so that good a is Country A's export good and good b is Country B's export good. There are two agents in each country $\iota \in \{\alpha, \beta\}$. Agent α owns all endowment of good a in each country and agent β owns all endowment of good b. Agent α thus represents the export sector in Country A, and agent β represents the import-competing sector. Similarly, agent β represents the export sector in Country B, and agent α (in Country B) represents the import-competing sector. Below we solve for county A's equilibrium.

Domestic demand. We assume that, as consumers, agents are not strategic, but are standard utility maximizers. All goods are consumed by all agents. Denote the consumption of good i by agent ι as $x_{i\iota}$. The utility of agent $\iota \in \{\alpha, \beta\}$ is thus

$$u_\iota = \sum_{i \in \{a,b\}} u(x_{i\iota}) + x_{0\iota} \tag{1}$$

with $u(x_{i\iota}) = cx_{i\iota} - (1/2)(x_{i\iota})^2$ and c is an exogenous constant.

Denote by $\tau_A \geq 0$ the specific tariff on imports imposed by Country A. We do not consider export taxes or import subsidies since these are less common in practice.

Agent ι derives income from his endowment, and an equal share of tax revenue from imports.[9] Agent α thus maximizes (1) subject to the budget constraint

$$\sum_{i\in\{a,b\}} p_i^A x_{i\alpha} + x_{0\alpha} \leq p_a^A \gamma_A + \frac{\tau_A[x_b - (1-\gamma_A)]}{2}, \tag{2}$$

where p_i^A is the domestic price of good i in Country A, $x_b = \sum_{\iota\in\{\alpha,\beta\}} x_{b\iota}$ is Country A's aggregate demand for its import good b, and $\tau_A[x_b - (1-\gamma_A)]$ is tariff revenue.[10] An analogous budget constraint holds for agent β. The maximizations for agents α and β give the following aggregate demands for goods a and b in Country A:

$$x_a = 2c - 2p_a^A \tag{3}$$

$$x_b = 2c + \tau_A - 2p_b^A. \tag{4}$$

World Prices. Denote the world price of good b as p_b. Since Country A will be a net importer of good b, the domestic price of good b in Country A is $p_b^A = p_b + \tau_A$. World trade balance determines world prices of goods a and b:

$$p_a = c - \tfrac{1+\tau_B+\gamma_B-\gamma_A}{4} \tag{5}$$

$$p_b = c - \tfrac{1+\tau_A+\gamma_A-\gamma_B}{4}. \tag{6}$$

This is strictly positive owing to the benefits of tariff revenue as is standard (e.g., Johnson 1954, Grossman and Helpman 1994).

There exists a tariff τ^{aut} such that for all $\tau_I \geq \tau^{aut}$ trade in Country I's import good is zero. We call this the autarky tariff and we can show that $\tau^{aut} = \gamma_A + \gamma_B - 1$. We henceforth assume $\tau_I \leq \tau^{aut}$ for all $I \in \{A, B\}$.

Tariff preferences. Agents α and β represent the export and import-competing sectors. We henceforth refer to export and import-competing sectors rather than agents.

[9] In Section 4.4 we relax the assumption that tariff revenue is equally divided and results are qualitatively unaffected for divisions that are not too extreme.

[10] The relevance of tariff revenue in sector-level trade-policy preferences has been pointed out by Feenstra and Bhagwati (1982), Hansen (1990), Irwin (2017), Mayer (1984) and others. By incorporating tariff revenue in the budget constraint, industries internalize the terms-of-trade motive for trade policy and this gives exporters a reason to desire low positive tariffs. This is consistent with the *Revenue* era of trade policy described by Irwin (2017). Moreover, in the revenue era, tariffs were the main source of government revenue and battles over tariff policy were battles over taxes (Hansen 1990).

World prices give rise to indirect utilities for the export and import-competing sectors denoted $v_\alpha(\tau_A, \tau_B)$ and $v_\beta(\tau_A, \tau_B)$. These functions are strictly concave, and hence single-peaked.

Single-peakedness implies $v_\iota(\tau_A, \tau_B)$ attains a unique maximum in τ_A. Denote the maximum for sector ι by $\tau_{A\iota}$ and refer to this as the ideal tariff for sector ι. These are

$$\begin{aligned} \tau_{A\alpha} &= \min\left\{\max\left\{-\frac{7}{3}+\frac{1}{3}\gamma_B+\frac{7}{3}\gamma_A, 0\right\}, \tau^{aut}\right\} \\ \tau_{A\beta} &= \min\left\{\max\left\{\frac{5}{3}+\frac{1}{3}\gamma_B-\frac{5}{3}\gamma_A, 0\right\}, \tau^{aut}\right\}. \end{aligned} \tag{7}$$

Moreover $\tau_{A\alpha} \leq \tau_{A\beta}$ so the export sector has a lower ideal tariff than the import-competing sector. The ordering of $\tau_{A\alpha}$ and $\tau_{A\beta}$ follows from $\gamma_A > 1/2$. The incentive for positive tariffs is tariff revenue. The incentive is greater for the import-competing sector as tariff revenue accounts for a larger proportion of income. The max and min operators ensure ideal tariffs are no less than zero and no greater than the autarky tariff. We illustrate the indirect utility functions below in Figure 2 with ideal tariffs for the import-competing and export sectors.

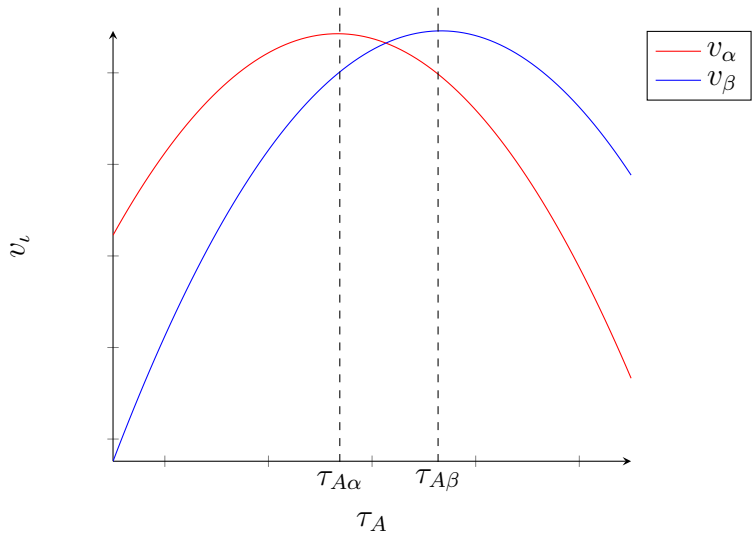

Figure 2: Indirect utilities as a function of τ_A for each industry ι in Country A

4.2 Domestic Trade Policymaking

We consider a representative democracy in Country A (which can be thought of as the United States to match our historical narrative) in which two parties $\iota \in \{\alpha, \beta\}$ negotiate trade policy according to the interests of each sector in the economy. The party representing the export sector (party α) is labeled the *globalists* and the party of the import-competing sector (party β) the *protectionists*. Many narratives of trade policy focus on lobbying by the import-competing sector, however Kim and Osgood (2019) point out that pro-trade firms account for a significant portion of legislative activity related to trade policy, and, thus, are an important part of our theory.[11]

Domestic trade policy can take the form of a unilateral tariff $\tau_A \in [0, \tau^{aut}]$ or free trade $\tau^{FT} = (0, 0)$. In the context of the model, "free trade" denotes a coordinated reduction of foreign and domestic tariffs relative to the status quo. Historical accounts suggest that concessions to domestic interests were a necessary part of the compromise that secured free trade (Brown 2003, Hornbeck 2013), thus we assume free trade policy can be accompanied by a domestic transfer to the import-competing sector $T \in \mathbb{R}^+$. Denote $\mathcal{I}_{FT} \in \{0, 1\}$ as the indicator variable that is 0 if trade policy is unilateral, and 1 if it is free trade with transfers. Trade policy is thus summarized by the triple $\tau = (\tau_A, T, \mathcal{I}_{FT})$.

We assume Country B's policy is fixed unless free trade is negotiated. This assumption simplifies the analysis, maintains the focus on domestic bargaining, and is consistent with evidence.[12] Given domestic trade policy τ and Country B tariff τ_B

[11] Kim and Osgood (2019) also point out that pro- and anti-trade coalitions often cross industry lines. In the model, for a given set of exogenous parameters, either one or both industries may be in favor of free trade or not. In this sense we add nuance to the traditional pro- and anti-trade cleavage along exporter and import-competing lines. This may help explain firms with pro- and anti-trade stance within a single industry—with heterogeneous returns to trade, preferences for trade will also vary. See also Milner (1988).

[12] Bilateral trade bargaining in the United States was authorized by the Reciprocal Trade Agreements Act (RTAA) in 1934 (Bailey, Goldstein, and Weingast 1997). Until that point, trade policy in the United States was set largely independent of foreign trade policy (Irwin 2017, Brown 2003). Up to then it was motivated by revenue maximization or protecting domestic interests against adverse economic conditions. Brown (2003) states that "The U.S. Congress did not, for the most part, see tariffs as an issue that was negotiable between nations; the determination of their level was a matter of domestic policy." One could explicitly model the negotiation between Country A and B to achieve a trade agreement. If this includes a transfer from one country to another (as in Grossman and Helpman 1995), the equilibrium tariff will maximize the joint utility of both countries and hence be zero as we assume. Even without inter-country transfers bargaining between countries implies that both parties in Country A can only improve their outcomes relative to the status quo, and so similar forces to what we find will be at work.

party payoffs are

$$\hat{v}_\alpha(\tau;\tau_B) = (1-\mathcal{I}_{FT})v_\alpha(\tau_A,\tau_B)+\mathcal{I}_{FT}[v_\alpha(0,0)-T] \quad (8)$$

$$\hat{v}_\beta(\tau;\tau_B) = (1-\mathcal{I}_{FT})v_\beta(\tau_A,\tau_B)+\mathcal{I}_{FT}[v_\beta(0,0)+T]. \quad (9)$$

The policy-setting game between parties follows the legislative bargaining literature. Decisions are made via unanimity rule and the agenda can be set by either party. The agenda setter requires the agreement of the responding party for trade policy to be implemented. Otherwise, trade policy reverts to the status quo $\tau^0 = (\tau_A^0, \mathcal{I}_{FT}^0, T^0)$.

Strategies Denote a strategy for party ι as $\sigma_\iota = (\pi_\iota, \rho_\iota)$ where π_ι is the proposal strategy and ρ_ι is the response strategy. A proposal strategy for party ι maps the status quo trade policy τ^0 into a complete trade policy proposal $\pi_\iota = (\tau_A^\iota, T^\iota, \mathcal{I}_{FT}^\iota)$. A response strategy for party ι maps the status quo and proposal into a choice to accept or reject the proposal. Rejection is indicated by $\rho_\iota = 0$ and acceptance by $\rho_\iota = 1$. Denote a strategy profile as $\sigma = (\sigma_\alpha, \sigma_\beta)$. Given a strategy profile σ, status quo τ^0 and proposer ι the implied trade policy is

$$\tau_A(\sigma;\tau^0,\iota) = \begin{cases} \pi_\iota & \text{if } \rho_{-\iota}=1 \\ \tau^0 & \text{otherwise .} \end{cases}$$

The timing of the game is illustrated in Figure 3.

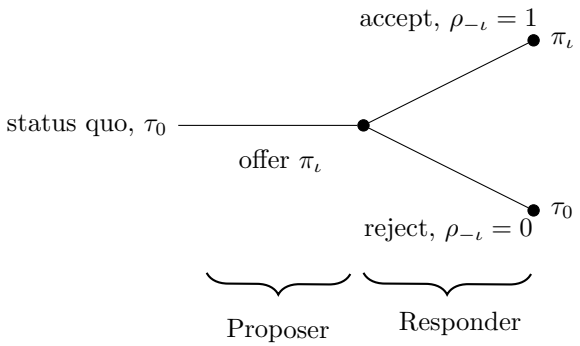

Figure 3: The trade policy-making game

We seek a subgame perfect Nash equilibrium of the trade policy setting game between the globalist and protectionist parties and solve by backward induction. Acceptance strategies are straightforward. Party ι accepts party $-\iota$'s proposal if and only if

it makes party ι as well off as under the status quo. Denoting equilibrium strategies with an asterisk, this implies for $\iota \in \{\alpha, \beta\}$,

$$\rho_\iota^* = \begin{cases} 1 & \text{if } \hat{v}_\iota(\pi_{-\iota}; \tau_B) \geq \hat{v}_\iota(\tau^0; \tau_B) \\ 0 & \text{otherwise.} \end{cases}$$

4.3 Proposal Strategies

We restrict attention to proposal strategies in which the responder accepts the proposal. This is without loss since the proposer is able to propose the status quo which is equivalent to a proposal being rejected. The proposer's equilibrium proposal strategy must solve

$$\begin{aligned} \pi_\iota^* = \arg\max_{\hat{\tau}} \quad & \hat{v}_\iota(\hat{\tau}; \tau_B) \\ \text{s.t.} \quad & \hat{v}_{-\iota}(\hat{\tau}; \tau_B) \geq \hat{v}_{-\iota}(\tau^0; \tau_B). \end{aligned}$$

The constraint ensures the responding party will accept the proposal. To further analyze proposal strategies we first consider when the status quo is a unilateral policy and then when the status quo is free trade with transfers.

4.3.1 Unilateral status quo policy

Suppose the status quo is a unilateral tariff τ^0, and a unilateral tariff τ_A is proposed by party ι. In this case $\mathcal{I}_{FT}^0 = 0$ and $\mathcal{I}_{FT}^\iota = 0$, which implies $\hat{v}_\iota(\tau^0; \tau_B) = v_\iota(\tau_A^0, \tau_B)$ and $\hat{v}_\iota(\tau; \tau_B) = v_\iota(\tau_A, \tau_B)$. Since $v_\iota(\tau_A, \tau_B)$ is single-peaked in τ_A, the solution takes a standard form (for example Bowen et al. 2017).

