Explaining Compensation Failure: Trade, Partisan Collusion, and the Underprovision of Compensation

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Abstract

Why has there not been more compensation for the losers of free trade? I make the novel argument that there has been a failure of compensation because political elites have tacitly colluded to avoid compensation. With the help of a simple formal model, I contend that political parties are better off implicitly agreeing to not increase compensation and instead compete over less costly issues. To evaluate the implication that import competition should cause less compensation as tacit collusion becomes more likely, I develop a two-part identification strategy. Firstly, I construct original shift-share instruments to estimate the effect of import competition on a measure of compensation. Secondly, I assess if this effect is moderated by how feasible tacit collusion is, which I estimate using latent variable analysis. For 24 European countries from 2000-2022, I show that a negative import shock causes less compensation on average as tacit collusion becomes more feasible.

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1 Introduction

Trade increases aggregate economic welfare but has distributional consequences. In the United States (U.S.), for example, an estimated 87% of the population gained real income from a rise in imports from China while some may have lost up to four times the average gain (Galle, Rodriguez-Clare, and Yi 2023, 349). More generally, the losers from free trade have been concentrated in "the 'old-rich' countries of Western Europe, North America, [and] Oceania," where the real incomes of lower to middle class citizens grew the least compared to any other group in the world from 1988 to 2008 (Milanović 2016, 20).

There is a growing body of evidence that these distributional consequences have political implications. Specifically, negative import shocks are associated with reduced vote share for political incumbents in the U.S. (Jensen, Quinn, and Weymouth 2017; Margalit 2011) and increased vote share for populist right-wing parties across Europe (e.g., Colantone and Stanig 2018; Milner 2021). Thus, the distributional consequences of free trade have contributed to an electoral backlash from the losers that has hurt incumbents and favored right-wing populists.

It is also understood that compensation can alleviate the distributional consequences of trade. By redistributing some of the gains from trade to the losers, free trade with compensation can still increase aggregate welfare while leaving no one worse off (e.g., Feenstra and Lewis 1994). However, there has been a "failure of compensation" (Frieden 2019, 182), where the supply of compensation has been less than demand in Western democracies. Consequently, a lack of compensation has made the backlash to globalization "perfectly predictable" (Rodrik 2018, 12).

It is puzzling why incumbent political elites in these countries have failed to compensate the losers of globalization. Scholars have long been aware of free trade's distributional impacts and of the ability for compensation to generate Pareto improvements. By failing to compensate those hurt by free trade, incumbent political elites appear to have harmed themselves by contributing to an electoral backlash that has benefited populist challengers. Thus,

it is surprising that incumbent political elites did not anticipate the electoral backlash and compensate the losers of globalization more. Why has there not been more compensation?

I argue that there has not been more compensation because political elites competing for office have tacitly colluded to avoid compensating the losers. Tacit collusion is often used to describe anti-competitive behavior between firms, where it means that firms can come to an implicit agreement through reward and punishment strategies to supply the amount of goods that jointly maximizes profits. I model the decision by political elites to supply compensation as a repeated prisoner's dilemma between two competing political parties or coalitions of parties. I show that if the two parties expect to compete in an indefinite number of elections, then it is possible for them to tacitly collude to restrict the supply of compensation and maximize their joint utility.

My argument implies that when tacit collusion is possible, an increase in imports should cause less compensation. Therefore, the goal of my research design is to estimate the effect of an import shock on compensation and assess if this effect is moderated by the feasibility of tacit collusion. Because political elites that are predisposed to compensate less may select out of an import shock, I use an instrument for imports to reduce selection bias. Specifically, I construct original shift-share instruments at the country-year level to instrument a country's imports from China with U.S. imports from China. The logic behind the instrument is that it captures variation in imports due to supply-side changes in China rather than variation due to endogenous demand (Autor, Dorn, and Hanson 2013; Acemoglu et al. 2016). In this case, demand is endogenous because political elites may prefer fewer imports if they are averse to compensation.

To assess if the effect of an import shock on compensation is moderated by the feasibility of tacit collusion, I estimate the feasibility of tacit collusion using latent variable analysis and interact the estimates with the instrumented import shocks. I use latent variable analysis because tacit collusion is unobservable, although my theory suggests conditions that make it more likely to be sustainable. The results are consistent with my argument that

when tacit collusion is more feasible, import shocks cause less compensation as measured by social spending as a percentage of GDP. Due to data limitations, my sample is 24 European countries between 2000 and 2022.

In the next section I discuss the literature surrounding compensation failure and why it should be considered puzzling. In section 3 I advance my argument with the help of a simple formal model. Section 4 details my research design, including my identification strategy, the construction of the shift-share instruments, and the latent variable analysis. I conclude by discussing the results in section 5.

2 What About Compensation Failure is Unexplained?

In 2019, the Organisation for Economic Cooperation and Development (OECD) described "a widespread decline in income redistribution across OECD countries" (Causa, Browne, and Vindics 2019, 13). In the U.S., Autor, Dorn, and Hanson (2016, 231) conclude that there has been "limited regional redistribution of trade gains from winners to losers." In general, scholars claim that there has been a failure in developed democracies to compensate the losers of globalization (Frieden 2019; Rodrik 2018).

There are several reasons why compensation failure is puzzling. Firstly, it is not obvious that governments are unable to compensate the losers. The literature has failed to find conclusive evidence that globalization has negatively affected capital tax rates or government expenditures (Adam, Kammas, and Lagou 2013; Meinhard and Potrafke 2012; Dreher, Sturm, and Ursprung 2008; Dreher 2006; Garrett and Mitchell 2001; c.f. Busemeyer 2009). Thus, it does not appear to be the case that governments are so constrained by globalization as to not compensate the losers that globalization causes.

Secondly, in a competitive democracy the political costs of not compensating the losers likely outweigh the economic costs for political elites. Although compensation generates deadweight losses through taxes (Rodrik 2018) and may negatively affect growth, failing to

compensate the losers may cause incumbent political elites to lose vote share to populist challengers (e.g., Colantone and Stanig 2018). Thus, it is not ex-ante obvious how much compensation should occur. Political elites no doubt want to procure economic growth for voters (e.g., Lewis-Beck and Stegmaier 2013), but they can also risk losing office if they fail to compensate the losers of free trade.

Indeed, there is descriptive evidence that mainstream European parties have suffered from not supplying more compensation. In Figure 1, I use replication data from Milner (2021) to evaluate how the effect of imports on vote share is moderated by total social spending as a percentage of GDP, the main measure I use for compensation. When spending is low, an increase in imports is associated with reduced vote share for mainstream parties but increased vote share for extremist parties. This description would seem to contradict some arguments that compensation is underfunded because it is politically ineffective (Frieden 2019; Rodrik 2018). These arguments also do not address how a lack of funding begs the question of why political elites have not compensated more. If compensation's ineffectiveness is due to it being underfunded, as with trade adjustment assistance (TAA) in the U.S. (Autor, Dorn, and Hanson 2016), why hasn't compensation been invested in more?

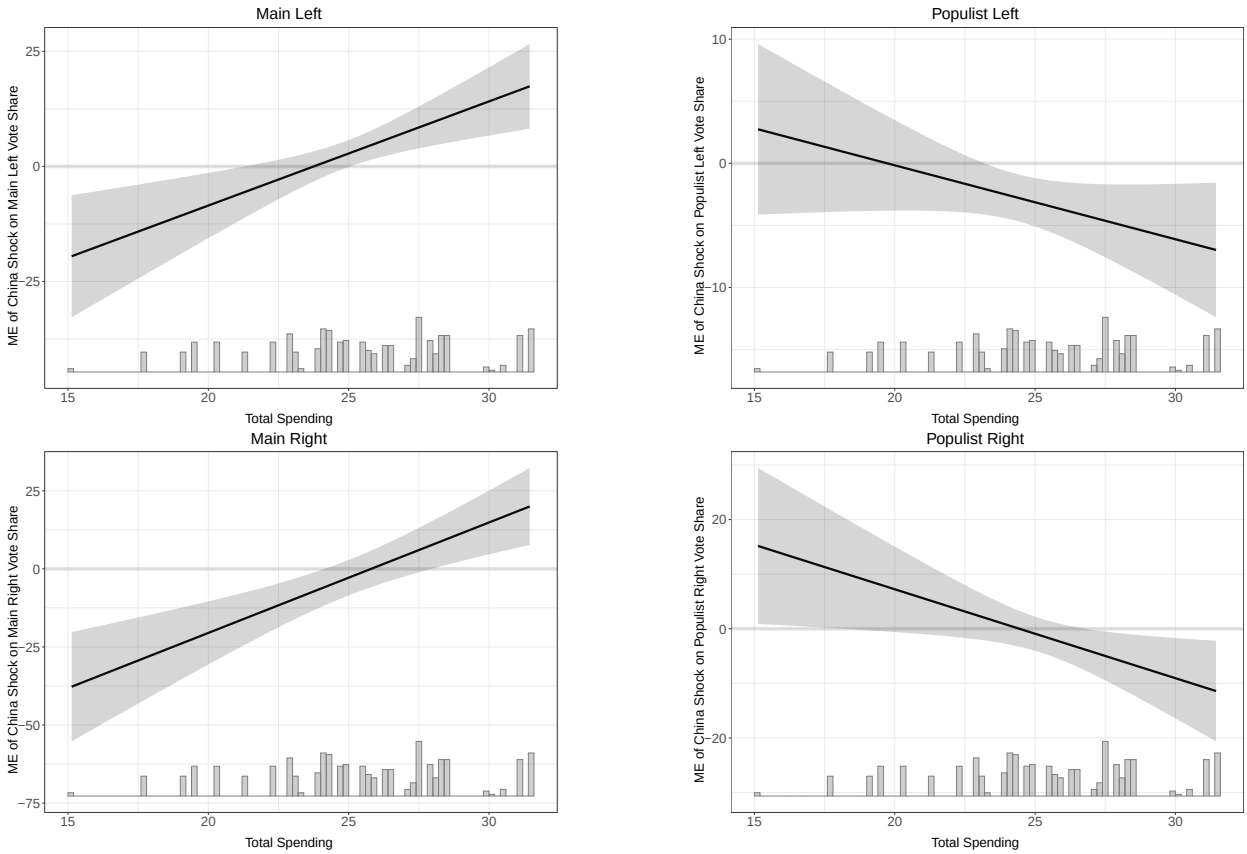


Figure 1: The effect of the China shock (OLS) calculated by Milner (2021) on party vote share, moderated by total spending as a measure of compensation. At higher levels of total spending, the China shock is associated with populists losing vote share and centrist parties gaining vote share.

