Globalization, Domestic Institutions, and the New Politics of Embedded Liberalism

Chapter 2: GOVERNMENT SPENDING AND PUBLIC SUPPORT FOR TRADE IN THE OECD

Jude C. Hays
Assistant Professor of Political Science
The University of Illinois, Urbana-Champaign
jchays@uiuc.edu; https://netfiles.uiuc.edu/jchays/www/page.html

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Attitudes to globalization in the industrialized countries will be key to the future of the global economy. Hence, governments in those countries need to stand up and support the right policies, help their own people deal with the adverse consequences of economic change, and deliver on their promises on trade, aid, and the strengthening of the international economic system.

--Stanley Fischer, Ely Distinguished Lecture to the American Economic Association, 2003.

According to John Ruggie, the international community learned two important lessons from the collapse of the Gold Standard and interwar global economy. First, the international economy would break down if states pursued unilateral, beggar-thy-neighbor trade policies. As a result, postwar governments around the OECD, by and large, have committed themselves to pursuing free trade through multilateralism. Second, governments could not ignore the internal costs of adjusting to external economic shocks. Because trade causes economic dislocations and exposes workers to greater risk, it generates political opposition that democratically elected leaders ignore at their peril. Thus, one important implication of the commitment to free trade is that political leaders have had to be aware of and actively manage public support for economic openness. To do this, governments have exchanged welfare state policies that cushion their citizens from the vagaries of the international economy in return for public support for openness.

Ruggie has termed this exchange the bargain of *embedded liberalism*.[1] According to this story of postwar reconstruction, a link between trade and welfare state spending was established soon after the Second World War ended. Of course, the specific form this bargain takes is both geographically and historically contingent. The Keynesianism that emerged in the United States, for example, differed from the social democratic corporatism that developed in Sweden and Austria, and the demand management policies of the Bretton Woods era have given way to the

[1] Ruggie 1982, 1994, 1997, and 2003.

active (supply-side) labor market policies of the so-called Third Way. But the idea that there is a more or less universal expectation held by citizens in the developed democracies that their governments will limit the costs and distribute the benefits of open markets through some kind of government intervention and spending, and that public support for liberalism depends on the willingness and ability of governments to do this successfully, is the core of the embedded liberalism thesis. This is what distinguishes the embedded liberalism of the postwar period from the ideology of pure laissez-faire that guided economic policy under the Gold Standard.[2]

Recently, the argument that trade and government spending go hand in hand because governments have to compensate market losers has come under attack. Several studies claim that the relationship between trade and spending is weak at best and largely attributable to omitted variable bias. I have four criticisms of this research, which has focused almost entirely on the macro (country) level empirical relationship. First, it rarely distinguishes between imports and exports. Most studies use the summed value of imports and exports as a percentage of GDP (trade openness) as an independent variable in their respective regression analyses. This constrains the effects of imports and exports on government spending to have the same sign. I suspect these flows should have opposite signs. Second, it fails to consider the varying degrees of labor market exposure to international trade. I argue the post-industrial shift in production from tradables to non-tradables should reduce the effect that trade has on government spending,

[2] See Blyth 2002. Blyth argues that liberal capitalism has become less embedded since the Reagan and Thatcher period, but the changes, in his view, do not amount to a return to pre-WWI policies. Others argue that the significance of the Reagan and Thatcher "revolutions" has been exaggerated—for example, Pierson 1994.

since it reduces the number of workers employed in import-competing sectors of the economy.[3] Third, the empirical analysis ignores the spatial interdependence in the data. This is inefficient at best and leads to biased estimates of causal effects at worst.

My final and most important criticism is that no one has tested the micro-foundations of the embedded liberalism thesis. The key assumption is that government policies can build public support for trade. Macro-empirical studies that put spending on the left-hand-side of regression models will always be vulnerable to claims of omitted variable bias. To build a convincing empirical case for the free trade / welfare state linkage, it is necessary to examine data at a lower level of aggregation. In this chapter, I provide a micro-level test of the embedded liberalism thesis. The results have important and testable implications for the relationship between aggregate trade and government spending.

The chapter is organized as follows. In the first section, I briefly review and critique the literature on trade and government spending. In the second, I examine the empirical determinants of individual support for protectionism. My results show that individuals employed in import competing industries are the strongest opponents of trade, but unemployment insurance and active labor market programs can moderate their opposition. Based on these findings I argue that (1) politicians respond to surges in imports and not necessarily to expanding trade if it is balanced and (2) the extent to which politicians respond to rising imports will be a function of how many workers are employed in tradable industries. I test these two macro-level hypotheses in the third section of the chapter as a way to check the

[3] This is a reasonable argument for the time period covered by my data. However, the volume of trade in services is growing rapidly so this may not be true in the long run. I return to this point in my conclusion.

significance of my micro-level results for the trade / welfare state debate. I conclude in the fourth section.

Trade and Government Spending in the Developed Democracies

It is well known that countries with open economies have bigger governments.[4] It is also true that OECD countries have increased both their levels of trade and government spending during the post-WWII period. However, the debate remains unresolved as to whether these strong cross-national and over-time correlations reflect a causal relationship between trade and government spending, a politically conditioned relationship, or a completely spurious one. In addition to Ruggie, those who have argued government policies, by neutralizing the negative effects of trade, can deliver pro-trade majorities are Rodrik, Adsera and Boix, Swank and Mares.[5] These scholars argue there is a short-term causal relationship between trade and government spending.[6]

This position has been challenged in two ways. First, Garrett and Mitchell argue the relationship between trade and welfare state effort is long-term and historically contingent.[7] For the small economies of Western Europe, trade dependence facilitated unionization, which, in turn, created strong social democratic parties that built large welfare states when they came to power. These historical forces molded a new type of political-economy, what Garrett has called

[4] See, for example, Cameron 1978, Katzenstein 1985, and Rodrik 1998.

[5] Rodrik 1997, 1998; Adsera and Boix 2002; Boix 2002; Swank 2002a; and Mares 2004, 2005.

[6] By short-term I mean changes in trade at time t-1 have a discernible effect on government spending at time t.

[7] Garrett and Mitchell 2001.

social democratic corporatism. Garrett and Mitchell distinguish this argument, which is in the varieties of capitalism tradition, from Ruggie's:

> With respect to trade, for example, Cameron (1978) and Katzenstein (1985) both argue that there is a historical relationship between trade and welfare state effort…This is a very different argument from another perspective with which it is often conflated—Ruggie's (1983) notion of embedded liberalism. For Ruggie, the American welfare state expanded immediately after World War II because the government chose to liberalize trade, and realized they had to compensate market losers directly for the dislocations liberalization generated.[8]

Garrett and Mitchell contend that when country dummies (fixed country effects) are added to regression models, the analyst can distinguish between the long-term historical argument of Cameron and Katzenstein and Ruggie's notion of embedded liberalism. They do this and show the positive relationship between trade openness and government spending disappears.[9]

The strongest challenge to the embedded liberalism thesis, however, has come from globalization skeptics who believe the pressures and constraints attributed international economic integration have been grossly exaggerated. Iversen and Cusak, for example, argue the post-WWII growth of the welfare state is a product of deindustrialization not expanding trade.[10] They posit that workers who move from manufacturing and agriculture to services cross significant skill boundaries that make the transition difficult and uncertain. These problems, in turn, create new demands for government spending. Iversen and Cusak show that the relationship between trade and spending is either statistically or substantively insignificant after controlling for deindustrialization. Moreover, they claim that deindustrialization and

[8] Garrett and Mitchell 2001, 163. I believe both short-term and long-term historical forces are operating, and the empirical analysis bears this out.

[9] In fact, they find that the relationship is negative and statistically significant.

[10] Iversen and Cusak 2000.

globalization are largely independent processes.

Garrett and Mitchell and Iversen and Cusak raise serious questions about the validity of the embedded liberalism thesis. Thus, the causal mechanisms identified by Ruggie and others deserve closer empirical scrutiny. It is difficult to do this effectively by working only with data at the country level, and so in the next section, I test the microfoundations of the embedded liberalism argument using survey data. However, before moving on, I note three important criticisms of the research described in this section.

First, it fails to adequately distinguish between imports and exports. Most of the research uses trade openness—the summed value of exports and imports as a percentage of GDP—as the key independent variable.[11] This variable constrains the effects of imports and exports on government spending to have the same sign. Yet theory tells us increasing imports and exports should have opposite effects on government spending.[12] Rising imports create losers—displaced workers in import competing industries—that may have to be compensated, rising exports do not. Similarly, falling exports are harmful to domestic employment in a way that declining imports are not.

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[11] In addition to trade openness, Garrett and Mitchell include the value of imports from low wage countries in their analysis. They find these imports are weakly positively correlated with higher government spending and transfers, 169-70. They do not examine the effects of total imports on spending and transfers.

[12] This is true unless one is interested in measuring a country's exposure to external risk. To do this, one would interact a country's trade openness—a measure of how exposed it is to the international economy—with a measure of external risk like its terms of trade volatility. See Rodrik 1997, 1998. By itself trade openness is not a good measure of risk.

Second, the research also fails to recognize that the impact of trade flows on government spending depends on the underlying structure of the economy, in particular how many workers are employed in vulnerable traded industries. Because democratically elected governments are sensitive to numbers of votes, ceteris paribus, their response will be conditioned by the scope of threatened industries. If imports displace a large number of workers / voters, governments will have little choice but to provide compensation. If a small number of workers are displaced, politicians will face less pressure to respond.[13]

Finally, the empirical analysis in these studies ignores the spatial interdependence in the data. This is not only inefficient, but it could lead to biased estimates of the impact of imports on government spending. For example, if it is true that governments have been constrained by international capital mobility, particularly during the post-Bretton Woods era, then countries will be affected by levels of government spending in their neighbors. If import flows cluster spatially as well, ignoring the spatial interdependence in spending will bias estimation.

In the next section, I test whether government policies can build support for economic openness among groups that oppose it. If government spending on programs like unemployment insurance and active labor market programs successfully reduces the level of opposition, there is micro-level evidence that the embedded liberalism compromise is a viable solution to the

[13] The ceteris paribus condition is important. I assume that the ability of those employed in traded industries to organize remains constant. Because small groups may find it easier to engage in collective action, they are oftentimes able to exert political influence that is disproportionate to their numbers. For a discussion of the importance of collective action issues in trade policy politics, see Alt and Gilligan 1994.

political problems faced by democratically elected leaders who commit their countries to free trade.

Unemployment Benefits and Individual Attitudes Toward Trade

A flurry of research on the determinants of individual support for trade has been published in the last couple of years. Most of it, drawing on international trade theory, focuses on how one's skill level and the competitiveness of one's sector of employment determine support for protectionism. Examples include Scheve and Slaughter, O'Rourke and Sinnot, and Mayda and Rodrik among others.[14] The main conclusion of this research is that groups adversely affected by international economic competition are less likely to support policies of free trade. If government spending is driven partly by the need to generate public support for economic openness, this micro-level research has significant implications for the macro debate over trade and government spending. Yet none of these studies examine the impact of government programs on support for trade. It is surprising that very few scholars have tried to bridge the micro-macro divide.

The exception is work by John Aldrich, Peter Lange, and others at Duke University which shows that objective conditions of vulnerability translate into subjective feelings of insecurity and strong policy preferences that then determine an individual's party identification and ideology, variables that significantly affect vote choice.[15] One of the underlying motivations for the Duke project is that the macro-level literature on globalization and

[14] See Scheve and Slaughter 2001; O'Rourke and Sinnot 2002; Mayda and Rodrik 2005.

[15] For a summary of this research, see Aldrich et al. 2002.

government spending rests on untested micro-level assumptions.[16] Unfortunately, the degree of objective economic vulnerability highlighted in this research is never directly tied to individual-level exposure to international competition.[17] It is possible that trade generated anxiety leads to a different set of policy preferences. Tariffs, quotas, and other forms of non-tariff barriers to trade are policy options that are not available when economic hardships are caused by purely domestic competition. It could be that those adversely affected by trade are more likely to demand tariff protection than welfare state compensation. Under this scenario, governments that want to maintain free trade policies will supply compensation as a compromise solution. But this would make sense only if compensation in the form of unemployment insurance or active labor market programs effectively builds support for free trade among those who are likely to oppose it otherwise. This relationship between government spending and support for trade is the crux of the embedded liberalism thesis, and it has yet to be tested directly.