Proposition 1 *Suppose the status quo is a unilateral policy, i.e., $\mathcal{I}_{FT}^0 = 0$, and a unilateral policy is proposed, i.e, $\mathcal{I}_{FT}^\iota = 0$. Each party will propose their ideal tariff if the status quo is sufficiently low or high, will propose the status quo if it is between the ideal points of each party, and will propose $\tau'_{A\iota}$ otherwise. Specifically,*

$$\tau_A^{\alpha*} = \begin{cases} \tau_{A\alpha} & \text{if } \tau_A^0 \in [0, \tau_{A\alpha}] \\ \tau_A^0 & \text{if } \tau_A^0 \in (\tau_{A\alpha}, \tau_{A\beta}] \\ \tau'_{A\alpha} & \text{if } \tau_A^0 \in (\tau_{A\beta}, 2\tau_{A\beta} - \tau_{A\alpha}] \\ \tau_{A\alpha} & \text{if } \tau_A^0 \in (2\tau_{A\beta} - \tau_{A\alpha}, \tau^{aut}] \end{cases}, \quad \tau_A^{\beta*} = \begin{cases} \tau_{A\beta} & \text{if } \tau_A^0 \in [0, 2\tau_{A\alpha} - \tau_{A\beta}] \\ \tau'_{A\beta} & \text{if } \tau_A^0 \in (2\tau_{A\alpha} - \tau_{A\beta}, \tau_{A\alpha}] \\ \tau_A^0 & \text{if } \tau_A^0 \in (\tau_{A\alpha}, \tau_{A\beta}] \\ \tau_{A\beta} & \text{if } \tau_A^0 \in (\tau_{A\beta}, \tau^{aut}], \end{cases}$$

where

$$\tau'_{A\iota} \quad = \quad 2\tau_{A-\iota} - \tau^0_A.$$

The proof for Proposition 1 and all omitted proofs are in the Appendix. The proposal strategies for unilateral policy are illustrated in Figure 4 and discussed below.

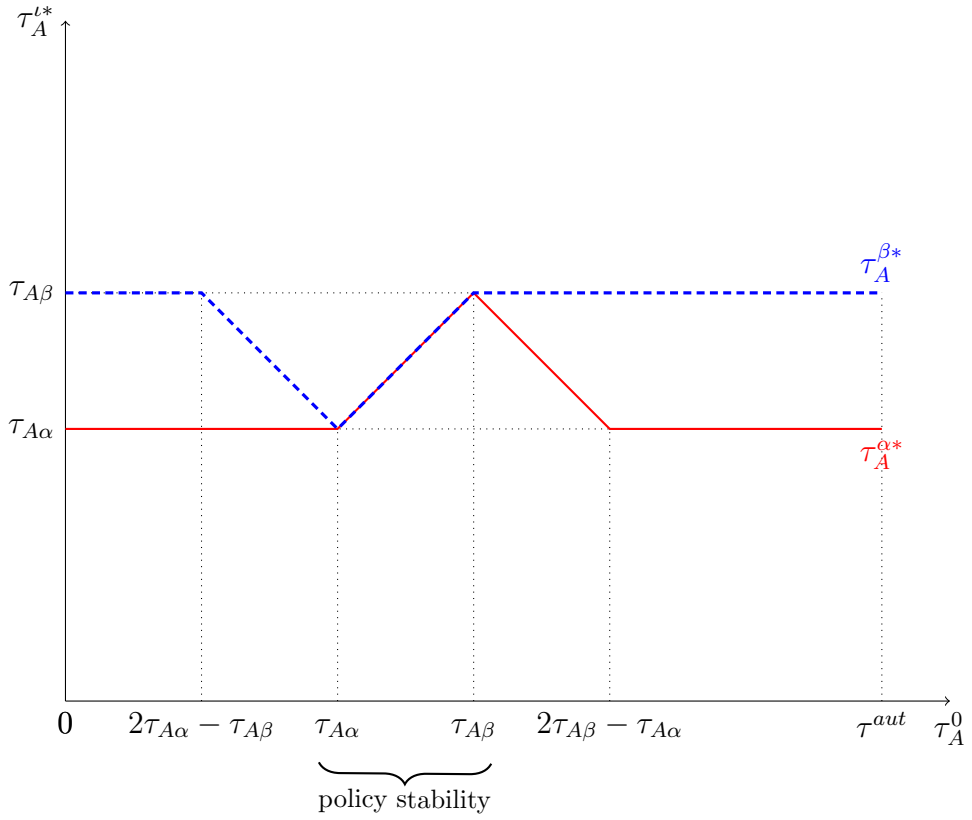

Figure 4: Unilateral proposal strategies when the status quo is unilateral

When the status quo tariff is very low, it is in the interest of both parties to increase the tariff for revenue reasons. If the agenda-setter is the globalist, the resulting tariff is its ideal—positive, but low. The protectionists accept this, because it is better than the status quo. Similarly, if the agenda-setter is the protectionists, the resulting tariff is its ideal—positive and high. The globalists accept this because it is better than a tariff that does not provide sufficient revenue. The same intuition holds when the status quo tariff is too high. Each party will have their ideal proposal accepted because these imply a Pareto improvement over the status quo. If the status quo is between the ideal of both parties, this induces policy stability as indicated in Figure 4. There

is no unilateral policy that can make at least one party better off without harming the other party, and so the status quo policy remains in place. If there is a significant shock to the domestic or global economy (positive or negative) this can disrupt the stability. For any other status quo, the responder's acceptance constraint binds, and so the agenda-setter is not able to attain its ideal, but is able to bring policy closer to its ideal (lower for globalists, higher for protectionists). This new equilibrium policy will fall inside the policy stability interval and will remain unless there is an economic shock.

We next characterize the equilibrium free trade proposal when the status quo is a unilateral policy. In this case $\mathcal{I}^{\iota}_{FT} = 1$. The free trade proposal for each party is simply the choice of a transfer that satisfies

$$\begin{aligned} T^{\alpha *} = \arg\max_{\hat{T} \in \mathbb{R}^+} \quad & v_\alpha(0,0) - \hat{T} \\ \text{s.t.} \quad & v_\beta(0,0) + \hat{T} \geq v_\beta(\tau^0_A, \tau_B). \end{aligned}$$

and

$$\begin{aligned} T^{\beta *} = \arg\max_{\hat{T} \in \mathbb{R}^+} \quad & v_\beta(0,0) + \hat{T} \\ \text{s.t.} \quad & v_\alpha(0,0) - \hat{T} \geq v_\alpha(\tau^0_A, \tau_B). \end{aligned}$$

The solution to the parties' maximization problems are straightforward. Party α pays transfers to party β to equate free trade with transfers to the status quo, as long as these transfers are positive. Party β extracts as much in transfers as possible without violating party α's acceptance constraint.

Proposition 2 *Suppose the status quo is a unilateral policy, i.e.* $\mathcal{I}^0_{FT} = 0$*, then the equilibrium transfers under free trade,* $\mathcal{I}^{\iota}_{FT} = 1$*, satisfy*

$$\begin{aligned} T^{\alpha *} &= \max\{0, v_\beta(\tau^0_A, \tau_B) - v_\beta(0,0)\} \\ T^{\beta *} &= \max\{0, v_\alpha(0,0) - v_\alpha(\tau^0_A, \tau_B)\}. \end{aligned}$$

We now compare the payoffs under a free trade proposal and a unilateral tariff proposal to determine the equilibrium choice of free trade or unilateral policy. That is

each party solves

$$\begin{aligned}\mathcal{I}_{FT}^{\alpha*} &= \arg\max_{\hat{\mathcal{I}}_{FT}\in\{0,1\}} (1-\hat{\mathcal{I}}_{FT})v_\alpha(\tau_A^{\alpha*},\tau_B)+\hat{\mathcal{I}}_{FT}[v_\alpha(0,0)-T^{\alpha*}]\\ \mathcal{I}_{FT}^{\beta*} &= \arg\max_{\hat{\mathcal{I}}_{FT}\in\{0,1\}} (1-\hat{\mathcal{I}}_{FT})v_\beta(\tau_A^{\beta*},\tau_B)+\hat{\mathcal{I}}_{FT}[v_\beta(0,0)+T^{\beta*}].\end{aligned}$$

The next proposition states that under a unilateral status quo, each party proposes free trade when the status quo tariff of Country B is sufficiently high and proposes unilateral trade policy otherwise. This is true for any value of the Country A's status quo tariff.

Proposition 3 *When the status quo is a unilateral policy, i.e.* $\mathcal{I}_{FT}^0 = 0$*, for all* $\iota \in \{\alpha,\beta\}$*, for all* $\tau_A^0 \in [0,\tau^{aut}]$ *and for all* $(\gamma_A,\gamma_B)\in(1/2,1)^2$*, there exists a* $\overline{\tau}^\iota_B \in [0,\tau^{aut}]$ *such that* $\mathcal{I}_{FT}^{\iota*}=1$ *if and only if* $\tau_B \geq \overline{\tau}^\iota_B$*.*

This implies that Country A prefers unilateral policy when Country B is sufficiently open. Conversely, Country A prefers free trade when Country B is closed. This is true regardless of which party is the agenda setter. The intuition is in line with the logic of two countries engaged in a policy-setting game—the more closed Country B is, the more Country A gains from reciprocal openness. If Country B is already quite open, there is little to gain from reciprocal opening for Country A. This holds even though domestic bargaining determines trade policy, because the benefits that accrue to the country, also accrue to the parties, albeit unevenly.

4.3.2 Free trade status quo

As before, we consider a unilateral proposal first with $\mathcal{I}_{FT}^\iota = 0$.[13] Proposal strategies solve

$$\begin{aligned}\tau_A^{\alpha*} = \arg\max_{\hat{\tau}_A\in[0,\tau^{aut}]} \quad & v_\alpha(\hat{\tau}_A,0)\\ \text{s.t.} \quad & v_\beta(\hat{\tau}_A,0)\geq v_\beta(0,0)+T^0,\end{aligned}$$

[13] In the instance that a party proposes a deviation from free trade and a return to unilateral policy, we treat the foreign country's tariff as fixed at the free trade level, zero. Retaliatory tariff hikes are rare in practice, and usually emerge only after a negotiations have failed, and all other remedies have been exhausted. Since the foreign country is not a player in the game, and we do not address inter-country tariff negotiations, we take its behavior as exogenous.

and

$$\begin{aligned}\tau_A^{\beta*} = \arg \max_{\hat{\tau}_A \in [0,\tau^{aut}]} \quad & v_\beta(\hat{\tau}_A, 0) \\ \text{s.t.} \quad & v_\alpha(\hat{\tau}_A, 0) \geq v_\alpha(0,0) - T^0.\end{aligned}$$

Define

$$\begin{aligned}\bar{\tau}_{A\alpha} &= \max\{\tau_A \in [0,\tau^{aut}] : v_\beta(\tau_A, 0) = v_\beta(0,0) + T^0\} \\ \bar{\tau}_{A\beta} &= \min\{\tau_A \in [0,\tau^{aut}] : v_\alpha(\tau_A, 0) = v_\alpha(0,0) - T^0\}.\end{aligned}$$

These values are the best unilateral tariff for the agenda-setter that makes the responding party indifferent between a unilateral policy and free trade with status quo transfer T^0. Note that $\bar{\tau}_{A\iota}$ must be greater than $\tau_{A\alpha}$ and less than $\tau_{A\beta}$ for any $\iota \in \{\alpha, \beta\}$. This follows from the single-peakedness of the indirect utility functions. Consider party α's problem, first. If there exists a $\hat{\tau}_A > \tau_{A\beta}$ that satisfies $v_\beta(\hat{\tau}_A, 0) = v_\beta(0,0) + T^0$, by single-peakedness of v_β there must also exist a $\hat{\tau}' < \tau_{A\beta}$ such that party α is better off and keeps party β at least indifferent. Similarly, party β will never choose a tariff less than party α's ideal since a higher tariff will make both parties better off.

Proposition 4 *If the status quo is free trade with transfers, i.e., $\mathcal{I}_{FT}^0 = 1$, then, when an equilibrium unilateral tariff proposal exists, party α's (β's) proposal is α's (β's) ideal for T^0 sufficiently low (high) and is between $\tau_{A\alpha}$ and $\tau_{A\beta}$ otherwise. Specifically*

$$\tau_A^{\alpha*} = \begin{cases} \tau_{A\alpha} & \text{if } T^0 \leq \frac{[\gamma_B - 7(1-\gamma_A)][\gamma_B - 17(1-\gamma_A)]}{96} \\ \bar{\tau}_{A\alpha} & \text{if } \frac{[\gamma_B - 7(1-\gamma_A)][\gamma_B - 17(1-\gamma_A)]}{96} < T^0 \\ & \quad \leq \min\left\{\frac{[\gamma_B - 5(1-\gamma_A)]^2}{96}, \frac{[\gamma_B - (1-\gamma_A)][13(1-\gamma_A) - \gamma_B]}{32}\right\}, \\ \textit{no solution} & \text{if } \min\left\{\frac{[\gamma_B - 5(1-\gamma_A)]^2}{96}, \frac{[\gamma_B - (1-\gamma_A)][13(1-\gamma_A) - \gamma_B]}{32}\right\} \leq T^0, \end{cases}$$

and

$$\tau_A^{\beta*} = \begin{cases} \bar{\tau}_{A\beta} & \text{if } 0 \leq T^0 < \frac{[\gamma_B + 5(1-\gamma_A)][19(1-\gamma_A) - \gamma_B]}{96}, \\ \tau_{A\beta} & \text{if } \frac{[\gamma_B + 5(1-\gamma_A)][19(1-\gamma_A) - \gamma_B]}{96} \leq T^0. \end{cases}$$

First observe that if the free trade payoff with transfers exceeds the protectionists' unilateral ideal payoff as responder, there is no unilateral tariff this party will

accept. Hence when the globalist proposes, there is no solution for sufficiently high status quo transfers to the protectionists. Protectionists have no incentive to return to unilateralism. For sufficiently low transfers to the protectionists, if the globalists chooses a unilateral policy, they can obtain their desired tariff. For an intermediate range of transfers, there is a tariff between the two parties' ideals that can make the protectionists indifferent. The reverse is true when the protectionists propose, but in this case a solution always exists because transfers are always positive.