For these reasons, it is unclear how extant arguments explain the lack of compensation. Rodrik (2018) argues that commitment problems hinder compensation since politicians no longer have the incentive to compensate losers once trade deals have been secured with their approval. However, it is not clear why the threat of losing an election does not provide enough incentive to overcome this commitment problem. Menendez (2016, 669) argues that political elites may weigh the demands of globalization winners more when the losers are concentrated geographically, but also notes that "[s]imply ignoring the demands of concentrated trade losers is unlikely to maximize electoral returns. . . ."

In sum, it is not ex-ante clear that compensation failure is rational for political elites when there exists a threat of electoral backlash from the losers. To prelude, I will argue in the

next section that tacit collusion enables political elites to minimize this threat of an electoral backlash. If political elites can implicitly agree to adopt similar positions on compensation, they can make rational voters indifferent between them on that issue. Thus voters, not preferring any candidate on the issue of compensation, cannot punish any one candidate for not offering more compensation. They will instead vote based on the issues where candidates choose to differentiate themselves, allowing political elites to avoid competing over compensation.

3 Theory

3.1 My Argument

Free trade has aggregate and distributional consequences. Because countries tend to specialize in what they have a comparative advantage in producing, countries are more productive when they trade with each other and average incomes rise. But how factors of production are reallocated within countries to best respond to comparative advantage pressures generates distributional effects. According to the classical Heckscher-Ohlin model, countries have a comparative advantage in producing goods that intensively use the factor of production they are relatively abundant in (Feenstra and Taylor 2020). For instance, if a country is abundant in labor but scarce in capital they will tend to specialize in and export goods that intensively use the factor of labor. The Stolper-Samuelson theorem then predicts that if factors of production are freely mobile, people will reallocate the factors they own towards the production of labor-intensive goods and labor will gain real income while capital loses real income.

Many developed democracies tend to be relatively abundant in capital while developing countries, like China, tend to be relatively abundant in labor. As trade has increased between the two sets of countries, the Stolper-Samuelson theorem implies that people who own labor in many developed democracies have lost real income while the owners of labor in developing

countries have gained real income. Indeed, this phenomenon is one of the reasons that global inequality has decreased but at the expense of middle to lower class citizens of developed democracies (Milanović 2016).

All else equal, I assume that these citizens prefer compensation for the real income they have lost from free trade. A manufacturing worker who was laid off due to import competition, for example, may not be able to regain the pride associated with their old job or expect to earn an identical income in the future. But this assumption means that they would still prefer to receive material compensation for being laid off than to be fired without compensation.

Moreover, I assume that these citizens hold incumbent political elites responsible for their lost income and compensation. Classic economic voting literature largely concludes that the average voter is myopic, retrospective in their evaluation of the government, and particularly sensitive to negative shocks (e.g., Nannestad and Paldam 1994; Lewis-Beck and Stegmaier 2013). This assumption also enjoys support from studies that find a relationship between negative import shocks and anti-incumbent voting effects (Margalit 2011; Jensen, Quinn, and Weymouth 2017). It is not necessary for citizens to understand economics for them to understand that they are not as well off as they used to be, and it seems reasonable that they would at least partially hold the government responsible.

I assume that the relevant political elites for my argument are political parties. Parties craft policy, including on trade and compensation, and have reputations that extend beyond an individual leaders' tenure. Any single government or administration may not be responsible for compensating the losers that have been hurt over decades of free trade. But parties have an interest in their brand and reputation with voters beyond particular governments, such that they are likely to be particularly concerned about an electoral backlash from losers in the future. Furthermore, I assume that political parties prefer to win elections. Even if they would like to pass specific legislation, they must first win elections to do so. Lastly, for the sake of the argument I assume that there are two main parties or coalitions of parties that

compete in elections. While this is a restrictive assumption, there are multiparty countries that credibly fit this assumption (e.g., Germany over the last few decades with the SPD and CDU parties). However, I do expect that my argument holds in countries with numerous parties albeit it may be difficult. I attempt to take this into account in my empirical analysis through several of my measures being functions of the number of political parties.

Under these assumptions, I argue that parties will compete over compensating those harmed by free trade. If the losers prefer compensation, they should vote for the party that compensates them most in expectation, *ceteris paribus*. The party or coalition that fails to compete over increasing compensation will experience an electoral backlash and lose votes from the losers.

However, compensation can be very costly. While political parties or individual elites may not directly pay for compensation, the taxes required for compensation likely create deadweight losses that affect economic growth. If budget surpluses are high, this cost may be less consequential. When budget deficits occur, however, the cost of raising additional revenue to pay for compensation is likely high. This is known as a high marginal cost of public funds.

When compensation is costly, both parties would be better off if they could compete over issues other than compensation. If they adopt similar policies on compensation while differentiating themselves on other issues, they can make it difficult for the losers to manifest a backlash about the lack of compensation. When both parties have similar policies, voters may choose between them based on the policies where they are distinguishable. If the parties differentiate themselves by adopting different positions on cultural issues, for example, the losers may vote based on their preference for these issues rather than vote against one party for failing to compensate them when the other party is just as likely to do the same.

Thus, when both parties do not offer compensation, a party's expected cost of not compensating the losers (i.e., backlash) decreases because it is less likely that voters will vote against them on the issue of compensation. Parties can then focus on maintaining free trade

without increasing compensation, providing economic benefits for the majority of voters who do win from free trade and competing on less costly issues.

There are two important things to note before I discuss the model. Firstly, readers may find it incredible that political parties tacitly collude in well-established and developed democracies. Anti-competitive behavior between political elites is possible because voters do not have complete control over which candidates run for office or what they run on. Again, if all of the candidates vying for office adopt the same policy position on a particular issue, a rational voter should be indifferent between candidates on that issue. Voters would instead use information on the positions where candidates differ to make their vote choice. This logic is similar to Riker's "dispersion principle" (1996, 104–9). Studying the U.S., Riker argued that political elites can abandon competition on an issue that is disadvantageous to them or that they agree on.

Indeed, I follow in a tradition of scholars who have studied elite behavior in democracies and noted noncompetitiveness. In Europe, Kitschelt (1997) argued that voters may support populist parties because they are disillusioned with mainstream parties that appear to collude and converge on certain issue dimensions (see Golder 2016). In Mali, a relatively democratic country at the time, Gottlieb (2015) documented explicit collusion between political parties. I contribute to this literature by further clarifying how tacit collusion is possible for political elites in developed democracies.

Secondly, I have thus far ignored ideology. This is because I assume that the issue of compensation is independent of other policy positions. In my argument, it is entirely possible for a left-leaning party to pursue an ideologically consistent agenda on other issues while implicitly adopting the same position on the costly issue of compensation as their right-wing challenger. Doing so effectively takes this costly issue off the table during an election while still allowing for ideological competition on other issues. Evaluating the possibility of tacit collusion when issue positions are dependent is a question I leave for future work, although I attempt to account for the effect of ideology in the empirical analysis.

In conclusion, my explanation for the puzzling compensation failure is that political parties have tacitly colluded to compete over issues other than compensation. By doing so, they effectively reduced the probability that an electoral backlash would fall on either one of them. The benefit of tacit collusion is that parties could continue the status quo of free trade with little compensation to minimize the potential costs of compensation on economic growth and the benefits accumulated to the winners of trade. Thus, parties can ensure that most citizens benefit from their policies and compete with each other on issues that are less costly.

3.2 Game-Theoretic Analysis of the Argument

Suppose there are two parties or coalitions of parties competing in an election, party A and party B. Both parties want to win the election and get the benefits of being in office, ψ. Neither party is certain that they will win, with A winning with probability p and B winning with probability $1 - p$. During the election, each party must decide to make a binding proposal to increase compensation ($) or not (¬$). Note that I assume that the issue of compensation is independent of other issues, meaning that parties can still compete in other issue domains even if no proposals are made on compensation. If a party makes a proposal to increase compensation, they must pay an associated cost if they win the election (c). This should not be interpreted as parties directly paying for compensation, but rather it captures the idea that there are opportunity costs for increasing spending on an issue and deadweight losses from any taxes associated with the increased spending.

