

Working Papers

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Imprint:

CESifo Working Papers

ISSN 2364-1428 (digital)

Publisher and distributor: Munich Society for the Promotion
of Economic Research - CESifo GmbH

Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740

Email office@cesifo.de
<https://www.cesifo.org>

Editor: Clemens Fuest

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Trade restrictions as effective industrial policy? Evidence from Indonesia’s import licensing scheme*

Benedikt Heid[†] Laura Márquez-Ramos[‡] Harry Wardana[§]

May 27, 2026

Abstract

Industrial policy is on the rise. A key instrument used by governments is import licensing to protect domestic industries. However, evidence of its effectiveness is limited. Using customs and firm level data, we estimate the effects of the introduction of import licensing for iron and steel products in Indonesia in 2009. While we find that the number of incoming shipments of protected products is reduced, and that imports are sourced from fewer countries, the overall value or quantity of imports is not affected. At the same time, while domestic iron and steel producers increase their sales in the short run, we find that these effects disappear two years after the enactment of the licensing scheme. Our results suggest that while import licensing imposes costs on importers who have to adjust their supply chains, sustained gains for domestic producers are limited. This implies that import licensing is ineffective as an industrial policy.

JEL classification: F13, F14, L52, L61

Keywords: trade restrictions, import licensing, industrial policy, Indonesia, iron and steel

*Acknowledgements: The authors would like to thank seminar participants of the XXII INTECO Workshop in València, the HDR Workshop in the School of Economics at the University of Adelaide as well as Alejandro Cuñat, Krisztina Kis-Katos, Arianto Patunru, Richard Pomfret, Francisco Requena Silvente, Arne Risa Hole, and Hylke Vandenbussche for helpful comments and suggestions. Heid and Márquez-Ramos gratefully acknowledge financial support received from the Australian Research Council under project number DP190103524, from PID2020-114646RB-C42 funded by MCIN-AEI/10.13039/501100011033 (a project from the Ministerio de Ciencia e Innovación (MCIN), Agencia Estatal de Investigación (AEI), Spain), from PID2023-147397NB-I00 (a project from the Ministerio de Ciencia, Innovación y Universidades, Agencia Estatal de Investigación (AEI), Spain), from the Prometeo project CIPROM/2022/50 financed by the Generalitat Valenciana, and from the Plan de Promoción de la Investigación de la Universitat Jaume I, UJI-B2022-36-(22I587). Heid also gratefully acknowledges financial support from the Spanish Ministry of Universities (Ministerio de Universidades, Plan de Recuperación, Transformación y Resiliencia) through María Zambrano contract MAZ/2021/04(UP2021-021) financed by the European Union - NextGenerationEU. Wardana is grateful for scholarship assistance under the University of Adelaide’s Adelaide Scholarship International. A previous version of this paper was part of Wardana’s PhD thesis. Part of the work on this paper was done while Heid and Márquez-Ramos were affiliated with the University of Adelaide. The funding sources had no involvement in the writing of this paper nor the decision to submit it for publication.

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1 Introduction

Industrial policy is on the rise: Between 2010 and 2022, the number of national-level industrial policies has increased fifteenfold.¹ Industrial policy intends to change the structure of the economy by subsidizing or protecting domestic industries, such as steel or semiconductors, to achieve policy goals, or to encourage the transition to a more sustainable economy.² Besides direct production subsidies, protecting domestic industries via import restrictions, e.g., through licensing requirements, is one of the most used industrial policies.³ Import licensing procedures consist of the steps and paperwork firms must complete to import goods. Recent data further confirm this trend: The WTO’s December 2024 *Trade Monitoring Report* flagged a further rise in import restrictive measures between 2023 and 2024 (WTO, 2024), covering 11.8% of world imports.⁴ The United Nation’s *Global Trade Update* (December 2023) linked that uptick to governments’ industrial policy and climate agendas (UNCTAD, 2023). Accordingly, UNIDO’s *Industrial Development Report 2024* describes the present period as “the new era of industrial policy,” noting that states increasingly rely on regulatory tools such as import licensing to shield strategic industries at minimal fiscal cost (UNIDO, 2024). Collectively, these findings show that bureaucratic barriers are increasingly replacing traditional trade policy instruments such as tariffs.⁵

There is a vast literature that quantifies the effects of traditional trade policies.⁶ In contrast, we do not know much about the effects of industrial policies such as import licensing schemes. Accordingly, Juhász et al. (2024) call for the empirical evaluation of their effects, stressing the need for credible, causal identification of policy effects to determine their efficacy. As Juhász et al. (2024) argue, one reason for the lack of evidence is that industrial policies are complex, and are difficult to evaluate in terms of their overall welfare effects, as most stated motivations for industrial policies allude to some market failure or externality that is difficult to observe or verify. As a result, more recently, the empirical literature on industrial policies has focused on identifying the effectiveness of individual industrial policies in particular settings. If these policies are to reach their stated policy goals, at a minimum,

¹For evidence, see Juhász et al. (2022).

²For a definition and discussion of industrial policy, see Juhász et al. (2024).

³In a study of the steel industry in a panel of 22 economies from 1975 to 2000, Blonigen (2016) finds that production subsidies and import licensing requirements are the most often used industrial policies. Evenett et al. (2024) document that after direct subsidies and explicit import tariffs, import licensing requirements are the most often used industrial policy that directly focuses on imports in emerging and developing economies in 2023.

⁴For comparison, in 2009, only 0.6% of world imports were covered by import restrictions.

⁵Import restrictions via licensing schemes may be relatively more difficult to implement as they imply a more complex administrative setup than tariffs, but they may have other advantages from a political economy perspective. For example, import licensing schemes may be perceived as implementing regulations necessary to uphold technical standards instead of as outright protectionist measures. Domestic consumers may therefore be oblivious to their potential negative effects on consumer prices, see Coate and Morris (1995). This may make them more innocuous policy instruments, not only domestically but also internationally. For the same reason, they may be less effective than tariffs as retaliatory measures in an international trade dispute.

⁶See, e.g., Yotov et al. (2016) for an overview of the literature that uses structural gravity models. For more detailed studies on the effects of tariffs and tariff wars, see, e.g., Amiti et al. (2019) and Fajgelbaum et al. (2020), or Ignatenko et al. (2025) who study the effects of the “Liberation Day” tariffs of the second Trump administration.

they should change firm behavior and lead to firm adjustments in line with these goals. In the case of import licensing schemes, the ultimate goal is probably to protect domestic producers of the goods subject to licensing, i.e., to increase domestic production. At a minimum, for this protective effect to occur, an effective policy has to actually reduce imports of the licensed goods.

In this paper, we provide an evaluation of one of the most used import restrictive measures, i.e., import licensing requirements, by quantifying their effect on both importers (i.e., users) and producers of protected products. We focus on Indonesia’s iron and steel industry. Indonesia is an ideal case to study the effect of import licensing: It liberalized its international trade relationships by reducing import tariffs after its WTO accession in 1995, see Amiti and Konings (2007), and further in the wake of the 1998 Asian financial crisis, see Patunru and Rahardja (2015). In 2008, Indonesia’s average MFN tariff rate stood at 5.4%, see Marks and Rahardja (2012). Subsequently, however, it substituted traditional trade policy measures by introducing non-tariff measures (NTMs) and import restricting measures, such as import licensing requirements, see Pangestu et al. (2015). The growing concern over Indonesia’s import licensing regimes during this period was also stated in the WTO’s 2013 Trade Policy Review of Indonesia.⁷ While barriers such as restrictions on foreign ownership also imposed by the Indonesian government have been the subject of academic study, see Genthner and Kis-Katos (2022) and Gehrke et al. (2025), Indonesia’s import licensing scheme has received little scrutiny so far.⁸

In February 2009, Indonesia introduced an import licensing scheme for iron and steel products. The policy scope was broad and affected over 173 iron and steel products, representing 42.3% of all Indonesian metal imports. Using Indonesian customs data from 2006 to 2011 and a Difference-in-Differences event-study approach, we analyze the consequences of the import licensing scheme for iron and steel products. We compare iron and steel products subject to the February 2009 import licensing policy (the treatment group) with other base metal products that were not subject to the policy (the control group), exploiting the policy’s introduction as a quasi-natural experiment that allows us to identify its causal effects on both the extensive and intensive margins of imports. This allows us to identify the dynamic effects on the imports of metal products affected by the import licensing scheme and compare them with unaffected metal product imports to evaluate how firms respond over time to the imposition of the import licensing scheme.

We not only identify the effect of the import licensing scheme on metal product importers, but, by using annual firm level manufacturing data, we also identify the effect of the import licensing scheme for domestic metal producers, i.e., those firms protected by the import restrictive measure. This allows us to answer Juhász et al. (2024)’s call for a detailed empirical

⁷WTO Members urged Indonesia to “reconsider a number of trade restrictive measures – including import licensing and permit requirements, which apply to a broad range of products and cover around 20% of all tariff lines and other measures such as point of entry restrictions on imports, pre-shipment inspection requirements as well as various export taxes and prohibitions – which have the effect of disrupting trade and reducing access to Indonesian markets.” (WTO, 2013).

⁸Note that the investment restrictions via Indonesia’s Negative Investment List (*Daftar Negatif Investasi*) as well as its reforms studied by Genthner and Kis-Katos (2022) and Gehrke et al. (2025) did not affect the iron and steel industry which we study in this paper, see Leshner (2012). For a recent descriptive case study of import licensing of agricultural goods by Indonesia, see Ahn and Gnutzmann-Mkrtchyan (2019).

evaluation of the effects of industrial policies. More specifically, our paper also responds to Marks and Rahardja (2012)’s request for a study of the NTMs present in Indonesia’s steel sector.

We distinguish between the extensive and intensive margins of trade. The extensive margin measures the number of countries a product is imported from as well as the number of shipments that arrive for a given product. The intensive margin refers to the total value or the total weight of the traded goods for a given product. Examining the effect of the import licensing scheme on both import margins provides a better understanding of its broader implications for Indonesia’s manufacturing firms and allows us to study its impact on what is sometimes called the lumpiness of imports, see e.g., Alessandria et al. (2010).

We find that while import licensing does not affect the value or quantity imported, i.e., the intensive margin, we find a negative effect on the number of shipments and the number of import source countries, i.e., the extensive margin. Reducing the number of shipments and the number of import source countries implies that importers tend to have a less diversified input supply chain. Over time, we find that the negative effect on the number of shipments decreases. The effect on the number of import source countries is persistent. Concerning the protective effects of the policy for domestic iron and steel producers, we find an increase of their sales one year after the introduction of import licensing, but this effect is short-lived and disappears after two years. Hence, we do not find significant increases in domestic sales of Indonesian iron and steel producers in the medium term. Taken together, these results suggest that import licensing leads iron and steel importers to adjust their supply chains by sourcing from fewer countries but without reducing the overall amount of their imports. At the same time, the protective effects of import licensing for domestic iron steel producers are limited. Our results therefore question the suitability of import licensing schemes as an effective industrial policy measure.

While our analysis focuses on one specific policy in one country, our results have broader policy implications beyond Indonesia’s iron and steel industry. Import restrictions are among the instruments most frequently deployed by emerging markets and developing economies in the recent wave of industrial policy revival (see Evenett et al., 2024), making causal evidence on their effects particularly timely. In addition, our results suggest that the ease of substitution between different import source countries is driving the lack of effectiveness of the import restrictions. This implies that our results should generalize to products for which substitutes are easily available, such as other homogeneous goods.

Our paper relates to the literature that quantifies the effects of NTMs. Previous research typically focuses on aggregate measures of NTMs using constructed tariff-equivalent measures. These measures lump together several NTM policies into a single aggregate, e.g., effective protection rates by Anderson (2003). Aggregating several policies into one measure challenges a credible identification of the causal effects of a policy, as it is not clear which particular policy causes variation in the data. Our paper mitigates these concerns by identifying the dynamic effect of a specific policy in a particular setting such as Indonesia’s iron and steel importers and domestic producers.