Choice of free trade or unilateral policy when status quo is free trade The only possible transfer under a free trade proposal is the status quo transfer T^0 (anything else would be rejected by one of the parties). Thus, each party solves the following problem to determine the equilibrium proposal

$$\begin{aligned}\mathcal{I}_{FT}^{\alpha*} &= \arg\max_{\hat{\mathcal{I}}_{FT}\in\{0,1\}} (1-\hat{\mathcal{I}}_{FT})v_\alpha(\tau_A^{\alpha*},0)+\hat{\mathcal{I}}_{FT}[v_\alpha(0,0)-T^0]\\ \mathcal{I}_{FT}^{\beta*} &= \arg\max_{\hat{\mathcal{I}}_{FT}\in\{0,1\}} (1-\hat{\mathcal{I}}_{FT})v_\beta(\tau_A^{\beta*},0)+\hat{\mathcal{I}}_{FT}[v_\beta(0,0)+T^0].\end{aligned}$$

If there is no solution for a unilateral policy, then the equilibrium proposal must be to maintain free trade.

Proposition 5 *If the status quo is free trade with transfers, i.e., $\mathcal{I}_{FT}^0=1$, then for all γ_A,γ_B, $\iota\in\{\alpha,\beta\}$ there exists a finite $\overline{T}^{0\iota}$ such that for all $T^0\leq\overline{T}^{0\iota}$ party ι chooses a unilateral policy in equilibrium and otherwise maintains free trade with transfers. [checking if this if and only if]*

Counterintuitively, unilateralism results when transfers are too low, regardless of which party is the agenda-setter. When the globalists are the agenda setters, low transfers imply that the protectionists are easy to buy-off because their free trade payoff is already low. Globalists prefer their ideal tariff to free trade (conditional on the foreign country maintaining low tariffs), so if their ideal tariff (or something close) can be implemented, they prefer this to making concessions to the protectionists under free trade. The same logic applies if the protectionists set the agenda. Low transfers cannot compensate for the harm from free trade so they prefer to revert to unilateralism as long as the globalists are willing to agree.

By Proposition 5 the threshold transfer is finite for any feasible γ_A,γ_B. This implies that even when Country A experiences a very high level of imports from Country B,

unilateralism results *only if* transfers are too low.

Comparative Statics We explore how the threshold level of transfers changes with the size of the foreign export sector. As might be expected, a larger foreign export sector admits a greater range of transfers that lead to unilateralism.

Proposition 6 *The threshold $\overline{T}^{0\alpha}$ is increasing in γ_B. Thus, when the status quo is free trade, as the foreign export sector increases, there is a greater range of transfers over which the globalist party selects unilateral policy in equilibrium.*

Proposition 6 has a natural empirical implication. It suggests that an increase in the endowment used in Country B's exports would be associated with a reduction in support for free trade. As the endowment in the foreign export sector expands, foreign exports and domestic imports expand as a consequence. Under free trade, with little redistribution, protectionists become more disadvantaged and have a strong preference to revert to unilateralism. As a consequence, they will accept unilateralism under almost any conditions, including accepting the globalists' low ideal tariff. The export oriented, globally minded winners from free trade realize that some protection offers several benefits relative to the status quo. First, instead of paying the higher redistributive costs to keep the protectionists whole as imports expand (the rise in the threshold $\overline{T}^{0\alpha}$), a tariff would offer the domestic losers from trade some protection. Second, the export sector benefits from some (potentially small) share of any tariff revenues that accrue. This motivates the export-oriented sector to desire a small positive tariff, which improves outcomes for the protectionists (relative to the free trade status quo). As a rising export power abroad emerges, low tariffs emerge as the bargained domestic policy.

Notably, the model predicts bi-partisan consensus for a return to protectionism, consistent with what has emerged in U.S. politics since the mid-2010s. While the growth in the foreign export sector contributes to the motive for protectionism, our results show that it in isolation it is not sufficient. Low status quo transfers, and an unwillingness to raise them, are crucial in driving the break-down in the political consensus for free trade. The combination of changes in external economic conditions and domestic political constraints lead to a shift towards protectionism. This is the main contribution to the extant literature on the political economy of trade policy and is why we refer to the current era as the *Era of Retreat*.

4.4 Alternate Distributions of Tariff Revenue

For completeness, we consider alternate distributions of tariff revenue. Consider the economy as modeled in Section 4.1, but, rather than sharing tariff revenue equally, a share $0 < q < 1$ is allocated to the import-competing sector and $1 - q$ to the export sector. The budget constraints for the export and import-competing sectors are thus respectively

$$\begin{aligned}
\sum_{\iota \in \{\alpha,\beta\}} p_\iota^A x_{\alpha\iota} + x_{\alpha 0} &\leq p_\alpha^A \gamma_A + (1-q)\tau_A[x_\beta - (1-\gamma_A)], \text{ and} \\
\sum_{\iota \in \{\alpha,\beta\}} p_\iota^A x_{\beta\iota} + x_{\beta 0} &\leq p_\beta^A (1-\gamma_A) + q\tau_A[x_\beta - (1-\gamma_A)].
\end{aligned}$$

We restrict attention values of q such that the second order condition for each sector is satisfied.

Assumption 1 $1/2 - \sqrt{13}/4 < q < 3/2 - \sqrt{13}/4$.

Proposition 7 *The ideal tariff on imports for the export sector and import-competing sector when a share of tariff revenue q goes to the import-competing sector are respectively*

$$\begin{aligned}
\tau_{A\alpha} &= \min\left\{\max\left\{-\frac{8\gamma_A q + 8\gamma_B q - 11\gamma_A - 5\gamma_B - 8q + 11}{16q^2 - 48q + 23}, 0\right\}, \tau^{aut}\right\} \\
\tau_{A\beta} &= \min\left\{\max\left\{\frac{8\gamma_A q + 8\gamma_B q - 9\gamma_A - 3\gamma_B - 8q + 9}{16q^2 + 16q - 9}, 0\right\}, \tau^{aut}\right\}.
\end{aligned}$$

Moreover $\tau_{A\alpha} < \tau_{A\beta}$ so the export sector has a lower ideal tariff than the import-competing sector.

The proof of Proposition 7 follows from straightforward maximization to obtain the ideal tariffs. The ordering of $\tau_{A\alpha}$ and $\tau_{A\beta}$ follows from $\gamma_A > 1/2$. The incentive for positive tariffs is tariff revenue. The incentive is greater for the import-competing sector as tariff revenue accounts for a larger proportion of income.

When can show that the main results hold qualitatively for any value of q satisfying Assumption 1. The steps of the proofs follow the existing proofs closely.

5 Model Interpretation

We now consider the three phases of U.S. trade policy over the last 160 years in the light of the model presented above. Changes in the exogenous parameters may induce shifts across trade regimes—from unilateral trade restrictions to free trade and vice versa. First, the identity of the trade policy agenda setter matters—when there are large shifts in political power across the parties we interpret this as a change in the agenda setter, with attendant shifts in the setter's ideal policy. Second, the status quo trade policy matters for the political feasibility of trade policy realignments. This includes the size of domestic social transfers (if any). Third, international economic conditions (which consists of two elements: the size of foreign tariffs, and the size of the export sector of the U.S.'s major trading partners) matter for the availability of a negotiated trade policy.

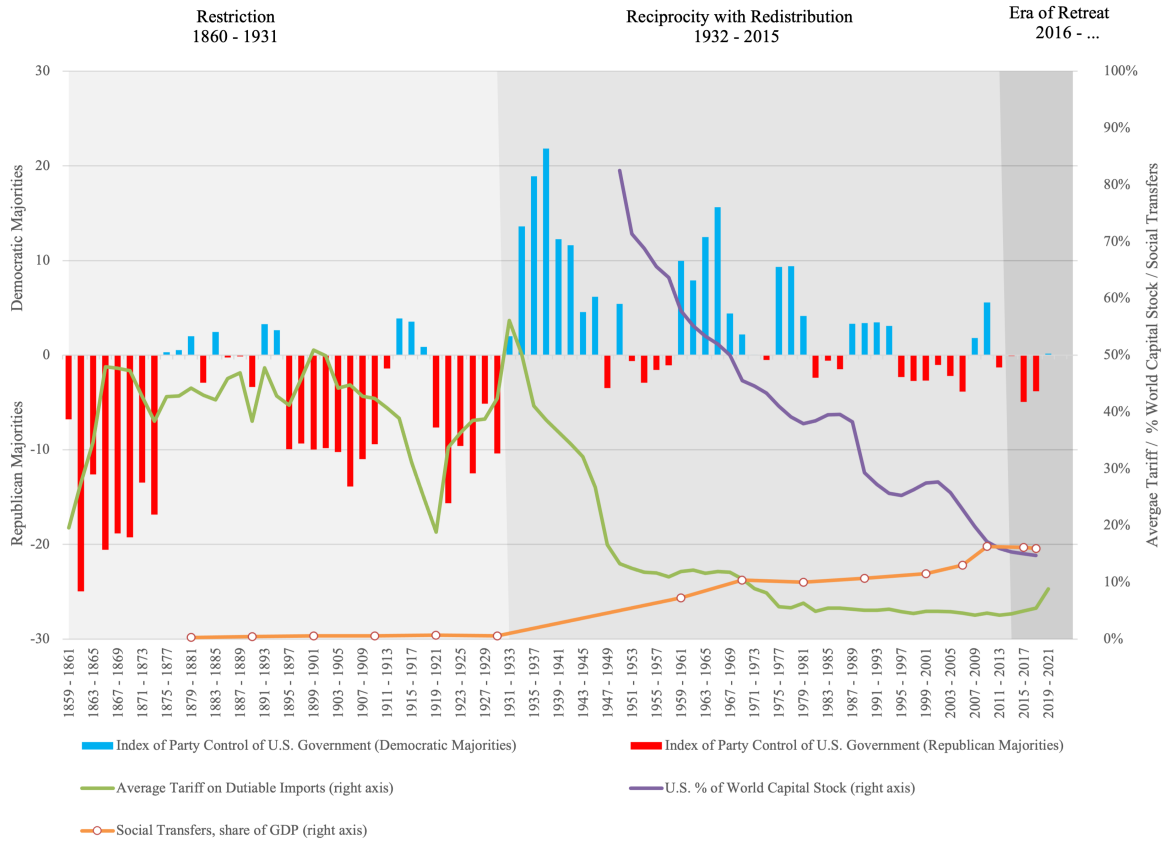

Figure 5: Party Majorities, Average Tariffs, U.S. Capital Endowment, and Social Transfers, 1859-2021

5.1 The Restriction Era, 1860-1931

The Civil War (1861-1865) marked a major shift in political power, from agricultural, export interests in the South, represented by the Democratic Party, towards the industrial and import-competing North, largely represented by the Republicans. While revenue generation was the primary motivation for trade policy prior to the war (Irwin 2017), trade policy shifts postbellum towards trade restriction, and the average tariff rises above 50% towards the end of the 19th century (See Figure 5.[14])

Prior to the Civil War, the primary source of fiscal revenue was the tariff—the income tax does not become permanent until 1913. While there was some debate as to whether the tariff should also be used for protection of domestic sectors, the Compromise Tariff of 1833 (Irwin 2020) limits the U.S. average tariff to well below 20% by 1860. We take this small and positive tariff as our starting point for the status quo tariffs in place post-war. Cut this paragraph? We say in preceding paragraph that revenue was the main motivation in the antebellum era; also, our analysis begins at the end of the Civil War.

In terms of the parameters of the model, the protectionist Republican Party holds an effective majority of 10% or more in combined popular votes in presidential elections and seats in the House and Senate for most of the Restriction Era, and constitute the agenda setter (see the red bars in Figure 5 for this period). There are no major shifts in relative factor endowments among the U.S. trading partners during this time. The Atlantic economy steadily integrated as transportation innovations (steamships, railroads) allowed land abundant nations in the Americas (Argentina, Canada, United States) to export agricultural products and natural resources to the mostly open markets of Europe (O'Rourke and Williamson 2001).

Propositions 1 and 3 offer the key insights to understanding U.S. trade policy under these conditions. When the Republicans ascend to power in 1859-1861, the status quo tariff is low and the protectionists have proposal power.

Figure 4 (which concisely summarizes Proposition 1) expresses the equilibrium proposals (that will be accepted in equilibrium) as a function of the status quo tariff and the identity of the agenda setter. At low status quo tariffs, Figure 4 shows that the

[14] Figure 5 reproduces Figure 1 with the addition of social transfers as a share of GDP (orange, on the right scale). The data on social transfers is from Peter H. Lindert, Growing Public: Social Spending and Economic Growth Since the Eighteenth Century, Volume I: The Story. New York: Cambridge University Press 2004. Chapter 2, table 1.2. P12-P13. OECD Social Expenditure Database (SOCX) 1980-2018.

protectionists (the blue graph) propose their ideal, high tariff, or at least tariff that is larger than the status quo. This tariff is accepted by the weaker globalist Democrats, motivated by their share of the tariff revenue. As we can see in Figure 5 this period is marked by high and sustained tariffs (the green line), restricting foreign trade well into the 20th century, and ending with the Smoot-Hawley Tariff of 1930 that raised tariffs to 47% which as Irwin (2020) notes, when combined with price deflation made the ad valorem rate effectively closer to 60%.[15]

Our model also speaks to the difficulty (impossibility) of shifting to a free trade regime during this period. Foreign tariffs are effectively low for most of this period and they only start to rise after World War I (see Figure 6).[16] Proposition 3 states that when foreign tariffs are low (below a threshold), and as was the case over this period, the status quo policy is restriction, any move to free trade cannot be supported in equilibrium without transfers, which were near zero at this point (see Figure 5). Intuitively, U.S. exporters had little to gain from liberalization abroad (foreign tariffs are already low), and in order to make the protectionists whole who are receiving significant protection, the transfers would need to be very large. Moreover the globalists would lose access to the tariff revenue. Restriction, therefore is self-sustaining, leading to the observed long period of persistent high tariffs that lasts until The Great Crash and the Democratic resurgence in 1932.