Before turning to the empirical analysis, I want to note another strength of the Duke project—its attention to the role of institutions in shaping individual policy preferences. Drawing upon important insights from the varieties of capitalism literature, this work examines the effects of different national production regimes on policy attitudes.[18] Because they determine the underlying nature of an economy's factor markets, national production regimes shape the political cleavages over trade, determine how vulnerable workers are to economic downturns,

[16] Brune and Garrett (2005) also call for empirical evaluations of these microfoundations.

[17] According to the table in Appendix 2 from Aldrich et al. 2002, none of the twenty or so objective economic variables examined in the Duke project directly measure an individual's degree of exposure to trade competition. The best proxy is sector of employment.

[18] See Hall and Soskice 2001 for an exposition of the varieties of capitalism argument.

and influence whether or not firms will support or oppose welfare state policies. For example, coordinated market economies rely more heavily on labor with sector-specific skills. Skill specificity makes workers more vulnerable to unemployment during economic downturns increasing political pressure for social insurance. In general, firms tend to be more supportive of welfare state policies in the coordinated economies as well. Moreover, because of the low levels of intersectoral mobility, trade politics is likely to divide along sector lines. In these ways, national production regimes affect how individuals perceive globalization.

I agree that a country's institutional structure plays an important role in shaping individual attitudes toward trade, but there are more general forces at work as well. I begin with these and then consider the importance of institutional context in chapters 3 and 4.

Data and Methods

The data is from the International Social Survey Program's (ISSP) 1995 and 2003 surveys on national identity. This dataset provides information about individuals' attitudes toward free trade. The countries in my sample are Australia, Germany, the United Kingdom, the United States, Austria, Norway, Sweden, New Zealand, and Canada.[19] The dependent variable (FREETRADE) is constructed from respondents' answers to the following question asked in the survey:

> How much do you agree or disagree with the following statement: (Respondent's Country) should limit the import of foreign products in order to protect its national economy.
>
> 1) Agree strongly
> 2) Agree

[19] I included all countries reporting occupational categories that a respondent's industry of employment.

3) Neither agree nor disagree
4) Disagree
5) Disagree strongly

I assigned a value of 1 to respondents who answered, "agree strongly," a 2 to those who answered, "agree," etc. Thus, high values of FREETRADE reflect pro-trade attitudes whereas low values reflect support for protectionism.

The baseline regression is grounded in trade theory. [20] The specific factors (Ricardo-Viner) model from international economics identifies sector of employment as crucial to determining an individual's attitudes toward trade. Individuals employed in export industries are likely to benefit from trade whereas individuals employed in import industries are likely harmed. This contrasts with the mobile factors (Stolper-Samuelson) model, which highlights the importance of one's factor endowment. Regardless of their industry of employment, the owners of relatively abundant factors of production benefit from trade. For the countries in this OECD sample, the abundant factors are highly skilled labor and capital.[21]

In the analysis, I use an income dummy variable as a proxy for one's capital endowment. I gave everyone in the sample whose annual family income was greater than $35,000 (1995 $'s)

[20] See Alt and Gilligan 1994; Hiscox 2002.

[21] These models tell us the direct effect of trade on income earned from employing different factors of production. It is also possible that trade affects the wealth and (unearned) income of asset owners. For example, Scheve and Slaughter (2001) find that home owners who live in import competing regions of the United States are, ceteris paribus, more likely to oppose trade than renters. Unfortunately, the data that I would need to test this and similar hypotheses on a cross-national basis is not readily available.

a score of one and everyone else a score of zero.[22] Following Mayda and Rodrik and Scheve and Slaughter, I use one's level of education as a proxy for skill endowment. I identify a respondent's (or spouse's) industry of employment by their occupation using the reported 4-digit code from the International Labor Organization's *International Standard Classification of Occupations*. I created a dummy variable indicating whether the respondent or respondent's spouse was employed in one of fourteen tradable industries identified in the OECD's (STAN) *Industry Structural Analysis Database*.[23] I then used the STAN database to create an export and import variable using each industry's ratio of exports and imports to value added. The export variable ranges from a low of zero for non-traded industries to a high of 4.403 for the Norwegian fabricated metals industry in 2003. The denominator in this ratio, value added, represents each sector's contribution to the country's GDP. The ratio can be greater than one for industries with costly inputs. The import variable ranges from zero for all non-traded industries to 9.656 for the Norwegian textile industry in 2003.

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[22] Local currencies were converted into dollars using the appropriate exchange rate; 2003 dollars were converted to 1995 dollars; and monthly income was converted to annual income when necessary. This is the same income measure used by Hiscox and Burgoon 2003.

[23] The industries are 1) Agriculture, hunting, forestry and fishing, 2) mining and quarrying, 3) food products, beverages and tobacco, 4) textiles, textile products, leather and footwear, 5) wood and products of wood and cork, 6) paper and paper products, 7) publishing, printing and reproduction of recorded media, 8) chemical, rubber, plastics and fuel products, 9) other non-metallic mineral products, 10) basic metals, 11) fabricated metal products, except machinery and equipment, 12) machinery and equipment, 13) transport equipment, and 14) manufacturing not elsewhere classified.

To this list I add several demographic and ideological variables used by Hiscox and Burgoon.[24] They identify gender, age, employment status, and marital status as important determinants of trade preferences. They also focus on an individual's political ideology and whether or not the respondent self-identifies with a particular religious faith. For ideology I use a five-point party affiliation scale provided in the ISSP dataset that ranges from far left (1) to far right (5). For the religion variable, I use a dummy that takes a value of one for individuals who self-identify with a religious denomination and zero for everyone else. One important demographic characteristic that Hiscox and Burgoon do not include in their analysis is whether the respondent has a dependent child living in their household. When it is possible to identify parental status from the survey, I include it as a control variable. I also include whether one holds nationalist attitudes, which was found by both Mayda and Rodrik and O'Rourke and Sinnott to be an important determinant of trade policy preferences. In their analysis, Mayda and Rodrik use four separate questions that gauge whether one holds patriotic, nationalistic, and/or chauvinistic attitudes. Using factor analysis, I extract a single component from the answers to these four questions that measures the degree to which an individual holds nationalist attitudes.

Finally, I include three policy variables in the analysis. Two of the three variables are objective measures of government policy: the net replacement rate for unemployment insurance and the amount of government spending on active labor market programs per unemployed worker. The former measure varies across individuals within countries while the latter does not. Active labor market spending does vary over time, however. I also include a subjective evaluation of the social security system. This variable is based on a question that asks respondents how proud they are of the social security system in their country. Respondents can

[24] Hiscox and Burgoon 2003.

answer "very proud", "somewhat proud", "not very proud", or "not proud at all." I scored these responses from 1 to 4, giving those who were not proud at all a 1 and those who were very proud a 4. I included a subjective measure out of concern that respondents might not be aware of the details of the unemployment insurance and active labor market policies in their countries. I assume that respondents who are "very proud" of their social security system feel that they are well protected by it and those who are "not proud at all" feel that they are not.[25]

Turning to the objective measures, I calculated each country's spending on active labor market (ALM) programs per unemployed worker using data from the OECD's Social Spending and Labor Force databases. These ALM programs, which are designed to improve job seekers' prospects of finding employment and increase the earning potential of workers, include spending on public employment, labor market training, and other policies intended to promote employment among the unemployed. I include the net replacement rate of each respondent's government-provided unemployment benefits (NRR). The 1998 Edition of the OECD's *Benefit Systems and Work Incentives* provides the 1995 net replacement rates for four family types at two income levels; the 2004 edition of *Benefits and Wages* provides these rates for 2002.[26] The family types are single, married couple, couple with two children, and lone parent with two

[25] This measure has its limitations. Political conservatives, for example, might not say they are proud of their country's social security system even if it offers generous protection. However, if conservatives are more supportive of trade, this will bias against finding a positive relationship between this subjective evaluation and support for free trade.

[26] Unfortunately, the 2003 numbers are not yet available. See tab. 3.1, 30, for the 1995 net replacement rates and tab. 3.1b, 95, for 2002 rates.

children. The income levels are average and two-thirds the average income level.[27] This gives up to eight different net replacement rates for each country in the sample.

I use Marital Status, Number of Persons in Household, and the Household Cycle variables from the ISSP dataset (v202, v293, and v294 respectively) as well as the family income dummy variable to identify each survey respondent's net replacement rate. The Household Cycle variable indicates whether there are children in the household. There are no problems identifying singles and married couples without children. In many instances it is not difficult to identify lone parents and married couples with children because these family types are included in the Household Cycle variable. The difficult cases arise when singles live in households with more than one adult and couples live in households with more than two adults. In these cases, parental status is unknown. I gave all identified married respondents with children the married two-child net replacement rate. Similarly, I gave all lone parents the lone parent two-child net replacement rate. When I could not identify parental status, I gave the respondent the average value of their no dependent and two-child net replacement rate.

The Household Cycle variable is not available for the United Kingdom and Austria in the 1995 survey. For these British and Austrian respondents, I used the Number of Persons in Household variable to identify cases where there are no children living in the household (e.g., a single respondent living in a household with only one person). When I could not determine whether or not children were living in the household, I used an average net replacement rate. In

[27] The 2004 edition of *Benefits and Wages* also provides net replacement rates for families with above average incomes (150% of the average). However, since my income (capital) variable is dichotomous and the above average income net replacement rates are not available for 1995, I do not use this data.

most countries net replacement rates are higher for low-income individuals. I used the income dummy variable to assign average income and below average net replacement rates. The main advantage of the NRR variable is that, with eight replacement rates, it provides substantial within country variation in unemployment insurance coverage.[28] (See appendix for summary statistics.)

I estimate ordered probits because the dependent variable, FREETRADE, is ordinal. Ordinal dependent variables can create problems for linear models because these models assume that the intervals between adjacent categories are equal. If this assumption does not hold, the estimated coefficients will be biased and misleading.[29] Also, since individuals sampled from the same country are likely to be influenced by common contextual factors, they should not be treated as independent of one another. This systematic country-level heterogeneity either needs to be modeled directly or the standard errors estimates for the regression coefficients need to take this clustering into account. I use fixed country and period effects and robust clustered standard errors to address this problem.[30]

[28] In terms of research design, this variable is an improvement over countrywide measures of unemployment protection because it allows the analyst to incorporate fixed country effects into the regressions. The fixed effects model allows us to control for unobservable or otherwise omitted country-level factors that correlate with a country's average net replacement rate.

[29] McKelvey and Zavoina 1975.

[30] For a discussion, see Moulton 1990 and Steenbergen and Jones 2002.

Results

The regression results are presented in Table 1.[31] Model 1 includes the baseline controls and the respondent's net replacement rate (NRR). The coefficients on all of the variables except *Imports* are correctly signed and statistically significant. Individuals in tradable industries are less supportive of free trade policies than those employed in non-tradable industries. However, because of the positive coefficient on the *Exports* variable, this difference shrinks as exports increase, implying that individuals employed in high import industries are more likely to support tariffs to protect the economy than individuals who are employed in either high export or non-tradable industries. Moreover, individuals with high levels of education (skills) and income (capital) are less likely to support protectionism. Finally, the higher an individual's net replacement rate the less likely they are to support protectionism. This confirms an important element of the embedded liberalism argument: government policies that remedy the negative effects of trade increase support for economic openness.[32] Note that these effects are identified from cross-national and over-time differences in net replacement rates for the various household types (e.g., single parent with below average income).

<Table 1 About Here>

In the second regression, I include each country's active labor market spending per unemployed worker. Again, the effects of this policy variable are identified from cross-national and over-time variation. The coefficient is correctly signed and statistically significant. Next, I estimate a model with both replacement rates and active labor market spending included. There

[31] The cut-point estimates are omitted from the table to save space.

[32] Along these same lines, Scheve (2000) finds that spending on labor market programs reduces the size of the skill cleavage individual-level support for European integration.

are no notable changes in the size or statistical significance of any of the coefficient estimates. For these regressions, the standard error estimates assume clustering by country-year (e.g., New Zealand-1995). Regressions 4-6 add all the demographic and ideological variables plus a period (i.e., 1995) dummy variable to the first three regressions. Because the period dummy is included, the standard errors estimates assume clustering by country only. In each of these regressions, the size of the effects of the policy variables increases.

