The Cost of Buying American*

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Abstract. The latest resurgence in the U.S. of policies aimed at reducing imports and bolstering domestic production has included the expansion of Buy American provisions. While some of these are new and untested, in this paper we evaluate the employment and welfare impact of long-standing procurement limitations on the purchase of foreign products by the U.S. Federal Government. Employing procurement micro-data, we calibrate a quantitative trade model adapted to include features relevant to the Buy American Act: a government sector, policy barriers in final and intermediate goods, labor force participation, and external economies of scale. We show that current Buy American restrictions on final goods create about 100,000 jobs at a welfare cost of about $170,000 per job. The imminent tightening of domestic-content rules for inputs to 75% creates about 86,600 jobs at a welfare cost of about $119,000 per job. We also find scant evidence of the use of Buy American rules as an effective industrial policy tool.

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1 Introduction

For much of the postwar period, the United States championed the liberalization of international trade. Even so, certain long-standing restrictions on imports have remained in place throughout this era—most notably the Buy American Act of 1933, which regulates procurement by the Federal government and was never lifted during the decades-long push toward freer trade. In recent years, the country has taken a sharper turn toward protectionism, *tightening* these pre-existing barriers, and embedding similar provisions into prominent U.S. policies—the Infrastructure Investment and Jobs Act, the CHIPS and Science Act, and the Inflation Reduction Act. Together with the parallel turn toward tariffs, they have raised concerns among policymakers and economists about the potential costs to the U.S. economy of restricting imports and about the tension between these rules and established WTO commitments.

While the consequences of this newer legislation have not yet fully materialized, this paper quantifies the effects of the original "Buy American" policy, the Buy American Act of 1933,[1] which has regulated public procurement by the Federal government and has provided the blueprint for a multitude of domestic-content provisions in many subsequent Federal programs, including the Federal Highway Administration "Buy America" and the "Build America, Buy America" provisions of the Infrastructure Investment and Jobs Act.[2] Studying the Buy American Act (BAA) is important not only because it has been the model for subsequent domestic-content requirements, but also because both the Trump and the Biden administrations have introduced the biggest changes in the legislation "in almost 70 years,"[3] which will substantially expand its scope by 2029. Under the Act, absent a waiver, (i) final goods purchased by the Federal government must be manufactured in the United States, and (ii) at least 50% of the cost of components in those goods must be spent on U.S.-produced inputs—a threshold scheduled to rise to 75% by 2029.[4] These BAA provisions effectively act as barriers to imports of goods, reducing import shares relative to free trade and potentially generating welfare costs. When the Federal government is forced by law to purchase relatively more expensive supplies from U.S. domestic producers, taxpayers pay more for the same public goods. What benefits can these costs be weighed against? The narrative that has accompanied the original Buy American Act and the subsequent similar provisions is that by purchasing certain goods in the U.S., the government would support "workers and manufacturing across America".[5] We take this job-creation objective—particularly the creation of manufacturing jobs in regions where they are essential to the local economy—as a benefit

[1]For Federal statute, see 41 U.S.C. §83.

[2]For Federal statute, see, respectively, 23 U.S.C. §313 and 41 U.S.C. §70901 (Pub. L. No. 117-58, §§ 70901–52).

[3]See White House (2024) and Appendix Section A.1.5.

[4]See Section 2 for details.

[5]See White House (2024) and Section A.1.1

valued by policymakers. A second, less explicitly stated rationale is closer to "industrial policy": by concentrating demand in industries with learning-by-doing or other positive externalities, guaranteed government purchases could, in principle, raise aggregate productivity. Modeling and measuring these costs and benefits is the ultimate goal of the paper.[6]

Despite the political salience of the BAA, academic evidence on its effects is thin. In a PIIE policy report, Hufbauer and Jung (2020) employ a partial equilibrium model to estimate the stringency of Buy American provisions from standard input-output tables.[7] Our paper improves on these earlier efforts along three dimensions: a new measurement of government import penetration that corrects for the proportionality assumption embedded in standard input-output tables; a multi-region, multi-sector quantitative trade model that captures the two margins of the BAA (final goods and intermediate inputs) in general equilibrium; and a reduced-form exercise that uses local variation in procurement exposure to validate the model's causal predictions.

Our first contribution is a new set of facts about how heavily the Federal government actually buys abroad. Using contract-level data from the Federal Procurement Data System (FPDS), we measure, *industry by industry*, government import penetration and compare it to the corresponding ratio for private consumption. Prior estimates rely instead on aggregate international input-output tables, whose proportionality assumption forces government and private import shares to coincide within each industry and cannot, *by construction*, isolate government-specific restrictions.[8] This matters: while the 7.5% government import penetration used by Hufbauer and Jung (2020) is roughly half of the U.S. import-to-GDP ratio of 15%, our FPDS micro-data reveal that in 83.7% of industries the true government import penetration is more than *ten times smaller*. A parallel correction for intermediate inputs—which we obtain by combining the WIOD with firm-level imports from the Census Bureau's *Profile of U.S. Importing and Exporting Companies*—is equally consequential: without it, the BAA's scheduled tightening of the component rule to 75% would appear to bind in only three industries; once the import shares are disciplined by firm-level data, it binds in six.

Our second contribution is a quantitative trade model based on the new data. As the main building block, we extend the quantitative trade model of Caliendo and Parro (2015) (which itself builds on Eaton and Kortum (2002)) to incorporate trade in both final and intermediate goods, capturing the two margins of the BAA. We introduce three modifications. First, we add a government sector that operates separately from the private market. Because the policy is, at its core, a quantity restriction on foreign sourcing by the Federal government, we follow a

[6] Another rationale is related to national security. We address these concerns in Section 6.2.3.

[7] Hufbauer and Jung (2020) conclude that Buy American provisions are equivalent to a 26% ad valorem tariff and that the "taxpayer cost was over $250,000 for each job "saved". Other policy reports, such as Bacchus (2023), mention the "high price" of the policy, but do not provide a specific figure.

[8] See Dietzenbacher *et al.* (2013), Timmer *et al.* (2015), and United States Government Accountability Office (2019) for discussion; earlier work in the same vein includes Trionfetti (2000) and Messerlin and Miroudot (2012).

long tradition in international trade of inferring trade frictions from variation in import shares through the lens of a gravity model (e.g., Head and Ries, 2001; Costinot and Rodríguez-Clare, 2014; Head and Mayer, 2014) and model the BAA wedge as the shadow cost of this restriction—equivalent to an ad-valorem import tariff specific to Federal purchases whose revenue is rebated lump-sum. Procurement is financed through a lump-sum tax so that counterfactuals isolate the sourcing distortion from tax distortions. Second, workers choose between working in one of several industries and being non-employed, with a nested Fréchet distribution of skills that allows the extensive- and intensive-margin labor supply elasticities to differ. Third, each sector may be subject to external economies of scale, so that sectoral productivity depends on total sectoral employment, as in Bartelme *et al.* (2025). In this setup, the government can, in principle, improve welfare by imposing tighter restrictions on sectors characterized by stronger economies of scale.

What would happen if the BAA were removed or tightened, as recent policy changes suggest? How would changes in government spending on public procurement affect the economy? To what extent does BAA protection align with and capitalize on external economies of scale? Armed with the model, we conduct a set of counterfactuals that offer a general-equilibrium evaluation of the Buy American Act across both its margins and the full universe of Federal procurement, implemented via the exact-hat algebra method of Dekle *et al.* (2007). For this purpose, we exploit a feature of the FPDS that, to our knowledge, has not been used in prior work: contract-level information on both where goods are produced *and* where the procuring agency is located, which allows us to build a bilateral state-level trade matrix for Federal procurement. Our lead exercise simulates the removal of BAA wedges on final goods. This reduces overall U.S. employment by about 100,500 jobs, and generates a welfare gain of roughly \$86–\$93 per capita—implying a cost of the current policy of about \$168,500–\$183,500 per job.[9] As a benchmark, we consider an alternative policy that removes BAA restrictions and instead raises tariffs uniformly by 1 percentage point for all U.S. buyers. This alternative generates a similar number of manufacturing jobs with no welfare loss, as it secures terms-of-trade gains while avoiding distortions arising from variation in BAA wedges across and within sectors.

Our second counterfactual simulates the scheduled tightening of the component-content requirement, which is rising from 50% to 75%. In the 2014 baseline, this restriction was binding only in Computer and Electronic Product Manufacturing; the announced change makes it binding in several additional sectors, raising domestic employment by about 86,600 jobs at a welfare cost of \$118,500–\$118,900 per additional job, similar in order of magnitude to the final-goods cost.

We document that the current stringency of the BAA is essentially uncorrelated with the sectors in which external economies of scale are strongest, so the policy does not appear to exploit this industrial-policy channel. Our headline results are robust across a broad range of sensitivity

[9] Under the more conservative narrow wedge measure, removal implies 27,600 fewer manufacturing jobs, 39,600 fewer total jobs, and a cost of \$261,900–\$302,600 per job.

exercises—inequality aversion in the aggregation of equivalent variations (as in Bombardini and Trebbi, 2012; Galle *et al.*, 2023), alternative utility weights on public goods (Fajgelbaum *et al.*, 2019), and alternative values of the trade, scale, and labor-supply elasticities—with the cost per job remaining between roughly $80,000 and $500,000.

Finally, we use variation in local exposure to Federal procurement to *validate* the quantitative model. Specifically, we estimate the effect of local procurement shocks on manufacturing employment, wages, and the non-employment rate using a state-sector shift-share design in the tradition of Nakamura and Steinsson (2014) and Auerbach *et al.* (2010, 2025); our reduced-form estimates line up closely with theirs. Following Adão *et al.* (2025b), we use these estimates not as a stand-alone empirical contribution, but to implement an IV-based validation test of the quantitative model, which the model generally passes.

Related literature

Our paper is closely related to a small literature that estimates trade frictions in government procurement by combining theory with granular contract-level data. Existing cross-country studies of home bias typically rely on aggregate international input-output tables (Mulabdic and Rotunno, 2022; Trionfetti, 2000; Messerlin and Miroudot, 2012), whose proportionality assumption can significantly understate how domestically concentrated government purchases are, as we show in Section 3. Our findings are consistent with a smaller set of contract-level studies of European public procurement (Herz and Varela-Irimia, 2020; Garcia Santana and Santamaría, 2023), which document persistent home bias in government awards, with local firms substantially more likely to win contracts even in the absence of formal barriers; in the U.S., United States Government Accountability Office (2019) and Cox *et al.* (2024) provide the first descriptive and macro uses of FPDS, respectively. The only prior welfare-cost estimate of the Buy American Act, to our knowledge, is the piece we mentioned by Hufbauer and Jung (2020); for comparison, related work on the cost per job of *tariff-based* protection reaches values between roughly $650,000 and $900,000 per job for washing machines, steel, and tires (Flaaen *et al.*, 2020; Hufbauer and Jung, 2018; Hufbauer and Lowry, 2020). Two contemporaneous working papers analyze Buy-American restrictions from different angles: Allcott *et al.* (2026) conduct an *ex-post* welfare analysis of the Buy-American content rules in the IRA's electric-vehicle tax credits, and Acosta and Cox (2025) study the BAA as a source of cross-contract variation in fiscal transmission, rather than as the object of a welfare study. Relative to this literature, we are the first to use a multi-region, multi-sector general-equilibrium trade model, disciplined by FPDS microdata, to evaluate both the current BAA and its scheduled tightening across the full universe of federal procurement. We also benchmark the welfare cost of creating jobs through the BAA against that of a *uniform* tariff, which in our model generates a similar number of manufacturing jobs at no welfare cost due to terms-of-trade effects.

The paper also connects to the literature on local-content requirements and rules of origin in regional trade agreements. Like the rules studied by Conconi *et al.* (2018), BAA restrictions constrain firms producing for the government by limiting their use of imported intermediate inputs. Unlike rules of origin, however, which can be bypassed by paying MFN tariffs (Grossman, 1981; Head *et al.*, 2024), BAA requirements can only be avoided by exiting the government market.

Methodologically, our paper belongs to the broad class of gravity and quantitative-trade models surveyed by Costinot and Rodríguez-Clare (2014) and Head and Mayer (2014) (e.g., Di Giovanni *et al.*, 2014; Caliendo and Parro, 2015; Eaton *et al.*, 2016; Caliendo *et al.*, 2023; Bonadio *et al.*, 2021), which typically employ the exact hat algebra of Dekle *et al.* (2007). We extend standard quantitative general equilibrium models along three dimensions: by allowing for differential BAA wedges on government demand at both margins; by interpreting each wedge as the shadow cost of the BAA quantity restriction—equivalent to an ad-valorem tariff on Federal purchases with revenue rebated lump-sum; and by showing, in an extension in the spirit of Blaum *et al.* (2018), that under empirically plausible parameter restrictions, our aggregate-model estimate of the welfare cost of tightening the BAA restrictions provides a lower bound for that predicted by a heterogeneous-firm model accounting for firm-level differences in import intensity. On the labor-supply side, we build on Galle *et al.* (2023) and extend it with a nested Fréchet distribution of skills so that the extensive- and intensive-margin labor supply elasticities can differ.

The paper further speaks to the procurement literature in industrial organization that evaluates policies restricting contract competition in favor of specific firms (Krasnokutskaya and Seim, 2011; Athey, Coey and Levin, 2013; Carril, Gonzalez-Lira and Walker, 2026), and to the industrial organization and public-finance applications of the FPDS (e.g., Decarolis, Giuffrida, Iossa, Mollisi and Spagnolo, 2020; Kang and Miller, 2022; MacKay, 2022). We extend this discussion to broader industry- and region-level effects on employment, wages, and welfare.

Our analysis of the local employment effects of government purchases is related to the literature on regional fiscal multipliers (Nakamura and Steinsson, 2014; Serrato and Wingender, 2016; Wilson, 2012; Garin, 2019; Chen *et al.*, 2021; Auerbach *et al.*, 2010, 2025; Acosta and Cox, 2025), with earlier work on the regional impact of defense spending surveyed by Braddon (1995). Unlike these studies, we leverage detailed Federal procurement data at the state-sector level to build and calibrate a quantitative model. We then validate this model using reduced-form estimates following Adão *et al.* (2025b), which implements an IV-based test comparing model-predicted and actual labor-market responses to procurement shocks. This approach disciplines the elasticities driving our counterfactuals, and we benchmark our estimates against prior work on fiscal multipliers.

Finally, our findings contribute to debates on public procurement as an industrial-policy tool (Rodrik, 2022; Aghion *et al.*, 2015; Juhász, 2018; Kalouptsidi, 2018; Criscuolo *et al.*, 2019; Hanlon, 2020; Giorcelli and Li, 2021; Choi and Levchenko, 2021; Lane, 2022).[10] We fill part of this gap by embedding external economies of scale (Kucheryavyy *et al.*, 2023; Bartelme *et al.*, 2025) in our framework, and show that the current stringency of the BAA is *uncorrelated* with the sectors in which such economies are strongest, so the policy, as designed, does not appear to exploit this industrial-policy channel. Consistent with the political-economy view of trade protection (Adão *et al.*, 2025c), we instead find that BAA wedges are positively correlated with measures of sectoral political weight. Because Federal procurement is geographically concentrated and sectoral exposure to the BAA is heterogeneous, our welfare and employment results have a strong regional dimension, linking the paper to the literature on place-based policies (Busso *et al.*, 2013; Neumark and Simpson, 2015; Fajgelbaum and Gaubert, 2020). Our welfare calculations also require a valuation of publicly procured goods: we calibrate the utility weight on public goods to match the ratio of Federal procurement to U.S. personal consumption expenditure, near the lower bound of the range estimated by Fajgelbaum *et al.* (2019). We find that the order of magnitude of our headline welfare cost remains robust to higher values of this parameter.

The rest of the article is organized as follows. Section 2 describes the policy. Section 3 details the FPDS data and the geography of public procurement. Section 4 presents the quantitative model. Section 5 discusses the additional datasets, and the calibration of the BAA wedges. Section 6 presents the reduced-form evidence used to validate the model, as well as the counterfactual analyses. Section 7 concludes.

2 Buy American Act

The Buy American Act of 1933 (BAA) was enacted during the Great Depression with the intention of preserving jobs for American workers.[11] While Congress has often discussed expanding the scope of domestic preferences in federal procurement, the Act itself has rarely been changed until very recently.

2.1 The Content of the BAA

The BAA mandates that federal agencies conducting procurement for public use in the U.S. purchase "[o]nly unmanufactured articles, materials, and supplies that have been mined or produced in the United States, and only manufactured articles, materials, and supplies that have been manufactured in the United States substantially all from articles, materials, or supplies mined, produced, or manufactured in the United States".[12] Similarly, these requirements extend to con-

[10]For surveys, see Harrison and Rodríguez-Clare (2010) and Juhász *et al.* (2023).

[11]See Appendix A.1.1 for more details on the origins of the policy.

[12]Although neither the BAA nor any of the Executive Orders that implement it contain an explicit definition, an unmanufactured product or material is considered one that is not processed into a specific form or combined, in

struction materials used by contractors working on government construction contracts within the United States.

The Federal Acquisition Regulation (FAR) implements this mandate by requiring federal agencies to apply a price preference to domestic "end products", defined as "articles, materials, and supplies to be acquired for public use" (48 CFR § 52.225-1). An end product comprises several "components".[13] Depending on whether an end product is manufactured or unmanufactured, the BAA delineates distinct criteria for items to qualify as domestic and therefore adhere to its regulation.

For an unmanufactured construction material or end product to be considered domestic, it must be mined or produced in the U.S. For instance, sand mined in the U.S. is compliant with BAA. For a manufactured construction material or end product, BAA uses a two-part test to determine if it qualifies as domestic: first, the article must be manufactured in the U.S.; second, the cost of all its domestic components must exceed 50% of the cost of all the components, where components are considered domestic if they are manufactured in the U.S.. For example, an automobile manufactured in France is non-compliant with BAA; instead, an automobile manufactured in Ohio, which includes components made in France, is compliant with BAA as long as it consists of more than 50% US components by cost. This 50% threshold had been the domestic-content rule governing federal procurement for decades, and it is the rule in place during our data period. It is precisely this long-standing benchmark that the Trump and Biden administrations recently moved to tighten, raising it first to 55% in 2019 and setting it on a path to reach 75% by 2029.[14] Throughout the paper, we take 50% as our baseline when evaluating the welfare and employment effects of current BAA restrictions. [15,16]

2.2 Applicability, Waivers, and Enforcement

The BAA applies to all procurement contracts made directly by U.S. federal government agencies and valued over the micro-purchase threshold.[17] The procurement contract must be for intended

advance, with other raw materials to create a new material (for instance, sand or unmodified gravel). On the other hand, a manufactured product has undergone substantial changes in physical character and has been transformed into the required form for public use (for instance, concrete mix or an automobile).

[13] The FAR defines a component as an article, material, or supply incorporated directly into an end product or construction material. For instance, in a procurement contract for an automobile, the automobile itself is considered an end product, whereas the engine is considered its component.

[14] See Appendix A.1.5 for the full timeline of amendments.

[15] In 2009, an exception was introduced for a set of manufactured end products considered commercially available off-the-shelf (COTS) items: they only have to be manufactured in the U.S. without any restriction on the cost of their components. An example of a COTS item is Microsoft Office.

[16] The costs of components are calculated by considering the specific expenses the contractor encounters when procuring or producing those components, excluding labor costs.

[17] In the period of our study, the micro-purchase threshold was increased twice: from $2,500 to $3,000 on September 28, 2006, and to $3,500 on October 1, 2015. Effective August 31, 2020, the micro-purchase threshold has been increased

use or performance within the U.S. This does not encompass locations where the U.S. lacks complete sovereign jurisdiction, such as overseas military bases leased from foreign governments. Moreover, the BAA does not apply to contracts procuring services or to contracts awarded by state and local authorities under federal grant programs, where other domestic-content requirements are often in place.

Federal law delineates exemptions ("waivers") under which a federal agency can procure foreign end products or permit the use of foreign construction materials without violating the BAA.[18] A waiver can be granted if (i) domestic end products are "unavailable in sufficient and reasonably available commercial quantities and of a satisfactory quality," (ii) the cost of acquiring the domestic product is deemed unreasonable, or (iii) the agency is purchasing foreign eligible products from designated countries under the Trade Agreements Act of 1979. The presence of these waivers makes it possible for the government's import share to be positive, and the ease of obtaining waivers has often been at the core of calls to reform and tighten the BAA.[19]

For compliance with the BAA, vendors supplying products to federal agencies must certify the origin and place of manufacture of their goods. For unmanufactured products, the origin is determined by the sourcing country. For manufactured products, the origin is based on where the majority of the components, by cost, are produced. Vendors can certify annually through the System for Award Management (SAM) or provide origin information in individual contract offers. Each bid requires a Buy American Certificate, which confirms whether the products are domestic or lists any foreign products and their origins.

Prospective or current bidders can contest an agency's implementation of the BAA or another vendor's compliance before a contract is awarded, typically through a bid protest. Furthermore, civil litigation can be instigated by whistle-blowers, often competitors, employees, or private citizens, if they suspect violations of the BAA. Finally, the Government Accountability Office (GAO), Inspector General, and Department of Justice (DOJ) also conduct audits to ensure compliance with the BAA.

Further details about the BAA and other Buy American provisions are reported in Section A.1. We now turn to the description of the federal procurement micro-data that we employ to construct flows of products produced for and consumed by the federal government.

3 The Data: The Size and Geography of Federal Public Procurement

In this section, we describe the federal procurement data we will subsequently use to quantify the employment and welfare effects of BAA. Our primary goal is to give the reader a sense of the

to $10,000.

[18]See Section A.1.3 in the Appendix for further details on BAA waivers.

[19]For example, President Biden instituted an office to monitor and publicize waivers. See Exec. Order 14,005.

geography of government purchases, where the products are consumed, where they are produced, and whether they come from abroad. The import share of government consumption will be our key variable for estimating the stringency of the BAA, and knowing where government demand is strong allows us to determine the biggest geographical and sectoral winners and losers from modifying the BAA provisions.

We use data from the Federal Procurement Data System (FPDS), which contains detailed information on the universe of contracts signed by the federal government. The data is available from 2001, and for every contract, we observe detailed information about the agency, sub-agency, and contracting office making the purchase, the identity (DUNS code[20]) of the private vendor, the dollar amounts obligated, a four-digit code describing the product or service required, and a six-digit Industry (NAICS) code. Also, we observe the type of contract pricing, the extent of competition in the award, the characteristics of the solicitation procedure, the number of offers received, the applicability of a variety of laws and rules (including BAA), and the reason and the content of all contract modifications after the contract is awarded.

Given that large contracts span multiple years, we organized the dataset at the contract-year level to capture the contracts' per-year amounts. We recover the location of each procuring office by matching FPDS office codes to the official registry of contracting offices; the dataset contains the zip codes of the buyers (procurement offices) and the vendors (DUNS). If the location is outside the U.S., we replace the zip code with the country name. The resulting dataset contains 32 million contract-year observations; these contracts were required by procurement offices located in 1,900 different U.S. zip codes across all fifty states (and DC) and were awarded to over 600,000 different vendors.[21] Appendix C.1 provides more details about the FPDS dataset.

Total procurement spending recorded in FPDS roughly doubled between 2001 and 2008 and stabilized at around $400 billion per year, with manufacturing contracts representing roughly one-third of the total (see Figure C.1 in Appendix C.1).

Comparing import penetration: government vs aggregate consumption. As we mentioned in the introduction, several papers use the ratio of government import penetration to aggregate (or non-government) import penetration to measure the restrictiveness of domestic-content provisions. However, when this metric is constructed using international input-output tables, it cannot, *by construction*, reveal *within-sector* differences in how constrained the government is relative to the private sector when importing. The reason is that imports are observed only at the aggregate level and are not separately assigned to final users (government, households, etc.). In the absence of such information, a proportionality rule is applied: within each sector, government and private de-

[20]The DUNS number is a nine-digit identifier for businesses. This identifier is proprietary as it is managed by Dun & Bradstreet. The identifier provides a distinct number for business branches relative to their headquarters, allowing for the separation of their locations.

[21]Roughly 4% of contracts are required from an office located outside of the U.S.

mand are assigned the same import penetration rate, with imports allocated in proportion to each final user's expenditure share.[22] As a result, any difference between government and aggregate import penetration ratios constructed from these data can only reflect differences in their *sectoral consumption composition*, rather than government-specific import restrictions within sectors.[23]

Figure 1 employs FPDS data to show that, when calculated industry by industry, government import penetration ratios are much lower than aggregate ones: 83.70% of NAICS 6-digit industries display a government import penetration ratio that is less than 10% of their aggregate counterpart. The vast majority of industries lie to the left of the two comparison values from Hufbauer and Jung (2020) (calculated using import of both goods and services in 2014) and Mulabdic and Rotunno (2022) (calculated using only goods for the year 2015).

The geography of procurement spending. One of the advantages of employing contract-level data is that we can describe the geographic distribution of government purchases at a very granular level. To document this, we construct a map at the commuting zone (CZ) level. Our quantitative analysis in the model-validation and counterfactual exercises is instead conducted at the state-sector level, both for consistency with the additional datasets we use to calibrate the model and with the level of aggregation at which our reduced-form shift-share regressions are estimated. The CZ-level map, however, makes clear that procurement exposure varies substantially *within* states as well, so that the state-level variation we exploit in later sections understates rather than overstates the underlying geographic heterogeneity.

To assess a CZ's dependency on government purchases, we require a measure of the total revenues generated in a CZ for each sector. Ideally, we would like to employ measures of revenues at the local level. However, such measures are not readily available for the US, so we apportion the total shipments (revenues) of NAICS 6-digit industry X_s to a CZ o according to the CZ's share of national employment in that sector. Specifically, we calculate $X_o = \sum_s \frac{L_{os}}{L_s} X_s$, where L_{os} represents employment in CZ o and industry s, and L_s is national employment in industry s. We then construct X_o^G / X_o, where X_o^G is the total FPDS awards granted to firms located in CZ o.[24]

[22] See Equation (12) on page 87 of Dietzenbacher *et al.* (2013).

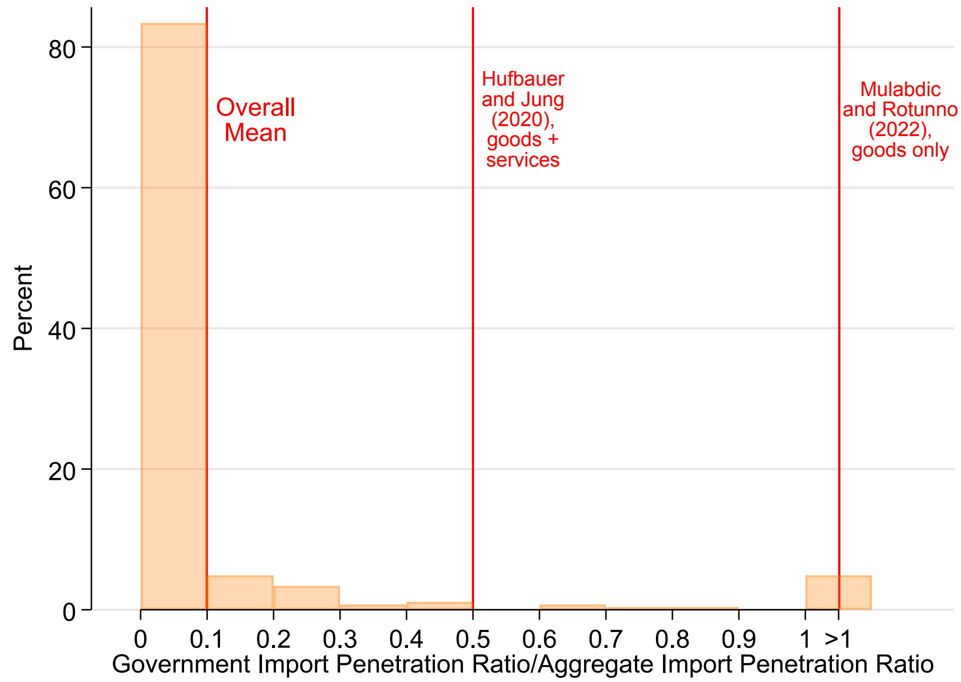
[23] Consider an economy with two goods, A and B, each with total consumption equal to 100, and suppose that good A has a lower import penetration ratio than good B.

	A	B
Gov. Consumption	80	20
Priv. Consumption	20	80
Total Imports	10	20

Under the proportionality rule, government imports of A and B are assigned as 8 and 4, respectively, implying an import penetration ratio of 12% for the government and 18% for the private sector (or 15% for the aggregate economy). The lower government import penetration ratio therefore reflects only the fact that the government consumes relatively more of the low-import-penetration good A, not that it faces tighter import restrictions within either sector.

[24] Total shipments X_o is from the NBER-CES dataset (Becker *et al.*, 2013).

Figure 1: Histogram for Import Penetration Ratio for Government versus Aggregate

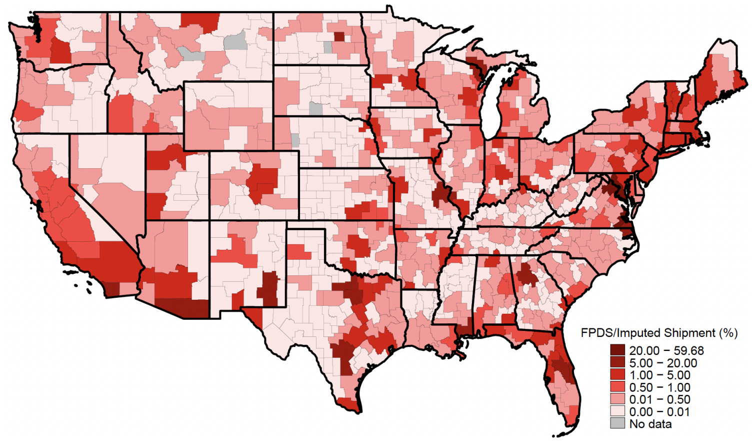


Notes: The histogram represents the frequency distribution of the ratio of government to aggregate import penetration ratios across manufacturing NAICS 6-digit industries in year 2014. The import penetration ratio for the government is calculated from FPDS data as the value of awards to firms located abroad relative to total awards in an industry. The aggregate import penetration ratio is obtained by dividing general imports and domestic absorption at the NAICS 6-digit level. Aggregate imports and exports are retrieved from US trade data built by Peter Schott, and domestic absorption is calculated as total shipment value (from NBER-CES) minus exports plus imports. We highlight the overall mean of 0.1 (calculated as the ratio of 0.028 import penetration ratio in FPDS and 0.276 import penetration for the aggregate economy) and two values from the literature: 0.5 is calculated as the ratio of *i)* goods and services imported by the government as a percent of government procurement (7.5%) and *ii)* imports of goods and services as a share of GDP in 2017 (15%) from Hufbauer and Jung (2020); 1.05 is reported in Table A.6 in Mulabdic and Rotunno (2022) and is defined as the ratio of government import penetration ratio to private import penetration ratio for goods (not services).

Figure 2 reports the government shares X_o^G/X_o for the first year of our dataset, 2001, across commuting zones. Notably, many CZs do not produce much for the government: for the majority of CZs, less than 1% of manufacturing revenues come from sales to the government. However, several CZs' government share is above 5%, indicating a substantial economic role of government purchases.

In the next section, we set up a model that captures government consumption and production as separate from the rest of the economy and allows us to reproduce the geographic and sector dimensions of the FPDS data and perform counterfactuals that reveal the benefits and costs of BAA.

Figure 2: Government Shares: Share of Revenues from Federal Procurement (Year 2001)



Notes: This figure reports the ratio between the amount of public procurement spending received by firms located in the commuting zone and the imputed total revenues (shipments) generated in the commuting zone calculated by multiplying the total shipments in a NAICS 6-digit industry by the CZ share of national employment in that NAICS industry. Darker colors indicate a higher share of shipments being purchased by the government. The shading represents CZ-level variation; state borders are overlaid to facilitate comparison with the state-sector level at which our model-validation and counterfactual exercises are conducted.

4 Model

We employ a quantitative trade model à la Eaton and Kortum (2002) with the following features: i) two separate markets in terms of production and consumption: one for government goods and one for private goods; ii) multiple sectors and an input-output structure as in Di Giovanni *et al.* (2014) and Caliendo and Parro (2015); iii) a choice for workers between non-employment and employment across multiple sectors as in Caliendo *et al.* (2019) and Galle *et al.* (2023); iv) the presence of external economies of scale at the sector level, as in Kucheryavyy *et al.* (2023) and Bartelme *et al.* (2025). These modeling choices allow us to incorporate key features of the BAA, i.e., restrictions on the purchase of both final and intermediate goods when selling to the government, and they allow the policy to affect both total local employment and productivity.

The economy consists of S production sectors, indexed by s and k, together with a home-production sector h. There are $N+1$ regions: N U.S. regions and the rest of the world (ROW). We index regions by o for origins and d for destinations.

In each U.S. region-sector pair, there are two types of buyers and producers, indexed by $j \in \{G, M\}$. Government buyers (G) represent government agencies that enter into procurement contracts with compliant G producers, while private-market buyers (M) purchase from ordinary M producers. The two types of producers share the same technology, but G producers are subject to Buy American restrictions on the sourcing of intermediate inputs, which may raise their costs relative to M producers. Outside the United States, only M producers and buyers exist.

All buyers have CES preferences over the continuum of varieties within sector s, with elasticity of substitution σ_s. For private-market buyers, let β^M_{ds} denote the expenditure share on sector s in total expenditure in destination region d.

4.1 Labor Supply

Labor supply is determined by individuals' choices across sectors and non-employment. Each individual in region o draws a vector of sector-specific productivities, denoted by $\mathbf{z} = \{z_1, z_2, \ldots, z_S\}$, together with a non-employment productivity draw, denoted by z_h. We assume that $(\mathbf{z}, z_h)$ follows a nested Fréchet distribution with CDF:

$$F(\mathbf{z}, z_h) = \exp\left[-b_{oh}(z_h)^{-\kappa_o} - \left(\sum_{s\in S} A_{os}\left(z_s^{-\frac{\kappa_o}{1-\rho_o}}\right)\right)^{1-\rho_o}\right].$$

where $\kappa_o > 1$ and $\rho_o \in [0, 1)$. This nested Fréchet distribution allows skill draws to be correlated in a structural way. In the upper nest, κ_o governs the overall dispersion of comparative advantage across employment and non-employment. In the lower nest, ρ_o captures the correlation of skill draws across employment sectors $s \in S$. $\kappa_o/(1-\rho_o)$ determines the dispersion of workers' comparative advantage across employment sectors $s \in S$, conditional on the employment nest. The parameters A_{os} and b_{oh} are region-sector-specific scale shifters for sectoral productivity z_s and non-employment productivity z_h, respectively. Workers employed in sector s and region o are paid a wage w_{so} per efficiency unit. We normalize the non-employment wage to one, i.e. $w_h = 1$, so that non-employed individuals receive non-employment income (or benefits) equal to z_h (as in Adão *et al.* (2025a)).[25]

Labor endowment in region o is given by L_o.[26] An individual chooses sector s if sector s delivers higher income than all alternative sectors and non-employment. Formally, we define the set of workers that work in sector s as $\Omega_{os} = \{z \ s.t. \ w_{os}z_s \geq w_{ok}z_k \text{ for all } k = 1, ...S \text{ and } w_{os}z_s \geq z_h\}$.

The share of workers in region o who choose to work in sector s is:

$$\pi_{os} = \underbrace{\frac{A_{os}w_{os}^{\frac{\kappa_o}{1-\rho_o}}}{\sum_{s'} A_{os'}w_{os'}^{\frac{\kappa_o}{1-\rho_o}}}}_{\equiv \pi_{os|e}} \times \underbrace{\frac{\left(\sum_{s'} A_{os'}w_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o}}{\left(\sum_{s'} A_{os'}w_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o} + b_{oh}}}_{\equiv e_o}. \tag{1}$$

The first component, $\pi_{os|e}$, captures the probability of working in sector s conditional on employ-

[25] This differs from models in which non-employed individuals engage in home production and consume what they produce independently of market prices, as in Galle *et al.* (2023) and Caliendo *et al.* (2019).

[26] We interpret L_o as the working-age population in region o and treat it as fixed, as in Caliendo and Parro (2015).

ment, and the second component, e_o, corresponds to the employment rate in region o. Efficiency labor supply in region o and sector s is then

$$Z_{os} = E\left[z_s \mid (z, z_h) \in \Omega_{os}\right] \pi_{os} L_o = \xi_o A_{os}^{\frac{1-\rho_o}{\kappa_o}} \left(\frac{A_{os} w_{os}^{\frac{\kappa_o}{1-\rho_o}}}{\sum_{s'} A_{os'} w_{os'}^{\frac{\kappa_o}{1-\rho_o}}} \right)^{-\frac{1-\rho_o}{\kappa_o}} \left(\frac{\left(\sum_{s'} A_{os'} w_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o}}{\left(\sum_{s'} A_{os'} w_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o} + b_{oh}} \right)^{-\frac{1}{\kappa_o}} \pi_{os} L_o,$$

where $\xi_o = \Gamma(1 - 1/\kappa_o)$. Hence, the average realized wage income in region o and sector s is:

$$\overline{Wage}_{os} = \frac{w_{os} Z_{os}}{\pi_{os} L_o} = \xi_o \left(\left(\sum_{s'} A_{os'} w_{os'}^{\frac{\kappa_o}{1-\rho_o}} \right)^{1-\rho_o} + b_{oh} \right)^{\frac{1}{\kappa_o}}.$$

Although wages per efficiency unit w_{os} may differ across sectors, equilibrium sorting based on comparative advantage implies that average realized wage income is equalized across employed workers within region o (across all sectors). Therefore, the observed average earnings in region o is $\overline{Wage}_o = \xi_o \left(\left(\sum_{s'} A_{os'} w_{os'}^{\frac{\kappa_o}{1-\rho_o}} \right)^{1-\rho_o} + b_{oh} \right)^{\frac{1}{\kappa_o}}$. By the same selection logic, expected income conditional on non-employment is also equal to $\overline{Wage}_o$.

4.2 Production

In each sector s and region o, each producer supplies a differentiated variety ω, combining labor $l_{os}(\omega)$ and a bundle of intermediate inputs $m_{o,s's}(\omega)$ according to a Cobb-Douglas production function of the form:

$$q_{os}(\omega) = z_{os}(\omega) l_{os}(\omega)^{\alpha_{o,s}} \prod_{s'} \left[m_{o,s's}(\omega) \right]^{\alpha_{o,s's}},$$

where $\alpha_{o,s}$ is the labor share while $\alpha_{o,s's}$ expenditure share on inputs from upstream sector s' used in the production of s.[27]

At the same time, we allow for external economies of scale. Specifically, variety-level productivity $z_{os}(\omega)$ is drawn independently from a Fréchet distribution (common to G and M producers) with shape parameter θ_s and scale parameter $T_{os} L_{os}^{\nu_s}$, where L_{os} denotes total employment in sector s and region o. Hence, ν_s can be interpreted as the scale elasticity, capturing the strength of external economies of scale as in Bartelme *et al.* (2025). This is the source of externalities that could, in principle, make the protection of domestic industries welfare improving, if concentrated in industries with large external economies of scale.[28]

[27] We assume constant returns to scale, so that $\alpha_{o,s} + \sum_{s'} \alpha_{o,s's} = 1$.

[28] External economies depend on local industry scale measured in worker counts rather than efficiency units, follow-

While G and M producers share the same production technology and productivity distribution, they may face different sourcing costs because producers serving government demand must comply with Buy American input-content requirements. Let c^j_{os} denote the deterministic unit input cost of a producer of type j in region o and sector s, so that the marginal cost of variety ω is $c^j_{os}/z_{os}(\omega)$. Standard Cobb-Douglas cost minimization then implies that producers of type $j \in \{G, M\}$ in region o and industry s face unit cost:

$$c^j_{os} = \phi_{os} w^{\alpha_{o,s}}_{os} \Pi_{s'} (P^{i,j}_{o,s's})^{\alpha_{o,s's}} \quad \forall o, \tag{2}$$

where $\phi_{os} = \alpha^{-\alpha_{o,s}}_{o,s} \prod_{s'} (\alpha_{o,s's})^{-\alpha_{o,s's}}$.

The price index of inputs from the upstream industry s' used by a type-j producer in the downstream sector s and region o is:

$$P^{i,j}_{o,s's} = \Gamma_{s'} \left[\sum_{o'} T_{o's'} L^{\nu_{s'}}_{o's'} (\tau^{i,j}_{o's',os} c^M_{o's'})^{-\theta_{s'}} \right]^{-\frac{1}{\theta_{s'}}} \qquad \forall o \in US \text{ if } j = G;\ \forall o \text{ if } j = M, \tag{3}$$

where i stands for intermediate and $\Gamma_{s'}$ is a constant.[29] As we assumed that G producers only produce final goods sold to government buyers, while intermediate goods are always sourced from ordinary M producers, the intermediate-input price index depends only on $c^M_{o's'}$, regardless of whether the downstream buyer is of type M or G. The trade cost $\tau^{i,j}_{o's',os} \geq 1$ captures the cost of shipping inputs from region o' to a type-j producer in region o, with $\tau^{i,j}_{o's',os} = 1$ when $o' = o$. As explained in detail in Section 4.4 we model BAA restrictions as affecting the cost $\tau^{i,G}_{o's',os}$ that G producers face when sourcing foreign inputs, compared with that faced by M producers, $\tau^{i,M}_{o's',os}$.

Government buyers in U.S. destination region d face the final-goods price index

$$P^{f,G}_{ds} = \Gamma_s \left[\sum_{o \notin US} T_{os} L^{\nu_s}_{os} (\tau^{f,G}_{ods} c^M_{os})^{-\theta_s} + \sum_{o \in US} T_{os} L^{\nu_s}_{os} (\tau^{f,G}_{ods} c^G_{os})^{-\theta_s} \right]^{-\frac{1}{\theta_s}} \qquad \forall d \in US, \tag{4}$$

where f stands for final. M consumers of good s in destination d face the following final-good price index:

$$P^{f,M}_{ds} = \Gamma_s \left[\sum_{o} T_{os} L^{\nu_s}_{os} (\tau^{f,M}_{ods} c^M_{os})^{-\theta_s} \right]^{-\frac{1}{\theta_s}} \qquad \forall d, \tag{5}$$

where $\tau^{f,j}_{ods} \geq 1$ is the trade cost of shipping final goods s from region o to j consumers in region d, with $\tau^{f,j}_{ods} = 1$ if $o = d$.

The final-good price indices (4) and (5) differ for two reasons. First, government buyers may

ing Bartelme *et al.* (2025).

[29] $\Gamma_{s'} = \left[\Gamma \left(\frac{\theta_{s'} + 1 - \sigma_{s'}}{\theta_{s'}} \right) \right]^{\frac{1}{1-\sigma_{s'}}}$

face different, and potentially higher, trade costs when sourcing foreign final goods, implying that $\tau^{f,G}_{ods}$ may exceed $\tau^{f,M}_{ods}$. Second, domestic firms G producing for government demand may face higher production costs than ordinary M producers because compliance with domestic-content requirements raises the cost of sourcing inputs c^G_{os}, compared to c^M_{os}.