One strain of the literature focuses on the trade effects of NTMs by focusing on technical barriers to trade (TBT) and sanitary and phytosanitary measures (SPS), see, e.g., Disdier et al. (2008); Essaji (2008); Yue and Chengyan (2009); Disdier and Marette (2010); Bao and Chen (2013); Fontagné et al. (2015); Murina and Nicita (2017). Another strain focuses on

NTMs that are non-technical, e.g. administrative requirements.⁹ Most of this literature uses aggregate data to estimate gravity models to evaluate their trade effects, see, e.g., Martínez-Zarzoso and Márquez-Ramos (2008); Djankov et al. (2010); Hornok and Koren (2015b); Wagner (2016); Heid et al. (2021). Using customs shipment data from Spain that are similar to the data we use in this paper, Hornok and Koren (2015a) show that administrative barriers reduce aggregate trade as well as the total number of shipments. Along this line, Hornok and Koren (2015b) show that shipments of products with higher administrative costs not only become less frequent but also larger. Hayakawa et al. (2019) study the effects of import processing time in Thailand at the firm level and also find that an increase in import processing time reduces firms' import shipment frequencies but raises their imports per shipment.

A common theme of this literature is that it uses similar measures to quantify technical barriers to trade, mostly relying on the proxies provided by the World Bank's Doing Business Indicators that measure the number of days or the number of documents needed to import goods. An issue with these indicators is that it is not clear whether they actually measure NTMs or capture country-specific variation in the overall quality of institutions, see the evidence presented in Sharafeyeva and Shepherd (2020).¹⁰ This highlights the need for evaluating specific, identifiable policies that affect administrative barriers, such as the import licensing procedures we study in this paper. We use the introduction of a particular administrative barrier, import licensing procedures for iron and steel in Indonesia. By focusing on a single policy, we can identify the causal effect of the import licensing scheme, allowing for a more transparent and clearer interpretation without relying on proxies.

Our paper also relates to the literature on the lumpiness of trade, i.e., the determinants of shipment size and frequency in international trade transactions. Alessandria et al. (2010) study the effect of large currency devaluations on the size of import shipments using a quantitative model of firms that choose the frequency of their import shipments to manage their inventory. Using Swiss customs data, Kropf and Sauré (2014) quantify fixed costs per shipment and the relationship between the elasticity of demand and shipment size. Using US and Spanish customs data, Hornok and Koren (2015a) show that shipment size increases with the time and cost spent on passing through customs, whereas Békés et al. (2017) study the impact of demand uncertainty on shipment size using French customs data. While this literature has documented the importance of overall per shipment costs, it abstracts from quantifying the effects of a particular policy such as the import licensing scheme we are focusing on.

Finally, our paper also relates to the literature on the trade effects of anti-dumping measures, which represent a different form of providing protection from import competition for domestic producers.¹¹ Anti-dumping measures can be imposed by an importing country

⁹The distinction between technical and non-technical measures is based on the UNCTAD classification of NTMs, see Nicita and Gourdon (2013).

¹⁰In 2020, after detecting data irregularities in the 2018 and 2020 editions, the World Bank decided to discontinue the Doing Business Indicators (see the statement from the World Bank at <https://www.worldbank.org/en/news/statement/2020/08/27/doing-business---data-irregularities-statement>).

¹¹Vandenbussche and Zanardi (2010) and Egger and Nelson (2011) study the trade effects of anti-dumping measures using aggregate trade data, whereas Konings et al. (2001), Besedeš and Prusa (2017), and Sandkamp (2020) are examples of studies using product-level data. Using information on firms targeted by

as a reaction to dumping, i.e., the sale of goods below their price in the origin country.¹² The two main types of anti-dumping measures are duties and undertakings: Duties are tariffs imposed on firms found to have engaged in dumping, while undertakings are voluntary commitments by the exporter, e.g., to observe a minimum price. About 80% of anti-dumping measures take the form of duties, see Zanardi (2004). While anti-dumping measures can also be seen as “industrial policy [...] in disguise”, see Konings and Vandenbussche (2005), the trade-restricting measures we study are import licenses and are unrelated to anti-dumping measures. Similar to the literature on the trade effects of anti-dumping, we find significant trade-reducing effects, albeit less persistent, and only for the extensive margin.

The remainder of the paper is structured as follows. Section 2 provides the policy background. Section 3 describes the data. Section 4 describes our identification strategy. Section 5 presents results for iron and steel importers, whereas Section 6 presents results for iron and steel producers. Section 7 concludes.

2 Policy background: Indonesia’s import licensing scheme for iron and steel

The “Provisions on the Import of Iron or Steel” (Decree of the Minister of Trade No 08/M-DAG/PER/2/2009), signed by then Minister of Trade Mari Pangestu on 18 February 2009, established a protective import-licensing regime for iron and steel.¹³ Based on our customs data for 2006 to 2011, the iron and steel products listed in the policy represent 42.3% of the total import value in the Indonesian metal sectors.¹⁴ When compared to total merchandise imports, using UNCOMTRADE data for 2009, the metal sector represents about 9.9% of all Indonesian imports.

According to the preamble of the law, its stated intention is “to support the creation of fair domestic trade and market as well as preserve conducive business climate”, and “to create conducive business climate and administrative order in the field of the import of iron or steel,

anti-dumping measures, Jabbour et al. (2019) and Felbermayr and Sandkamp (2020) study their trade effects at the firm level. Finally, Durling and Prusa (2006) study the trade effects of anti-dumping measures on international trade in a dataset of steel products for a panel of countries.

¹²For an overview of anti-dumping, see Vandenbussche and Zanardi (2007).

¹³It entered into force on the same day, but the stipulated requirement to provide a surveyor’s report on a technical verification in the loading port was not binding until 1 April. The decree was amended by a further Decree of the Minister of Trade, No 21/M-DAG/PER/6/2009, on 11 June that clarified certain articles in the original decree and somewhat relaxed the reporting requirements. In particular, it removed the need for providing a prospective annual import plan that covered the planned quantity of imported iron and steel products as well as their port of origin. The mandatory loading port verification was however maintained. Under the WTO Agreement in Import Licensing Procedures, members have to notify new licensing procedures or changes in existing ones (see chapter 29 in Koul, 2018). The 2009 provision had been notified to the WTO on 15 May 2009. The original decree foresaw the expiration of the policy on 31 December 2010, but Decree No. 54/M-DAG/PER/12/2010 published on 28 December 2010 contained essentially the same import licensing scheme, with most articles being identical to the previous decrees, but with a more extensive administrative sanction regime for non-complying firms. This decree came into force 1 January 2011 and expired 31 December 2012, after the end of our sample period, so for all practical purposes, the import licensing scheme was continuously in place from 18 February 2009 until at least 2012.

¹⁴We list the products regulated by the policy in Table A.1 in the online Appendix.

it is necessary to stipulate provision on the Import of iron or steel”.¹⁵ Statements from the government from the time of publication of the law echo these statements. According to the then Director General of Foreign Trade (*Direktur Jenderal Perdagangan Luar Negeri*), Diah Maulida, from the Directorate General of Foreign Trade, part of the Indonesian Ministry of Trade, another reason for the implementation was to prevent “illegal imports” of non-Indonesian National Standard (SNI) steel products such as zinc-coated steel, as well as to prevent the misclassification of imports in order to evade tariffs.¹⁶

Overall, the policy’s intention appears to be protectionist, which is also consistent with statements by industry representatives complaining that domestic producers are unable to compete with low-priced imports.¹⁷ More broadly, the use of import licensing is in line with Indonesia’s increasing reliance on NTMs to counter rising import competition, in particular from China, see, e.g., Pane (2026).

The policy introduced new procedures for the import of iron and steel: (i) It required registration of importers with Indonesia’s Ministry of Trade: Under the decree, iron and steel imports may only be imported by Registered Importers (IT) or Producer Importers (IP) of steel or iron. This status is valid for one year and may be extended; (ii) Pre-shipment import technical verification: This must be done by an independent state-appointed surveyor at the loading port. The import technical verification covers the type of goods, classification of goods, quantity, and port of destination; and (iii) Submission of quarterly reports on the realization of imports: The written reports must be submitted to the Director-General of the Ministry of Trade.

All costs associated with the above requirements, including the fees for the external surveyor, are borne by the importer. Repeated failure to abide by the article will result in the revocation of the Registered Importers (IT) or Producer Importers (IP) of Steel or Iron status. The regulation applies to a number of domestically produced steel products including hot rolled coil, hot rolled plate, layered sheet iron, welding pipes, wire rods, and coated-steel products. Some items excluded from the verification and import technical tracking regulation are: steel or iron imported by licensed importers (ITs) of steel or iron in the automotive industry, electronics industry, ship dock industry and their relevant components; steel or iron imported that is already subjected to import verification based on the User Specific Duty Free Scheme (USDFS/BM-DTP); and steel or iron imported for industrial needs in Special Economic Zones (SEZs).

Finally, note that the Indonesian import licensing scheme is distinct from import licensing schemes created to implement import quotas, i.e., those that impose a quantitative restriction on imports.¹⁸ The Indonesian scheme imposed no quantitative restrictions, provided that imports complied with the regulations specified in the ministerial decree.

¹⁵Translations taken from https://www.flevin.com/id/lgso/translations/JICA%20Mirror/english/4391_08_M-DAG_PER_2_2009_e.html, accessed 15/06/2026.

¹⁶See <https://www.hukumonline.com/berita/a/aturan-antisipasi-impor-baja-ilegal-diterbitkan-ho121261/>, accessed 15/05/2026.

¹⁷See <https://www.hukumonline.com/berita/a/aturan-impor-besi-atau-baja-diterbitkan-ho122309/>, accessed 15/05/2026.

¹⁸An example is the Argentine import licensing scheme; see, e.g., Atkin et al. (2024) and Bernini et al. (2025). Contrary to the Indonesian import licensing scheme on iron and steel products, the Argentinian scheme applied to all imports and was not based on a regulation or a law. Instead, its application was completely arbitrary; see Atkin et al. (2024).

3 Data

3.1 Customs data

We use data from the Compilation of Import Declaration Documents from 2006 to 2011 from the Indonesian Central Bureau of Statistics (BPS). Import declaration documents are filled out by importers and approved by customs and excises regional offices, and then sent to BPS and Bank of Indonesia. Each document, administered at the shipment level, covers information about the imported goods such as product classification, value (in US\$), net weight (in tonnes), country of origin, port of arrival, and the time of arrival (month and year). From this raw data, we generate four monthly variables: the number of shipments, the number of countries of origin, the value of shipments, and the net weight of shipments, aggregated at the 6-digit HS Code product level. We measure the extensive margin of imports with the number of shipments and the number of countries of origin; and the intensive margin of imports with the value and weight of incoming shipments.

Proclaimed on 18 February 2009, the Decree of the Minister of Trade No 08/M-DAG/PER/2/2009 introduced new procedures for the import of iron and steel. Given that our sample runs from 2006 to 2011, we have a quite balanced period leading to (37 months) and following (33 months) the policy implementation. As iron and steel are categorized as metal products, in order to minimize the noise in the data we restrict our sample to only include import data of metal products. More specifically, in our final dataset we only include observations for products of base metals and articles of base metals (e.g. copper, aluminium, zinc, nickel, lead, and tin).¹⁹

The policy excludes steel and iron that is (i) imported by the automotive industry, electronics industry, ship dock industry and their relevant components; (ii) subject to import verification based on the User Specific Duty Free Scheme; and (iii) for the industrial needs in special economic zones (SEZs).²⁰ Concerning exclusion (iii), the relevant SEZs for the period analysed in this research are Batam, Bintan and Karimun islands, which are all located in the Riau Archipelago province (Rothenberg and Temenggung, 2019). Hence, in our final dataset we exclude shipments that come into ports in these zones. However, we will later revisit these data for our robustness tests.