I describe the situation these parties are in with the simultaneous move game depicted in Figure 2. Under the reasonable assumption that the costs associated with increasing compensation are positive yet smaller than the benefits of being in office ($0 < c < \psi$), the game is a prisoner's dilemma. Specifically, each party has a dominant strategy to propose an increase in compensation even though they are both better off maintaining the status quo level of spending. This is due to the fear each party has of losing with certainty; If

party B proposes to increase compensation while party A does not, B will win over the losers of free trade and win the election with certainty. This is A's least preferred outcome, perhaps because they will have disappointed important fundraisers or damaged their party's brand by choosing to compete so poorly over this issue. To avoid this, A has an incentive to always propose an increase in compensation and at least secure themselves a possibility of winning. This holds for B as well, who also least prefers losing with certainty. As a result, the parties are expected to play the strategy pair $(\$, \$)$, which is the solution in strictly dominant strategies and also the Nash equilibrium.

		B	
		$\neg\$$	$\$$
A	$\neg\$$	$p\psi,\ (1-p)\psi$	$0,\ \psi$
	$\$$	$\psi,\ 0$	$p(\psi - c),\ (1-p)(\psi - c)$

Figure 2: A game between two parties or coalitions of parties competing for office. Each party must decide to propose an increase in compensation ($\$$) or not ($\neg\$$).

Again, note that both parties are better off by not proposing to increase compensation. This is because as long as they both maintain the status quo, the losers of free trade will be indifferent between them. The key idea here is that when both players adopt identical policies on compensation, voters are indifferent between them on that issue. Thus, under both strategy pairs $(\$, \$)$ and $(\neg\$, \neg\$)$, the parties will be competing for office based on their other policy positions. However, under $(\$, \$)$ the expected value of competing is more costly due to the parties proposing increases in compensation.

While both parties are expected to increase compensation in the game above, parties often face each other in many elections. If we can assume that parties expect to compete in an indefinite number of elections, we can evaluate the parties' behavior in an infinitely repeated prisoner's dilemma. In the repeated game, each party decides to propose an increase in compensation or not at every election or stage in the game. Because the game

repeats infinitely, there is an infinite set of decisions that each party must make (e.g., {\$ in stage 1, $\neg$\$ in all future stages}, {\$ in stages 1 and 2, $\neg$\$ in all future stages}, and so on). I assume that each party assesses their utility over these sets of decisions according to a discounted utility function, where future outcomes are discounted by δ, which is positive but less than 1 ($0 < \delta < 1$).[1]

In the infinitely repeated game it can become reasonable to expect the parties to attain the outcome ($\neg\$, \neg\$$), where they are jointly better off by not proposing increases in compensation. Multiple elections allow the parties to use information from previous elections to make a decision about compensation in the current stage of the game. If party A did not propose an increase in compensation in the previous election, it may occur to party B that it is possible for both of them not to do so in the current election. However, it is still better for B to "defect" from this jointly optimal outcome and try to win the election with certainty if they suspect that A will not increase compensation.

The action pair ($\neg\$, \neg\$$) only becomes one reasonable outcome to expect when A can credibly threaten B for defecting. Specifically, A must adopt a punishment strategy such that it is not profitable for B to defect from ($\neg\$, \neg\$$). The punishment strategy I will focus on here is grim trigger, where A promises not to propose an increase in compensation in the first stage of the game and all subsequent stages unless B proposes an increase. Once B proposes an increase, A will punish them by proposing an increase in compensation for the rest of the game. This ensures that B cannot do any better than earning their payoff from ($\$, \$$) for every future stage of the game (see the discussion on mixmax values in the Appendix). Notice that for that whole time, B will be forgoing the gains they could have earned from sustaining ($\neg\$, \neg\$$) with A. Ultimately, the outcome ($\neg\$, \neg\$$) becomes sustainable when defection is made unprofitable by the grim trigger threat from A (and vice versa for B).

More formally, τ^{GT} represents the strategy pair where both parties play grim trigger.

[1]Specifically, the discounted utility function for party i is given by $\gamma_i^\delta(\tau_i) = \mathbb{E}\big[(1-\delta)\sum_{t=1}^{\infty}\delta^{t-1}u_i^t\big]$ (Maschler, Solan, and Zamir 2020, 552), where u_i^t is the utility of the outcome at stage t and τ_i is a strategy vector or set of decisions for party i.

τ^{GT} is an equilibrium if and only if for both parties, the payoff from τ^{GT} is greater than or equal to the payoff they could get from playing any other strategy while the other party still plays grim trigger (denoted τ_{-i}^{GT}) (Maschler, Solan, and Zamir 2020, 552). For player $i \in \{A, B\}$:

$$\gamma_i^{\delta}(\tau^{GT}) \geq \gamma_i^{\delta}(\tau_i, \tau_{-i}^{GT}). \tag{1}$$

Given that party A is playing grim trigger, for example, the best alternative strategy (τ_i) party B can consider is to propose compensation in all stages of the game. Since A will not propose an increase in compensation in the first stage per grim trigger, B can earn a larger payoff that stage by defecting and choosing to compensate. In all other stages, it would be best to increase compensation since A will also be increasing compensation per grim trigger. Thus, for τ^{GT} to be an equilibrium both parties must receive a weakly greater utility than the strategy of compensating in all stages. For stages of the game $t \in \infty$:

$$\gamma_i^{\delta}\left(\Big(p\psi, (1-p)\psi\Big)_{t=1\to\infty}\right) \geq \gamma_i^{\delta}\left((\psi, \psi)_{t=1} + \Big(p(\psi - c), (1-p)(\psi - c)\Big)_{t=2\to\infty}\right). \tag{2}$$

Solving for δ (see Appendix), the equilibrium condition is:

$$(\delta_A^*, \delta_B^*) \geq \left(\frac{\psi - p\psi}{\psi - p(\psi - c)}, \frac{\psi - (1-p)\psi}{\psi - (1-p)(\psi - c)}\right). \tag{3}$$

It is important to also note that the punishment strategies discussed above ensure that there are many equilibria possible in the infinitely repeated game (i.e., the Folk Theorem, see Appendix). It is possible to construct a learning model to predict which equilibrium will be selected by players (e.g., Jindani 2022), but it is reasonable to expect that players will choose the "best" equilibrium they can. τ^{GT}, the equilibrium of interest, is Pareto dominant and thus may be reasonably expected to be the equilibrium of choice for players.

3.3 Implications

Equation (3) states that both parties need to value future election outcomes enough to resist the electoral advantages of compensating today. When this is true, tacit collusion is sustainable between the parties. Whether or not tacit collusion is sustainable is a function of the parameters in the model, namely the cost of compensation (c), the payoff of winning office (ψ), the probability of each party winning office (p, $1-p$), and the extent to which the parties value future election outcomes (δ_A, δ_B). In this section I will detail how each of these parameters affect the sustainability of tacit collusion before introducing my research design.

The graphs in Figure 3 show how a change in one of the parameters on the right-hand side of equation (3) affects the sustainability of tacit collusion, holding all else constant. For each parameter being varied, the others are held at reasonable values (e.g., the cost of compensation may be positive but less than the payoff from office). From left to right, these graphs imply that tacit collusion becomes more sustainable as compensation becomes more costly, the value of holding office decreases, and the parties have more equal chances of winning the election.