4.3 Trade Shares

Even though the components of the model are standard, the novel aspect of incorporating asymmetry in buyer types and trade costs makes it particularly important to report trade shares for both intermediate and final goods. For type $j \in \{G, M\}$ producers in region d and industry k, the share of expenditure on intermediate goods s that is sourced from producers in region o is given by:

$$\lambda^{i,j}_{os,dk} = \frac{T_{os} L^{\nu_s}_{os} (\tau^{i,j}_{os,dk} c^M_{os})^{-\theta_s}}{\left(P^{i,j}_{d,sk}/\Gamma_s\right)^{-\theta_s}} \quad \forall o, d \in US \text{ if } j = G;\ \forall o, d \text{ if } j = M. \tag{6}$$

The share of expenditure by G consumers in region $d \in US$ on final goods s sourced from producers in region $o \in US$ is:

$$\lambda^{f,G}_{ods} = \frac{T_{os} L^{\nu_s}_{os} (\tau^{f,G}_{ods} c^G_{os})^{-\theta_s}}{\left(P^{f,G}_{ds}/\Gamma_s\right)^{-\theta_s}} \quad \forall o \in US, d \in US, \tag{7}$$

while the import share from a region $o \in ROW$ is:

$$\lambda^{f,G}_{ods} = \frac{T_{os} L^{\nu_s}_{os} (\tau^{f,G}_{ods} c^M_{os})^{-\theta_s}}{\left(P^{f,G}_{ds}/\Gamma_s\right)^{-\theta_s}} \quad \forall o \in ROW,\ d \in US. \tag{8}$$

Final expenditure shares in equations (7) and (8) vary because, conditional on obtaining a waiver for imports from a foreign country, the foreign supplier is not expected to comply with BAA requirements on components origin. In this case, the relevant unit production cost is c^M_{os}. Finally, the share of expenditures on final goods s by M consumers in region d on output from o is given by:

$$\lambda^{f,M}_{ods} = \frac{T_{os} L^{\nu_s}_{os} (\tau^{f,M}_{ods} c^M_{os})^{-\theta_s}}{\left(P^{f,M}_{ds}/\Gamma_s\right)^{-\theta_s}} \quad \forall o, d. \tag{9}$$

4.4 BAA Wedges

BAA wedges on final goods. We assume that for $d \in US$, the trade costs on final goods purchased by M and G consumers follow the relationship:

$$\begin{cases} \tau_{ods}^{f,G} = \tau_{ods}^{f,M} \tau_{s}^{f,G} & \forall\ o \notin US;\ d \in US \\ \tau_{ods}^{f,G} = \tau_{ods}^{f,M} & \forall\ o \in US;\ d \in US, \end{cases} \tag{10}$$

where $\tau_{ods}^{f,M}$ captures the iceberg trade cost of shipping final good s from region o to region d. The term $\tau_{s}^{f,G}$ denotes the additional tariff-equivalent BAA wedge faced by G consumers, which varies across industries. This wedge reflects the effective BAA restrictions on purchases of foreign-produced goods across different industries. Since BAA imposes restrictions on all G producers nationwide, we assume that for a given s the BAA wedge is uniform across $d \in US$.

BAA wedges on imports of component inputs. As already discussed, BAA imposes restrictions on imports of intermediate inputs. So we posit that, when a destination is located in the U.S., i.e. $d \in US$, the trade costs on imported component inputs used by M and G producers have the following relationship:

$$\begin{cases} \tau_{os,dk}^{i,G} = \tau_{os,dk}^{i,M} \tau_{k}^{i,G} & \forall\ o \notin US;\ d \in US \\ \tau_{os,dk}^{i,G} = \tau_{os,dk}^{i,M} & \forall\ o \in US;\ d \in US. \end{cases} \tag{11}$$

Here, $\tau_{os,dk}^{i,M}$ represents the iceberg cost of shipping intermediate good s from region o to producers in downstream industry k and region d, while $\tau_{k}^{i,G}$ denotes the additional tariff-equivalent BAA wedge faced by G producers in downstream industry k when importing from the ROW. In addition, this tariff-equivalent cost is applied uniformly to imported inputs from all upstream industries. This setup is consistent with the simple model in Appendix B.1, where BAA domestic content restrictions enter as an additional constraint in the representative firm's cost-minimization problem. We show that imposing domestic content requirements is isomorphic to introducing a tariff on imported inputs coupled with a lump-sum rebate. Specifically, the BAA wedge is equivalent to a uniform ad valorem tariff on imported inputs from all upstream industries, and corresponds to the Lagrange multiplier on the domestic content constraint, capturing the tightness of the restriction faced by producers in the downstream industry. In addition, because G producers in downstream sector k face the same BAA domestic content restrictions in all U.S. states, we assume $\tau_{k}^{i,G}$ is invariant across $d \in US$.

4.5 Market Clearing Conditions and Equilibrium

Goods market clearing conditions. We allow for trade imbalances and denote by D_o the trade deficit of region o. We assume that $D_o = \iota_o \sum_{o'} \sum_s X_{o's}$, where $X_{o's}$ is the total output of industry s in region o' and ι_o is treated as an exogenous structural parameter that determines the magnitude of lump-sum transfers across regions. This implies that each region receives a transfer equal to an exogenously determined share of world's total income.

Let $\mathcal{G}$ denote the total federal procurement budget in the US. This budget is allocated across different industries according to weights γ_s, where $\sum_s \gamma_s = 1$. The industry-specific budgets are then distributed to each state based on the weights ψ_{os}, such that the amount allocated to state o for industry s is $\psi_{os}\gamma_s\mathcal{G}$, with $\sum_o \psi_{os} = 1$. The total procurement expenditure $\mathcal{G}$ is financed through a lump-sum tax, with the amount collected from state d given by $H_d = \frac{L_d}{\sum_{d'\in US} L_{d'}}\mathcal{G}$. The total non-employment benefit in the U.S. is determined according to $\mathcal{B} = \sum_o \sum_s \frac{1-e_o}{e_o}\left(\alpha_{o,s}X^G_{os} + \alpha_{o,s}X^M_{os}\right)$, where X^G_{os} and X^M_{os} represent the value of output of industry s in region o produced by G and M respectively. We assume that non-employment benefits are financed through a lump-sum tax, with state d's share given by $\frac{L_d}{\sum_{d'\in US} L_{d'}}\mathcal{B}$. Accordingly, transfer income in state d is $B_d = \sum_s \frac{1-e_d}{e_d}\left(\alpha_{d,s}X^G_{ds} + \alpha_{d,s}X^M_{ds}\right) - \frac{L_d}{\sum_{d'\in US} L_{d'}}\mathcal{B}$.

Then, goods market clearing implies that:

$$X^G_{os} = \begin{cases} \sum_{d\in US} \lambda^{f,G}_{ods}\psi_{ds}\gamma_s\mathcal{G} & \forall o \in US \\ 0 & \forall o \notin US \end{cases} \tag{12}$$

$$X^M_{os} = \begin{cases} \sum_{d\in US}\sum_k \lambda^{i,G}_{os,dk}\alpha_{d,sk}X^G_{dk} + \sum_d\sum_k \lambda^{i,M}_{os,dk}\alpha_{d,sk}X^M_{dk} \\ \quad + \sum_{d\in US}\lambda^{f,M}_{ods}\beta^M_{ds}\left[\sum_k \alpha_{d,k}(X^G_{dk}+X^M_{dk}) - H_d + B_d + D_d + R_d\right] \\ \quad + \sum_{d\notin US}\lambda^{f,M}_{ods}\beta^M_{ds}\left[\alpha_{d,k}X^M_{dk} + D_d\right] & \forall o \in US \\ \sum_{d\in US}\sum_k \frac{1}{\tau^{i,G}_k}\lambda^{i,G}_{os,dk}\alpha_{d,sk}X^G_{dk} + \sum_d\sum_k \lambda^{i,M}_{os,dk}\alpha_{d,sk}X^M_{dk} \\ \quad + \frac{1}{\tau^{f,G}_s}\sum_{d\in US}\lambda^{f,G}_{ods}\psi_{ds}\gamma_s\mathcal{G} + \sum_{d\in US}\lambda^{f,M}_{ods}\beta^M_{ds}\left[\sum_k \alpha_{d,k}(X^G_{dk}+X^M_{dk}) - H_d + B_d + D_d + R_d\right] \\ \quad + \sum_{d\notin US}\lambda^{f,M}_{ods}\beta^M_{ds}\left[\alpha_{d,k}X^M_{dk} + D_d\right] & \forall o \notin US, \end{cases} \tag{13}$$

where $R_d = \sum_{o\notin US}\sum_s\sum_k \frac{\tau^{i,G}_k - 1}{\tau^{i,G}_k}\lambda^{i,G}_{os,dk}\alpha_{d,sk}X^G_{dk} + \sum_{o\notin US}\sum_s \frac{\tau^{f,G}_s - 1}{\tau^{f,G}_s}\lambda^{f,G}_{ods}\psi_{ds}\gamma_s\mathcal{G}$ denotes the tariff revenue in region $d \in US$. Note that for the ROW, since there are only M producers, $X^G_{os} = 0$. M producers in the U.S. face demand originating from three sources: (i) the demand for intermediate inputs by G producers in the U.S., (ii) the demand for intermediate inputs by M producers worldwide, and (iii) the demand of final consumer goods worldwide. M producers in the ROW face additional demand from G consumers in the U.S., who can purchase from them upon meeting one of the waiver conditions described in Section 2.2.

Labor market clearing conditions. Labor market clearing. For each region o and sector s, labor-market clearing requires:

$$\alpha_{o,s}(X_{os}^{G}+X_{os}^{M})=\xi_{o}A_{os}w_{os}^{\frac{\kappa_{o}}{1-\rho_{o}}}\left(\sum_{s'}A_{os'}w_{os'}^{\frac{\kappa_{o}}{1-\rho_{o}}}\right)^{-\rho_{o}}\left(\left(\sum_{s'}A_{os'}w_{os'}^{\frac{\kappa_{o}}{1-\rho_{o}}}\right)^{1-\rho_{o}}+b_{oh}\right)^{\frac{1}{\kappa_{o}}-1}L_{o}\quad\forall o,s. \tag{14}$$

Equilibrium. Given $\{L_o, A_{os}, b_{oh}, \kappa_o, \rho_o, T_{os}, \theta_s, \nu_s, \alpha_{o,s}, \alpha_{o,sk}, \beta_{os}^M, \gamma_s, \psi_{os}, \iota_o, \mathcal{G}\}$, and trade costs $\{\tau_{ods}^{f,G}, \tau_{ods}^{f,M}, \tau_{os,dk}^{i,G}, \tau_{os,dk}^{i,M}\}$, an equilibrium is characterized by a wage vector $\{w_{os}\}$ that satisfies equations (1)-(9), goods market clearing conditions (12)-(13), and labor market clearing condition (14).

4.6 Welfare

In this section, we formulate consumer welfare by incorporating the utility derived from public goods. Without loss of generality, we normalize the size of the U.S. working-age population so that $\sum_{o\in US} L_o = 1$.

The expected welfare for consumers in $o \in US$, denoted as V_o, follows a Cobb-Douglas structure, where personal consumption (Q_o^M) and public goods (Q_o^G) are assigned utility weights of φ and $1-\varphi$ respectively. More specifically, consumer welfare is given by $V_o = (Q_o^M)^{\varphi}(Q_o^G)^{1-\varphi}$. We consider two alternative formulations for welfare, depending on the assumptions regarding how public goods enter into consumers' utility function.

Case I: Nationwide public good. In the first case, we assume that consumers have access to the composite public good s compiled by procurement from all states, $Q_s^G = \prod_{o'}\left(Q_{o's}^G\right)^{\psi_{o's}}$. The public goods from different industries are then aggregated following a Cobb-Douglas structure to $Q_o^G = \prod_s \left(Q_s^G\right)^{\gamma_s}$. This appropriately describes the utility derived from public goods such as defense, where air jets stationed at Army and Navy bases nationwide provide a collective defense service to all U.S. residents. The personal consumption component is determined by the expected real income, expressed as $Q_o^M = \frac{I_o}{L_o P_o^{f,M}}$, where $I_o = \sum_s \alpha_{o,s}(X_{os}^G + X_{os}^M) - H_o + B_o + D_o + R_o$ represents the total nominal income received by individuals in region o. Taken together,

$$V_o = \left(\frac{I_o/L_o}{P_o^{f,M}}\right)^{\varphi}\left(\prod_s\left(\prod_{o'}\left(Q_{o's}^G\right)^{\psi_{o's}}\right)^{\gamma_s}\right)^{1-\varphi}. \tag{15}$$

Case II: Local public good. In the second scenario, we adopt an alternative assumption that consumers in $o \in US$ have access only to the local public good s. As a result, the composite public good available to consumers in region o across industries is $Q_o^G = \Pi_s\left(Q_{os}^G\right)^{\gamma_s}$. This is more representative of public goods that are consumed more locally, such as national parks, where it is reasonable to assume that residents of Maine benefit less from Yosemite National Park than residents of California. The expected welfare is then given by:

$$V_o = \left(\frac{I_o / L_o}{P_o^{f,M}} \right)^{\varphi} \left(\frac{\prod_s \left(Q_{os}^G \right)^{\gamma_s}}{L_o} \right)^{1-\varphi}. \tag{16}$$

The formulations of welfare presented in (15) and (16) represent two extreme cases. Throughout the quantitative analyses in Section 6, we report the welfare consequences of policy shocks using both (15) and (16), which capture a range of plausible welfare outcomes.

5 Taking the Model to the Data

The model described in the previous section allows us to answer the questions we posed at the beginning of this paper through a series of counterfactual exercises that remove or tighten current restrictions, using the exact hat algebra approach of Dekle *et al.* (2007). However, in order to do so and to link the model to the data, we need sectoral and regional information for various variables, including: bilateral trade shares $\lambda_{ods}^{f,G}$, $\lambda_{ods}^{f,M}$, $\lambda_{os,dk}^{i,G}$ and $\lambda_{os,dk}^{i,M}$, shares of value added in gross output $\alpha_{o,s}$, input-output coefficients $\alpha_{o,sk}$, consumption shares β_{os}^M, outputs X_{os}^G and X_{os}^M, labor allocations π_{os}, employment ratio e_o, labor endowment L_o, global portfolio shares ι_o, procurement budget shares γ_s and ψ_{os}, federal procurement budget $\mathcal{G}$, and utility weight on public goods $1-\varphi$. Estimates are required for the following parameters: sectoral trade elasticities θ_s, sectoral scale elasticities ν_s, and the parameters governing labor supply elasticities κ_o and ρ_o. Furthermore, we need to quantify the BAA wedges imposed on imports of final goods, $\tau_s^{f,G}$, as well as the wedges on component inputs, $\tau_k^{i,G}$. We match the model to the data moments observed in the year 2014.

In this section, we describe various data sources used to compute these variables. In addition, we outline the procedures for calibrating the BAA wedges imposed on imports of final goods and component inputs. Further details are provided in Appendix C.

5.1 Regions and Sectors

We calibrate the model to the 48 U.S. mainland states, the rest of the world, and a total of 29 sectors classified according to the North American Industry Classification System (NAICS). These sectors comprise 16 manufacturing sectors, 5 tradable mining and service sectors, and 8 non-tradable service sectors, which are listed in Appendix C.2. The selection of the number of sectors was guided by the maximum level of disaggregation at which we could collect the production and trade data needed to use our model. The labor market is defined at the region-sector level, including the home production sector. As a result, there are a total of 1470 labor markets.

5.2 Trade and Production Data

The bilateral trade and production data for the year 2014 are from the World Input-Output Database (WIOD). The WIOD contains data on trade flows of goods for final consumption among countries, along with information on input-output linkages across countries and sectors. For our purpose, we consolidate countries other than the U.S. into a single entity referred to as the Rest of the World (ROW). Furthermore, we make additional necessary adjustments and expansions to the WIOD to gather all the relevant information required for quantitative analyses. We illustrate the procedure below, with additional details provided in Appendix C.3.

5.2.1 Adjusting the World I-O Table

The WIOD makes use of a similar proportionality assumption to the one we discussed in Section 3: within intermediate use, the ratio of imported use to total use is the same across downstream industries k for each input s (Dietzenbacher *et al.*, 2013). That is, $\frac{X^{i,\text{WIOD}}_{\text{ROW}\,s,\text{US}\,k}}{X^{i,\text{WIOD}}_{\text{ROW}\,s,\text{US}\,k}+X^{i,\text{WIOD}}_{\text{US}\,s,\text{US}\,k}}$ is constant in k for each s. Hence, in the WIOD, the heterogeneity of import intensity of intermediate inputs among industries may be understated, as argued by Feenstra and Jensen (2012), whose procedure motivated our adjustment. The import share of component inputs is crucial for assessing how binding the BAA domestic content requirements are, so we adjust the data on imports for intermediate- and final-use using 2014 data on imports by companies in different industries, as reported in the Profile of U.S. Importing and Exporting Companies published by the U.S. Census Bureau (Profile). The statistics at the 3-digit NAICS level in the Profile are created from import and export merchandise trade information and company characteristics contained in the Census Bureau's database of company information, the Business Register.[30] For our purposes, we aggregate these data to the 29 sectors used in the analysis. Total imports by companies reported in the Profile ($1,943 billion) closely align with the 2014 WIOD figure for intermediate goods imports ($2,050 billion). Figure C.2 compares sectoral imports in the Profile with intermediate input imports from WIOD. Overall, the data points tend to cluster around the 45-degree line. However, we observe a substantially wider range of import values in the Profile compared to those from WIOD. To adjust the WIOD data, we proceed as follows (for a 2-industry graphical representation of the adjustment see Appendix Figure C.4):

(a) We scale the imports of intermediate inputs s by industry k in WIOD, $X^{i,\text{WIOD}}_{\text{ROW}\,s,\text{US}\,k}$, by the factor $\frac{X^{\text{Profile}}_{\text{ROW}\,\text{US}\,k}}{X^{i,\text{WIOD}}_{\text{ROW}\,\text{US}\,k}}$, where $X^{\text{Profile}}_{\text{ROW}\,\text{US}\,k}$ denotes the imports by firms in industry k as reported in the Profile, and $\sum_{s'} X^{i,\text{WIOD}}_{\text{ROW}\,s',\text{US}\,k} = X^{i,\text{WIOD}}_{\text{ROW}\,\text{US}\,k}$ denotes the imported intermediate inputs by industry k in

[30](https://www.census.gov/foreign-trade/Press-Release/profile_index.html). The original data for the year 2014 is tabulated in Exhibit 7d of the 2014-2015 Profile. Although the U.S. Census Bureau has published the Profile since 1987, we note that detailed import data by industry is only available from 2014 onward.

WIOD. Thus, $X^{i,\text{Adj}}_{\text{ROW}\,s,\text{US}\,k} = X^{i,\text{WIOD}}_{\text{ROW}\,s,\text{US}\,k} \times \frac{X^{\text{Profile}}_{\text{ROW US}\,k}}{\sum_{s'} X^{i,\text{WIOD}}_{\text{ROW}\,s',\text{US}\,k}}$. In this way, the total adjusted imports of intermediate goods by each downstream industry k, $\sum_s X^{i,\text{Adj}}_{\text{ROW}\,s,\text{US}\,k}$, match the values reported in the Profile, thereby the cross-industry differences of import intensities are determined by the Profile data.

(b) We adjust the use of domestically sourced intermediate inputs s by industry k as $X^{i,\text{Adj}}_{\text{US}\,s,\text{US}\,k} = X^{i,\text{WIOD}}_{\text{ROW}\,s,\text{US}\,k} + X^{i,\text{WIOD}}_{\text{US}\,s,\text{US}\,k} - X^{i,\text{Adj}}_{\text{ROW}\,s,\text{US}\,k}$, so that, for each downstream industry k and input s, total intermediate use (from domestic and foreign sources combined) remains consistent with the original WIOD data.

(c) We then adjust imports of good s for final consumption by setting $X^{f,\text{Adj}}_{\text{ROW US}\,s} = X^{f+i,\text{WIOD}}_{\text{ROW US}\,s} - \sum_k X^{i,\text{Adj}}_{\text{ROW}\,s,\text{US}\,k}$. This ensures that total US imports of each good s, by both consumers and producers, remain consistent with the original WIOD data, $X^{f+i,\text{WIOD}}_{\text{ROW US}\,s}$.

(d) Finally, we adjust final consumption of good s from domestic producers as the residual, $X^{f,\text{Adj}}_{\text{US US}\,s} = \sum_{o \in \text{US,ROW}} X^{f,\text{WIOD}}_{o\,\text{US}\,s} - X^{f,\text{Adj}}_{\text{ROW US}\,s}$, so that total final consumption of good s is unchanged and matches the WIOD data.

In this way, we ensure that in the adjusted data: (i) the imports by each manufacturing industry in the U.S. align with the actual imports reported in the Profile; and (ii) the total intermediate use, total imports, and consumption by the U.S. remain consistent with the original WIOD data.

Figure C.3 compares the import shares of component inputs based on the adjusted IO table and the original WIOD data for the manufacturing industries subject to BAA domestic content restrictions. Once again, we observe substantially greater variation in the Profile-based data than in WIOD. Without this adjustment to import intensities, none of the industries encounter a binding BAA domestic content restriction at 50%. When the requirement is increased to 75%, only three industries face a binding constraint. In contrast, with the adjusted data, we observe that one industry faces a binding BAA constraint at 50%, and six industries do so at 75%.[31]

Using adjusted WIOD data, we obtain U.S. material input shares across industries, $\alpha_{\text{US},sk}$, input-specific import shares by downstream industry, $\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k}$, and total industry output, $X_{\text{US}\,k}$. These variables provide the information needed to impute the import shares $\lambda^{f,G}_{\text{ROW US}\,k}$, $\lambda^{f,M}_{\text{ROW US}\,k}$, $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ and $\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$ in what follows.

5.2.2 Imputation of $\lambda^{f,G}_{\text{ROW US}\,k}$, $\lambda^{f,M}_{\text{ROW US}\,k}$, $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ and $\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$

Using the FPDS data described in section 3 and aggregated at the WIOD sector level, we can break down the US final-use consumption of goods from each origin and industry into two components:

[31] They include: Chemical (325), Machinery (333), Computer and Electronic Product Manufacturing (334), Electrical Equipment, Appliance, and Component Manufacturing (335), Transportation Equipment (336), and Furniture and Related Products, and Miscellaneous Manufacturing (337-339).

the portion consumed by G and the portion consumed by M. Thereby, we can obtain the data on $\lambda^{f,G}_{\text{ROW}\,\text{US}\,k}$ and $\lambda^{f,M}_{\text{ROW}\,\text{US}\,k}$.

Now, we turn to the imputation of trade shares related to intermediate use. The import share of input s for an entire downstream industry k, $\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k}$ is given by

$$\begin{aligned}\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} &= \frac{\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}\alpha_{\text{US},sk}X^G_{\text{US}\,k}+\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}\alpha_{\text{US},sk}X^M_{\text{US}\,k}}{\alpha_{\text{US},sk}(X^G_{\text{US}\,k}+X^M_{\text{US}\,k})} \\ &= \frac{X^G_{\text{US}\,k}}{X^G_{\text{US}\,k}+X^M_{\text{US}\,k}}\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k} + \frac{X^M_{\text{US}\,k}}{X^G_{\text{US}\,k}+X^M_{\text{US}\,k}}\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}.\end{aligned} \tag{17}$$

Here, $X^G_{\text{US}\,k}$ is the output of k by G which we obtain from the FPDS data, and $X^M_{\text{US}\,k} = X_{\text{US}\,k} - X^G_{\text{US}\,k}$ is the output of k by M. Through the lenses of our model, $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k} \leq \lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} \leq \lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$, where the strict inequality holds when the domestic content restriction is binding. Let C denote the set of goods considered as component inputs subject to BAA domestic content restrictions, and let S_C be the number of industries $s \in C$.[32] We then impute $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ and $\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$, using the following procedure:

1. If the observed relation $\sum_{s\in C}\frac{\alpha_{\text{US},sk}}{\sum_{s'\in C}\alpha_{\text{US},s'k}}\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} < 0.5$, the BAA domestic content restriction is non-binding for k. In this case, $\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} = \lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k} = \lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}\ \forall\ s$.

2. If the observed relation $\sum_{s\in C}\frac{\alpha_{\text{US},sk}}{\sum_{s'\in C}\alpha_{\text{US},s'k}}\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} \geq 0.5$, the domestic content restriction is binding for k.[33] In this case, the foreign content in the component inputs used by producers G satisfies:

$$\sum_{s\in C}\frac{\alpha_{\text{US},sk}}{\sum_{s'\in C}\alpha_{\text{US},s'k}}\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k} = 0.5 \tag{18}$$

   To impute $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ and $\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$, there are two sub-cases to consider, depending on whether s belongs to the set C.

   (a) Case I: $s \in C$. For each downstream k that faces a binding constraint, equations (17) and (18) provide $S_C + 1$ restrictions. In order to solve for $2 \times S_C$ unknown variables (i.e., $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ and $\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$), we introduce an additional S_C number of model-consistent restrictions as follows:

$$\frac{\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}/\lambda^{i,G}_{\text{US}\,s,\text{US}\,k}}{\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}/\lambda^{i,M}_{\text{US}\,s,\text{US}\,k}} = \frac{\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}/\left(1-\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}\right)}{\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}/\left(1-\lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}\right)} = \left(\tau^{i,G}_k\right)^{-\theta_s}. \tag{19}$$

   In sum, for each downstream k that faces a binding constraint, we may solve for $2\times S_C+1$ unknowns $\{\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}, \lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}, \tau^{i,G}_k\}$ with $2\times S_C + 1$ equations (17), (18) and (19).

[32] According to BAA regulations, we include goods from Manufacturing industries (31-33), as well as Transportation and Warehousing (48-49), as component inputs.

[33] Since $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k} \leq \lambda^{i,M}_{\text{ROW}\,s,\text{US}\,k}$, the observed relation $\sum_{s\in C}\frac{\alpha_{\text{US},sk}}{\sum_{s'\in C}\alpha_{\text{US},s'k}}\lambda^{i,G+M}_{\text{ROW}\,s,\text{US}\,k} > 0.5$ indicates a binding case.

(b) Case II: $s \notin C$. $\lambda^{i,G+M}_{\mathrm{ROW}\,s,\mathrm{US}\,k} = \lambda^{i,G}_{\mathrm{ROW}\,s,\mathrm{US}\,k} = \lambda^{i,M}_{\mathrm{ROW}\,s,\mathrm{US}\,k}$.

5.2.3 Expanding the Adjusted World I-O Table

Next, we expand the adjusted WIOD by incorporating spatial data for the U.S. economy as discussed in Section 3. As shown in Figure C.5, the extended world input-output matrix includes additional blocks as follows: (i) bilateral trade flows of goods for final use by G (respectively, M) between each U.S. state and the ROW; (ii) bilateral trade flows of goods for intermediate use by G (respectively, M) between each U.S. state and the ROW; (iii) inter-regional trade flows of goods for final use among the U.S. states respectively for G and M; and (iv) inter-regional trade flows of goods for intermediate use among the U.S. states respectively for G and M. While trade in final goods (i) and (iii) is observed for G (using FPDS data), measures for the other aforementioned trade flows are not readily available; therefore, we proceed by imputation described in detail in Appendix C.3. The imputation is done by combining the information derived from the FPDS, WIOD, Commodity Flow Survey (CFS), USA Trade Online, and the County Business Patterns (CBP). The imputation procedure ensures that: (a) the aggregation of the expanded I-O table to the country-sector level remains consistent with the original data, and (b) the data on bilateral trade flows of G goods at the disaggregated level aligns with the FPDS data.

Using FPDS, we directly observe total procurement $\mathcal{G}$. Industry allocations γ_s are set to match each industry's share of total federal procurement, and ψ_{os} is set equal to the observed state share of procurement in good s. Using the expanded world input-output table, we can directly compute the bilateral trade shares $\lambda^{f,G}_{ods}$,$\lambda^{f,M}_{ods}$,$\lambda^{i,G}_{os,dk}$ and $\lambda^{i,M}_{os,dk}$, the share of value added in gross output $\alpha_{o,s}$, the input-output coefficients $\alpha_{o,sk}$, the consumption shares β^M_{os}, and the outputs X^G_{os} and X^M_{os}. Given the structure of our model, we may also compute the employment shares according to $\pi_{os} = \frac{\alpha_{o,s}(X^G_{os}+X^M_{os})}{\sum_{s'}\alpha_{o,s'}(X^G_{os'}+X^M_{os'})} \cdot e_o$, where the data on e_o is derived based on wage and salary employment data obtained from the BEA and working-age (ages 18-64) population data from the National Vital Statistics System.[34] The portfolio shares ι_o are disciplined to match the observed trade imbalances. Lastly, we calibrate the utility weight on public goods $1-\varphi$ so that $(1-\varphi)/\varphi$ matches the ratio of FPDS procurement to the U.S. personal consumption expenditure. Specifically, we take $\varphi = 0.966$.[35]

5.3 Elasticities

In all subsequent counterfactual simulations, we adopt the following estimated parameters from the existing literature. The trade elasticities, θ_s, are obtained from the estimates provided by Giri

[34] For the ROW, we employ information from the World Development Indicators (WDI). Specifically, we calculate e_o by averaging the employment ratios across countries other than the U.S., using countries' working-age population as weights.

[35] FPDS procurement is $418 billion in 2014, while U.S. personal consumption expenditure is $11,874 billion in 2014 (https://fred.stlouisfed.org/release/tables?eid=43861&od=2014-01-01&rid=53). We consider the entire FPDS expenditure, and not just manufacturing, to make it comparable with aggregate personal consumption.

et al. (2021). The scale elasticities, ν_s, are collected from the estimates presented in Bartelme *et al.* (2025).[36] The values of these industry-specific parameters are reported in Table E.1. Following Galle *et al.* (2023) we set the labor supply elasticity $\kappa_o = 1.5\ \forall o$.[37] We are not aware of any existing estimates of ρ_o in the literature. We therefore assume that $\rho_o = 0.2\ \forall o$ in our baseline analysis. We will later evaluate the robustness of our quantitative results to alternative parameter values.

5.4 Calibrating the BAA Wedges

In this section, we calibrate the wedges faced by G producers and G consumers due to BAA restrictions in a model-consistent way. There are two dimensions: (i) the wedges affecting imported input prices resulting from BAA domestic content requirements on component inputs used by G producers; and (ii) the wedges on the price of imported final goods due to strict limitations on the purchase of foreign manufactured products by G consumers.

5.4.1 BAA Wedges on Imports of Component Inputs: $\tau_k^{i,G}$

As the BAA stipulations do not vary across regions within the U.S., we calibrate these $\tau_k^{i,G}$ using the data aggregated to the country-industry level. Accordingly, for the calibration, we consider $o, d = US$ or ROW. We infer wedges $\tau_k^{i,G}$ by considering two cases depending on whether the equilibrium share of foreign components for G producers, $\sum_{s\in C} \frac{\alpha_{\mathrm{US},sk}}{\sum_{s'\in C}\alpha_{\mathrm{US},s'k}} \lambda^{i,G+M}_{\mathrm{ROW}\,s,\mathrm{US}\,k}$, exceeds 50% of all component inputs. Specifically,

1. If the domestic content restriction is non-binding, i.e., $\sum_{s\in C} \frac{\alpha_{\mathrm{US},sk}}{\sum_{s'\in C}\alpha_{\mathrm{US},s'k}} \lambda^{i,G+M}_{\mathrm{ROW}\,s,\mathrm{US}\,k} < 0.5$, then $\tau_k^{i,G} = 1$.

2. If the domestic content restriction is binding, i.e., $\sum_{s\in C} \frac{\alpha_{\mathrm{US},sk}}{\sum_{s'\in C}\alpha_{\mathrm{US},s'k}} \lambda^{i,G+M}_{\mathrm{ROW}\,s,\mathrm{US}\,k} \geq 0.5$, then G producers are constrained and we can back out $\tau_k^{i,G}$ following the approach delineated in Section 5.2.2. This method derives $\lambda^{i,G}_{\mathrm{ROW}\,s,\mathrm{US}\,k}$, $\lambda^{i,M}_{\mathrm{ROW}\,s,\mathrm{US}\,k}$ and $\tau_k^{i,G}$ together, by leveraging available data on the output respectively by G and M producers in each downstream sector, the aggregate import share data for each input-output pair, and the structural relation (19).

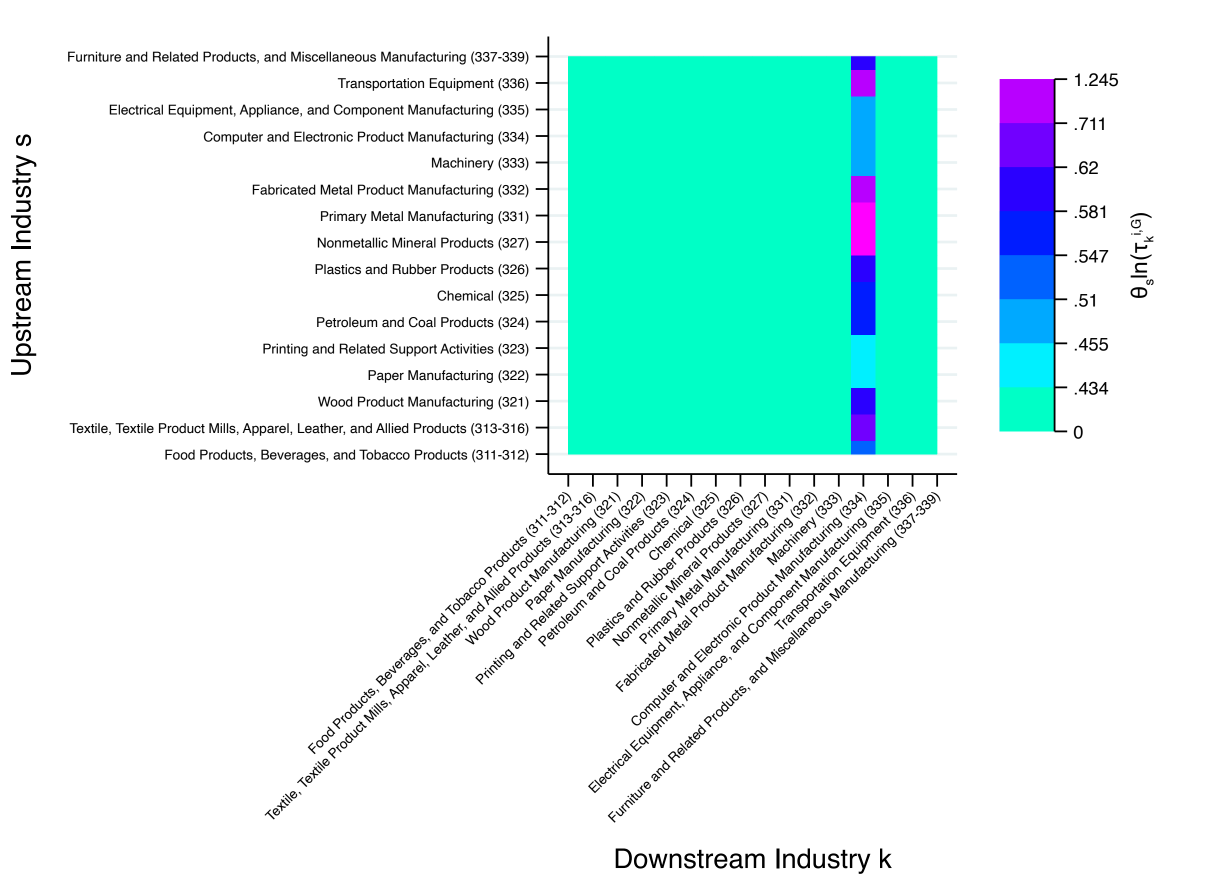
Figure 3 presents the effective wedges in logarithm, $\theta_s \ln(\tau_k^{i,G})$, encountered by G producers from different downstream industries across various upstream inputs. Computer and Electronic Product Manufacturing (334) is the sole industry that exhibits positive values for $\theta_s \ln(\tau_k^{i,G})$—consistent with its being the only industry whose equilibrium foreign component-input share exceeds 50% (Figure C.3.) The input-side BAA restriction is thus non-binding for the rest of

[36] Note that Bartelme *et al.* (2025) employ the auxiliary estimates of θ_s from Giri *et al.* (2021) to estimate ν_s. Since our model embeds both θ_s and ν_s, for the sake of consistency, we also adopt the estimated value of θ_s from Giri *et al.* (2021) in our baseline analysis.

[37] In Section 6.1, we report a back-of-the-envelope IV estimate of κ_o from our reduced-form regressions equal to 1.201 (s.e. 0.509), statistically consistent with the calibrated value of 1.5 used here.

manufacturing under current rules; however, this changes substantially under the 75% tightening (Section 6.3).

Figure 3: Effective BAA Wedges on Imported Inputs Faced by G Producers: $\theta_s \ln(\tau_k^{i,G})$



Notes: This figure reports the estimates of effective trade barriers, expressed in logarithms, encountered by G producers due to BAA restrictions, $\theta_s \ln(\tau_k^{i,G})$. Here, $\tau_k^{i,G}$ is the estimate of the BAA wedges faced by the G producers in the downstream sector k, and θ_s represents the trade elasticity of the upstream sector s.

5.4.2 BAA Wedges on Imports of Final Goods: $\tau_s^{f,G}$

Broader Measure: Using country-industry-level data, we back out $\tau_s^{f,G}$ in a model-consistent way as follows:

$$\frac{\lambda^{f,G}_{\text{ROW US}\,s} \Big/ \left(1 - \lambda^{f,G}_{\text{ROW US}\,s}\right)}{\lambda^{f,M}_{\text{ROW US}\,s} \Big/ \left(1 - \lambda^{f,M}_{\text{ROW US}\,s}\right)} = \left(\tau_s^{f,G}\right)^{-\theta_s} \left(\frac{c^G_{\text{US},s}}{c^M_{\text{US},s}}\right)^{\theta_s} \tag{20}$$

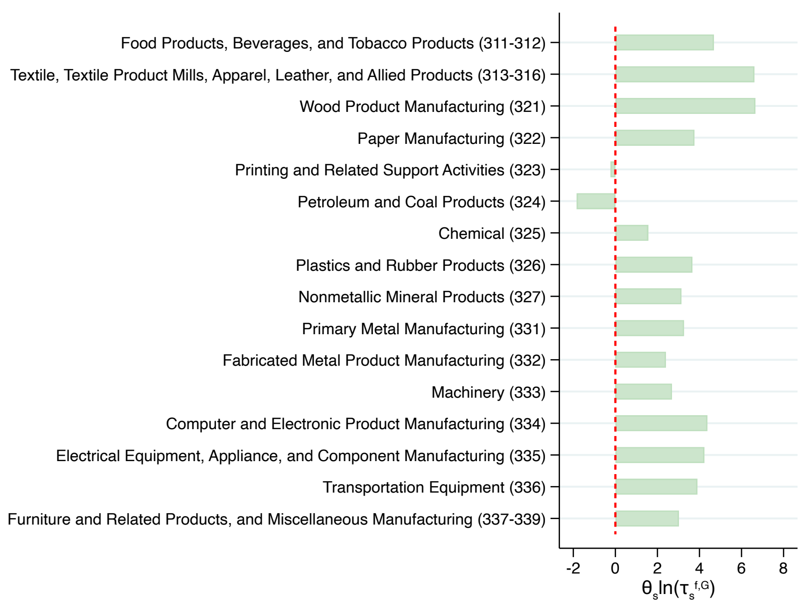
While the unit costs of production $c^G_{\text{US},s}$ and $c^M_{\text{US},s}$ in the above equation are not directly observable, they can be inferred based on the structure of our model:

$$\begin{aligned}\frac{c^G_{\text{US},s}}{c^M_{\text{US},s}} = \prod_{s'} \left(\frac{P^{i,G}_{\text{US},s's}}{P^{i,M}_{\text{US},s's}}\right)^{\alpha_{\text{US},s's}} &= \prod_{s'} \left(\frac{\left[T_{\text{ROW},s'} L^{\nu_{s'}}_{\text{ROW},s'} (\tau^{i,M}_{\text{ROW}\,s',\text{US}\,s} c_{\text{ROW},s'})^{-\theta_{s'}} + T_{\text{US},s'} L^{\nu_{s'}}_{\text{US},s'} (c^M_{\text{US},s'})^{-\theta_{s'}}\right]^{\frac{1}{\theta_{s'}}}}{\left[T_{\text{ROW},s'} L^{\nu_{s'}}_{\text{ROW},s'} (\tau^{i,G}_{\text{ROW}\,s',\text{US}\,s} c_{\text{ROW},s'})^{-\theta_{s'}} + T_{\text{US},s'} L^{\nu_{s'}}_{\text{US},s'} (c^M_{\text{US},s'})^{-\theta_{s'}}\right]^{\frac{1}{\theta_{s'}}}}\right)^{\alpha_{\text{US},s's}} \\ &= \prod_{s'} \left((\tau^{i,G}_s)^{\theta_{s'}} \lambda^{i,G}_{\text{ROW}\,s',\text{US}\,s} + \lambda^{i,G}_{\text{US}\,s',\text{US}\,s}\right)^{\frac{\alpha_{\text{US},s's}}{\theta_{s'}}}\end{aligned}$$

where $\tau^{i,G}_s$, $\lambda^{i,G}_{\text{ROW}\,s',\text{US}\,s}$ and $\lambda^{i,G}_{\text{US}\,s',\text{US}\,s}$ have been derived in the previous step. This expression has the intuitive interpretation that the difference in unit cost of production between G and M producers is related to a weighted average of wedges imposed on G's inputs sourced from different regions.

Figure 4 reports the estimates of effective wedges in logarithm, $\theta_s \ln(\tau^{f,G}_s)$. The mean is 3.24 (s.d. 2.16)[38], implying that the BAA reduces G imports by approximately 96% for the average manufacturing industry[39]. Only Printing (323) and Petroleum (324) have effective wedges near zero, and the final-good wedges are substantially larger than the components-side wedges (Figure 3).

Figure 4: Effective BAA Wedges on Imported Final Goods Faced by G Consumers: $\theta_s \ln(\tau^{f,G}_s)$



Notes: This figure reports the estimates of effective trade barriers, expressed in logarithm, encountered by G consumers due to BAA restrictions, $\theta_s \ln(\tau^{f,G}_s)$. Here, $\tau^{f,G}_s$ is the estimate of the broad measure of the BAA wedges faced by G consumers of good s, and θ_s represents the trade elasticity of sector s.

[38]The mean of $\tau^{f,G}_s$ is 2.58, with a standard deviation of 1.29.

[39]Calculated as $100 * (\exp(-3.24) - 1)$.

Narrow measure. The broad $\tau_s^{f,G}$ inferred above captures both BAA-specific restrictions and other costs faced by foreign firms that are unrelated to the BAA—e.g. the fixed cost of understanding the U.S. federal procurement bidding process.[40] To separate the two components, we consider a narrow measure $t_s^{f,G}$ linked to the broad measure via $\tau_s^{f,G} = t_s^{f,G}\, t_s^e$, where $t_s^{f,G}$ denotes the trade barriers directly resulting from the BAA restrictions, and t^e is the additional cost (or home bias) faced by foreign producers in contract bidding which is invariant across industries.

To identify t^e, we exploit two institutional features: (i) federal procurement conducted outside the U.S. is not subject to the same stringent BAA restrictions as the purchase of foreign manufacturing products within the U.S., and (ii) non-BAA home bias should be present regardless of procurement location. In EU-procured-for-EU-use settings, the effective wedge therefore collapses to $\tau_s^{f,G} = t^e$, so we recover an industry-level t_s^e from the analogous G-vs-M foreign-share gap in EU procurement: $t_s^e = \left(\frac{\lambda^{f,G}_{\text{EU EU}\,s}/\lambda^{f,G}_{\text{US EU}\,s}}{\lambda^{f,M}_{\text{EU EU}\,s}/\lambda^{f,M}_{\text{US EU}\,s}}\right)^{-1/\theta_s}$, where $\lambda^{f,j}_{ods}$ denotes the share of type-$j \in \{G, M\}$ procurement of good s used in d that is sourced from o. We then construct t^e as the procurement-weighted average of t_s^e across industries, using each industry's share of U.S. procurement as weights, obtaining $t^e = 1.22$.[41] This finding implies that, measured in terms of tariff-equivalent trade costs, the wedge due to home bias may account for at most 14% of the broad BAA wedge.[42]

The narrow effective wedge $\theta_s \ln t_s^{f,G}$ averages 2.41 across manufacturing industries, implying that BAA-specific barriers alone reduce G imports by at least 91% on average.[43]

5.4.3 BAA Wedges and Industry Characteristics

At this stage, we have derived the BAA wedges based on the model's structure by applying the ratio method, which is widely used in the trade literature to infer trade barriers (Head and Mayer, 2014). The validity of the approach depends on whether the model is correctly specified. While we will formally conduct model validation test in Section 6.1, in Table 1, we explore potential factors that determine the extent of trade protection provided by BAA provisions across industries, including political weight from Adão *et al.* (2025c),[44] labor intensity ($\alpha_{\text{US},s}$), and consideration of

[40] Appendix A.2.1 describes the bidding registration procedure and shows that it does not differ materially for foreign firms.