Table 1 presents the summary statistics of our final dataset. The table reports the mean and standard deviation (in parentheses) of our variables of interest: the extensive and intensive margin of imports. We report the log of the intensive margin. The balanced panel dataset contains 43,488 product-month observations for the period 2006–2011.²¹ In Table 1, we present the descriptive statistics for the first half of our entire time period, 2006–2008 (shown in the top panel), and the second half, 2009–2011 (shown in the bottom panel). Column (1) reports the statistics for shipments of all metal products. Column (2) reports the statistics for the shipments of iron and steel products listed in the 2009 import

¹⁹See Table A.2 in the online Appendix for a list of products (at 2-digit HS Code) that are included in our final dataset.

²⁰Given the difficulty to merge customs and firm level data in Indonesia (see, e.g., Márquez-Ramos, 2022), we are unable to incorporate exclusions (i) and (ii) in our analyses.

²¹We take into account the presence of no shipments at the product-month level by generating zero values across the dependent variables in these cases.

Table 1: Summary statistics of monthly incoming shipments from 2006 to 2011.

	(1) All metal products	(2) Iron and steel products with import licensing	(3) Products of other metals without import licensing
<u>2006–2008 (years without import licensing):</u>			
Avg # of shipments	16.44 (25.59)	20.13 (37.85)	14.86 (17.67)
Avg # of countries of origin	7.75 (6.15)	8.28 (6.80)	7.52 (5.83)
Avg ln(import value)	12.08 (2.39)	12.93 (2.12)	11.72 (2.40)
Avg ln(import net weight)	11.12 (2.91)	12.50 (2.45)	10.53 (2.90)
<u>2009–2011 (years with import licensing):</u>			
Avg # of shipments	19.06 (35.44)	20.99 (52.34)	18.22 (24.59)
Avg # of countries of origin	8.03 (6.71)	7.57 (7.21)	8.23 (6.48)
Avg ln(import value)	12.49 (2.39)	13.02 (2.27)	12.26 (2.41)
Avg ln(import net weight)	11.22 (2.97)	12.28 (2.66)	10.76 (2.98)
Number of products (6-digit HS)	604	173	431
Number of observations	43,488	12,456	31,032

Notes: Table reports the mean and standard deviation (in parentheses) of our dependent variables. Observations are at the 6-digit product level and the time period is monthly. Column (1) reports the statistics for shipments of all “Base Metals and Articles of Base Metals”; column (2) reports the statistics for the shipments of iron and steel products listed in the 2009 import licensing procedures; and column (3) reports the statistics for the shipments of products of other metals not listed in the policy. The number of observations is for the entire period, i.e. 72 months.

licensing procedures. Column (3) reports the statistics for the shipments of products of other metals not listed in the policy. The total number of products in our dataset is 604, with 173 products listed in the policy and 431 not listed products.

In the first half of the period (2006–2008), i.e., before the imposition of the import licensing policy, we observe substantial differences between the two groups. The mean values are all higher for the listed iron and steel products compared to the non-listed products. This highlights the importance of iron and steel products for the metal industry in Indonesia. In terms of the extensive margin, the difference in the monthly number of shipments is more profound, with 20 shipments per month for the listed products versus 15 shipments a month for the non-listed products.

In the second half of the period (2009–2011), i.e., during the policy, we still observe significant differences between the two groups of products that go in the same direction than before the policy (excluding the case of number of countries of origin, which during the policy, is higher for other metals than for iron and steel products). In addition, differences between the two groups of products are considerably lower than before the policy in both the extensive and the intensive margin of imports.

This descriptive analysis highlights persistent but reduced differences between treated (listed in the policy) and non-treated (non-listed) products, a pattern that sets the stage for our identification strategy and motivates the causal analysis of the effect of industrial policy on the extensive and intensive margin of imports in protected industries.

3.2 Manufacturing census firm level data

The Indonesian customs data to which we obtained access from BPS do not contain firm identifiers.²² This prevents us from exploiting firm information in our analysis of the customs data that focuses on iron and steel importers, i.e., users. For our analysis of domestic iron and steel producers, we therefore resort to census data of Indonesian manufacturing plants. More specifically, we use a firm level dataset, *Statistik Industri Besar dan Sedang (IBS)* (survey of large and medium sized industries/enterprises), that provides a census of all Indonesian manufacturing plants with 20 or more employees over the period 2006–2011. It comes from an annual survey conducted by BPS. The questionnaire, administered at the national level, is anonymous and covers establishment characteristics including their sales at the product level.²³ We use all manufacturing firms that are continuously active between 2006 and 2011 in ISIC industries 27 to 37, i.e., iron and steel producing industries as well as industries that produce goods that use iron or metal products as intermediate inputs, i.e., manufacturers of other metal products. We define treatment analogously as in our customs data analysis by identifying firms that are classified as producers of iron and steel products affected by

²²While some researchers have access to a version of the customs data that includes firm identifiers for a different time period, BPS did not facilitate it to us. The difficulty of obtaining the customs dataset with firm identifiers is well-known, see Pane (2019) and Márquez-Ramos (2022) for a discussion.

²³Firms are classified using the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 3, in its Indonesian variant *Klasifikasi Baku Lapangan Usaha Indonesia (KBLI)*. Firms producing more than one product are classified according to their main product, which is defined as the product with the largest production value.

the import licensing policy.²⁴ Our final dataset contains 22,080 firm-year observations with positive sales for the period 2006–2011: 3,818 observations for the treated iron and steel manufacturers and 18,262 observations in the control group.²⁵

4 Identification strategy

4.1 Regression specification

We are interested in estimating the effect of the import licensing scheme on Indonesian imports at the product level. Using the introduction of the import licensing scheme in February 2009 as a quasi-natural experiment, we compare iron and steel products subject to the policy (the treatment group) with other base metal products that were not subject to the policy (the control group). In particular, to quantify the effect of the import licensing procedures on incoming shipments, i.e., imports, we use a Difference-in-Differences (DID) framework. Our baseline DID regression is given by:

$$Y_{pt} = \exp[\mu_p + \eta_t + \beta(\text{ImportLicensingProcedures} \times D)_{pt}] + \varepsilon_{pt}, \quad (1)$$

where Y_{pt} stands for four different dependent variables: We use two measures of the extensive margin of imports, i.e., (a) the number of incoming shipments of product p in month t , or (b) the number of countries of origin for imports of product p in month t . We also use two measures for the intensive margin of imports, i.e., (c) the value of incoming shipments of product p in month t , or (d) the net weight of incoming shipments of product p in month t .

We observe our dependent variables at the 6-digit product level and at monthly frequency, so there is a large share of zero shipments in our final dataset. We therefore follow the suggestion by Santos Silva and Tenreiro (2006) and use a Pseudo Poisson Maximum Likelihood (PPML) estimator to ensure all the observations are taken into account.²⁶ As demonstrated by Chen and Roth (2024), PPML consistently estimates the average treatment effect of the import licensing scheme expressed as a percentage of the baseline mean of the dependent variable, i.e., an elasticity that is easily interpretable.

The variable `ImportLicensingProcedures` equals 1 if product p is listed in the import licensing procedures (Decree of the Minister of Trade No 08/M-DAG/PER/2/2009), and zero otherwise. D is a dummy equal to 1 if the observation is from March 2009 or after (the treatment period).²⁷ μ_p is a set of product fixed effects that control for time-invariant

²⁴In particular, the treated product categories are 27101, 27102, 27103, 27201, 27310, 28113, 28120, 28910, 28920, 28931, 28932, 28933, 28939, 28991, 28992, 28993, 28994, 28995, 28996, 28997, and 28999. The ISIC 2-digit categories 27 and 28 are basic metals and manufacture of fabricated metal products, except machinery and equipment, respectively.

²⁵In the final regressions, 38 singleton observations are dropped to avoid overstating the statistical significance of the regression results, see Correia (2015).

²⁶Using PPML implies using the dependent variable in levels, not logs, as PPML models the conditional expectation of the dependent variable as an exponential function of the covariates. The interpretation of the estimated coefficients is identical to that of a log-linear regression model. For our estimations, we use the `ppmlhdfc` package by Correia et al. (2020).

²⁷As our data are monthly, we define treatment to start in March, as the policy was enacted at the end of February. We later use event study specifications which relax this assumption.

product characteristics. η_t refers to time fixed effects (i.e., month-year effects) that control for time-varying factors that influence treatment and control products in a similar way, such as fluctuations in the global price of steel.²⁸ Finally, ε_{pt} represents a zero-mean error term that captures random fluctuations in our dependent variable. The parameter of interest, captured by β , indicates the effect of the import licensing procedures on a product’s extensive and intensive margin of imports. More specifically, β captures the change in the dependent variable from the pretreatment to the treatment period for the treatment group of products affected by the policy relative to the control group of unaffected products. Following the suggestion by Bertrand et al. (2004) and Cameron et al. (2011), we cluster standard errors at the product level to allow for correlation within product as our treatment variable is defined at the product level.²⁹

It is worth noting that while the share of treated products is considerable, it is far from 100% (see Table 1). This mitigates any problems with negative weights and wrong comparisons that arise with settings where there are no “never-treated” units in the dataset.³⁰

A potential concern is that Indonesian policy makers might have chosen to protect specific products to be in the treatment group, i.e., that there is a selection bias, or, in other words, that trade policy is chosen endogenously, see Treffer (1993). In our case, we consider this to be less of a concern because the Indonesian government seems to have followed other countries when protecting iron and steel products in its 2009 import licensing scheme. Following the Global Financial Crisis, from September 2008 to July 2009, trade restrictive measures increased world-wide, as reported by OECD (2009). For example, India imposed import duties on a range of iron and steel products in November 2008, followed by Vietnam, Turkey, Egypt, Indonesia, Russia, and U.A.E. in the following months. A similar pattern happened with non-tariff measures. In November 2008, Argentina, India, and Malaysia introduced licensing requirements for imports of certain iron and steel products. Indonesia and Thailand applied similar measures in the following months. This is also the case for trade remedy measures.³¹ Hence, for our purposes, this only leaves the question of the presence of general equilibrium fluctuations driven by the fall in demand, for example from the big iron and steel consumers (China, the U.S., and the E.U.). These fluctuations are controlled for by the time fixed effects included in the model.

Equation (1) assumes that the treatment effect is constant over time and also rules out potential anticipation effects. It also does not allow for effects of the policy to vary over time. We therefore relax the assumption of a constant treatment effect over time in our baseline specification, following, e.g., de Chaisemartin and D’Haultfoeuille (2020). We estimate the

²⁸Note that the treatment group indicator (ImportLicensingProcedure) does not appear as a separate regressor in Equation (1) because it is a time-invariant product-level characteristic and is therefore absorbed by the product fixed effects μ_p . Similarly, the before/after indicator D does not appear separately because the timing of introduction of the import licensing scheme is common to all products and is therefore absorbed by the time fixed effects η_t .

²⁹Note that as our policy of interest is implemented at the same time across all products, our treatment is identical to a textbook DID setting and we avoid the econometric issues of false comparisons highlighted by Goodman-Bacon (2021) arising in settings with staggered treatments.

³⁰Typical settings where this problem does arise are panels of US states where eventually all states are treated. For an in-depth discussion of this issue, see Borusyak et al. (2024).

³¹Developed countries such as Australia, the E.U. and the U.S. also initiated anti-dumping and counter-vailing duties investigations.

following event study specification:

$$Y_{pt} = \exp[\mu_p + \eta_t + \sum_{\tau=Jan'06}^{Dec'11} \beta_{\tau}(\text{ImportLicensingProcedures} \times D_{\tau})_{pt}] + \varepsilon_{pt}, \quad (2)$$

where D_{τ} is a dummy variable that is one τ months after the treatment started, and zero otherwise.

In the terms of Borusyak et al. (2024) and Sun and Abraham (2021), we use a “fully dynamic” event study specification, i.e., we estimate a separate treatment effect β_{τ} for every month in our dataset, up to a normalization.³² This means we not only allow for dynamic treatment effects in the months after the policy was enacted but also allow for announcement effects in the months prior, see Malani and Reif (2015). It also allows us to test the reliability of our identification strategy by checking whether there exists a systematic and persistent difference between the treated and untreated products before the enactment of the policy. Consistently significant effects for τ prior to March 2009 that are not plausibly caused by anticipation effects would indicate pre-existing differences in the trends between listed and non-listed products, which may cast doubt on the common trend assumption underlying our approach. We discuss and test the plausibility of this assumption in the next subsection.