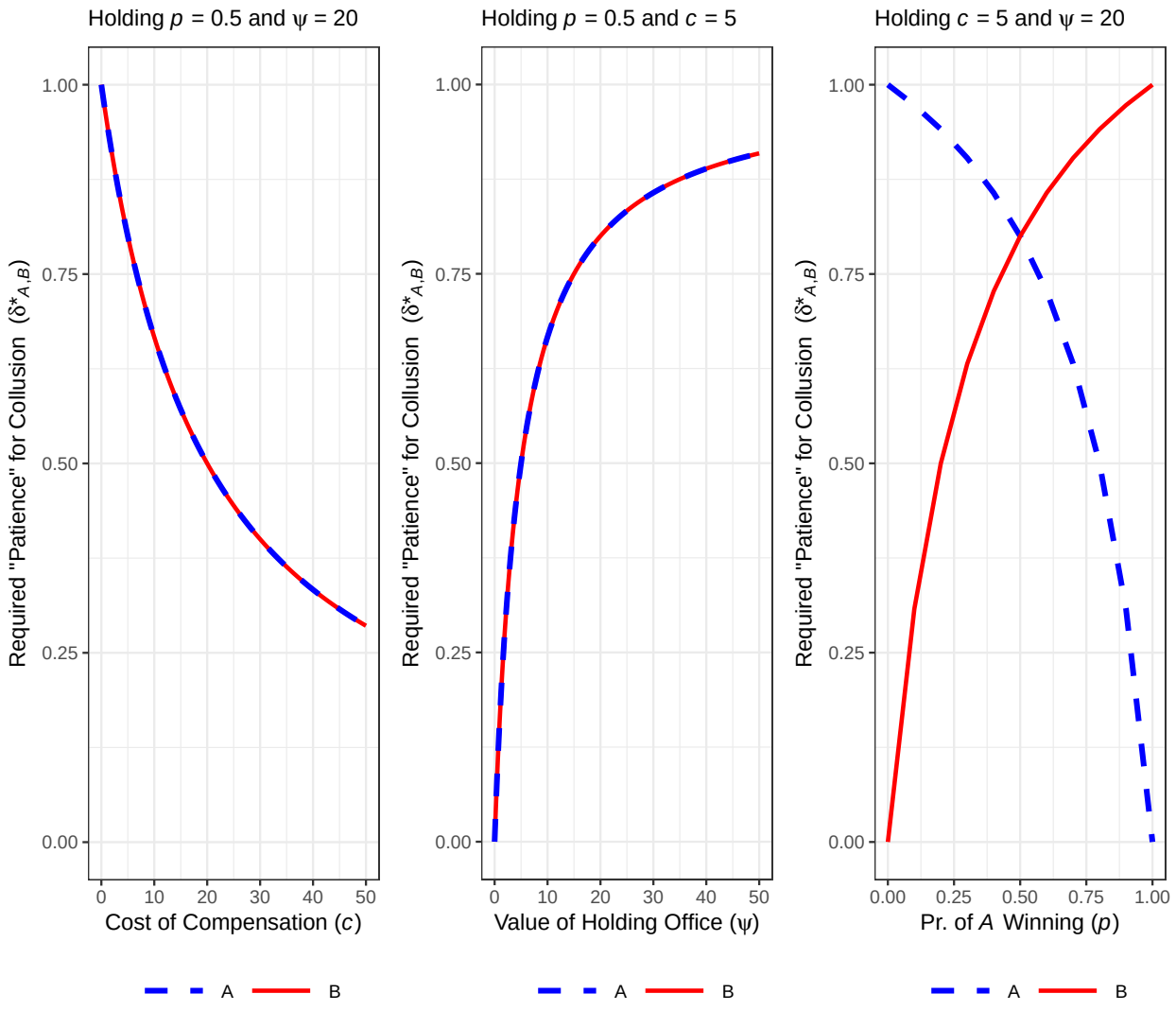


Figure 3: Tacit collusion is easier to sustain as parties value the future more. These graphs show how much each party needs to value the future to make tacit collusion sustainable given changes in the parameters on the right-hand side of equation (3). They imply that tacit collusion is easiest to sustain when compensation is costly, the value of holding office is relatively low, and both parties have a relatively equal chance of winning the election.

Holding all else equal, increasing the cost of compensation (c) decreases the right-hand side of equation (3) and makes tacit collusion easier to sustain (left graph of Figure 3). This is the most intuitive implication since the more costly compensation is, the greater the incentive parties have to avoid it. As discussed earlier, I interpret the cost to political parties of increasing compensation as the opportunity cost of increasing spending elsewhere and the potential deadweight loss from enacting the taxes needed to increase compensation.

This cost is especially high when a country is already running budget deficits, for example, because increasing spending and enacting inefficient taxes harms economic performance more than when there is a budget surplus.

Conversely, increasing the payoff that parties get from holding office (ψ) increases the right-hand side of equation (3) *ceteris paribus* and makes tacit collusion harder to sustain (middle graph). This is due to the fact that a larger payoff from holding office enhances the incentive to defect. If ψ is large enough, players would rather "take the money and run" by defecting for one period and foregoing the gains from collusion in the future. One way to interpret this is to consider ψ as the time in office or power gained from holding office. If the winner was able to stay in power for a very long time or change the rules of the game after winning, then they have no need to tacitly collude with a competitor in the future.

Holding all else constant, increasing the probability of party A winning the election (p) decreases the right-hand side of equation (3) for A (right graph, red dashed line) but increases it for B (right graph, blue solid line). Mechanically, a higher probability of winning increases the expected payoff from future elections and decreases the attractiveness of a one-shot defection and vice versa. Thus, increasing p makes party A more willing to tacitly collude but party B less willing. I interpret this as meaning that parties need to be competitive for tacit collusion to be sustainable. For example, if party A were to win every election with certainty, then the campaign proposals made by party B do not induce competition on that issue and thus does not make A pay a cost. Since tacit collusion is about implicitly agreeing to avoid incurring costs for one another, parties need to be competitive enough for that agreement to matter.

Lastly, since equation (3) is in terms of δ, it is straightforward to see that larger values of δ make tacit collusion easier to sustain. If parties knew that they were going to survive and be able to compete in many future elections, the potential gains from tacitly colluding and avoiding the costs of compensation become larger. In sum, tacit collusion is easiest to sustain when compensation is expensive, the probability of winning elections is high for both

parties, and when the payoff from holding office is not prohibitively high for either party. Intuitively, parties need to sufficiently value future election outcomes and expect to win often enough for tacit collusion to be sustainable. If the benefits from holding office now dwarf the benefits of holding office in the future or one party does not expect to be competitive in the future, there is no benefit to tacitly colluding.

4 Research Design

My theory implies that there should be less compensation to the losers of free trade as tacit collusion becomes more sustainable. Therefore, the quantity of interest I want to estimate is the effect of a negative trade shock on compensation conditional on how sustainable or feasible tacit collusion is. My strategy to estimate this quantity is two-fold: 1) identify the effect of a negative trade shock on a measure of compensation and 2) measure how feasible tacit collusion is to assess if it moderates this effect.

4.1 Identifying the Effect of a Negative Trade Shock on a Measure of Compensation

4.1.1 Negative Trade Shocks

I focus on negative trade shocks that take the form of an increase in imports, particularly imports of goods that domestic producers have a comparative disadvantage in producing. Given that my theory is about developed democracies, a negative import shock may be an increase in imports from any of the dozens of countries that are relatively low-wage and likely to specialize in goods that developed democracies are comparatively disadvantaged in producing (e.g., Bernard, Jensen, and Schott 2006). A naive estimate of the effect of a negative import shock on compensation may then simply regress a measure of compensation on a change in low-wage imports.

However, this would fail to recover the effect of a negative import shock on compensation

due to selection bias. Countries that are more or less willing to increase compensation in the event of a negative import shock (i.e., countries that have baseline differences in potential outcomes) may try to select how much of a shock they receive. This is akin to omitting variables that correlate with receiving a negative import shock and directly affect compensation. For example, countries that lack large safety nets may find it more difficult to compensate the losers of a negative trade shock and thus may be less open to trade. Failing to control for safety net size in this case would result in estimating a biased effect of a trade shock on compensation since countries are anticipating compensation by reducing their exposure to imports.

To avoid selection bias and potentially omitted confounders, I rely on a now standard approach in political economy to identify the effect of a negative import shock on compensation. I calculate a shift-share instrument that uses a common (i.e., shared by all units), plausibly exogenous change in import-competing goods to instrument for unit level changes in import-competing goods that countries can more easily select into. This common change or shock is then multiplied by unit level shares of manufacturing employment to retrieve unique, unit level shocks. Following Autor et al. (2013) and Colantone and Stanig (2018), among others, I use a common change in imports from China to the U.S. to instrument for unit-level changes in Chinese imports. The logic for using Chinese imports to the U.S. as an instrument is that it captures supply-side changes in Chinese production that is plausibly exogenous to demand (and therefore potential compensation) in non-U.S. countries.

Because my measure for compensation is observed at the country-year level (discussed below), I calculate a novel shift-share instrument using the following two equations. The unit-level negative import shocks are given by:

$$\frac{\text{Manufacturing Employment}_{it-1}}{\text{Total Employment}_{it-1}} \times \frac{\Delta_{t-1}^{t}\text{Imports from China}_{i}}{\text{Total Employment}_{it-1}}. \tag{4}$$

These are then instrumented with:

$$\frac{\text{Manufacturing Employment}_{it-1}}{\text{Total Employment}_{it-1}} \times \frac{\Delta_{t-1}^{t}\text{Imports from China}_{U.S.}}{\text{Total Employment}_{it-1}}. \tag{5}$$

Note that in keeping with the literature, I normalized changes in imports by total employment such that this country-year shift-share simplifies to the weighted product of manufacturing employment and import changes. As is also standard, I use employment in the "pre" shock period $(t-1)$ which provides information about how many workers involved in the production of comparatively disadvantaged goods (i.e., losers) are exposed to the negative import shock. The data on imports used to construct this measure come from the IMF (2025) while data on employment come from the OECD (2025).

There are two primary assumptions underlying this identification strategy: exogeneity and relevance of the instrument. While it is impossible to demonstrate exogeneity, I borrow the logic from Autor et al. (2013) to argue that the changes in Chinese exports to the U.S. during the 2000's (which is a significant part of my sample period, as will be discussed more below) largely stem from supply-side changes in Chinese production. These supply-side changes are plausibly exogenous to the potential outcomes of other developed countries when measured using changes in Chinese imports to the U.S. This may be violated, for example, if there were spillovers in demand for Chinese goods from the U.S. to other developed countries. For the sake of my analysis, I assume that this is not the case but I present the assumption for transparency.

Demonstrating relevance of the instrument is more straightforward. Regressing the endogenous shock from equation (4) onto the instrument from equation (5) for my sample (again, discussed below) yields an F statistic of 38.02 (including country fixed effects and clustering standard errors by country). Specifying country and year fixed effects while clustering on country gives an F statistic of 117.18. Both of these F statistics are above the threshold of 23.10 recommended by Olea and Pflueger (2013). However, the exact F statis-

tics and thus relevance of the instrument vary when including covariates, as is done when I present results in section 5.

4.1.2 A Measure of Compensation

I now turn to how I measure the outcome, compensation. Theoretically, compensation is the redistribution of trade gains from the winners to the losers. The textbook example of compensation, and thus how it is typically measured, is trade adjustment assistance (TAA) in the U.S. However, there is not a standard measure of compensation that is used in cross-national studies. I settle on two related measures from the OECD (2023) to measure compensation in developed democracies: total public spending as a percentage of GDP (henceforth, total spending) and unemployment spending as a percentage of GDP (henceforth, unemployment spending).