Models 7-9 have the same specification as 4-6 except I include fixed country effects in the regressions—that is, I include country dummies—and drop the fixed period dummy variable. This controls for any omitted or unobservable variables at the national level that are correlated with the generosity of a country's unemployment insurance benefits. In these regressions, the policy effects are identified from over-time and cross-national variation in replacement rates and over-time variation in active labor market spending. In models 10-12, I add the subjective measure of an individual's satisfaction with the social security system to the set of independent variables. The most notable change in the coefficient estimates for the models with fixed country effects is that the coefficient on NRR becomes statistically insignificant. This is not too surprising because there is very little change from 1995 to 2003 in the net replacement rates for household types and the country dummies remove much of the cross-national variation.[33] The coefficient on the ALM variable is remarkably robust, its size and statistical significance holding across all the model specifications.

In order to demonstrate the size of the effects that the key variables have on individual support for free trade, I conduct several counterfactual experiments using the estimates for model

[33] In a larger cross-section that includes Eastern European countries, Hays et al. (2005) find the NRR effect is robust to the inclusion of country dummies.

(6). The results are reported in terms of predicted probabilities and changes in predicted probabilities in Table 2. As the benchmark, I use an individual with median scores on all of the variables included in the analysis. This individual is not employed in a tradable sector of the economy, has government provided unemployment insurance with a net replacement rate of 69%, can expect to benefit from $236 worth of government spending on active labor market programs in the case of job loss, and supports protectionism as a means to bolster the domestic economy with an approximate probability of .77. This representative respondent opposes protection with an approximate probability of .08.

If the respondent were employed in an export-oriented sector of the economy instead of a non-tradable sector, the probability of support for protectionism would be very similar. In the counterfactual, where the sector's exports are about 226% of value added, we cannot reject the hypothesis of no change in support for protectionism. If this respondent were employed in an import-competing sector of the economy, however, the probability of supporting protection rises by about .09 from .77 to .86.[34] Increasing this respondent's unemployment insurance from the median net replacement rate of 69% to the 90th percentile rate of 82% would lower the probability of strong support for protection by .08 bringing the level back down to the median respondent's. Finally, raising the level of active labor market spending from the median of $236 to the 90th percentile level of $3,982 would lower the probability of strong support for protectionism by a sizable .18.

[34] This number is calculated by summing the first two columns of tab. 2. In the experiment, I use trade to value added numbers for the individual at the 90th percentile from the distribution of those employed in tradable industries. The imports to value added ratio at the 90th percentile is 3.98.

<Table 2 About Here>

Overall, the results are very supportive of the embedded liberalism thesis. The strongest opposition to trade comes from individuals employed in sectors of the economy that have the highest levels of imports. Yet, the analysis also demonstrates that politicians can, in fact, build support for trade, even among these sectors. Politically feasible policy reforms can offset declines caused by increased exposure to international competition.

Imports and Government Spending in Post-Industrial Economies

The micro results confirm the significance of the tradable/non-tradable and import/export distinctions. Politicians who want to maintain support for trade will have to respond to surges in imports. This is particularly true if there are a large number of individuals employed in tradable sectors of the economy. However, as individuals move out of tradable industries it becomes less important for politicians to respond to increased imports. Thus, the micro results suggest that the movement of workers from tradable to non-tradable sectors will increase support for trade. Therefore, globalization and deindustrialization should have interdependent effects on government spending.[35] In post-industrial economies, the effect of imports on spending should be smaller in magnitude. I test this hypothesis below.

[35] Many believe that globalization and deindustrialization are interdependent processes in the sense that expanding trade explains the decline of manufacturing among the OECD economies. Iversen and Cusak reject this argument. See Iversen and Cusak 2000, 339-345. I am not arguing that trade causes deindustrialization but rather deindustrialization conditions the effect of trade on government spending. A similar argument is made by Mares, 2004.

Data and Methods

The sample, which spans from 1960 to 2000, includes twenty OECD countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. The key independent variable is the natural log of imports measured in millions of 1995 US dollars.[36] The size of the effect that imports will have on spending depends on how many workers are employed in tradable industries. I use Iversen and Cusak's measure of deindustrialization as a measure of the number of workers exposed to import competition.[37]

I include three separate dependent variables in the analysis. The first two are common in the literature: government consumption as a percentage of GDP and social benefits as a percentage of GDP.[38] The third is based on the NRR measure from the micro analysis. I use spending on unemployment insurance per unemployed worker divided by the average level of compensation per employee as a proxy for each country's net replacement rate (NRR).[39] The

[36] Economic Outlook Database.

[37] Their measure is 100 minus the workers employed in manufacturing and agriculture as a percentage of the working age population.

[38] This data is from the OECD's Economic Outlook database.

[39] The variables used to construct NRR are from the OECD's Social Spending, Labor Force, and Economic Outlook databases. For a critique of the research using government consumption and social benefits as dependent variables, see Burgoon 2001, and Mares, 2004. Mares argues that all expenditure-based measures are problematic because they do not reflect politically salient

first two measures are less specific to the causal argument being made—we might expect changes in these variables to be driven by a number of other factors—but there is almost twenty additional years of data available for them. Moreover, it is possible that the NRR measure is too limited in its scope. Constrained governments might respond in less direct ways to demands for insurance. For example, in the United States, much of the insecurity associated with losing one's job, comes from the fear of losing one's health insurance. In theory, the US government could respond to globalization pressures by providing better health care for its poorest citizens, and this would not show up in the NRR measure.

I add five control variables to the analysis: GDP per capita; the percentage of the population above the age of sixty-five; the percentage of cabinet seats held by left-wing parties; union density; and exports.[40] The first variable controls for Wagner's law, which predicts that governments will spend a higher proportion of GDP as per-capita real income rises. It also correlates with the business cycle and therefore may control for some of the non-discretionary changes in government spending. (In this case, we would expect the coefficient to be negative.) Pierson and others have identified an ageing population as the key demographic change driving government spending in the OECD today.[41] (For the net replacement rate variable, by contrast, we might expect a negative relationship since retired individuals do not benefit from unemployment insurance.) One would expect government spending to be higher where the political left and / or organized labor is strong. Since imports and exports are highly correlated,

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aspects of policy design. I disagree since expenditures are driven partly by the generosity of benefit payments, which is both discretionary and politically salient.

[40] The sources are Economic Outlook, Franzese 2002, and Swank 2002b.

[41] See, for example, Pierson 2001.

the log of exports is also included as a control variable. I expect the coefficients on imports and exports to have opposite signs. (See appendix for summary statistics.)

I estimate six panel regressions, two for each of the dependent variables. One model includes the controls; the other does not. Like many political scientists, I include a temporal lag of the dependent variable and country dummies in all of the models to control for persistence and unit heterogeneity respectively. I also include a spatial lag in the analysis as a way to model the cross-sectional interdependence in the data. This not only improves estimation efficiency, but also helps guard against bias. For example, if it is true that governments have been constrained by international capital mobility, particularly during the post-Bretton Woods era, then countries will be affected by levels of government spending in their neighbors. If import flows cluster spatially as well, ignoring the spatial interdependence in spending will bias estimation of the impact of imports on government spending. The spatial lags are generated with a row-standardized binary contiguity weighting matrix using shared territorial borders as the criterion.[42] Spatio-temporal lag models are discussed extensively in Franzese and Hays (2006) and more briefly in the methodological appendix to this chapter. Formally, the model is written as

$$\mathbf{y} = \rho\mathbf{W}\mathbf{y} + \phi\mathbf{M}\mathbf{y} + \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon} \tag{2.1}$$

where $\mathbf{y}$, the dependent variable, is an $NT \times 1$ vector of cross sections stacked by periods (i.e., the N first-period observations, then the N second-period ones, and so on to the N in the last period, T). The parameter ρ is the spatial autoregressive coefficient and $\mathbf{W}$ is an $NT \times NT$ block-diagonal spatial-weighting matrix. More specifically, we can express this $\mathbf{W}$ matrix as the Kronecker

[42] A few exceptions to the territorial border rule were made. France, Belgium, and the Netherlands were coded as contiguous with Britain; Denmark was coded as contiguous with Sweden; and Australia was coded as contiguous with New Zealand.

product of a $T \times T$ identity matrix and an $N \times N$ weights matrix $\left(\mathbf{I}_T \otimes \mathbf{W}_N\right)$, with elements w_{ij} of $\mathbf{W}_N$ reflecting the relative degree of connection from unit j to i. $\mathbf{Wy}$ is thus the spatial lag; i.e., for each observation y_{it}, $\mathbf{Wy}$ gives a weighted sum of the y_{jt}, with weights, w_{ij}, given by the relative connectivity from j to i. The parameter ϕ is the temporal autoregressive coefficient, and $\mathbf{M}$ is an $NT \times NT$ matrix with ones on the minor diagonal, i.e., at coordinates $(N+1,1)$, $(N+2,2)$, …, $(NT, NT-N)$, and zeros elsewhere, so $\mathbf{My}$ is the (first-order) temporal lag. The matrix $\mathbf{X}$ contains $NT \times k$ observations on k independent variables, and $\boldsymbol{\beta}$ is a $k \times 1$ vector of coefficients on them. The final term in (2.1), $\boldsymbol{\varepsilon}$, is an $NT \times 1$ vector of disturbances, assumed to be independent and identically distributed.

I estimate the model using maximum likelihood. This estimator is discussed in the appendix too. All of the right-hand-side variables, with the exception of the spatial lag, are serially lagged one period to address potential problems of endogeneity.[43]

Results

The regression estimates are reported in Table 3. In short, I find that the effect of imports on a country's level of government spending depends on how exposed the domestic labor market

[43] Franzese and Hays (2006) discuss the benefits and costs of using a serially lagged spatial lag variable. Since the endogeneity of the spatial lag is relatively easy to address in the specification of the likelihood function, I use a contemporaneous spatial lag.

is to trade.[44] The estimated coefficients on the imports and deindustrialization interaction variables are correctly signed in all the regressions, except for the coefficient on imports in model (6) which is correctly signed but not statistically significant at conventional levels.[45] An increase in a country's imports is associated with an increase in government spending. This effect is magnified when a large portion of the working-age population is employed in tradable industries. The estimated coefficients on both the temporal and spatial lag variables are positively signed and statistically significant.

<Table 3 About Here>

What do these results tell us of the substantive magnitude that import shocks in OECD countries have over time and across space? To answer this question we need to calculate the so-called spatial and spatio-temporal multipliers. (See Appendix for discussion.) The spatio-temporal effects of import shocks are presented in Tables 4 and 5 and Figures 1a and 1b. The spatial multiplier, $\left(\mathbf{I}_N - \rho\mathbf{W}\right)^{-1}$, captures the feedback from, say, Belgium on France and other

[44] This is similar to Mares' finding for the interwar period that both terms-of-trade and unemployment volatility have a larger impact on the coverage of unemployment insurance when the percentage of the workforce employed in manufacturing is high. See Mares, 2004.

[45] I do not include deindustrialization as a stand-alone regressor in model 5 because it is highly collinear with the interaction term and we have a small sample. The estimates of the other coefficients are much more precise when deindustrialization is omitted from the model. I feel comfortable dropping the variable because its coefficient is not statistically significant. In other words, I cannot reject the hypothesis that deindustrialization does not have a direct effect on net replacement rates. Excluding deindustrialization as a stand-alone regressor does not change the results in a qualitative sense though it does make them stronger.

countries, and back from France and those others on Belgium, and so on recursively. The immediate time-t effect on the vector of policy-outcomes throughout the OECD including that recursive feedback, can now be calculated with this spatial multiplier by considering certain counter-factual shocks to variables in $\mathbf{X}$ on the right-hand side of (2.1). Specifically, multiplying $\left(\mathbf{I}_N - \rho\mathbf{W}\right)^{-1}$ by an Nx1 column vector with 1 in row i and 0 elsewhere gives the immediate effect of a unit-shock to country i on policies in the other (N-1) countries j. For example, multiplying by a 20x1 column vector with 0 in all rows except that corresponding to Austria, which gets a 1, will give a 20x1 column-vector containing the estimated effects of a unit-shock in Austria on both its own spending and the spending of the other 19 countries.

The results of these calculations are presented in Table 4. The off-diagonal elements of the table report the effect of a one-unit positive shock in the column country's imports on the other countries' level of government consumption. So, for example, a $1 positive shock to the log of British imports increases spending in Ireland .04% of Irish GDP.[46] The diagonal elements of Table 4 report the effect of a one-unit positive import shock in the column country on its own government consumption after spatial feedback.