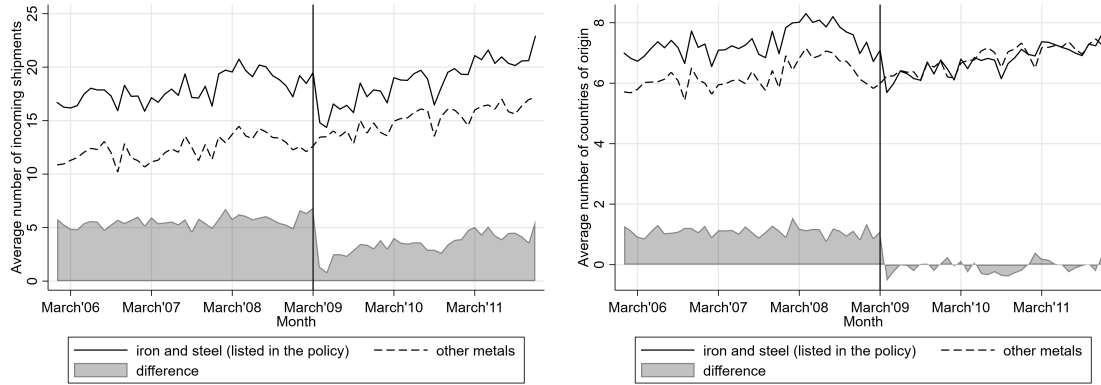
4.2 Does the parallel trends assumption hold?

Identification in the DID setting relies on a parallel trends assumption, that is, the assumption that in the absence of the policy intervention, the changes in the extensive and intensive margin of imports for listed iron and steel products would not have been different from the changes for other products. The next four figures present visual descriptive statistics as well as parallel trend checks for our dependent variables: the extensive margin of imports (shown in Figure 1) and their intensive margin (shown in Figure 2).³³

³²It is well known that in such a fully dynamic specification that also includes time-period effects, the full set of dynamic treatment dummies is only identified up to scale; for a succinct explanation, see Section 2.1 in Schmidheiny and Sieglöcher (2023). The solution to this is to normalize one of the estimated $\beta_{\tau} = 0$, i.e., to drop one treatment dummy D_{τ} . With this normalization, all estimated treatment effects can be interpreted relative to this period. The standard choice in the literature is to drop D_{-1} , i.e., to normalize $\beta_{-1} = \beta_{Feb'09} = 0$, i.e., the treatment effect in the period immediately before the treatment starts. However, this is problematic in the presence of anticipation effects. If some firms anticipated the policy and imported more in the months before March 2009, trade would be larger than normal due to the policy in the reference period. To avoid this, we follow the suggestion by Schmidheiny and Sieglöcher (2023) and use a different, sensible reference period. We normalize $\beta_{Dec'08} = 0$, i.e., we assume that there is no treatment effect three months before the imposition of the import licensing scheme. This avoids that the normalization affects the estimation of the treatment effects in the presence of anticipation effects in the immediate months prior to March 2009.

³³We follow Heid and Márquez-Ramos (2023) and also formally test for the absence of pre-trends using the approach suggested by Bilinski and Hatfield (2026). Their test consists in estimating a restricted version of our event study specification given by Equation (2) that restricts all coefficients before the treatment in March 2009 to 0 but that adds $\theta \text{ImportLicensingProcedures}_i t$, i.e., a time trend variable t interacted with our dummy $\text{ImportLicensingProcedures}_i$ that identifies the treated products. As Bilinski and Hatfield (2026) explain, any violation of the pre-trend assumption will show up by a non-zero estimate for the associated parameter θ . The corresponding standard error and t -statistic can be interpreted as a formal test of the no

Figure 1: Monthly average number of incoming shipments and countries of origin in 2006–2011.



Notes: Figure depicts the average number of shipments per month (left panel) and the average number of countries of origin per month (right panel) for iron and steel products that are listed in the 2009 import licensing procedures versus those other metals that have never been regulated by import licensing procedures during our time period. The vertical line indicates the onset of the import licensing procedures.

The left panel of Figure 1 shows the evolution of the monthly average number of shipments for iron and steel products that are listed in the policy and for the other metal products that are not, respectively, within our sample period. As shown in Table 1, there are pre-existing differences between listed and non-listed products.³⁴ The figure also shows a shaded area that represents the evolution of the difference in the average number of shipments between listed and non-listed products. This shaded area allows a coarse comparison of the relative pre-existing trends for the period before any metal products are treated, i.e, before March 2009. We see that the average number of shipments seems to move on parallel trends before the policy entered into force. After March 2009, the trends start to diverge. The shipments of the listed products exhibit an immediate and pronounced decline and, because of this change, the difference between the two groups falls.

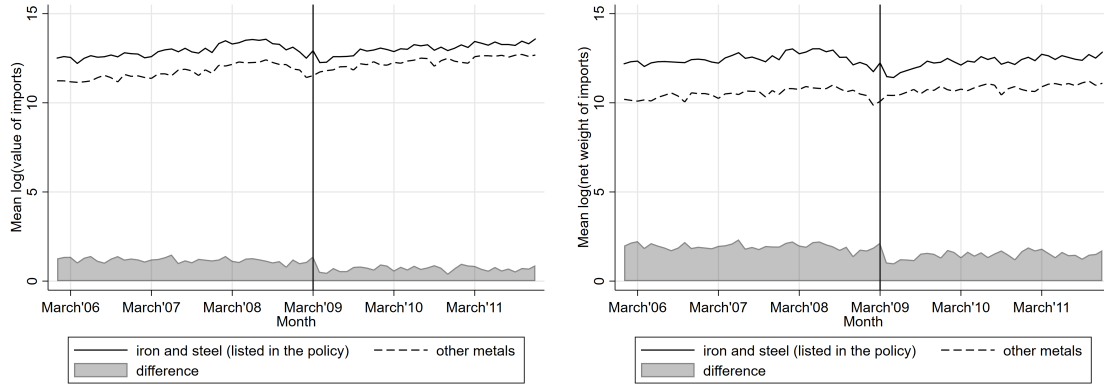
The right panel of Figure 1 shows the evolution of the monthly average number of countries of origin for the imports of iron and steel products that are listed in the policy and of the other metal products that are not, respectively. Similar to the left panel of the same figure, this panel shows the average number of countries of origin per month for these two groups along with the difference between the groups, shown by the shaded area. As in the left panel, there are pre-existing differences between listed and non-listed products. However, after March 2009, the average total number of countries of origin becomes similar between the two groups across the policy period.

The left and right panels of Figure 2 use the same layout as Figure 1 but for the two variables measuring the intensive margin of imports. Particularly, the left panel shows the

pre-trends assumption. We present the estimated coefficients, standard errors and p -values for these tests in Table A.5 in the online Appendix. We test for pre-existing trends for both our measures of the extensive and the intensive margin. For all specifications, the estimated coefficients are estimated to be effectively zero and none of them are significant.

³⁴We control for these differences by including product fixed effects in our regression analysis.

Figure 2: Monthly average value and net weight of imports in 2006–2011.



Notes: Figure depicts the average log value (left panel) and average log net weight (right panel) per month for imports of iron and steel products that are listed in the 2009 import licensing procedures versus those other metals that have never been regulated by import licensing procedures during our time period. The vertical line indicates the onset of the import licensing procedures.

evolution of the monthly average log value for the import of iron and steel products that are listed in the policy and of other metal products that are not, respectively, along with the difference between the groups, shown by the shaded area, while the right panel displays the evolution for the monthly average log net weight of imports. Although we notice an immediate decline for the listed products in the first month following the policy, and contrary to what happens for the extensive margin, we do not observe large differences between the pre-treatment and treatment period in the two groups of products in any of the two measures used for the intensive margin.

4.3 Is strategic misclassification of products a concern?

One caveat to the interpretation of the graphs presented in the previous section is that firms may purposefully misclassify goods in HS codes not affected by the import licensing scheme, trying to evade the policy. This can only be a successful strategy when products are similar. Products included in the import licensing scheme are defined at the heading level of the HS system, i.e., at the HS4-digit level. In the literature on misclassification as a strategy for tariff evasion, similar products are actually defined at the HS4-digit level.³⁵ Hence substitution across four digit categories should be limited, but does occasionally occur in practice.³⁶ Crucially, we do not observe whether firms actually do engage in misclassification. It is difficult for us to come up with a definition of products that are similar enough, as we already restrict our sample to Section XV articles of base metal. This means, similar products are

³⁵In their seminal article, Fisman and Wei (2004) define “similar products” to be all products *within* a HS4-digit category. Using interviews with industry experts, Mangini (2023) confirms that substitution for similar products mainly occurs within a HS4-digit category.

³⁶Javorcik and Narciso (2008) mention a dispute about a customs decision concerning the classification of shower gel as either soap (HS 3401) or as a beauty product (HS 3304); Mangini (2023) mentions a dispute about an electronic device being either a telephone (HS 8517) or a measuring instrument (HS 9031).

part of our control group.

Notwithstanding this fact, we can make some simple inferences on the potential worst case impact of misclassification on our results. If firms engage in meaningful misclassification, we should see a drop in imports of products affected by the import licensing scheme, and a concurrent rise in the products in the control group, in Figure 1. While we do see a large drop in the average number of incoming shipments of the products affected by the import licensing scheme, we observe only a small increase in the control group. Imagine the worst case scenario that all firms that are affected by the policy opt to misclassify the products they import. We should then observe that the control group behaves like a mirror image in the sense that a drop by x shipments in the treatment group implies an increase by x shipments in the control group. The left panel of Figure 1 demonstrates that we do not observe this extreme case. What is more, if firms do indeed misclassify at a large scale, this would imply that not only the number of shipments is affected, but also the value should show the same mirroring behavior between treatment and control group. The left panel of Figure 2 shows that while we observe an increase in the value of the control group, it is smaller than the drop in the treatment group. Also note that as the mean of the control group is smaller, the increase in the log (i.e., the percentage increase) should actually be larger in the control group than in the treatment group. The opposite is the case. Summing up, while we cannot rule out that there is some misclassification occurring, we interpret the descriptive evidence to imply that misclassification cannot be the main driver of our findings.

Overall, the descriptive results give us a first intuition about what happens following the industrial policy under study: Incoming shipments of the listed products are less frequent and originate from fewer source countries (i.e., there is a decrease in the extensive margin of imports after the policy comes into effect), but the value and weight of incoming shipments of the listed products do not change (i.e., the intensive margin of imports does not change after the policy comes into effect). While visually striking, we turn to econometric tests in the next section.

5 Results

5.1 Effect of import licensing procedures on the extensive margin of imports (number of incoming shipments and countries of origin)

We present estimates of Equation (1) for the extensive margin of imports in Table 2. Column (1) presents OLS estimates on the number of shipments. We find that a product listed in the import licensing procedures has 26% less incoming shipments after the introduction of the import licensing policy.³⁷ In column (2), we present the results using PPML. We find that the effect is smaller, 14%.

Estimates for our second measure of the extensive margin, i.e., the number of countries of origin, are shown in columns (3) and (4). We find a similar pattern and sized effects as in

³⁷We calculate marginal effects of dummy variables as $[\exp(\hat{\beta}) - 1] \times 100$, where $\hat{\beta}$ is the estimated regression coefficient.