Total spending is a commonly employed measure of welfare spending and is consistent with Rodrik's (2018, 18) definition of "actual compensation" in the form of "generous safety nets." Total spending may also be less politically contentious than targeted redistribution and more holistic, making it a likely supply of compensation (Rodrik 2018). However, total spending is also extremely broad. Therefore, I use unemployment spending as another measure, which may more narrowly capture redistribution to those who have lost wages and jobs from trade. Unemployment spending also has some precedent in the literature of trade shocks in developed democracies, with Milner (2021), for example, using it as a measure of compensation.

4.2 Measuring Tacit Collusion

Step two of my research design is to measure tacit collusion. A fundamental challenge with measuring tacit collusion is that it is unobservable. By definition, tacit collusion relies on an implicit or unstated agreement between those involved. At best, tacit collusion may be inferred through the behavior resulting from the implicit agreement. For example, in the

canonical example of Cournot duopoly, tacit collusion between two firms may be inferred when both firms restrict their production to increase profits. However, there are always alternative explanations for correlated behaviors (e.g., a common increase in the cost of production), and inferring tacit collusion can become tautological. If tacit collusion between political parties results in a lack of compensation, for example, it is tautological to infer that tacit collusion is occurring from observing a lack of compensation.

One possible solution to the problem of measuring tacit collusion is to use information about the factors that make tacit collusion feasible. If these factors were known and observable in principle, it should be possible to measure when tacit collusion is likely to occur. Because I suggest four factors that affect the sustainability or feasibility of tacit collusion in my theoretical model, I adopt this approach. In Table 1, I summarize the factors that affect the feasibility of tacit collusion according to my model (see section 3.3 for more detail). My goal is to measure these factors to observe how feasible tacit collusion is in developed democracies.

Theoretical Parameter	Interpretation	Theoretical Effect on the Possibility of Tacit Collusion
δ	How much coalitions value the future	$\uparrow$
p	Probability the incumbent coalition wins	$\curvearrowright$
c	Cost of compensation	$\uparrow$
ψ	Payoff from winning the election	$\downarrow$

Table 1: The parameters in my formal analysis that affect the feasibility of tacit collusion (see section 3.3 for more detail).

However, this approach creates an additional problem. If a country has high values for some factors but low values for others, what can be concluded about the overall feasibility of tacit collusion in that country? I address this problem in two ways. The first is including the measures for all factors in one statistical model, thus accounting for differing values of each. The second is to conduct latent variable analysis, which allows me to model how the

unobserved feasibility of tacit collusion relates to the observed factors. This gives me an overall value for feasibility that is easier to interpret. Because of this, I prefer the second approach using latent variable analysis and include results from the first approach in the appendix, which I discuss there.

4.2.1 Measuring the Factors

In this section I describe how I measure the factors displayed in Table 1. I measure δ by calculating the average number of past elections each effective party has competed in for the countries with available data (Doring and Manow 2024). Using data on the effective number of parties (Hellstrom et al. 2024) and each party's seat share in the lower house of the legislature (Doring and Manow 2024), I focus on the parties that I infer are the "effective" parties. For example, if the effective number of parties in a country-year is 3, I calculate how long the 3 parties with the highest seat shares have been competing together. The reason for this is because I want to avoid including smaller, potentially more temporary parties that likely join coalitions and would bring this measure closer to zero. The idea behind this measure is that it provides information on how long parties can expect to compete for in the future. If the effective parties in a country have a long history of competing, it may be reasonable for these parties to expect to compete for a long time going forward. Thus, this gives insight into how much coalitions value the future and is a measure of δ from section 3.

I measure p by calculating the average difference between each effective party's seat share and an equal split of total seat share (Doring and Manow 2024). For example, if there are 4 parties, this measure would be small if each party had roughly a quarter of seat share. Again, I focus on effective parties because including smaller parties would likely inflate the measure. This measure allows me to capture the idea that relatively noncompetitive parties (i.e., a large inequality in seat share won among parties) are less likely to tacitly collude.

Cost (c) is measured using primary balances (IMF 2021), which describes the budget deficit or surplus that a governments runs in any country-year. This captures the theoretical

cost of compensation for those who win office, as a larger deficit means that it is more costly to spend on compensation. A main cost of compensation is the raising of inefficient taxes to pay it. If budget surpluses are high, this cost is relatively low. When budget deficits occur, the cost of raising additional revenue to pay for compensation is high. Intuitively, the greater the cost of compensation the greater the incentive to implicitly agree to avoid competing over increasing it.

The payoff from holding office, ψ, is measured using the average number of years that a coalition can stay in office for if they win (Hellstrom et al. 2024). This captures the payoff from holding office since a longer maximum time in office means that winning that election is more valuable. The more valuable it is to win office, the greater incentive there is to forgo the long-term benefits of avoiding the cost of compensation by tacitly colluding. Table 2 summarizes the measures used.[2]

[2]The first three of these measures were transformed by multiplying by -1. This is to ensure that the measure is comparable to the theoretical parameter. For example, the cost of compensation should positively affect the feasibility of tacit collusion, but lower values of primary balances imply higher costs (i.e., deficits). Thus, primary balances should be negatively related to the feasibility of tacit collusion.

Theoretical Parameter	Observed Indicator	Relationship to Theoretical Parameter
δ	The average number of past elections each effective party has competed in	The more that parties have competed together, the more that parties may think they'll compete in the future
p	The average difference between each effective party's seat share and an equal split	The more equal seat share, more equal parties judge probabilities of winning
c	Primary balances	The more that a country runs a deficit, more costly it is to compensate
ψ	The number of years until the next election	The more time that a coalition has in office, the more valuable winning that election is

Table 2: The observed indicators that are used in the latent variable analysis to estimate the feasibility of tacit collusion.

4.2.2 Estimating the Latent Variable

Given these measures, I conduct latent variable analysis to back out the overall feasibility of tacit collusion. Because these measures are continuous rather than the binary indicator variables typically used in item response theory, I model the relationship between each measure and the overall feasibility of tacit collusion with a normal distribution. Specifically, I use JAGS in R (Plummer 2025) to estimate the parameters of the following likelihood over

50,000 iterations:

$$\mathcal{L}(Y_{itk}) = \prod_{i=1}^{N}\prod_{t=1}^{T}\prod_{k=1}^{K}\mathcal{N}(\alpha_k + \beta_k\theta_{it}, \sigma^Y), \tag{6}$$

where θ_{it} is the latent, overall feasibility of tacit collusion in country i and year t. The k factors used in the model were discussed in the previous section and are displayed in Table 2 above. Since electoral competition does not change rapidly from year to year, I follow Reuning, Kenwick, and Fariss (2019, 506) and specify a dynamic latent that is ideal for latents that are "relatively slow-moving over time:"

$$\theta_{i,t=1} \sim \mathcal{N}(0, 3) \tag{7}$$

$$\theta_{it} \sim \mathcal{N}(\theta_{i,t-1}, \sigma^\theta_{it}). \tag{8}$$

I also follow Reuning, Kenwick, and Fariss (2019, 505–6) in specifying "weakly informative" priors on the intercept $\Big(\alpha_k \sim \mathcal{N}(0, 3)\Big)$, slope $\Big(\beta_k \sim \mathcal{HN}(0, 3)\Big)$, and variance parameters $\Big(\sigma^\theta_{i,t=1}, \sigma^Y \sim \mathcal{HN}(0, 3)\Big)$ where $\mathcal{HN}$ is the half-normal distribution. However, I also allow for σ^θ to vary by unit and time. To do so, I specify $\sigma^\theta_{it} \sim \mathcal{N}(\sigma^\theta_{i,t-1}, 0.1)$. These are relatively loose priors and the results do not depend on these particular parameter values.

The ultimate result of this process is displayed in Figure 4, with Figure 5 showing a cross-section of the estimated latent variable in 2022 for easier comparison across countries. The estimated feasibility of tacit collusion in these figures have some face validity that may imply the analysis is capturing the concept of tacit collusion. Specifically, the United Kingdom consistently reports a relatively high feasibility, which fits with intuition since it is a country dominated by two parties with a long history of competing. This should translate into both parties valuing future electoral competition highly since each party knows it has a fair chance at winning an election and that this will be the case for perhaps an indefinite number of future elections. The country has also ran a budget deficit on average for the sample period, meaning that spending more on compensation is likely relatively costly.