[41] Appendix E.1 details the data construction.

[42] Calculated as $100 * (1.22 - 1)/(2.58 - 1)$, where 2.58 is the average value of the broad BAA wedge measures $\tau_s^{f,G}$. Notably, this is an upper bound on t^e—and hence a lower bound on $t_s^{f,G}$—since some BAA restrictions still apply to procurement conducted abroad. Indeed, although procurement conducted outside of the U.S. is not subject to the same stringent BAA restrictions as those conducted within the U.S., some restrictions still apply. Hence, the calibrated value of t^e still incorporates trade barriers resulting from the restrictions on the purchase of foreign products, resulting in an upward bias in the estimation of home bias.

[43] Calculated as $100 \cdot (\exp(-2.41) - 1)$.

[44] The sector-level measure of political influence is the political weight estimated by Adão *et al.* (2025c), derived from cross-sector variation in observed trade protection under an inverse-optimal-tariff approach; it captures how much the government weights each sector's profits relative to consumer welfare when setting trade policy.

external economies of scale (ν_s) from Bartelme *et al.* (2025).

Panel A shows that the estimated BAA wedges on final goods are positively and significantly correlated with political weight (Column 1). Additionally, these wedges are positively associated with labor intensity and scale elasticity, although these correlations are not statistically significant (Column 2). Columns (3) and (4) further confirm a strong rank correlation between the BAA wedges on final goods and political weight. In sum, the findings presented in Table 1 indicates that our measures of BAA wedges capture economically meaningful variation, particularly that associated with political economy forces which are likely connected to industry lobbying activities (Adão *et al.*, 2025c).[45]

Table 1: Industry Characteristics and Calibrated BAA Wedges on Final Goods $\tau_s^{f,G}$

	$\theta_s \ln(\tau_s^{f,G})$ (1)	$\theta_s \ln(\tau_s^{f,G})$ (2)	Rank $\theta_s \ln(\tau_s^{f,G})$ (3)	Rank Rank $\theta_s \ln(\tau_s^{f,G})$ (4)
Political Weight$_s$	2.3380***	2.6293***		
	(0.5201)	(0.6589)		
$\alpha_{\text{US},s}$		3.8930		
		(4.5055)		
ν_s		4.3241		
		(10.9058)		
Rank Political Weight$_s$			0.4648**	0.5300**
			(0.1942)	(0.2013)
Rank $\alpha_{\text{US},s}$				0.1477
				(0.2237)
Rank ν_s				0.1977
				(0.2612)
Observations	16	16	16	16
R-squared	0.2240	0.3155	0.2249	0.2984

Notes: The sector-level measure of political influence is derived from the work of Adão *et al.* (2025c). Robust standard errors are reported in parentheses.

5.4.4 Robustness and Stability of the BAA Wedges

We subject our calibrated final-good wedges $\tau_s^{f,G}$ to two checks; the full derivations, tables, and figures are in Appendix E.2.

Compositional bias. A potential concern is that our baseline estimates of $\tau_s^{f,G}$ could be upward-biased if, within an aggregated NAICS industry s, G disproportionately consumes sub-industries

[45] We do not analyze the relationship between industry characteristics and the BAA wedges on component-input imports, $\tau_k^{i,G}$, because only one industry has binding BAA restrictions (Figure 3). Instead, Table E.2 examines the relationship between the level of protection an upstream industry derives from the tightening BAA restrictions on domestic components—applied to its downstream industries—and various industry characteristics. (The experiment that raises the required domestic input share to 75% is discussed in Section 6.3.) Again, we detect a positive rank correlation between the protection level and political weight.

that have inherently lower import intensities than M. To assess this, we re-estimate the wedges at the more granular 6-digit NAICS level, combining the FPDS with Census trade flows and the NBER-CES Manufacturing Industry Database. Three pieces of evidence indicate that such compositional differences do not drive our estimates. First, we regress each producer type's expenditure share across 6-digit sub-industries ς within an aggregated industry s on the inherent import intensity of those sub-industries, $\lambda^M_{\text{ROW US}\,\varsigma}$. The estimated coefficients are small, statistically insignificant, and statistically indistinguishable between G and M, with or without aggregated-industry fixed effects (Table E.3); G's expenditure therefore does not systematically tilt toward sub-industries with lower import intensity. Second, we compare our baseline aggregated-industry wedges to an alternative measure obtained by first estimating wedges at the 6-digit level and then aggregating them with G expenditure weights. The two sets of estimates line up closely along the 45-degree line across industries (Figure E.1); the only outlier is Food Products, Beverages, and Tobacco (311–312), where over 75% of the 6-digit codes record zero G imports, so the small positive value we impute for these zeros mechanically inflates the implied wedge. Third, residual bias could still arise *within* 6-digit industries if G procures more specialized varieties with inherently lower import intensities. We test for this by splitting 6-digit industries into high- and low-differentiation groups using the Rauch (1999) classification: if such bias were present, the distribution of estimated wedges in the high-differentiation group should first-order stochastically dominate that in the low-differentiation group. We find the opposite pattern (Figure E.2), consistent with the BAA's exemption for products not available domestically.

Stability over time. Because our baseline wedges are calibrated from a single year (2014), we examine whether they reflect stable features of the BAA rather than year-specific noise. We recompute $\tau_s^{f,G}$ for each industry over 2001–2018 using the same ratio method; absent significant policy changes, the implied wedges should be similar across neighboring years. The cross-sector distribution of the estimated wedges remains stable around 2014, with a mild upward trend suggesting that BAA restrictions tightened over the period. The cross-sector correlation between the 2014 wedges and those of other years stays near 0.8 in recent years (Figure E.3). We conclude that our 2014-based wedges capture persistent features of the BAA provisions.

6 Counterfactual Experiments

This section conducts four sets of counterfactual experiments, each serving different purposes: (i) evaluating the model's predictive performance regarding the effects of procurement demand shocks on various local labor market outcomes, (ii) quantifying the impacts of the BAA restrictions on welfare and employment, (iii) examining the implications on welfare and employment when the domestic content requirement for component inputs is raised from 50% to 75%, and (iv) comparing the welfare effects of BAA restrictions to tariff changes that generate comparable amount of employment.

We perform the counterfactuals by applying the exact hat algebra method (Dekle *et al.*, 2007). The method solves for the proportional change $\hat{x} = x'/x$ in any endogenous variable between the initial equilibrium (x) and the counterfactual equilibrium (x') in response to exogenous changes in fundamentals and policies. Across different counterfactual experiments, we consider counterfactual changes in federal procurement, reflected by $\hat{\gamma}_s = \gamma'_s/\gamma_s$ and $\hat{\mathcal{G}} = \mathcal{G}'/\mathcal{G}$, and the BAA wedges, captured by $\hat{\tau}_s^{f,G} = \tau_s^{'f,G}/\tau_s^{f,G}$ and $\hat{\tau}_k^{i,G} = \tau_k^{'i,G}/\tau_k^{i,G}$. The solution algorithm and additional details are described in Appendix F.

6.1 Federal Procurement Demand Shocks and Model Validation

In this first counterfactual, our main goal is to test whether the model's predicted causal effect of a shock on a given outcome coincides with its true causal effect in the data. For this reason, we shock the model, calibrated to the 2014 data, with the sectoral procurement, demand changes $\hat{\gamma}_s\hat{\mathcal{G}}$ observed over the two five-year periods 2009-2014 and 2014-2019, and simulate the corresponding state-level changes in three outcomes with direct empirical counterparts: log wages, the log non-employment rate, and the manufacturing employment share.

The challenge is that the true causal effect is never observed: what we see in the data is the total change in the outcome, which reflects *both* the shock of interest *and* all other unobserved shocks. For instance, let Δy_o denote the observed change in an outcome (e.g., log wages) in region o. Decompose it structurally into the true causal effect of the shock, Δx_o^*, and the causal effect of all other shocks, $\Delta\eta_o^*$: $\Delta y_o = \Delta x_o^* + \Delta\eta_o^*$. Neither component is directly observed. The quantitative model delivers a prediction for the first component, Δx_o, and the question we want to answer is: does the model's prediction Δx_o equal the true causal effect Δx_o^*?

To answer this question, we adapt the IV-based test in Adão *et al.* (2025b) (hereafter ACD). The ACD insight is that, by projecting both the observed outcome and the model-predicted outcome on a *common exogenous instrument*, one isolates the component of each that is driven by the shock of interest alone, and under the null that the model is correctly specified, these two projections must coincide. The instrument has a shift-share form, $z_o = \sum_s s_{os}\,\Delta\zeta_{IV,st}$, where $\Delta\zeta_{IV,st} = \hat{\gamma}_s\hat{\mathcal{G}} - 1$ is the exogenous sector-level shifter in our application (the national-level change in procurement demand) and s_{os} measures region o's exposure to it. The identifying assumption is that z_o is orthogonal to the non-shock component of the outcome: $\mathbb{E}[z_o\,\Delta\eta_o^*] = 0$. The exogenous variation we exploit is a *preference* shock, a change in the government's sectoral procurement demand, rather than a *policy* shock, by which we would mean a direct change in the BAA wedges. We rely on preference shocks because the BAA wedges themselves do not exhibit clean exogenous time-variation in our data, whereas national procurement demand does. For the same reason we do not implement ACD's welfare-based statistic, since the welfare consequences of procurement-demand shifts are not the welfare object of the BAA counterfactual.

Under this assumption, projecting Δy_o on z_o yields

$$\underbrace{\frac{\mathbb{E}[z_o\,\Delta y_o]}{\mathbb{E}[z_o^2]}}_{\beta^y} = \underbrace{\frac{\mathbb{E}[z_o\,\Delta x_o^*]}{\mathbb{E}[z_o^2]}}_{\beta^{x^*}} + \underbrace{\frac{\mathbb{E}[z_o\,\Delta \eta_o^*]}{\mathbb{E}[z_o^2]}}_{=0} = \beta^{x^*}.$$

That is, the slope from regressing the *observed* outcome on z_o recovers the slope of the unobserved true causal effect on z_o. Analogously, projecting the model-predicted outcome Δx_o on z_o yields a slope β^x. Under the null that the model correctly predicts the causal response to the variation captured by z_o (i.e., $\Delta x_o = \Delta x_o^*$), we must have $\beta^y = \beta^x$; a statistically significant gap between the two slopes is evidence of model misspecification.[46]

Slope-based Tests. We estimate the stacked first-difference regression

$$\Delta y_{o,t} = \beta\,\Delta Proc\_PW_{o,t} + W'_{o,0}\gamma_t + D_{d,t} + D_o + \varepsilon_{o,t}, \tag{21}$$

where $\Delta y_{o,t} = y_{o,t} - y_{o,t-5}$ is the five-year change in outcome y in state o and $\Delta Proc\_PW_{o,t}$ is the Bartik procurement-demand shock:

$$\Delta Proc\_PW_{o,t} = \sum_s \underbrace{\frac{X^G_{os,t-10}}{L_{o,t-10}}}_{s_{os}}\ \underbrace{\frac{X^G_{s,t} - X^G_{s,t-5}}{X^G_{s,t-10}}}_{\Delta\zeta_{IV,st}}. \tag{22}$$

The exposure share s_{os} is state o's per-worker share of sector-s procurement in the lagged base period; the sectoral shifter $\Delta\zeta_{IV,st}$ is the five-year national growth rate in sector-s procurement and maps one-for-one to $\hat{\gamma}_s\hat{\mathcal{G}} - 1$ in the quantitative model. A unit of $\Delta Proc\_PW_{o,t}$ corresponds to USD 1,000 of additional procurement demand per working-age worker.[47] When the outcome is $\Delta ShareMfg$, we split the Bartik into manufacturing and non-manufacturing components and include both jointly:

$$\Delta Proc\_PW\_Mfg_{o,t} = \sum_{s\in Mfg} s_{os}\,\Delta\zeta_{IV,st}, \qquad \Delta Proc\_PW\_NonMfg_{o,t} = \sum_{s\notin Mfg} s_{os}\,\Delta\zeta_{IV,st}. \tag{23}$$

[46] Equivalently, $H_0 : \beta^y = \beta^x$ is the null of a unit coefficient in the IV regression of Δy_o on Δx_o with z_o as the instrument. A rejection signals misspecification of the model's response to the variation captured by z_o; it does not rule out additive state-specific discrepancies orthogonal to the instrument.

[47] Weights are lagged by ten years to mitigate simultaneity bias, as in Autor *et al.* (2013). The measure is close to those used in the fiscal-multiplier literature (e.g. Auerbach *et al.*, 2010, 2025), which lets us benchmark our point estimates to theirs. Appendix F.5 reports a robustness variant in which s_{os} is replaced by the model's Jacobian with respect to preference shocks, as suggested by ACD to improve power and account for general-equilibrium linkages.

We stack the five-year differences 2009–2014 and 2014–2019. $W_{o,0}$ is a vector of state-level initial conditions interacted with year dummies.[48] $D_{d,t}$ are census-region-by-year dummies and D_o are state fixed effects, which absorb state-specific linear time trends in $y_{o,t}$; β is identified from variation in procurement shocks both across states within Census regions and within states over time. Regressions are weighted by the lagged working-age population, with standard errors clustered at the state level.

Equation (21) estimated on the actual outcome $\Delta y_{o,t}$ (constructed from the BEA Local Area Personal Income and Employment Database and the National Vital Statistics System) delivers $\hat{\beta}^y$.[49] To obtain $\hat{\beta}^x$, we re-run the same regression after replacing $\Delta y_{o,t}$ with the model-simulated outcome $\Delta x_{o,t} = x_{o,t} - x_{o,t-5}$, where $x_{o,t}$ is the state-level outcome produced by the 2014-calibrated model when shocked with the *same* sectoral demand changes $\hat{\gamma}_s \hat{\mathcal{G}}$ that enter the Bartik. The validation test is $H_0 : \beta^y = \beta^x$; we report two p-values, one from a seemingly unrelated regression stacking the two equations, and one from a t-test that treats $\hat{\beta}^x$ as a fixed target.

Table 2 reports the tests. The actual-data estimates (columns 1, 3, 5) imply that USD 1,000 of additional procurement demand per worker raises wages by 0.69% and lowers the non-employment rate by 0.83 percentage points.[50] The simulated slopes (columns 2, 4, 6) are smaller in magnitude but of the same sign, and the cross-model tests of equality fail to reject for $\Delta \ln Wage$ and $\Delta \ln(1 - EmpRate)$. The test rejects on the non-manufacturing sub-component of $\Delta ShareMfg$ (columns 5–6); this is driven by a small number of outliers (see Panels C and D of Figure F.1 and Figure F.2 in Appendix F.5), and the gap narrows once they are excluded.[51] The model therefore passes the ACD slope test on the three outcomes that discipline its welfare predictions.

Identification and Robustness The slope test relies on $\Delta Proc\_PW_{o,t}$ being conditionally exogenous. Following Goldsmith-Pinkham *et al.* (2020), this amounts to

$$\mathbb{E}\left[\frac{X^G_{os,t-10}}{L_{o,t-10}} \, \varepsilon_{o,t} \,\middle|\, \mathcal{W} \right] = 0 \quad \text{for all } s,$$

[48] Following Autor *et al.* (2019): shares of employment in manufacturing, routine-task-intensive, and offshorable occupations; the female employment share; and the population shares of college-educated, foreign-born, non-white, and age 0–17, 45–64, 65+.

[49] Appendix C.4 reports summary statistics on outcomes and procurement shocks.

[50] On our wage base of USD 42,100 per worker, the wage elasticity corresponds to USD 290 per worker, close to the USD 350 that Auerbach *et al.* (2010) report for DoD spending at the CBSA level. The ratio of the non-employment and wage elasticities yields an implied extensive-margin labor-supply elasticity of 1.20 (SE 0.51), statistically indistinguishable from our baseline value $\kappa = 1.5$ taken from Galle *et al.* (2023).

[51] Columns 2 and 4 share a common R^2 because in the model $\ln(\widehat{1 - e_o}) = -\kappa \ln \widehat{Wage}_o$ up to a state-level fundamental; the simulated non-employment rate is therefore a scalar multiple of the simulated wage, so regressing either on a common instrument yields the same fit.

Table 2: Testing Model Predictions on Labor Market Outcomes of Procurement Demand Shocks

Dependent Variable:	$\Delta \ln(Wage)$		$\Delta \ln(1 - EmpRate)$		$\Delta ShareMfg$	
	Actual	Simulated	Actual	Simulated	Actual	Simulated
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Proc\_PW$	0.0069**	0.0038***	-0.0083*	-0.0057***		
	(0.0031)	(0.0013)	(0.0047)	(0.0020)		
$\Delta Proc\_PW\_Mfg$					0.0054*	0.0010***
					(0.0031)	(0.0004)
$\Delta Proc\_PW\_NonMfg$					0.0004	-0.0006**
					(0.0006)	(0.0003)
$\beta^{act} = \beta^{sim}$: p-value	[0.228]		[0.468]			
	{0.334}		{0.597}			
$\beta^{act,Mfg} = \beta^{sim,Mfg}$: p-value					[0.130]	
					{0.175}	
$\beta^{act,NonMfg} = \beta^{sim,NonMfg}$: p-value					[0.040]	
					{0.076}	
Initial State characteristics × Year FEs	Y	Y	Y	Y	Y	Y
Census Region × Year FEs	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y
Observations	96	96	96	96	96	96
R-squared	0.9397	0.8670	0.7958	0.8670	0.9181	0.7727

Notes: All regressions are weighted by the working-age population in the 5-year lagged period. Robust standard errors clustered at the state level. The p-value in brackets corresponds to the test based on a seemingly unrelated regression that combines and compares estimation results from the actual-data models (odd-numbered columns) with those from the simulated-data models (even-numbered columns). This test accounts for correlation in the error terms across equations. The p-value in curly braces corresponds to a t-test that treats the point estimates in the even-numbered columns as fixed parameters.

where $\mathcal{W} = \{D_{d,t}, D_o, W_{o,0} \times D_t\}$ is the control set in Equation (21). We assess this assumption with Rotemberg-weight diagnostics and a battery of robustness checks (pre-trends, only focusing on Department of Defense, leave-one-out instruments, two-year differences, and AKM/AKM0 inference); all leave the conclusions unchanged. Details are in Appendix F.7.

6.2 Evaluating Current Buy American Restrictions: the Removal of BAA

6.2.1 Removal of BAA Wedges on Imports of Final Goods (Broader Measure)

To quantify the impact of the domestic content restrictions imposed by the BAA on the imports of final goods, we conduct counterfactual experiments by setting $\hat{\tau}_s^{f,G} = 1/\tau_s^{f,G}$. The simulation results are reported in Panel A of Table 3. We first focus on the results in Row (a) of Panel A, where welfare changes are calculated based on Equation (15) assuming that consumers have access to public goods from different states (Case I). Removing the BAA wedges raises U.S. welfare by 0.118% (Column 1), or \$85.85 per worker in consumption-equivalent terms (Column 5). The corresponding employment effects are 39,900 manufacturing jobs and 100,500 total jobs lost, the latter reflecting the propagation of demand shocks through I-O linkages (Columns 6–7). The findings suggest that the BAA restrictions preserve employment, and the implied cost per job preserved by the BAA is substantial ($168,500, Column 8).

The uneven procurement intensity and G production activity across space, coupled with their differential sectoral exposure to BAA restrictions, imply that the welfare and employment impacts of the removal of BAA wedges vary across regions. While the average welfare change across states is 0.115 percent (Column 2), it masks a large spatial heterogeneity: state-level welfare changes range from 0.046% in Virginia ($31 per worker) to 0.145% in North Dakota ($211), and states with smaller gains tend to experience larger employment losses.[52]

Row (b) reports the local-public-goods specification (Case II): aggregate effects are similar, but the cross-state range of welfare gains widens to (−0.034%, 0.550%), reflecting heightened sensitivity to where public goods are produced.[53]

Table 3: Counterfactual Experiments

Welfare Measure	$\hat{V}_{US}$	Distribution of $\hat{V}_o$ Mean	Min	Max	EV_{US} (USD)	Δ Mfg. Jobs	Δ Jobs	Costs per Job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Removing the "Buy American" Wedges on Final Goods (Broader Measure)								
(a) Nationwide Public Goods	0.1175	0.1150	0.0458	0.1453	85.85	-39,900	-100,500	168,500
(b) Local Public Goods Only	0.1280	0.1049	-0.0338	0.5504	93.49	-39,900	-100,500	183,500
Panel B: Removing the "Buy American" Wedges on Final Goods (Narrow Measure)								
(a) Nationwide Public Goods	0.0719	0.0694	0.0358	0.2144	52.55	-27,600	-39,600	261,900
(b) Local Public Goods Only	0.0831	0.0717	-0.0166	0.3803	60.74	-27,600	-39,600	302,600
Panel C: Removing the "Buy American" Wedges on Final Goods Accounting for NS Concerns								
(a) Nationwide Public Goods	0.1071	0.1046	0.0614	0.1666	78.28	-39,500	-85,000	181,700
(b) Local Public Goods Only	0.1186	0.0995	-0.0297	0.4997	86.64	-39,500	-85,000	201,100
Panel D: Removing the "Buy American" Wedges on both Final and Intermediate Goods								
(a) Nationwide Public Goods	0.1206	0.1180	0.0433	0.1501	88.15	-39,400	-103,600	167,800
(b) Local Public Goods Only	0.1310	0.1078	-0.0336	0.5485	95.69	-39,400	-103,600	182,100
Panel E: Increasing the Required Domestic Share of Inputs For G Production to 75%								
(a) Nationwide Public Goods	-0.0714	-0.0702	-0.1067	0.1143	-52.19	16,400	86,600	118,900
(b) Local Public Goods Only	-0.0712	-0.0702	-0.1074	0.1112	-52.03	16,400	86,600	118,500

Notes: In Row (a), welfare changes are calculated according to (F.8), assuming consumers have the access to the composite public goods from different states. In Row (b), welfare changes are calculated according to (F.9), assuming consumers only have the access to the locally produced public goods. Column (1) shows the aggregate welfare effect for the US, in percentage terms $100(\sum_o \frac{L_o}{L_{US}} \hat{V}_o - 1)$. Columns (2)-(4) present the summary statistics of the distribution of $\hat{V}_o$ across states: Column (2) shows the mean welfare effect $100(\frac{1}{N_o} \sum_o \hat{V}_o - 1)$; and Columns (3) and (4) show the minimum and maximum of $100(\hat{V}_o - 1)$, respectively. Column (5) displays the consumption equivalence variation (EV) per worker measured by USD. Column (6) shows the counterfactual change in the number of manufacturing jobs for the US. Column (7) shows the counterfactual change in the number of jobs for the US. Column (8) displays the cost per job saved due to the policy of question.

[52] Columns 3 and 4. Appendix Figures F.6 and F.7 map the full state-level distributions of welfare and employment changes; Appendix Figures F.8 and F.9 further show changes in the manufacturing-employment ratio and in wages.

[53] Figure F.10 illustrates the alternative-welfare distribution.

6.2.2 Removal of BAA Wedges on Imports of Final Goods (Narrow Measure)

As discussed in Section 5.4.2, the broad measure $\tau_s^{f,G}$ may incorporate non-BAA costs faced by foreign producers (for instance, generic home bias in the procurement process), that would persist even if the BAA were removed. To isolate the BAA-specific component, we re-run the counterfactual using the narrower measure $t_s^{f,G}$, setting $\hat{\tau}_s^{f,G} = 1/t_s^{f,G}$, with results reported in Panel B of Table 3.

Because $t_s^{f,G}$ is a lower bound on the true BAA-induced wedge, the estimated effects should be read as conservative. Row (a) shows that removing the BAA-specific component raises welfare by at least 0.072% and reduces employment by at least 39,600. The implied cost per manufacturing job preserved is $261,900, about 50% larger than under the broad measure. Row (b) delivers consistent findings.

6.2.3 Factor in National Security Considerations

A complete removal of the BAA may not be a realistic counterfactual, since some procurement is tied to national security (NS). To identify the sectors involved, we rely on the statutory definition of national security embedded in procurement law rather than on a discretionary classification of "defense-relevant" industries. Specifically, we use the National Security exception to full and open competition (FAR 6.302-6), which may be invoked only by national-security agencies and only when disclosure of the Government's needs would compromise national security. Exploiting FPDS records of contracts awarded under this exception, we classify NS-relevant 6-digit NAICS industries and compute the share ρ_s of NS-subject procurement at the aggregated-sector level.[54]

We then set $\hat{\tau}_s^{f,G} = 1/[(1-\rho_s)\tau_s^{f,G}]$ so that only the non-NS portion of the wedge is removed. Panel C of Table 3 shows welfare and employment effects are slightly attenuated relative to Panel A but remain quantitatively meaningful: a 0.107-0.119% welfare gain and 85,000 jobs lost. As the cost of removing only the non-security portion of the wedge remains large, our welfare estimates are not only driven by the security-relevant sectors.

6.2.4 Remove the BAA Wedges on Imports of both Final Goods and Component Inputs

Panel D removes both wedges simultaneously, setting $\hat{\tau}_s^{f,G} = 1/\tau_s^{f,G}$ and $\hat{\tau}_k^{i,G} = 1/\tau_k^{i,G}$. Compared to the baseline case (where solely the wedges on imports of final goods are removed), the welfare and employment effects show only a modest increase, since the input-side BAA restriction is non-binding for most downstream industries under current rules (Section 5.4).

[54]We report the procedure in Appendix D, where we also discuss the affected sectors: Chemical (325) and Transportation Equipment (336), in each of which roughly 5% of procurement is security-related.

6.3 Required Domestic Share of Inputs Rising from 50% to 75%

Based on the recent amendments to the BAA introduced by both the Trump and Biden administrations that we discussed in Section 2, the domestic content requirement for component inputs is scheduled to rise from 50% to 75% in 2029.[55] To understand the impacts on welfare and labor market outcomes, we calibrate the implied changes in BAA wedges on component inputs, $\hat{\tau}_k^{i,G}$, to cap each downstream industry's foreign component-input share at 25%. A positive value of $\hat{\tau}_k^{i,G}$ indicates that the domestic content requirement becomes binding or more binding when the BAA restriction is tightened (see Appendix F.6 for the procedure).

Figure 5 displays the resulting effective wedge changes $\theta_s \ln(\hat{\tau}_k^{i,G})$, faced by G producers from different downstream industries across various upstream inputs. Six manufacturing industries become bound.[56] The binding constraint forces sub-optimal input mixes, raising G's unit production costs (which are subsequently passed on to G consumers) and shifting demand toward domestic inputs and labor.

Panel E of Table 3 reports the welfare and employment effects. The tightening lowers U.S. welfare by 0.071% ($52.19 per worker), while creating 16,400 manufacturing jobs and 86,600 total jobs—an implied cost of $118,900 per job, about 30% below the cost per job under the broad-measure final-goods removal (Panel A). State-level welfare effects average −0.070% with a range from −0.107% to +0.114%, mapped in Appendix Figures F.11. Row (b)'s local-public-goods specification delivers consistent findings.[57]

6.4 Extensions and Robustness

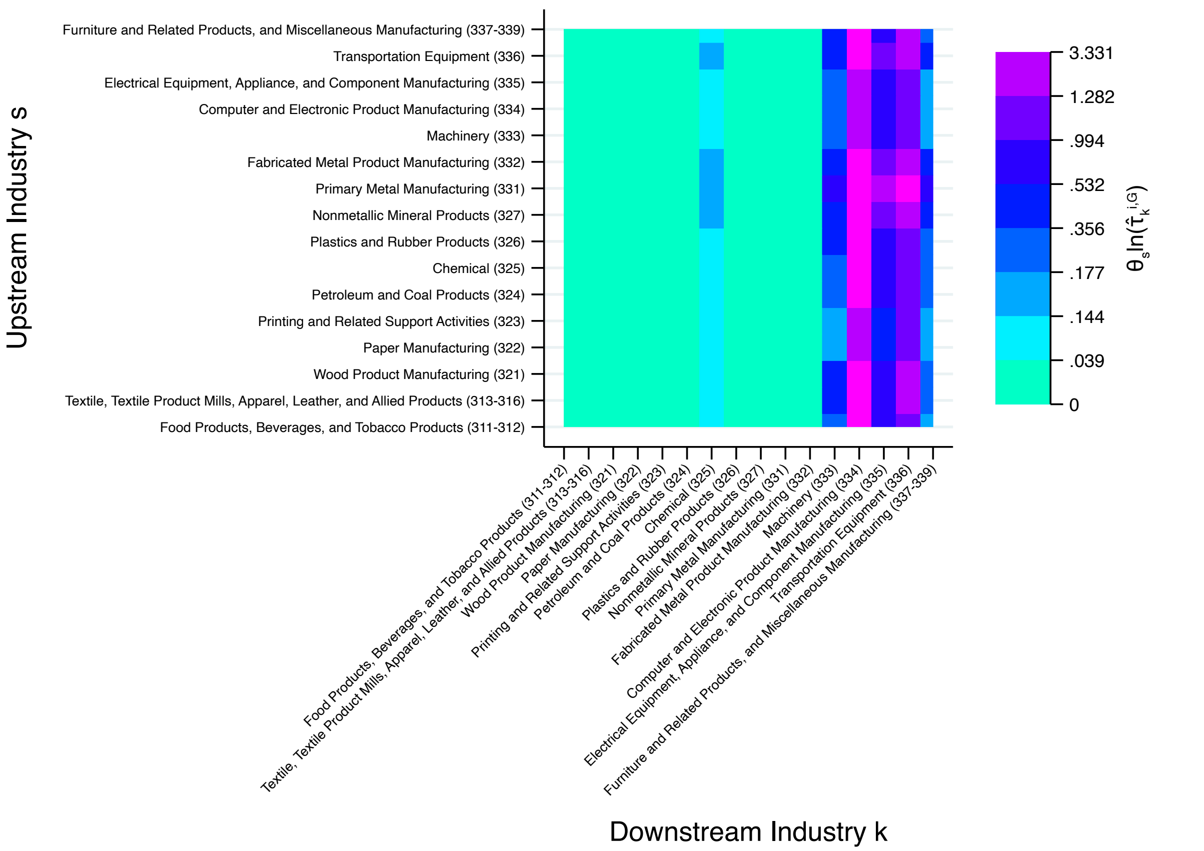
We summarize here a series of extensions and robustness checks; details are in Appendices B.2, F.8, and F.9. First, our baseline aggregate Eaton and Kortum (2002) model abstracts from firm-level heterogeneity in imported-input use, which a binding domestic-content rule distorts unevenly across firms. Extending the model along the lines of Blaum *et al.* (2018), we show that the aggregate wedge can be expressed as a market-share-weighted average of firm-specific wedges. We further show that, in the absence of firm-level microdata, the aggregate model provides a *lower bound* on the true welfare cost of the BAA under empirically plausible parameter restrictions. Second, our results are robust to alternative treatments of external economies of scale—shutting EES down, allowing EES in non-manufacturing, and allowing EES to operate at the sector level—as well as to alternative values of labor-supply elasticities (κ, ρ), trade elasticities (θ_s), and public-good utility weight $(1-\varphi)$. They are also robust to incorporating inequality aversion into the welfare measure.

[55]See Appendix A.1.5 for the timeline detailing the recent amendments made to the BAA.

[56]Chemicals (325), Machinery (333), Computer and Electronic Products (334), Electrical Equipment (335), Transportation Equipment (336), and Furniture/Miscellaneous Manufacturing (337-339).

[57]Appendix Figures F.13 and F.14 show the corresponding maps for the manufacturing-employment ratio and wages. Figure F.15 shows cross-state variation in welfare changes under the local-public-goods specification.

Figure 5: Counterfactual Changes in $\theta_s \ln(\hat{\tau}_k^{i,G})$: $\underline{\zeta} = 0.75$



Notes: This figure reports the changes in effective trade barriers encountered by G producers when the domestic content requirement on imported component inputs is raised from 50% to 75%, $\theta_s \ln(\hat{\tau}_k^{i,G})$. Here, $\hat{\tau}_k^{i,G}$ is the proportional change in the BAA wedges faced by the downstream sector k, and θ_s represents the trade elasticity of the upstream sector s.

Across these variants, the estimated welfare and employment effects remain close to the baseline. The main exception is the trade elasticity from Caliendo and Parro (2015), which roughly doubles the estimated welfare cost (Appendix F.8, Tables F.5 and F.6). The limited role of EES partly reflects the small share of federal procurement in U.S. output and the fact that current BAA wedges are not aligned with the sectors where scale economies are strongest; had they been, welfare would have risen by only \$9.9–\$13.9 per capita (Appendix F.9).

6.5 The Cost of Creating Jobs: Comparison with Uniform Tariff Increases

How do the welfare costs associated with BAA wedges compare with those of other trade policies that have comparable employment effects? To answer this question, we remove the BAA wedges on final goods and instead raise tariffs uniformly across industries, extending the model to impose tariffs not only on U.S. federal government procurement but also to purchases by U.S. consumers and firms. Specifically, in the extended model, the common trade cost faced by M and G consumers in region $d \in US$ when importing final goods is given by $\tau^{f,M}_{ods} = t^{f,M}_{ods}\tau_{\text{US},s}$, where $t^{f,M}_{ods}$ denotes the iceberg shipping cost of good s from o to d. The term $\tau_{\text{US},s}$ equals 1+tariff imposed by the U.S. on good s when $o \notin US$, and equals 1 if $o \in US$. Additionally, we assume $\tau^{f,M}_{ods} = 1$ when $o = d$. Analogously, the common trade cost faced by M and G producers in region $d \in US$ when importing intermediate inputs is $\tau^{i,M}_{os,dk} = t^{i,M}_{os,dk}\tau_{\text{US},s}$, where $t^{i,M}_{os,dk}$ denotes the iceberg cost of shipping intermediate good s from region o to producers in industry k and region d. We further assume that $\tau^{i,M}_{os,dk} = 1$ when $o = d$. The tariff revenues are rebated to consumers in a lump sum.

In Panel A of Table 4, we implement a uniform tariff increase by setting $\hat{\tau}_{\text{US},s} = 1.01$ while removing BAA wedges on final goods. For comparison, we also use the extended model with tariffs to simulate two counterfactuals—(i) removing BAA wedges on final goods (Panel B) and (ii) raising the required domestic input share in G production to 75% (Panel C)—yielding quantitative results similar to those in Panels A and E of Table 3.[58] The results in Panels A and B illustrate the distinct welfare implications of BAA restrictions relative to uniform tariff increases. The uniform increase tariffs almost fully offsets the manufacturing employment losses associated with removing the BAA wedges, reducing job losses from 41,200 to 4,300. In aggregate, replacing BAA restrictions with additional tariffs creates 81,000 additional jobs, comparable to the number generated by tightening BAA domestic content requirements on intermediate inputs, as shown in Panel C. More importantly, removing the BAA and introducing this tariff yields a larger welfare gain than simply removing the BAA. This indicates that a uniform tariff can capture terms-of-trade gains while avoiding the distortions generated by variation in BAA wedges across and within sectors. These findings suggest that, even if the primary objective is job creation because of its high social value, Buy American provisions function as a relatively blunt instrument. A comparable amount of jobs could be generated at lower cost using alternative policy tools, such as a simple uniform increase in tariffs.

6.6 The Cost of Creating Jobs: Discussion and Comparison with Other Policies

The main contribution of this paper is to offer a rigorous evaluation of the cost of creating jobs using Buy American provisions. This is only one of the many policy levers governments have to promote the creation of jobs. In this section, we compare the numbers we obtain to others in the literature. Before we do so, it is essential to note that these papers generally differ from ours in the measure of "cost" they employ. It may sometimes be the cost in terms of government expenditures, while in other cases, it is the welfare cost calculated as the welfare change or just consumer surplus change computed in the model divided by the number of jobs created coming from external sources. Our methodology has the advantage of taking both welfare and job changes from the

[58]For the counterfactual exercises presented in Table 4, we obtain tariff data at the 6-digit HS level from the WITS-TRAINS database and aggregate it across the 29 industries used in our analysis.

Table 4: Welfare Effects of BAA Wedges on Final Goods and Tariffs

Welfare Measure	$\hat{V}_{US}$	Distribution of $\hat{V}_o$ Mean	Min	Max	EV_{US} (USD)	Δ Mfg. Jobs	Δ Jobs	Costs per Job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Setting $\hat{\tau}_{us,s} = 1.01$ and Removing "Buy American" Wedges on Final Goods								
(a) Nationwide Public Goods	0.1267	0.1383	0.0451	0.3224	92.58	-4,300	81,000	–
(b) Local Public Goods Only	0.1374	0.1286	-0.0425	0.5262	100.36	-4,300	81,000	–
Panel B: Removing the "Buy American" Wedges on Final Goods								
(a) Nationwide Public Goods	0.1188	0.1160	0.0562	0.1450	86.81	-41,200	-100,400	170,600
(b) Local Public Goods Only	0.1293	0.1060	-0.0354	0.5524	94.49	-41,200	-100,400	185,700
Panel C: Increasing the Required Domestic Share of Inputs For G Production to 75%								
(a) Nationwide Public Goods	-0.0714	-0.0702	-0.1067	0.1143	-52.19	16,400	86,600	118,900
(b) Local Public Goods Only	-0.0712	-0.0702	-0.1074	0.1112	-52.03	16,400	86,600	118,500

Notes: In Row (a), welfare changes are calculated according to (F.8), assuming consumers have the access to the composite public goods from different states. In Row (b), welfare changes are calculated according to (F.9), assuming consumers only have the access to the locally produced public goods. Column (1) shows the aggregate welfare effect for the US, in percentage terms $100(\sum_o \frac{L_o}{L_{US}} \hat{V}_o - 1)$. Columns (2)-(4) present the summary statistics of the distribution of $\hat{V}_o$ across states: Column (2) shows the mean welfare effect $100(\frac{1}{N_o} \sum_o \hat{V}_o - 1)$; and Columns (3) and (4) show the minimum and maximum of $100(\hat{V}_o - 1)$, respectively. Column (5) displays the consumption equivalence variation (EV) per worker measured by USD. Column (6) shows the counterfactual change in the number of manufacturing jobs for the US. Column (7) shows the counterfactual change in the number of jobs for the US. Column (8) displays the cost per job saved due to the policy of question.

same model counterfactual. These caveats are important when evaluating the vast heterogeneity in the numbers one can find across various studies.

On the higher range of the cost per job are papers like Flaaen *et al.* (2020), which estimates that the cost to consumers per job created due to the 2018 Section 201 tariffs on washing machines was over $815,000. Policy briefs by Hufbauer and Jung (2018) and Hufbauer and Lowry (2020) estimate a consumer surplus loss of $650,000 and $900,000 per job created in the steel and tire industries by tariffs or anti-dumping duties. Our estimates are substantially lower than these figures.

Other studies estimate the effect of government spending associated with employment using different shocks. This is akin to our reduced-form exercise and does not involve any welfare calculations. These studies find figures that range from $30,000 per year (Serrato and Wingender, 2016) to $125,000 (Wilson, 2012)-$150,000 (Garin, 2019) per job. For place-based policies, the estimated cost per job varies across programs, ranging from $12,000 for firm-specific subsidies in the U.S. (Slattery and Zidar, 2020), to $18,000 for Empowerment Zones (Busso *et al.*, 2013; Bartik, 2019), with Bartik (2020) finding that the typical incentive package generates a job at a discounted cost of $180,000. In other countries, these estimates are once again different. For instance, in the United Kingdom, the European investment subsidies have a cost per job between $3,541 and $26,572 (Criscuolo *et al.*, 2019). These numbers are more readily comparable to our reduced form estimates in Section 6.1. When we manipulate our estimated coefficient in Column (3) of Table 2 to make it comparable to these studies, the implied figure is approximately \$120,000 per job.[59]

7 Conclusion

The Buy American Act is the oldest and most consequential domestic-content restriction still in use in the United States, and it is now undergoing its largest expansion in nearly seventy years: by 2029, the share of foreign content permitted in federal contracts will fall from 50% to 25%. This paper measures the policy's welfare cost both as currently enforced and under that scheduled tightening. We do so by combining contract-level micro-data from the Federal Procurement Data System with a multi-region, multi-sector quantitative trade model that captures the policy's two key margins (restrictions on imports of finished goods, and restrictions on imports of intermediate inputs by domestic producers serving the government), along with non-employment and external economies of scale. Four takeaways stand out.

First, the micro-data reveal that government imports are dramatically smaller than aggregate input-output data suggest. This finding underscores the importance of using the appropriate data to measure the stringency of the policy. It also suggests that violations of Buy American provisions are less frequent than recent U.S. Presidents have claimed.[60]

Second, despite these low import shares, the welfare cost of the *current* Buy American program—computed consistently within a single quantitative model—is substantial, though not extreme. The policy preserves approximately 100,500 jobs at a cost of roughly \$170,000 per job.

Third, the scheduled tightening of the domestic-content requirement from 50% to 75% in 2029 does not make the BAA more efficient; rather, it expands the program. The reform creates about 86,600 additional jobs at a cost of about \$119,000 per job, a figure not very different from the cost of jobs preserved under the existing program.

Fourth, it is difficult to rationalize the policy as industrial policy. We find that BAA wedges on final goods are uncorrelated with the sectors in which external economies of scale are strongest, and there is no evidence that the scheduled tightening improves targeting along this dimension.

The Buy American Act may serve rationales beyond industrial policy. The most important is national security. We address this possibility directly by removing only the portion of the BAA

[59] Note that $\Delta \ln(1 - EmpRate) \approx -\Delta EmpRate$. Hence, the estimated coefficient in Column (3) of Table 2 captures the change in $-\Delta EmpRate \approx -\frac{\Delta Emp}{Pop}$ in response to a \$1,000 increase in government procurement per capita. By a simple back of the envelope calculation, the cost per job created is given by $\frac{\Delta GovSpending/Pop \times 1000}{\Delta Emp/Pop} = \frac{\Delta GovSpending \times 1000}{\Delta Emp} = \frac{1000}{0.0083} \approx 120,482$.

[60] Both recent administrations have publicly framed foreign sourcing and Buy American waivers as a widespread problem. The Biden White House described E.O. 14005 as "creat[ing] a central review of agency waivers of Buy American requirements, fulfilling the President's commitment to crack down on unnecessary waivers" (The White House, 2021). The Trump administration likewise moved to "remov[e] misrepresented products from procurement" under its Made-in-America order (The White House, 2026), with the President directing that "ALL FEDERAL AGENCIES MUST BUY AMERICAN—NO EXCUSES" and calling for an end to "handing out Waivers like candy" and to "rubber-stamping exceptions for Foreign Products" (Fox Business, 2026).

wedge unrelated to national security, setting aside industries that invoke the Federal Acquisition Regulation's national-security exception. The resulting welfare and employment costs remain quantitatively meaningful, indicating that security-sensitive sectors are not driving our estimates. A fuller assessment of the national-security benefits of domestic-content protection is beyond the scope of this paper and remains an important topic for future research.

The costs we estimate should also be compared with those of more targeted instruments. Because the Buy American Act pursues a labor-market objective through a trade-policy distortion, more direct tools—such as production or employment subsidies—can in principle create the same jobs at lower cost. Consistent with this logic, the procurement, place-based, and production-subsidy literatures report costs per job well below those we estimate here (Section 6.6). We also show that a uniform tariff replacing the BAA can create a comparable number of jobs in the aggregate while raising welfare, because it moves the United States toward its unilaterally optimal tariff, capturing terms-of-trade gains while avoiding the BAA's procurement distortion (Section 6.5).[61]

A carefully estimated cost of job creation is one essential input into evaluating policies such as the Buy American Act. The other is the social value of the jobs themselves. The two decades we study have seen sharp declines in labor-force participation among certain socioeconomic groups (Abraham and Kearney, 2020). The causes of these declines remain debated (Aguiar *et al.*, 2021; Binder and Bound, 2019), but their consequences are broad: they include rising morbidity, mortality, and political polarization (Pierce and Schott, 2020; Autor *et al.*, 2019, 2020). Whether policies that create jobs and support workers' incomes can counteract these trends remains an open question.[62] We view this paper as contributing to that broader debate by quantifying the costs of using domestic-content restrictions as a job-preservation tool.