5.2 The Reciprocity with Redistribution Era, 1932-2015

After the stock market crash of 1929, the Democratic Party dominates U.S. political institutions and government after sweeping the 1932 election. The Democrats continue to represent export-oriented agriculture while the Republican Party still represents import-competing industries. This alignment lasts until World War II, which destroys much of the capital stock of Europe and Asia. U.S. manufacturing becomes a dominant exporting industry, pushing the Republican Party into a more free trade posture. This brief consensus lasts only until the 1960s and 1970s, when Japan and Europe have fully

[15]Similarly, the decline in the average tariff during the First World War (1914-1918) follows from the jumps in prices which reduces the ad valorem equivalent of specific tariffs, not due to changes in applied tariff rates Irwin (2020).

[16]We thank Michael Clemens for graciously sharing the regional tariff data in Figure 6 (Clemens and Williamson 2004). "European Core Average Tariff" is the unweighted average of France, Germany, and the United Kingdom. "Asia Average Tariff" is the unweighed average of Burma, Ceylon, China, Egypt, India, Indonesia, Japan, Philippines, Thailand, and Turkey. For ease of comparison, we include the U.S. average tariff on all imports (dark green).

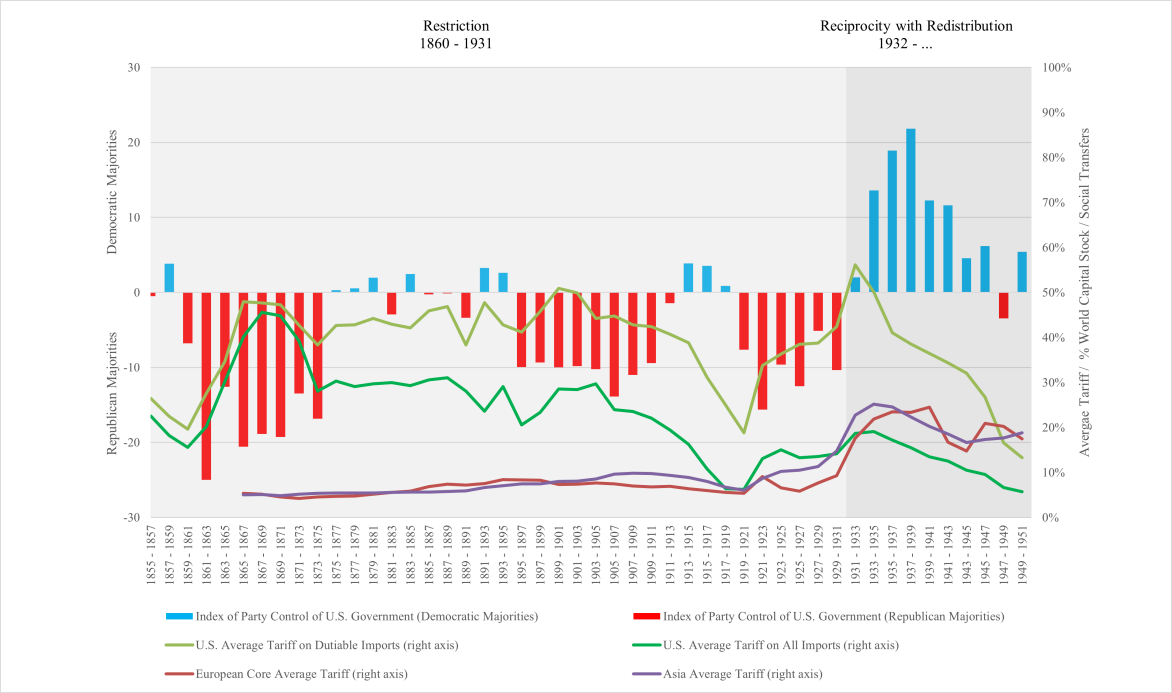

Figure 6: Party Majorities, U.S. Tariffs, and Foreign Tariffs, 1859-1951

restored their capital stocks and become exporting powerhouses in mature industries like steel, autos and electronics. The Democrats become the party of the industrial working class and minorities and become protectionist; Republicans become globalists, in line with the interests of their capital-intensive export industry constituents. This interlude of party repositioning on trade appears to end in 2016, with the Republicans reasserting a more protectionist stance.

For the period following 1932, however, the agenda setters are the Democrats with a predominately globalist position, and the status quo policy after the Smoot-Hawley Tariff of 1930 is very high domestic protection. Importantly for our purposes, the Smoot-Hawley Tariff was consistent with a global shift to isolationism, evidenced by high tariffs in the U.S.'s major trading partners (Figure 6). Furthermore, at least in the 1930s, there is no major shift in relative factor endowments across the U.S. and its trading partners.

It is striking how far U.S. tariffs declined over this period, from over 50% in 1933 to as low as 4% by 2016 (the green line in Figure 5). This was achieved largely by the post-war multilateral rounds of negotiation at the GATT and later the WTO, led by the U.S. and its major trading partners. But the decline in U.S. tariffs precedes

World War II and is evident almost immediately after the Democrats take over in 1932. As the dominant party with a globalist perspective, the Democrats pass the RTAA in 1934, which requires reciprocal rather than unilateral tariff setting—a turning point on the path to freer trade.

Proposition 3 again offers key insights as to how this political shift in the agenda setter from the protectionists to the globalists in an environment of high domestic and foreign tariffs determined the subsequent reduction in tariffs at home. This change was driven by the political benefits of reciprocity, combined with a transfer program designed to compensate the protectionists for going along with liberalization. The proposition states that if the status quo is protectionism (unilateral trade policy), a shift to reciprocal free trade with transfers to compensate the protectionists is feasible, and occurs in equilibrium, when foreign tariffs are high enough. The party of free trade sees its export interests gain sufficiently from reciprocal liberalization abroad that it is willing to incur the costs of funding a transfer program to insure the protectionists against the adverse distributional effects. This is feasible only because of the reductions in tariffs abroad, and is the basis for the post-war social compact, where social insurance is traded for the benefits of liberalization.

A striking feature of the political economy of the U.S. in the 20th century is the emergence of a transformative social safety net, and government investment in public assistance. Unemployment insurance, social security, a health insurance system, a public education system, and trade related programs such as Trade Adjustment Assistance all become part of the Reciprocity with Redistribution Era. Figure 5 includes a plot of transfers and spending as a share of GDP in the U.S., rising from effectively zero to almost 20% over this period.

The model also offers some insight into trade policy after World War II. While there is no major political realignment immediately after the war, there is a shift in relative factor endowments. The wartime destruction of European and Japanese industrial capacity leaves the U.S. as relatively capital abundant among its trading partners. The Republican Party, representing industrial interests, shifts its position to open trade, while the Democratic Party's pro-free trade position is adjusted downwards as it becomes the party of the urban working class after the civil rights era. Proposition 6 speaks to the potential move away free trade (or not) as the relative size of the foreign export sector changes. Given that the status quo is one of free trade with transfers, the proposition asserts that free trade will be sustained, even in the midst of

large adjustments to relative factor endowments, when the level of social spending and transfers is large enough. The proposition shows that this remains true, regardless of which party is the agenda setter. At a time when social spending is an all time high (the orange line in Figure 5) tariffs remain low (and continue to decline) after 1948 (the green line).

Similarly, as the capital stock in Europe is restored, and Japan emerges as a major trading partner by the 1960s and 1970s, social spending remained historically high in the United States. While the party positions switch over this period, with the Democrats taking on a more protectionist hue, and the Republicans the free-traders, the proposition assures us that irrespective of the agenda setter, there is no feasible political coalition that can drive the U.S. away from a position of reciprocal liberalization with transfers towards a unilateral trade policy.

Proposition 5 speaks to the long term stability of the free trade with transfers regime. While Democratic Party dominance in government declines towards the end of the 20th century, and the Democrats themselves become less committed to the liberalization enterprise, conditions for a switch back to protectionism did not emerge. This proposition says that if the status quo is free trade with transfers, and as long as the transfers reach a minimum threshold, neither party would propose a shift back to protectionism. Even though Democratic commitment to free trade wanes towards the end of this period (and Republican protectionism has yet to take full effect) there is no political bargain available to either party to reverse the reciprocal liberalization of the era. Export interests prefer to fund social transfers to the degree that keeps the import-competers relatively indifferent to a return to protectionism.

The rise of the welfare state in the 1930s, and its expansion in the 1960s and 1970s, are thus crucial to the persistence of reciprocal free trade in this era. This is consistent with the literature emphasizing that trade openness must be combined with a generous social safety net to be politically sustainable. Political scientist John Ruggie coined the phrase "embedded liberalism" to describe the post-war combination of social transfers and globalization (Ruggie 1982), and confirmed empirically by Cameron (1978). In economics, Dani Rodrik has been a leading voice calling attention to the political importance of social transfers in sustaining free trade (Rodrik 1997, 2011).

The Reciprocity with Redistribution Era lasts for over 80 years, until the next major shift, this time not in any major political realignment as in the previous cases, but rather in relative factor endowments.

5.3 The Era of Retreat? 2016—

The narrative thus far has stressed the interests of the agenda setter, and interacted that with the status quo trade policy, comprised of the domestic tariff and any transfers, in the context of the broader world economy summarized by the foreign tariff. The model also stresses role of transformative reversals in relative factor endowments across trading partners, most relevant in the current era.

Since China's accession to the WTO in 2001 and its emergence as a major trading partner of the U.S., its economy has grown at an annualized rate of more than 6% per year, raising its GDP to one of the largest in the world. Even more profound is the growth of the Chinese capital stock, both as a share of the world capital stock and relative to the United States. The China/U.S. capital stock ratio has risen from 0.08 in 1952 to 1.21 in 2019, and this massive accumulation of productive capital has led to China's rise as a major exporter of manufactured goods.[17] Over a similar period, the U.S. share of the world's captial stock, plotted in Figure 1 (the purple line), has declined precipitously from above 80% at the end of World War II to less than 15% currently, while China's share (the red line) has risen to exceed that of the United States. As China has become relatively capital abundant, its exports of capital intensive goods have caused major dislocations for U.S. manufacturers and contributed to a backlash against trade (Autor, Dorn, and Hanson 2013, Autor et al. 2020, Broz, Frieden, and Weymouth 2021).

The 2016 presidential election solidified the Republican Party's return to protectionism. The new Trump administration quickly withdrew from the Trans-Pacific Partnership, a broad free trade agreement, applied tariffs to steel and aluminum from several countries, and engaged in an escalating trade war with China. The U.S. refused to appoint judges to the WTO's Appellate Body, bringing the effective adjudication of trade disputes to a halt. The U.S. renegotiated the NAFTA, strengthening some of the rules of origin for tariff free trade across the member states. Most recently, the new Biden administration appears unwilling, as yet, to reverse many of these Trump administration restrictions on trade. The Reciprocity with Redistribution Era appears to have reached its end, and the pendulum may be swinging back towards protectionism and isolationism.

[17] Capital stock data for China and the U.S. are from the Penn World Table version 10.0 using the variable "rnna," capital stock at constant 2017 national prices based on investment in structures and equipment.

At the end of the Reciprocity with Redistribution Era, both domestic and foreign tariffs had declined to historical lows, making the status quo one of free trade with transfers. Proposition 5 establishes that, irrespective of the identity of the agenda setter, the free trade regime can be sustained as long as the status quo transfers T^0 are large enough—above the crucial threshold $\overline{T}^{0\iota}$ where ι denotes the agenda setter.

This crucial threshold $\overline{T}^{0\iota}$ is the transfer that leaves the parties indifferent between free trade and feasible bargains over the tariff. This indifference condition depends on equilibrium world prices, and the available gains from trade. As the foreign export sector expands, local import-competers see their welfare shrink (as observed in US manufacturing after 1980). The levels of social transfers required to keep the import-competing interests inside the free trade coalition must rise. Proposition 6 states that as the foreign export sector expands, the crucial cutoff threshold for social transfers *rises*.

Transfer spending as a share of GDP has been flat since the mid-2000s, and did not rise to compensate the domestic US losers from the growth in Chinese exports (see Figure 5). At some point in the 2000s, transfers are no longer large enough, and the free trade coalition cannot be sustained.

This holds irrespective of the agenda setter: both parties agree to switch to a more protectionist stance when transfers are too low. The apparent return to protectionism in the current era emerges from the lack of an available policy bargain among the major US parties to adequately invest in social transfers and protection for those harmed by trade. The return to protectionism is a consequence of the failure of redistribution consequent to globalization.

6 Conclusion

A model of political bargaining between two parties supplements a standard two good, two factor, two country trade model, and offers a foundation for understanding 160 years of U.S. trade policy, and its major transitions between the eras of Restriction, Reciprocity and Redistribution, and the Era of Retreat. We endogenize trade policy as the outcome of bargaining between political parties, we examine switches from periods of protectionism to free trade and vice versa, and we offer an explanation for the long periods of trade policy stability.

The model has as its primitives the status quo domestic tariff and transfer levels, the

interests of the agenda setting party, and economic conditions abroad, which include the foreign tariff and the size of the foreign export sector. Political conditions determine the identity and interests of the agenda setter, and any offer the agenda setter makes to the rival political party must be no worse (for either party) than that available under the status quo tariffs and transfers. While this status quo bias leads to long periods of policy stability, significant political and economic shifts can be large enough to fundamentally change trade policy outcomes.

When the agenda setter represents protectionist interests, and status quo tariffs are low, the protectionist party can get the globalist party to agree to moderately higher tariffs in return for a share of the tariff revenue. Immediately following the Civil War, Republicans, representing import-competing manufacturers, proposed and received their preferred higher tariffs, ushering in the period of Restriction. When instead both domestic and foreign tariffs are high, a globalist agenda setter will propose (reciprocal) tariff reductions, together with social transfers to the protectionist interests—the gains from trade exceed the cost of any transfers—and a consensus emerges in favor of free trade (with transfers). The Great Depression and the Smoot-Hawley Tariff of 1930 set the stage for a political upheaval—the Democratic Party, the party of export interests, initiated a period of reciprocal tariff reduction and an emergent welfare state, ushering in the era of Reciprocity with Redistribution.