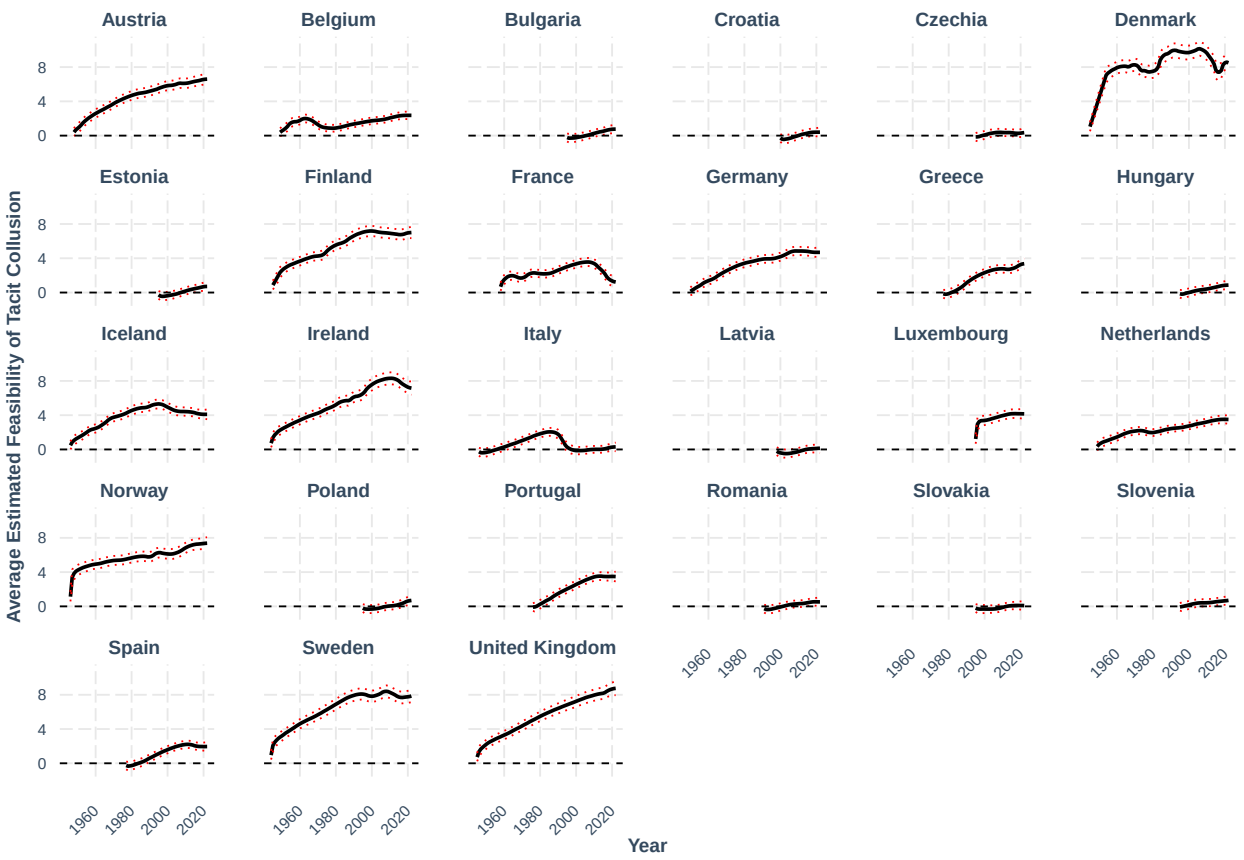


Figure 4: The estimated feasibility of tacit collusion. The black line represents the mean results from 50,000 iterations of the model in equation (6) estimated with JAGS in R. The red, dotted lines represent 1 standard deviation above and below the mean.

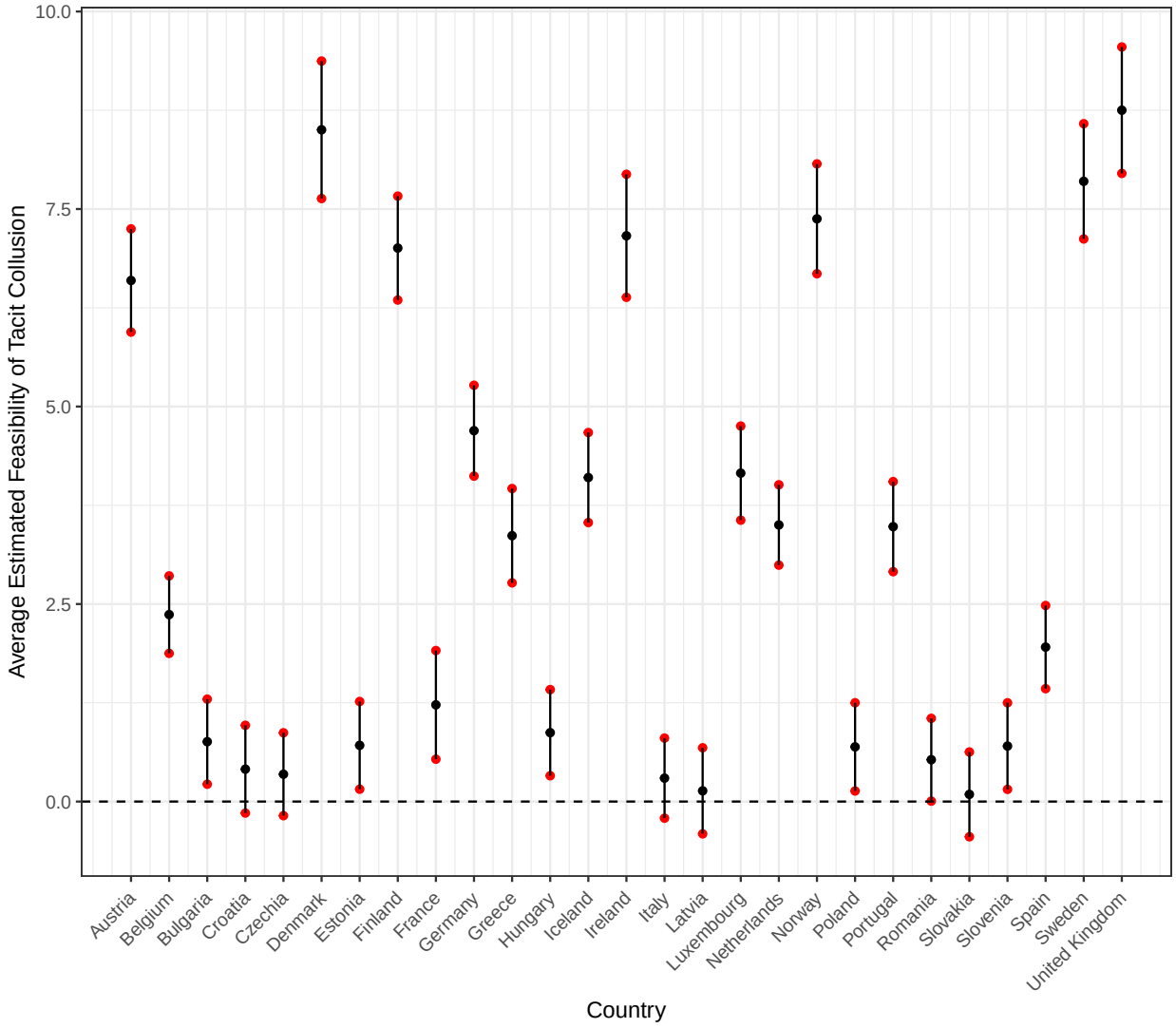


Figure 5: The estimated feasibility of tacit collusion in 2022 across the countries used in the latent variable analysis.

4.3 Statistical Model and Sample

Due to the employment data used in constructing the shift-share instruments and some of the observed indicator data in the latent variable analysis, the final sample I use in subsequent results is limited to 24 countries with unbalanced years between 2000-2022.[3]

[3]The countries are Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, and the U.K.

The main model I specify is:

$$DV_{it} = DV_{i,t-1} + \beta_1 \text{China Shock}_{it} + \beta_2 \text{Tacit Collusion}_{it} + \beta_3(\text{China Shock}_{it} \times \text{Tacit Collusion}_{it}) + \beta_4 \text{Ideology}_{it} + e_{it} \tag{9}$$

for $DV_{it} \in \{\text{Total Spending, Unemployment Spending}\}$. I include a lagged dependent variable because past values of government spending are well-known to be very influential on current values of spending (Lipsmeyer, Philips, and Whitten 2023). I also include a measure of government ideology (Doring and Manow 2024) to explicitly account for the alternative explanation that spending is mostly driven by ideological considerations. The China shock variable is calculated according to equation (4) and is instrumented with a variable calculated according to equation (5).

To incorporate the uncertainty from the estimated feasibility of tacit collusion, I estimate the model in equation (9) 10,000 times. Each time, I use a different vector of values for the feasibility of tacit collusion drawn from $\mathcal{N}\Big(\text{mean}(\theta_{it}), \text{sd}(\theta_{it})\Big)$, the posterior distribution of the latent variable (Fariss, Kenwick, and Reuning 2020). The results are then combined using the rules for combining results from imputation, namely (Rubin 1987; King et al. 2001):

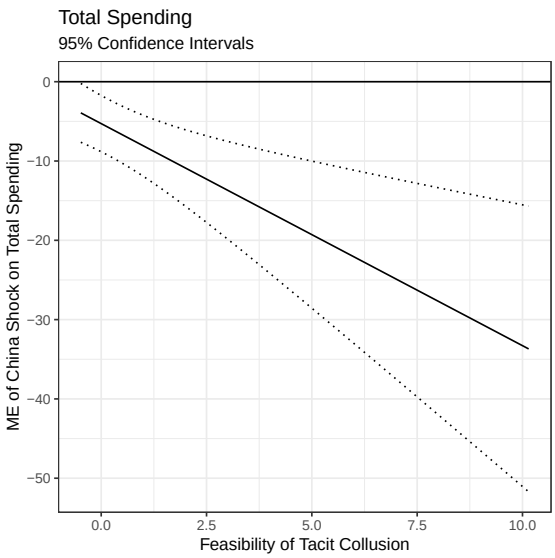
$$\bar{\beta_k} = \frac{1}{m} \sum_{j=1}^{m} \hat{\beta}_{kj}, \tag{10}$$

$$\widehat{\text{var}}(\bar{\beta_k}) = \frac{1}{m} \sum_{j=1}^{m} \widehat{\text{var}}(\hat{\beta}_{kj}) + \sum_{j=1}^{m} \frac{(\hat{\beta}_{kj} - \bar{\beta_k})^2}{m-1}(1 + \frac{1}{m}). \tag{11}$$