[61]This welfare gain presumes no retaliation by trading partners and could be eroded, or even reversed, if they responded in kind.

[62]Dow *et al.* (2020) shows that policies such as minimum wages and the EITC have reduced some "deaths of despair" (Case and Deaton, 2015, 2017).

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Online Appendix

The Cost of Buying American

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The following appendices are intended for online publication only and are not part of the main manuscript.

A Additional Institutional Details

A.1 Buy American Act

A.1.1 Origin of the Policy

The first years of 1930s were characterized by high economic distress, with one quarter of the workforce being jobless. Several members of Congress started to support protectionist measures to revitalize the American economy during the Great Depression, partly also in response to other Governments becoming increasingly protectionist.

The Smoot Hawley Tariff Act of 1930 was the first protectionist measure implemented, establishing the second-highest tariff levels in U.S. history. This act was a response to the problems of American agriculture, which had failed to recover from the recession of 1920–21. It was magnified by the imposition of import duties on wheat by Germany, Italy, and France (Eichengreen, 2002). While the Smoot Hawley Act was originally conceived as agricultural relief, it then evolved into a bill extending protection to portions of both industry and agriculture, increasing tariffs on more than 20,000 items.

The BAA can be seen as instead a way to counteract the "buy-British" clauses in all public purchase and construction contracts in the United Kingdom (Nagle, 2012). Initially discussed only in the context of the Army's procurement budget in 1932, Congress expanded 'buy-American' restrictions to cover all Federal agency purchases partly due to the Hoover Dam controversy (Nagle, 2012). Purchases of heavy electrical equipment for large-scale projects like the Hoover Dam spanned several years, and domestic bidders raised objections against foreign competition in various contracts.[63] Specifically, manufacturers of heavy electrical equipment in California and Pennsylvania expressed apprehension about potential competition from German manufacturers for contracts related to the Hoover Dam.[64]

To respond to their protests and address domestic unemployment concerns, Senator Johnson introduced his bill on February 2, 1933. Senator Vandenberg described the legislation as " primarily an employment measure. American tax money should maintain American labor in a moment of American crisis and exigency. [..] Why have American make-work programs which make work in Europe or Asia?". Despite the bid opening for hydraulic apparatus for the Hoover power plant being initially set for February 3, 1933, it was delayed until March 10, 1933, due to the introduction of the bill. President Hoover signed the bill into law on his last day in office, March 3, 1933, with immediate effect. Just seven days later, on March 10, 1933, the impact of the legislation

[63] An example is the contract for turbines used in the Madden Dam for the Panama Canal. Although a German firm appeared to offer the lowest bid for the project, additional factors beyond price, which would ultimately affect the total cost to the United States, prompted the decision to award the contract to the second lowest bidder.

[64] The Act was also supported by the Common Brick Manufacturers Association of America, among others. Testimony revealed that the cement used in the Hoover Dam project was sourced from Belgium.

became apparent during the bid opening for the hydraulic apparatus. The act resulted in the disqualification of six foreign bidders for the contract, all of whom were the lowest bidders.

A.1.2 Debates on BAA

Starting in 1953, the mass media began advocating for the repeal of the Act, arguing against what they perceived as unjust and stringent measures. This push gained momentum when a British company, despite offering the lowest bid for electrical generators needed for the Chief Joseph Dam, was disqualified due to the Act's provisions. As a result, the contract was awarded to a domestic manufacturer at a significantly higher expense. Newspapers on both sides of the Atlantic joined in calling for the Act's abolition, raising concerns among foreign nations about its effect on global commerce and its conflict with broader principles of US international trade policies.

Critics of the BAA saw it as damaging to the United States' position as a leader in post-war endeavors to lessen trade barriers and foster international trade. Another notable critique centered on the elevated expense of domestic goods compared to similar foreign options. To address the growing discord between protectionist and trade liberal factions in the US, President Eisenhower tasked numerous committees with examining the matter. The Gray report determined that the Buy American principle directly contradicted core US foreign economic policies. Likewise, the Bell report emphasized that Buy American limitations inflated government expenditures and essentially imposed a "super tariff" on goods procured by the government.

A.1.3 Waivers

Non-Agency Specific Waivers. A waiver of the BAA can be authorized if the head of the procuring agency determines that adhering to the BAA is contrary to the public interest. This provision is invoked when an agency possesses an agreement with a foreign government that provides a broad exemption from the BAA's requirements.

Besides, a waiver can also be obtained if domestic end products "are unavailable in sufficient and reasonably available commercial quantities and of a satisfactory quality". Class determinations for articles are listed in FAR 25.104 and are published for comment at least once every 5 years. Individual determinations are made by the Head of Contracting Activity but can be delegated.

Furthermore, a waiver can be granted if the cost of acquiring the domestic product is deemed "unreasonable". Specifically, when a domestic offer (i.e., an offer for a domestic end product) is not the lowest offer, the procuring agency must add a certain percentage of the low offer's price (inclusive of duty) to that offer before determining which offer is the lowest priced for the government. During the period of our study, this percentage ranges from 6% for cases where the lowest domestic offer is from a large business, to 12% when the lowest domestic offer is from a small business, to 50% for Department of Defense procurement. For example, suppose that two firms bid in a call for tenders: the domestic end product offer is $50,000, while the foreign end product offer is $40,000. The federal agency will compare the domestic offer to a foreign offer of $42,400 (if the domestic offer is from a big firm) or to $44,800 (if the domestic offer is from a small firm), while the Department of Defense will consider the foreign offer as bidding $60,000 (regardless of the size). Then the Department of Defense will award the contract to the firm manufacturing the domestic product, while other agencies will award it to the firm manufacturing the foreign product.

Other waivers can be granted if goods are acquired specifically for commissary resale, or if the agency procures information technology that is a commercial item.

TAA. The Trade Agreements Act (TAA) of 1979 was established with the aim of promoting open international trade. The TAA essentially provides that the Government may acquire only "U.S.-made or designated country" products or services, thus ensuring that items from "designated countries" are considered equally with domestic ones. These eligible countries include those with which the U.S. has signed multilateral or bilateral agreements such as Free Trade Agreements or the World Trade Organization Government Procurement Agreement (WTO GPA), or those designated as TAA eligible, such as Least Developed Countries and Caribbean Basin Countries.

The TAA waiver is applicable when certain conditions are met: the procurement value falls above a specified threshold in the relevant trade agreement, involves goods or materials listed in the agreement, and does not qualify for other exceptions.[65] Thresholds for TAA applicability differ based on the trade agreement, and the President has delegated TAA's waiver authority to the U.S. Trade Representative (USTR), who establishes TAA thresholds depending on the agreement and type of contract covered. For instance, currently thresholds for the WTO GPA are $180,000 for supply and service contracts and $6,932,000 for construction contracts, while Free Trade Agreement (FTA) thresholds vary from $25,000 to $180,000 for supplies and services and $6,932,000 to $10,441,216 for construction.

BAA and TAA apply different rules to define an end product as being domestic. Indeed, the TAA applies a rule-of-origin that requires products to be "wholly the growth, product or manufacture" or "substantially transformed [..] into a new and different article of commerce with a name, character, or use distinct from that of the article or articles from which it was transformed" in the U.S. or a designated country.[66] Contrary to the BAA, the assessment of substantial transformation for TAA purposes does not primarily hinge on the value or percentage of U.S. (or designated country) content. Instead, it revolves around whether the item in question

[65]For instance, BAA applies to specific types of acquisitions, irrespective of whether they surpass the TAA threshold, in the following cases: (1) acquisition for small business set-asides; (2) acquisition of end products for resale; (3) procurements of arms, ammunition, or war materials crucial for national security or defense purposes; (4) sole-source awards.

[66]See FAR 25.003.

has undergone a significant change in character or function as a result of the transformation process. The determination of "substantial transformation" can involve complex interpretations and applications that require case-specific consideration, with determinations typically made by the Bureau of Customs and Border Protection.

Department of Defense's BAA Waivers. The Berry Amendment prohibits the Department of Defense (DOD)[67] from using its funds to buy certain covered items, including food, clothing, tents, specific textile fabrics and fibers, and hand or measuring tools. This measure, designed to protect national security interests and ensure the defense industry can supply necessary products during crises, demands a higher level of domestic content in DOD-purchased goods compared to BAA. Specifically, DOD funds can only be used to procure items "entirely grown, reprocessed, reused, or manufactured within the United States". Several statutory exceptions exist, such as procurements for combat or contingency operations and those below a certain threshold.

The Specialty Metal domestic sourcing requirement, originally part of the Berry Amendment and now separately codified at 10 U.S.C.A. § 2533b, pertains to DOD acquisitions of certain items and components containing specialty metal, as well as the specialty metal itself, if not melted or produced in the United States. Specialty metals primarily include specific types of steel, nickel and iron-nickel alloys, cobalt alloys, titanium and its alloys, and zirconium and its alloys. This restriction bars DOD from purchasing aircraft, missile and space systems, ships, tank and automotive items, weapon systems, ammunition, or related components containing specialty metal not produced in the U.S. There are exceptions to this restriction, similar to those in the Berry Amendment, such as purchases deemed necessary for U.S. national security interests. Similar to the Berry Amendment, the BAA does not apply if the specialty metals restriction applies.

The Balance of Payments Program, governed by DFARS Subpart 225.75, is a DOD initiative that extends BAA, typically applicable to products used within the U.S., to apply to contracts for supplies to be used, and construction to be performed, outside the U.S.. The program only affects DOD procurements above a certain threshold,[68] with exemptions for specific items like petroleum products, industrial gases, and certain brand drugs. Similar to the BAA, the program includes exemptions such as the unavailability of domestic products or products intended for commissary resale. If the lowest offer contains nonqualifying end products or material, a price preference must be applied, with DOD's preference being a 50% increase. However, TAA requirements may override mandates of the Balance of Payments Program.

[67] 10 U.S.C. § 2533a.

[68] The simplified acquisition threshold, currently set at $250,000 but subject to change.

A.1.4 Cost of Components

The definition of the *cost of components* is central to the BAA because it determines how demanding the requirement that at least 50% of component cost be domestic actually is. The statute and the FAR do not ask whether more than half of the *total value added* of the end product is generated in the United States. Rather, the relevant inquiry is narrower: whether the cost of *domestic components* exceeds 50% of the cost of *all components* incorporated directly into the end product. This distinction matters because many expenses that might appear economically important from the standpoint of overall domestic production - such as final assembly labor, testing, packaging, or end-product transportation - are not counted toward the domestic-content threshold.

For *purchased components*, cost includes the acquisition price, transportation costs to the place where the component is incorporated into the end product or construction material, and any applicable duties. For *components manufactured by the contractor*, cost includes the expenses associated with manufacturing the component itself, including transportation and allocable overhead, but excludes profits and excludes expenses associated with manufacturing the *end product*. Thus, the BAA focuses on the cost of the components as components, not on the total cost of bringing the completed end product to market.

An important implication is that labor applied only at the final assembly stage does not count toward the domestic-content calculation. The relevant question is the cost of the components themselves, not the cost of working on those components after they have already been manufactured. This point has been emphasized repeatedly in procurement disputes. In *Glazer Construction Co. v. United States*, the contractor argued that domestic labor used to cut, drill, notch, weld, and prime foreign steel should be counted toward the domestic share. The court rejected that argument, reasoning that the BAA calculation concerns the value of the components themselves rather than the labor later used to prepare them for incorporation into the project. Likewise, in *S.J. Amoroso Construction Co. v. United States*, domestic labor used to detail and cut raw material, install domestic material onto beams, and apply protective coatings to foreign steel could not be counted toward the domestic component percentage. These cases make clear that a contractor cannot satisfy the 50% threshold simply by performing enough domestic assembly labor on foreign inputs.

Relatedly, costs incurred only after the relevant component has already been manufactured are generally excluded. This includes, for example, the costs of combining previously manufactured components to form the end product, the mere reassembly of a foreign item that had been disassembled for shipment, post-manufacture testing, packaging, user manuals, and transporting the completed end product to the place where it will be used. The reason is straightforward: these are not costs of the component itself, but costs incurred after the component has already come into existence. The Comptroller General made this point early on in the power-circuit-breaker cases, explaining that costs of combining and testing foreign and domestic components after manufacture must be excluded from the BAA component calculation.

The treatment of contractor-manufactured components also requires care because the relevant object is the *component*, not the entire end product. In *General Kinetics, Inc.*, the agency examined the cost breakdown for each component of a digital facsimile terminal separately. For components manufactured in-house, it considered direct material costs, direct labor hours, applicable labor rates, and manufacturing overhead allocable to those components; for purchased components, it considered only the prices paid to suppliers. At the same time, the contracting officer excluded various items - including packaging, fax paper, and user manuals - because they were not components directly incorporated into the end product. This illustrates both sides of the BAA test: manufacturing cost attributable to the *component* may count, but costs associated only with the completed end product do not.

A further complication is that the BAA treats a component as either domestic or foreign as a unit. A component is domestic only if it is manufactured in the United States, but once it qualifies as a domestic component, the origin of its *subcomponents* no longer matters for the end-product calculation. For instance, if the government procures a vehicle, and the engine is manufactured in the United States, then the engine counts as a domestic component of the vehicle even if some of its internal subcomponents were imported. By contrast, if the engine itself is the end product being procured, then those same internal parts become components of the end product and their status matters directly. In this sense, the cost-of-components calculation cannot be separated from the prior legal classification of what constitutes the end product and what constitutes a component.

Overall, the BAA component-cost test is therefore more formal and more restrictive than a broad domestic-value-added concept. It asks whether the components directly incorporated into the end product are domestic by the statutory and regulatory definitions, and then compares the cost of those domestic components to the cost of all components. Domestic labor performed only at the final assembly stage, however substantial in economic terms, does not by itself convert foreign components into domestic ones and does not count toward the 50% threshold.

A.1.5 Recent Amendments to BAA

Both former President Trump and President Biden have issued Executive Orders addressing Buy American requirements and preferences.

Executive Order 13881, issued by President Trump on July 15, 2019 (Maximizing Use of American-Made Goods, Products, and Materials), bolstered the BAA in several ways. Firstly, it increased the domestic content threshold from 50% to 55%. Secondly, it established a standalone domestic content requirement for products made wholly or predominantly of iron and steel, allowing less than 5% of the component cost to be foreign. Thirdly, it heightened the price evaluation preference for domestic items in civilian agencies from 12% to 30% for small businesses and from 6% to 20% for large businesses.

One week into his presidency, President Biden signed Executive Order 14005, titled "Ensuring the Future Is Made in All of America by All of America's Workers" on January 25, 2021, increasing further the domestic content threshold from 55 to 60%, then to 65% in 2024 and to 75% in 2029.[69]

A.1.6 The BAA and Other Protectionist Measures

One prominent example is the "Buy America" restrictions, which are linked to specific grant funds managed by the Department of Transportation (DOT) and certain other federal agencies. The Buy America provisions typically mandate that steel, iron, and manufactured products primarily composed of steel or iron, used in infrastructure projects, must be produced or manufactured in the United States. The BAA does not automatically apply to these funds because, although the funding originates from the federal government, purchases are not made directly by the federal government.

The American Recovery and Reinvestment Act of 2009 (ARRA) also contains Buy American provisions, mandating 100% domestic components in all ARRA-funded public buildings and works projects. More recently, the 2022 Inflation Reduction Act incorporates Buy American provisions.

A.2 Bidding in the US Federal Procurement

A.2.1 Registration

To bid on contracts within the U.S. federal procurement system, companies must fulfill the requirement outlined in FAR 4.1102, which mandates that prospective contractors must be enrolled in the SAM database when submitting an offer or quotation. Enrollment can be done online through SAM.gov, with no associated fees, although companies are required to provide detailed information during the registration process. For example, both domestic and international entities need to verify their legal physical address or business name by submitting original documentation, like utility bills or bank statements, along with a self-certified translation if the original documents are not in English[70]. Moreover, they need to provide "points of contact," which include the names of individuals within the organization who are knowledgeable about the registration process on SAM.gov and the reasons behind the entity's interest in conducting business with the U.S. Federal government. Furthermore, to commence the registration process, entities must be linked to a DUNS number, a distinctive nine-digit identification code issued by Dun & Bradstreet (D&B). If

[69] In the remarks on "Delivering On Made In America Commitments", President Biden announced "when I say Buy American, I mean buy all — all American. I want to increase the share of federal spending on goods and services that goes to small businesses in America — the backbone of our country" (March 4, 2022).

[70] The self-certification is accompanied with the following text: "I [insert typed name], certify that I am fluent (conversant) in the English and [insert foreign language] languages, and that the above/attached document is an accurate translation of the document attached entitled [insert translated document name]. [Signature] [Typed Name] [Address] [Certification Date]".

an entity lacks a DUNS number, they can obtain one at no cost by visiting D&B, and the process typically takes 1-2 business days.[71]

Nevertheless, certain details are exclusively mandated for domestic entities. For example, they must disclose the entity's Tax ID Number (TIN), which is an employer identification number issued by the Internal Revenue Service. Acquiring a new EIN from the IRS typically takes 2-5 weeks. However, foreign entities that do not have U.S. employees are exempt from providing this information. Additionally, domestic companies must furnish their Electronic Funds Transfer details.

Before 2023, the primary distinction in the registration process for entities located outside the United States was the requirement to obtain an NCAGE (NATO Commercial and Government Entity) code first. This code serves as a unique identifier for suppliers to various government or defense agencies and is administered by NATO and the Ministry of Defense of the respective countries where the entities are based. Obtaining an NCAGE code could take varying amounts of time, with a minimum of 3 days. In contrast, U.S.-based entities were not required to apply for an NCAGE code. Once they submitted their registration on SAM for processing, SAM would forward their entity information to the Department of Defense's Defense Logistics Agency (DLA) for CAGE Code assignment. The DLA would assign the CAGE Code, which SAM would then receive and apply to the Entity Registration. Typically, no further action by the registrant was necessary unless the DLA requested additional information.[72]

There are no registration fees for obtaining DUNS, NCAGE, CAGE, or SAM. Once all the required information is provided, it typically takes up to 10 business days to have an active profile in SAM. Once active, the entity can then pursue bidding opportunities with the U.S. government. SAM.gov mandates organizations to maintain their registration by verifying and updating information annually. An active registration is crucial for organizations to receive payments on existing awards and to be eligible for new awards or amendments.

A.2.2 Evaluation of Bids

For the evaluation of supply contracts, currently FAR Subpart 25.5 requires the contracting officer to perform the following steps in the order presented (unless otherwise specified in agency regulations):

1. Eliminate all offers or offerors that are unacceptable for reasons other than price; e.g., nonresponsive, debarred or suspended, or a prohibited source.

[71] In 2022, the Unique Entity ID, or UEI (SAM), replaced the DUNS number as the official government-wide identifier used for federal awards. The DUNS number is no longer used in the registration process for entities seeking to do business with the federal government.

[72] Since February 2023, foreign-based entities no longer have to procure an NCAGE code.

2. Rank the remaining offers by price.

3. If the solicitation specifies award on the basis of factors in addition to cost or price, apply the evaluation factors as specified and use the evaluated cost or price in determining the offer that represents the best value to the Government.

For acquisitions covered by the WTO GPA, the Contracting Officer must follow the following steps:

1. Consider only offers of U.S.-made or designated country end products, unless no offers of such end products were received;

2. If the agency gives the same consideration given eligible offers to offers of U.S.-made end products that are not domestic end products, award on the low offer. Otherwise, evaluate in accordance with agency procedures; and

3. If there were no offers of U.S.-made or designated country end products, make a nonavailability determination and award on the low offer.

For acquisitions not covered by the WTO GPA, but subject to the Buy American statute (an FTA or the Israeli Trade Act also may apply), the following applies:

- If the low offer is a domestic offer or an eligible offer under an FTA or the Israeli Trade Act, award on that offer.

- If the low offer is a noneligible offer and there were no domestic offers, award on the low offer. If the low offer is a noneligible offer and there is an eligible offer that is lower than the lowest domestic offer, award on the low offer.

- Otherwise, apply the appropriate evaluation factor provided in 25.106 to the low offer. If the evaluated price of the low offer remains less than the lowest domestic offer, award on the low offer. If the price of the lowest domestic offer is less than the evaluated price of the low offer, award on the lowest domestic offer.

When submitting a bid for construction contracts, a contractor can request a waiver based on unreasonable cost by presenting a reasonable survey of the market and a completed price comparison table as specified in FAR 52.225-9 and reported in Figure A.1. The contractor requesting a waiver must include several pieces of information in the survey of suppliers: a description of the foreign and domestic construction materials; unit of measure; quantity; and price, which must include all delivery costs to the construction site and any applicable duty. Moreover, the contractor must list name, address, telephone number, and contact for suppliers surveyed.

Figure A.1

Foreign and Domestic Construction Materials Price Comparison

Construction Material Description	Unit of Measure	Quantity	Price (dollars)*
Item1:			
Foreign construction material	_______	_______	_______
Domestic construction material	_______	_______	_______
Item2:			
Foreign construction material	_______	_______	_______
Domestic construction material	_______	_______	_______

B Model Appendix

B.1 Representing Domestic Content Requirements with Tariffs with Rebates

This appendix employs a simple model to illustrate how representing domestic content requirements through a tariff coupled with a rebate is isomorphic to an optimization that takes domestic content requirements as an additional constraint. We also show that the tariff-equivalent BAA wedge is determined by the strength of the binding BAA restriction, and that this micro-founded model produces a formula for the BAA wedge that exactly aligns with the one used in our calibration.

Consider a producer in region d and sector k that only employs intermediate inputs s in the production of a final good, according to a Cobb-Douglas+CES production function analogous to our main model and specified in Equation (B.2) below, where $x_{os,dk}$ is the quantity of input s from region o used in sector k region d and y_k is output of k.

DCR (Domestic Content Requirement) Problem. We start by describing the problem of minimizing production costs in the presence of domestic content requirements that prescribe a maximum cost share spent on foreign inputs equal to ϕ. The problem can be represented as:

$$\min_{x_{os,dk}} \quad \sum_o \sum_s p_{os} x_{os,dk} \tag{B.1}$$

$$\text{s.t.} \quad \prod_s \left(\sum_o x^{\varepsilon}_{os,dk} \right)^{\frac{\alpha_{sk}}{\varepsilon}} \leq y_k \tag{B.2}$$

$$\frac{\sum_{o \neq d} \sum_s p_{os} x_{os,dk}}{\sum_o \sum_s p_{os} x_{os,dk}} \leq \phi \tag{B.3}$$

We can rearrange constraints (B.2) and (B.3) into a linear form that facilitates manipulation and produces the Lagrangian associated with optimization problem (B.1)-(B.3) is given by:

$$\mathcal{L} = \sum_o \sum_s p_{os} x_{os,dk} \; - \; \mu_1 \left[\prod_s \left(\sum_o x^{\varepsilon}_{os,dk} \right)^{\frac{\alpha_{sk}}{\varepsilon}} - y_k \right] \; + \; \mu_2 \left[\sum_{o \neq d} \sum_s p_{os} x_{os,dk} - \phi \sum_o \sum_s p_{os} x_{os,dk} \right],$$

where μ_2 is the Lagrange multiplier associated with the domestic content requirement and represents the shadow cost of this constraint, when binding. The first order conditions of this problem are:

$$p_{ds}\,(1-\mu_2\phi) = \mu_1 \Lambda_{s,dk}\, x_{ds,dk}^{\varepsilon-1}, \qquad \forall s \tag{B.4}$$

$$p_{os}\Big(1-\mu_2(1-\phi)\Big) = \mu_1 \Lambda_{s,dk}\, x_{os,dk}^{\varepsilon-1}, \qquad \forall s,\ o\neq d \tag{B.5}$$

where $\Lambda_{s,dk} = \alpha_{sk}\prod_{s'}\left(\sum_o x_{os',dk}^{\varepsilon}\right)^{\frac{\alpha_{s'k}}{\varepsilon}}\left(\sum_o x_{os,dk}^{\varepsilon}\right)^{-1}$. Furthermore, $\mu_2 > 0$ when the domestic content restriction (B.3) is binding. Conversely, $\mu_2 = 0$ when the constraint (B.3) is non-binding. Taking the ratio of first order conditions (B.4) and (B.5), yields the following equation:

$$\frac{p_{os}}{p_{ds}}\,\frac{1+\mu_2\big(1-\phi\big)}{1-\mu_2\phi} = \left(\frac{x_{os,dk}}{x_{ds,dk}}\right)^{\varepsilon-1}, \quad \forall s,\ o\neq d. \tag{B.6}$$

Notice how there is only one Lagrange multiplier, μ_2 associated with the domestic content requirement for each final good k and that the expression $\frac{1+\mu_2(1-\phi)}{1-\mu_2\phi}$ makes this problem isomorphic to the one we adopted of a firm minimizing costs under an additional wedge on inputs. Assuming constraint (B.3) is binding, the solution to this problem will yield a total cost to produce output y_k, $\sum_o\sum_s p_{os}x_{os,dk}$, described by equations (B.6), (B.2) with equality and (B.3) with equality.

Tariff Problem. We now consider the case of ad valorem tariff t imposed on imports of intermediate inputs, at a level common to all inputs employed in sector k and destination d. The problem can be represented as:

$$\min_{x_{os,dk},x_{ds,dk}} \quad \sum_s p_{ds}x_{ds,dk} + \sum_{o\neq d}\sum_s (1+t)p_{os}x_{os,dk} - \Xi \tag{B.7}$$

$$\text{s.t.} \quad \prod_s\left(\sum_o x_{os,dk}^{\varepsilon}\right)^{\frac{\alpha_{sk}}{\varepsilon}} \leq y_k \tag{B.8}$$

where Ξ is a lump sum tariff rebate. It is easy to verify that the first order conditions of this problem yield the following set of equations:

$$\frac{(1+t)p_{os}}{p_{ds}} = \left(\frac{x_{os,dk}}{x_{ds,dk}}\right)^{\varepsilon-1}, \quad \forall s,\ o\neq d. \tag{B.9}$$

If we set:

$$\frac{1+\mu_2\big(1-\phi\big)}{1-\mu_2\phi} = 1+t \tag{B.10}$$

then the total cost to produce output y_k, $\sum_s p_{ds}x_{ds,dk}+\sum_{o\neq d}\sum_s(1+t)p_{os}x_{os,dk}-\Xi$, with $\Xi = \sum_{o\neq d}\sum_s t\,p_{os}x_{os,dk}$ is described by (B.9) and (B.2) with equality. This problem is therefore isomorphic to the DCR

Problem. Moreover, the tariff-equivalent wedge t increases with the Lagrangian multiplier μ_2; that is, the effective wedge is larger when the BAA domestic content restriction is more binding.

Tariff-equivalent BAA wedge. To map the above analysis to our baseline approach to calibrate the BAA wedge, let $o = ROW$ and $d = US$, and consider the constrained optimization problem is faced only by G producers. Then, Equation (B.9) can be rewritten as:

$$t_k = \left(\frac{p_{\text{ROW},s} x^G_{\text{ROW}\,s,\text{US}\,k}}{p_{\text{US},s} x^G_{\text{US}\,s,\text{US}\,k}}\right)^{\varepsilon-1} \left(\frac{p_{\text{ROW},s}}{p_{\text{US},s}}\right)^{-\varepsilon} = \left(\frac{\lambda^G_{\text{ROW}\,s,\text{US}\,k}}{\lambda^G_{\text{US}\,s,\text{US}\,k}}\right)^{\varepsilon-1} \Bigg/ \left(\frac{\lambda^M_{\text{ROW}\,s,\text{US}\,k}}{\lambda^M_{\text{US}\,s,\text{US}\,k}}\right)^{\varepsilon-1}, \tag{B.11}$$

where $\lambda^G_{\text{ROW}\,s,\text{US}\,k}$ (resp. $\lambda^G_{\text{US}\,s,\text{US}\,k}$) denotes the share of input s sourced from the ROW (resp. US) by G producers of good k in the US, and $\lambda^M_{\text{ROW}\,s,\text{US}\,k}$ (resp. $\lambda^M_{\text{US}\,s,\text{US}\,k}$) denotes the corresponding shares for M producers. The second equality follows from the demand function faced by M, who do not encounter domestic content restrictions. Equation (B.11) corresponds directly to our baseline approach for inferring the BAA wedge on intermediate goods in Equation (19) of the main text:

$$\tau_k = \left(\frac{\lambda^G_{\text{ROW}\,s,\text{US}\,k}}{\lambda^G_{\text{US}\,s,\text{US}\,k}}\right)^{-1/\theta} \Bigg/ \left(\frac{\lambda^M_{\text{ROW}\,s,\text{US}\,k}}{\lambda^M_{\text{US}\,s,\text{US}\,k}}\right)^{-1/\theta},$$

where the exponent $\varepsilon - 1$ is replaced by $-1/\theta$.

B.2 Heterogeneous Firm Model v.s. Aggregate Model

A potential concern with our baseline aggregate model is that firms vary substantially in their use of imported intermediate inputs. A domestic-content restriction that binds for some firms and not for others would, in principle, generate firm-level distortions that might be different from our aggregate approach.

In this appendix, we ask whether this missing dimension changes our quantitative conclusions about the welfare cost of tightening the BAA. Section B.2.1 sets up a model with firm-level heterogeneity in productivity and imported-input intensity, following Blaum *et al.* (2018). Section B.2.2 derives the analogous predictions of an aggregate Eaton and Kortum (2002)-style model calibrated to the same macroeconomic trade elasticity. Section B.2.3 compares the two and shows that, under empirically plausible parameter restrictions, with or without a fixed cost of supplying the government, the heterogeneous-firm model predicts a larger increase in public-good prices than the aggregate model in response to a tighter domestic-content rule. In other words, our baseline aggregate model results serve as a lower bound on the welfare loss predicted by a richer model with firm-level dispersion, so the headline cost-per-job estimates in the main text are conservative on this dimension. We close in Section B.2.4 with a derivation of the aggregate BAA wedge on imported intermediate inputs under the heterogeneous-firm model.

B.2.1 Heterogeneous Firm Model

Consumer Preferences. Consumers' utility is Cobb-Douglas across a private composite Q^M and a public composite Q^G with weights ζ and $1-\zeta$:

$$U = \left(Q^M\right)^{\zeta}\left(Q^G\right)^{1-\zeta},$$

The composite private consumption good is CES across domestic and foreign with elasticity ε: $Q^M = \left(\alpha q_D^{\frac{\varepsilon-1}{\varepsilon}} + (1-\alpha) q_F^{\frac{\varepsilon-1}{\varepsilon}}\right)^{\frac{\varepsilon}{\varepsilon-1}}$. Within Q^M, the composite domestic good is $q_D = \left(\int_{i\in\Omega_D^M}\left(q_{Di}\right)^{\frac{\chi-1}{\chi}} di\right)^{\frac{\chi-1}{\chi}}$, and the composite foreign good is $q_F = \left(\int_{i\in\Omega_F}\left(q_{Fi}\right)^{\frac{\chi-1}{\chi}} di\right)^{\frac{\chi-1}{\chi}}$. The composite public good is $Q^G = \left(\int_{i\in\Omega_D^G} q_i^{\frac{\chi-1}{\chi}} di\right)^{\frac{\chi}{\chi-1}}$.

Throughout, we maintain $\alpha,\zeta\in(0,1)$, and $\chi > \varepsilon > 1$, so love-of-variety across firms exceeds substitutability across input origins. The set of domestic firms (Ω_D^M) and the set of foreign (Ω_F) are exogenous. The set of G producers Ω_D^G is endogenous and may shrink as the BAA tightens.

Firms and technology. Each firm i produces a single variety using labor l_i and a CES intermediate-input bundle x_i with intermediate share γ in a Cobb-Douglas production function:

$$y_i = \varphi_i\, l_i^{1-\gamma}\, x_i^{\gamma}, \qquad x_i = \left[\beta_i\, x_{Di}^{\frac{\varepsilon-1}{\varepsilon}} + (1-\beta_i)\, x_{Fi}^{\frac{\varepsilon-1}{\varepsilon}}\right]^{\frac{\varepsilon}{\varepsilon-1}}.$$

Inputs can be either domestic or foreign. Firms are heterogeneous along two dimensions: productivity $\varphi_i\in(0,1)$ and imported-input preference $\beta_i\in(0,1)$. A high-β_i firm is naturally "domestic-rooted", while a low-β_i firm is naturally import-intensive.

The domestic composite input is

$$x_{Di} = \left(\int_{i'\in\Omega_D^M}\left(x_{Di}(i')\right)^{\frac{\chi-1}{\chi}} d_{i'}\right)^{\frac{\chi-1}{\chi}},$$

and the foreign composite input is

$$x_{Fi} = \left(\int_{i'\in\Omega_F}\left(x_{Fi}(i')\right)^{\frac{\chi-1}{\chi}} d_{i'}\right)^{\frac{\chi-1}{\chi}}.$$

Optimal sourcing and unit cost. Each firm minimizes intermediate-input cost subject to its CES aggregator. Standard CES algebra delivers the firm's intermediate-input price index:

$$P_i = \left(\beta_i^{\varepsilon} \left(P_D^M\right)^{1-\varepsilon} + \left(1-\beta_i\right)^{\varepsilon} P_F^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}}.$$

and the firm's *unconstrained* optimal domestic input share,

$$s_{Di}^{*} = \beta_i^{\varepsilon} \left(\frac{P_D^M}{P_i}\right)^{1-\varepsilon}. \tag{B.12}$$

We can interpret s_{Di}^{*} as the share of intermediate-input spending the firm would direct to domestic suppliers *absent the BAA*, given input prices. It is monotonically increasing in β_i (holding prices fixed): a domestic-rooted firm has a higher unconstrained domestic share.

The firm's unit cost can then be expressed compactly as[73]

$$c_i \;=\; \tilde{\varphi}_i^{-1} \, (s_{Di}^{*})^{\frac{\gamma}{\varepsilon-1}} \, (P_D^M)^{\gamma} \, w^{1-\gamma}, \qquad \tilde{\varphi}_i \equiv \varphi_i \, \beta_i^{\frac{\gamma\varepsilon}{\varepsilon-1}} \, (1-\gamma)^{1-\gamma} \, \gamma^{\gamma}, \tag{B.13}$$

where w is the wage (the equilibrium return to the primary factor of production). The composite efficiency $\tilde{\varphi}_i$ combines productivity φ_i and the input-mix preference β_i.

The two industry-level price indices. With (B.13) in hand, the two industry-level price indices follow from CES aggregation across firms. The price index of *domestic varieties*, faced by consumers and by firms when sourcing intermediate inputs, is

$$\begin{aligned} P_D^M &= \tfrac{\chi}{\chi-1} \left(\int_{\Omega_D^M} c_i^{1-\chi} di\right)^{\frac{1}{1-\chi}} \\ &= \tfrac{\chi}{\chi-1} \left(P_D^M\right)^{\gamma} w^{1-\gamma} \left(\int_{\Omega_D^M} \left(\tfrac{1}{\tilde{\varphi}_i} \, (s_{Di})^{\frac{\gamma}{\varepsilon-1}}\right)^{1-\chi} di\right)^{\frac{1}{1-\chi}}, \end{aligned}$$

where the factor $\chi/(\chi-1)$ is the standard CES markup.

The foreign price index P_F is analogously defined over Ω_F. The price index of *public-good varieties* (faced by the government) will be derived after we introduce the BAA constraint.

Producing for G: BAA Domestic Content Restriction on Intermediate Inputs. A firm that supplies the government must use a domestic-input share at least $\underline{s}_D$. The constraint binds for firms whose unconstrained share (B.12) falls below the floor: $s_{Di}^{*} < \underline{s}_D$. For a constrained firm,

[73]Derivation:

$$c_i = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}} \frac{1}{\varphi_i} w^{1-\gamma} P_i^{\gamma} = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}} \frac{1}{\varphi_i} w^{1-\gamma} \beta_i^{\frac{\gamma\varepsilon}{1-\varepsilon}} \left(P_D^M\right)^{\gamma} (s_{Di})^{\frac{\gamma}{\varepsilon-1}} = \tilde{\varphi}_i^{-1} \left(s_{Di}^{*}\right)^{\frac{\gamma}{\varepsilon-1}} (P_D^M)^{\gamma} \, w^{1-\gamma}$$

optimal sourcing pins the realized domestic share exactly at the constrained level:

$$\frac{P_D^M x_{Di}}{P_F x_{Fi}} = \frac{\underline{s}_D}{1-\underline{s}_D},$$

and the unit cost rises by a firm-specific factor:

$$\tilde{c}_i \;=\; \kappa_i \, c_i, \qquad \kappa_i = \left[\underline{s}_D\Big(\tfrac{s^*_{Di}}{\underline{s}_D}\Big)^{1/\varepsilon} + (1-\underline{s}_D)\Big(\tfrac{1-s^*_{Di}}{1-\underline{s}_D}\Big)^{1/\varepsilon}\right]^{\frac{\gamma\varepsilon}{1-\varepsilon}} \;>\; 1. \tag{B.14}$$

The variable κ_i captures the cost wedge relative to that of the unconstrained optimal input bundle. When the BAA domestic content requirement is binding, i.e. when $s^*_{Di} < \underline{s}_D$, we have $\kappa_i > 1$, and κ_i is strictly decreasing in s^*_{Di} in the subset of constrained firms: the further the firm's unconstrained optimum is from the constrained level, the larger the cost wedge it has to absorb to comply. In contrast, for firms for which the constraint is not binding, the domestic input share is chosen optimally at s^*_{Di}, and the corresponding unit cost is c_i. This partitions the set of G producers into binding ($\Omega_D^{G,B}$) and non-binding ($\Omega_D^{G,N}$) subsets accordingly. The set of all domestic firms selling to G is therefore $\Omega_D^G = \Omega_D^{G,N} \cup \Omega_D^{G,B}$.

The public-good price index P_D^G and expenditure shares. With the binding/non-binding partition in hand, the CES price index over domestic G producers is

$$\begin{aligned} P_D^G &= \tfrac{\chi}{\chi-1}\left(\int_{\Omega_D^{G,N}} c_i^{1-\chi} di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi} di\right)^{\frac{1}{1-\chi}} \\ &= \tfrac{\chi}{\chi-1}\left(P_D^M\right)^{\gamma} w^{1-\gamma}\left(\int_{\Omega_D^{G,N}}\left(\tfrac{1}{\varphi_i}\,(s_{Di})^{\frac{\gamma}{\varepsilon-1}}\right)^{1-\chi} di + \int_{\Omega_D^{G,B}}\left(\tfrac{\kappa_i}{\tilde{\varphi}_i}\,(s_{Di})^{\frac{\gamma}{\varepsilon-1}}\right)^{1-\chi} di\right)^{\frac{1}{1-\chi}}. \end{aligned}$$

Non-binding firms charge in proportion to their unit cost c_i; binding firms charge in proportion to the BAA-distorted cost $\tilde{c}_i = \kappa_i \, c_i$. Define each firm's share of G expenditure:

$$\omega_i^G \;=\; \begin{cases} \dfrac{c_i^{1-\chi}}{\int_{\Omega_D^{G,N}} c_i^{1-\chi}\, di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi}\, di} & \text{if } i \in \Omega_D^{G,N}, \\ \dfrac{\tilde{c}_i^{1-\chi}}{\int_{\Omega_D^{G,N}} c_i^{1-\chi}\, di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi}\, di} & \text{if } i \in \Omega_D^{G,B}. \end{cases} \tag{B.15}$$

By construction $\int \omega_i^G \, di = 1$. Each ω_i^G is the slice of the government's procurement budget that flows to firm i. Note that for binding firms the share depends on the BAA wedge through $\tilde{c}_i$.

Sorting of firms into G Production. Suppose there is a fixed cost f_D^G of supplying the government. A firm sells to G iff its operating profit is larger than the fixed cost, i.e.,

$$\begin{cases} \frac{1}{\chi}\left(\frac{\frac{\chi}{\chi-1}c_i}{P_D^G}\right)^{1-\chi} E_D^G > f_D^G & \text{if } s_{Di}^* > \underline{s}_D \\ \frac{1}{\chi}\left(\frac{\frac{\chi}{\chi-1}\tilde{c}_i}{P_D^G}\right)^{1-\chi} E_D^G > f_D^G & \text{if } s_{Di}^* \le \underline{s}_D \end{cases},$$

where E_D^G denotes the total expenditure by G. These conditions imply that, all else equal, firms with lower inherent import intensity (equivalently, a higher domestic input share s_{Di}^*) are more likely to be selected into G production.

In this simple model, we abstract from firm entry, so the set of domestic firms Ω_D^M is exogenously given. Because of love of variety, all domestic firms sell to M. A subset of domestic firms with sufficiently low inherent import intensity also sell to G; these firms serve both the government and the private market. Note that none of the results we derive below rely on the assumption of a positive fixed cost f_D^G, so they hold under the case in which $\Omega_D^G = \Omega_D^M$, i.e. all firms sell both to the government and the private market and there is no selection of the least import-intensive firms into selling to the government.

Tightening BAA Domestic Content Restriction: Special Case with $\underline{s}_D' = 1$. Using this heterogeneous firm framework, we re-examine the welfare cost of tightening the BAA domestic-content requirement on intermediate goods. In particular, we derive an analytical solution for the special case in which no imported inputs are allowed in production G (i.e., $\underline{s}_D' = 1$), under a partial-equilibrium setting in which the w and Ω_D^G remain fixed. Here, x' denotes the value of variable x in the counterfactual case.

When $\underline{s}_D' = 1$, every G producer becomes binding, and (B.14) simplifies to $\kappa_i' = (s_{Di}^*)^{\gamma/(1-\varepsilon)}$. Substituting into the price equation and rearranging gives the following change in the price index:

$$\ln \frac{P_D^{G\prime}}{P_D^G}\bigg|_{w,\Omega_D^G} = \underbrace{\frac{1}{1-\chi} \ln\left[\int_{\Omega_D^{G,N}} (s_{Di}^*)^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega_i^G \, di + \int_{\Omega_D^{G,B}} (s_{Di}^*)^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \kappa_i^{\chi-1} \omega_i^G \, di\right]}_{\equiv \Lambda_\kappa^{Aut}}. \tag{B.16}$$

The expression Λ_κ^{Aut} is the price-index increase predicted by the heterogeneous-firm model. It is an integral over firm-level shares $\{s_{Di}^*\}$ and wedges $\{\kappa_i\}$, weighted by G-expenditure shares $\{\omega_i^G\}$ from Equation (B.15). Notice that the wage w and the input price indices P_D^M, P_F have all been cancelled in the ratio: only firm-level primitives and the within-G weights remain.

Note that allowing for extensive-margin adjustments would further increase $\ln\left(\frac{P_D^{G\prime}}{P_D^G}\right)$, since the set of firms selling to G would shrink when $\underline{s}_D' = 1$.

B.2.2 Aggregate Model Based on the Eaton and Kortum (2002) Framework

This section derives an object analogous to Λ_{κ}^{Aut} under our *baseline* aggregate model, which is the one we use in the body of the paper to compute counterfactuals. The aggregate model treats production in each region-sector à la Eaton and Kortum (2002) technology, so the heterogeneity in firm-level import intensity that drives the previous subsection is absent.

Production and Input Trade. We present a simplified version of the model from the main text. Each variety ω is produced according to

$$y(\omega) \;=\; \varphi(\omega)\, l(\omega)^{1-\gamma}\, x(\omega)^{\gamma},$$

where $\varphi(\omega)$ is a productivity draw that follows a Fréchet distribution with shape parameter θ. The scale parameter is T_D in the domestic country and T_F in the foreign country. The wage in the domestic country is denoted w and the unit cost of foreign producers is denoted c_F, both taken as exogenous in the partial-equilibrium setting we use below.

For M producers, the price index for intermediate inputs is given by

$$p_D^M = \Gamma\left(T_D (c_D^M)^{-\theta} + T_F (\tau^M c_F)^{-\theta}\right)^{-\frac{1}{\theta}},$$

where Γ is a Gamma function and τ^M is the iceberg trade cost on imported inputs faced by M producers. Under perfect competition with Cobb–Douglas technology, the unit cost of domestic M producers is $c_D^M = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}}\left(p_D^M\right)^{\gamma} w^{1-\gamma}$; c_F denotes the unit cost of foreign producers.