When a major shift in the size of the foreign export sector occurs, especially when the status quo is free trade, and current social transfers are low, the free trade consensus comes under pressure. Added imports negatively affect the well-being of protectionist interests; the social transfers needed to keep the protectionists supportive of free trade must rise. The globalists fearing the added costs of these transfers chooses instead to offer modest protection. The protectionists benefit; and the globalists see their social transfers bill decline while taking a share of any tariff revenue. The rise of China as a large exporter of manufactured goods at the end of the 20th century put U.S. import-competing interests under pressure, raising the minimum levels of social transfers necessary for continued support of free trade; the Democratic Party's commitment to free trade waned over this period, and the Republican Party took on a protectionist position around 2016. A consensus emerged in the face of large shocks to foreign exports and low domestic transfers, shifting policy away from free trade, evident in the current Era of Retreat.

The model also offers insights into long periods of policy stability. During the

Restriction period, foreign tariffs remain low—there was little to be gained from liberalization for exporters, and transfers would have to be paid to importers, adding to the burdens of the export sector. No consensus was available during this period for a shift to free trade. While World War II shifted relative capital abundance towards the U.S., this only reinforced the free trade consensus in place since 1932, where social transfers were high by historical standards. The emergence of Europe and Japan as large trading partners in the 1960s and 1970s did little to dislodge the free trade consensus, held in place by the post-war social compact of embedded liberalism.

Our historical narrative complements that of Irwin (2020) and Irwin (2017) by emphasizing two additional and related elements: political bargaining over trade policy and the attendant societal transfers necessary to achieve or sustain free trade. On the first, Irwin stresses the role of the majority party in U.S. history and equates observed policy with the preferences of the party in power, especially when there is unified government. Here, we emphasize the need for *bargained* outcomes and a degree of consensus among the parties, given the difficulty of shifting the status quo in the U.S. system of multiple veto players and checks and balances. Majority parties get to set the agenda but they do not get to set policy unilaterally.

On the second, we integrate the social transfer into the trade policy bargain, and recognize that Irwin's Era of Reciprocity would not have been possible politically without high enough social transfers, where the globalists compensate the protectionists for their losses associated with liberalization. We take the liberty of renaming this period the Era of Reciprocity with Redistribution.

The combined effects of a richer politics and the importance of transfers permits explanations for periods of trade policy stability even when exogenous economic conditions change, and even when the party in power shifts yet trade policy does not, as in the latter part of the twentieth century.

Our model also highlights the importance of political institutions in understanding trade policy. While a social planner may implement free trade with transfers in almost any conditions, political bargaining across parties with divergent interests, given low foreign tariffs and protectionism at home, is unlikely to result in liberalization. Similarly, a long period of free trade with transfers is not immune to reversal—when the foreign export sector expands, there may not be a domestic willingness, even among exporters, to raise social transfers sufficiently to compensate trade's losers. Instead, consensus emerges to replace free trade with transfers with unilateral tariffs, a condition

that appears to manifesting in the current Era of Retreat.

The persistence of free trade depends on both global economic conditions and the available political bargains. It emerges and persists when the adversely affected can be compensated; but there is no guarantee that sufficient transfers are available in a political equilibrium, especially in a globalized world. The social compact is contingent.

References

Autor, David, David Dorn, Gordon Hanson, and Kaveh Majlesi. 2020. "Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure." *American Economic Review* 110 (10):3139–83. URL https://www.aeaweb.org/articles?id=10.1257/aer.20170011.

Autor, David H., David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103 (6):2121–68. URL https://www.aeaweb.org/articles?id=10.1257/aer.103.6.2121.

Bagwell, Kyle and Robert W. Staiger. 1990. *A Theory of Managed Trade*, vol. 80.

Bailey, Michael and David W. Brady. 1998. "Heterogeneity and Representation: The Senate and Free Trade." *American Journal of Political Science* 42 (2):524–544. URL http://www.jstor.org/stable/2991769.

Bailey, Michael A., Judith Goldstein, and Barry R. Weingast. 1997. "The Institutional Roots of American Trade Policy: Politics, Coalitions, and International Trade." *World Politics* 49 (3):309–338. URL http://www.jstor.org/stable/25054005.

Baldwin, Richard. 1987. "Politically Realistic Objective Functions and Trade Policy." *Economics Letters* 24 (3):287–90.

Bowen, T. Renee and J. Lawrence Broz. 2020. "Designing an International Economic Order: A Research Agenda." *NBER Working Paper* .

Bowen, T. Renee, Ying Chen, and Hülya Eraslan. 2014. "Mandatory Versus Discretionary Spending: The Status Quo Effect." *American Economic Review* 104 (10):2941–2974.

Bowen, T. Renee, Ying Chen, Hülya Eraslan, and Jan Zapal. 2017. "Efficiency of Flexible Budgetary Institutions." *Journal of Economic Theory* 167:148–176.

Brookings Institution. 2021. "Vital Statistics of Congress." URL https://www.brookings.edu/multi-chapter-report/vital-statistics-on-congress/.

Brown, Andrew G. 2003. *The Failed Attempts of the Interwar Years*, chap. 4. Studies In International Economics. University of Michigan Press, 66–81.

Broz, J. Lawrence, Jeffry Frieden, and Stephen Weymouth. 2021. "Populism in Place: The Economic Geography of the Globalization Backlash." *International Organization* 75 (2):464494.

Cameron, David R. 1978. "The Expansion of the Public Economy: A Comparative Analysis." *American Political Science Review* 72 (4):1243–1261.

Clemens, Michael A. and Jeffrey G. Williamson. 2004. "Why Did the Tariff-Growth Correlation Change after 1950?" *Journal of Economic Growth* 9 (1):5–46. URL http://www.jstor.org/stable/40215892.

Cole, Matthew T., James Lake, and Ben Zissimos. 2021. "Contesting an Internaional Trade Agreement." *Journal of International Economics* 128:1–22.

Congressional Quarterly Press. 2021. *Vital Statistics of the Presidency*. Congressional Quarterly Press. URL http://sk.sagepub.com/cqpress/vital-statistics-on-the-presidency-4e/n4.xml.

Dziuda, Wioletta and Antoine Loeper. 2016. "Dynamic Collective Choice with Endogenous Status Quo." *Journal of Political Economy* 124 (4).

Eichengreen, Barry. 1986. "The Political Economy of the Smoot-Hawley Tariff." Working Paper 2001, National Bureau of Economic Research. URL http://www.nber.org/papers/w2001.

Fajgelbaum, Pablo D., Pinelopi K. Goldber, Patrick J Kennedy, and Amit K Khandelwal. 2019. "The Return to Protectionism." *The Quarterly Journal of Economics* 135 (1):1–55.

Feenstra, Robert C. and Jagdish N. Bhagwati. 1982. *Tariff Seeking and the Efficient Tariff*, book 9. University of Chicago Press, 245–262. URL http://www.nber.org/chapters/c6007.

Fetter, Frank Whitson. 1933. "Congressional Tariff Theory." *The American Economic Review* 23 (3):413–427. URL http://www.jstor.org/stable/1806431.

Gilligan, Michael. 1997. *Empowering Exporters: Delegation, Reciprocity and Collective Action in Twentieth Century American Trade Policy*. University of Michigan Press.

Goldstein, Judith and Robert Gulotty. 2014. "America and Trade Liberalization: The Limits of Institutional Reform." *International Organization* 68 (2):263–295.

Grossman, Gene M. and Elhanan Helpman. 1994. "Protection for Sale." *The American Economic Review* 84 (4):833–850.

———. 1995. "Trade Wars and Trade Talks." *The Journal of Political Economy* 103 (4):675–708.

Haggard, Stephan. 1988. "The Institutional Foundations of Hegemony: Explaining the Reciprocal Trade Agreements Act of 1934." *International Organization* 42 (1):91–119. URL http://www.jstor.org/stable/2706771.

Handley, Kyle and Fariha Kamal. 2020. "Rising Import Tariffs, Falimg Export Growth: When Modern Supply Chains Meet Old-STyle Protectionism." *Working Paper* .

Hansen, John Mark. 1990. "Taxation and the Political Economy of the Tariff." *International Organization* 44 (4):527–551.

Henisz, Witold J. and Edward D. Mansfield. 2006. "Votes and Vetoes: The Political Determinants of Commercial Openness." *International Studies Quarterly* 50 (1):189–211. URL +http://dx.doi.org/10.1111/j.1468-2478.2006.00398.x.

Hillman, Arye L. 1982. "Declining Industries and Political–Support Protectionist Motives." *American Economic Review* 72 (5):1180–1190.

Hillman, Arye L. and Heinrich W. Urspring. 1988. "Domestic Politics, Foreign Interests, and International Trade Policy." *American Economic Review* 78 (4):729–745.

Hiscox, Michael J. 1999. "The Magic Bullet? The RTAA, Institutional Reform, and Trade Liberalization." *International Organization* 53 (4):669–698.

Hornbeck, J.F. 2013. "Trade Adjustment Assistance (TAA) and Its Role in U.S. Trade Policy." *CRS Report for Congress* .

Irwin, D.A. 2017. *Clashing Over Commerce: A History of US Trade Policy*. Long-term factors in economic development. University of Chicago Press. URL https://books.google.com/books?id=IzxCDwAAQBAJ.

Irwin, Douglas A. 1996. "Industry or Class Cleavages over Trade Policy? Evidence from the British General Election of 1923." In *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*. MIT Press.

Irwin, Douglas A. 2020. "Trade Policy in American Economic History." *Annual Review of Economics* 12:23–44.

Irwin, Douglas A. and Randall S. Kroszner. 1999. "Interests, Institutions, and Ideology in Securing Policy Change: The Republican Conversion to Trade Liberalization After SmootHawley." *The Journal of Law & Economics* 42 (2):643–674. URL http://www.jstor.org/stable/10.1086/467437.

Johnson, Harry G. 1954. "Optimal Tariffs and Retaliation." *The Review of Economic Studies* 21 (2):142–153.

Karol, David. 2000. "Divided Government and U.S. Trade Policy: Much Ado About Nothing?" *International Organization* 54 (4):825–844. URL http://www.jstor.org/stable/2601383.

Key, V. O. 1959. "Secular Realignment and the Party System." *The Journal of Politics* 21 (2):198–210. URL http://www.jstor.org/stable/2127162.

Kim, In Song and Iain Osgood. 2019. "Firms in Trade and Trade Politics." *Annual Review of Political Science* 22:399–417.

Kong, Mary Amiti Sang Hoon and David Weinstein. 2020. "The Effect of the US-China Trade War on U.S. Investment." *Working Paper* .

Kuziemko, Ilyana and Ebonya Washington. 2018. "Why Did the Democrats Lose the South? Bringing New Data to an Old Debate." *American Economic Review* 108 (10):2830–67. URL https://www.aeaweb.org/articles?id=10.1257/aer.20161413.

Lee, Frances E. 2016. *Insecure Majorities: Congress and the Perpetual Campaign*. University of Chicago Press.

Linarelli, John. 1995. "International Trade Relations and the Separation of Powers under the United States Constitution." *Dickinson Journal of International Law* 13 (2):203–240.

Lohmann, Susanne and Sharyn O'Halloran. 1994. "Divided Government and U.S. Trade Policy: Theory and Evidence." *International Organization* 48 (4):595–632. URL http://www.jstor.org/stable/2706897.

Magee, Stephen P., William A. Brock, and Leslie Young. 1989. *Black Hole Tariffs and Endogenous Policy Theory: Political Economy in General Equilibrium*. Cambridge University Press.

Maggi, Giovanni and Andrés Rodríguez-Clare. 2007. "A Political-Economy Theory of Trade Agreements." *The American Economc Review* 97 (4):1374–1406.

Mayer, Wolfgang. 1984. "Endogenous Tariff Formation." *American Economic Review* 74 (5):970–985.

Mayhew, David R. 2000. "Electoral Realignments." *Annual Review of Political Science* 3 (1):449–474. URL https://doi.org/10.1146/annurev.polisci.3.1.449.

Milner, Helen V. 1988. *Resisting Protectionism: Global Industries and Politics of International Trade*. Princeton, NJ: Princeton University Press.

Milner, Helen V. and B. Peter Rosendorff. 1996. "Trade Negotiations, Information and Domestic Politics: The Role of Domestic Groups." *Economics and Politics* 8 (2):145–189.

———. 1997. "Democratic Politics and International Trade Negotiations: Elections and Divided Government as Constraints on Trade Liberalization." *Journal of Conflict Resolution* 41 (1):117–147.

Milner, Helen V. and Dustin Tingley. 2015. *Sailing the Water's Edge: The Domestic Politics of American Foreign Policy*. Princeton University Press. URL http://press.princeton.edu/titles/10627.html.

O'Halloran, Sharyn. 1994. *Politics, process, and American trade policy*. University of Michigan Press.

O'Rourke, Kevin H. and Jeffrey G. Williamson. 2001. *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*, *MIT Press Books*, vol. 1. The MIT Press. URL https://ideas.repec.org/b/mtp/titles/0262650592.html.

Persson, Torsten, Gerard Roland, and Guido Tabellini. 1997. "Separation of Powers and Political Accountability." *The Quarterly Journal of Economics* 112 (4):1163–1202. URL http://www.jstor.org/stable/2951269.

Rodrik, Dani. 1997. *Has Globalization Gone Too Far?* Washington, DC: Institute for International Economics. URL http://bookstore.piie.com/book-store/57.html.

———. 2011. *The Globalization Paradox: Democracy and the Future of the World Economy*. New York and London: W.W. Norton. URL http://books.wwnorton.com/books/The-Globalization-Paradox/.

Romer, Thomas and Howard Rosenthal. 1978. "Political Resource Allocation, Controlled Agendas, and the Status Quo." *Public Choice* 33 (4):27–43.

Ruggie, John Gerard. 1982. "International Regimes, Transactions and Change: Embedded Liberlism in the Postwar Economic Order." *International Organization* 36 (2):379–415.

Schattschneider, E. E. 1935. *Politics, Pressures and the Tariff*. Prentice Hall.

Stigler, George T. 1971. "The Theory of Economic Regulation." *The Bell Journal of Economics and Management Science* 2 (1):3–21.

Tsebelis, George. 2002. *VETO PLAYERS THEORY*. Princeton University Press. URL http://www.jstor.org/stable/j.ctt7rvv7.7.