<Table 4 About Here>

In addition to these spatial dynamics, the model of government consumption includes a time-lag of the dependent variable and corresponding temporal dynamics. We could, therefore, plot the evolution of the one-period effects from Table 4 over time to illustrate the spatio-temporal dynamics of responses to various counterfactuals. More compactly, we can calculate

[46] In 2004, Ireland recorded a GDP of approximately $180 billion. The size of this effect, or .04% of $180 billion, is $72 million.

the long-run steady-state effect, including the feedback effects, of permanent hypothetical shocks to one country.

Table 5 reports these steady-state calculations, the column-entries corresponding to the same hypotheticals as those in Table 4. Not surprisingly, long-run steady-state effects are much larger. In the long run, a $1 positive shock to the log of British imports increases spending in Ireland by 3.9% of GDP. Of course, this effect assumes a permanent increase in British imports and would take many years to materialize. In this sense, the calculation likely represents an upper bound for the spatial effects. The results from the German column in Tables 4 and 5 are presented graphically in Figures 1a and 1b.

<Table 5, Figures 1a and 1b About Here>

Finally, I conduct a set of counterfactual experiments that compare the effects of a permanent increase in German imports on government consumption in both Germany and Austria for the industrial and post-industrial cases.[47] I set the deindustrialization variable to its sample low and high values for Germany and then calculated the effects of a 1-unit surge in imports.[48] I plot the results in Figures 2a-3b. Figure 2a presents the temporal effects (with spatial feedback) on government consumption in Germany from a positive 1-unit shock to imports. The solid and dashed lines with markers represent the estimated effects for the post-industrial and industrial cases respectively. The solid and dashed lines without markers provide a 95% confidence interval around these effects. The effects are larger for industrial Germany

[47] For the experiments, I used regression model (2).

[48] The sample low and high deindustrialization values Germany, found at the beginning and end of the series respectively, are 60% and 75%. Since the import variable is logged, a 1-unit positive shock amounts to a 100% increase.

than for post-industrial Germany—1.4% vs. 1.2% of GDP to begin and then 9% vs. 7.75% after ten periods—and the first differences in these effects, which are presented in Figure 2b, are statistically significant for up to ten periods after the initial surge in German imports.

<Figures 2a and 2b About Here>

Figure 3a presents the first-order spatio-temporal effects on government consumption in Austria from a positive 1-unit shock to German imports. Again, the solid and dashed lines with markers represent the estimated effects for the post-industrial and industrial cases respectively, and the solid and dashed lines without markers provide a 95% confidence interval around these effects. Deindustrialization reduces the size of the spatio-temporal effects that a shock to German imports has on government consumption in Austria. The first differences in the industrial and post-industrial effects, which are presented in Figure 3b, are statistically significant in both the short and long-run.

<Figures 3a and 3b About Here>

To sum, the macro results presented in this section demonstrate the significance of the individual-level findings for the trade / welfare state debate. Previous research has concluded that the short-term relationship between trade and governments spending is an artifact that disappears when fixed country effects and deindustrialization are taken into account. My results show that this is not the case. The relationship between trade and government spending is robust when imports and exports are distinguished, the interactive effects of trade and deindustrialization are recognized, and the spatial interdependence in the data is modeled.

Conclusion

Ruggie's embedded liberalism involves a political compromise in which leaders commit their countries to freer trade while managing the dislocations that follow. My empirical tests

demonstrate that this compromise is a politically feasible one. Citizens' attitudes towards trade are malleable and well informed by their self-interest according to the predictions of trade theory. Workers who compete against imports tend to oppose free trade, but their opposition can be reduced with policies designed to protect them like unemployment insurance and active labor market programs.

And yet the results in this chapter also suggest that governments are less responsive to imports today than in the past. As OECD countries have moved more toward service economies, the effect of import surges on spending has declined because fewer citizens work in import-competing sectors. Does this mean that the political significance of the bargain of embedded liberalism is on the decline? Probably not. The current situation with respect to trade and services is unlikely to last long. Those employed in services sectors of the economy will become increasingly exposed to international competition over time, especially if trade in services is effectively incorporated into the GATT/WTO.

With respect to the US economy, trade in services is growing rapidly and the balance between exports and imports is shrinking (relative to the value of these flows). According to data from the Bureau of Economic Analysis, exports of private services were worth $197 billion and imports $130 billion in 1995. By 2005, these numbers were $360 billion and $281 billion respectively. The recent American backlash against Indian phone centers is indicative of the increasingly competitive and global nature of service industries. Using measures of geographic industrial concentration, Jensen and Kletzer (2005) estimate that 13.7% of total US employment is in *tradable service industries* and therefore, at least potentially, subject to international competition. This compares to 12.4% in manufacturing industries. Thus, it is likely that the

bargain of embedded liberalism will remain politically significant well into the twenty-first century.

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Methodological Appendix

I. Estimation

A. Least Squares Estimation

OLS estimation of model(2.1), sometimes called spatial OLS or S-OLS, is inconsistent because the regressor $\mathbf{Wy}$, the spatial lag, covaries with the residual, $\boldsymbol{\varepsilon}$. The reason is simple; the spatial lag, $\mathbf{Wy}$, is a weighted average of the outcome in other units, thus placing the left-hand side (LHS) of some observations on the right-hand side (RHS) of others: textbook simultaneity. To see the implications of this endogeneity, first rewrite the spatial-lag model as

$$\mathbf{y} = \mathbf{Q}\boldsymbol{\delta} + \boldsymbol{\varepsilon} \tag{2.2},$$

where

$$\mathbf{Q} = \begin{bmatrix} \mathbf{Wy} & \mathbf{My} & \mathbf{X} \end{bmatrix} \text{ and } \boldsymbol{\delta} = \begin{bmatrix} \rho & \phi & \boldsymbol{\beta} \end{bmatrix}' \tag{2.3}.$$

The matrices $\mathbf{Q}$ and $\boldsymbol{\delta}$ have dimensions $N \times (k+2)$ and $(k+2) \times 1$ respectively. The asymptotic simultaneity bias for the S-OLS estimator is given by

$$\text{plim}\ \hat{\boldsymbol{\delta}} = \boldsymbol{\delta} + \text{plim}\left[\left(\frac{\mathbf{Q}'\mathbf{Q}}{n} \right)^{-1} \frac{\mathbf{Q}'\boldsymbol{\varepsilon}}{n} \right] \tag{2.4}.$$

In the case where $\mathbf{Q}$ contains a single exogenous regressor $\mathbf{x}$ (i.e., $k = 1, \text{cov}(\boldsymbol{\varepsilon}, \mathbf{x}) = 0$) and the error term retains no serial dependence controlling for time-lagged $\mathbf{y}$ (i.e., $\text{cov}(\mathbf{My}, \boldsymbol{\varepsilon}) = 0$), we can rewrite equation (2.4) as

$$\text{plim}\ \hat{\boldsymbol{\delta}} = \begin{bmatrix} \rho \\ \phi \\ \beta \end{bmatrix} + \frac{1}{|\boldsymbol{\Psi}|} \begin{bmatrix} \text{cov}(\mathbf{Wy}, \boldsymbol{\varepsilon}) \times \text{var}(\mathbf{My}) \times \text{var}(\mathbf{x}) \\ -\text{cov}(\mathbf{Wy}, \boldsymbol{\varepsilon}) \times \text{cov}(\mathbf{Wy}, \mathbf{My}) \times \text{var}(\mathbf{x}) \\ -\text{cov}(\mathbf{Wy}, \boldsymbol{\varepsilon}) \times \text{cov}(\mathbf{Wy}, \mathbf{x}) \times \text{var}(\mathbf{My}) \end{bmatrix} \tag{2.5},$$

where $\boldsymbol{\Psi} = \text{plim}\left(\frac{\mathbf{Q}'\mathbf{Q}}{n} \right)$.

Since $\boldsymbol{\Psi}$ is a variance-covariance matrix, its determinant is strictly positive. Thus, when the data exhibit positive (negative) spatial and temporal dependence, the covariances in equation (2.5) will be positive (negative), and so S-OLS will over- (under-) estimate ρ and under- (over-) estimate ϕ and β. To elaborate, assuming $\mathbf{W}$ positive definite, $\text{cov}(\mathbf{Wy}, \boldsymbol{\varepsilon})$ and $\text{cov}(\mathbf{Wy}, \mathbf{My})$ have the same signs as ρ and ϕ, respectively, and $\text{cov}(\mathbf{Wy}, \mathbf{x})$ is non-zero if $\mathbf{x}$ exhibits spatial interdependence, say $\mathbf{x} = \theta \mathbf{W}_x \mathbf{u}$, and, assuming both $\mathbf{W}$ are positive definite, has the same sign as $\rho\theta$.

In short, assuming positive spatial and temporal dependence, the most common case in practice, S-OLS estimation of spatial-lag models tends to overestimate the strength of spatial interdependence at the expense of unit-level and exogenous-external explanatory factors, including the temporal dynamics, all of which will tend consequently to be underestimated in proportion to their relative correlation with the spatial lag.

One easy way to ease or even erase the simultaneity problem with S-OLS is to lag temporally the spatial lag. To the extent that this makes the spatial lag pre-determined—that is, to the extent spatial interdependence does not have instantaneous effect, where *instantaneous* here means within an observation period, given the model—the S-OLS bias disappears. In other words, provided that the spatial-interdependence process does not have effect within an observational period, and, of course, that the spatial and temporal dynamics are adequately correctly modeled to prevent that problem arising via measurement/specification error, OLS with a temporally lagged spatial-lag on the RHS is a simple and effective estimation strategy. However, even in this best-case scenario, *OLS with time-lagged spatial-lags only provides unbiased estimates when the first observation is non-stochastic*. Elhorst (2001:128) shows that the likelihood

function for the spatio-temporal lag model retains the offending Jacobian even in this case if the first observation is stochastic.

B. Maximum-Likelihood Estimation

The conditional likelihood function for the spatio-temporal-lag model, which assumes the first observation non-stochastic, is a straightforward extension of the standard spatial-lag likelihood function, which, in turn, adds only one mathematically and conceptually small complication (albeit a computationally intense one) to the likelihood function for the standard linear-normal model. To see this, start by rewriting the spatial-lag model with the stochastic component on the left:

$$\mathbf{y} = \rho\mathbf{W}\mathbf{y} + \mathbf{XB} + \boldsymbol{\varepsilon} \Rightarrow \boldsymbol{\varepsilon} = \left(\mathbf{I} - \rho\mathbf{W}\right)\mathbf{y} - \mathbf{XB} \equiv \mathbf{A}\mathbf{y} - \mathbf{XB} \tag{2.6}.$$

Assuming *i.i.d.* normality, the likelihood function for $\boldsymbol{\varepsilon}$ is then the typical linear one:

$$L(\boldsymbol{\varepsilon}) = \left(\frac{1}{\sigma^2 2\pi}\right)^{\frac{NT}{2}} \exp\left(-\frac{\boldsymbol{\varepsilon}'\boldsymbol{\varepsilon}}{2\sigma^2}\right) \tag{2.7},$$

which, in this case, will produce a likelihood in terms of $\mathbf{y}$ as follows:

$$L(\mathbf{y}) = \mid \mathbf{A} \mid \left(\frac{1}{\sigma^2 2\pi}\right)^{\frac{NT}{2}} \exp\left(-\frac{1}{2\sigma^2}\left(\mathbf{Ay} - \mathbf{XB}\right)'\left(\mathbf{Ay} - \mathbf{XB}\right)\right) \tag{2.8}.$$

This still resembles the typical linear-normal likelihood, except that the transformation from $\boldsymbol{\varepsilon}$ to $\mathbf{y}$ is not by the usual factor, 1, but by $|\mathbf{A}|=|\mathbf{I}- \rho\mathbf{W}|$. Since $|\mathbf{A}|$ depends on ρ, it seemed that each time the maximum-likelihood routine recalculates the likelihood with updated estimates of ρ, it would have to recalculate the determinant at these new ρ-values. Ord (1975) redressed this computational-intensity issue by using the approximation $\mathbf{\Pi}_i\lambda_i$ for $|\mathbf{W}|$ because the eigenvector $\boldsymbol{\lambda}$ does not depend on ρ. Using $|\mathbf{I}- \rho\mathbf{W}| = \mathbf{\Pi}_i(1-\lambda_i)$ for $|\mathbf{A}|$ requires the estimation routine only to recalculate a product, not a determinant, as it updates. The estimated variance-covariances of parameter estimates follow the usual ML formula (negative the inverse of Hessian of the

likelihood) and so are also functions of |**A**|. The analogous strategies may serve there.