Under perfect competition, the price index faced by M consumers coincides with this unit cost: $P_D^M = c_D^M = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}}\left(p_D^M\right)^{\gamma} w^{1-\gamma}$. As in the baseline model, domestic M producers sell not only to final consumers but also supply intermediate inputs to both M and G producers.

For G producers, the analogous intermediate-input price index is

$$p_D^G = \Gamma\left(T_D (c_D^M)^{-\theta} + T_F (\tau^G c_F)^{-\theta}\right)^{-\frac{1}{\theta}},$$

where $\tau^G = \tau^{f,G}\tau^M$ is the trade cost on imported inputs faced by G producers, and $\tau^{f,G}$ captures the additional wedge induced by the BAA domestic content requirement. The unit cost of domestic G producers and price is $P_D^G = c_D^G = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^{\gamma}}\left(p_D^G\right)^{\gamma} w^{1-\gamma}$. The domestic share of intermediate inputs used by G producers is

$$s_D^G = \frac{T_D (c_D^M)^{-\theta}}{T_D (c_D^M)^{-\theta} + T_F (\tau^G c_F)^{-\theta}}. \tag{B.17}$$

Substituting the expression for s_D^G from (B.17) into the unit cost expression for G producers re-expresses the public-good price in closed form as a function of s_D^G:

$$P_D^G = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^\gamma}\left(p_D^G\right)^\gamma w^{1-\gamma} = \frac{1}{(1-\gamma)^{1-\gamma}\gamma^\gamma}\Gamma^\gamma\left(\frac{T_D(c_D^M)^{-\theta}}{s_D^G}\right)^{-\frac{\gamma}{\theta}} w^{1-\gamma}.$$

Tightening BAA Domestic Content Restriction: Special Case with $\tau'^{f,G} = \infty$. As in the heterogeneous-firm model, we consider the special case in which no imported inputs are allowed in G production (i.e., $\tau'^{f,G} = \infty$), under a partial-equilibrium setting in which w remains unchanged. Conditional on w , the change in the price index P_D^G is given by

$$\begin{aligned} \ln\left(\frac{P_D^{G\prime}}{P_D^G}\right)\Big|_w &= -\frac{\gamma}{\theta}\ln\left(s_D^G\right) \\ &= -\frac{\gamma}{\theta}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}^*\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di\right). \end{aligned} \tag{B.18}$$

where the second equality writes the aggregate share s_D^G as the G-expenditure-weighted average of firm-level realized shares from the previous heterogeneous model: the unconstrained optimum s_{Di}^* for non-binding firms and the policy floor $\underline{s}_D$ for binding firms. When micro-level data are unavailable, we only observe the aggregate share s_D^G—i.e., only the integral inside the logarithm in (B.18)—and not the underlying firm-level distribution $\{s_{Di}^*, \omega_i^G\}$. The next subsection uses this difference in observability to compare the price-index changes implied by the two models.

B.2.3 Comparing the Impacts on Public Good Price Index Across Models

The two models in the sections above use different parameters to govern the same macroeconomic object: the elasticity of aggregate trade flows to a change in relative trade costs. In the aggregate Eaton-Kortum model that elasticity is the Fréchet shape parameter θ; in the heterogeneous-firm model with CES aggregation across origins it is the sourcing elasticity ε minus one. Following Blaum *et al.* (2018), we calibrate the two models to deliver the same trade response by setting $\frac{\gamma}{\varepsilon-1} = \frac{\gamma}{\theta}$, i.e., $\theta = \varepsilon - 1 < \chi - 1$. This restriction is what makes the cross-model comparison meaningful: any difference between the two models' predictions about a BAA tightening must then come from firm-level dispersion alone, not from a different macro trade elasticity. Under this restriction, the two changes in the public-good price index derived above, equations (B.16) and (B.18), are directly comparable. Define their difference as

$$Bias = \underbrace{-\frac{\gamma}{\varepsilon-1}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di\right)}_{\Lambda_{Agg}^{Aut}} - \underbrace{\frac{1}{1-\chi}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}^{*\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di + \int_{\Omega_D^{G,B}} s_{Di}^{*\frac{\gamma(\chi-1)}{\varepsilon-1}}\kappa_i^{\chi-1}\omega_i^G di\right)}_{\Lambda_\kappa^{Aut}},$$

where Λ^{Aut}_{Agg} is the price-index increase that we would infer with only aggregate-share data; Λ^{Aut}_{κ} is the increase predicted by the heterogeneous-firm model with full firm-level information on $\{s^*_{Di}, \omega^G_i, \kappa_i\}$. A negative bias means the aggregate model under-states the rise in the public-good price index relative to the heterogeneous-firm model and, therefore, under-states the welfare cost of tightening the BAA. Formally, we show that:

Proposition B.1. *When $\frac{\gamma(\chi-1)}{\varepsilon-1}$ is moderately above* 1 *or below it, Bias* < 0*: the aggregate model is a lower bound on the welfare loss from a tighter BAA domestic-content rule.*[74]

Proof. Starting with the term inside the logarithm of Equation (B.16)

$$\begin{aligned}
&\int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \kappa_i^{\chi-1} \omega^G_i di \\
&= \int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \left[\underline{s}_D \left(\frac{s^*_{Di}}{\underline{s}_D} \right)^{\frac{1}{\varepsilon}} + (1-\underline{s}_D) \left(\frac{1-s^*_{Di}}{1-\underline{s}_D} \right)^{\frac{1}{\varepsilon}} \right]^{\frac{\gamma\varepsilon(\chi-1)}{1-\varepsilon}} \omega^G_i di \\
&= \int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \left[\underline{s}_D + (1-\underline{s}_D) \left(\frac{1-s^*_{Di}}{s^*_{Di}} \right)^{\frac{1}{\varepsilon}} \Big/ \left(\frac{1-\underline{s}_D}{\underline{s}_D} \right)^{\frac{1}{\varepsilon}} \right]^{\frac{\gamma\varepsilon(\chi-1)}{1-\varepsilon}} \omega^G_i di \\
&< \int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \left[\underline{s}_D + (1-\underline{s}_D) \right]^{\frac{\gamma\varepsilon(\chi-1)}{1-\varepsilon}} \omega^G_i di \\
&= \int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di.
\end{aligned}$$

The inequality follows because, for binding firms $i \in \Omega_D^{G,B}$ (where $s^*_{Di} < \underline{s}_D$), $\left(\frac{1-s^*_{Di}}{s^*_{Di}}\right)^{1/\varepsilon} \Big/ \left(\frac{1-\underline{s}_D}{\underline{s}_D}\right)^{1/\varepsilon} > 1$, and the exponent $\gamma\varepsilon(\chi-1)/(1-\varepsilon)$ is strictly negative (recall $\varepsilon > 1$ and $\chi > 1$). Applying the operator $\frac{1}{1-\chi}\ln(\cdot)$, which is monotonically decreasing because $1/(1-\chi) < 0$, this implies

$$\underbrace{\frac{1}{1-\chi} \ln\left(\int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \kappa_i^{\chi-1} \omega^G_i di \right)}_{\Lambda^{Aut}_{\kappa}} > \underbrace{\frac{1}{1-\chi} \ln\left(\int_{\Omega_D^{G,N}} (s^*_{Di})^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}} \omega^G_i di \right)}_{\Lambda^{Aut}}.$$

The price index increases more in the case in which a set of firms is "constrained" at $\underline{s}_D$ than when there is simply a mass of firms with unconstrained optimal import share equal to $\underline{s}_D$. There are now two cases:

[74]In Blaum *et al.* (2018), the reported values of the ratio $\frac{\gamma(\chi-1)}{\varepsilon-1}$ are as follows: minimum 0.22, maximum 3.75, median 1.12, and average 1.37, based on the data and estimates presented in their Tables 1 and 2.

Case I: $\frac{\gamma(\chi-1)}{\varepsilon-1} \leq 1$. In this case, we can show that

$$\underbrace{-\frac{\gamma}{\varepsilon-1}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}^{*}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di\right)}_{\Lambda_{Agg}^{Aut}} - \underbrace{\frac{1}{1-\chi}\ln\left(\int_{\Omega_D^{G,N}} (s_{Di}^{*})^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di\right)}_{\Lambda^{Aut}}$$

$$= -\frac{\gamma}{\varepsilon-1}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}^{*}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di\right) + \frac{\gamma}{\varepsilon-1}\ln\left(\int_{\Omega_D^{G,N}} (s_{Di}^{*})^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di\right)^{\frac{\varepsilon-1}{\gamma(\chi-1)}}$$

$$= \frac{\gamma}{\varepsilon-1}\ln\left(\frac{\left(\int_{\Omega_D^{G,N}} (s_{Di}^{*})^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di\right)^{\frac{\varepsilon-1}{\gamma(\chi-1)}}}{\int_{\Omega_D^{G,N}} s_{Di}^{*}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di}\right)$$

$$\leq 0.$$

Because $\Lambda_\kappa^{Aut} > \Lambda^{Aut}$ and $\Lambda^{Aut} \geq \Lambda_{Agg}^{Aut}$, it follows that $Bias = \Lambda_{Agg}^{Aut} - \Lambda_\kappa^{Aut} < 0$. This indicates that the increase in P_D^G from moving to input autarky is smaller in the aggregate model than in models featuring input intensity heterogeneity. Equivalently, the welfare cost of tightening the domestic content requirement is smaller in our aggregate model than in the heterogeneous-firm model.

Case II: $\frac{\gamma(\chi-1)}{\varepsilon-1} > 1$. Under this condition, it can be shown that

$$\underbrace{-\frac{\gamma}{\varepsilon-1}\ln\left(\int_{\Omega_D^{G,N}} s_{Di}^{*}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D\omega_i^G di\right)}_{\Lambda_{Agg}^{Aut}} - \underbrace{\frac{1}{1-\chi}\ln\left(\int_{\Omega_D^{G,N}} (s_{Di}^{*})^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di + \int_{\Omega_D^{G,B}} \underline{s}_D^{\frac{\gamma(\chi-1)}{\varepsilon-1}}\omega_i^G di\right)}_{\Lambda^{Aut}} > 0.$$

Because $\Lambda_\kappa^{Aut} > \Lambda^{Aut}$ and $\Lambda_{agg}^{Aut} > \Lambda^{Aut}$, it is indeterminate whether $\Lambda_{Agg}^{Aut} \lesseqgtr \Lambda_\kappa^{Aut}$. In general, the sign of the *Bias* cannot be determined without additional micro-level data. We note that when $\frac{\gamma(\chi-1)}{\varepsilon-1}$ in only moderately above 1, it can be shown that $Bias < 0$ by continuity, which means the welfare cost of tightening the domestic content requirement is smaller in our aggregate model than in the heterogeneous-firm model.

□

Moreover, as noted above, we abstract from extensive-margin adjustments in this derivation. Allowing Ω_D^G to adjust would further increase $\ln\left(\frac{P_D^{G\prime}}{P_D^G}\right)$ in the heterogeneous-firm model, because the set of firms selling to G shrinks when $\underline{s}_D' = 1$.

B.2.4 Aggregate BAA Wedges under Heterogeneous Firm Model

The aggregate wedge resulting from the BAA domestic content restrictions on intermediate goods is represented by $\kappa = \frac{P_D^G}{\tilde{P}_D^G}$. Here, $\tilde{P}_D^G$ represents the price index of domestic firms in Ω_D^G in the absence of BAA restrictions, while P_D^G denotes the price index when the BAA restrictions are in effect. Note that, in our model, the binding firms in $\Omega_D^{G,B}$ also sell to the private market M thanks to the CES love-of-variety preference and the absence of a fixed cost of producing for M, so the BAA wedge enters their cost only through their sales to the government. This wedge can be rewritten as:

$$
\begin{aligned}
\kappa = \frac{P_D^G}{\tilde{P}_D^G} &= \left(\frac{\int_{\Omega_D^{G,N}} c_i^{1-\chi} di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi} di}{\int_{\Omega_D^{G,N}} c_i^{1-\chi} di + \int_{\Omega_D^{G,B}} c_i^{1-\chi} di} \right)^{\frac{1}{1-\chi}} \\
&= \left(\frac{\int_{\Omega_D^{G,N}} c_i^{1-\chi} di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi} \kappa_i^{\chi-1} di}{\int_{\Omega_D^{G,N}} c_i^{1-\chi} di + \int_{\Omega_D^{G,B}} \tilde{c}_i^{1-\chi} di} \right)^{\frac{1}{\chi-1}} \\
&= \left(\int_{\Omega_D^{G,N}} \omega_i^G di + \int_{\Omega_D^{G,B}} \kappa_i^{\chi-1} \omega_i^G di \right)^{\frac{1}{\chi-1}}
\end{aligned}
$$

where ω_i^G is firm i's share of expenditure in market G defined in Equation (B.15).

The two intermediate equalities use $\tilde{c}_i = \kappa_i c_i$ to move the BAA distortion between the numerator and the denominator of the price-index ratio without changing its value. The final expression has the intuitive interpretation that the aggregate wedge κ is a weighted power mean (of order $\chi - 1$) of the firm-level wedges κ_i, with weights given by the firms' shares of G expenditure: non-binding firms enter with $\kappa_i = 1$, and binding firms enter with their cost markup $\kappa_i > 1$.

To estimate κ from firm-level data one would need (i) the unconstrained domestic-input share s_{Di}^* for every G producer, regardless of whether its constraint is binding, and (ii) each firm's expenditure share in market G, ω_i^G. Requirement (i) is demanding even when firm-level data are available, because s_{Di}^* is the share the firm would have chosen absent the BAA: for binding firms, the realized share is mechanically $\underline{s}_D$ rather than s_{Di}^*, so the unconstrained optimum cannot be read directly from observed sourcing decisions.

C Data Appendix

C.1 FPDS

The Federal Procurement Data System (FPDS) tracks the universe of federal awards that exceed the micro-purchase threshold ($3,500).[75] The Federal Acquisition Regulation (FAR) requires Contracting Officers (COs) to submit complete reports on all contract actions.[76] Thus, every observation corresponds to a contract action, representing either an initial award or a follow-on action, e.g., modification, termination, renewal, or exercise of options. For each observation, we observe detailed information, such as the dollar value of the funds obligated by the transaction; a four-digit product category code (PSC); six-digit Industry (NAICS) code; identification codes for the agency, sub-agency, and contracting office making the purchase; the location where the contracts is required, the identity (DUNS) and location (zip-code or country of origin if it's located abroad) of the vendor. Also, each observation indicates the type of contract type[77] and pricing (typically, fixed-price or cost-plus); the extent of competition for the award; characteristics of the solicitation procedure; the number of offers received; and the applicability of a variety of laws and statutes. We collapse all actions by unique contract ID variables (IDV-PIID and PIID). Moreover, the procurement officer is required report contract's *Place of Manufacture* in accordance with the FAR 25.1 (Buy American Act), and any exceptions or reasons for waivers employed compliance and applicability of the Buy American Act.

C.1.1 Procurement Offices

The federal government is organized into different layers: agencies, subagencies, and offices. Each layer is identified by a unique code. For example,

- Agency: DEPARTMENT OF JUSTICE (15):
  - Sub-agency: FEDERAL PRISON SYSTEM / BUREAU OF PRISONS (1540)
    - Office #1: FPC ALDERSON (15B101), ALDERSON, WV, 24910
    - Office #2: FCI ASHLAND (15B102), ASHLAND, KY, 41105
    - Office #3: FCI BECKLEY (15B103), BEAVER, WV, 25813
    - Office #4: FMC BUTNER (15B106), BUTNER, NC, 27509

[75] The FAR 4.606 describes specific contract actions exempted from being reported to FPDS. In particular, it exempts contracts between public entities or contracts that involve fund transactions. The micro-purchase threshold was increased from $3,500 to $10,000 in 2018.

[76] On an annual basis, the General Services Administration (GSA) requires federal agencies to state the completeness and accuracy percentages of their data contained in the FPDS.

[77] There are two types of contract designs: Definitive contracts (DC) or Indefinite delivery vehicle (IDV), the latter correspond to long-term agreements with suppliers.

* . . .

The lowest level corresponds to procurement offices. Most federal procurement is decentralized; procurement offices use their budget to procure according to their needs. Each office's location (zip code) is not provided in FPDS directly but can be obtained from the official list of active procurement offices.

C.1.2 Location Variables

The FPDS dataset includes variables to identify relevant locations:

- *Place of Manufacture*: This field must be populated for all reported manufactured end products, including those valued under the micro-purchase threshold. Procurement officers will choose "Not a Manufactured End Product" when the procurement is for services or for unmanufactured end products (e.g., ores, food, animals). Instead, they will choose "Manufactured Outside the U.S. – Use Outside the U.S." when the procurement is for supplies acquired for use outside the United States (BAA does not apply). If the procurement is for supplies to be used inside the United States, it must be either manufactured in the U.S. (when the supplies are considered domestic end products) or "Manufactured Outside the U.S." (and subject to Trade Agreements or to one of the exceptions).

  Although BAA requirements do not apply to contract awards valued below the micro-purchase threshold (generally $3,500 in fiscal year 2017), the FPDS-NG "Place of Manufacture" field does not have an option to indicate whether a contract is under the threshold. Instead, contracting officers entering information for awards under the micro-purchase amount must still state whether the product is domestic or foreign. If the product is foreign, the officials must select a Buy American Act exception authorizing the purchase, even though no exception is needed at these dollar levels. As a result, when agencies report in FPDS-NG that a BAA exception or waiver applied for a procurement valued at less than $3,500, that information would not be accurate. Based on our review, this may have involved about $16 million in fiscal year 2017 obligations.

- *Place of performance*: This variable is reported by the procurement officer and indicates the location of the principal plant or place of business where the items will be produced, supplied from stock, or where the service will be performed. For construction contracts, enter the site of construction. If more than one location is involved in performance, enter the principal place of performance.

- *Firm location*: This information is automatically populated based on the firm's DUNS number. The *Dun's and Bradstreet* registry is updated annually.[78]

[78]Since the variable Place of Manufacture is sparsely populated in the early years of our study, we use firm location

- *Office location*: FPDS identifies procurement offices using unique office codes. The office codes can be combined with the registry of contracting office information available on the FPDS website to add characteristics and locations of procurement offices. The process required additional work as offices changed their code format between 2003 and 2016.[79] The registry of contracting offices is only available from 2010 onwards, so if an office changed office code format before 2010, it would require some extra work to retrieve the corresponding new office code to merge with the registry.[80] The resulting dataset includes office zip codes if the office is located in the U.S. and the name of the country if located abroad.[81]

C.1.3 FPDS Coverage

The Federal Acquisition Regulation (FAR 4.606) describes contract actions exempt from reporting to FPDS over the micro-purchase threshold. Notably, the FAR exempts the reporting of contract actions in which the required data would constitute classified information, contracts between public entities that involve fund transactions, or interagency agreements.

To evaluate the comprehensiveness of FPDS, we compare its aggregate spending data with the budget execution reports provided by the U.S. Government Budget Office. Table C.1 presents the spending figures by fiscal year.[82] Column 2 shows the aggregate amounts from FPDS, while column 3 provides the spending data for Budget's Object Class 20: "Contractual Services and Supplies." Column 4 adjusts these figures by excluding sub-categories unlikely to be reported in FPDS as per FAR 4.606.[83]

We find that the spending amount reported in the FPDS falls within the range defined by the total Object Class 20 amount and the amount adjusted to exclude sub-categories that are unlikely to qualify under FAR 4.606. This result underscores the comprehensiveness of FPDS in capturing

data (specifically, the firm's country) to infer U.S. government imports. However, firms based abroad may have U.S. branches, which could lead us to incorrectly classify some contracts as imports, even though the government is purchasing from firms with U.S. establishments. To address this, we manually check a sample of U.S. contracts awarded in 2015, where the place of performance is the U.S. but the winning firm is located in another country. We look for any evidence that these firms have a manufacturing establishment in the U.S., by browsing through their websites, looking at their LinkedIn profiles and vacancy announcements (to check where they hire). We find that in the vast majority of cases, these firms do not have any U.S. manufacturing establishment.

[79] The new office code format was a 6-digit called "AAC" and was adopted by the DOD a few years before the rest of the federal government.

[80] The process involved tracing multi-year contracts (PIID) that experienced changes in procurement office code; this way, we were able to identify office code transitions. This process was accompanied by a manual check of the most relevant procurement offices. As a result, only 1.5% of observations miss the office location (zip code, if located in the U.S.).

[81] Most procurement offices located in foreign countries correspond to the Dept. of Defense or the Dept. of the State, which manages embassies and other government units.

[82] The federal fiscal year begins on October 1st and ends on September 30th of the following year.

[83] While some of these sub-categories are generic, our interpretation of FAR 4.606 suggests that the following sub-categories may not qualify for FPDS reporting: "23.1 Rental payments to GSA," "23.2 Rental payments to others," and "25.3 Other goods and services from Federal sources."

federal procurement expenditures.

Aggregate Procurement Spending and Manufacturing Share. To illustrate the scope and composition of the data, Figure C.1 reports total federal procurement spending recorded in FPDS between 2001 and 2019, broken down by whether the contract involves a manufacturing industry. Procurement spending roughly doubled between 2001 and 2008 and stabilized at around $400 billion per year. Manufacturing contracts account for approximately one-third of the total. The most heavily procured manufacturing industry is Aircraft Manufacturing (NAICS 336411); the full list of the top 20 manufacturing industries is reported in Table C.2.

C.1.4 Top NAICS in FPDS

Table C.2 lists the top 20 manufacturing industries at the 6-digit NAICS level with the highest procurement amounts.

C.2 List of Sectors

The sample of sectors used in the quantitative analysis includes: Mining and Oil and Gas Extraction (21); Construction (23)*; Manufacture of Food products, Beverages and Tobacco products (311-312); Textile, Textile Product Mills, Apparel, Leather, and Allied Products (313-316); Wood Product Manufacturing (321); Paper Manufacturing (322); Printing and Related Support Activities (323); Petroleum and Coal Products (324); Chemical (325); Plastics and Rubber Products (326); Nonmetallic Mineral Products (327); Primary Metal Manufacturing (331); Fabricated Metal Product Manufacturing (332); Machinery (333); Computer and Electronic Product Manufacturing (334); Electrical Equipment, Appliance, and Component Manufacturing (335); Transportation Equipment (336); Furniture and Related Products, and Miscellaneous Manufacturing (337-339); Wholesale and Retail Trade (42-45); Transportation and Warehousing (48-49); Information and Cultural Industries (51); Finance and Insurance (52)*; Real Estate and Rental and Leasing (53)*; Professional, Scientific and Technical Services, Management of Companies and Enterprises (54-55); Administrative and Support, Waste Management and Remediation Services (56)*; Educational Services (61)*; Health Care and Social Assistance (62)*; Accommodation and Food Services (72)*; Other Services (except Public Administration) (71,81)*. The corresponding 2-digit/3-digit NAICS codes for different industries are in parentheses. Nontradable industries are indicated by *. We exclude Agriculture, Forestry, Fishing and Hunting (11), Utilities (22), and Public Administration (91) sectors due to the lack of data on domestic trade flows from the CBP data.

C.3 Expanding the Adjusted World I-O Table

We now expand the adjusted WIOD data so that it contains the eight blocks in the trade matrix in Figure C.5, including: (i) imports of intermediate inputs respectively by G and M in each U.S.

state from the ROW; (ii) imports of intermediate inputs by the ROW respectively from G and M in each U.S. state; (iii) interregional trade flows of goods for intermediate use among the U.S. states respectively for G and M; (iv) trade flows of goods for intermediate use within the ROW; (v) imports of goods for final-use consumption respectively by G and M in each U.S. state from the ROW; (vi) imports of goods for final-use consumption by the ROW respectively from G and M in each U.S. state; (vii) interregional trade flows of goods for final-use consumption among the U.S. states respectively for G and M; and (viii) trade flows of goods for final-use consumption within the ROW.

The imputation is implemented by combining the information derived from various datasets, including the FPDS, WIOD, Commodity Flow Survey (CFS), USA trade online and the County Business Patterns (CBP). Specifically, we use information from the CFS for the year 2012, which is the closest available year to 2014. The CFS survey tracks pairwise trade flows between different industries across U.S. states. We map the CFS industries, which are defined by various 3- to 5-digit NAICS codes, to the corresponding NAICS industries described in subsection C.2. Having constructed the bilateral trade flows for these NAICS industries, we compute: (i) how much of the sectoral expenditure of each state is spent on goods from each of the U.S. states, and (ii) how much of the sectoral revenue of each state is generated from sales to each of the U.S. states. We obtain 2014 bilateral export and import data at the four-digit NAICS level between U.S. states and countries worldwide from USA Trade Online, which we aggregate to derive trade between each state and the rest of the world across industries listed in subsection C.2. We employ the CBP data for the year 2014, which tracks employment by county and industry. To protect confidentiality, employment for county-industry cells is sometimes reported as an interval instead of exact count. We employ the imputed dataset developed by Eckert *et al.* (2020) and aggregate the employment data to the state-industry level. With the data, we calculate the employment share of each state within each industry and the population share of each state.

Equipped with these data, we adopt the following approach to construct the matrix for each block:

(i) Imports of intermediate inputs respectively by G and M in each U.S. states from the ROW

The imports of intermediate inputs by G in each U.S. state from the ROW is computed as follows:

$$X^{i,G}_{\text{ROW}\,s,dk} = \lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}\alpha_{\text{US},sk}X^{G}_{dk}\ \forall\ d \in US,$$

where X^{G}_{dk} is the G output of good k in state d, which is derived from the FPDS data. A portion $\lambda^{i,G}_{\text{ROW}\,s,\text{US}\,k}$ of the corresponding expenditure on input s (i.e., $\alpha_{\text{US},sk}X^{G}_{dk}$) is sourced from the ROW. Analogously, the imports of intermediate inputs by M in each state from the ROW is computed according to:

$$X^{i,M}_{\mathrm{ROW}\,s,dk} = \lambda^{i,M}_{\mathrm{ROW}\,s,\mathrm{US}\,k}\alpha_{\mathrm{US},sk}\left(\frac{L_{dk}}{L_k}X^M_{\mathrm{US}\,k}\right)\ \forall\ d \in US,$$

where we apportion the total M output of good k in the U.S. to each state according to its employment share L_{dk}/L_k to calculate the state-level M output.

(ii) Imports of intermediate inputs by the ROW respectively from G and M in each U.S. state

Given the setup of our model, G producers only serve demand from G final-use consumption in the U.S. Therefore, the imports of intermediate inputs by the ROW from G producers in each state is zero. The imports of intermediate inputs by the ROW from M producers in each U.S. state is calculated as follows:

$$X^{i}_{os,\mathrm{ROW}\,k} = \frac{X_{o\,\mathrm{ROW}\,s}}{\sum_{o'\in US} X_{o'\,\mathrm{ROW}\,s}}X^{i}_{\mathrm{US}\,s,\mathrm{ROW}\,k}\ \forall\ o \in US,$$

where we apportion the imports of inputs s by industry k in the ROW (i.e., $X^i_{\mathrm{US}\,s,\mathrm{ROW}\,k}$) to each U.S. state according to its export share in industry s (i.e., $X_{o\,\mathrm{ROW}\,s}/\sum_{o'\in US} X_{o'\,\mathrm{ROW}\,s}$) which is calculated based on the 2014 data from USA Trade Online.

(iii) Inter-regional trade flows of goods for intermediate use among the U.S. states respectively for G and M

Since G producers only serve demand from G final-use consumption in the U.S., there are no trade flows of inputs from G producers to M or G producers among the states. Now, we consider the trade flows of inputs from M to G:

$$X^{i,G}_{os,dk} = \frac{F_{ods}}{F_{ds}}(1-\lambda^{i,G}_{\mathrm{ROW}\,s,\mathrm{US}\,k})\alpha_{\mathrm{US},sk}X^G_{dk}\ \forall\ o,d \in US,$$

where $(1-\lambda^{i,G}_{\mathrm{ROW}\,s,\mathrm{US}\,k})\alpha_{\mathrm{US},sk}X^G_{dk}$ represents the expenditure on goods s that originates from the U.S. We then compute how much of the sectoral expenditure of each state is spent on goods from each of U.S. states. We do so by applying the expenditure share F_{ods}/F_{ds} calculated with the 2014 CFS data. Similarly, the trade flows of inputs from M to M is computed according to:

$$X^{i,M}_{os,dk} = \frac{F_{ods}}{F_{ds}}(1-\lambda^{i,M}_{\mathrm{ROW}\,s,\mathrm{US}\,k})'\alpha_{\mathrm{US},sk}\left(\frac{L_{dk}}{L_k}X^M_{\mathrm{US}\,k}\right)\ \forall\ o,d \in US.$$

(iv) Trade flows of goods for intermediate use within the ROW

The data on $X^i_{\mathrm{ROW}\,s,\mathrm{ROW}\,k}$ is obtained from the original WIOD.

(v) Imports of goods for final-use consumption respectively by G and M in each U.S. state from the ROW

For G final-use consumption, imports of good s from the ROW, $X^{f,G}_{\mathrm{ROW}\,ds}$, is the data taken from the FPDS. For M final-use consumption, imports of good s from the ROW is calculated as follows:

$$X^{f,M}_{\mathrm{ROW}\,ds} = \frac{L_d}{L}X^{f,M}_{\mathrm{ROW}\,\mathrm{US}\,s}\ \forall\ d \in US,$$

$$\text{where } X^{f,M}_{\text{ROW US}\,s} = X^{M}_{\text{ROW}\,s} - \sum_{d\in US}\sum_{k} X^{i,G}_{\text{ROW}\,s,dk} - \sum_{d\in US}\sum_{k} X^{i,M}_{\text{ROW}\,s,dk} - \sum_{k} X^{i,M}_{\text{ROW}\,s,\text{ROW}\,k} - \sum_{d\in US} X^{f,G}_{\text{ROW}\,ds} - X^{f,M}_{\text{ROW ROW}\,s}.$$

We allocate the nationwide imports of final-use goods by M (i.e., $X^{f,M}_{\text{ROW US}\,s}$) to each state according to their respective population shares L_d/L. $X^{f,M}_{\text{ROW US}\,s}$, in turn, is determined as the difference of total sectoral output in the ROW and the combined demands arising from intermediate use in both the U.S. and the ROW, and final consumptionby G in the U.S. and the ROW.

(vi) Imports of goods for final-use consumption by the ROW respectively from G and M in each U.S. state

As G producers only serve demand from G final-use consumption in the US, there are no trade flows of final goods from G producers to the ROW. To calculate state-level trade flows from M to the ROW, we distribute the US sectoral exports to each state based on its respective export share:

$$X^{f,M}_{o\,\text{ROW}\,s} = \frac{X_{o\,\text{ROW}\,s}}{\sum_{o'\in US} X_{o'\,\text{ROW}\,s}} X^{f,M}_{\text{US ROW}\,s} \;\; \forall\; o \in US.$$

(vii) Interregional trade flows of goods for final-use consumption among the U.S. states respectively for G and M

As G final-use consumption is sourced only from G producers, the data on trade flows $X^{f,G}_{ods}$ $\forall\; o, d \in US$ is obtained from the FPDS. In addition, since G producers only serve demand from G final-use consumption in the US, there are no trade flows of final goods from G producers to M final-use consumers. In principle, the trade flows from M producers to M consumers can be computed as follows:

$$X^{f,M}_{ods} = \frac{F_{ods}}{F_{ds}} \left(\frac{L_{os}}{L_s} X^{f,M}_{\text{US US}\,s} \right) \;\; \forall\; o, d \in US,$$

$$\text{where } X^{f,M}_{\text{US US}\,s} = X^{M}_{\text{US}\,s} - \sum_{d\in US}\sum_{k} X^{i,G}_{\text{US}\,s,dk} - \sum_{d\in US}\sum_{k} X^{i,M}_{\text{US}\,s,dk} - \sum_{k} X^{i,M}_{\text{US}\,s,\text{ROW}\,k} - X^{f,M}_{\text{US ROW}\,s}.$$

The domestic final-use expenditure by M (i.e., $X^{f,M}_{\text{US US}\,s}$) is allocated to producers in each state according to their respective employment shares L_{os}/L_s. We then distribute the state-level output to consumers across different states by applying the revenue share F_{ods}/F_{ds} calculated with the 2014 CFS data. $X^{f,M}_{\text{US US}\,s}$, in turn, is determined as the difference of total sectoral output by M in the US and the combined demands arising from intermediate use in both the US and the ROW, and final consumption by the ROW.

The above imputation procedure yields several problematic cases where the total imputed expense on inputs exceeds the total output for some os:[84]

[84]In the data, 7.8% of the os observations for which the total imputed expense on inputs exceeds the total output.

$$\sum_{o'}\sum_{s'} X^{i,M}_{o's',os} > \sum_{d\in US}\sum_{k} X^{i,G}_{os,dk} + \sum_{d\in US}\sum_{k} X^{i,M}_{os,dk} + \sum_{k} X^{i,M}_{os,\mathrm{ROW}\,k} + \sum_{d\in US} X^{f,M}_{ods} + X^{f,M}_{o\,\mathrm{ROW}\,s}.$$

To address the problem, we adjust the imputed $X^{f,M}_{ods}$. We begin by identifying os where $\sum_{o'}\sum_{s'} X^{i,M}_{o's',os} > \sum_{d\in US}\sum_{k} X^{i,G}_{os,dk} + \sum_{d\in US}\sum_{k} X^{i,M}_{os,dk} + \sum_{k} X^{i,M}_{os,\mathrm{ROW}\,k} + X^{f,M}_{o\,\mathrm{ROW}\,s}$. In such instances, we proceed to allocate a portion of total domestic final-use expenditure by M, $X^{f,M}_{\mathrm{US}\,\mathrm{US}\,s'}$, to o. The portion is denoted by $\tilde{X}^{f,M}_{os}$, and it is chosen so that $\sum_{o'}\sum_{s'} X^{i,M}_{o's',os} = \sum_{d\in US}\sum_{k} X^{i,G}_{os,dk} + \sum_{d\in US}\sum_{k} X^{i,M}_{os,dk} + \sum_{k} X^{i,M}_{os,\mathrm{ROW}\,k} + X^{f,M}_{o\,\mathrm{ROW}\,s} + \tilde{X}^{f,M}_{os}$. (For other cases, $\tilde{X}^{f,M}_{os} = 0$.) The remaining domestic expenditure by M, denoted by $\tilde{X}^{f,M}_{\mathrm{US}\,\mathrm{US}\,s'}$, is then apportioned to producers in each state according to their respective employment shares. The revised interregional trade flows are then given by:

$$\tilde{X}^{f,M}_{ods} = \frac{F_{ods}}{F_{ds}}\left(\tilde{X}^{f,M}_{os} + \frac{L_{os}}{L_s}\tilde{X}^{f,M}_{\mathrm{US}\,\mathrm{US}\,s}\right)\ \forall\ o,d \in US.$$

(viii) Trade flows of goods for final-use consumption within the ROW

The data on $X^{f,M}_{\mathrm{ROW}\,\mathrm{ROW}\,s}$ is obtained from the original WIOD.

The final product of the imputation is an expanded bilateral trade flows matrix as is shown in Table E.1. The above approach ensures that: (a) the aggregation of the expanded I-O table to the country-sector level remains consistent with the original data, and (b) the data on bilateral trade flows of G goods aligns with the FPDS data. For each state-sector, the value added is calculated as the difference between the sectoral output and the sectoral expense on intermediate inputs.

C.4 Data Employed for the Model Validation

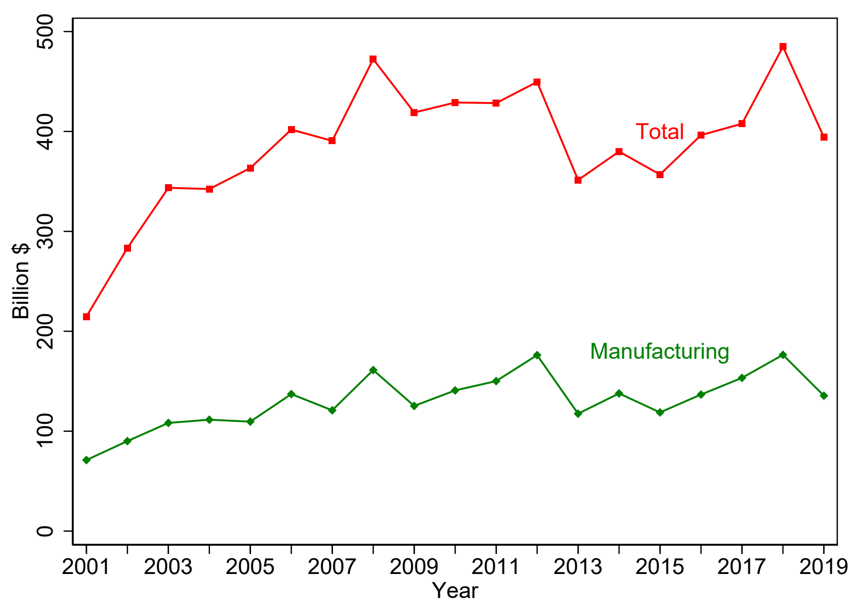
C.4.1 BEA Local Area Personal Income and Employment Database

To construct measures of labor market outcomes in the reduced form analysis in Section 6.1, we employ data from BEA Local Area Personal Income and Employment Database, which provides disaggregated information on employment and personal income by state and sector. The BEA data primarily relies on comprehensive quarterly tabulations of unemployment insurance contribution reports, which are used by the Bureau of Labor Statistics to construct the Quarterly Census of Employment and Wages (QCEW). Additionally, the BEA incorporates supplementary data sources to account for employment in industries that may not be fully covered by unemployment insurance, resulting in slightly broader coverage of employment compared to the QCEW (Autor *et al.*, 2021). Based on the data, we construct the following variables for the years 2009, 2014, and 2019: $Wage_{o,t}$, defined as the average wage per private nonfarm employee in state o and year t; $EmpRate_{o,t}$, defined as the ratio of private nonfarm employment to the working-age population in state o and year t; and $ShareMfg_{o,t}$, defined as the share of manufacturing employment in private nonfarm employment in state o and year t.

C.4.2 Summary Statistics

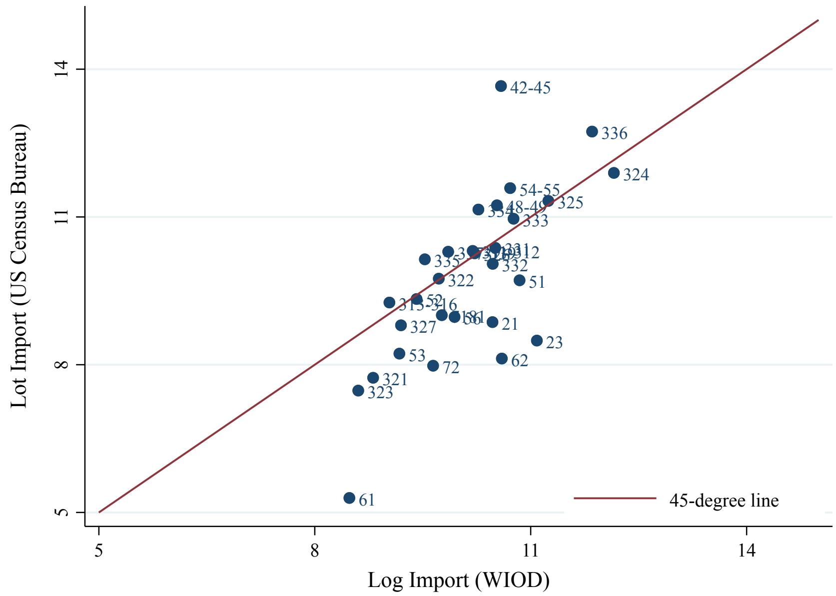
Table C.3 provides the summary statistics for the variables employed in the reduced form analysis. We focus on the procurement shock $\Delta Proc\_PW_{o,t}$, along with three outcome variables of interest over 2009-2014 and 2014-2019: $\Delta \ln Wage_{o,t}$, $\Delta \ln(1 - EmpRate_{o,t})$ and $\Delta ShareMfg_{o,t}$. The average procurement shock, $\Delta Proc\_PW_{o,t}$, across states and periods is 0.238, with a standard deviation of 0.513, indicating substantial spatial and temporal variation. Over the sample period, wages increased by an average of 11.3 percent, while the non-employment rate declined by an average of 1.8 percent; the corresponding standard deviations are 4.1 and 5.3 percentage points, respectively, revealing the variability across space and time. Manufacturing employment exhibits a secular decline, with the 5-year change in the manufacturing employment share averaging -1 percentage point. However, states in the right tail of the distribution experienced relative expansions: for example, states at the 90th percentile saw no change in their manufacturing employment share.

Figure C.1: Federal Procurement Spending



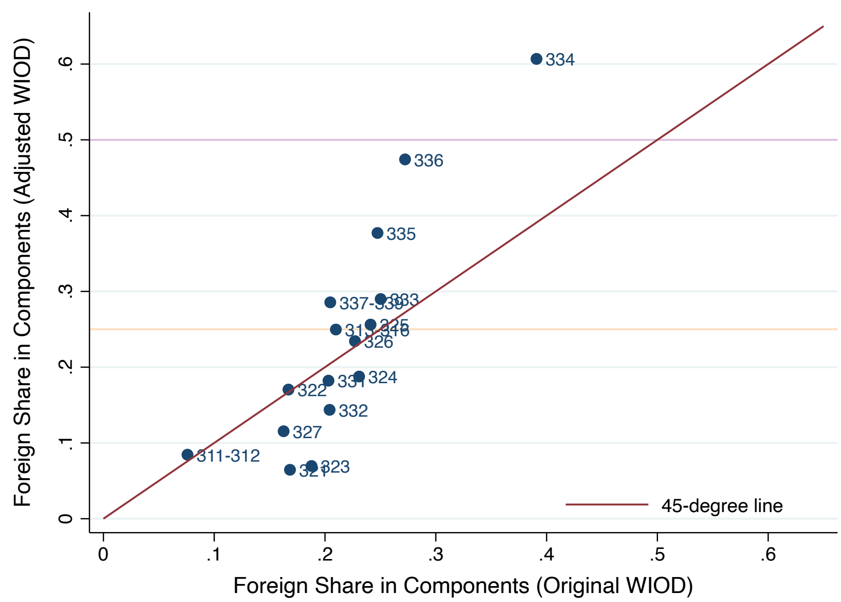
Notes: This figure describes spending by the federal government between 2001 and 2019. The amount of expenditure is calculated by aggregating FPDS contract-year observations at the year level. Manufacturing contracts are those NAICS starting with 31, 32 or 33.

Figure C.2: Imports by Companies in the Profile v.s. Imports of Intermediate Inputs in WIOD



Notes: This figure compares the imports by sectors reported in the Profile (y-axis) and the imports of intermediate inputs by sectors reported in WIOD data.

Figure C.3: Import Share in Total Component Inputs Used



Notes: This figure reports the foreign shares in component inputs used by different downstream industries in the manufacturing sector, $\sum_{s\in C} \frac{\alpha_{\mathrm{US},sk}}{\sum_{s'\in C} \alpha_{\mathrm{US},s'k}} \lambda^{i,G+M}_{\mathrm{ROW}\,s,\mathrm{US}\,k}$. The horizontal axis variable represents the foreign shares calculated from the original WIOD data, while the vertical axis variable is the adjusted foreign shares derived from the procedure detailed in Section 5.2.1.