Vanek, Jarsolav. 1968. "The Factor Proportions Theory: The N-Factor Case." *Kyklos* 21 (4):749–756.

Weller, Nicholas. 2009. "Trading Policy: Constituents and Party in U.S. Trade Policy." *Public Choice* 141 (1/2):87–101. URL http://www.jstor.org/stable/40270947.

Appendix

7 Proof of Proposition 1

In the case of $\mathcal{I}^0_{FT} = 0$, we have $\tau^0_A \not> \geq 0$ and $\hat{v}_\iota = v_\iota$ for $\iota \in \{\alpha, \beta\}$.

Note that $\tau'_{A\iota}$ is the tariff that keeps the responding party $-\iota$ indifferent to the status quo, and is not the status quo. That is $\tau'_{A\iota}$ satisfies

$$\begin{aligned} v_{-\iota}(\tau'_{A\iota}, \tau_B) &= v_{-\iota}(\tau^0_A, \tau_B), \text{and} \\ \tau'_{A\iota} &\neq \tau^0_A. \end{aligned}$$

Party α's proposal strategy solves [Please substitute $v_\alpha(\hat{\tau}; \tau_B)$ with $v_\alpha(\hat{\tau}_A, \tau_B)$ below]

$$\begin{aligned} \tau^{\alpha^*}_A = \arg\max_{\hat{\tau} \geq 0} \; & v_\alpha(\hat{\tau}; \tau_B) \\ \text{subject to } & v_\beta(\hat{\tau}; \tau_B) \geq v_\beta(\tau^0_A; \tau_B) \\ & \hat{\tau} \leq \tau^{aut}. \end{aligned}$$

We know $v_\iota(\cdot; \tau_B)$ is single-peaked, so the KKT sufficient condition is satisfied. The Lagrangian of the problem is

$$\mathcal{L}(\hat{\tau}, \lambda_1, \lambda_2) = v_\alpha(\hat{\tau}; \tau_B) + \lambda_1(v_\beta(\hat{\tau}; \tau_B) - v_\beta(\tau^0_A; \tau_B)) + \lambda_2(\tau^{aut} - \hat{\tau}) \tag{10}$$

The KKT conditions are

$$\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = \frac{\partial v_\alpha}{\partial \hat{\tau}} + \lambda_1 \frac{\partial v_\beta}{\partial \hat{\tau}} - \lambda_2 \leq 0, \qquad \hat{\tau} \geq 0, \; \hat{\tau}\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0, \tag{11}$$

$$v_\beta(\hat{\tau}; \tau_B) - v_\beta(\tau^0_A; \tau_B) \geq 0, \qquad \lambda_1 \geq 0, \; \lambda_1(v_\beta(\hat{\tau}; \tau_B) - v_\beta(\tau^0_A; \tau_B)) = 0 \tag{12}$$

$$\tau^{aut} - \hat{\tau} \geq 0, \qquad \lambda_2 \geq 0, \; \lambda_2(\tau^{aut} - \hat{\tau}) = 0 \tag{13}$$

First, notice that $\frac{\partial \mathcal{L}}{\partial \hat{\tau}}(\hat{\tau}, 0, 0) = \frac{\partial v_\alpha}{\partial \hat{\tau}} = 0$ solves agent α's unconstrained utility maximization problem and implies $\hat{\tau} = \tau_{A\alpha} \in [0, \tau^{aut}]$. Second, by Lemma 2, party β's incentive constraint binds at $\hat{\tau} \in \{\tau^0_A, \tau'_{A\alpha}\}$. Note further that $\tau^0_A < \tau'_{A\alpha}$ if and only if $\tau^0_A < \tau_{A\beta}$.

There are following cases that solve the KKT conditions:

1. Interior solution $\tau^{\alpha^*}_A \in (0, \tau^{aut})$ (that is $\lambda_2 = 0$ and $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$), and β's con-

straint is slack $\lambda_1 = 0$. In this case, the optimal solution is pinned down by the first order condition of unconstrained problem $\frac{\partial \mathcal{L}}{\partial \hat{\tau}}(\hat{\tau}, 0, 0) = 0$ and thus $\hat{\tau} = \tau_{A\alpha}$ if $\tau_{A\alpha} \in (0, \tau^{aut})$. For $v_\beta(\tau_{A\alpha}; \tau_B) - v_\beta(\tau_A^0; \tau_B) \geq 0$, we need $\tau_{A\alpha} \in [\min\{\tau_A^0, \tau'_{A\alpha}\}, \max\{\tau_A^0, \tau'_{A\alpha}\}] \cap (0, \tau^{aut})$. Therefore, the solution to this case is $\tau_A^{\alpha^*} = \tau_{A\alpha}$ if

$$\begin{cases} 0 < \tau_A^0 \leq \tau_{A\alpha} \leq \tau'_{A\alpha} < \tau^{aut} \implies \tau_A^0 \in (0, \tau^*_{A_\alpha}] \\ 0 < \tau'_{A\alpha} \leq \tau_{A\alpha} \leq \tau_A^0 < \tau^{aut} \implies \tau_A^0 \in [2\tau_{A\beta} - \tau_{A\alpha}, \tau^{aut}) \end{cases}$$

2. Corner solution $\tau_A^{\alpha^*} = 0 \leq \tau_{A\alpha}$, then we have $\lambda_2 = 0$. For $\lambda_1(v_\beta(\hat{\tau}; \tau_B) - v_\beta(\tau_A^0; \tau_B)) = 0$, we have that $\frac{\partial \mathcal{L}}{\partial \hat{\tau}}(0, \lambda_1, 0) = \frac{\partial v_\alpha}{\partial \hat{\tau}}(0) \geq 0$, so it has to be $\tau_A^{\alpha^*} = \tau_{A\alpha} = 0$. Furthermore, for $\tau_A^0 \geq 0$ and $v_\beta(0; \tau_B) \geq v_\beta(\tau_A^0; \tau_B)$ to be satisfied, we need $\tau_A^0 \in \{0\} \cup [\tau'_{A\alpha}, \tau^{aut}]$. Therefore, the solution to this case is $\tau_A^{\alpha^*} = \tau_{A\alpha} (= 0)$ if

$$\begin{cases} \tau_A^0 = 0 \\ \tau'_{A\alpha} \leq \tau_{A\alpha} = \tau_A^0 \leq \tau^{aut} \implies \tau_A^0 \in [2\tau_{A\beta} - \tau_{A\alpha}, \tau^{aut}] \end{cases}$$

3. Corner solution $\tau_A^{\alpha^*} = \tau^{aut}$, then we have $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$, so it must be that $\frac{\partial v_\alpha}{\partial \hat{\tau}}(\tau^{aut}) = -\lambda_1 \frac{v_\beta}{\partial \hat{\tau}}(\tau^{aut})$ and $v_\beta(\tau^{aut}; \tau_B) \geq v_\beta(\tau_A^0; \tau_B)$. For $\tau_A^0 \leq \tau^{aut}$, we need $\tau^{aut} \geq \tau'_{A\alpha}$, so $\frac{v_\beta}{\partial \hat{\tau}}(\tau^{aut}) \leq 0$. Further, because $\lambda_1 > 0$, in order to satisfy $\frac{\partial v_\alpha}{\partial \hat{\tau}}(\tau^{aut}) \geq 0$, we need $\tau_{A\alpha} \geq \tau^{aut}$, and, by definition of $\tau_{A\alpha}$, the only possibility is $\tau_{A\alpha} = \tau^{aut}$. Therefore, the solution to this case is $\tau_A^{\alpha^*} = \tau_{A\alpha} (= \tau^{aut})$ if

$$\tau'_{A\alpha} \leq \tau^{aut} = \tau_{A\alpha} \implies \tau_A^0 \in [2\tau_{A\beta} - \tau_{A\alpha}, \tau^{aut}]$$

4. Interior solution $\tau_A^{\alpha^*} \in (0, \tau^{aut})$ (that is $\lambda_2 = 0$ and $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$), and β's constraint binds $\lambda_1 \geq 0$ and $v_\beta(\hat{\tau}; \tau_B) - v_\beta(\tau_A^0; \tau_B) = 0$. Hence, we need to check $\frac{\partial v_\alpha}{\partial \hat{\tau}}(\hat{\tau}) = -\lambda_1 \frac{v_\beta}{\partial \hat{\tau}}(\hat{\tau})$ for $\hat{\tau} \in \{\tau_A^0, \tau'_{A\alpha}\}$. Denote $\hat{\tau}_l \equiv \min\{\tau_A^0, \tau'_{A\alpha}\}$ and $\hat{\tau}_h \equiv \max\{\tau_A^0, \tau'_{A\alpha}\}$.

   (a) $\hat{\tau} = \hat{\tau}_l \in (0, \tau^{aut})$ requires v_β to increase and hence v_α to decrease at $\hat{\tau}_l$, which implies $\hat{\tau}_l \geq \tau_{A\alpha}$

   (b) $\hat{\tau} = \hat{\tau}_h \in (0, \tau^{aut})$ requires v_β to decrease and hence v_α to increase at $\hat{\tau}_h$, which implies $\hat{\tau}_h \leq \tau_{A\alpha}$

Recall that by definition $\tau_{A\alpha} \leq \tau_{A\beta}$ and that $\tau_A^0 < \tau'_{A\alpha}$ if and only if $\tau_A^0 < \tau_{A\beta}$. Therefore, the solution to this case is

$$\tau_A^{\alpha^*} = \begin{cases} \tau_A^0, & \text{if } \tau_{A\alpha} \leq \tau_A^0 \leq \tau'_{A\alpha} \implies \tau_A^0 \in [\tau_{A\alpha}, \tau_{A\beta}] \\ \tau'_{A\alpha}, & \text{if } \tau_{A\alpha} \leq \tau'_{A\alpha} \leq \tau_A^0 \implies \tau_A^0 \in [\tau_{A\beta}, 2\tau_{A\beta} - \tau_{A\alpha}]. \end{cases}$$

The above four cases give party α's proposal strategies. Party β's strategies follow analogously.

8 Proof of Proposition 2

$T^{\alpha*}$ solves α's problem

$$\max_{\hat{T} \geq 0} v_\alpha(0,0) - \hat{T}$$
$$\text{subject to } v_\beta(0,0) + \hat{T} \geq v_\beta(\tau_A^0, \tau_B)$$

Lagrangian of this problem is

$$\mathcal{L}(\hat{T}, \lambda) = v_\alpha(0,0) - \hat{T} + \lambda(v_\beta(0,0) + \hat{T} - v_\beta(\tau_A^0, \tau_B)) \tag{14}$$

The objective function and constraint are both linear in the decision variable, so the sufficient condition is satisfied. KKT condition gives

$$\frac{\partial \mathcal{L}}{\partial \hat{T}} = -1 + \lambda \leq 0, \qquad \hat{T} \geq 0, \ \hat{T}\frac{\partial \mathcal{L}}{\partial \hat{T}} = 0$$
$$v_\beta(0,0) + \hat{T} \geq v_\beta(\tau_A^0, \tau_B), \qquad \lambda \geq 0, \ \lambda(v_\beta(0,0) + \hat{T} - v_\beta(\tau_A^0, \tau_B)) = 0$$

So we have the following cases:

1. Corner solution at $\hat{T} = 0$, then the constraint requires $0 \geq v_\beta(\tau_A^0, \tau_B) - v_\beta(0,0)$. To check the other conditions, we have $0 \leq \lambda \leq 1$ if $0 = v_\beta(\tau_A^0, \tau_B) - v_\beta(0,0)$ and $\lambda = 0$ if $0 < v_\beta(\tau_A^0, \tau_B) - v_\beta(0,0)$.

2. If the interior solution with constraint binds, then $\hat{T} = v_\beta(\tau_A^0, \tau_B) - v_\beta(0,0) > 0$ and $\lambda = 1 > 0$.

To sum up,

$$T^{\alpha *}=\begin{cases}0, & \text{if } v_\beta(\tau_A^0,\tau_B)-v_\beta(0,0)\leq 0\\ v_\beta(\tau_A^0,\tau_B)-v_\beta(0,0), & \text{if } v_\beta(\tau_A^0,\tau_B)-v_\beta(0,0)>0,\end{cases}$$

This proves the first part of Proposition 2. The proof of the second part follows analogously.

9 Proof of Proposition 3

We need to establish some properties of $v_{\not\alpha\iota}(\tau_A,\tau_B)$ before proving the next proposition.[Please check super and subscripts below and fix accordingly. Some subscript α I believe can be ι. Also, β needs to be considered separately because of $x_{0\iota}$. I removed superscript A from u, v, x in the main text] Note that the utility function u_ι is continuous and concave. By the Theorem of Maximum and the Envelope Theorem, we know the indirect utility is continuous and has the same partial derivatives as utility function.

Given Equations (3)-(6) , $x_{a\alpha}(p_a^A)$, $x_{b\alpha}(\tau_A,p_b^A)$, $p_a(\tau_B;\gamma_A,\gamma_B)$, $p_b(\tau_A;\gamma_A,\gamma_B)$, and the optimal $\tau_A^{\alpha *}$ solved in Proposition 1 being independent of τ_B, the partial derivative with respect to τ_B then is

$$\begin{aligned}\frac{\partial v_\alpha}{\partial \tau_B}=\frac{\partial u_\alpha}{\partial \tau_B} &= \frac{\partial u}{\partial x_{a\alpha}}\frac{\partial x_{a\alpha}}{\partial p_a^A}\frac{\partial p_a^A}{\partial \tau_B}+\frac{\partial u}{\partial x_{b\alpha}}\frac{\partial x_{b\alpha}}{\partial p_b^A}\frac{\partial p_b^A}{\partial \tau_A}\frac{\partial \tau_A}{\partial \tau_B}\\ &= \frac{\partial u}{\partial x_{a\alpha}}\frac{\partial x_{a\alpha}}{\partial p_a^A}\frac{\partial p_a^A}{\partial \tau_B}+0\\ &= (c-x_{a\alpha})\cdot(-1)\cdot\left(-\tfrac{1}{4}\right)>0,\ \text{if } x_{a\alpha}<c.\end{aligned}$$

[I think we need to include $x_{0\iota}$ in these calculations.]