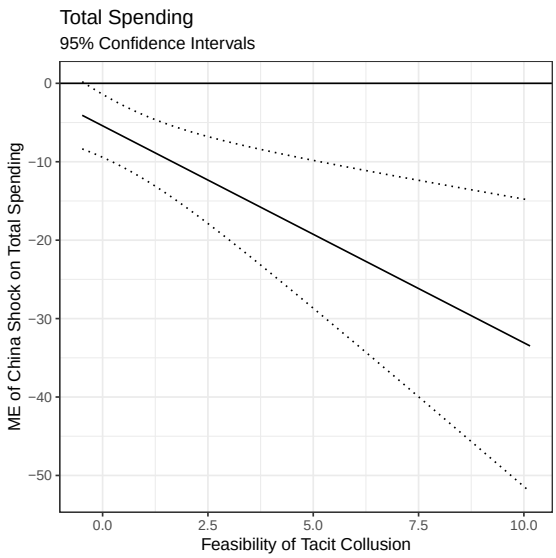
5 Results and Discussion

Figure 6 presents the main results. The left-hand graph displays the results from the main model displayed in equation (9) while the right-hand side includes country fixed effects. Both models are estimated with 2 stage least squares and feature standard errors clustered

by country. Both models were estimated 10,000 times with the results combined according to Rubin's rules for combining imputation results (Fariss, Kenwick, and Reuning 2020).



Variable	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.96	0.01	0 ***
China Shock	-5.29	1.81	0.006 ***
Tacit Collusion	0.04	0.02	0.045 **
China Shock × Tacit Collusion	-2.80	0.90	0.003 ***
Ideology	0.09	0.09	0.237
N×T:	506.00		
First stage F Statistic:	37.90		
FE: None			
SE's clustered by: Country			



Variable	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.87	0.02	0 ***
China Shock	-5.42	2.05	0.012 **
Tacit Collusion	0.14	0.10	0.146
China Shock × Tacit Collusion	-2.77	0.95	0.006 ***
Ideology	0.31	0.17	0.078 *
N×T:	506.00		
First stage F Statistic:	33.00		
FE: Country			
SE's clustered by: Country			

Figure 6: These two tables display the results from the statistical model in equation (9), respectively. Each model was estimated 10,000 times, each time using a different vector of values for the feasibility of tacit collusion drawn from $\mathcal{N}\Big(\text{mean}(\theta_{it}), \text{sd}(\theta_{it})\Big)$, the posterior distribution of the latent variable. The coefficients and standard errors were then calculated using Rubin's (1987) rules for combining results from imputation. The plots display the interactions highlighted in the respective table below each plot.

The marginal effect plots displayed in Figure 6 were calculated using the following formulas (Clark and Golder 2023):

$$\text{ME} = \hat{\beta}_1 + \hat{\beta}_3 Z, \tag{12}$$

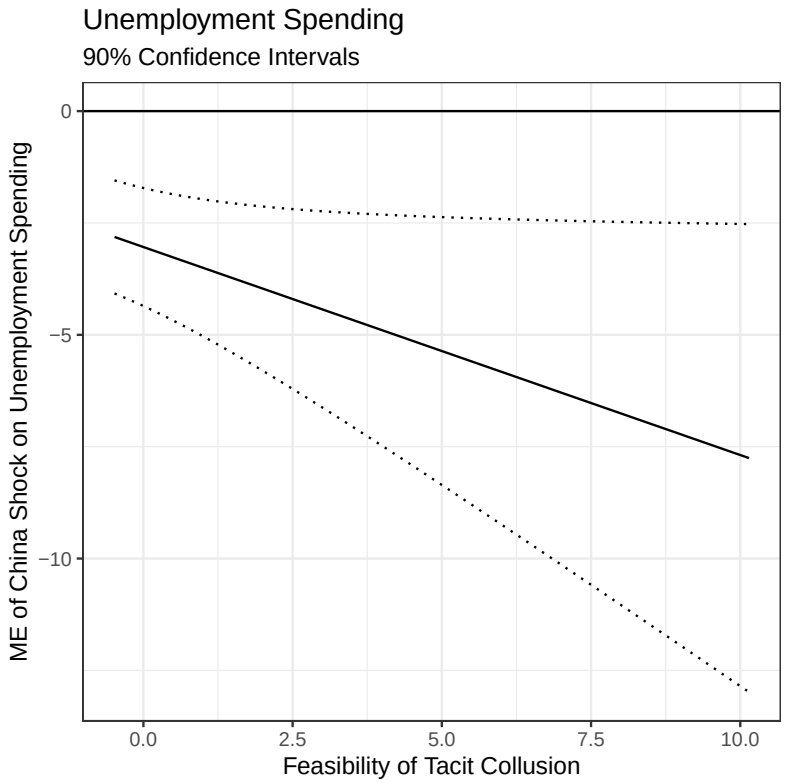
$$\widehat{\text{var}}(\text{ME}) = \widehat{\text{var}}(\hat{\beta}_1) + Z^2 \widehat{\text{var}}(\hat{\beta}_3) + 2Z\widehat{\text{cov}}(\hat{\beta}_1, \hat{\beta}_3), \tag{13}$$

where $\hat{\beta}_1 = \text{Coefficient}(\text{China Shock})$, $\hat{\beta}_3 = \text{Coefficient}(\text{China Shock} \times \text{Tacit Collusion})$, and Z is

a vector of representative values for the feasibility of tacit collusion.

Figure 7 shows the results for unemployment spending, which are only statistically distinguishable from 0 at a 10% significance level and with the inclusion of both country and year fixed effects. The above result with total spending (Figure 6) is not robust to the inclusion of year fixed effects. The full results for both total spending and unemployment spending can be found in the Appendix, where it can be seen that the interaction term is always in the theoretically predicted direction (negative), albeit imprecise for several specifications.

The results in Figures 6 and 7 are consistent with the theoretical implication that negative import shocks cause less compensation on average as tacit collusion becomes more possible. As the estimated feasibility of tacit collusion increases, the marginal effect of the China shock becomes increasingly negative. Conditional on the assumptions holding that are necessary for identification, namely exogeneity of the instruments (see section 4.1), this marginal effect captures how much changes in compensation are caused by an increase in free trade. Interestingly, and in line with work discussing compensation failure (e.g., Rodrik 2018; Frieden 2019), this quantity is never positive. This implies that on average for the given sample, compensation never increases as free trade increases. Even when the estimated feasibility of tacit collusion is low, compensation remains unchanged at best as free trade increases. This suggests to me that there should be a greater appreciation in future research for the difficulty in providing compensation, even when political elites want to supply it.



Variable	Coefficient	SE	p-value
Unemployment Spending$_{t-1}$	0.88	0.03	0 ***
China Shock	-3.04	0.80	0 ***
Tacit Collusion	-0.00	0.02	0.393
China Shock × Tacit Collusion	-0.47	0.28	0.099 *
Ideology	0.08	0.03	0.014 **
N×T:	441.00		
First stage F Statistic:	27.48		
FE: Country + Year			
SE's clustered by: Country			

Figure 7: As in Figure 6, this model was estimated 10,000 times. Each time, a different vector of values for the feasibility of tacit collusion was drawn from $\mathcal{N}\Big(\text{mean}(\theta_{it}), \text{sd}(\theta_{it})\Big)$, the posterior distribution of the latent variable. The coefficients and standard errors were then calculated using Rubin's (1987) rules for combining results from imputation. The plot displays the interaction highlighted in the table below the plot.

6 Conclusion

In conclusion, I have argued that it is puzzling why political elites have failed to compensate the losers of globalization. It has long been understood that free trade has distributional consequences and that it is possible for compensation to moderate these consequences. By failing to compensate the losers, incumbent political elites have made themselves vulnerable to a backlash against globalization from the right.

I argue that compensation failure can be explained by political elites avoiding competition over compensation. When the elites that partition the political sample space for voters take the same position on an issue, it ceases to be a factor in deciding who to vote for. If both an incumbent and challenger party promise the same policy on an issue during an election, then no matter who is elected the policy on that issue will be the same. Thus, rational voters will cast their votes based on the issues where political competitors differentiate themselves. This would explain why- even if voters demand more compensation- compensation failure can occur. If political elites adopt the same position of free trade with little compensation, voters have no one to vote for that could implement more compensation. They will then vote on other issues where elites have different policy positions.

I developed a simple formal model to demonstrate that it is rational for political elites to adopt similar positions on the issue of compensation when compensation is particularly costly, the payoff from a one-shot election win is not prohibitively large, and the political incumbent and challenger have relatively equal chances of winning the election. In this case, it is possible for elites to improve their utility by competing over less costly issues and adopting the same policy on compensation.

I evaluated the implications of my model by constructing original shift-share instruments to measure import shocks and the estimated feasibility of tacit collusion using latent variable analysis. To the extent that imports from China to the U.S. are independent of imports to countries in Europe, my research design identifies the effect of a negative shock to imports and how it is moderated by the tacit collusion. Results are consistent with my argument

that negative import shocks cause less compensation when tacit collusion is feasible.