Figure C.4: Adjusting the WIOD Input–Output Matrix with the Profile Data

		Interm. use by industry k: US k=1	US k=2	ROW k=1	ROW k=2	Final cons.: US	ROW
2*US	s=1	$X^{i,\mathrm{WIOD}}_{us1,us1}$	$X^{i,\mathrm{WIOD}}_{us1,us2}$	$X^{i,\mathrm{WIOD}}_{us1,row1}$	$X^{i,\mathrm{WIOD}}_{us1,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,1}$	$X^{f,\mathrm{WIOD}}_{us,row,1}$
	s=2	$X^{i,\mathrm{WIOD}}_{us2,us1}$	$X^{i,\mathrm{WIOD}}_{us2,us2}$	$X^{i,\mathrm{WIOD}}_{us2,row1}$	$X^{i,\mathrm{WIOD}}_{us2,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,2}$	$X^{f,\mathrm{WIOD}}_{us,row,2}$
2*ROW	s=1	$X^{i,\mathrm{WIOD}}_{row1,us1}$	$X^{i,\mathrm{WIOD}}_{row1,us2}$	$X^{i,\mathrm{WIOD}}_{row1,row1}$	$X^{i,\mathrm{WIOD}}_{row1,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,1}$	$X^{f,\mathrm{WIOD}}_{row,row,1}$
	s=2	$X^{i,\mathrm{WIOD}}_{row2,us1}$	$X^{i,\mathrm{WIOD}}_{row2,us2}$	$X^{i,\mathrm{WIOD}}_{row2,row1}$	$X^{i,\mathrm{WIOD}}_{row2,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,2}$	$X^{f,\mathrm{WIOD}}_{row,row,2}$

Step (0) — proportionality in WIOD.

$$\frac{X^{i,\mathrm{WIOD}}_{row\,s,\,us\,k}}{X^{i,\mathrm{WIOD}}_{us\,s,\,us\,k}} = \pi^{\mathrm{WIOD}}_{row,\,us,\,s} \quad \text{for every } k.$$

		Interm. use by industry k: US k=1	US k=2	ROW k=1	ROW k=2	Final cons.: US	ROW
2*US	s=1	$X^{i,\mathrm{WIOD}}_{us1,us1}$	$X^{i,\mathrm{WIOD}}_{us1,us2}$	$X^{i,\mathrm{WIOD}}_{us1,row1}$	$X^{i,\mathrm{WIOD}}_{us1,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,1}$	$X^{f,\mathrm{WIOD}}_{us,row,1}$
	s=2	$X^{i,\mathrm{WIOD}}_{us2,us1}$	$X^{i,\mathrm{WIOD}}_{us2,us2}$	$X^{i,\mathrm{WIOD}}_{us2,row1}$	$X^{i,\mathrm{WIOD}}_{us2,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,2}$	$X^{f,\mathrm{WIOD}}_{us,row,2}$
2*ROW	s=1	$X^{i,\mathrm{WIOD}}_{row1,us1}$	$X^{i,\mathrm{WIOD}}_{row1,us2}$	$X^{i,\mathrm{WIOD}}_{row1,row1}$	$X^{i,\mathrm{WIOD}}_{row1,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,1}$	$X^{f,\mathrm{WIOD}}_{row,row,1}$
	s=2	$X^{i,\mathrm{WIOD}}_{row2,us1}$	$X^{i,\mathrm{WIOD}}_{row2,us2}$	$X^{i,\mathrm{WIOD}}_{row2,row1}$	$X^{i,\mathrm{WIOD}}_{row2,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,2}$	$X^{f,\mathrm{WIOD}}_{row,row,2}$

Step (a) — rescale imported intermediates.

$$X^{i,\mathrm{Adj}}_{row\,s,\,us\,k} = X^{i,\mathrm{WIOD}}_{row\,s,\,us\,k} \times \frac{X^{\mathrm{Profile}}_{row,\,us\,k}}{\sum_{s'} X^{i,\mathrm{WIOD}}_{row\,s',\,us\,k}}$$

		Interm. use by industry k: US k=1	US k=2	ROW k=1	ROW k=2	Final cons.: US	ROW
2*US	s=1	$X^{i,\mathrm{Adj}}_{us1,us1}$	$X^{i,\mathrm{Adj}}_{us1,us2}$	$X^{i,\mathrm{WIOD}}_{us1,row1}$	$X^{i,\mathrm{WIOD}}_{us1,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,1}$	$X^{f,\mathrm{WIOD}}_{us,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{us2,us1}$	$X^{i,\mathrm{Adj}}_{us2,us2}$	$X^{i,\mathrm{WIOD}}_{us2,row1}$	$X^{i,\mathrm{WIOD}}_{us2,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,2}$	$X^{f,\mathrm{WIOD}}_{us,row,2}$
2*ROW	s=1	$X^{i,\mathrm{Adj}}_{row1,us1}$	$X^{i,\mathrm{Adj}}_{row1,us2}$	$X^{i,\mathrm{WIOD}}_{row1,row1}$	$X^{i,\mathrm{WIOD}}_{row1,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,1}$	$X^{f,\mathrm{WIOD}}_{row,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{row2,us1}$	$X^{i,\mathrm{Adj}}_{row2,us2}$	$X^{i,\mathrm{WIOD}}_{row2,row1}$	$X^{i,\mathrm{WIOD}}_{row2,row2}$	$X^{f,\mathrm{WIOD}}_{row,us,2}$	$X^{f,\mathrm{WIOD}}_{row,row,2}$

Step (b) — offset in the domestic cell.

$$X^{i,\mathrm{Adj}}_{us\,s,\,us\,k} = X^{i,\mathrm{WIOD}}_{row\,s,\,us\,k} + X^{i,\mathrm{WIOD}}_{us\,s,\,us\,k} - X^{i,\mathrm{Adj}}_{row\,s,\,us\,k}$$

		Interm. use by industry k: US k=1	US k=2	ROW k=1	ROW k=2	Final cons.: US	ROW
2*US	s=1	$X^{i,\mathrm{Adj}}_{us1,us1}$	$X^{i,\mathrm{Adj}}_{us1,us2}$	$X^{i,\mathrm{WIOD}}_{us1,row1}$	$X^{i,\mathrm{WIOD}}_{us1,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,1}$	$X^{f,\mathrm{WIOD}}_{us,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{us2,us1}$	$X^{i,\mathrm{Adj}}_{us2,us2}$	$X^{i,\mathrm{WIOD}}_{us2,row1}$	$X^{i,\mathrm{WIOD}}_{us2,row2}$	$X^{f,\mathrm{WIOD}}_{us,us,2}$	$X^{f,\mathrm{WIOD}}_{us,row,2}$
2*ROW	s=1	$X^{i,\mathrm{Adj}}_{row1,us1}$	$X^{i,\mathrm{Adj}}_{row1,us2}$	$X^{i,\mathrm{WIOD}}_{row1,row1}$	$X^{i,\mathrm{WIOD}}_{row1,row2}$	$X^{f,\mathrm{Adj}}_{row,us,1}$	$X^{f,\mathrm{WIOD}}_{row,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{row2,us1}$	$X^{i,\mathrm{Adj}}_{row2,us2}$	$X^{i,\mathrm{WIOD}}_{row2,row1}$	$X^{i,\mathrm{WIOD}}_{row2,row2}$	$X^{f,\mathrm{Adj}}_{row,us,2}$	$X^{f,\mathrm{WIOD}}_{row,row,2}$

Step (c) — imported final consumption.

$$X^{f,\mathrm{Adj}}_{row,\,us,\,s} = \Big[X^{f,\mathrm{WIOD}}_{row,\,us,\,s} + \sum_k X^{i,\mathrm{WIOD}}_{row\,s,\,us\,k}\Big] - \sum_k X^{i,\mathrm{Adj}}_{row\,s,\,us\,k}$$

		Interm. use by industry k: US k=1	US k=2	ROW k=1	ROW k=2	Final cons.: US	ROW
2*US	s=1	$X^{i,\mathrm{Adj}}_{us1,us1}$	$X^{i,\mathrm{Adj}}_{us1,us2}$	$X^{i,\mathrm{WIOD}}_{us1,row1}$	$X^{i,\mathrm{WIOD}}_{us1,row2}$	$X^{f,\mathrm{Adj}}_{us,us,1}$	$X^{f,\mathrm{WIOD}}_{us,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{us2,us1}$	$X^{i,\mathrm{Adj}}_{us2,us2}$	$X^{i,\mathrm{WIOD}}_{us2,row1}$	$X^{i,\mathrm{WIOD}}_{us2,row2}$	$X^{f,\mathrm{Adj}}_{us,us,2}$	$X^{f,\mathrm{WIOD}}_{us,row,2}$
2*ROW	s=1	$X^{i,\mathrm{Adj}}_{row1,us1}$	$X^{i,\mathrm{Adj}}_{row1,us2}$	$X^{i,\mathrm{WIOD}}_{row1,row1}$	$X^{i,\mathrm{WIOD}}_{row1,row2}$	$X^{f,\mathrm{Adj}}_{row,us,1}$	$X^{f,\mathrm{WIOD}}_{row,row,1}$
	s=2	$X^{i,\mathrm{Adj}}_{row2,us1}$	$X^{i,\mathrm{Adj}}_{row2,us2}$	$X^{i,\mathrm{WIOD}}_{row2,row1}$	$X^{i,\mathrm{WIOD}}_{row2,row2}$	$X^{f,\mathrm{Adj}}_{row,us,2}$	$X^{f,\mathrm{WIOD}}_{row,row,2}$

Step (d) — domestic final consumption.

$$X^{f,\mathrm{Adj}}_{us,\,us,\,s} = \sum_{o\in\{us,row\}} X^{f,\mathrm{WIOD}}_{o,\,us,\,s} - X^{f,\mathrm{Adj}}_{row,\,us,\,s}$$

Notes: This figure illustrates how we adjust the WIOD input–output matrix with the Profile data. Step (0) shows the proportionality assumption imposed by WIOD: the ROW-to-US ratio for each input s is constant across downstream industries k. Steps (a)–(d) replace this assumption with industry-specific import intensities from the Profile, adjusting intermediate and final-consumption cells while preserving all WIOD aggregates. In each panel, cells modified in that step carry a saturated fill and bold border; cells modified in other steps are shown pale; untouched cells are gray. Input s=2 is analogous throughout.

Figure C.5: The Structure of Extended World Input-Output Table

				Input use & value added																Final use						Total use
				US													ROW			US					ROW	
				d_1, M			d_1, G			$\cdots$	d_N, M			d_N, G						d_1, M	d_1, G	$\cdots$	d_N, M	d_N, G		
				s_1	$\cdots$	s_K	s_1	$\cdots$	s_K	$\cdots$	s_1	$\cdots$	s_K	s_1	$\cdots$	s_K	s_1	$\cdots$	s_K			$\cdots$				
			s_1							$\cdots$												$\cdots$				
		o_1, M	$\cdots$							$\cdots$												$\cdots$				
			s_K							$\cdots$												$\cdots$				
			s_1																			$\cdots$				
		o_1, G	$\cdots$																			$\cdots$				
			s_K																			$\cdots$				
Output Supplied	US	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$	$\cdots$
			s_1							$\cdots$												$\cdots$				
		o_N, M	$\cdots$							$\cdots$												$\cdots$				
			s_K							$\cdots$												$\cdots$				
			s_1																			$\cdots$				
		o_N, G	$\cdots$																			$\cdots$				
			s_K																			$\cdots$				
			s_1							$\cdots$												$\cdots$				
	ROW		$\cdots$							$\cdots$												$\cdots$				
			s_K							$\cdots$												$\cdots$				
Value added										$\cdots$																
Gross output										$\cdots$																

Notes: As *G* producers only cater for the demand from *G* final-use consumption within the US, there are no trade flows of goods for intermediate use from *G* producers to *G* or *M* producers in either the U.S. or the ROW. Similarly, there are no trade flows of goods for final-use consumption from *G* producers to *M* consumers nor trade flows from *M* producers to *G* consumers in either the U.S. or the ROW. The relevant cells in the table are shaded in gray.

Table C.1: Comparison of FPDS and US Gov. Budget

Fiscal Year	FPDS ($ Amount BN)	Budget US Gov. Obj. Class 20: All ($ Amount BN)	Budget US Gov. Obj. Class 20: Minus 23.1, 23.2, 25.3 ($ Amount BN)
2001	235.0	256.6	201.9
2002	303.7	328.7	270.5
2003	352.3	387.8	310.9
2004	321.1	401.6	325.5
2005	388.0	405.7	319.3
2006	391.9	437.0	350.8
2007	414.6	465.4	367.4
2008	452.0	494.4	389.9
2009	415.0	531.8	429.9
2010	420.4	553.8	444.5
2011	448.6	527.8	424.7
2012	418.2	583.1	409.2
2013	359.1	485.5	367.3
2014	376.0	503.6	369.1
2015	369.1	507.0	404.5
2016	394.3	509.7	409.3
2017	451.8	544.1	444.3
2018	398.9	544.1	444.3
2019	357.2	639.7	530.1

Notes: This table compares FPDS's amounts relative to U.S. Gov Budget's Object Class 20: "Contractual Services and Supplies," reported by the Office of Management and Budget (OMB). Column 4 excludes the following three sub-categories that are unlikely to be reported in FPDS: "23.1 Rental payments to GSA", "23.2 Rental payments to others", and '25.3 Other goods and services from Federal sources." The federal government's fiscal year begins on October 1st and ends on September 30th the following year.

Table C.2: Federal Procurement: Top 20 Manufacturing NAICS

Rank	NAICS	Name	Contracts/year (thousand)	Amount/year (billion)
1	336411	Aircraft Manuf.	3.41	30.92
2	336611	Ship Building and Repairing	4.60	13.99
3	336414	Guided Missile and Space Vehicle Manuf.	0.14	9.55
4	336413	Other Aircraft Parts and Auxiliary Equip. Manuf.	22.36	9.17
5	334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical Syst. and Instr. Manuf.	4.46	7.96
6	336412	Aircraft Engine and Engine Parts Manuf.	4.57	4.55
7	324110	Petroleum Refineries	16.19	3.99
8	334220	Radio and Television Broadcasting and Wireless Communications Equip. Manuf.	6.70	2.78
9	336992	Military Armored Vehicle, Tank, and Tank Component Manuf.	2.16	2.53
10	334111	Electronic Computer Manuf.	18.61	2.48
11	332993	Ammunition (except Small Arms) Manuf.	0.35	1.98
12	336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equip. Manuf.	0.39	1.83
13	334290	Other Communications Equip. Manuf.	5.13	1.63
14	325412	Pharmaceutical Preparation Manuf.	2.18	1.55
15	336112	Light Truck and Utility Vehicle Manuf.	7.57	1.28
16	325414	Biological Product (except Diagnostic) Manuf.	0.62	1.18
17	332410	Power Boiler and Heat Exchanger Manuf.	0.38	1.08
18	334419	Other Electronic Component Manuf.	7.62	1.03
19	336212	Truck Trailer Manuf.	0.51	0.75
20	336111	Automobile Manuf.	13.02	0.67

Notes: This table describes the top 20 six-digit NAICS codes in terms of annual spending. Column 4 and 5 show the average number of contracts and amount per year in FPDS. These averages are calculated between 2001 and 2019.

Table C.3: Summary Statistics

	mean	std	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
$\Delta Proc\_PW$	0.238	0.513	-0.050	0.022	0.114	0.333	0.747
$\Delta\ln(Wage)$	0.113	0.041	0.065	0.086	0.112	0.135	0.159
$\Delta\ln(1-EmpRate)$	-0.018	0.053	-0.076	-0.055	-0.029	0.021	0.056
$\Delta ShareMfg$	-0.010	0.009	-0.023	-0.015	-0.008	-0.003	0.000

Notes: This table reports the summary statistics of the independent and dependent variables employed in the model validation tests in Section 6.1.

D National Security

We define a six-digit industry NAICS as subject to national security (NS) concerns based on contract-level information in FPDS. The Federal Acquisition Regulation (FAR Part 6.3) lays out a number of conditions for contracting without providing for full and open competition.[85] One of the exemptions, called "National Security" (FAR 6.302-6), considers that a procurement officer is allowed to restrict competition "when the disclosure of the agency's needs would compromise the national security [...] contracts awarded using this authority shall be supported by the written justifications and approvals." Between 2000 and 2019, we observe 32 thousand contracts that use the exemption to restrict competition. Even though the fraction of contracts that use this exemption is low, it is concentrated on specific industries, as 68% of all NAICS in FPDS never use this exception.[86]

Using these data, we define that a six-digit NAICS as subject to NS concerns (for BAA removal counterfactual) if the NAICS has at least 1% of contracts using the National Security Exemption. Table D.1 lists all the six-digit NAICS that meet these criteria.[87] The main Manufacturing industries (in terms of spending) subject to NS are "Other Guided Missile and Space Vehicle Parts," "Light Truck and Utility Vehicle Manufacturing," "Automobile Manufacturing" and "Explosives Manufacturing". Once we define the list of six-digit industries subject to NS, we can aggregate at the three-digit sector level. The two sectors affected by NS concerns are "Chemical (325)" and "Transportation Equipment (336)." The fraction of procurement spending subject to NS in each of these two sectors is roughly 5%.

Table D.1: NAICS Subject to National Security Concerns

NAICS	Name	(1) Fraction (%)	(2) Total Amount (M $)
928110	National Security	10.78%	2,910
483114	Coastal and Great Lakes Passenger Transportation	2.89%	167
336111	Automobile Manufacturing	2.00%	13,800
336112	Light Truck and Utility Vehicle Manufacturing	1.58%	27,100
423140	Motor Vehicle Parts Merchant Wholesalers	1.49%	21
921190	Other General Government Support	1.42%	12,600
325920	Explosives Manufacturing	1.32%	4,310
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equip. Manuf.	1.12%	33,500

Notes: This table presents the six-digit NAICS codes whose share of contracts with NS exception exceed 1%, i.e., meet the 1% NS rule. Column (1) shows the percentage of contracts that use the exemption. Column (2) shows the aggregate amount (in millions of dollars) of spending in each NAICS. Both measures are calculated using the complete FPDS sample (2001-2019). We exclude from the table a few small NAICS that applied the exemption less than ten times in the twenty-year window.

[85] The most commonly used exceptions under FAR 6.3 are "Only One Source-Other (FAR 6.302-1 other)," "Authorized by Statute (FAR 6.302-5(a)(2)(i)), "Simplified Acquisition Procedure Non-Competition (FAR 13)," "Urgency (FAR 6.302-2)," and "Follow-On Contract (FAR 6.302-1(a)(2)(ii/iii))".

[86] The fraction of contracts using this exemption is in part low because the procurement office can avoid (full and open) competition under any of the other statutes granted in FAR 6.3.

[87] The list excludes a few small NAICS that rarely appear in FPDS and have fewer than ten contracts with the National Security exemption.

E Calibration: Additional Details

E.1 Separating Costs Not Directly Related to BAA Restrictions from the Broader Measure of BAA Wedges

To separate the costs that are not directly associated with the BAA restrictions from the broad measure of BAA wedges $\tau_s^{f,G}$, we take advantage of two institutional features: (i) federal procurement conducted in regions outside of the U.S. is not subject to the same stringent limitations on the purchase of foreign manufacturing products, while (ii) the additional costs (or home bias) faced by foreign producers, such as those arising from extra efforts to understand the US government procurement auction process, should be present regardless the procurement location.

Specifically, when the procurement is conducted within the U.S., we assume that the broad measure of BAA wedges on imported final goods can be expressed in a multiplicative form as follows:

$$\tau_s^{f,G} = t_s^{f,G} t^e \tag{E.1}$$

where $t_s^{f,G}$ denotes the trade barriers directly resulting from the BAA restriction, and t^e is the additional cost (or home bias) faced by foreign producers in contract bidding which is invariant across industries. When the procurement is conducted outside of the U.S., the "Buy American" restrictions no longer apply, and hence the wedges becomes $\tau_s^{f,G} = t^e$. Our goal is to separately identify $t_s^{f,G}$ given the calibrated $\tau_s^{f,G}$ obtained from the procedure outlined in Section 5.4. To accomplish this, we first calibrate t^e in Equation (E.1) using the approach as follows.

In our calibration, we consider 15 early EU members, namely: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom. We estimate t^e industry by industry to account for differences in industry composition between procurement conducted within and outside the U.S., using the following model-implied data moment:

$$\frac{\lambda_{\mathrm{EU\,EU}\,s}^{f,G} / \lambda_{\mathrm{US\,EU}\,s}^{f,G}}{\lambda_{\mathrm{EU\,EU}\,s}^{f,M} / \lambda_{\mathrm{US\,EU}\,s}^{f,M}} = \left(t_s^e\right)^{-\theta} \tag{E.2}$$

where $\lambda_{\mathrm{EU\,EU}\,s}^{f,G}$ is the share of procurement of good s used in the EU that is sourced from j; $\lambda_{\mathrm{US\,EU}}^{f,G}$ represents the share of procurement of good s used in the EU that is sourced from the U.S.; $\lambda_{\mathrm{EU\,EU}}^{f,M}$ denotes the share of imports of good s by the EU that is sourced from the EU itself; and $\lambda_{\mathrm{US\,EU}}^{f,M}$ is the share of imports of good s by the EU that is sourced from the U.S. The equality follows given the assumption that $\tau_{\mathrm{EU\,EU}\,s}^{f,G} = \tau_{\mathrm{EU\,EU}\,s}^{f,M} t_s^e$.

The data on $\lambda_{\mathrm{EU\,EU}\,s}^{f,G}$ and $\lambda_{\mathrm{US\,EU}\,s}^{f,G}$ are computed using the FPDS data, and the information on $\lambda_{\mathrm{EU\,EU}\,s}^{f,M}$ and $\lambda_{\mathrm{US\,EU}\,s}^{f,M}$ are inferred from the WIOD data. In Table E.4, we present summary statistics of procurement activities in the EU and compare them to those in the U.S. across industries in the manufacturing sector. Procurement conducted in the EU totals approximately $1,843 million for manufacturing goods. The industry composition of procurement in the EU differs from that in the U.S. To address the potentially noisy estimates for industries with limited procurement in the EU (e.g., Nonmetallic Mineral Products), we construct an aggregate measure of home bias, t^e, as a weighted average of t^e_s across industries, using each industry's share of U.S. procurement as its weight.

There are some notes to make about this approach. The last column in Table E.4 reports the share of procurement in the EU that is sourced from the EU. The average is 71%, which aligns with the institutional feature that federal procurement activities outside the U.S. are not subject to the same stringent restrictions on purchasing foreign manufactured products. However, some restrictions still apply—for example, the Berry Amendment effectively requires 100% domestic content for certain categories, including food, clothing, fabrics, fibers, yarns, and other made-up textiles. Consequently, the share of procurement sourced from the EU in industries such as Textile, Textile Product Mills, Apparel, Leather, and Allied Products (categories 313–316) is significantly lower than in most other industries. Hence, we regard the measure of home bias described below as an upper bound of its true value. Consequently, our "narrow" measure of BAA wedges, $t_s^{f,G}$, serves as a lower bound for the true value.

Our calibrated value of t^e is 1.22. We then back out $t_s^{f,G}$ according to Equation (E.1), which could be lower bound for the true value. The mean of $\theta_s \ln(t_s^{f,G})$ across manufacturing industries is 2.41, which implies that the BAA restrictions reduce imports by G consumers by 91%[88] on average.

E.2 Robustness and Stability of the BAA Wedges on Final Goods

This appendix details the two robustness checks summarized in Section 5.4.4; throughout, we abbreviate the final-goods wedge $\tau_s^{f,G}$ as τ_s^G (and its 6-digit counterpart as τ_ς^G), consistent with the accompanying figures.

Compositional bias. The concern is that our baseline estimates could be upward-biased if, within an aggregated NAICS industry s, G disproportionately consumes sub-industries with lower inherent import intensities than M. We re-estimate the wedges at the 6-digit NAICS level, computing $\lambda^G_{\text{ROW US}\,\varsigma}$ and $\lambda^M_{\text{ROW US}\,\varsigma}$ for 6-digit codes (ς) within each manufacturing industry (s).[89]

Test 1 (Table E.3). The dependent variable in columns (1) and (3) is $\beta^G_{\varsigma,s}$, G's expenditure share on 6-digit sub-industry ς within aggregated industry s (computed from FPDS); in columns (2) and (4) it is the analogous share for M, $\beta^M_{\varsigma,s}$ (derived from Census trade flows and NBER-CES output

[88]Calculated as $100 * (\exp(-2.41) - 1)$.

[89]No world I-O table exists at the 6-digit level, so we cannot distinguish imports between final consumption and intermediate use; this analysis therefore abstracts from input-output linkages.

data). The regressor is the 6-digit inherent import intensity $\lambda^{M}_{\text{ROW US}\,\varsigma}$, and columns (3) and (4) add aggregated-industry fixed effects to absorb between-s variation. The estimated coefficients are small, insignificant, and statistically indistinguishable across the G and M specifications.

Test 2 (Figure E.1). Our baseline measure estimates the wedge directly at the aggregated-industry level,

$$\tau^G_s = \left(\frac{\lambda^G_{\text{ROW US}\,s} / \lambda^G_{\text{US US}\,s}}{\lambda^M_{\text{ROW US}\,s} / \lambda^M_{\text{US US}\,s}} \right)^{-1/\theta_s},$$

whereas the alternative first estimates wedges at the 6-digit level,

$$\tau^G_\varsigma = \left(\frac{\lambda^G_{\text{ROW US}\,\varsigma} / \lambda^G_{\text{US US}\,\varsigma}}{\lambda^M_{\text{ROW US}\,\varsigma} / \lambda^M_{\text{US US}\,\varsigma}} \right)^{-1/\theta_s},$$

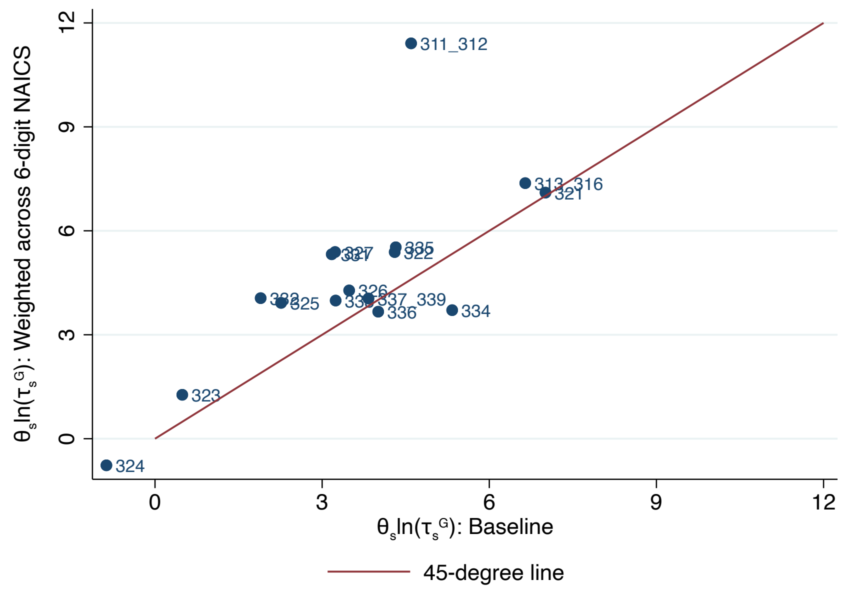
and aggregates them with G expenditure weights, $\tau^G_s = \prod_{\varsigma \in s} (\tau^G_\varsigma)^{\beta^G_{\varsigma,s}}$.[90] The two measures align closely along the 45-degree line.

Test 3 (Figure E.2). Residual bias could remain *within* 6-digit industries if G procures more specialized varieties with inherently lower import intensities—for example, more specialized aircraft varieties, whose low import intensity may reflect national-security sourcing. We split 6-digit industries into high- and low-differentiation groups using the Rauch (1999) classification, which assigns 4-digit SITC (Rev. 2) goods to *homogeneous*, *reference-priced*, or *differentiated* categories; we treat the first two as non-differentiated and the third as differentiated, map the measure to 6-digit NAICS via two crosswalks (4-digit SITC Rev. 2 → 6-digit HS → 6-digit NAICS), and split industries at the cross-industry median of the share of differentiated HS goods. If such bias were present, the distribution of $\theta_s \ln(\tau^G_\varsigma)$ in the high-differentiation group should first-order stochastically dominate that in the low-differentiation group; Figure E.2 shows the opposite.

Stability of the wedges over time. We recompute τ^G_s for each industry over 2001–2018 using the same ratio method. Panel A of Figure E.3 shows that the cross-sector distribution remains stable around 2014, with a mild upward trend indicating that BAA restrictions tightened over the period; Panel B shows that the cross-sector correlation between the 2014 wedges and those of other years stays around 0.8 in recent years.

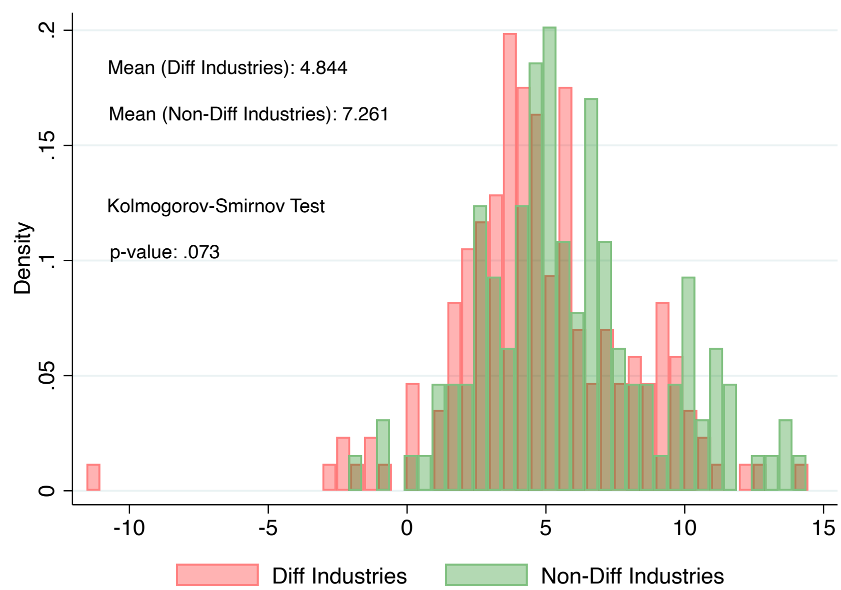
[90]The Eaton–Kortum structure requires strictly positive trade shares, but ~30% of 6-digit manufacturing industries have zero G imports. We replace each zero with a small positive constant ($1e^{-4}$), smaller than the smallest positive import value in the FPDS data. This imputation also drives the single outlier in the figure, Food Products, Beverages, and Tobacco (311–312), where over 75% of its 6-digit codes record zero G imports.

Figure E.1: BAA Wedges Calibrated Using Data at Different Aggregation Levels



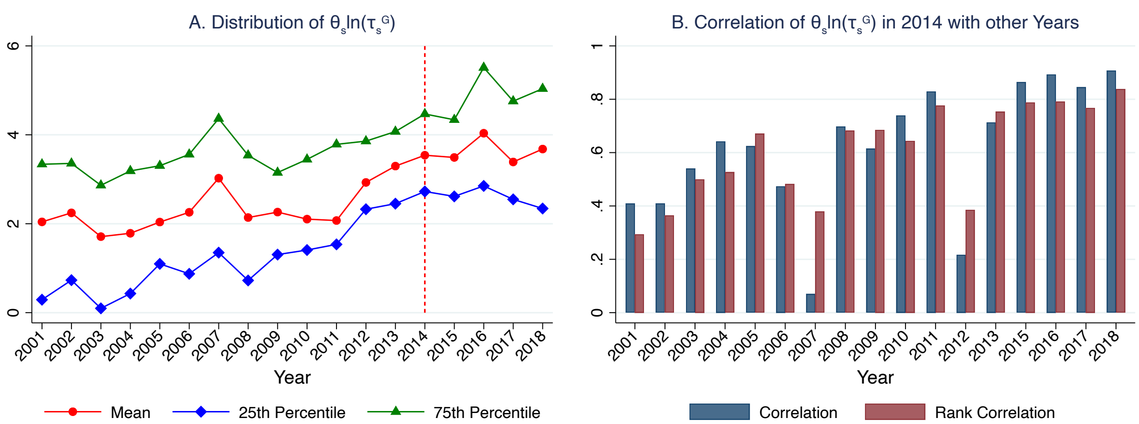
Notes: This figure reports the effective trade barriers faced by G consumers due to BAA restrictions, $\theta_s \ln(\tau_s^G)$ calibrated using data with different levels of aggregation, as described in Appendix E.2. The horizontal axis variable represents our baseline measure calibrated based on the data from the aggregated sectors listed in Table E.1. The vertical axis variable is the measure obtained from aggregating the trade barriers calibrated using the disaggregated data at the 6-digit NAICS level.

Figure E.2: Distribution of $\theta_s \ln(\tau_\varsigma^G)$: Differentiated v.s. Non-Differentiated Goods



Notes: This figure shows the distributions of effective trade barriers due to BAA restrictions at the 6-digit NAICS level, $\theta_s \ln(\tau_\varsigma^G)$, categorized by two groups of industries with different degree of differentiation. The p-value of the Kolmogorov-Smirnov test of the equality of the two distribution is 0.073.

Figure E.3: Comparing $\theta_s \ln(\tau_s^G)$ in 2014 to Other Years



Notes: The BAA wedge τ_s^G is calculated according to $\tau_s^G = \left(\frac{\lambda^G_{\text{ROW US}s}/\lambda^G_{\text{US US}s}}{\lambda^M_{\text{ROW US}s}/\lambda^M_{\text{US US}s}}\right)^{-1/\theta_s}$. Data on imports and exports are retrieved from US trade data built by Peter Schott, and domestic absorption is calculated as total shipment value (from NBER-CES) minus exports plus imports.

Table E.1: Sector-Level Trade Elasticities (θ_s) and Scale Elasticities (ν_s)

Sectors	θ_s	ν_s
Mining and Oil and Gas Extraction (21)	4	0
Construction (23)	4	0
Manufacture of Food products, Beverages and Tobacco products (311-312)	3.57	0.24
Textile, Textile Product Mills, Apparel, Leather, and Allied Products (313-316)	4.43	0.21
Wood Product Manufacturing (321)	4.17	0.19
Paper Manufacturing (322)	2.97	0.31
Printing and Related Support Activities (323)	2.97	0.31
Petroleum and Coal Products (324)	3.75	0.11
Chemical (325)	3.75	0.22
Plastics and Rubber Products (326)	4.11	0.20
Nonmetallic Mineral Products (327)	5.14	0.19
Primary Metal Manufacturing (331)	8.94	0.11
Fabricated Metal Product Manufacturing (332)	5.07	0.18
Machinery (333)	3.27	0.27
Computer and Electronic Product Manufacturing (334)	3.27	0.25
Electrical Equipment, Appliance, and Component Manufacturing (335)	3.27	0.26
Transportation Equipment (336)	4.47	0.20
Furniture and Related Products, and Miscellaneous Manufacturing (337-339)	4.17	0.19
Wholesale and Retail Trade (42-45)	4	0
Transportation and Warehousing (48-49)	4	0
Information and Cultural Industries (51)	4	0
Finance and Insurance (52)	4	0
Real Estate and Rental and Leasing (53)	4	0
Professional, Scientific and Technical Services, Management of Companies and Enterprises (54-55)	4	0
Administrative and Support, Waste Management and Remediation Services (56)	4	0
Educational Services (61)	4	0
Health Care and Social Assistance (62)	4	0
Accommodation and Food Services (72)	4	0
Other Services (except Public Administration) (71,81)	4	0

Notes: This table lists the 29 sectors included in the quantitative analysis, and reports the trade elasticities (θ_s) obtained from Giri *et al.* (2021) and the scale elasticities (ν_s) obtained from Bartelme *et al.* (2025).

Table E.2: Industry Characteristics and $\hat{\tau}_k^{i,G}$ When Required Domestic Share Increases to 75%

	$\theta_s \sum_k m_{sk} \ln(\hat{\tau}_k^{i,G})$ (1)	$\theta_s \sum_k m_{sk} \ln(\hat{\tau}_k^{i,G})$ (2)	Rank $\theta_s \sum_k m_{sk} \ln(\hat{\tau}_k^{i,G})$ (3)	Rank $\theta_s \sum_k m_{sk} \ln(\hat{\tau}_k^{i,G})$ (4)
Political Weight$_s$	0.0559	0.0158		
	(0.0894)	(0.0997)		
$\alpha_{\text{US},s}$		-0.5393		
		(0.6218)		
ν_s		-0.5835		
		(1.0037)		
Rank Political Weight$_s$			0.6145***	0.5685**
			(0.1674)	(0.2189)
Rank $\alpha_{\text{US},s}$				-0.1604
				(0.2573)
Rank ν_s				-0.0616
				(0.2081)
Observations	16	16	16	16
R-squared	0.0160	0.2319	0.3931	0.4256

Notes: The sector-level measure of political influence is derived from the work of Adão *et al.* (2025c). In this table, the dependent variable, $\theta_s \sum_k m_{sk} \ln(\hat{\tau}_k^{i,G})$, captures the increasing effective protection for sector s due to stricter domestic content restrictions imposed on downstream sectors. Here, $\ln(\hat{\tau}_k^{i,G})$ is the log change in the BAA wedge on intermediate inputs faced by the downstream sector k, while m_{sk} represents downstream sector k's share in the economy-wide use of intermediate inputs from upstream sector s. Robust standard errors are reported in the parentheses.

Table E.3: Government Expenditure Shares and Inherent Import Intensities

Dependent Variable:	$\beta^G_{\varsigma,S}$ (1)	$\beta^M_{\varsigma,S}$ (2)	$\beta^G_{\varsigma,S}$ (3)	$\beta^M_{\varsigma,S}$ (4)
$\lambda^M_{\text{ROW US}\,\varsigma}$	-0.0065	-0.0090	0.0114	0.0076
	(0.0145)	(0.0193)	(0.0138)	(0.0219)
p-value	0.8982		0.8711	
Aggregated Industry FEs	N	N	Y	Y
Observations	335	335	335	335
R-squared	0.0005	0.0006	0.1938	0.1184

Notes: The p-values reported are for the tests of whether the coefficients of $\lambda^M_{\text{ROW US}\,\varsigma}$ are equal across models in columns (1) and (2) (respectively, columns (3) and (4)), based on the seemly unrelated estimation. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E.4: Summary Statistics: Procurement in the US and EU

Sector	Sector Name	Proc. in US (1)	Share in US (%) (2)	Proc. in EU (3)	Share in EU (%) (4)	Share from EU (%) (5)
313–316	Textile, Textile Product Mills, Apparel, Leather, and Allied Products	1068.92	0.72	6.66	0.36	31.35
321	Wood Product Manufacturing	312.82	0.21	0.45	0.02	50.52
322	Paper Manufacturing	106.97	0.07	0.79	0.04	71.08
323	Printing and Related Support Activities	57.26	0.04	0.75	0.04	13.41
324	Petroleum and Coal Products	8379.89	5.65	955.62	52.10	87.32
325	Chemical	7497.09	5.05	120.90	6.59	99.26
326	Plastics and Rubber Products	178.60	0.12	0.55	0.03	81.24
327	Nonmetallic Mineral Products	151.08	0.10	0.31	0.02	93.03
331	Primary Metal Manufacturing	129.10	0.09	0.72	0.04	83.79
332	Fabricated Metal Product Manufacturing	7077.31	4.77	179.87	9.81	95.70
333	Computer and Electronic Product Manufacturing	3129.03	2.11	188.48	10.28	85.17
334	Electrical Equipment, Appliance, and Component Manufacturing	19757.40	13.31	91.48	4.99	44.97
335	Machinery	1434.69	0.97	24.29	1.32	78.30
336	Transportation Equipment	93437.19	62.97	149.63	8.16	70.07
337–339	Furniture and Related Products, and Miscellaneous Manufacturing	2705.59	1.82	25.96	1.42	49.27

Notes: Value in millions of dollars in (1) and (3).

F Counterfactuals: Additional Details and Results

F.1 Exact Hat Algebra

We use x' to denote the counterfactual value of x, and $\hat{x}$ to denote x'/x. We consider shocks to $\hat{\tau}^{f,G}_{ods}$, $\hat{\tau}^{i,G}_{os,dk}$, γ_s and $\mathcal{G}$ in various counterfactual simulations. For instance, in the counterfactual experiment where the BAA restrictions are removed, we have $\hat{\tau}^{f,G}_{ods} = \frac{1}{\tau^{f,G}_s}$ and $\hat{\tau}^{i,G}_{os,dk} = \frac{1}{\tau^{i,G}_k}$.

Define

$$\begin{cases}
\mu^{i,G}_{os,dk} = \frac{\lambda^{i,G}_{os,dk}\alpha_{d,sk}X^G_{dk}}{X_{os}} & \forall\ o\in US,\ d\in US \\
\mu^{i,G}_{os,dk} = \frac{\lambda^{i,G}_{os,dk}\alpha_{d,sk}X^G_{dk}/\tau^{i,G}_k}{X_{os}} & \forall\ o\notin US,\ d\in US \\
\mu^{i,M}_{os,dk} = \frac{\lambda^{i,M}_{os,dk}\alpha_{d,sk}X^M_{dk}}{X_{os}} & \forall\ o,d\in US \\
\mu^{i,M}_{os,dk} = \frac{\lambda^{i,M}_{os,dk}\alpha_{d,sk}X^M_{dk}}{X_{os}} & \forall\ o,d\notin US \\
\mu^{f,G}_{ods} = \frac{\lambda^{f,G}_{ods}\psi_{os}\gamma_s\mathcal{G}}{X_{os}} & \forall\ o\in US, d\in US \\
\mu^{f,G}_{ods} = \frac{\lambda^{f,G}_{ods}\psi_{os}\gamma_s\mathcal{G}/\tau^{f,G}_s}{X_{os}} & \forall\ o\notin US, d\in US \\
\mu^{f,M}_{ods} = \frac{\lambda^{f,M}_{ods}\beta^M_{ds}\left[\sum_k(\alpha_{d',k}X^G_{d'k}+\alpha_{d',k}X^M_{d'k})-H_d+B_d+D_d+R_d\right]}{X_{os}} & \forall\ o,d\in US \\
\mu^{f,M}_{ods} = \frac{\lambda^{f,M}_{ods}\beta^M_{ds}\left[\sum_k \alpha_{d,sk}X^M_{dk}+D_d\right]}{X_{os}} & \forall\ o,d\notin US
\end{cases}$$

$$\begin{cases}
\chi^G_{os} = \frac{\alpha_{o,s}X^G_{os}}{\sum_k\left(\alpha_{o,k}X^G_{ok}+\alpha_{o,k}X^M_{ok}\right)-H_o+B_o+D_o+R_o} & \forall\ o\in US \\
\chi^M_{os} = \frac{\alpha_{o,s}X^M_{os}}{\sum_k\left(\alpha_{o,k}X^G_{ok}+\alpha_{o,k}X^M_{ok}\right)-H_o+B_o+D_o+R_o} & \forall\ o\in US \\
\chi^M_{os} = \frac{\alpha_{o,s}X^M_{os}}{\sum_k \alpha_{o,k}X^M_{ok}+D_o} & \forall\ o\notin US
\end{cases}$$

where $X_{os} = X^M_{os} + X^G_{os}$; $\{\mu^{f,G}_{ods}, \mu^{f,M}_{ods}\}$ represent the share of revenue from the sales of final goods s by producers in region o that is generated from respectively buyers G and M in region d; $\{\mu^{i,G}_{os,dk}, \mu^{i,G}_{os,dk}\}$ denote the share of revenue from the sales of intermediate goods s by producers in region o that is attributed to respectively producers G and M of downstream goods k in region d; and χ^G_{os}, χ^M_{os} denote labor income from G and M production of good s in region o, respectively, as shares of total labor income in region o, adjusted for income transfers and trade imbalances.