In is possible to solve the first-order conditions for all of the parameters in the spatio-temporal lag model except ρ. Therefore, it is possible (and preferable) to maximize a concentrated-likelihood rather than the full likelihood. To see this, unpack the spatial-lag likelihood function from equation (2.8) further to:

$$\ln L(\mathbf{y}) = \ln |\mathbf{A}| - \left(\frac{N}{2}\right)\ln \pi - \left(\frac{N}{2}\right)\ln \sigma^2 - \left(\frac{1}{2\sigma^2}(\mathbf{Ay} - \mathbf{X\beta})'(\mathbf{Ay} - \mathbf{X\beta})\right) \qquad (2.9).$$

Then, given an estimate of the spatial-lag coefficient, ρ, an analytic optimum estimate of the non-spatial coefficients can be found thusly:

$$\hat{\boldsymbol{\beta}} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{Ay} = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{y} - \rho(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\mathbf{Wy} = \hat{\boldsymbol{\beta}}_{\mathbf{O}} - \rho\hat{\boldsymbol{\beta}}_{\mathbf{L}} \qquad (2.10).$$

Note that the first term in the final expression of (2.10) is just the OLS regression of $\mathbf{y}$ on $\mathbf{X}$, and the second term is just ρ times the OLS regression of $\mathbf{Wy}$ on $\mathbf{X}$. Both of these rely soley on observables, (except for ρ), and so are readily calculable given some ρ (estimate). Next, define these terms:

$$\begin{aligned} &\hat{\boldsymbol{\varepsilon}}_{\mathbf{O}} \equiv \mathbf{y} - \mathbf{X\beta}_{\mathbf{O}} \\ &\text{and} \\ &\hat{\boldsymbol{\varepsilon}}_{\mathbf{L}} \equiv \mathbf{Wy} - \mathbf{X\beta}_{\mathbf{L}} \end{aligned} \qquad (2.11).$$

Then:

$$\hat{\sigma}^2 = (1/N)(\hat{\boldsymbol{\varepsilon}}_{\mathbf{O}} - \rho\hat{\boldsymbol{\varepsilon}}_{\mathbf{L}})'(\hat{\boldsymbol{\varepsilon}}_{\mathbf{O}} - \rho\hat{\boldsymbol{\varepsilon}}_{\mathbf{L}}) \qquad (2.12)$$

yields the S-ML estimate of the standard-error of the regression, and

$$\ln L_C(\mathbf{y}) = -\left(\frac{N}{2}\right)\ln \pi + \ln |\mathbf{A}| - \frac{N}{2}\ln\left(\frac{1}{N}(\boldsymbol{\varepsilon}_{\mathbf{O}} - \rho\boldsymbol{\varepsilon}_{\mathbf{L}})'(\boldsymbol{\varepsilon}_{\mathbf{O}} - \rho\boldsymbol{\varepsilon}_{\mathbf{L}})\right) \qquad (2.13)$$

yields the S-ML estimate of ρ. These latter substituted into (2.10) yields $\hat{\boldsymbol{\beta}}$. The procedure may be iterated, and estimated variance-covariances of parameter estimates derive from the

information matrix as usual, although they could also be bootstrapped. Routines written in *MatLab*^{TM} to employ this concentrated-likelihood approach (LeSage XXXX, www.spatial-econometrics.com).

II. Calculating and Presenting Spatio-Temporal Effects

Calculation, interpretation, and presentation of effects in empirical models with spatio-temporal interdependence, as in any model beyond the strictly linear-additive (in variables and parameters, explicitly and implicitly), involve more than simply considering coefficient estimates. *Coefficients* do *not* generally equate to *effects* beyond that simplest strictly linear-additive world. In empirical models containing spatio-temporal dynamics, as in those with only temporal dynamics, for example, coefficients on explanatory variables give only the pre-dynamic impetuses to the outcome variable from changes in those variables. The coefficients represent only the (often inherently unobservable) pre-interdependence impetus to outcomes associated with each RHS variable.

This section discusses the calculation of spatio-temporal multipliers, which allow expression of the effects of counterfactual shocks of various kinds to some unit(s) on itself (themselves) and other units over time, accounting both the temporal and spatial dynamics. These multipliers also allow expression the long-run, steady-state, or equilibrium impact of permanent such shocks. In this section, we also apply the delta-method to derive analytically the asymptotic approximate standard errors for these response-path and long-run effect estimates.[49]

Calculating the cumulative, steady-state spatio-temporal effects is most convenient working with the spatio-temporal-lag model in (Nx1) vector form:

[49] For an excellent discussion of spatial multipliers, see Anselin (2003).

$$\mathbf{y}_t = \rho\mathbf{W}\mathbf{y}_t + \phi\mathbf{y}_{t-1} + \mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t \tag{2.14}$$

To find the long-run, steady-state, equilibrium (cumulative) level of $\mathbf{y}$, simply set $\mathbf{y}_{t-1}$ equal to $\mathbf{y}_t$ in (2.14) and solve. This gives the steady-state effect, assuming stationarity and that the exogenous RHS terms, $\mathbf{X}$ and $\boldsymbol{\varepsilon}$, remain permanently fixed to their hypothetical/counterfactual levels:[50]

$$\begin{aligned}
\mathbf{y}_t &= \rho\mathbf{W}\mathbf{y}_t + \phi\mathbf{y}_t + \mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t \\
&= \left(\rho\mathbf{W} + \phi\mathbf{I}\right)\mathbf{y}_t + \mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t \\
&= \left[\mathbf{I}_{\mathrm{N}} - \rho\mathbf{W} - \phi\mathbf{I}_{\mathrm{N}}\right]^{-1}\left(\mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t\right) \\
&= \begin{bmatrix} 1-\phi & -\rho w_{1,2} & \cdots & \cdots & -\rho w_{1,\mathrm{N}} \\ -\rho w_{2,1} & 1-\phi & & & \vdots \\ \vdots & & \ddots & & \vdots \\ \vdots & & & 1-\phi & -\rho w_{(\mathrm{N}-1),\mathrm{N}} \\ -\rho w_{\mathrm{N},1} & \cdots & \cdots & -\rho w_{\mathrm{N},(\mathrm{N}-1)} & 1-\phi \end{bmatrix}^{-1}\left(\mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t\right) \\
&\equiv \mathbf{S}\left(\mathbf{X}_t\boldsymbol{\beta} + \boldsymbol{\varepsilon}_t\right)
\end{aligned} \tag{2.15}$$

To offer standard-error estimates for these steady-state estimates, one could use the delta method. I.e., give a first-order Taylor-series linear-approximation to nonlinear (2.15) around the estimated parameter-values and determine the asymptotic variance of that linear approximation. To find the key elements needed for this, begin by denoting the i^{th} column of $\mathbf{S}$ as $\mathbf{s}_i$ and its estimate as $\hat{\mathbf{s}}_i$. The steady-state spatio-temporal effects of a one-unit increase in explanatory variable *k* in country *i* are $\mathbf{s}_i\beta_k$ giving delta-method standard-errors of

$$\widehat{\mathbf{V}\left(\hat{\mathbf{s}}_i\hat{\beta}_k\right)} = \left[\frac{\partial\hat{\mathbf{s}}_i\hat{\beta}_k}{\partial\hat{\boldsymbol{\theta}}}\right]\widehat{\mathbf{V}\left(\hat{\boldsymbol{\theta}}\right)}\left[\frac{\partial\hat{\mathbf{s}}_i\hat{\beta}_k}{\partial\hat{\boldsymbol{\theta}}}\right]' \tag{2.16}$$

[50] The counterfactual addressed here is usually the steady-state effect of *permanent* shocks; since, given stationarity, the long-run steady-state effect of a temporary shock is zero.

where $\hat{\boldsymbol{\theta}} \equiv \left[\hat{\rho} \quad \hat{\phi} \quad \hat{\beta}_k \right]'$, $\left[\frac{\partial \hat{\mathbf{s}}_i \hat{\beta}_k}{\partial \hat{\boldsymbol{\theta}}} \right] \equiv \left[\frac{\partial \hat{\mathbf{s}}_i \hat{\beta}_k}{\partial \hat{\rho}} \quad \frac{\partial \hat{\mathbf{s}}_i \hat{\beta}_k}{\partial \hat{\phi}} \quad \hat{\mathbf{s}}_i \right]$, and the vectors $\left[\frac{\partial \hat{\mathbf{s}}_i \hat{\beta}_k}{\partial \hat{\rho}} \right]$ and $\left[\frac{\partial \hat{\mathbf{s}}_i \hat{\beta}_k}{\partial \hat{\phi}} \right]$ are the i^{th} columns of $\hat{\beta}_k \hat{\mathbf{S}} \mathbf{W} \hat{\mathbf{S}}$ and $\hat{\beta}_k \hat{\mathbf{S}} \hat{\mathbf{S}}$ respectively.

The spatio-temporal response path of the $N \times 1$ vector of unit outcomes, $\mathbf{y}_t$, to the exogenous RHS terms, $\mathbf{X}$ and $\boldsymbol{\varepsilon}$, could also emerge by rearranging (2.14) to isolate $\mathbf{y}_t$ on the LHS:

$$\mathbf{y}_t = \left[\mathbf{I}_N - \rho \mathbf{W}_N \right]^{-1} \left\{ \phi \mathbf{y}_{t-1} + \mathbf{X}_t \boldsymbol{\beta} + \boldsymbol{\varepsilon}_t \right\} \tag{2.17}.$$

This formula gives the response-paths of all unit(s) $\{i\}$ to hypothetical shocks to $\mathbf{X}$ or $\boldsymbol{\varepsilon}$ in any unit(s) $\{j\}$, including a shock in $\{i\}$ itself/themselves, just by setting $\left(\mathbf{X}_t \boldsymbol{\beta} + \boldsymbol{\varepsilon}_t \right)$ to one in the row(s) corresponding to $\{j\}$. To calculate marginal spatio-temporal effects (non-cumulative) or plot the over-time path of the effect of a permanent one-unit change in an explanatory variable (cumulative), and their standard errors, working with the entire NT x NT matrix is easier. Simply redefine $\mathbf{S}$ in the (2.15) as $\mathbf{S} \equiv \left[\mathbf{I}_{\text{NT}} - \rho \mathbf{W} - \phi \mathbf{M} \right]^{-1}$ and follow the steps outlined above.

Data Appendix

<Tables A1 and A2 About Here>

Book Appendix

A Brief Description of *Globalization, Domestic Institutions, and the New Politics of Embedded Liberalism*

By Jude C. Hays

Around the world there is growing political opposition to the liberalization of trade, rising levels of foreign investment, and inflows of foreign workers. This backlash against economic globalization is beginning to have an impact on public policy, particularly in the developed democracies. In Europe over the last few years, we have witnessed EU "enlargement fatigue," the rejection of a European constitution by French and Dutch voters and, more recently, governmental attempts to limit cross-border mergers and acquisitions in "strategic" industries. On the other side of the Atlantic we see similar political developments. President Bush had to fight an intense political battle early into his administration to win Trade Promotion Authority from Congress. During the 2004 campaign, presidential candidate John Kerry called CEOs who outsource production traitors. The Central American Free Trade Agreement passed the US House of Representatives by a single vote in the summer of 2005. The recent collapse of the WTO's Doha round of multilateral trade negotiations is yet another manifestation of swelling discontent with globalization.

Why do we observe this backlash, and where will it have the most significant and lasting policy consequences? What are the implications for the global economy and international relations more generally? These questions are important because expanding trade has been a source of growth and prosperity in core countries for many years and promises the same for countries in the developing periphery. There are potentially serious consequences for international peace and security too. When globalization was reversed in the 1930's, political disintegration and world war followed closely behind. Hence, it is imperative that we better our understanding of these issues.