For the monotonicity with respect to τ_A, we have

$$\begin{aligned}\frac{\partial v_\alpha}{\partial \tau_A}=\frac{\partial u_\alpha}{\partial \tau_A} &= \frac{\partial u^A}{\partial x_{a\alpha}^A}\frac{\partial x_{a\alpha}^A}{\partial p_a^A}\frac{\partial p_a^A}{\partial \tau_B}\frac{\partial \tau_B}{\partial \tau_A}+\frac{\partial u^A}{\partial x_b^A}\left(\frac{\partial x_{b\alpha}^A}{\partial \tau_A}+\frac{\partial x_{b\alpha}^A}{\partial p_b^A}\frac{\partial p_b^A}{\partial \tau_A}\right)\\ &= 0+\frac{\partial u_\alpha^A}{\partial x_b^A}\left(\frac{\partial x_{b\alpha}^A}{\partial \tau_A}+\frac{\partial x_{b\alpha}^A}{\partial p_b^A}\frac{\partial p_b^A}{\partial \tau_A}\right)\\ &= (c-x_{b\alpha}^A)\cdot\left(\tfrac{1}{2}+(-1)\times\left(-\tfrac{1}{4}\right)\right)>0,\ \text{if } x_{a\alpha}^A<c.\end{aligned}$$

The condition $x^A_{a\alpha} < c$ is trivially satisfied for $p_a > 0$ and $x^A_{a\alpha} > 0$. By symmetry, v_β is also increasing in τ_A. Therefore, we conclude that v_ι is strictly increasing in τ_B. Further, with τ_A being bounded by 0 and τ^{aut}, we have the bounds on v_ι:

$$v_\iota(\tau_A, 0) < v_\iota(\tau_A, \tau_B) \leq v_\iota(\tau_A, \tau^{aut}), \forall \tau_A \in [0, \tau^{aut}]. \tag{15}$$

Further, for a fixed τ_B, we know that v_ι is a continuous concave function in τ_A .

$$v_\iota(\tau_A, \tau_B) \leq v_\iota(\tau_{A\alpha}, \tau_B), \forall \tau_A \in [0, \tau^{aut}],$$

in particular,

$$v_\iota(0, 0) \leq v_\iota(\tau_A, 0) \leq v_\iota(\tau_{A\alpha}, 0), \forall \tau_A \in [0, \tau_{A\alpha}], \tag{16}$$

$$v_\iota(\tau^{aut}, 0) \geq v_\iota(\tau_A, 0) \geq v_\iota(\tau_{A\alpha}, 0), \forall \tau_A \in [\tau_{A\alpha}, \tau^{aut}], \tag{17}$$

Next we proceed to prove Proposition 3 using the Indeterminate Value Theorem. We prove the existence of $\overline{\tau}^\alpha_B$, and the existence of $\overline{\tau}^\beta_A$ follows analogously. The binary variable $\mathcal{I}^{\alpha*}_{FT}$ solves α's maximization problem, so

$$\mathcal{I}^{\alpha*}_{FT} = \begin{cases} 0, & \text{if } v_\alpha(\tau^{\alpha*}_A, \tau_B) < v_\alpha(0,0) - T^{\alpha*} \\ 1, & \text{if } v_\alpha(\tau^{\alpha*}_A, \tau_B) \geq v_\alpha(0,0) - T^{\alpha*}. \end{cases}$$

To prove Proposition 3, it suffices to find the condition such that

$$v_\alpha(\tau^{\alpha*}_A, \tau_B) \geq v_\alpha(0,0) - T^{\alpha*} \tag{18}$$

holds. With Proposition 2, $T^{\alpha*}$ has two cases to consider:

1. $v_\beta(\tau^0_A, \tau_B) - v_\beta(0,0) \leq 0$, then inequality (18) becomes

$$v_\alpha(\tau^{\alpha*}_A, \tau_B) \geq v_\alpha(0,0) \tag{19}$$

   The right side of this inequality is independent of τ_B and left side is an increasing continuous function of τ_B.

   (a) When $\tau^{\alpha*}_A \leq \tau_{A\alpha}$, then inequality (19) is trivially satisfied because of (16).

   (b) When $\tau^{\alpha*}_A > \tau_{A\alpha}$, then $v_\alpha(0,0)$ can be either higher or lower than $v_\alpha(\tau_A, 0)$.

- If $v_\alpha(0,0)$ is lower than $v_\alpha(\tau_A^{\alpha*},0)$, then (19) is trivially satisfied because of (15).
- If $v_\alpha(0,0)$ is higher than $v_\alpha(\tau_A^{\alpha*},0)$, then $\tau_{A\alpha} < \tau_A^{\alpha*} - \tau_{A\alpha}$, then by Lemma 2, $v_\alpha(0,0) = v_\alpha(\tau'_{A\alpha},0) < v_\alpha(\tau_A^{\alpha*},\tau^{aut})$. This means that we have showed $v_\alpha(0,0) \in [v_\alpha(\tau_A^{\alpha*},0), v_\alpha(\tau_A^{\alpha*},\tau^{aut})]$, so by the Intermediate Value Theorem and monontonicity of $v_\alpha(\tau_A^{\alpha*},\tau_B)$, there exits a threshold value $\bar{\tau}_B^\alpha$ such that when $\tau_B > \bar{\tau}_B^\alpha$, inequality (19) holds.

2. $v_\beta(\tau_A^0,\tau_B) - v_\beta(0,0) > 0$, then inequality (18) becomes

$$v_\alpha(\tau_A^{\alpha*},\tau_B) \geq v_\alpha(0,0) - [v_\beta(\tau_A^0,\tau_B) - v_\beta(0,0)]$$

$$\implies v_\alpha(\tau_A^{\alpha*},\tau_B) + v_\beta(\tau_A^0,\tau_B) \geq v_\alpha(0,0) + v_\beta(0,0) \tag{20}$$

By Proposition 1, we have four cases

(a) $\tau_A^0 \in [0,\tau_{A\alpha}]$, then $\tau_A^{\alpha*} = \tau_{A\alpha}$ and inequality (20) becomes

$$v_\alpha(\tau_{A\alpha},\tau_B) + v_\beta(\tau_A^0,\tau_B) \geq v_\alpha(0,0) + v_\beta(0,0).$$

Because $0 < \tau_A^0 \leq \tau_{A\alpha} \leq \tau_{A\beta}$, we have

$$v_\alpha(0,0) \leq v_\alpha(\tau_{A\alpha},0), \quad v_\beta(0,0) \leq v_\beta(\tau_A^0,0),$$

and hence inequality (20) is trivially satisfied by (15).

(b) $\tau_A^0 \in (2\tau_{A\beta} - \tau_{A\alpha}, \tau^{aut}]$, then $\tau_A^{\alpha*} = \tau_{A\alpha}$ and inequality (20) becomes

$$v_\alpha(\tau_{A\alpha},\tau_B) + v_\beta(\tau_A^0,\tau_B) \geq v_\alpha(0,0) + v_\beta(0,0)$$

Similar to the case of $\tau_A^0 \in [0,\tau_{A\alpha}]$, inequality (20) is trivially satisfied because $\tau^{aut} > \tau_A^0 > 2\tau_{A\beta} - \tau_{A\alpha} > 2\tau_{A\alpha} - \tau_{A\beta}$,

(c) $\tau_A^0 \in (\tau_{A\alpha},\tau_{A\beta}]$, then $\tau_A^{\alpha*} = \tau_A^0$ and inequality (20) becomes

$$v_\alpha(\tau_A^0,\tau_B) + v_\beta(\tau_A^0,\tau_B) \geq v_\alpha(0,0) + v_\beta(0,0)$$

In this case, we have v_α decreases and v_β increases in τ_A, so

$$v_\beta(0,0) \leq v_\beta(0,\tau_B) < v_\beta(\tau_A^0,\tau_B) \leq v_\beta(\tau_{A\beta},\tau_B).$$

Hence, we only need to consider $v_\alpha(\tau_A^0,\tau_B) \geq v_\alpha(0,0)$ for inequality (20) to be satisfied. Note that this is a spacial case of Case 1b, where we have proved that $v_\alpha(\tau_A^{\alpha*},\tau_B) \geq v_\alpha(0,0)$ is satisfied for $\tau_A^{\alpha*} > \tau_{A\alpha}$.

(d) $\tau_A^0 \in (\tau_{A\beta}, 2\tau_{A\beta} - \tau_{A\alpha}]$, then $\tau_A^{\alpha*} = \tau'_{A\alpha}(\tau_A^0)$ and inequality (20) becomes

$$v_\alpha(\tau_A^0,\tau_B) + v_\beta(\tau_A^0,\tau_B) \geq v_\alpha(0,0) + v_\beta(0,0)$$

where we use the definition $v_\alpha(\tau'_{A\alpha}(\tau_A^0),\tau_B) = v_\alpha(\tau_A^0,\tau_B)$. Because $\tau_{A\alpha} < \tau_{A\beta} < \tau_A^0 < 2\tau_{A\beta} - \tau_{A\alpha}$, both v_α and v_β are decreasing in τ_A. Apply the Case 1b for v_α and v_β seperately, we get

$$v_\alpha(0,0) \in [v_\alpha(\tau_A^0,0), v_\alpha(\tau_A^0,\tau^{aut})], \quad v_\beta(0,0) \in [v_\beta(\tau_A^0,0), v_\beta(\tau_A^0,\tau^{aut})]$$

$$\implies v_\alpha(0,0) + v_\beta(0,0) \in [v_\alpha(\tau_A^0,0) + v_\beta(\tau_A^0,0), v_\alpha(\tau_A^0,\tau^{aut}) + v_\beta(\tau_A^0,\tau^{aut})].$$

Therefore, by the Intermediate Value Theorem and monontonicity of $v_\alpha(\tau_A^{\alpha*},\tau_B)$, there exits a threshold value $\bar{\tau}_B^\alpha$ such that when $\tau_B > \bar{\tau}_B^\alpha$, inequality (20) holds.

Combining the above cases, we have proved the first part of Proposition 3. The proof of part 2 follows analogously.

10 Proof of Proposition 4

First consider α's problem

$$\begin{aligned} \tau_A^{\alpha^*} = \arg\max_{\hat{\tau}\geq 0} \ & v_\alpha(\hat{\tau},0) \\ \text{subject to } & v_\beta(\hat{\tau},0) \geq v_\beta(0,0) + T^0 \\ & \hat{\tau} \leq \tau^{aut}. \end{aligned}$$

We know $v_\iota(\cdot;\tau_B)$ is single-peaked, so the KKT sufficient condition is satisfied. The Lagrangian of the problem is

$$\mathcal{L}(\hat{\tau},\lambda_1,\lambda_2) = v_\alpha(\hat{\tau},0) + \lambda_1(v_\beta(\hat{\tau},0) - v_\beta(0,0) - T^0) + \lambda_2(\tau^{aut} - \hat{\tau}).$$

The KKT conditions are

$$\begin{aligned}
&\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = \frac{\partial v_\alpha}{\partial \hat{\tau}} + \lambda_1 \frac{\partial v_\beta}{\partial \hat{\tau}} - \lambda_2 \leq 0, && \hat{\tau} \geq 0, \hat{\tau}\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0,\\
&v_\beta(\hat{\tau},0) - v_\beta(\tau_A^0,0) - T^0 \geq 0, && \lambda_1 \geq 0, \lambda_1(v_\beta(\hat{\tau},0) - v_\beta(0,0) - T^0) = 0,\\
&\tau^{aut} - \hat{\tau} \geq 0, && \lambda_2 \geq 0, \lambda_2(\tau^{aut} - \hat{\tau}) = 0.
\end{aligned}$$

First, notice that $\frac{\partial \mathcal{L}}{\partial \hat{\tau}}(\hat{\tau},0,0) = \frac{\partial v_\alpha}{\partial \hat{\tau}} = 0$ solves party α's unconstrained utility maximization problem and implies $\hat{\tau} = \tau_{A\alpha} \in [0,\tau^{aut}]$. Second, $\bar{\tau}_{A\alpha}(T^0)$, if exists, is defined as the smallest $\hat{\tau}$ such that β's incentive constraint binds, so $\frac{\partial v_\beta}{\partial \hat{\tau}}$ is increasing at $\bar{\tau}_{A\alpha}(T^0)$, that is, $\bar{\tau}_{A\alpha}(T^0) \leq \tau_{A\beta}$. Further recall that by definition, $\tau_{A\alpha} < \tau_{A\beta}$.

There are three cases based on the existence and location of $\bar{\tau}_{A\alpha}(T^0)$:

1. The problem is infeasible when the constraints lead to an empty set.

   (a) When $\bar{\tau}_{A\alpha}(T^0)$ doesn't exist, that is when $T^0 > v_\beta(\tau_{A\beta},0) - v_\beta(0,0)$, the β's incentive constraint is violated in α's problem, therefore, α's problem has no solution.

   (b) When $\bar{\tau}_{A\alpha}(T^0)$ exists but the two constraints cannot hold simultaneously, that is when $v_\beta(\hat{\tau}_A,0)$ increases at $\hat{\tau}_A < \bar{\tau}_{A\alpha}(T^0) < \tau_{A\beta}$, where $\bar{\tau}_{A\alpha}(T^0) > \tau^{aut}$, then $\tau^{aut} < \bar{\tau}_{A\alpha}(T^0)$ implies $v_\beta(\tau^{aut},0) < v_\beta(\bar{\tau}_{A\alpha}(T^0),0) = v_\beta(0,0) + T^0 < v_\beta(\tau_{A\beta},0)$. Therefore, when $v_\beta(\tau_{A\beta},0) - v_\beta(0,0) > T^0 > v_\beta(\tau^{aut},0) - v_\beta(0,0)$, the problem has no solution.