Expressed as the exact hat algebra, the equilibrium conditions consist of:

$$\hat{L}_{os} = \hat{w}_{os}^{\frac{\kappa_o}{1-\rho_o}}\left(\left(\sum_{s'}\pi_{os'|e}\hat{w}_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o} e_o + (1-e_o)\right)^{-1}\left(\sum_{s'}\pi_{os'|e}\hat{w}_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{-\rho_o} \quad \forall\ o \tag{F.1}$$

$$\begin{cases}
\hat{c}^G_{os} = \hat{w}_{os}^{1-\alpha_{o,s}}\Pi_{s'}(\hat{P}^{i,G}_{o,s's})^{\alpha_{o,s's}} & \forall\ o\in US \\
\hat{c}^M_{os} = \hat{w}_{os}^{1-\alpha_{o,s}}\Pi_{s'}(\hat{P}^{i,M}_{o,s's})^{\alpha_{o,s's}} & \forall\ o
\end{cases} \tag{F.2}$$

$$\begin{cases} \hat{P}^{i,G}_{o,s's} = \left[\sum_{o'} \lambda^{i,G}_{o's',os} \hat{L}^{\nu_{s'}}_{o's'} (\hat{\tau}^{i,G}_{o's',os} \hat{c}^{M}_{o's'})^{-\theta_{s'}}\right]^{-\frac{1}{\theta_{s'}}} & \forall\ o \in US \\ \hat{P}^{i,M}_{o,s's} = \left[\sum_{o'} \lambda^{i,M}_{o's',os} \hat{L}^{\nu_{s'}}_{o's'} (\hat{\tau}^{i,M}_{o's,os} \hat{c}^{M}_{o's'})^{-\theta_{s'}}\right]^{-\frac{1}{\theta_{s'}}} & \forall\ o \end{cases} \tag{F.3}$$

$$\begin{cases} \hat{P}^{f,G}_{os} = \left[\sum_{o' \notin US} \lambda^{f,G}_{o'os} \hat{L}^{\nu_s}_{o's} (\hat{\tau}^{f,G}_{o'os} \hat{c}^{M}_{o's})^{-\theta_s} + \sum_{o' \in US} \lambda^{f,G}_{o'os} \hat{L}^{\nu_s}_{o's} (\hat{\tau}^{f,G}_{o'os} \hat{c}^{G}_{o's})^{-\theta_s}\right]^{-\frac{1}{\theta_s}} & \forall\ o \in US \\ \hat{P}^{f,M}_{os} = \left[\sum_{o'} \lambda^{f,M}_{o'os} \hat{L}^{\nu_s}_{o's} (\hat{\tau}^{f,M}_{o'os} \hat{c}^{M}_{o's})^{-\theta_s}\right]^{-\frac{1}{\theta_s}} & \forall\ o \end{cases} \tag{F.4}$$

$$\begin{cases} \hat{\lambda}^{f,G}_{ods} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{f,G}_{ods} \hat{c}^{G}_{os})^{-\theta_s}}{\left(\hat{P}^{f,G}_{ds}\right)^{-\theta_s}} \\ \hat{\lambda}^{f,G}_{ods} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{f,G}_{ods} \hat{c}^{M}_{os})^{-\theta_s}}{\left(\hat{P}^{f,G}_{ds}\right)^{-\theta_s}} \\ \hat{\lambda}^{f,M}_{ods} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{f,M}_{ods} \hat{c}^{M}_{os})^{-\theta_s}}{\left(\hat{P}^{f,M}_{ds}\right)^{-\theta_s}} \end{cases} \qquad \begin{cases} \hat{\lambda}^{i,G}_{os,dk} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{i,G}_{os,dk} \hat{c}^{M}_{os})^{-\theta_s}}{\left(\hat{P}^{i,G}_{d,sk}\right)^{-\theta_s}} & \forall\ o \in US,\ d \in US \\ \hat{\lambda}^{i,G}_{os,dk} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{i,G}_{os,dk} \hat{c}^{M}_{os})^{-\theta_s}}{\left(\hat{P}^{i,G}_{d,sk}\right)^{-\theta_s}} & \forall\ o \notin US,\ d \in US \\ \hat{\lambda}^{i,M}_{os,dk} = \frac{\hat{L}^{\nu_s}_{os} (\hat{\tau}^{i,M}_{os,dk} \hat{c}^{M}_{os})^{-\theta_s}}{\left(\hat{P}^{i,M}_{d,sk}\right)^{-\theta_s}} & \forall\ o, d \end{cases} \tag{F.5}$$

$$\begin{cases} \hat{X}^G_{os} = \frac{X^G_{os}+X^M_{os}}{X^G_{os}} \sum_{d \in US} \mu^{f,G}_{ods} \hat{\lambda}^{f,G}_{ods} \hat{\gamma}_s \hat{\mathcal{G}} & \forall\ o \in US \\ \hat{X}^G_{os} = 0 & \forall\ o \notin US \\ \hat{X}^M_{os} = \frac{X^G_{os}+X^M_{os}}{X^M_{os}} \Bigg\{ \sum_{d \in US} \sum_k \mu^{i,G}_{os,dk} \hat{\lambda}^{i,G}_{os,dk} \hat{X}^G_{dk} + \sum_d \sum_k \mu^{i,M}_{os,dk} \hat{\lambda}^{i,M}_{os,dk} \hat{X}^M_{d'k} & \forall\ o \in US \\ \quad + \sum_{d \in US} \mu^{f,M}_{ods} \hat{\lambda}^{f,M}_{ods} \left[\sum_k \left(\chi^G_{dk} \hat{X}^G_{dk} + \chi^M_{dk} \hat{X}^M_{dk} \right) + \left(1 - \sum_k \chi^G_{dk} - \sum_k \chi^M_{dk}\right) \left(\frac{D'_d + R'_d - H'_d + B'_d}{D_d + R_d - H_d + B_d} \right) \right] \\ \quad + \sum_{d \notin US} \mu^{f,M}_{ods} \hat{\lambda}^{f,M}_{ods} \left[\sum_k \chi^M_{dk} \hat{X}^M_{dk} + \left(1 - \sum_k \chi^M_{dk}\right) \left(\frac{D'_d}{D_d} \right) \right] \Bigg\} \\ \hat{X}^M_{os} = \sum_{d \in US} \sum_k \frac{1}{\hat{\tau}^{i,G}_k} \mu^{i,G}_{os,dk} \hat{\lambda}^{i,G}_{os,dk} \hat{X}^G_{dk} + \sum_{d \in US} \sum_k \mu^{i,M}_{os,dk} \hat{\lambda}^{i,M}_{os,dk} \hat{X}^M_{d'k} + \frac{1}{\hat{\tau}^{f,G}_s} \sum_{d \in US} \mu^{f,G}_{ods} \hat{\lambda}^{f,G}_{ods} \hat{\gamma}_s \hat{\mathcal{G}} & \forall\ o \notin US \\ \quad + \sum_{d \in US} \mu^{f,M}_{ods} \hat{\lambda}^{f,M}_{ods} \left[\sum_k \left(\chi^G_{dk} \hat{X}^G_{dk} + \chi^M_{dk} \hat{X}^M_{dk} \right) + \left(1 - \sum_k \chi^G_{dk} - \sum_k \chi^M_{dk}\right) \left(\frac{D'_d + R'_d - H'_d + B'_d}{D_d + R_d - H_d + B_d} \right) \right] \\ \quad + \sum_{d \notin US} \mu^{f,M}_{ods} \hat{\lambda}^{f,M}_{ods} \left[\sum_k \chi^M_{dk} \hat{X}^M_{dk} + \left(1 - \sum_k \chi^M_{dk}\right) \left(\frac{D'_d}{D_d} \right) \right] \end{cases} \tag{F.6}$$

Here,

$$D'_d = \iota_d \sum_o \sum_s \left(X^G_{os} \hat{X}^G_{os} + X^M_{os} \hat{X}^M_{os} \right) \quad \forall d$$

$$R'_d = \sum_{o \notin US} \sum_s \sum_k \frac{\hat{\tau}^{i,G}_k \tau^{i,G}_k - 1}{\hat{\tau}^{i,G}_k \tau^{i,G}_k} \hat{\lambda}^{i,G}_{os,dk} \lambda^{i,G}_{os,dk} \alpha_{d,sk} \hat{X}^G_{dk} X^G_{dk} + \sum_{o \notin US} \sum_s \frac{\hat{\tau}^{f,G}_s \tau^{f,G}_s - 1}{\hat{\tau}^{f,G}_s \tau^{f,G}_s} \hat{\lambda}^{f,G}_{ods} \lambda^{f,G}_{ods} \psi_{ds} \hat{\gamma}_s \gamma_s \hat{\mathcal{G}} \mathcal{G} \quad \forall d \in US$$

$$H'_d = \frac{L_d}{\sum_{d' \in US} L_{d'}} \mathcal{G} \hat{\mathcal{G}} \quad \forall d \in US$$

$$B_d^{'} = \sum_s \frac{1-e_d\hat{e}_d}{e_d\hat{e}_d}\left(\alpha_{d,s}\hat{X}_{ds}^G X_{ds}^G + \alpha_{d,s}\hat{X}_{ds}^M X_{ds}^M\right) - \frac{L_d}{\sum_{d'\in US} L_{d'}} \sum_{o\in US}\sum_s \frac{1-e_o\hat{e}_o}{e_o\hat{e}_o}\left(\alpha_{o,s}\hat{X}_{os}^G X_{os}^G + \alpha_{o,s}\hat{X}_{os}^M X_{os}^M\right) \quad \forall d \in US$$

where

$$\hat{e}_o = \frac{\left(\sum_s \pi_{os|e}\hat{w}_{os}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o}}{e_o\left(\sum_s \pi_{os|e}\hat{w}_{os}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o} + (1-e_o)} \quad \forall\, o$$

$$\frac{X_{os}^G}{X_{os}^G + X_{os}^M}\hat{X}_{os}^G + \frac{X_{os}^M}{X_{os}^G + X_{os}^M}\hat{X}_{os}^M = \hat{w}_{os}^{\frac{\kappa_o}{1-\rho_o}}\left(\left(\sum_{s'} \pi_{os'|e}\hat{w}_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{1-\rho_o} e_o + (1-e_o)\right)^{\frac{1}{\kappa_o}-1}\left(\sum_{s'} \pi_{os'|e}\hat{w}_{os'}^{\frac{\kappa_o}{1-\rho_o}}\right)^{-\rho_o} \quad \forall\, o \tag{F.7}$$

F.2 Solution Algorithm

Given the parameters $\{\theta_s, \nu_s, \kappa_o, \rho_o\}$, and data on:

$$\{\lambda_{ods}^{f,G}, \lambda_{ods}^{f,M}, \lambda_{os,dk}^{i,G}, \lambda_{os,dk}^{i,M}, \mu_{ods}^{f,G}, \mu_{ods}^{f,M}, \mu_{os,dk}^{i,G}, \mu_{os,dk}^{i,M}, X_{os}^G, X_{os}^M, \alpha_{o,s}, \alpha_{o,sk}, \chi_{os}^G, \chi_{os}^M, \pi_{os|e}, e_o, \gamma_s, \psi_{os}, \beta_{os}^M, \iota_o, L_o, \mathcal{G}\}$$

and shocks to $\tau_{ods}^{f,G}$, $\tau_{os,dk}^{i,G}$, $\hat{\gamma}_s$ and $\hat{\mathcal{G}}$, we can solve for the system using the following solution algorithm:

1. Guess $\{\hat{w}_{os}\}$
   - Compute $\{\hat{L}_{os}\}$ given equations (F.1).
   - Solve for $\{\hat{P}_{o,s's}^{i,M}, \hat{c}_{os}^M\}$ given equations (F.2) and (F.3).
   - Compute $\{\hat{P}_{o,s's}^{i,G}, \hat{c}_{os}^G, \hat{P}_{os}^{f,G}, \hat{P}_{os}^{f,M}\}$ according to equations (F.2), (F.3) and (F.4).
   - Compute $\{\hat{\lambda}_{ods}^{f,G}, \hat{\lambda}_{ods}^{f,M}, \hat{\lambda}_{os,dk}^{i,G}, \hat{\lambda}_{os,dk}^{i,M}\}$ according to equations (F.5).
   - With $\{\hat{\lambda}_{ods}^{f,G}, \hat{\lambda}_{ods}^{f,M}, \hat{\lambda}_{os,dk}^{i,G}, \hat{\lambda}_{os,dk}^{i,M}\}$, solve for $\{\hat{X}_{os}^G, \hat{X}_{os}^M\}$ given equations (F.6).
2. Update for $\{\hat{w}'_{os}\}$ using equations (F.7).
3. Repeat the above procedures until $\{\hat{w}'_{os}\}$ equals $\{\hat{w}_{os}\}$.

F.3 Welfare

Under the assumption that consumers across the US have access to the public goods from different industries in all states, the change in welfare resulting from a shock $\hat{\tau}^{f,G}_{ods}$ or $\hat{\tau}^{i,G}_{os,dk}$ is given by:

$$\hat{V}_o = \left(\frac{\frac{\sum_s \left(\alpha_{o,s} X'^{G}_{os} + \alpha_{o,s} X'^{M}_{os}\right) + D'_o + R'_o + B'_o - H'_o}{\sum_s \left(\alpha_{o,s} X^{G}_{os} + \alpha_{o,s} X^{M}_{os}\right) + D_o + R_o + B_o - H_o}}{\hat{P}^{f,M}_o} \right)^{\varphi} \left(\prod_s \left(\frac{1}{\hat{P}^{f,G}_s} \right)^{\gamma_s} \right)^{1-\varphi} \quad \forall o \in US, \tag{F.8}$$

where $\hat{P}^{f,M}_o = \prod_s \left(\hat{P}^{f,M}_{os}\right)^{\beta^M_{os}}$ and $\hat{P}^{f,G}_s = \prod_{o'} \left(\hat{P}^{f,G}_{o's}\right)^{\psi_{o's}}$.

Under the alternative formulation that consumers in $o \in US$ only have access to the public goods s compiled locally, the change in welfare resulting from a shock $\hat{\tau}^{f,G}_{ods}$ or $\hat{\tau}^{i,G}_{os,dk}$ is expressed as follows:

$$\hat{V}_o = \left(\frac{\frac{\sum_s \left(\alpha^G_{o,s} X'^{G}_{os} + \alpha^M_{o,s} X'^{M}_{os}\right) + D'_o + R'_o + B'_o - H'_o}{\sum_s \left(\alpha^G_{o,s} X^{G}_{os} + \alpha^M_{o,s} X^{M}_{os}\right) + D_o + R_o + B_o - H_o}}{\hat{P}^{f,M}_o} \right)^{\varphi} \left(\prod_s \left(\frac{1}{\hat{P}^{f,G}_{os}} \right)^{\gamma_s} \right)^{1-\varphi} \quad \forall o \in US. \tag{F.9}$$

F.4 Consumption Equivalent Variation

Baseline Measure. Denote ψ be the adjustment ratio of personal consumption to make the welfare change in the US as a whole to be the same as in the counterfactual case. Then:

$$\Psi = \left(\sum_o \frac{L_o}{\sum_{o'} L_{o'}} \hat{V}_o \right)^{\frac{1}{\varphi}}.$$

The term in the parentheses represents the expected change in welfare. Total personal consumption in the US is given by $\sum_o \sum_{d \in US} \sum_s X^{f,M}_{ods}$. Therefore, the consumption equivalence variation per capita is given by $(\Psi - 1) \sum_o \sum_{d \in US} \sum_s X^{f,M}_{ods} / \sum_o L_o$. The cost per job created by the BAA wedges is then calculated as $(\Psi - 1) \sum_o \sum_{d \in US} \sum_s X^{f,M}_{ods} / \Delta \sum_o e_o L_o$.

Alternative Measure Accounting for Risk Aversion. If there is aversion to inequality induced by the policies' distributional effects, the adjustment ratio of personal consumption can be reformulated as:

$$\Psi^{alt} = \left(\sum_{o \in US} \frac{L_o}{\sum_{o'} L_{o'}} \hat{V}_o^{1-\vartheta} \right)^{\frac{1}{1-\vartheta} \frac{1}{\varphi}},$$

where ϑ is an inequality aversion parameter, typically ranging between 1 and 3 in the literature. For our analysis, we adopt the midpoint value and set $\vartheta = 2$. (Bombardini and Trebbi, 2012; Galle *et al.*, 2023) Then the consumption equivalence variation per capita is $\left(\Psi^{alt} - 1\right) \sum_o \sum_{d \in US} \sum_s X^{f,M}_{ods} / \sum_o L_o$.

The cost per job created by the BAA wedges is then calculated as $\left(\Psi^{alt}-1\right)\sum_{o}\sum_{d\in US}\sum_{s}X^{f,M}_{ods}/\Delta\sum_{o}e_{o}L_{o}$.

F.5 Slope-base Tests: Visualization and Alternative Instruments

Figures F.1 and F.2 visualize the slope-test results from Table 2 (baseline instrument), with the full sample and excluding outliers, respectively. In each panel, the dashed line is the slope from regressing the actual outcome on the instrument, and the solid line is the corresponding slope using the model-implied outcome. Statistically, the two slopes coincide for Δ lnWage and $\Delta \ln(1-\text{EmpRate})$; the rejection for ΔShareMfg is driven by a small set of outlier states, as shown by the comparison with Figure F.2.

Figures F.3 and F.4 repeat the exercise using the ACD-suggested alternative instrument. Specifically, to construct an alternative measure z_o, we set s_{os} equal to the model's Jacobian with respect to preference shocks, $\hat{\gamma}_s\hat{\mathcal{G}}$. This approach improves the test's statistical power and accounts for general-equilibrium linkages.

The results remain consistent-there is no discernible gap between the projections, especially after excluding outliers. Note that for $\Delta\ln(1-EmpRate)$, the estimated coefficient of the procurement shock is positive. This occurs because the share in the shift-share measure corresponds to the Jacobian of the model, which assumes a negative value when the predicted effect is negative. A similar explanation applies to the estimated coefficients for the non-manufacturing procurement shock in the case of $\Delta ShareMfg$.

F.6 Changes in $\tau^{i,G}$ When the Domestic Content Restriction on Component Inputs is Tightened

When the domestic content share on components for G production is raised from 0.5 to $\underline{\zeta}$, the restriction could start being binding for some industries. For example, industries with $\sum_{s\in C}\frac{\alpha_{US,sk}}{\sum_{s'\in C}\alpha_{US,s'k}}\lambda^{i,G+M}_{ROW\ s,US\ k}>1-\underline{\zeta}$ would have faced a binding constraint for G production had the domestic content restriction been $\underline{\zeta}$. In a counterfactual experiment where $\underline{\zeta}>0.5$, $\tau'^{i,G}_{k}$ is calibrated for two separate cases as follows:

1. For k with $\sum_{s\in C}\frac{\alpha_{US,sk}}{\sum_{s'\in C}\alpha_{US,s'k}}\lambda^{i,G+M}_{ROW\ s,US\ k}>1-\underline{\zeta}$, we solve for $\tau'^{i,G}_{k}$ so that

$$\sum_{s\in C}\frac{\alpha_{US,sk}}{\sum_{s'\in C}\alpha_{US,s'k}}\lambda'^{i,G}_{ROW\ s,US\ k}=1-\underline{\zeta},$$

   where according to Equation (19), the counterfactual trade shares for G (i.e., $\lambda'^{i,G}_{ROW\ s,US\ k}$) are given by:

$$\lambda_{ROW\ s,US\ k}^{\prime i,G} = \frac{\left(\tau_k^{\prime i,G}\right)^{-\theta_s} \lambda_{ROW\ s,US\ k}^{\prime i,M} / \left(1 - \lambda_{row,s;us,k}^{\prime i,M}\right)}{1 + \left(\tau_k^{\prime i,G}\right)^{-\theta_s} \lambda_{ROW\ s,US\ k}^{\prime i,M} / \left(1 - \lambda_{ROW\ s,US\ k}^{\prime i,M}\right)}.$$

Note that $\lambda_{ROW\ s,US\ kk}^{\prime i,M} = \lambda_{ROW\ s,US\ k}^{i,M}$ since the domestic content restriction is imposed only on G production.

2. For k where the constraint is non-binding, i.e., $\sum_{s \in C} \frac{\alpha_{US,sk}}{\sum_{s' \in C} \alpha_{US,s'k}} \lambda_{ROW\ s,US\ k}^{i,G+M} \leq 1 - \underline{\zeta}$, we have $\tau_k^{\prime i,G} = \tau_k^{i,G} = 1$.

Figure 5 shows $\hat{\tau}_k^{i,G} = \tau_k^{\prime i,G} / \tau_k^{i,G}$, when the domestic content restriction is raised to $\underline{\zeta} = 0.75$. More industries face a binding constraint in this counterfactual case, including: Chemical (325), Machinery (333), Computer and Electronic Product Manufacturing (334), Electrical Equipment, Appliance, and Component Manufacturing (335), Transportation Equipment (336), and Furniture and Related Products, and Miscellaneous Manufacturing (337-339).

F.7 Robustness: Reduced-Form Results

F.7.1 Validating the Use of a Bartik IV

As shown in Equation (22), the procurement shock can be interpreted as a shift-share (Bartick) measure. The identification assumption is that exposure to sector-specific procurement demand shocks—measured using lagged values—is conditionally exogenous to unobserved, state-specific shocks to the labor market outcomes of interest. More formally, it requires: $E\left[\frac{X_{os,t-10}^G}{L_{o,t-10}} \varepsilon_{o,t} | \mathcal{W}\right] = 0$ for all s, where $\mathcal{W} = \{D_{d,t}, D_o, W_{o,0} \times D_t\}$ is a shorthand for this set of controls on the right hand-side of the regression.

To assess the credibility of this identification assumption, we follow Goldsmith-Pinkham *et al.* (2020) and compute the Rotemberg weights of procurement shocks with controls, aggregated across time periods. The sector-specific Rotemberg weights capture the sensitivity of the estimates to misspecification when the exogeneity of lagged procurement exposure fails. OLS estimates are more vulnerable to bias from sectors with larger Rotemberg weights. In our case, the top five sectors with the largest Rotemberg weights include: Professional, Scientific and Technical Services, Management of Companies and Enterprises (NAICS: 54-55), Wholesale and Retail Trade (NAICS: 42-45), Transportation Equipment (NAICS: 336), Electrical Equipment, Appliance, and Component Manufacturing (NAICS: 334), and Information and Cultural Industries (NAICS: 51). The sum of the Rotemberg weights of these sectors amounts to 61% of the positive weights in the Bartik estimator.

Table F.2 reports regressions of changes in labor market outcomes over the preceding five-year period on procurement exposure to the top five sectors. We find no statistically significant relationships, except for a positive correlation between the pre-trend in log wages and exposure to procurement in the Transportation Equipment sector. In unreported results (available upon request), we verify the robustness of the regressions in Table 2 by controlling for this exposure interacted with year dummies.

F.7.2 Alternative Specifications and Measures

In Panel A of Table F.3, we conduct stacked first-difference regressions of the changes in outcomes of interest over the periods 2004–2009 and 2009–2014, respectively, on future procurement demand shocks during 2009–2014 and 2014–2019. Our analysis confirms that changes in labor market outcomes are uncorrelated with future procurement shocks; there thus do not appear to be pre-trends or anticipation effects. It is worth noting that our baseline specification controls for state fixed effects, which account for differences in the average changes in outcomes across states—effectively capturing state-specific linear time trends in these outcomes.

Panel B repeats the baseline analyses, but uses the measures of procurement shocks constructed from the Department of Defense (DoD) procurement. Specifically, we replace $X^G_{s,t} - X^G_{s,t-5}$ in Equations (22) and (23) by $X^{DoD}_{s,t} - X^{DoD}_{s,t-5}$, which reflects the change in procurement of goods from sector s by DoD during the five-year period. These alternative measures might be more exogenous, as changes in military spending could be the responses to external shocks—such as wars—as discussed in Nakamura and Steinsson (2014) and Auerbach *et al.* (2025). The results are similar to our baseline findings. An unreported set of results (available upon request) presents IV regressions using the respective DoD procurement shocks as instruments for procurement shocks, as specified in equations (22) and (23). The IV estimates are similar to the OLS estimates, supporting the exogeneity of the baseline measures.

In Panel C, we adopt the leave-one-out measures of procurement shocks. Specifically, we replace $X^G_{s,t} - X^G_{s,t-5}$ in equations (22) and (23) by $X^G_{s/o,t} - X^G_{s/o,t-5}$, where $X^G_{s/o,t}$ (resp. $X^G_{s/o,t-5}$) is the procurement of goods s excluding those sourced from the state o itself in year t (resp. $t-5$). It alleviates the concern about finite sample bias arising from using own-observation information. Our results indicate that employing leave-one-out measures has little impact on the point estimates, although the estimates become somewhat less precise.

In the baseline analysis, we use 5-year changes for two reasons. First, our model is static, so labor market responses measured over a longer horizon are more comparable to the model's predictions. Second, longer-difference measures could be less noisy. Despite these considerations, we conducted robustness checks by estimating the regressions using two-year changes in Panel D. Overall, our findings remain consistent across the alternative time window, except for the effects of procurement shocks on the manufacturing employment share.

We also compute the 90% confidence intervals (CIs) based on different procedures, AKM and

AKM0, proposed by Adão *et al.* (2019).[91] This is to address the potential issue that regression residuals in shift-share empirical specifications would be correlated across regions that are similar in their sectoral composition, regardless of their geographic proximity. As is shown in Table F.4, for most of the cases, the CIs based on the AKM and AKM0 procedures are wider than the state-clustered CIs. For $\Delta \ln(Wage)$, the 90% CIs derived from AKM and AKM0 include zero (Column 1). However, when employing the measure of DoD procurement shocks, these CIs become narrower and do not cover zero (Column 3). In Columns 2 and 4, the estimated effect of procurement shocks on $\Delta \ln(1 - EmpRate)$ remain statistically significant at the 10 percent level, as indicated by the AKM and AKM0 confidence intervals.

F.8 Counterfactual Robustness Tables

Tables F.5 and F.6 report the parameter-sensitivity analysis for the two main counterfactuals: removing the BAA wedges on final goods, and tightening the domestic-content requirement on component inputs from 50% to 75%. The baseline numbers are those reported in Section 6 of the main text; each panel below varies one element of the calibration and reports the implied changes in welfare, employment, and cost per job.

External economies of scale — no EES (Panel A). BAA may serve as a policy intervention that directs demand towards domestic producers, strategically leveraging positive external economies of scale that may be strong in certain manufacturing sectors (Harrison and Rodríguez-Clare, 2010). To investigate this channel, we shut down external economies of scale (EES) by setting the scale elasticities $\nu_s = 0$ for all sectors. Panel A in Table F.5 presents the findings of the counterfactual experiment of removing the BAA wedges on final goods. In the absence of EES, the removal of the BAA restrictions leads to a contraction of the production scale of the affected sectors, but it does not affect their productivity. Hence, compared to the baseline results, the policy experiment results in around 3% larger welfare gains while yielding 9% smaller employment losses. Panel A of Table F.6 reports the effects of the more stringent domestic content requirement on component inputs. Relative to the baseline results, the welfare impact is slightly more negative and the employment effect is slightly weaker.

The limited impacts of EES can, in part, be attributed to the relatively small proportion of government consumption (G) within overall U.S. output. Consequently, its effect on production scale remains limited. In our data, the ratio of federal procurement to U.S. personal consumption expenditure is about 0.035. It is also worth noting that positive demand shocks induce reallocation

[91] We do not compute the AKM and AKM0 confidence intervals for the case of $\Delta ShareMfg$ specification because it includes two shift-share regressors (manufacturing and non-manufacturing procurement). The inference procedures of Adão *et al.* (2019) are developed for regressions with a single shift-share instrument; extensions to multiple shift-share regressors fall outside the scope of that paper.

of labor from unaffected to affected sectors. With EES in place, employment in the affected sectors grows more rapidly, while employment in unaffected sectors expands more slowly, compared to the scenario without EES. When examining outcomes at the regional level, these cross-sector effects tend to partially offset one another, making the aggregate outcomes with EES more similar to those without EES. In Appendix F.9, we demonstrate that the small quantitative effects of EES are also due in part to the fact that current BAA provisions do not effectively target the sectors where industrial policy could have the greatest impact—the stringency of BAA appears to be unrelated to the strength of EES. Had the BAA wedges across sectors been perfectly correlated with the strength of EES, welfare would have improved by $9.9 to $13.92 per capita.

EES in the non-manufacturing sector (Panel B). In Panels B of Tables F.5 and F.6, we allow for scale economies in the non-manufacturing sector. Specifically, we set the scale elasticity for non-manufacturing equal to the average elasticity across manufacturing industries. In this case, removing the BAA wedges on final goods results in smaller welfare gains.[92] Additionally, both the welfare loss and the cost per job created are smaller when the domestic content requirement is increased to 75%. However, for both counterfactual experiments, the quantitative differences relative to the baseline results are modest.

EES operating at the industry level (Panel C). As a robustness check, we reformulate the model and assume that external economies of scale operate at the sector level, consistent with the data used by Bartelme *et al.* (2025) to estimate sector-specific scale elasticities. Specifically, we assume that the state of technology in sector s is determined by $T_{os}L_s^{\nu_s}$, where ν_s is the scale elasticity capturing the strength of EES and $L_s = \sum_{o \in US} L_{os}$. As shown in Panels C of Tables F.5 and F.6, our baseline findings are robust to this alternative modeling assumption.

Alternative labor supply and trade elasticities (Panels D–I). In Panels D and E of Tables F.5 and F.6, we consider alternative values of κ. Specifically, we set $\kappa = 1.17$ and $\kappa = 3.12$, respectively, which represent the lower and upper bounds of the κ range estimated in (Galle *et al.*, 2023). Panels F and G assess the sensitivity of the quantitative results to alternative values of ρ, setting $\rho = 0$ and $\rho = 0.5$. In Panel H, we set θ_s to the values estimated in Caliendo and Parro (2015), whereas in Panel I, we take $\theta_s = 4$.

Across all these tests, the estimated welfare gains remain largely stable, except when θ_s is calibrated using Caliendo and Parro (2015), in which case the welfare cost of BAA wedges on final goods doubles. As expected, the predicted change in employment is most sensitive to the value of

[92]This is because removing BAA wedges not only reduces manufacturing employment but also decreases the scale of non-manufacturing employment. Due to the presence of scale economies in the non-manufacturing sector, this reduction leads to lower productivity in the sector, thereby dampening overall welfare gains. Consequently, the cost per job created due to the BAA wedges is also reduced.

κ, which governs the extensive-margin labor supply elasticity: when $\kappa = 3.12$, the number of jobs created is nearly twice the baseline level following the removal of BAA wedges on final goods. The value of ρ, which governs the intensive-margin labor supply elasticity, has modest effects on the welfare and employment impacts of the different policy experiments.

Accounting for inequality aversion (Panel J). In the baseline analysis, the welfare effect of a policy experiment is measured by the expected welfare change of an ex-ante identical worker, given by $\sum_o \frac{L_o}{\sum_{o'} L_{o'}} \hat{V}_o$. This ignores the potential aversion to inequality induced by the policies' distributional effects. As a robustness check, Panels J of Tables F.5 and F.6 report welfare effects computed based on a generalized average, $\left(\sum_{o \in US} \frac{L_o}{\sum_{o'} L_{o'}} \hat{V}_o^{1-\vartheta}\right)^{\frac{1}{1-\vartheta}}$, where ϑ is an inequality aversion parameter typically ranging between 1 and 3 in the literature. In our analysis, we follow Bombardini and Trebbi (2012) and Galle *et al.* (2023) and adopt the midpoint value, setting $\vartheta = 2$. (Appendix F.4 provides details on computing consumption equivalent variation for different cases, with and without accounting for inequality aversion.) We find that the predicted welfare effects remain quantitatively similar across models, with or without inequality aversion.

Utility weight on public goods $1 - \varphi$ (Panel K). In our baseline analysis, we calibrate the utility weight on public goods, $1 - \varphi$, to match the ratio of federal procurement to U.S. personal consumption expenditure, resulting in a calibrated value of $1 - \varphi$ equal to 0.034. This strategy is similar to one of the approaches in Fajgelbaum *et al.* (2019), who set $1 - \varphi$ to match the ratio of tax revenue to GDP, which is approximately 0.04. Using a GMM approach, Fajgelbaum *et al.* (2019) also obtain an alternative estimate of $1 - \varphi$ equal to 0.16. Thus, our calibrated value of $1 - \varphi$ lies near the lower end of the range considered in Fajgelbaum *et al.* (2019), suggesting that our baseline analysis may provide a lower bound on the true welfare cost of BAA restrictions. Panels K of Tables F.5 and F.6 report the welfare implications of the BAA wedges for the case $1 - \varphi = 0.16$. As expected, when the utility weight on public goods is increased to about five times its baseline value, the welfare gains or losses from the policy experiments, measured by consumption equivalent variation, also rise to roughly five times their baseline magnitude, and the implied cost per job created by the BAA wedges increases proportionally.

F.9 Rearrange Buy American Wedges to Target High EES Sector

As is shown in Kucheryavyy *et al.* (2023) and Bartelme *et al.* (2025), the strength of the EES channel through which a trade cost shock influences output is governed by the product of trade elasticity and scale elasticity, $\theta_s \nu_s$. Given this insight, we examine the relationship between the BAA wedges on imports of final goods ($\ln(\tau_s^{f,G})$) and the strength of EES ($\theta_s \nu_s$) in Figure F.5. Panel A reveals a positive correlation. However, if we exclude the outlier sector Petroleum and Coal Products (324), the correlation becomes negative. Panel B finds an insignificant rank correlation between $\ln(\tau_s^{f,G})$ and $\theta_s \nu_s$. These findings indicate that the current policy, as inferred from the BAA wedges, does not effectively leverage the EES.

For the last set of counterfactuals, we maintain the distribution of $\tau_s^{f,G}$, but rearrange the wedges so that they perfectly align with the strength of EES across manufacturing industries. The simulation results for the baseline specification are presented in Row (a) of Table F.7. Two intriguing findings emerge. Firstly, if the policy had fully leveraged the EES, welfare would have improved by 0.014 percent or \$9.90 measured by consumption equivalent variation (Columns 1 and 5). The modest impact on welfare can be attributed, in part, to the relatively small share of G consumption in the overall output in the U.S.. Hence, its influence on the production scale is limited. Secondly, in the counterfactual scenario, manufacturing employment and total employment would have experienced a decline of 8,600 and 7,000, respectively (Columns 6 and 7). This result indicates that the current arrangement of the BAA wedges promotes employment. Specifically, the correlation between BAA wedges $\ln(\tau_s^{f,G})$ and labor intensity $\alpha_{\text{US},s}$ across manufacturing industries stands at 0.26 in the data. In the counterfactual experiment aligning the BAA wedges with the strength of EES, the correlation between the counterfactual BAA wedges $\ln(\tau_s^{f,G'})$ and $\alpha_{\text{US},s}$ diminishes to 0.07. As reported in Row (b), we obtain quantitatively similar results for the alternative specifications. Taken together, these findings are consistent with the historical narrative and current political discourse that the BAA serves as an employment measure (for more details, please refer to Appendix A.1). The modest welfare effect we find here is consistent with the broader parameter-sensitivity analysis reported in Tables F.5 and F.6, where shutting down the EES channel entirely has a similarly limited quantitative impact on our counterfactual estimates.

F.10 Spatial Distribution of Counterfactual Effects

This appendix maps the state-level distribution of welfare and employment effects under the two main counterfactuals analyzed in Section 6: (i) removing the BAA wedges on final goods, and (ii) tightening the domestic-content rule on intermediate inputs from 50% to 75%. The aggregate numbers reported in the body text mask substantial heterogeneity across states: procurement-intensive states bear most of the cost when the BAA tightens, while states with less exposure to federal procurement gain the most from removing the existing wedges. The figures below visualize this heterogeneity for several outcomes.

F.10.1 Removing the BAA wedges on final goods

Figures F.6 and F.7 map the per-capita consumption-equivalent variation and the change in the total employment-to-working-age-population ratio, respectively. Removal of the BAA generates positive welfare effects everywhere but with sharp spatial differences—per-capita gains range from

\$31 in Virginia to \$211 in North Dakota—and states with smaller welfare gains tend to experience larger employment losses. Figure F.8 disaggregates the employment effect to the manufacturing sector; Figure F.9 shows the corresponding state-level pattern of wage changes; and Figure F.10 reports the welfare distribution under the alternative welfare specification in which consumers have access only to locally produced public goods. The qualitative patterns are robust to all four representations.

F.10.2 Tightening the domestic-content rule to 75%

Figures F.11 and F.12 report the analogous maps for the counterfactual that raises the domestic-content requirement on component inputs to 75%. In contrast to the removal counterfactual, the tightening generates welfare losses in essentially all states, with the largest losses concentrated in states whose industrial composition is most exposed to the binding sectors (Chemicals, Machinery, Computer and Electronics, Electrical Equipment, Transportation Equipment, and Furniture/Miscellaneous Manufacturing) and to federal procurement more generally. Employment expands in the protected sectors but contracts elsewhere, and the regional incidence reflects both channels. Figure F.13 shows the manufacturing-employment ratio under the tightening, Figure F.14 the corresponding wage map, and Figure F.15 reports the welfare distribution under the alternative formulation in which consumers have access only to locally produced public goods.

Figure F.1: Observed versus Predicted Changes

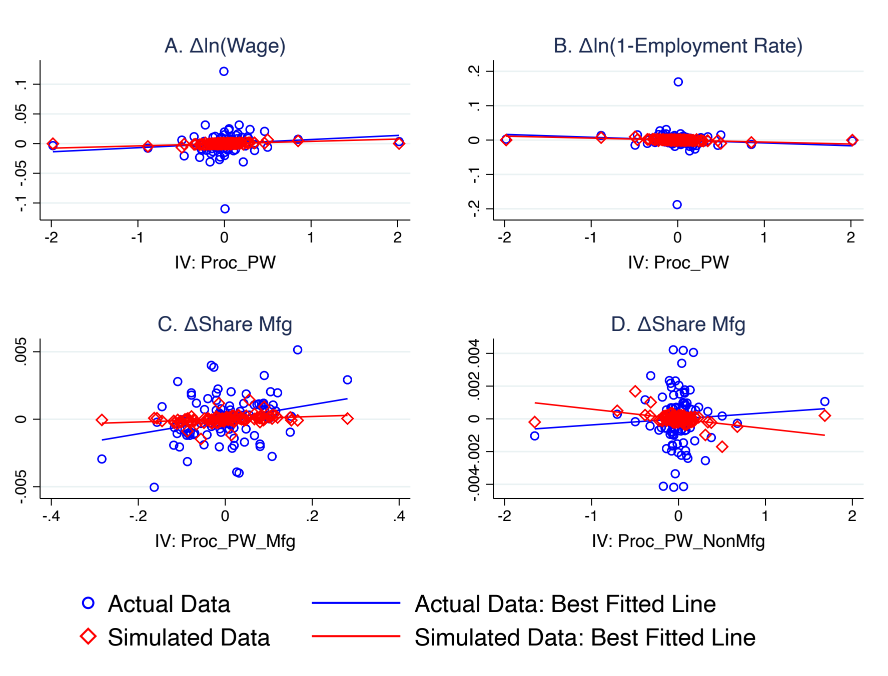
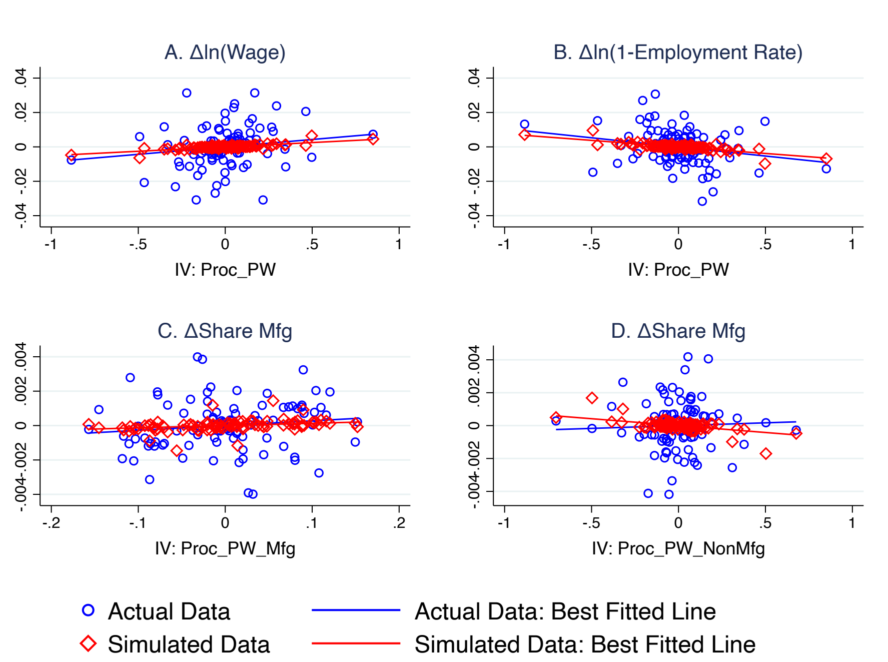


Figure F.2: Observed versus Predicted Changes (Excluding Outliers)



Notes: This figure repeats the analyses in Figure F.1, but excludes observations with the most extreme positive or negative values of the outcome variable or the instrument.