My book addresses a large and rapidly growing literature in international and comparative political economy on globalization politics and closely related topics that focus on the relationship between the international economy and domestic politics. Portions of my argument have appeared in articles published by *International Organization* and *World Politics*. Some of the notable books in the same genre of scholarship include Garrett (1998), Gilpin (2000), Hiscox (2002), Swank (2002), Clark (2003), Mosley (2003), Iversen (2005), and Jensen (2006) among many others. The subject matter is one of longstanding interest to international relations and comparative politics scholars, but the book will appeal broadly to academics across several disciplines and to policymakers, as well as graduate and undergraduate students interested globalization.

International and comparative political economists have argued that the domestic political foundation of the current liberal international economy rests on an implicit bargain between governments and their citizens called the bargain of embedded liberalism. According to this compact, governments are expected to protect their citizens from the vagaries of the global economy, primarily through the provision of social insurance and, more recently, with active labor market programs in return for political support for policies like free trade that drive economic globalization. Without this support, democratically elected politicians find it hard to endorse policies of economic openness.

Some believe that new revenue constraints arising from the globalization of production and finance are making it increasingly difficult for governments to live up to their end of the bargain. International bond markets "discipline" governments that borrow excessively and multinational corporations shift production across borders to avoid taxation. In this way, globalization creates a dilemma for governments by increasing the political demands on them to provide social insurance and

other public goods at the same time that it undermines their ability to finance additional spending. The fear is that politicians will resolve the dilemma by abandoning their commitment to economic openness, particularly free trade policies.

In this book, I argue that the political pressures that gave rise to the bargain of embedded liberalism are as strong today as ever. Citizens still expect their governments to shield them from the global economy. However, because of important cross-national differences in domestic political and economic institutions, the globalization dilemma is not equally severe for all countries. I argue that the combination of majoritarian (or Westminster) democracy and decentralized labor markets exacerbates the political problems that governments committed to economic openness face, and that the countries with these institutions are the most susceptible to a backlash against globalization. This runs directly counter to the conventional wisdom in political science, which starts with the assumption that globalization presents the most serious political and policy challenges for countries that have corporatist institutions and spend generously on social welfare programs. My logic, which draws on theories from both economics and political science, is twofold.

First, the degree to which trade increases demands for protection depends on how, and the extent to which, shocks in international commercial markets are transmitted to domestic labor markets. This is determined by a country's labor market institutions. The strength of the political demand for protection is also a function of how exposed the aggregate (national) labor market is to trade and the size of the shocks in international commercial markets. I argue that, ceteris paribus, trade generates more uncertainty and insecurity for workers who operate in competitive labor markets, and this leads them to pressure their governments for protection.

Second, the constraints arising from the multinationalization of production (or international capital mobility more generally) primarily affect countries that depend on capital taxes to finance government spending. Majoritarian democracies rely more heavily on capital taxes. Therefore, the globalization dilemma applies most forcefully to countries that combine competitive labor markets with majoritarian political institutions. Unfortunately, this list of countries includes the United States and United Kingdom, two pillars of the international economy, Australia, a country that plays a special role in the current multilateral trade talks because of its membership in the Cairns Group, and Canada, also a member of the Cairns group as well as the G8. Moreover, Germany and Japan are undergoing market reforms that, if successful, will make their political-economies much more similar to the American and British systems.

I challenge some of the most influential research on globalization in political science, which has focused almost exclusively on the small corporatist European economies with large welfare states, downplayed the policy constraints arising from increased international capital mobility, and ignored public attitudes toward the international economy. In the end, I conclude that a new bargain of embedded liberalism must be forged, particularly within the world's most powerful nations, to sustain economic globalization. This will require carefully crafted retraining and insurance programs that are designed with an eye to their politically sustainability

My empirical analysis is primarily quantitative. I use statistical methods to evaluate causal claims combined with a few case studies to illustrate and flesh out causal mechanisms. There is a large and respected quantitatively-oriented literature on globalization in political science that relies on macro-panels of data (i.e., annual observations of country-level quantities). I follow in this tradition. However, I make two important methodological points that guide and distinguish my own empirical research. First, in order to avoid fallacies of ecological and functional inference, macro-level analyses of globalization politics should be supplemented with lower-level analyses whenever theoretical micro-foundations are empirically verifiable. It may be misleading to assume either individual-level preferences or political

necessity from observed policy choices. Second, analysts should model directly the spatial (cross-sectional) interdependence in their macro-panels. For those interested in globalization, spatial interdependence across units of observation is more than just a statistical nuisance; it is the very substance of what they study. Research that ignores this interdependence will be biased toward finding domestic, internal factors are more important that international, external ones in determining political, economic, and policy outcomes across countries. In other words, the empirical deck will be stacked against globalization-related hypotheses. To address this problem, I use empirical methods of spatial analysis that have been ignored almost completely by those who study globalization politics.

To sum, my book addresses a rapidly growing area of scholarship at the intersection of international relations, comparative politics, and economics. Three things set my research apart. First, the theoretical argument is novel, essentially turning the conventional wisdom about globalization politics on its head. I argue that countries with liberal market economies and majoritarian polities (e.g., the U.S. and U.K.) will face the most serious political and policy challenges as a result of economic globalization, not countries with corporatist institutions and generous welfare programs (e.g., Austria and Sweden). Second, the empirical work corrects for two methodological limitations of the existing research by including analyses of individual-level survey data as a way to evaluate micro-level assumptions and by modeling directly the spatial interdependence in macro-panel data using techniques and estimators from spatial econometrics. Finally, I take the policy implications of my research seriously by considering the political feasibility of a new bargain of embedded liberalism in countries with majoritarian polities and liberal market economies.

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Table 1. Models of Individual Support for Trade

	(1)	(2)	(3)	(4)	(5)	(6)
Tradable	-.377***	-.343***	-.349***	-.327***	-.332***	-.308***
	(.066)	(.06)	(.063)	(.113)	(.094)	(.106)
Exports	.162***	.111***	.103***	.124***	.094***	.068**
	(.041)	(.042)	(.038)	(.035)	(.032)	(.029)
Imports	-.009	.003	.003	-.026	-.012	-.013
	(.019)	(.02)	(.018)	(.018)	(.022)	(.022)
Education	.138***	.119***	.133***	.111***	.087***	.103***
	(.024)	(.026)	(.022)	(.019)	(.031)	(.023)
Income	.205***	.181***	.236***	.323***	.223***	.341***
	(.052)	(.03)	(.036)	(.085)	(.043)	(.07)
Male				.289***	.284***	.279***
				(.045)	(.053)	(.051)
Age				-.003**	-.003*	-.003**
				(.002)	(.002)	(.001)
Single				.136***	0	.105***
				(.037)	(.025)	(.032)
Unemployed				-.099**	-.034	-.066
				(.046)	(.054)	(.049)
Ideology				.021	.027	.035*
				(.018)	(.023)	(0.02)
Religious				-.037	-.125*	-.118**
				(.081)	(.052)	(.057)
Nationalism				-.252***	-.256***	-.26***
				(.028)	(.031)	(.03)
No Kids				.135**	.058	.113***
				(.052)	(.044)	(.036)
Kids				-.108	-.026	-.094
				(.092)	(0.04)	(.077)
NRR	1.571***		1.275***	2.071***		1.601***
	(.335)		(.348)	(.448)		(.465)
ALM		.178***	.149***		.215***	.176***
		(.047)	(.044)		(.058)	(.047)
Soc Sec						
Fixed Effects						
Country/Period	No/No	No/No	No/No	No/Yes	No/Yes	No/Yes
Clustered S.E.'s	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13766	13896	13766	8630	8646	8630
Log Likelihood	-19703.4	-19860.7	-19564.3	-11754.4	-11747.9	-11640.3
Pseudo R2	.025	0.026	.032	.055	.057	.064

Note: Standard-error estimates for models 1-3 are clustered by country-year; standard-error estimates for models 4-6 are clustered by country.

Table 1. Models of Individual Support for Trade (Cont.)

	(7)	(8)	(9)	(10)	(11)	(12)
Tradable	-.322***	-.31***	-.311***	-.316***	-.304***	-.305***
	(.043)	(.043)	(.043)	(.044)	(.044)	(.044)
Exports	.072***	.061**	.061**	.063**	.051*	.051*
	(.028)	(.028)	(.028)	(.028)	(.029)	(.029)
Imports	.003	.000	.001	.006	.004	.005
	(.017)	(.017)	(.017)	(.017)	(.017)	(.017)
Education	.137***	.135***	.134***	.134***	.131***	.131***
	(.01)	(.01)	(.01)	(.01)	(.01)	(.01)
Income	.209***	.219***	.213***	.215***	.223***	.218***
	(.029)	(.026)	(.029)	(.029)	(.027)	(.029)
Male	.264	.266***	.266***	.263***	.264***	.265***
	(.024)	(.024)	(.024)	(.024)	(.024)	(.024)
Age	-.001	-.001	-.001	-.001	-.002*	-.002*
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Single	.051*	.044	.041	.056*	.048*	.046
	.029	(.028)	(.03)	(.03)	(.028)	(.03)
Unemployed	-.048	-.047	-.046	-.057	-.055	-.055
	(.071)	(.071)	(.071)	(.072)	(.072)	(.072)
Ideology	.039	.038***	.037***	.046***	.044***	.044***
	(.012)	(.012)	(.012)	(.012)	(.012)	(.012)
Religious	-.1***	-.099***	-0.1***	-.096***	-.095***	-.097***
	(.029)	(.029)	(.029)	(.03)	(.03)	(.03)
Nationalism	-.263***	-.263***	-.262***	-.272***	-.271***	-.27***
	(.012)	(.012)	(.012)	(.013)	(.013)	(.013)
No Kids	.044	.046	.042	.047	.048	.045
	(.031)	(.03)	(.031)	(.031)	(.03)	(.031)
Kids	.015	.012	.019	.003	.003	.007
	(.033)	(.031)	(.033)	(.033)	(.032)	(.033)
NRR	.000		-.092	.029		-.066
	(.179)		(.183)	(.182)		(.186)
ALM		.261***	.27***		.27***	.277***
		(.102)	(.104)		(.103)	(.105)
Soc Sec				.094***	.094***	.095***
				(.014)	(.014)	(.014)
Fixed Effects						
Country/Period	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Clustered S.E.'s	No	No	No	No	No	No
Observations	8630	8646	8630	8400	8414	8400
Log Likelihood	-11487.6	-11505.6	-11484.2	-11166.0	-11181.9	-11162.5
Pseudo R2	.076	.077	.077	.078	.078	.079

Table 2. Counterfactual Effects of Key Variables on Individual Support for Free Trade

	Pr(freetrad=1) (Support Protection)	Pr(freetrad=2)	Pr(freetrad=3) (Indifferent)	Pr(freetrad=4)	Pr(freetrad=5) (Oppose Protection)
Benchmark I (Non-tradable)	.344	.427	.152	.072	.005
Predicted Probability	(.048)	(.018)	(.008)	(.001)	(.003)
1) Impact of changing from	.058	-.014**	-.024**	-.018**	-.002
Non-tradable to Export Industry	(.032)	(.002)	(.002)	(.000)	(.001)
2) Impact of changing from	.139**	-.046**	-.054**	-.037**	-.003**
Non-tradable to Import Industry	(.021)	(.005)	(.004)	(.000)	(.002)
Benchmark II (Import Industry)	.484	.381	.098	.036	.002
Predicted Probability	(.057)	(.013)	(.005)	(.000)	(.001)
3) Impact of raising NRR	-.082**	.032**	.03**	.019**	.002
From 69% to 82%	(.024)	0.003	(.002)	(.000)	(.002)
4) Impact of raising ALM	-.182**	.051**	.073**	.054**	.005
From $236 to $3,982	(.045)	(.007)	(.005)	(.001)	(.003)

Standard errors, calculated using the delta method, are in parentheses. For each counterfactual, I report the change in predicted probabilities based on the Model (6) estimates. ** significant at 5%

Table 3. Imports, Deindustrialization, and Government Spending

	Govcon		Socben		NRR	
	(1)	(2)	(3)	(4)	(5)	(6)
Temporal Lag	.917***	.895***	.984***	.961***	.835***	.815***
	(.014)	(.018)	(.014)	(.018)	(.035)	(.035)
Spatial Lag	.04***	.034***	.026**	.025**	.013**	.000
	(.01)	(.011)	(.01)	(.01)	(.006)	(.039)
Imports	1.49***	2.185***	1.54***	2.612***	4.343***	7.516
	(.239)	(.118)	(.244)	(.057)	(.198)	(6.203)
Deindustrialization	.059*	.078**	.073**	.09***		1.281**
	(.036)	(.053)	(.036)	(.03)		(.605)
Imports*	-.013***	-.013***	-.015***	-.014***	-.03***	-.168***
Deindustrialization	(.003)	(.003)	(.003)	(.003)	(.005)	(.048)
Exports		-.629***		-1.136***		2.511
		(.119)		(.177)		(2.802)
RGDP per capita		-.029*		-.033***		.584***
		(.016)		(.015)		(.219)
Old Age		4.072		5.07*		.586
		(2.568)		(2.892)		(.422)
Left Government		.141**		-.037		.003
		(.068)		(.068)		(.008)
Union Density		.528*		.682**		-.044
		(.315)		(.317)		(.158)
Observations	706	706	650	650	324	324
Log Likelihood	-364.7	-355.0	-325.9	-308.5	-806.3	-798.0
R-squared	.978	.979	.983	.984	.938	.941

Note: All regressions include fixed period effects; those coefficient-estimates suppressed to conserve space. Standard errors are in parentheses. The spatial lags are generated with a binary contiguity weighting matrix using shared territorial borders as the criterion, excepting that France, Belgium, and the Netherlands are coded as contiguous with Britain, Denmark as contiguous with Sweden, and Australia as contiguous with New Zealand. All the spatial weights matrices are row-standardized. Govcon = government consumption; NRR = net replacement rate; Socben = social benefits. ***significant at 1%; **significant at 5%; *significant at 1%.