7 Appendix

7.1 Solving for equation (3)

$$
\begin{aligned}
(1-\delta)\Big(\big(p\psi,(1-p)\psi\big)(1+\delta+...+\delta^{\infty})\Big) &\geq (1-\delta)\Big(\big(\psi,\psi\big)(1) \\
&\quad + \big(p(\psi-c),(1-p)(\psi-c)\big)(\delta+...+\delta^{\infty})\Big) \\
(1-\delta)\Big(\big(\frac{p\psi}{1-\delta},\frac{(1-p)\psi}{1-\delta}\big)\Big) &\geq (1-\delta)\Big(\big(\psi,\psi\big)+\big(\frac{\delta p(\psi-c)}{1-\delta},\frac{\delta(1-p)(\psi-c)}{1-\delta}\big)\Big) \\
\big(p\psi,(1-p)\psi\big) &\geq (1-\delta)\Big(\psi+\frac{\delta p(\psi-c)}{1-\delta},\psi+\frac{\delta(1-p)(\psi-c)}{1-\delta}\Big) \\
\big(p\psi,(1-p)\psi\big) &\geq \big(\psi-\psi\delta+\delta p(\psi-c),\psi-\psi\delta+\delta(1-p)(\psi-c)\big) \\
\big(\psi\delta-\delta p(\psi-c),\psi\delta-\delta(1-p)(\psi-c)\big) &\geq \big(\psi-p\psi,\psi-(1-p)\psi\big) \\
\Big(\delta\big(\psi-p(\psi-c)\big),\delta\big(\psi-(1-p)(\psi-c)\big)\Big) &\geq \big(\psi-p\psi,\psi-(1-p)\psi\big) \\
(\delta_A^*,\delta_B^*) &\geq \Big(\frac{\psi-p\psi}{\psi-p(\psi-c)},\frac{\psi-(1-p)\psi}{\psi-(1-p)(\psi-c)}\Big)
\end{aligned}
$$

7.2 Folk Theorem

Denote the minmax value of player i as $\bar{v}_i$, where $\bar{v}_i = \min_{s_{-i}\in S_{-i}}\max_{s_i\in S_i}U_i(s_i,s_{-i})$.[4] In words, the minmax value is the result of player $-i$ choosing the strategy (s_{-i}) that gives player i the smallest of their best response payoffs $(\max_{s_i\in S_i}U_i(s_i,s_{-i}))$.

[4](Maschler, Solan, and Zamir 2020, 112)

$$\begin{aligned}\bar{v}_A &= \min_{s_B \in S_B} \max_{s_A \in S_A} U_A(s_A, s_B) \\ &= \min_{s_B \in S_B} \{\psi, p(\psi - c)\} \\ &= p(\psi - c)\end{aligned}$$

$$\begin{aligned}\bar{v}_B &= \min_{s_A \in S_A} \max_{s_B \in S_B} U_B(s_B, s_A) \\ &= \min_{s_A \in S_A} \{\psi, (1-p)(\psi - c)\} \\ &= (1-p)(\psi - c)\end{aligned}$$

Denote a payoff as x and the set of players as N. The set of "individually rational" payoffs is denoted as V, where $V = \{x_i \geq \bar{v}_i \ \forall \ i \in N\}$.[5] V is simply the list of each individual's payoff that is greater than or equal to their minmax value. For this game, $V = \{p(\psi), \psi_A, p(\psi - c), (1-p)\psi, \psi_B, (1-p)(\psi - c)\}$.

Denote the set of feasible payoffs as F, where $F = \text{conv}\{U(s), s \in S\}$.[6] At is the smallest vector of numbers that contains the pair of payoffs for each strategy in the game. An this game, it is simply the list of payoff pairs for each action: $F = \{\Big(p(\psi, (1-p)\psi)\Big), \Big(0, \psi\Big), \Big(\psi, 0\Big), \Big(p(\psi - c), (1-p)(\psi - c)\Big)\}$.

Thus, the set of individually rational and feasible payoffs is $F \cap V$, also known as W (see Figure 8).[7]

[5](Maschler, Solan, and Zamir 2020, 538)
[6](Maschler, Solan, and Zamir 2020, 538)
[7](Maschler, Solan, and Zamir 2020, 548)

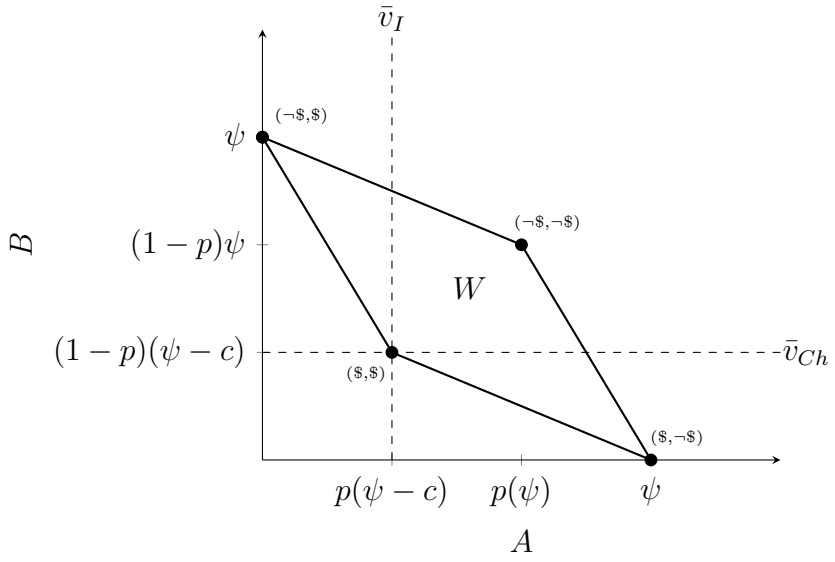


Figure 8: W is the set of payoffs that can be approximated in equilibrium via the Folk Theorem.

7.3 Full Results

Variable	Coefficient	SE	p-value	Coefficient	SE	p-value	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.961	0.008	0 ***	0.856	0.019	0 ***	0.902	0.018	0 ***
China Shock	-2.13	1.18	0.078 *	-1.81	1.37	0.166	-0.146	0.96	0.394
Tacit Collusion	0.037	0.014	0.013 **	0.124	0.095	0.169	0.041	0.072	0.338
China Shock × Tacit Collusion	-2.12	0.436	0 ***	-2.13	0.416	0 ***	-0.698	0.317	0.035 **
Ideology	0.065	0.082	0.289	0.293	0.169	0.089 *	0.303	0.122	0.019 **
N×T:			506			506			506
FE:			None			Country			Country + Year
SE's clustered by:			Country			Country			Country

Variable	Coefficient	SE	p-value	Coefficient	SE	p-value	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.96	0.01	0 ***	0.87	0.022	0 ***	0.9	0.019	0 ***
China Shock	-5.29	1.81	0.006 ***	-5.42	2.05	0.012 **	0.573	1.74	0.378
Tacit Collusion	0.044	0.021	0.045 **	0.14	0.099	0.146	0.045	0.071	0.327
China Shock × Tacit Collusion	-2.8	0.901	0.003 ***	-2.77	0.952	0.006 ***	-0.94	0.874	0.224
Ideology	0.087	0.086	0.237	0.306	0.169	0.078 *	0.301	0.115	0.013 **
N×T:			506			506			506
First stage F Statistic:	37.9			33			20.3		
FE:			None			Country			Country + Year
SE's clustered by:			Country			Country			Country

Table 3: DV: Total Spending. The top set of results are estimated using OLS and the bottom set using 2SLS instrumental variables.

Variable	Coefficient	SE	p-value	Coefficient	SE	p-value	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.965	0.009	0 ***	0.852	0.035	0 ***	0.866	0.03	0 ***
China Shock	-1.55	0.576	0.011 **	-1.61	0.566	0.007 ***	-1.04	0.59	0.084 *
Tacit Collusion	0.002	0.004	0.353	-0.008	0.021	0.37	-0.01	0.018	0.344
China Shock × Tacit Collusion	-0.193	0.181	0.225	-0.201	0.183	0.219	-0.125	0.19	0.321
Ideology	0.028	0.016	0.081 *	0.078	0.044	0.084 *	0.076	0.032	0.026 **
N×T:			441			441			441
FE:			None			Country			Country + Year
SE's clustered by:			Country			Country			Country

Variable	Coefficient	SE	p-value	Coefficient	SE	p-value	Coefficient	SE	p-value
Total Spending$_{t-1}$	0.968	0.011	0 ***	0.864	0.036	0 ***	0.877	0.029	0 ***
China Shock	-2.67	0.443	0 ***	-2.59	0.421	0 ***	-3.04	0.802	0 ***
Tacit Collusion	0.002	0.004	0.335	-0.006	0.022	0.382	-0.003	0.019	0.393
China Shock × Tacit Collusion	-0.261	0.177	0.134	-0.315	0.221	0.145	-0.465	0.278	0.099 *
Ideology	0.034	0.017	0.055 *	0.081	0.044	0.071 *	0.084	0.032	0.014 **
N×T:			441			441			441
First stage F Statistic:	37			38.3			27.5		
FE:			None			Country			Country + Year
SE's clustered by:			Country			Country			Country

Table 4: DV: Unemployment Spending. The top set of results are estimated using OLS and the bottom set using 2SLS instrumental variables.

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