Figure F.3: Observed versus Predicted Changes (Alternative Measures)

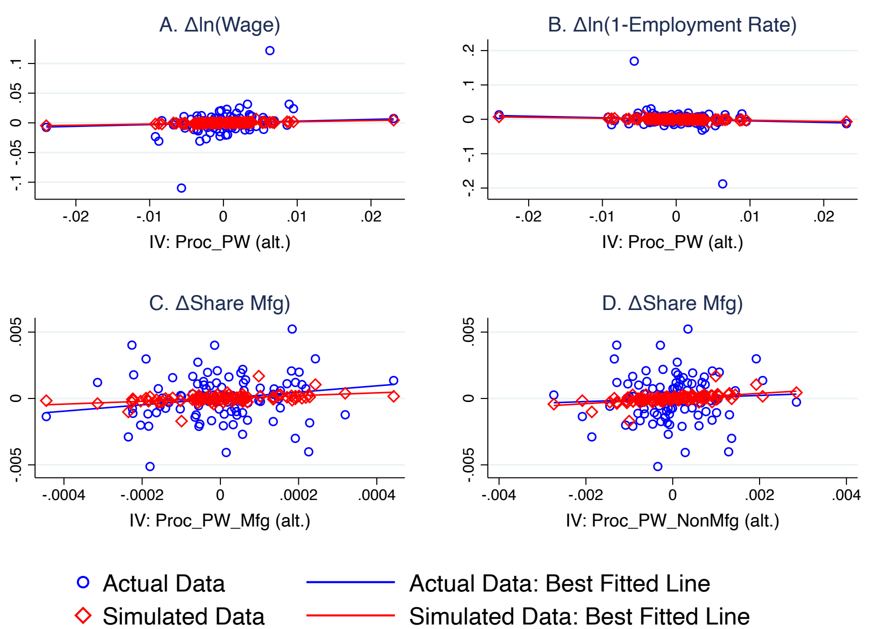
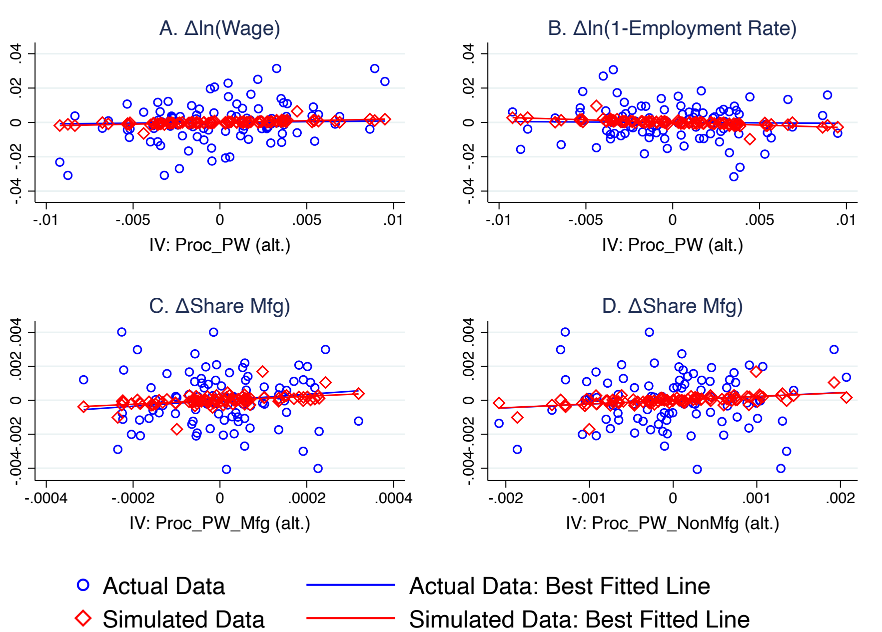
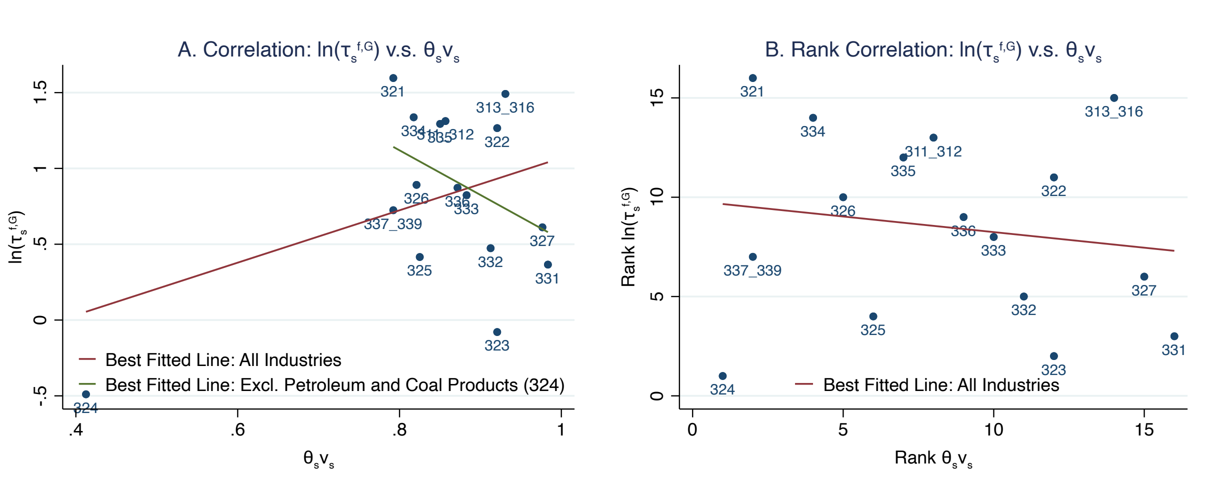


Figure F.4: Observed versus Predicted Changes (Alternative Measures, Excluding Outliers)



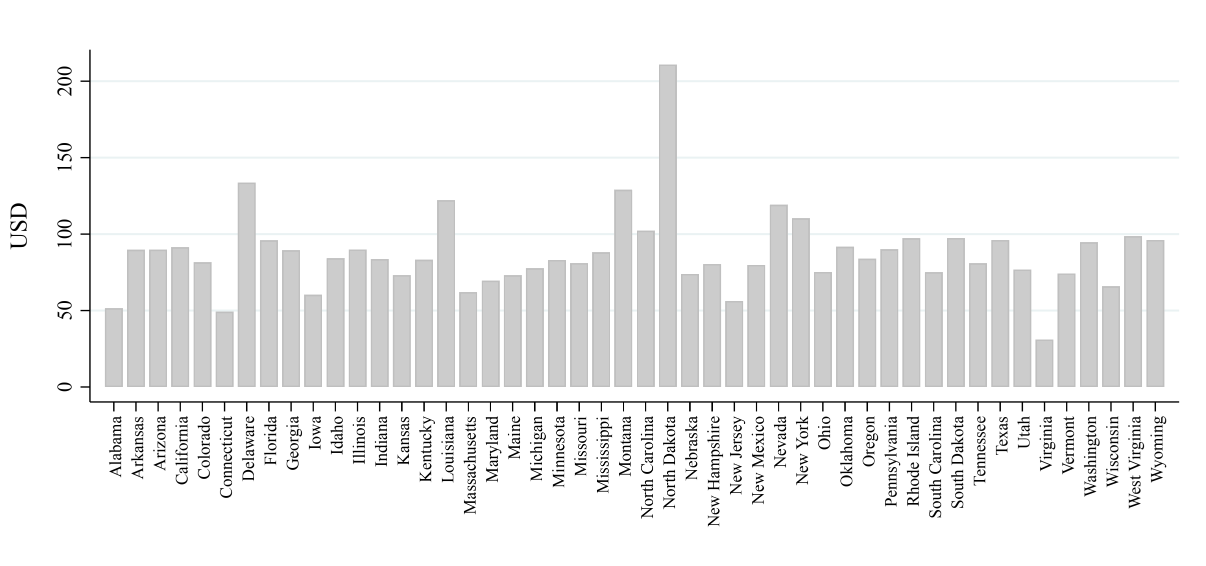
Notes: This figure repeats the analyses in Figure F.3, but excludes observations with the most extreme positive or negative values of the outcome variable or the instrument.

Figure F.5: Correlation between BAA Wedges and Strength of EES



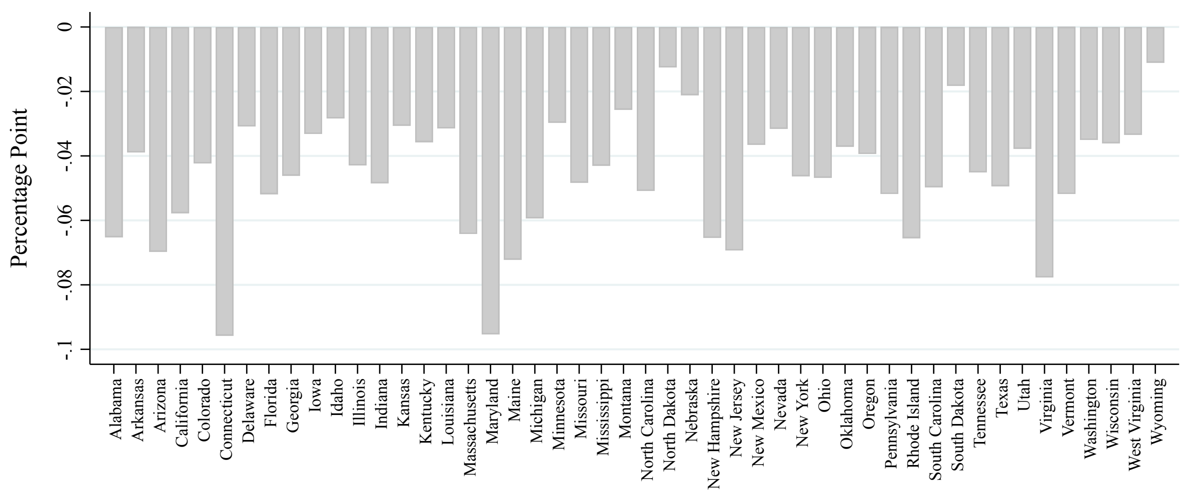
Notes: Panel A of the figure shows the relation between the BAA wedges (broad measure) in logarithm, $\ln(\tau_s^{f,G})$, and the strength of EES, $\theta_s \nu_s$. The red line corresponds to the best-fitted line across all sectors, while the green line represents the best-fitted line for the sample that excludes Petroleum and Coal Products (324). Panel B illustrates the rank correlation between $\ln(\tau_s^{f,G})$ and $\theta_s \nu_s$.

Figure F.6: Consumption Equivalent Variation: Remove the BAA Wedges on Imports of Final Goods (Broader Measure)



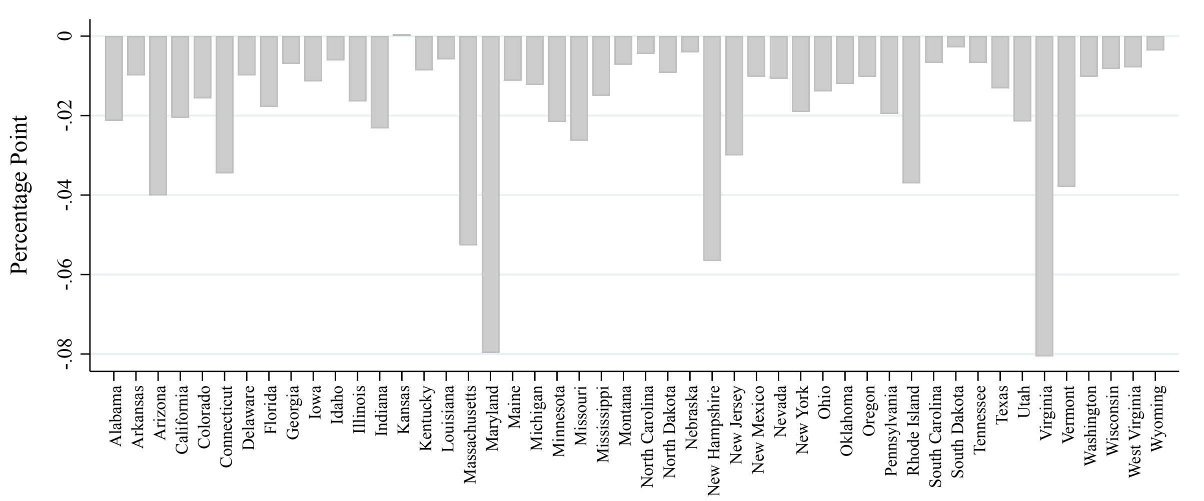
Notes: This figure presents the counterfactual changes in welfare across states resulting from the removal of the BAA wedges on imports of final goods $\tau_s^{f,G}$. The welfare changes are measured by consumption equivalent variation. The calculation assumes that consumers have access to the composite public goods from different states.

Figure F.7: Changes in Employment to Working Age Population Ratio: Remove the BAA Wedges on Imports of Final Goods (Broader Measure)



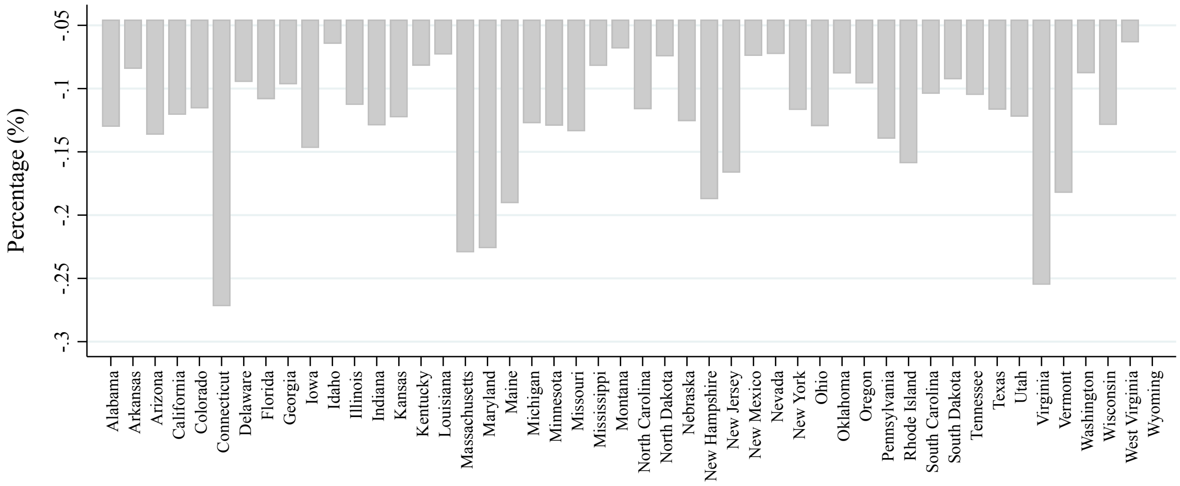
Notes: This figure presents the counterfactual changes in employment to working age population ratio resulting from the removal of the BAA wedges on imports of final goods $\tau_s^{f,G}$.

Figure F.8: Changes in Manufacturing Employment to Working Age Population Ratio: Remove the BAA Wedges on Imports of Final Goods (Broader Measure)



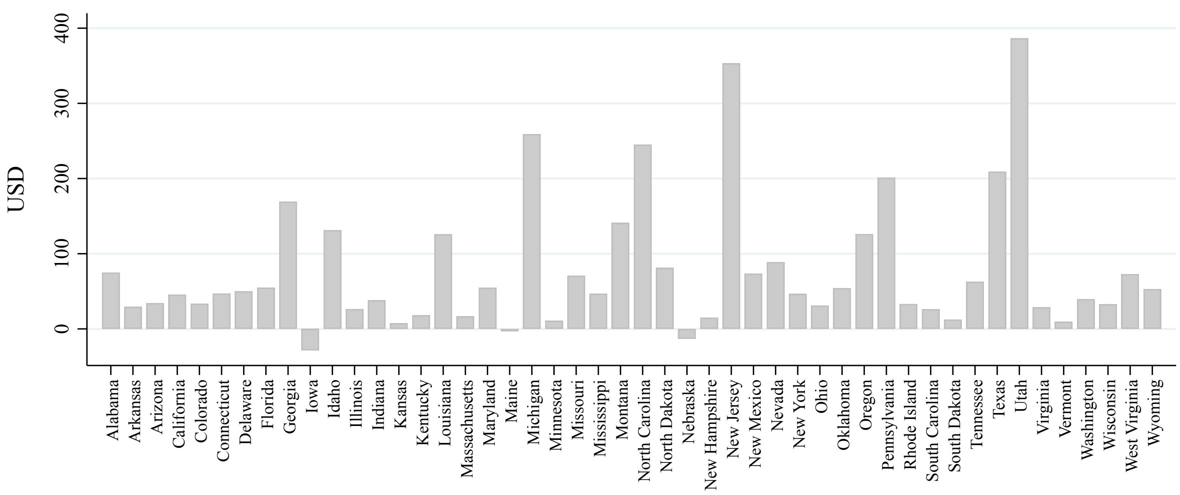
Notes: This figure presents the counterfactual changes in manufacturing employment to working age population ratio resulting from the removal of the BAA wedges on imports of final goods $\tau_s^{f,G}$.

Figure F.9: Percentage Changes in Wages: Remove the BAA Wedges on Imports of Final Goods (Broader Measure)



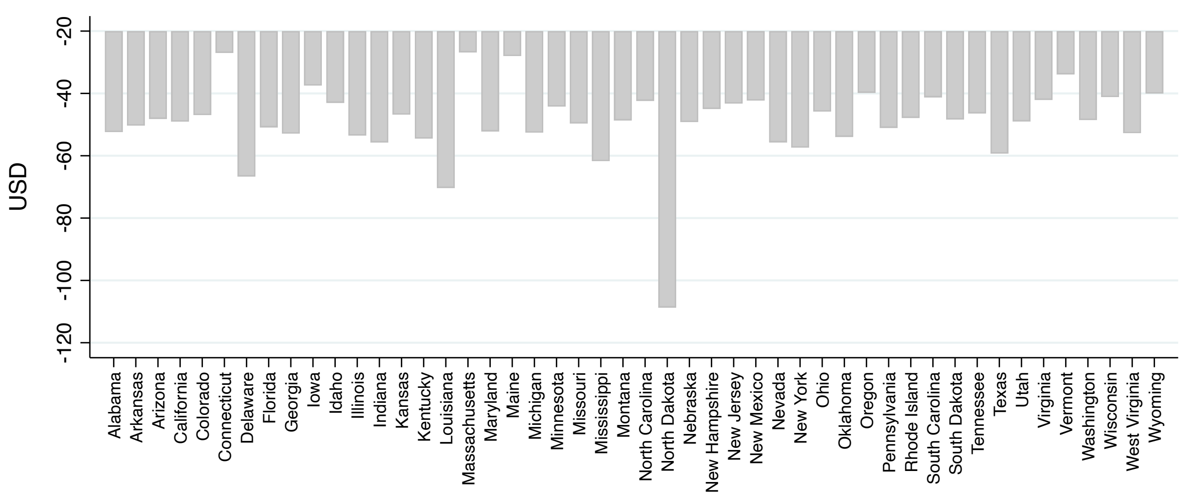
Notes: This figure presents the counterfactual percentage changes in wages across states resulting from the removal of the BAA wedges on imports of final goods $\tau_s^{f,G}$.

Figure F.10: Consumption Equivalent Variation (Alternative Formulation of Welfare): Remove the BAA Wedges on Imports of Final Goods (Broader Measure)



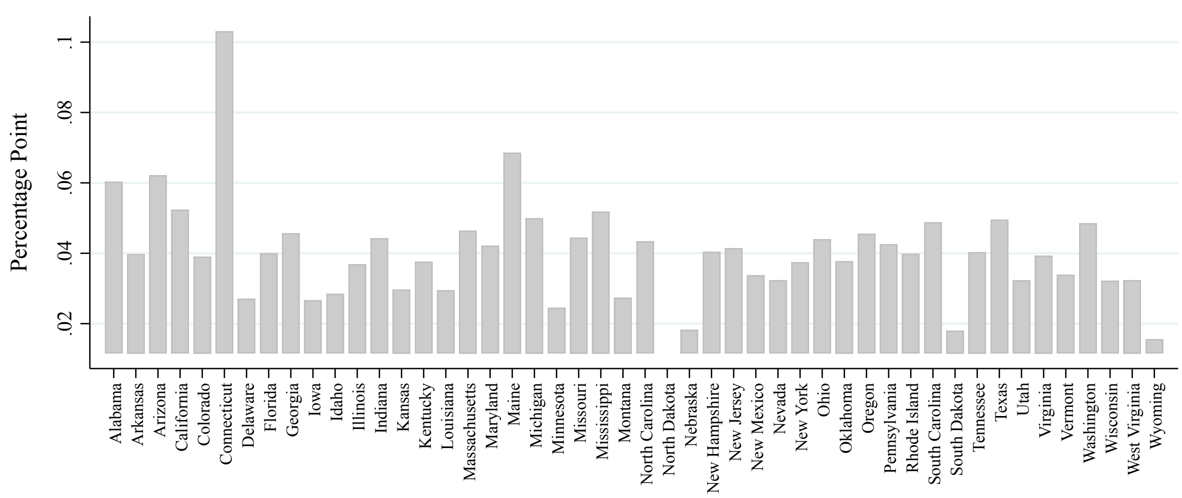
Notes: This figure presents the counterfactual changes in welfare across states resulting from the removal of the BAA wedges on imports of final goods $\tau_s^{f,G}$. The welfare changes are measured by consumption equivalent variation. The calculation assumes that consumers only have access to the locally produced public goods.

Figure F.11: Consumption Equivalent Variation: Increase the Required Domestic Share of Component Inputs for G to 75%



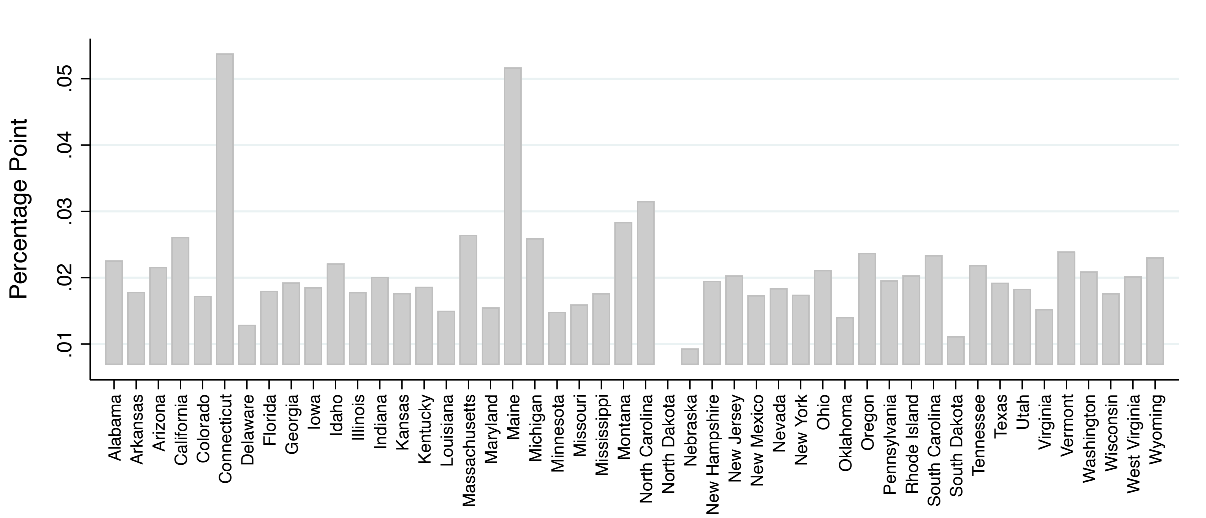
Notes: This figure presents the counterfactual changes in welfare across states resulting from an increase in the required domestic share of component inputs for G production to 75%. The welfare changes are measured by consumption equivalent variation. The calculation assumes that consumers have access to the composite public goods from different states.

Figure F.12: Changes in Employment to Working Age Population Ratio: Increase the Required Domestic Share of Component Inputs for G to 75%



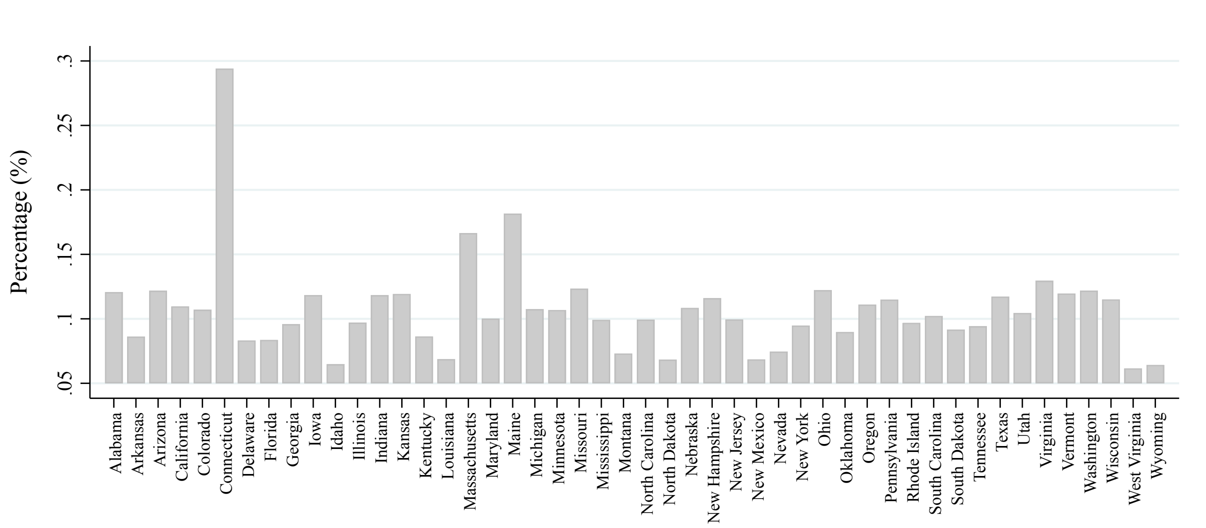
Notes: This figure presents the counterfactual changes in employment to working age population ratio across states resulting from an increase in the required domestic share of component inputs for G production to 75%.

Figure F.13: Changes in Manufacturing Employment to Working Age Population Ratio: Increase the Required Domestic Share of Component Inputs for G to 75%



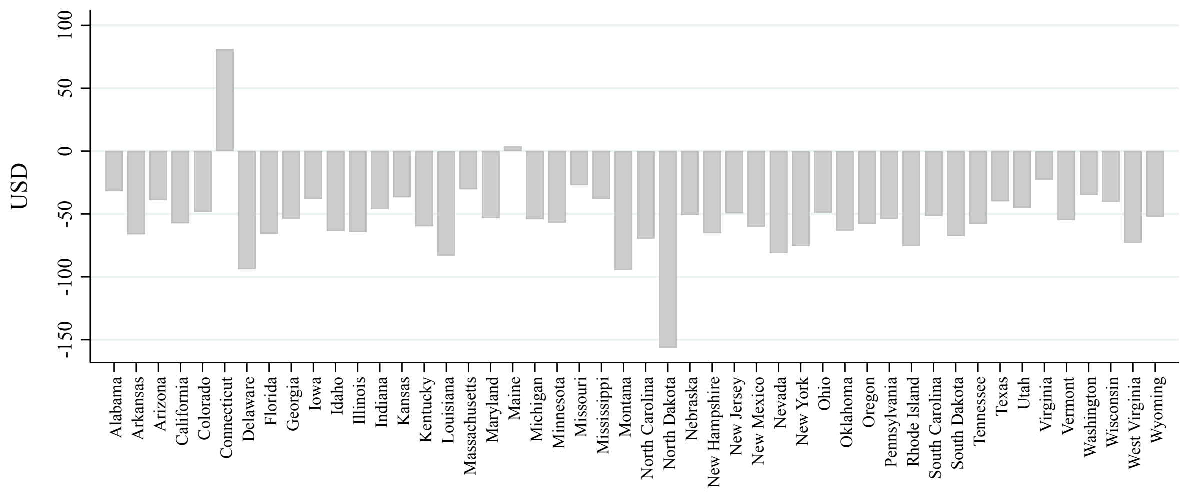
Notes: This figure presents the counterfactual changes in manufacturing employment to working age population ratio across states resulting from an increase in the required domestic share of component inputs for G production to 75%.

Figure F.14: Percentage Changes in Wages: Increase the Required Domestic Share of Component Inputs for G to 75%



Notes: This figure presents the counterfactual percentage changes in wages across states resulting from an increase in the required domestic share of component inputs for G production to 75%.

Figure F.15: Consumption Equivalent Variation (Alternative Formulation of Welfare): Increase the Required Domestic Share of Component Inputs for *G* to 75%



Notes: This figure presents the counterfactual changes in welfare across states resulting from an increase in the required domestic share of component inputs for *G* production to 75%. The welfare changes are measured by consumption equivalent variation. The calculation assumes that consumers only have access to the locally produced public goods.

Table F.1: Testing Model Predictions on Labor Market Outcomes of Procurement Demand Shocks (Alternative Measures)

Dependent Variable:	$\Delta \ln(Wage)$		$\Delta \ln(1 - EmpRate)$		$\Delta ShareMfg$	
	Actual	Simulated	Actual	Simulated	Actual	Simulated
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta Proc\_PW$ (alt.)	0.2904**	0.1992***	0.3027**	0.1992***		
	(0.1405)	(0.0088)	(0.1361)	(0.0179)		
$\Delta Proc\_PW\_Mfg$ (alt.)					2.3862	1.0613***
					(1.7109)	(0.2082)
$\Delta Proc\_PW\_NonMfg$ (alt.)					0.1159	0.1934***
					(0.1732)	(0.0294)
$\beta^{act} = \beta^{sim}$: p-value	[0.476]		[0.406]			
	{0.519}		{0.451}			
$\beta^{act,Mfg} = \beta^{sim,Mfg}$: p-value					[0.382]	
					{0.443}	
$\beta^{act,NonMfg} = \beta^{sim,NonMfg}$: p-value					[0.596]	
					{0.657}	
Initial State characteristics × Year FEs	Y	Y	Y	Y	Y	Y
Census Region × Year FEs	Y	Y	Y	Y	Y	Y
State FEs	Y	Y	Y	Y	Y	Y
Observations	96	96	96	96	96	96
R-squared	0.9395	0.9362	0.7997	0.9362	0.9173	0.8600

Notes: All regressions are weighted by the working-age population in the 5-year lagged period. Robust standard errors clustered at the state level. The p-value in brackets corresponds to the test based on a seemingly unrelated regression that combines and compares estimation results from the actual-data models (odd-numbered columns) with those from the simulated-data models (even-numbered columns). This test accounts for correlation in the error terms across equations. The p-value in curly braces corresponds to a t-test that treats the point estimates in the even-numbered columns as fixed parameters.

Table F.2: Relationship between Sector Exposures and Characteristics

	(1)	(2)	(3)	(4)	(5)
Panel A: Dependent Variable $\Delta \ln(Wage_{o,t-5})$					
$s_{ok,t}$: NAICS 54-55	-1.6038				
	(2.8985)				
$s_{ok,t}$: NAICS 42-45		0.0970			
		(0.1045)			
$s_{ok,t}$: NAICS 336			2.8848**		
			(1.4091)		
$s_{ok,t}$: NAICS 334				2.0060	
				(1.2105)	
$s_{ok,t}$: NAICS 51					-0.8439
					(1.2386)
Observations	96	96	96	96	96
R-squared	0.8912	0.8912	0.9020	0.8978	0.8921
Panel B: Dependent Variable $\Delta \ln(1 - EmpRate_{o,t-5})$					
$s_{ok,t}$: NAICS 54-55	0.9822				
	(3.9726)				
$s_{ok,t}$: NAICS 42-45		0.0141			
		(0.1101)			
$s_{ok,t}$: NAICS 336			-2.0718		
			(2.0577)		
$s_{ok,t}$: NAICS 334				-0.5296	
				(1.8204)	
$s_{ok,t}$: NAICS 51					-0.1596
					(1.4323)
Observations	96	96	96	96	96
R-squared	0.9326	0.9324	0.9354	0.9326	0.9324
Panel C: Dependent Variable $\Delta ShareMfg_{o,t-5}$					
$s_{ok,t}$: NAICS 54-55	0.2399				
	(0.8400)				
$s_{ok,t}$: NAICS 42-45		0.0027			
		(0.0200)			
$s_{ok,t}$: NAICS 336			0.5287		
			(0.4594)		
$s_{ok,t}$: NAICS 334				0.2017	
				(0.3827)	
$s_{ok,t}$: NAICS 51					-0.2935
					(0.2562)
Observations	96	96	96	96	96
R-squared	0.9411	0.9408	0.9440	0.9414	0.9431

Notes: The regressions pool two cross-sections. The first cross-section relates the change in labor market outcomes from 2004 to 2009 to industry exposures to procurement shocks ($z_{ok,t}$) in 2009-2014. The second cross-section links the change in labor market outcomes from 2009 to 2014 on industry exposures to procurement shocks in 2014-2019. All regressions control for initial state characteristics × year fixed effects, state fixed effects, and region dummies × year fixed effects. Observations are weighted by the working-age population in the five-year lagged period. For legibility, coefficients and standard errors of the first five columns are multiplied by 1,000,000. Standard errors are clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1

Table F.3: Robustness-Alternative Specifications and Measures

	$\Delta\ln(Wage)$ (1)	$\Delta\ln(1-EmpRate)$ (2)	$\Delta ShareMfg$ (3)
Panel A: Effects of Future Procurement Shocks			
$\Delta Proc\_PW : t+5$	-0.0112	0.0017	
	(0.0074)	(0.0102)	
$\Delta Proc\_PW\_Mfg : t+5$			0.0071
			(0.0063)
$\Delta Proc\_PW\_NonMfg : t+5$			-0.0035
			(0.0022)
Observations	96	96	96
R-squared	0.7939	0.8547	0.7778
Panel B: Impacts of DoD Procurement Shocks			
ΔDoD_PW	0.0087***	-0.0102**	
	(0.0031)	(0.0048)	
ΔDoD_PW_Mfg			0.0065*
			(0.0037)
ΔDoD_PW_NonMfg			0.0000
			(0.0008)
Observations	96	96	96
R-squared	0.9402	0.7982	0.9239
Panel C: Leave-One-Out Measures			
$\Delta Proc\_PW$	0.0085*	-0.0099	
	(0.0043)	(0.0060)	
$\Delta Proc\_PW\_Mfg$			0.0055
			(0.0034)
$\Delta Proc\_PW\_NonMfg$			0.0006
			(0.0007)
Observations	96	96	96
R-squared	0.9398	0.7970	0.9231
Panel D: 2-Year Difference (2010-18)			
$\Delta Proc\_PW$	0.0073*	-0.0086*	
	(0.0043)	(0.0046)	
$\Delta Proc\_PW\_Mfg$			0.0005
			(0.0010)
$\Delta Proc\_PW\_NonMfg$			0.0004
			(0.0006)
Observations	240	240	240
R-squared	0.8443	0.9595	0.9242
Initial State characteristics × Year FEs	Y	Y	Y
Census Region × Year FEs	Y	Y	Y
State FEs	Y	Y	Y

Notes: All regressions are weighted by the working-age population in the 5-year lagged period. Robust standard errors clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table F.4: Robustness - Statistical Inference

	$\Delta\ln(Wage)$ (1)	$\Delta\ln(1-EmpRate)$ (2)	$\Delta\ln(Wage)$ (3)	$\Delta\ln(1-EmpRate)$ (4)
$\Delta Proc\_PW$	0.0069**	-0.0083*		
	(0.0031)	(0.0047)		
Clustered 90% CI	$[0.0017, 0.0121]$	$[-0.0162, -0.0004]$		
AKM	$[-0.0039, 0.0189]$	$[-0.0151, -0.0024]$		
AKM0	$[-0.0063, 0.0189]$	$[-0.0143, -0.0024]$		
ΔDoD_PW			0.0087***	-0.0102**
			(0.0031)	(0.0048)
Clustered 90% CI			$[0.0035, 0.0139]$	$[-0.0183, -0.0021]$
AKM			$[0.0046, 0.0285]$	$[-0.0219, -0.0076]$
AKM0			$[0.0028, 0.0285]$	$[-0.0215, -0.0076]$
Initial State characteristics × Year FEs	Y	Y	Y	Y
Census Region × Year FEs	Y	Y	Y	Y
State FEs	Y	Y	Y	Y
Observations	96	96	96	96
R-squared	0.9397	0.7969	0.9402	0.7982

Notes: All regressions are weighted by the working-age population in the 5-year lagged period. Robust standard errors reported in the parentheses are clustered at the state level. Brackets report 90% confidence intervals: clustered intervals use a $t(G-1)$ critical value with $G = 48$ state clusters; AKM and AKM0 intervals follow the exposure-robust procedures of Adão *et al.* (2019). *** p<0.01, ** p<0.05, * p<0.1.

Table F.5: Robustness: Removing the “Buy American” Wedges on Final Goods (Broader Measure)

		Distribution of $\hat{V}_o$						
Welfare Measure	$\hat{V}_{US}$	Mean	Min	Max	EV_{US} (USD)	Δ Mfg. Jobs	Δ Jobs	Costs per Job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Without EES								
(a) Nationwide Public Goods	0.1217	0.1189	0.0530	0.1472	88.93	-36,100	-91,200	192,300
(b) Local Public Goods Only	0.1319	0.1086	-0.0277	0.5522	96.39	-36,100	-91,200	208,400
Panel B: EES in Non-Mfg Sector								
(a) Nationwide Public Goods	0.1146	0.1121	0.0434	0.1456	83.75	-40,000	-101,400	163,000
(b) Local Public Goods Only	0.1251	0.1020	-0.0360	0.5449	91.38	-40,000	-101,400	177,800
Panel C: EES at Industry Level								
(a) Nationwide Public Goods	0.1185	0.1156	0.0506	0.1461	86.55	-39,800	-101,300	168,500
(b) Local Public Goods Only	0.1287	0.1052	-0.0350	0.5515	94.00	-39,800	-101,300	183,000
Panel D: $\kappa = 1.17$								
(a) Nationwide Public Goods	0.1178	0.1161	0.0414	0.1486	86.08	-34,600	-78,600	215,900
(b) Local Public Goods Only	0.1283	0.1060	-0.0314	0.5490	93.71	-34,600	-78,600	235,000
Panel E: $\kappa = 3.12$								
(a) Nationwide Public Goods	0.1170	0.1110	0.0593	0.1452	85.50	-60,800	-206,300	81,800
(b) Local Public Goods Only	0.1275	0.1011	-0.0457	0.5602	93.19	-60,800	-206,300	89,100
Panel F: $\rho = 0$								
(a) Nationwide Public Goods	0.1175	0.1150	0.0461	0.1439	85.85	-37,900	-100,000	169,400
(b) Local Public Goods Only	0.1280	0.1050	-0.0331	0.5523	93.49	-37,900	-100,000	184,500
Panel G: $\rho = 0.5$								
(a) Nationwide Public Goods	0.1186	0.1156	0.0465	0.1483	86.67	-43,600	-103,000	165,900
(b) Local Public Goods Only	0.1291	0.1056	-0.0340	0.5485	94.31	-43,600	-103,000	180,600
Panel H: θ_s **= CP's estimates**								
(a) Nationwide Public Goods	0.2666	0.2666	0.1753	0.3073	194.82	-30,000	-80,800	475,700
(b) Local Public Goods Only	0.2836	0.2001	-0.0752	1.8501	207.19	-30,000	-80,800	505,900
Panel I: $\theta_s = 4$								
(a) Nationwide Public Goods	0.1205	0.1179	0.0521	0.1489	88.04	-38,600	-101,100	171,700
(b) Local Public Goods Only	0.1297	0.1035	-0.0329	0.5563	94.75	-38,600	-101,100	184,800
Panel J: Allowing for Inequality Aversion ($\vartheta = 2$**)**								
(a) Nationwide Public Goods	0.1175	0.1150	0.0458	0.1453	85.84	-39,900	-100,500	168,500
(b) Local Public Goods Only	0.1280	0.1049	-0.0338	0.5504	93.37	-39,900	-100,500	183,200
Panel K: $1 - \varphi = 0.16$								
(a) Nationwide Public Goods	0.5262	0.5240	0.4636	0.5505	442.35	-39,900	-100,500	868,100
(b) Local Public Goods Only	0.5771	0.4778	-0.0080	2.7062	485.15	-39,900	-100,500	952,100

Notes: This table shows the effects of the policy experiment that removes the “Buy American” wedges on final goods on welfare and manufacturing employment. In Row (a), welfare changes are calculated according to (F.8), assuming consumers have the access to the composite public goods from different states. In Row (b), welfare changes are calculated according to (F.9), assuming consumers only have the access to the locally produced public goods. Column (1) shows the aggregate welfare effect for the US, in percentage terms $100(\sum_o \frac{L_o}{L_{US}} \hat{V}_o - 1)$. Columns (2)-(4) present the summary statistics of the distribution of $\hat{V}_o$ across states: Column (2) shows the mean welfare effect $100(\frac{1}{N_o} \sum_o \hat{V}_o - 1)$; and Columns (3) and (4) show the minimum and maximum of $100(\hat{V}_o - 1)$, respectively. Column (5) displays the consumption equivalence variation (EV) per worker measured by USD. Column (6) shows the counterfactual change in the number of manufacturing jobs for the US. Column (7) shows the counterfactual change in the number of jobs for the US. Column (8) displays the cost per job saved due to the BAA wedge on final goods $\tau_s^{f,G}$.

Table F.6: Robustness: Increasing the Required Domestic Share of Inputs For G Production to 75%

Welfare Measure	$\hat{V}_{US}$ (1)	Distribution of $\hat{V}_o$: Mean (2)	Min (3)	Max (4)	EV_{US} (USD) (5)	Δ Mfg. Jobs (6)	Δ Jobs (7)	Costs per Job (8)
Panel A: Without EES								
(a) Nationwide Public Goods	-0.0712	-0.0695	-0.1091	0.1331	-52.04	18,000	86,500	118,700
(b) Local Public Goods Only	-0.0710	-0.0695	-0.1098	0.1304	-51.90	18,000	86,500	118,400
Panel B: EES in Non-Mfg Sector								
(a) Nationwide Public Goods	-0.0677	-0.0666	-0.1068	0.1308	-49.49	16,400	87,100	112,000
(b) Local Public Goods Only	-0.0675	-0.0665	-0.1075	0.1278	-49.33	16,400	87,100	111,700
Panel C: EES at Industry Level								
(a) Nationwide Public Goods	-0.0715	-0.0703	-0.1068	0.1095	-52.27	16,400	86,500	119,200
(b) Local Public Goods Only	-0.0712	-0.0702	-0.1073	0.1058	-52.05	16,400	86,500	118,700
Panel D: $\kappa = 1.17$								
(a) Nationwide Public Goods	-0.0722	-0.0718	-0.1094	0.1183	-52.72	12,800	68,600	151,600
(b) Local Public Goods Only	-0.0719	-0.0717	-0.1100	0.1148	-52.56	12,800	68,600	151,100
Panel E: $\kappa = 3.12$								
(a) Nationwide Public Goods	-0.0690	-0.0651	-0.1005	0.0755	-50.42	31,600	170,600	58,300
(b) Local Public Goods Only	-0.0688	-0.0651	-0.1010	0.0734	-50.29	31,600	170,600	58,100
Panel F: $\rho = 0$								
(a) Nationwide Public Goods	-0.0712	-0.0695	-0.1091	0.1331	-52.04	18,000	86,500	118,700
(b) Local Public Goods Only	-0.0710	-0.0695	-0.1098	0.1304	-51.90	18,000	86,500	118,400
Panel G: $\rho = 0.5$								
(a) Nationwide Public Goods	-0.0716	-0.0707	-0.1053	0.1016	-52.34	15,600	86,900	118,900
(b) Local Public Goods Only	-0.0714	-0.0707	-0.1059	0.0983	-52.18	15,600	86,900	118,500
Panel H: θ_s **= CP's estimates**								
(a) Nationwide Public Goods	-0.0796	-0.0801	-0.1188	0.1488	-58.18	15,700	75,800	151,400
(b) Local Public Goods Only	-0.0795	-0.0803	-0.1196	0.1466	-58.08	15,700	75,800	151,100
Panel I: $\theta_s = 4$								
(a) Nationwide Public Goods	-0.0768	-0.0756	-0.1144	0.1249	-56.11	17,400	91,600	120,900
(b) Local Public Goods Only	-0.0766	-0.0756	-0.1151	0.1216	-55.96	17,400	91,600	120,600
Panel J: Allowing for Inequality Aversion ($\vartheta = 2$**)**								
(a) Nationwide Public Goods	-0.0714	-0.0702	-0.1067	0.1143	-52.19	16,400	86,600	118,900
(b) Local Public Goods Only	-0.0712	-0.0702	-0.1074	0.1112	-52.04	16,400	86,600	118,600
Panel K: $1 - \varphi = 0.16$								
(a) Nationwide Public Goods	-0.3526	-0.3516	-0.3832	-0.1916	-296.18	16,400	86,600	674,700
(b) Local Public Goods Only	-0.3516	-0.3514	-0.3871	-0.2060	-295.35	16,400	86,600	672,900

Notes: This table shows the effects of the policy experiment that increases the required domestic share of inputs to 75% for G production. In Row (a), welfare changes are calculated according to (F.8), assuming consumers have the access to the composite public goods from different states. In Row (b), welfare changes are calculated according to (F.9), assuming consumers only have the access to the locally produced public goods. Column (1) shows the aggregate welfare effect for the US, in percentage terms $100(\sum_o \frac{L_o}{L_{US}} \hat{V}_o - 1)$. Columns (2)-(4) present the summary statistics of the distribution of $\hat{V}_o$ across states: Column (2) shows the mean welfare effect $100(\frac{1}{N_o} \sum_o \hat{V}_o - 1)$; and Columns (3) and (4) show the minimum and maximum of $100(\hat{V}_o - 1)$, respectively. Column (5) displays the consumption equivalence variation (EV) per worker measured by USD. Column (6) shows the counterfactual change in the number of manufacturing jobs for the US. Column (7) shows the counterfactual change in the number of jobs for the US. Column (8) displays the cost per job saved due to the policy experiments that raises the required domestic share of inputs to 75% for G production.

Table F.7: Reshuffle τ_s^{fG} to be Perfectly Aligned with $\theta_s \nu_s$

Welfare Measure	$\hat{V}_{US}$	Distribution of $\hat{V}_o$ Mean	Min	Max	EV_{US} (USD)	Δ Mfg. Jobs	Δ Jobs	Costs per Job
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) Nationwide Public Goods	0.0136	0.0129	-0.0012	0.0371	9.90	-8,600	-7,000	279,600
(b) Local Public Goods Only	0.0191	0.0208	-0.0052	0.1170	13.92	-8,600	-7,000	393,000

Notes: This table shows the effects of the policy experiment that reshuffles the BAA wedges on final goods so that they are positively correlated with the strength of EES across manufacturing industries. In Row (a), welfare changes are calculated assuming consumers have access to the composite public goods from different states. In Row (b), welfare changes are calculated assuming consumers only have access to the locally produced public goods. Column (1) shows the aggregate welfare effect for the US, in percentage terms $100(\sum_o \frac{L_o}{L_{US}} \hat{V}_o - 1)$. Columns (2)-(4) present the summary statistics of the distribution of $\hat{V}_o$ across states. Column (5) displays the consumption equivalence variation (EV) per worker measured by USD. Columns (6) and (7) show the counterfactual changes in manufacturing and total jobs. Column (8) displays the cost per job.