Table 4. Short-Run Spatial Effects of a One-Unit Increase in Imports (Government Consumption)

	AUS	AUT	BEL	CAN	DEN	FIN	FRA	DEU	IRE	ITA	NTH	NWZ	NOR	POR	ESP	SWE	CHE	GBR	USA
AUS	1.208	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.041	.000	.000	.000	.000	.000	.000	.000
	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.016)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
AUT	.000	1.207	.000	.000	.000	.000	.000	.014	.000	.014	.000	.000	.000	.000	.000	.000	.014	.000	.000
	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.005)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.000)
BEL	.000	.000	1.207	.000	.000	.000	.01	.01	.000	.000	.01	.000	.000	.000	.000	.000	.000	.01	.000
	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.004)	(.004)	(.000)	(.000)	(.004)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.004)	(.000)
CAN	.000	.000	.000	1.208	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.041
	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.016)
DEN	.000	.000	.000	.000	1.207	.000	.000	.021	.000	.000	.000	.000	.000	.000	.000	.021	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)
FIN	.000	.000	.000	.000	.000	1.208	.000	.000	.000	.000	.000	.000	.021	.000	.000	.021	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.008)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)
FRA	.000	.000	.008	.000	.000	.000	1.208	.008	.000	.008	.000	.000	.000	.000	.008	.000	.000	.008	.000
	(.000)	(.000)	(.003)	(.000)	(.000)	(.000)	(.241)	(.003)	(.000)	(.003)	(.000)	(.000)	(.000)	(.000)	(.003)	(.000)	(.000)	(.003)	(.000)
DEU	.000	.01	.01	.000	.000	.000	.01	1.207	.000	.000	.01	.000	.000	.000	.000	.000	.000	.000	.000
	(.000)	(.004)	(.004)	(.000)	(.000)	(.000)	(.004)	(.241)	(.000)	(.000)	(.004)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
IRE	.000	.000	.000	.000	.000	.000	.000	.000	1.207	.000	.000	.000	.000	.000	.000	.000	.000	.041	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.016)	(.000)
ITA	.000	.014	.000	.000	.000	.000	.014	.000	.000	1.207	.000	.000	.000	.000	.000	.000	.014	.000	.000
	(.000)	(.005)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.000)
NTH	.000	.000	.014	.000	.000	.000	.000	.014	.000	.000	1.207	.000	.000	.000	.000	.000	.000	.014	.000
	(.000)	(.000)	(.005)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)
NWZ	.041	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.208	.000	.000	.000	.000	.000	.000	.000
	(.016)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
NOR	.000	.000	.000	.000	.000	.021	.000	.000	.000	.000	.000	.000	1.208	.000	.000	.021	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)
POR	.000	.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	1.208	.041	.000	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.016)	(.000)	(.000)	(.000)	(.000)
ESP	.000	.000	.000	.000	.000	.000	.021	.000	.000	.000	.000	.000	.000	.021	1.208	.000	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.008)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.008)	(.241)	(.000)	(.000)	(.000)	(.000)
SWE	.000	.000	.000	.000	.014	.014	.000	.000	.000	.000	.000	.000	.014	.000	.000	1.208	.000	.000	.000
	(.000)	(.000)	(.000)	(.000)	(.005)	(.005)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.005)	(.000)	(.000)	(.241)	(.000)	(.000)	(.000)
CHE	.000	.01	.000	.000	.000	.000	.01	.01	.000	.01	.000	.000	.000	.000	.000	.000	1.207	.000	.000
	(.000)	(.004)	(.000)	(.000)	(.000)	(.000)	(.004)	(.004)	(.000)	(.004)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)	(.000)
GBR	.000	.000	.01	.000	.000	.000	.01	.000	.01	.000	.01	.000	.000	.000	.000	.000	.000	1.208	.000
	(.000)	(.000)	(.004)	(.000)	(.000)	(.000)	(.004)	(.000)	(.004)	(.000)	(.004)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)	(.000)
USA	.000	.000	.000	.041	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.208
	(.000)	(.000)	(.000)	(.016)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.241)

Note: The off-diagonal elements of the table report the effect of a one-unit increase in the column country's imports on government consumption in its OECD counterparts. The diagonal elements give the total effect of an exogenous one-unit increase in the column country's imports on its own government consumption. These numbers are calculated using the spatial multiplier matrix $(\mathbf{I}_N - \rho\mathbf{W})^{-1}$ and thus reflect all feedback effects. Parentheses contain standard errors calculated by the delta method. Effects in shaded cells are more than twice the size of their estimated standard errors.

Table 5. Steady-State Spatial Effects of a One-Unite Increase in Imports (Government Consumption)

	AUS	AUT	BEL	CAN	DEN	FIN	FRA	DEU	IRE	ITA	NTH	NWZ	NOR	POR	ESP	SWE	CHE	GBR	USA
AUS	12.824 (3.478)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	4.144 (1.989)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
AUT	.000 (.000)	11.871 (3.04)	.162 (.139)	.000 (.000)	.000 (.000)	.000 (.000)	.408 (.317)	1.448 (.701)	.004 (.006)	1.421 (.671)	.135 (.11)	.000 (.000)	.000 (.000)	.004 (.006)	.028 (.031)	.000 (.000)	1.432 (.672)	.055 (.062)	.000 (.000)
BEL	.000 (.000)	.106 (.087)	11.876 (3.045)	.000 (.000)	.000 (.000)	.000 (.000)	1.174 (.593)	1.172 (.587)	.096 (.076)	.089 (.075)	1.15 (.567)	.000 (.000)	.000 (.000)	.013 (.014)	.08 (.065)	.000 (.000)	.021 (.024)	1.19 (.605)	.000 (.000)
CAN	.000 (.000)	.000 (.000)	.000 (.000)	12.824 (3.478)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	4.144 (1.988)
DEN	.000 (.000)	.163 (.121)	.193 (.152)	.000 (.000)	11.698 (2.972)	.253 (.198)	.185 (.146)	1.956 (.879)	.004 (.005)	.031 (.033)	.177 (.136)	.000 (.000)	.253 (.198)	.002 (.003)	.013 (.014)	1.972 (.896)	.021 (.023)	.048 (.052)	.000 (.000)
FIN	.000 (.000)	.004 (.005)	.004 (.006)	.000 (.000)	.253 (.198)	12.095 (3.137)	.004 (.006)	.042 (.046)	.000 (.000)	.001 (.001)	.004 (.006)	.000 (.000)	2.207 (1.071)	.000 (.000)	.000 (.000)	2.352 (1.186)	.000 (.001)	.001 (.002)	.000 (.000)
FRA	.000 (.000)	.167 (.129)	.94 (.475)	.000 (.000)	.000 (.000)	.000 (.000)	11.932 (3.066)	.897 (.45)	.072 (.056)	.797 (.367)	.221 (.172)	.000 (.000)	.000 (.000)	.131 (.098)	.814 (.382)	.000 (.000)	.104 (.082)	.894 (.447)	.000 (.000)
DEU	.000 (.000)	.991 (.453)	1.172 (.587)	.000 (.000)	.000 (.000)	.000 (.000)	1.121 (.562)	11.886 (3.047)	.023 (.025)	.189 (.145)	1.078 (.518)	.000 (.000)	.000 (.000)	.012 (.014)	.076 (.062)	.000 (.000)	.127 (.1)	.291 (.228)	.000 (.000)
IRE	.000 (.000)	.011 (.015)	.385 (.303)	.000 (.000)	.000 (.000)	.000 (.000)	.361 (.281)	.094 (.101)	11.801 (3.01)	.025 (.027)	.354 (.271)	.000 (.000)	.000 (.000)	.004 (.006)	.025 (.027)	.000 (.000)	.004 (.006)	3.906 (1.751)	.000 (.000)
ITA	.000 (.000)	1.422 (.673)	.14 (.123)	.000 (.000)	.000 (.000)	.000 (.000)	1.459 (.712)	.38 (.293)	.009 (.011)	11.848 (3.031)	.051 (.056)	.000 (.000)	.000 (.000)	.016 (.018)	.099 (.079)	.000 (.000)	1.429 (.67)	.114 (.097)	.000 (.000)
NTH	.000 (.000)	.122 (.095)	1.534 (.756)	.000 (.000)	.000 (.000)	.000 (.000)	.368 (.287)	1.438 (.69)	.118 (.09)	.038 (.042)	11.843 (3.03)	.000 (.000)	.000 (.000)	.004 (.006)	.025 (.028)	.000 (.000)	.017 (.02)	1.461 (.714)	.000 (.000)
NWZ	4.144 (1.989)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	12.824 (3.478)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)
NOR	.000 (.000)	.004 (.005)	.004 (.006)	.000 (.000)	.253 (.198)	2.207 (1.071)	.004 (.006)	.042 (.046)	.000 (.000)	.001 (.001)	.004 (.006)	.000 (.000)	12.095 (3.137)	.000 (.000)	.000 (.000)	2.352 (1.186)	0 (.001)	.001 (.002)	.000 (.000)
POR	.000 (.000)	.009 (.013)	.052 (.057)	.000 (.000)	.000 (.000)	.000 (.000)	.657 (.49)	.049 (.055)	.004 (.006)	.044 (.046)	.012 (.017)	.000 (.000)	.000 (.000)	12.125 (3.142)	3.96 (1.801)	.000 (.000)	.006 (.008)	.049 (.054)	.000 (.000)
ESP	.000 (.000)	.028 (.031)	.16 (.131)	.000 (.000)	.000 (.000)	.000 (.000)	2.034 (.956)	.153 (.124)	.012 (.014)	.136 (.104)	.038 (.042)	.000 (.000)	.000 (.000)	1.98 (.9)	12.257 (3.199)	.000 (.000)	.018 (.02)	.152 (.123)	.000 (.000)
SWE	.000 (.000)	.018 (.019)	.022 (.024)	.000 (.000)	1.315 (.597)	1.568 (.791)	.021 (.023)	.22 (.165)	0 (.001)	.004 (.005)	.02 (.022)	.000 (.000)	1.568 (.791)	.000 (.000)	.001 (.002)	12.204 (3.184)	.002 (.003)	.005 (.008)	.000 (.000)
CHE	.000 (.000)	1.167 (.575)	.195 (.162)	.000 (.000)	.000 (.000)	.000 (.000)	1.205 (.616)	1.18 (.595)	.009 (.011)	1.152 (.564)	.12 (.103)	.000 (.000)	.000 (.000)	.013 (.015)	.082 (.068)	.000 (.000)	11.735 (2.988)	.109 (.098)	.000 (.000)
GBR	.000 (.000)	.033 (.036)	1.19 (.605)	.000 (.000)	.000 (.000)	.000 (.000)	1.118 (.558)	.291 (.228)	.976 (.438)	.077 (.062)	1.096 (.535)	.000 (.000)	.000 (.000)	.012 (.014)	.076 (.062)	.000 (.000)	.012 (.014)	12.087 (3.129)	.000 (.000)
USA	.000 (.000)	.000 (.000)	.000 (.000)	4.144 (1.989)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	.000 (.000)	12.824 (3.478)

Note: The off-diagonal elements of the table report the effect of a one-unit increase in the column country's imports on government consumption in its OECD counterparts. The diagonal elements give the total effect of an exogenous one-unit increase in the column country's imports on its own government consumption. These numbers are calculated using the spatio-temporal multiplier matrix $(\mathbf{I}_N - \rho\mathbf{W} - \phi\mathbf{I}_N)^{-1}$ and thus reflect all feedback effects. Parentheses contain standard errors calculated by the delta method. Effects in shaded cells are more than twice the size of their estimated standard errors.