Table 2: Effect of import licensing procedures on the extensive margin of imports.

	ln(# of shipments)	# of shipments	ln(# of countries of origin)	# of countries of origin
	(1) OLS	(2) PPML	(3) OLS	(4) PPML
Import licensing procedures	−0.302*** (0.037)	−0.151** (0.070)	−0.258*** (0.026)	−0.168*** (0.039)
<i>N</i>	36,741	43,488	36,741	43,488

Notes: Table reports regression coefficients of estimating the average treatment effects on the treated (ATT) on the extensive margin of imports of the 2009 import licensing procedures. Columns (1) and (2) report the estimates of our baseline specification for our first measure of the extensive margin of imports: the number of shipments. Columns (3) and (4) report the estimates for our second measure of the extensive margin: the number of countries of origin. Columns (1) and (3) are OLS estimates using log-transformed values of the dependent variables, while columns (2) and (4) are PPML estimates for levels of the dependent variable. All regressions include product and time fixed effects. Standard errors are clustered at the product level (6-digit HS Code). ***, **, * denotes significance at the 1%, 5%, 10% levels, respectively.

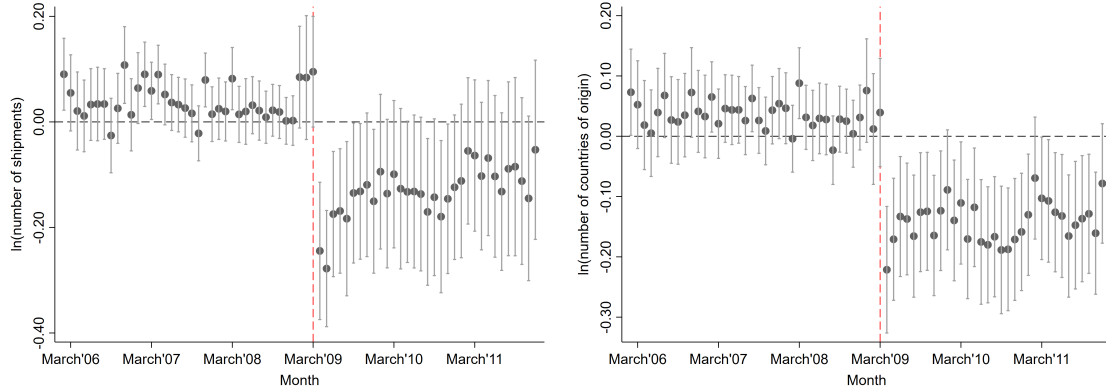
columns (1) and (2). While the OLS estimates imply that the products listed in the import licensing scheme are imported from 23% fewer source countries after the introduction of the policy, the PPML estimates imply a smaller effect of 15%. As the log transformation sweeps away the zero values, the OLS results seem to overestimate the effects of the policy. We therefore focus on the more conservative PPML estimates for the rest of our customs data analyses.

Next, we allow the treatment effect of import licensing procedures on the extensive margin of imports to vary over time, i.e., we estimate the event study specification presented in Equation (2). PPML estimates are shown in Figure 3. We again find that the introduction of the import licensing has a negative effect on the extensive margin of imports, and this is confirmed using both measures, i.e., the number of shipments and the number of source countries. The effect occurs immediately and sharply. However, the negative effect on the number of shipments reduces over time, as shown in the left panel of Figure 3. The negative effect on the number of import source countries is persistent, as shown in the right panel, as it remains negative and significant over almost the entire treatment period.³⁸

Overall, we find that import licensing procedures reduce the extensive margin of imports, immediately and sharply, although the effect is only persistent for the number of countries of origin. This within-firm adjustment may create a loss for consumers in two ways: (1) consumption less close to the preferred date due to less frequent shipments (in the immediate period after the policy); and (2) less variety due to fewer suppliers. The next question is how firms react to the policy in terms of value and quantity of these shipments.

³⁸Note that most pre-trend variables are not statistically significant, validating the common trend assumption.

Figure 3: Effect of import licensing procedures on the extensive margin of imports: event study.



Notes: This figure shows coefficient estimates from PPML regressions of the extensive margin of imports (left: number of shipments; right: number of countries of origin) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), along with a set of product and time fixed effects. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,488.

5.2 Effect of import licensing procedures on the intensive margin of imports (value and weight)

We present results of Equation (1) for the intensive margin in Table 3. The table is organized as Table 1, showing both OLS and PPML results. In Column (1) of Table 3, we present OLS estimates for the value of imports. We find a supposedly negative effect of the import licensing scheme. This, however, changes when moving to the PPML estimator in column (2): Then, the estimated coefficient is reduced substantially to close to zero and is no longer significant. As in Table 1, this highlights the bias introduced by using the OLS estimator in the presence of heteroskedastic trade data and zero values, stressing the importance of using the PPML estimator. In summary, we find that the effect of the policy is not significant for the value of imports. This result is confirmed for the second measure of the intensive margin, the net weight of imports (see Columns (3) and (4) of Table 3), with a similar bias evidenced in the OLS results.

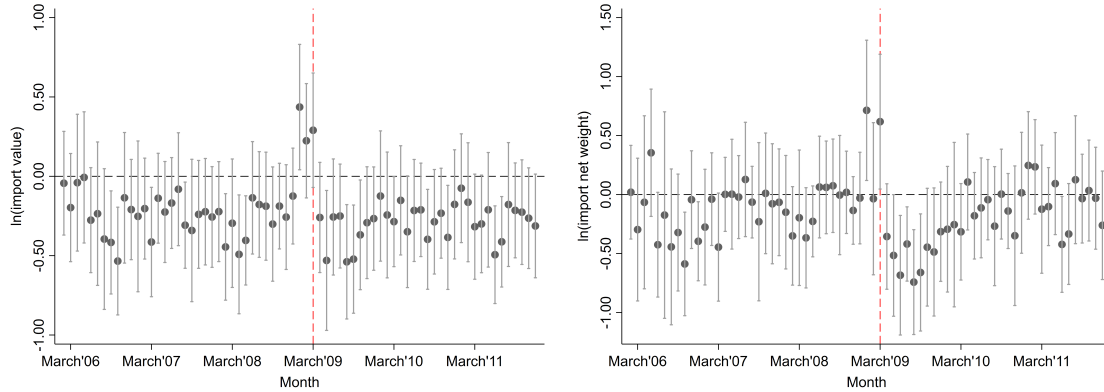
We then allow the treatment effect of import licensing procedures to vary over time, i.e., we estimate the event study specification given by Equation (2). We present estimates for the value of imports as the dependent variable in the left panel of Figure 4. Contrary to what we find for the extensive margin, the estimated treatment effects are mostly not significant. This indicates that the import licensing procedures do not have an effect on the intensive margin of imports of the listed products. When we estimate Equation (2) for the net weight of imports as the dependent variable, although we observe significant negative effects in four consecutive months three months after the policy was enacted, in general, we can confirm the non-significant effect of the policy on the intensive margin of imports (see right panel of

Table 3: Effect of import licensing procedures on the intensive margin of imports.

	Import value		Import weight	
	OLS (1)	PPML (2)	OLS (3)	PPML (4)
Import licensing procedures	−0.436*** (0.082)	−0.035 (0.107)	−0.437*** (0.099)	−0.067 (0.149)
N	36,741	43,488	36,741	43,488

Notes: Table reports regression coefficients of estimating the average treatment effects on the treated (ATT) on imports' intensive margins following the import licensing procedures announced in February 2009. Columns (1) and (3) are OLS estimates using log-transformed values of the dependent variables, while columns (2) and (4) are PPML estimates for levels of the dependent variable. All regressions include product and time fixed effects. Standard errors are clustered at the product level (6-digit HS Code). ***, **, * denotes significance at the 1%, 5%, 10% levels, respectively.

Figure 4: Effect of import licensing procedures on the intensive margin of imports: event study.



Notes: This figure shows coefficient estimates from PPML regressions of the intensive margin of imports (left: import value; right: import net weight) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), along with a set of product and time fixed effects. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,488.

Figure 4).

Overall, we find that import licensing procedures do not have long-lived effects on the intensive margin of imports. However, we do find that they force firms to adjust their import sourcing decisions by reducing the number of shipments (in the immediate period after the start of the policy) as well as the number of import source countries. This second effect on the extensive margin is persistent, meaning that firms are involved in less diversified supply chains as a consequence of the import licensing scheme.

The different effects of import licensing on the extensive and intensive margins can be understood by contrasting how import licensing and tariffs affect trade. Tariffs directly increase the price of imported goods, thereby reducing the value and quantity of imports through the standard price mechanism. Import licensing, by contrast, imposes per-shipment administrative costs such as those associated with the pre-shipment verification by a state-appointed surveyor as well as general reporting requirements. These costs are independent of the value or quantity of each individual shipment. Hornok and Koren (2015a) and Hornok and Koren (2015b) show theoretically and empirically that such per-shipment costs reduce the frequency of shipments while increasing their average size. Consistent with this mechanism, we find that importers consolidate their supply chains by sourcing from fewer countries and reducing the number of shipments, but maintain the same overall import volumes.

Finally, our results are consistent with previous findings for other trade restrictive measures in Indonesia. For example, Pane and Patunru (2023) find that tariffs also lead to lower access for firms to varieties of imported inputs, such as in our case, from different import source countries. We test whether tariff changes are responsible for our results in the next section.

5.3 Robustness: Are results driven by tariff changes?

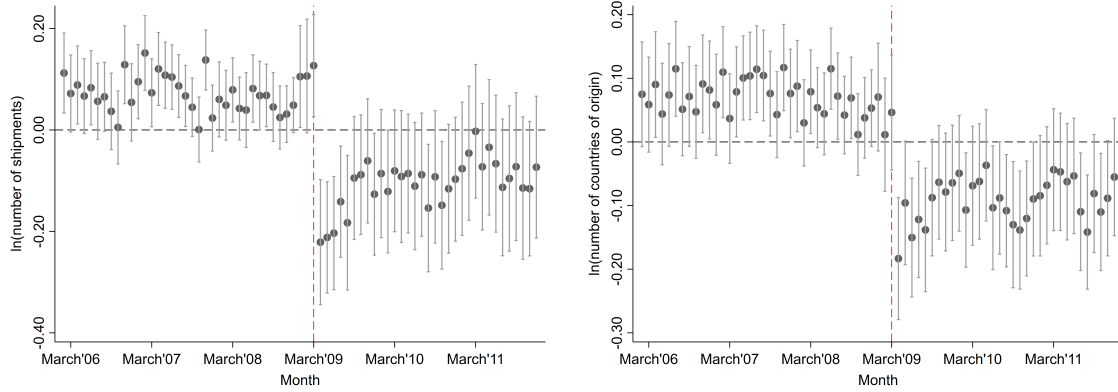
Our results provide evidence that a metal product affected by the import licensing procedures saw a decrease in its extensive margin of imports but not in its intensive margin. If our results are driven by increases in import tariffs applied in the same product categories, our regressions would erroneously attribute the negative trade effects of higher import tariffs to the import licensing policy. To isolate the effect of import licensing procedures, we restrict our dataset to include only shipments from countries that have free trade agreements (FTAs) with Indonesia.³⁹ This means that for our sample period, any changes in MFN tariffs are irrelevant as trade is governed by the preferential regime within the FTA.⁴⁰

We report results for the DID specification in column (2) of Table A.6 in the online Appendix. For ease of comparison, we repeat the results of our baseline specification in column (1) of the same table. Results are similar to our baseline results: Significant negative effects for the extensive margin, but small and non-significant effects for the intensive margin. Figure 5 presents the estimates of the event study specification for the extensive margin of

³⁹The countries are China, Japan, South Korea, Australia, Singapore, Cambodia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam and Brunei Darussalam. Tables A.3 and A.4 in the online Appendix show the lists of the top 5 countries of origin for the import of iron and steel products listed in the policy, by number of shipments and by total value, respectively.