   The set of parameters making the problem infeasible is

$$T^0 > \begin{cases} v_\beta(\tau_{A\beta},0) - v_\beta(0,0) & \text{if } \tau_{aut} > \tau_{A\beta} \\ v_\beta(\tau^{aut},0) - v_\beta(0,0) & \text{if } \tau_{aut} < \tau_{A\beta} \end{cases}$$

   which is equivalent to

$$T^0 > v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0) - v_\beta(0,0).$$

Note that is not [the case that (?)] $T^0 \geq \min\{v_\beta(\tau_{A\beta}, 0), v_\beta(\tau^{aut}, 0)\} - v_\beta(0,0)$, because $v_\beta(\tau_{A\beta}, 0) \geq v_\beta(\tau^{aut}, 0)$ by definition.

2. When the problem is feasible, that is when $T^0 \leq v_\beta(\min\{\tau_{A\beta}, \tau^{aut}\}, 0)$:

   (a) When $\bar{\tau}_{A\alpha}(T^0) \leq \tau_{A\alpha} < \min\{\tau_{A\beta}, \tau^{aut}\}$, that is when

   $$T^0 \leq v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0) < v_\beta(\min\{\tau_{A\beta}, \tau^{aut}\}, 0) - v_\beta(0,0).$$

   This condition translates into the KKT condition being interior solution with constraints unbinding: $\tau_A^{\alpha^*} \in (0, \tau^{aut})$ (that is $\lambda_2 = 0$ and $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$), and β's constraint is slack $\lambda_1 = 0$. In this case, the optimal solution is pinned down by the first order condition of unconstrained problem $\frac{\partial \mathcal{L}}{\partial \hat{\tau}}(\hat{\tau}, 0, 0) = 0$ and thus $\hat{\tau} = \tau_{A\alpha}$ if $\tau_{A\alpha} \in (0, \tau^{aut})$. For $v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0) - T^0 \geq 0$, we need $T^0 \leq v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0)$ and hence $v_\beta(\bar{\tau}_{A\alpha}(T^0), 0) < v_\beta(\tau_{A\alpha}, 0) < v_\beta(\tau_{A\beta}, 0)$, which is satisfied by monontonicity of v_β.

   (b) When $\tau_{A\alpha} < \bar{\tau}_{A\alpha}(T^0) \leq \min\{\tau_{A\beta}, \tau^{aut}\}$, that is when

   $$v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0) < T^0 \leq v_\beta(\min\{\tau_{A\beta}, \tau^{aut}\}, 0) - v_\beta(0,0).$$

   This condition translates into the KKT condition being interior solution with β's incentive constraint binding: $\tau_A^{\alpha^*} \in (0, \tau^{aut})$ (that is $\lambda_2 = 0$ and $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$), and β's constraint binds $\lambda_1 \geq 0$ and $v_\beta(\hat{\tau}, 0) - v_\beta(0,0) = T^0$. To check $\frac{\partial \mathcal{L}}{\partial \hat{\tau}} = 0$, we have $\frac{\partial v_\alpha}{\partial \hat{\tau}} + \lambda_1 \frac{\partial v_\beta}{\partial \hat{\tau}} = 0$ for $\lambda_1 \geq 0$, which yields $\frac{\partial v_\alpha}{\partial \hat{\tau}}$ and $\frac{\partial v_\beta}{\partial \hat{\tau}}$ have opposite signs at $\bar{\tau}_{A\alpha}(T^0)$. Because $\tau_{A\alpha} < \tau_{A\beta}$, this requires $\bar{\tau}_{A\alpha}(T^0) \in [\tau_{A\alpha}, \tau_{A\beta}]$, which is satisfied in this case.

Next, β's problem is solved similarly. With $\bar{\tau}_{A\beta}(T_0)$ being defined as the maximum $\hat{\tau}$ making α's constraint binds in β's problem, then $\frac{\partial v_\alpha}{\partial \hat{\tau}}$ is decreasing at $\bar{\tau}_{A\beta}(T^0)$, that is, $\bar{\tau}_{A\beta}(T^0) \geq \tau_{A\alpha}$. Further recall that by definition, $\tau_{A\alpha} < \tau_{A\beta}$. There are three cases based on the existence and location of $\bar{\tau}_{A\beta}(T^0)$:

1. Infeasible case:

   (a) When $\bar{\tau}_{A\beta}(T^0)$ doesn't exist, that is when $T_0 < \min_{\hat{\tau}_A}\{v_\alpha(0,0) - v_\alpha(\hat{\tau}_A, 0)\}$,

which yields

$$T_0 < v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0),$$

there is no solution. Given $\tau_{A\alpha}$ is the maximizer of $v_\alpha(\cdot, 0)$ this case does not exist unless transfers are negative. We rule out negative transfers, so this case does not arise.

(b) Define

$$\bar{\tau}_{A\beta}(T^0) \equiv \min_{\hat{\tau}_A} s.t. v_\alpha(\hat{\tau}_A, 0) = v_\alpha(0,0) - T_0$$

When the two constraints cannot hold simultaneously, that is when $T_0 > v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0)$ but $v_\alpha(\hat{\tau}_A, 0) < v_\alpha(0,0) - T^0$ for $\hat{\tau}_A < \tau^{aut}$. In this case, $\tau^{aut} < \tilde{\tau}_{A\beta}(T^0) < \hat{\tau}_A < \tau_{A\alpha}$, that is $v_\alpha(\tau^{aut}, 0) < v_\alpha(\tilde{\tau}_{A\beta}(T^0), 0) = v_\alpha(0,0) - T_0$, which simplifies to

$$T_0 < v_\alpha(0,0) - v_\alpha(\tau^{aut}, 0)$$

The set of parameters making the problem infeasible is

$$T^0 < \begin{cases} v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0), \text{ if } \tau^{aut} > \tau_{A\alpha} \\ v_\alpha(0,0) - v_\alpha(\tau^{aut}, 0), \text{ if } \tau^{aut} < \tau_{A\alpha} \end{cases}$$

which is equivalent to

$$T^0 < v_\alpha(0,0) - v_\alpha(\min\{\tau_{A\alpha}, \tau^{aut}\}, 0).$$

2. When the problem is feasible, that is when $T_0 < v_\alpha(0,0) - v_\alpha(\min\{\tau_{A\alpha}, \tau^{aut}\}, 0)$:

(a) When $\bar{\tau}_{A\beta}(T^0) \geq \tau_{A\beta} > \tau_{A\alpha}$, that is, when

$$T_0 \geq v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0) > v_\alpha(0,0) - v_\alpha(\tau_{A\beta}, 0),$$

the constraint is slack, so $\tau_A^{\beta^*} = \tau_{A\beta}$.

(b) When $\tau_{A\beta} > \bar{\tau}_{A\beta}(T^0) \geq \tau_{A\alpha}$, that is,

$$v_\alpha(0,0) - v_\alpha(\tau_{A\beta}, 0) > T_0 \geq v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0),$$

the constraint binds, so $\tau_A^{\beta^*} = \bar{\tau}_{A\beta}(T^0)$.

In conclusion,

$$\tau_A^{\alpha^*} = \begin{cases} \tau_{A\alpha}, & \text{if } T^0 \leq v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0) \\ \bar{\tau}_{A\alpha}(T^0), & \text{if } v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0) < T^0 \leq v_\beta(\min\{\tau_{A\beta}, \tau^{aut}\}, 0) - v_\beta(0,0) \\ \text{no solution}, & \text{if } T^0 > v_\beta(\min\{\tau_{A\beta}, \tau^{aut}\}, 0) - v_\beta(0,0) \end{cases}$$

and

$$\tau_A^{\beta^*} = \begin{cases} \text{no solution}, & \text{if } T_0 < v_\alpha(0,0) - v_\alpha(\min\{\tau_{A\alpha}, \tau^{aut}\}, 0), \\ \bar{\tau}_{A\beta}(T^0), & \text{if } v_\alpha(0,0) - v_\alpha(\tau_{A\beta}, 0) > T_0 \geq v_\alpha(0,0) - v_\alpha(\min\{\tau_{A\alpha}, \tau^{aut}\}, 0), \\ \tau_{A\beta}, & \text{if } T_0 \geq v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0) \end{cases}$$

The algebraic expressions follow from these.

11 Proof of Proposition 5

First consider α's problem

$$\mathcal{I}_{FT}^{\alpha*} = \arg \max_{\hat{\mathcal{I}}_{FT} \in \{0,1\}} (1 - \hat{\mathcal{I}}_{FT}) v_\alpha(\tau_A^{\alpha*}, 0) + \hat{\mathcal{I}}_{FT}[v_\alpha(0,0) - T^0]. \tag{21}$$

The solution to this problem is

$$\mathcal{I}_{FT}^{\alpha*} = \begin{cases} 0, \text{ if } v_\alpha(\tau_A^{\alpha*}, 0) > v_\alpha(0,0) - T^0; \\ 1, \text{ else.} \end{cases}$$

- When $T^0 < v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0)$, Proposition 4 implies $\tau_A^{\alpha*} = \tau_{A\alpha}$, then $v_\alpha(\tau_{A\alpha}, 0) > v_\alpha(0,0) - T^0$ if $T^0 > v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0)$. In this case, $\mathcal{I}_{FT}^{\alpha*} = 0$ for

$$v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0) + v_\beta(0,0) < T^0 + v_\beta(0,0) < v_\beta(\tau_{A\alpha}, 0)$$

  So the set of T^0 for $\mathcal{I}_{FT}^{\alpha*} = 0$ is

$$T^0 \in \begin{cases} \emptyset, \text{ if } v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0) + v_\beta(0,0) > v_\beta(\tau_{A\alpha}, 0); \\ [v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0), v_\beta(\tau_{A\alpha}, 0) - v_\beta(0,0)], \\ \qquad\qquad \text{if } v_\alpha(0,0) - v_\alpha(\tau_{A\alpha}, 0) + v_\beta(0,0) \leq v_\beta(\tau_{A\alpha}, 0). \end{cases}$$

- When $v_\beta(\tau_{A\alpha},0)-v_\beta(0,0)\leq T^0<v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0)-v_\beta(0,0)$, Proposition 4 implies $\tau_A^{\alpha*}=\bar{\tau}_{A\alpha}(T^0)$, then $v_\alpha(\bar{\tau}_{A\alpha}(T^0),0)>v_\alpha(0,0)-T^0$ if $T^0>v_\alpha(0,0)-v_\alpha(\bar{\tau}_{A\alpha}(T^0),0)$. By definition, $T^0=v_\beta(\bar{\tau}_{A\alpha}(T^0),0)-v_\beta(0,0)$, so this case translates into

  $$\max\{v_\beta(\tau_{A\alpha},0),v_\alpha(0,0)-v_\alpha(\bar{\tau}_{A\alpha}(T^0),0)+v_\beta(0,0)\}\leq v_\beta(\bar{\tau}_{A\alpha}(T^0),0)<v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0)$$

  The set of T^0 for $\mathcal{I}_{FT}^{\alpha*}=0$ is

  $$T^0\in\begin{cases}[v_\alpha(0,0)-v_\alpha(\bar{\tau}_{A\alpha}(T^0),0),v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0)-v_\beta(0,0)],\\ \qquad\qquad\text{if } v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)+v_\beta(0,0)>v_\beta(\tau_{A\alpha},0);\\ [v_\beta(\tau_{A\alpha},0)-v_\beta(0,0),v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0)-v_\beta(0,0)],\\ \qquad\qquad\text{if } v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)+v_\beta(0,0)\leq v_\beta(\tau_{A\alpha},0).\end{cases}$$

- When $T^0\geq v_\beta(\min\{\tau_{A\beta},\tau^{aut}\},0)-v_\beta(0,0)$, Proposition 4 implies no solution, then the equilibrium proposal is status quo.

To sum up, the three cases imply that $\mathcal{I}_{FT}^{\alpha*}=0$ if $T^0>\bar{T}^{0\alpha}$, where

$$\bar{T}^{0\alpha}\equiv\begin{cases}v_\alpha(0,0)-v_\alpha(\bar{\tau}_{A\alpha}(T^0),0),\ \text{if } v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)+v_\beta(0,0)>v_\beta(\tau_{A\alpha},0);\\ v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0),\ \text{if } v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)+v_\beta(0,0)\leq v_\beta(\tau_{A\alpha},0).\end{cases}$$

12 Proof of Proposition 6

To prove monontonicity, first show that $\bar{T}^{0\alpha}$ is continuous at $T^0=v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)=v_\beta(\tau_{A\alpha},0)-v_\beta(0,0)$. In this case, both α and β are indifferent between status quo and α's first best policy, which implies $\bar{\tau}_{A\alpha}(T^0)=\tau_{A\alpha}$.

Next, to show that $\bar{T}^{0\alpha}$ increases in γ_B, we only need to consider the two cases separately:

- In the first case, we show $v_\alpha(\bar{\tau}_{A\alpha}(T^0),0)$ decreases in γ_B.

  When $v_\alpha(0,0)-v_\alpha(\tau_{A\alpha},0)+v_\beta(0,0)>v_\beta(\tau_{A\alpha},0)$, the T^0 that makes α indifferent breaks β's incentive condition, so T^0 must be greater than $\tau_{A\alpha}$. This implies that $v_\alpha(\bar{\tau}_{A\alpha}(T^0),0)$ decreases in $\bar{\tau}_{A\alpha}(T^0)$. It suffices to show that $\bar{\tau}_{A\alpha}(T^0)$ increases in

γ_B. To see this, we use the chain rule:

$$\frac{\partial \bar{\tau}_{A\alpha}(T^0)}{\partial \gamma_B} = \frac{\partial \bar{\tau}_{A\alpha}(T^0)}{\partial v_\beta} \frac{\partial v_\beta}{\partial \gamma_B}.$$

By definition of $\bar{\tau}_{A\alpha}(T^0)$, the first partial derivative is positive. The second partial derivative is also positive because γ_B is β's endowment. Therefore, we proved that $v_\alpha(\bar{\tau}_{A\alpha}(T^0), 0)$ decreases in γ_B in the first case.

- In the second case, we show $v_\alpha(\tau_{A\alpha}, 0)$ decreases in γ_B. This is obvious: because γ_B is β's endowment, the global maxima of α decreases in γ_B due to competition. When $\tau_A > 0$ and $\tau_B = 0$, increasing γ_B causes the utility increasing from a to be lower than the utility decreasing from b.

To complete proof, $v_\alpha(0, 0)$ does not change when γ_B changes, because the increasing utility from one good offset the decreasing utility from the other good.