Figure 1a. Short-Run Spatial Effects of a One-Unit Increase in German Imports on Government Consumption in Europe (Post-Industrial Case)

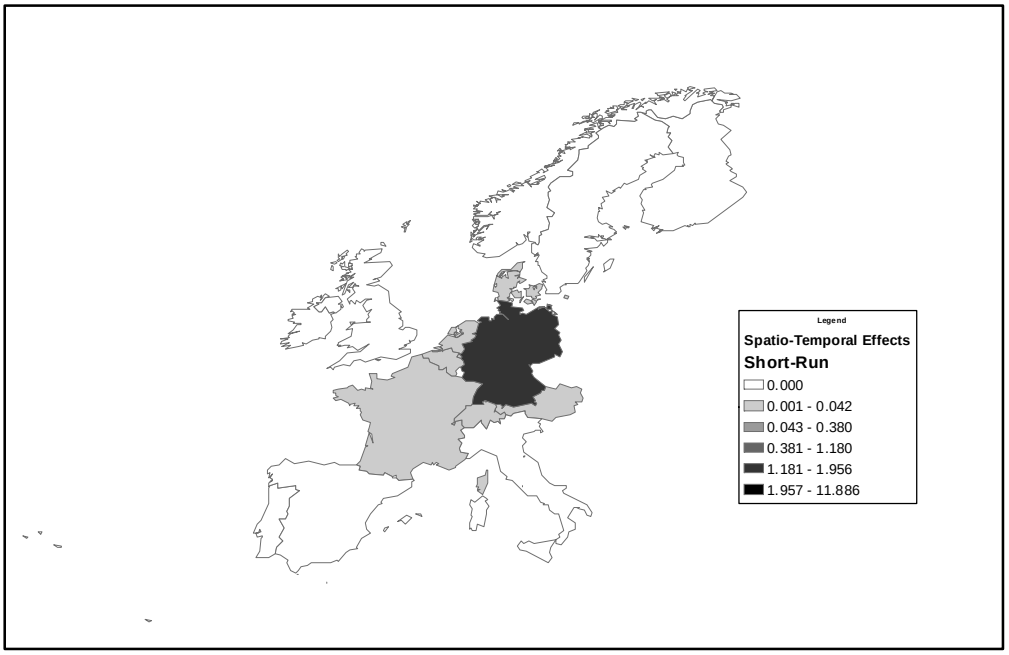

Figure 1b. Steady-State Spatial Effects of a One-Unit Increase in German Imports on Government Consumption in Europe (Post-Industrial Case)

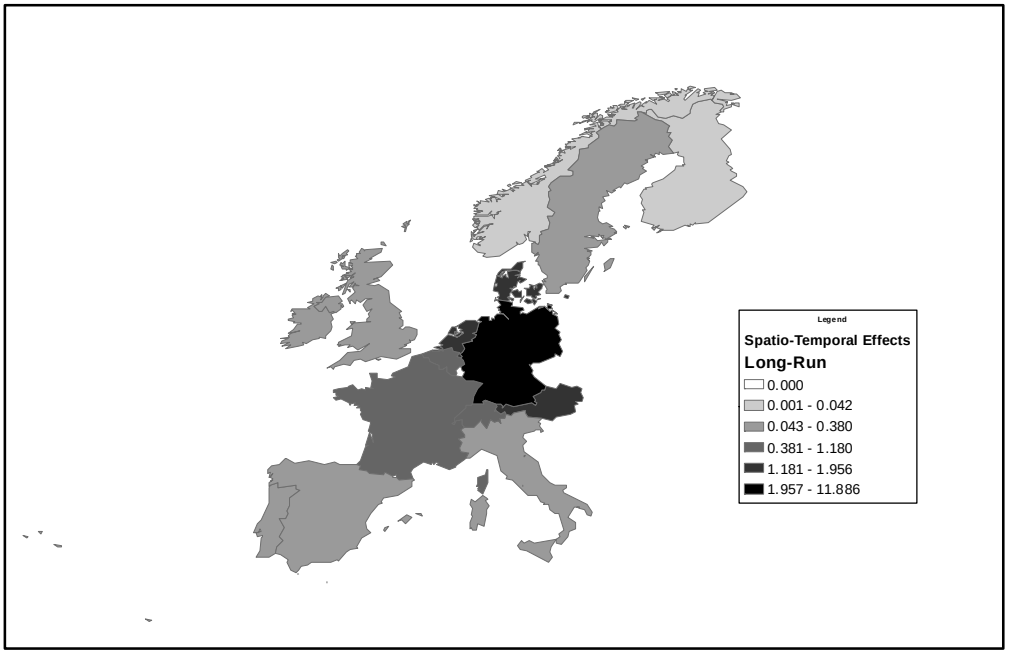

Figure 2a. Temporal Effects with Spatial Feedback on Government Consumption in Germany from a Positive One-Unit Counterfactual Shock to German Imports under Industrial and Post-Industrial Conditions with 95% Confidence Intervals.

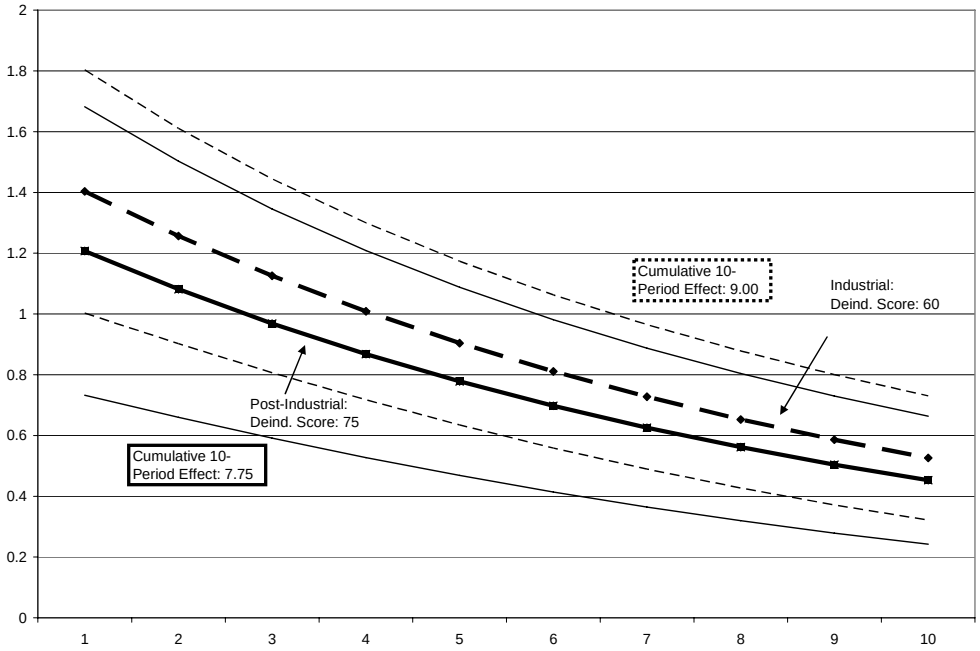

Figure 2b. First-Difference in Temporal Effects with 95% CI.

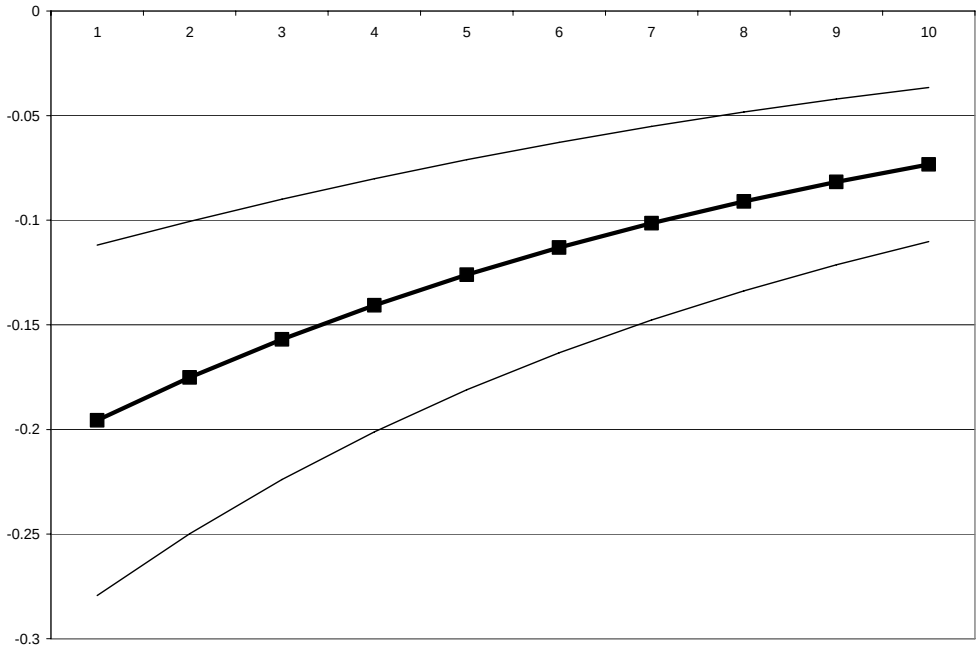

Figure 3a. First-Order Spatio-Temporal Effects on Government Consumption in Austria from a Positive One-Unit Counterfactual Shock to German Imports under Industrial and Post-Industrial Conditions with 95% Confidence Intervals.

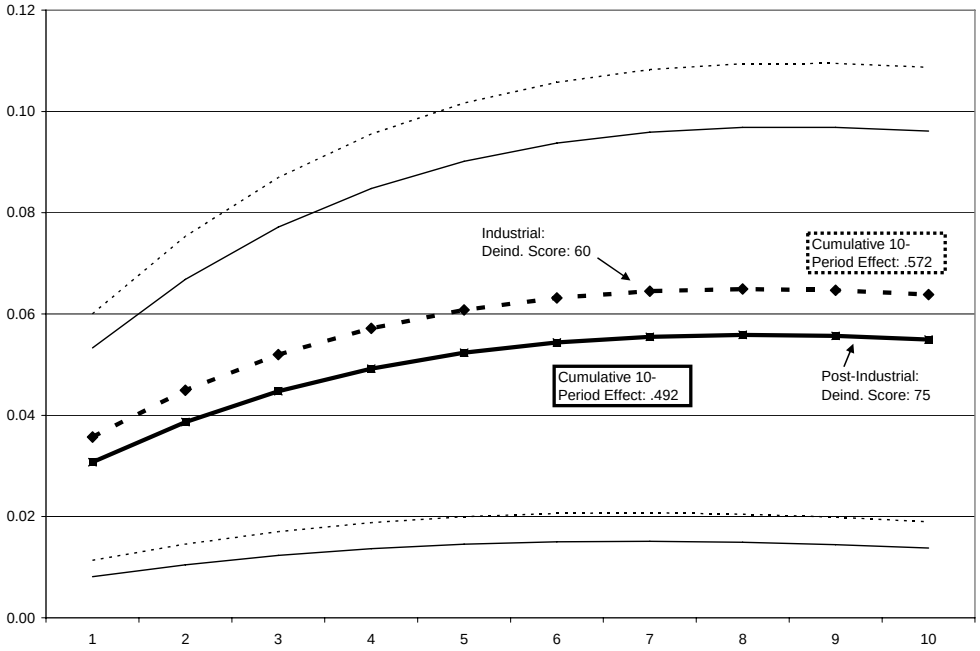

Figure 3b. First-Difference in Spatio-Temporal Effects with 95% CI.