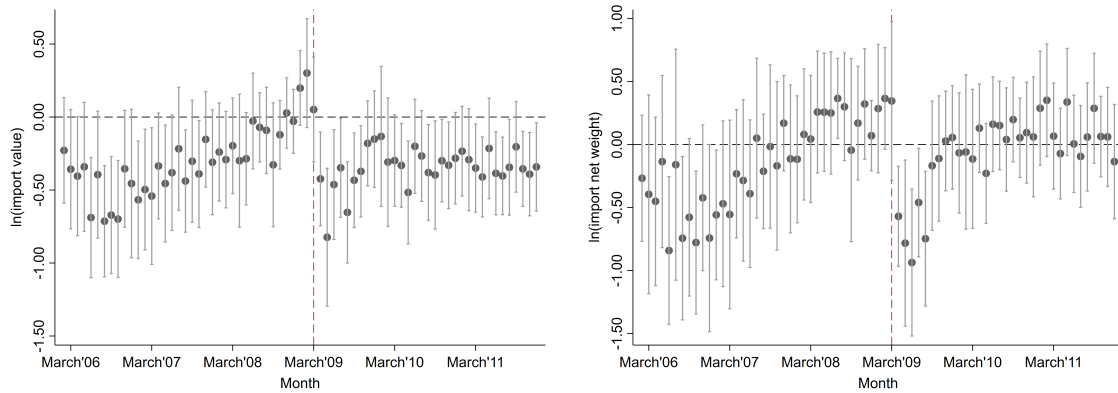
⁴⁰Actually, MFN tariffs for metal products have basically not changed since 2007 until the end of our sample period, see Figure A.1 in the online Appendix.

Figure 5: Effect of import licensing procedures on the extensive margin of imports (only including countries of origin that have an FTA with Indonesia).



Notes: This figure shows coefficient estimates from PPML regressions of the extensive margin of imports (left: number of shipments; right: number of countries of origin) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have an FTA with Indonesia, along with a set of product and time fixed effects. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,200.

Figure 6: Effect of import licensing procedures on the intensive margin of imports (only including countries of origin that have an FTA with Indonesia).



Notes: This figure shows coefficient estimates from PPML regressions of the intensive margin of imports (left: import value; right: import net weight) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have an FTA with Indonesia, along with a set of product and time fixed effects. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,200.

imports using only source countries that have FTAs with Indonesia (left panel: number of shipments; right panel: number of countries of origin). We find similar results as in our baseline specifications, i.e., a reduction in the number of shipments as well as in the number of countries of origin. The effect on the number of shipments decreases in absolute size and turns insignificant after the first months of the policy. The negative effect on the number of countries mostly remains significantly negative also in the medium term. The changes are abrupt and sharp. Overall, the results confirm the effects of the policy on the extensive margin of imports. Figure 6 presents the respective results for the intensive margin of imports (left panel: import value; right panel: import net weight). Results are broadly consistent with our earlier interpretation: Point estimates are negative for the treatment effects on import values, but not consistently significant except in the first few months after the introduction of the import licensing policy. In terms of net weight, the effects are clearly short-lived and die out after few months. Also, most of the estimates of the effects before March 2009 are not significant. In any case, there are no persistently significant pre-trends apparent in the data, lending overall support to our identification strategy. Overall, the interpretation of our results does not change: Effects of the policy mostly affect the number of import source countries, but there is no clear evidence that the policy consistently reduces the overall level of imports in the medium (to long) term.

5.4 Robustness: Are effects of import licensing heterogeneous across import source countries?

The effect of the import licensing scheme may be heterogeneous across different import source countries. We investigate this possibility in this subsection. We present results in columns (3) to (5) of Table A.6 in the online Appendix, so that we can easily compare results with our baseline specification in column (1) as well as the specification that only focuses on shipments from FTA partners as import source countries.

In column (3), we repeat the estimation that restricts our sample to only FTA partners as import source countries from column (2) but additionally drop shipments from China. Results in terms of both magnitude and significance are similar to the results in columns (1) and (2).

Columns (4) and (5) restrict the sample to shipments only from developing or developed countries, respectively. Before describing the results, a clarification is needed to avoid confusion. Remember that the unit of observation in these regressions is an HS6 code and month combination: How many shipments are imported of a product with a particular HS6 code in a particular month. Therefore, dropping shipments from a particular country only reduces the number of observations used in a regression if an HS6 code is no longer imported from any other source country. Most products are simultaneously imported from both developing and developed economies. Hence, the number of observations from columns (4) and (5) do not add up to the number of observations in column (1), contrary to what one may expect at first glance. Observations would only add up if the unit of observation were an import source country in a particular month, not an HS6 code.

Comparing results from columns (4) and (5), it appears that the effect on the extensive margin is primarily driven by imports from developing countries, as the effect is larger in this

subsample. The two subsamples confirm that the major adjustment channel is the extensive margin, with no statistically significant effect on the intensive margin, corroborating the results from our baseline specification.

5.5 Placebo tests with Special Economic Zones

Our sample period partly coincides with the Global Financial Crisis (GFC). One may therefore worry that the effects we identify may be driven by factors related to the GFC instead of the import licensing scheme. The GFC is generally considered to start with the collapse of Lehman brothers in September 2008.⁴¹ In contrast, the import licensing scheme starts in March 2009. If demand for iron and steel products, i.e., the treatment group, was more heavily affected by the GFC compared to other metals such as nickel or copper in our control group, we would expect to observe diverging pre-trends beginning in late 2008. Note that our event study specifications are flexible enough that they would mechanically pick up such effects in the months between September 2008 and March 2009. However, none of the event study plots presented in Figures 3 and 4 as well as the formal pre-trend test following Bilinski and Hatfield (2026) (see Table A.5 in the online Appendix) show any evidence of such pre-treatment divergence during the onset of the GFC, i.e., in the period from September 2008 to February 2009.⁴²

To provide further corroborative evidence that our identification strategy actually uncovers the effects of the import licensing scheme and not of some other, time-varying omitted variable that affects iron and steel imports of products listed in the policy, we conduct two placebo falsification tests. The idea of a placebo falsification test is to estimate the treatment effects of the policy of interest in a setting where we know that the policy should not have any effect (the placebo). Finding no effect corroborates the chosen identification strategy, finding an effect falsifies it.⁴³ In our setting, potential candidate placebo falsifications are products or locations whose import shipments would not be affected by the import licensing scheme. The presence of so-called Special Economic Zones (SEZs) in Indonesia allows us to do such a placebo falsification since the import licensing scheme does not apply to listed products that are shipped to SEZs. Given the time frame of our dataset, we focus on the SEZ on Batam, Bintan and Karimun, or BKK for short. These islands are part of Indonesia’s Riau Islands province (*Provinsi Kepulauan Riau* in Indonesian). BKK was designated an industrial zone by presidential decree in 1971 to foster its development, mostly due to its

⁴¹For a succinct description of the GFC, see Mishkin (2011).

⁴²Another potential confounding factor could be the consolidation in the global steel industry. In principle, it could have reduced the number of vendors of iron and steel, and hence the number of import source countries, thereby driving the drop in the extensive margin. However, Huh (2015) documents that mergers and acquisitions (M&As) in the global steel industry peaked before the GFC and declined from 2009 onward, so the major consolidation wave does not coincide with the introduction of the import licensing scheme. Also, the GFC reduced M&A activity as it constrained acquisition financing, see Kotas (2025). Moreover, Table A.3 in the online Appendix shows that the top five source countries for Indonesian iron and steel imports, i.e., China, Japan, the United States, Singapore, and Taiwan, are the same before and after the introduction of the policy. If the consolidation of the global steel industry had meaningfully contracted the global supply of iron and steel, one would expect to observe changes in the composition of source countries during this period, which we do not.

⁴³For a discussion of placebo falsification, see, e.g., Cunningham (2021).

geographical proximity to Singapore, less than ten kilometers across the Singapore strait.⁴⁴ For iron and steel products, imports into BKK SEZ represent 29.1% of total imports in 2009. Importantly, the import licensing requirement we study does not apply to shipments into BKK SEZ. We therefore should see no significant effects of the imposition of the import licensing scheme on either the extensive or intensive margin of imports into BKK SEZ. We implement this placebo test by re-estimating Equations (1) and (2) using a restricted dataset that only contains import transactions into BKK SEZ.⁴⁵

Table 4: Import values and SEZ shares by sector, 2009.

	Total imports (US\$)	SEZ imports (US\$)	SEZ share (%)
Other sectors	5,243,847,042	574,301,616	11.0
Iron & steel	4,313,261,398	1,255,065,935	29.1

Notes: Table reports annual import values for 2009. Total imports refers to aggregate import values across all Indonesian ports. SEZ imports refers to import values arriving into ports in the Batam-Bintan-Karimun (BKK) Special Economic Zone. SEZ share is the percentage of total imports into the BKK SEZ.

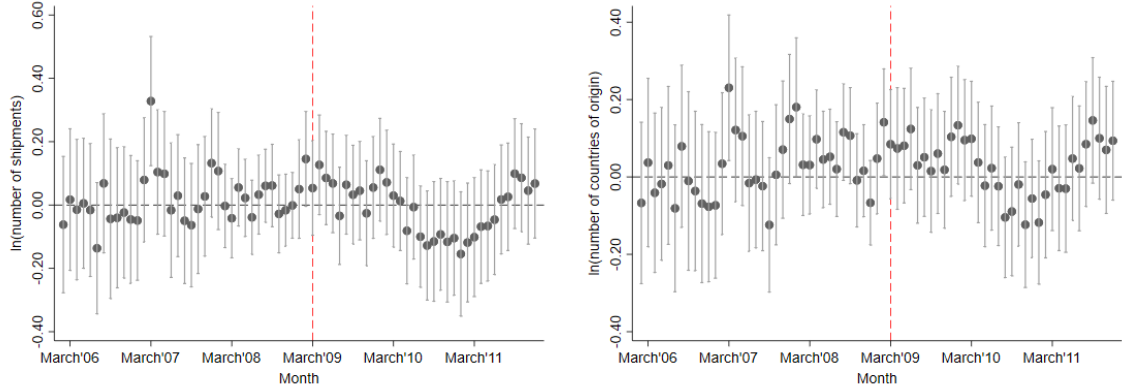
We report results for the placebo DID specification for this subsample in column (6) of Table A.6 in the online Appendix. For ease of comparison, we repeat the results of our baseline specification in column (1). As expected, we do not find a significant effect of the import licensing scheme on the extensive and intensive margin. Figures 7 and 8 show the corresponding event study plots of the effects, respectively. We estimate overwhelmingly non-significant zero treatment effects for any of the dependent variables. This confirms our expectation that the import licensing does not affect products listed in the policy if they are imported into the SEZ, providing corroborative evidence that our regressions in our main analysis do not pick up a spurious correlation that is present in iron and steel import data unrelated to the import licensing scheme.

A potential objection to our placebo test may be that we are simply throwing away too many observations, leading to an underpowered test. We therefore construct another, less restrictive placebo dataset in the following way: As before, we start from the sample from Section 5.3, i.e., the sample of import transactions from import source countries with whom Indonesia has an FTA. We then keep all imports of iron and steel products listed in the policy that enter the BKK SEZ (the placebo treatment group), and all imports into all regions of all other metal products (the control group). In other words, we combine all listed products imported into the SEZ with all non-listed products imported into the rest of Indonesia. This increases our dataset from 40,752 to 43,272 observations. We then re-estimate Equation (2) on this dataset for both the extensive and the intensive margin. Figures A.2 and A.3 in the online Appendix present the results. We see a jump in the estimated treatment effects in late

⁴⁴For a detailed history of the development of the BKK SEZ, see Ng (2008). For a discussion on the distinction between Indonesia’s special economic zones and free trade zones as well as a comparison to the use of these terms in other countries, see Negara and Hutchinson (2020).

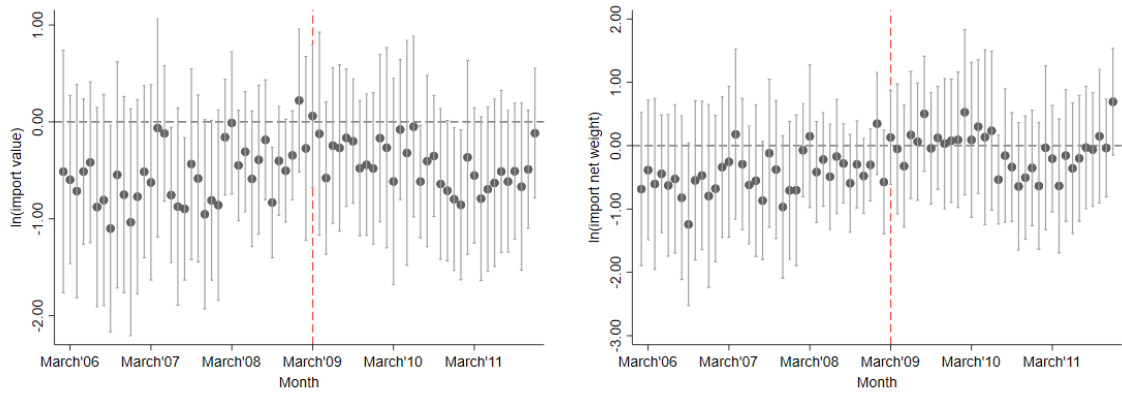
⁴⁵To avoid the effect of tariffs, we continue to use the sample from Section 5.3 and only keep BKK SEZ import transactions.

Figure 7: Effect of import licensing procedures on the extensive margin of imports (dataset includes only all shipments into SEZs): placebo tests.



Notes: This figure shows coefficient estimates from PPML regressions of the extensive margin of imports (left: number of shipments; right: number of countries of origin) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have FTA with Indonesia, along with a set of product and time fixed effects. Note that the sample is restricted to shipments arriving into ports in the BKK Special Economic Zone. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 40,752.

Figure 8: Effect of import licensing procedures on the intensive margin of imports (dataset includes only all shipments into SEZs): placebo tests.



Notes: This figure shows coefficient estimates from PPML regressions of the intensive margin of imports (left: import value; right: import net weight) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have FTA with Indonesia, along with a set of product and time fixed effects. Note that the sample is restricted to shipments arriving into ports in the BKK Special Economic Zone. The vertical dashed line indicates the onset of the import licensing procedures. 95% confidence intervals are displayed around each point estimate. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 40,752.

2007, but no difference in estimated effects when the policy is introduced.⁴⁶ These results line up perfectly with the facts: In late 2007, Batam was upgraded to a Free Trade Zone, and Bintan and Karimun were upgraded to enclave status, see Ng (2008). The Free Trade Zone status eliminated import tariffs, and hence we see an immediate and persistent increase in the extensive and intensive margin of imports.⁴⁷ In contrast, the introduction of the import licensing scheme does not affect imports, as the Free Trade Zone status exempts importers from the import licensing scheme.⁴⁸ In sum, our placebo tests provide corroborative evidence that our estimates of the trade effects of the import licensing scheme are not driven by other, time-varying drivers of iron and steel imports.

6 Do domestic producers benefit from the import licensing requirements?

We have focused on the importing firms of metal products and established that the administrative barriers created by the import licensing scheme do force firms to adjust by reducing the number of shipments and the number of suppliers, but the total value and weight of imports are not significantly affected. If the import licensing policy is largely ineffective in the medium to long term, why does the government impose it? The answer might lie in providing protection for domestic producers of steel products in the short run, perhaps for political gain. In our case, the import licensing procedures entered into force in February 2009, just a few months before the direct presidential election in July 2009. The timing of the policy could therefore also be driven by electoral incentives, as then incumbent President Susilo Bambang Yudhoyono was campaigning to win a second term in the 2009 election. This fits with the general influence of electoral motives in Indonesia’s trade policy making, see Hill and Menon (2021). The re-election motive is also similar to the one scrutinized by Conconi et al. (2017) who provide theoretical and empirical evidence of suspiciously-timed trade disputes aimed at appealing to voters. A similar argument could be made for attempts to garner support from industry lobbies. Restricting import competition via outright protectionist measures such as import tariffs may be difficult, as voters may be wary of the negative effects of tariffs on consumer prices. As Coate and Morris (1995) argue, politicians may therefore prefer more indirect or “sneaky” support for industry, such as import licensing, that does not come with an explicit price tag visible to consumers.

We have not yet analyzed the effects on domestic producers of the products subject to the import licensing scheme. If the policy is protectionist, does it indeed protect or help these local producers? Answering this question is important to complete the picture, especially for policymakers who often intend to protect domestic producers by restricting competition from foreign suppliers. Hence, in this section, we investigate the performance of these domestic

⁴⁶We use the same normalization as we used in the previous subsections 5.1, 5.2 and 5.3, i.e., we drop the treatment dummy for December 2008, see footnote 32. Hence estimated coefficients have to be interpreted relative to December 2008.

⁴⁷Remember that for this exercise, all (placebo) treated imports are entering BKK SEZ.

⁴⁸We do not see the negative effects before 2007 in the first placebo test as that sample only consists of imports into the BKK SEZ; hence, both treatment and control group benefited from the upgrade of Batam to a Free Trade Zone in 2007.

Table 5: The effects of import licensing procedures on firms' sales.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: $\ln(\text{total sales})$					
$(\text{ImportLicensingProcedures} \times D)_{ft}$	0.0179 (0.0956)	0.0643 (0.122)				
$(\text{ImportLicensingProcedures} \times D_{2006})_{ft}$			0.0985 (0.114)	-0.351 (0.257)	0.0161 (0.126)	-0.279 (0.253)
$(\text{ImportLicensingProcedures} \times D_{2007})_{ft}$			0.0939 (0.113)	-0.214 (0.188)	0.0329 (0.120)	-0.171 (0.184)
$(\text{ImportLicensingProcedures} \times D_{2008})_{ft}$			0.0454 (0.0867)	-0.109 (0.106)	0.00672 (0.0939)	-0.0956 (0.105)
$(\text{ImportLicensingProcedures} \times D_{2010})_{ft}$			0.165** (0.0726)	0.324*** (0.123)	0.195*** (0.0700)	0.300** (0.123)
$(\text{ImportLicensingProcedures} \times D_{2011})_{ft}$			-0.102 (0.115)	0.211 (0.188)	-0.0573 (0.108)	0.152 (0.187)
$\ln(\text{workers})$					0.795*** (0.0246)	0.726*** (0.0328)
Firm FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Product-specific trends	X		X		X	
Firm-specific trends		X		X		X
N	22,042	22,042	22,042	22,042	22,042	22,042
adj. R^2	0.854	0.878	0.854	0.878	0.869	0.887

Notes: Table reports regression coefficients of estimating Equations (3) (columns 1 and 2) and (4) (columns 3 to 6) using `reghdfe` by Correia (2017). In columns (1), (3), and (5), we present estimates when controlling for product-specific trends. In columns (2), (4), and (6), we control for firm-specific trends. All regressions include firm and year fixed effects. Standard errors are clustered at the product level (based on classification from the census, mapped with HS Code listed in the policy). Columns (3) to (6) normalize by dropping $(\text{ImportLicensingProcedures} \times D_{2009})_{ft}$. ***, **, * denotes significance at the 1%, 5%, 10% levels, respectively.

producers.

For this analysis, we turn to the annual firm level data contained in the census of Indonesian manufacturing plants. Using this dataset, we estimate the following DID specification:

$$\ln(Z_{ft}) = \mu_f + \eta_t + \beta(\text{ImportLicensingProcedures} \times D)_{ft} + \varepsilon_{ft}, \quad (3)$$

where D is a dummy equal to 1 if the observation is in 2009 or after (the treatment period). Note that the firm level data are annual data, hence t now indexes years, not months.

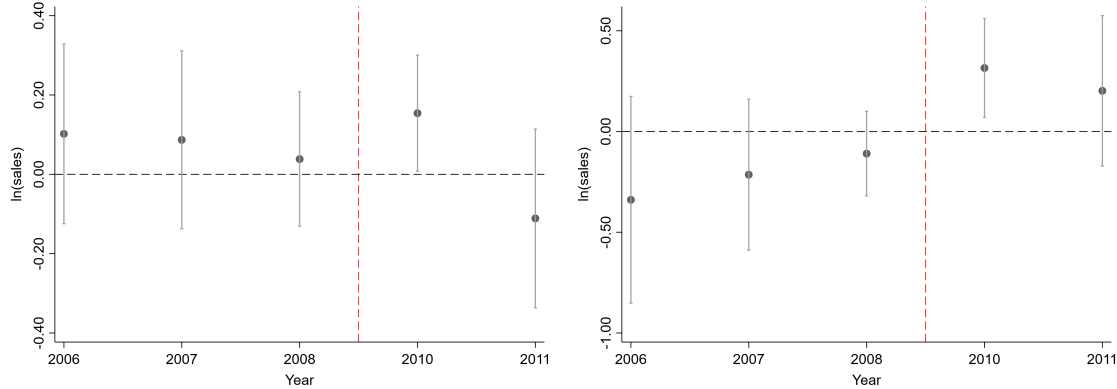
We also estimate the corresponding “fully dynamic” event study specification given by:

$$\ln(Z_{ft}) = \mu_f + \eta_t + \sum_{\tau=2006}^{2011} \beta_{\tau}(\text{ImportLicensingProcedures} \times D_{\tau})_{ft} + \varepsilon_{ft}. \quad (4)$$

In both specifications, the dependent variable $\ln(Z_{ft})$ is the natural log of total sales of firm f in year t .⁴⁹ The variable $\text{ImportLicensingProcedures}$ equals 1 if firm f is selling products

⁴⁹As sales data are not 0, we use a log-linear model estimated by OLS which is the standard in the DID literature, see Angrist and Pischke (2009) and Cunningham (2021).

Figure 9: Effect of import licensing procedures on sales of the producers of the listed products.



Notes: This figure shows coefficient estimates from an OLS regression (using `reghdfe`) of the natural log of firm's sales on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), along with a set of firm and time fixed effects and product-specific trends (left panel) or firm-specific trends (right panel). Point estimates are reported in columns (3) and (4) of Table 5. 95% confidence intervals are displayed around each point estimate. The vertical dashed line indicates the onset of the import licensing procedures. Standard errors are clustered at the product level (based on classification from the census, mapped with HS Code listed in the policy). Number of observations: 22,480.

listed in the import licensing procedures, and zero otherwise. D_τ is a dummy variable that is one τ years after the treatment started, and zero otherwise. μ_f represents a set of firm fixed effects that control for time-invariant firm-characteristic bias. η_t refers to year fixed effects that control for time-varying factors that influence treatment and control firms in a similar way. Finally, ε_{ft} represents a zero-mean error term that captures random fluctuations in our dependent variable. Our interest lies in estimating the treatment effects β_τ on metal producing firms' sales after the policy was introduced.⁵⁰ In line with our analysis of the shipment data, we cluster standard errors at the product level to allow for correlation within products as our treatment variable is defined at the product level.

We present point estimates of Equations (3) and (4) in Table 5. All specifications include firm and year fixed effects. In addition, in columns (1), (3), and (5), we control for product-specific trends. In columns (2), (4), and (6), we control for firm-specific trends instead. Columns (1) and (2) show the estimates for the standard DID from Equation (3) that assume a constant treatment effect. Columns (3) and (4) show the estimates of the average treatment effects for individual years from 2006 to 2011. To account for time-varying differences in firm sales due to changes in firms' size that are not captured by the time-invariant firm fixed effect, we control for the natural log of the number of workers, $\ln(\text{workers})$, in columns (5) and (6).

Columns (1) and (2) show that on average, domestic metal producers do not benefit

⁵⁰As in our event study specification given by Equation (2), the full set of treatment dummies and time fixed effects are only identified up to scale, so we have to drop one treatment dummy. We drop D_{2009} , hence our estimated treatment effects can be interpreted as conservative lower bounds of the effect of the import licensing scheme. See also the discussion in footnote 32.

from increased sales after the introduction of the import licensing policy. However, these estimates may be biased due to dynamic treatment effects, so we also estimate the event study specification of Equation (4). Figure 9 presents the event study graphs that correspond to columns (3) and (4) in the left and right panel, respectively. Note that in the left panel, we take into account product-specific time-variant unobserved heterogeneity by controlling for product-specific trends. We control for firm-specific trends, in line with the literature of firm heterogeneity in the right panel. The event study specifications all show a similar picture: While we find a positive and significant effect on sales in the short run in 2010, this effect disappears after one year.

If domestic metal producers benefited from the protection offered by the import licensing scheme, their sales should go up while the policy is in place. Instead, we find that this is not the case.

It may be that other firm outcomes besides sales are affected by the import licensing scheme. We therefore investigate the impact on two additional variables, employment and labor productivity. We measure employment by the (log) number of workers at firm f in year t , and measure labor productivity as the (log) of sales divided by the number of workers. We present results for these regressions in columns (2) and (3) of Table 6. Otherwise, we use the same specification as before, i.e., including firm and year fixed effects as well as the most restrictive trend specification, firm-specific trends. For comparison and convenience, column (1) repeats column (4) from Table 5. We find that import licensing does not have any statistically significant effects on firm employment, see column (2). Consequently, the short-term increase of sales in 2010 shows up as an increase in measured labor productivity, see column (3).

Standard models of heterogeneous firms in the vein of Melitz (2003) imply that changes in trade costs affect firms with different levels of productivity in a different way. To investigate these effects, we augment the specifications present in columns (1) to (3) by an interaction term of the treatment dummies with an indicator variable `HighProd` that is one if the firm's labor productivity is above the median in 2006, i.e., at the start of the sample period. We present results in columns (4) to (6). We find a statistically significant positive effect on employment for high-productivity firms in the year before the enactment of the import licensing policy in 2008, and a similarly sized effect of opposite sign in 2010, one year after the policy entered into force. The positive effect in 2008, i.e., before the treatment, implies that we should not attribute the negative employment effect in 2010 to the import licensing scheme. Overall, we do not find systematic differences across the firm-size distribution caused by the import licensing scheme, as the precision of the estimates is low.

Table 6: The effects of import licensing procedures on firm outcomes.

	Baseline			Heterogeneity by Productivity		
	(1) ln(sales)	(2) ln(workers)	(3) ln(labor prod.)	(4) ln(sales)	(5) ln(workers)	(6) ln(labor prod.)
<i>Panel A: Treatment effects</i>						
Treat $\times D_{2006}$	−0.351 (0.257)	−0.0823 (0.105)	−0.252 (0.261)	−0.502 (0.410)	−0.199 (0.179)	−0.304 (0.410)
Treat $\times D_{2007}$	−0.214 (0.188)	−0.0500 (0.0725)	−0.154 (0.189)	−0.0666 (0.306)	−0.129 (0.124)	0.0582 (0.307)
Treat $\times D_{2008}$	−0.109 (0.106)	−0.0160 (0.0373)	−0.0903 (0.107)	−0.0609 (0.173)	−0.0951 (0.0603)	0.0340 (0.171)
Treat $\times D_{2010}$	0.324*** (0.123)	0.0252 (0.0422)	0.291** (0.126)	0.234 (0.174)	0.0896 (0.0630)	0.147 (0.173)
Treat $\times D_{2011}$	0.211 (0.188)	0.0700 (0.0782)	0.129 (0.192)	0.00933 (0.291)	0.169 (0.137)	−0.152 (0.279)
<i>Panel B: High-productivity interactions (Treat $\times D_t \times \text{HighProd}$)</i>						
$\times D_{2006}$				0.333 (0.585)	0.246 (0.184)	0.0695 (0.593)
$\times D_{2007}$				−0.147 (0.441)	0.165 (0.124)	−0.320 (0.443)
$\times D_{2008}$				−0.0368 (0.224)	0.141** (0.0633)	−0.189 (0.229)
$\times D_{2010}$				0.0961 (0.207)	−0.119* (0.0617)	0.216 (0.214)
$\times D_{2011}$				0.227 (0.426)	−0.195 (0.136)	0.422 (0.433)
Firm FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Firm-specific trends	X	X	X	X	X	X
N	22,042	22,716	22,042	22,042	22,716	22,042
Adj. R^2	0.878	0.953	0.729	0.879	0.953	0.730

Notes: OLS estimates from `reghdfe` absorbing firm, year, and firm-specific linear trend fixed effects. Treatment indicates firms producing products listed in the 2009 import licensing policy. D_t are year dummies with 2009 as the reference year. *HighProd* is an indicator for above-median labor productivity in 2006. Standard errors clustered at the product level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In sum, combined with our results from Section 5, our evaluation of the effects of the import licensing scheme as a successful tool for industrial policy is sobering. At best, domestic producers benefit from the protection offered by the import restrictions only in the short run, but this effect disappears after one year. This ineffective policy comes at the cost of imposing significant adjustment costs on importers of iron and steel products. They reorganize their imported input supply chain by reducing their extensive margin, i.e., the number of import source countries. At the same time, they are able to circumvent the protectionist intent of the import licensing scheme as their intensive margin, i.e., imported volumes, are not reduced. Therefore, domestic producers at best seem to benefit from the policy only in the short term, as importers find a way to keep importing their required inputs without having to recur to domestic metal producers. Hence, while the import licensing scheme does impose costs on importers, its success as an industrial policy to prop up domestic metal producers seems limited.

From a political economy perspective, our results are consistent with our intuition that the ulterior motive behind the introduction of the import licensing scheme is most likely a short-term electoral gain by ensuring support from business groups while avoiding the negative effects on consumer prices by a more direct protectionist policy such as import tariffs, see Coate and Morris (1995).⁵¹

7 Conclusion

Industrial policies that restrict international trade to protect domestic industries are increasingly used by governments around the world. One particular type of such policies is import licensing. Import licensing procedures consist of the steps and paperwork that firms have to undergo before they are allowed to import goods. Our understanding of their effects for domestic firms, both importers and producers, is limited. Using Indonesian customs and firm level data, we provide evidence that the import licensing scheme introduced for iron and steel imports in 2009 reduced the extensive margin of imports. Specifically, we find that importers reduced both the number of incoming shipments and the number of countries from which they sourced their inputs. This means that users of protected products have decreased the diversification of their supply chains as a consequence of industrial policy. Otherwise, we find no significant effect of the industrial policy under study on the intensive margin of imports. In other words, although domestic users import less frequently and source from fewer countries, they do not import less in value or quantity. We also do not find a significant increase in the sales of domestic producers of protected products two years after the imposition of the licensing.

Our results suggest that the ease of substitution between different import source countries is driving the lack of effectiveness of the import restrictions. This implies that our results should generalize to products for which substitutes are easily available, such as other homogeneous goods.

Taken together, while import licensing imposes adjustment costs on firms as they make

⁵¹And it appears to have been successful, as the positive reception of the policy by an Indonesian steel lobby group demonstrates, see <https://www.hukumonline.com/berita/a/aturan-antisipasi-import-baja-ilegal-diterbitkan-hol21261/>, accessed 15/05/2026.

changes in the diversification of their supply chains, sustained gains for domestic producers are limited. Our study suggests that import licensing schemes are likely to impose costs on importers for little benefit to domestic producers. They therefore seem ill-suited as measures of industrial policy.

A natural question following from our results is whether the costs imposed by import licensing requirements are passed on to final consumers, as is typically the case with tariffs.⁵² We leave this question for further research.

Declarations

Funding: Heid and Márquez-Ramos gratefully acknowledge financial support received from the Australian Research Council under project number DP190103524, from PID2020-114646RB-C42 funded by MCIN-AEI/10.13039/501100011033 (a project from the Ministerio de Ciencia e Innovación (MCIN), Agencia Estatal de Investigación (AEI), Spain), from PID2023-147397NB-I00 (a project from the Ministerio de Ciencia, Innovación y Universidades, Agencia Estatal de Investigación (AEI), Spain), from the Prometeo project CIPROM/2022/50 financed by the Generalitat Valenciana, and from the Plan de Promoción de la Investigación de la Universitat Jaume I, UJI-B2022-36-(22I587). Heid also gratefully acknowledges financial support from the Spanish Ministry of Universities (Ministerio de Universidades, Plan de Recuperación, Transformación y Resiliencia) through María Zambrano contract MAZ/2021/04(UP2021-021) financed by the European Union - NextGenerationEU. Wardana is grateful for a PhD scholarship by the University of Adelaide’s Adelaide Scholarship International programme. The funding sources had no involvement in the writing of this paper nor the decision to submit it for publication.

Competing interests: Besides the above funding, the authors are not aware of any other competing interests, financial or otherwise.

Use of Artificial Intelligence tools: During the revision of this paper, the authors used Claude Code and ChatGPT to assist with manuscript editing and exploratory discussions. After using this tool, the authors reviewed and edited the content as needed. The authors take full responsibility for the content of the article and for any errors.

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⁵²Studying the Argentinian import licensing scheme, Atkin et al. (2024) find that licensing increases import prices at the border. A crucial difference from the Indonesian case, however, is that the Argentinian import licensing scheme was introduced to implement an import quota, whereas the Indonesian import licensing did not impose any quantitative restrictions as long as imports complied with the ministerial decree.

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A Online Appendix

Table A.1: List of products at 4-digit HS Code that are regulated by the 2009 import licensing procedures (Regulation of the Minister of Trade No. 08/M-DAG/Per/2/2009 dated 18 February 2009 on Provisions on the Import of Iron or Steel).

No.	4-digit HS Code	Product Name
1	7208	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated
2	7209	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold-rolled cold-reduced, not clad, plated or coated
3	7210	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated
4	7211	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated
5	7213	Bars and Rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel
6	7214	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot-rolled, hot-drawn or hot-extruded, but including those twisted after rolling
7	7215	Other bars and Rods of iron or non-alloy steel
8	7216	Angles, shapes and sections of iron or non-alloy steel
9	7217	Wire of iron or non-alloy steel
10	7219	Flat-rolled products of stainless steel, of a width of 600 mm or more
11	7229	Wire of other alloy steel
12	7301	Sheet piling of iron or steel, whether or not drilled, punched or made from assembled elements, welded angles, shapes and sections, of iron or steel
13	7304	Tubes, pipes and hollow profiles, seamless, of iron other than cast iron or steel
14	7305	Other tubes and pipes for example, welded, riveted or similarly closed, having circular cross-sections, the external diameter of which exceeds 4064 mm, of iron or steel
15	7306	Other tubes, pipes and hollow profiles for example, open seam or welded, riveted or similarly closed, of iron or steel
16	7307	Tube or pipe fittings for example, couplings, elbows, sleeves, of iron or steel
17	7308	Structures excluding prefabricated buildings of heading 9406 and parts of structures for example, bridges and bridge-sections, lock-gates, towers, lattice masts, roofs, roofing frameworks, doors and windows and their frames and thresholds for doors, sh
18	7311	Containers for compressed or liquefied gas, of iron or steel
19	7312	Stranded wire, ropes, cables, plaited bands, slings and the like, of iron or steel, not electrically insulated
20	7314	Cloth including endless bands, grill, netting and fencing, of iron or steel wire, expanded metal of iron or steel
21	7317	Nails, tacks, drawing pins, corrugated nails, staples other than those of heading 8305 and similar articles, of iron or steel, whether or not with heads of other material, but excluding such articles with heads of copper
22	7318	Screws, bolts, nuts, coach-screws, screw hooks, rivets, cotters, cotter-pins, washers including spring washers and similar articles, of iron or steel
23	7321	Stoves, ranges, grates, cookers including those with subsidiary boilers for central heating, barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel

Table A.2: List of products at 2-digit HS code included in the dataset: base metals and articles of base metal (HS classification Section XV).

2-digit HS code	Product name
72	Iron and steel
73	Articles of iron or steel
74	Copper and articles thereof
75	Nickel and articles thereof
76	Aluminium and articles thereof
78	Lead and articles thereof
79	Zinc and articles thereof
80	Tin and articles thereof
81	Other base metals, cermets, articles thereof
82	Tools, implements, cutlery, spoons and forks, of base metal, parts thereof of base metal
83	Miscellaneous articles of base metal

Table A.3: Top 5 countries of origin for iron and steel imports by number of shipments.

Year	Top 5 origins	# of shipments	ln(import weight)	ln(import value)
2006	China	4059	20.42	19.80
	Japan	4007	20.18	20.20
	Singapore	3803	17.43	18.15
	United States	3696	16.34	17.90
	Taiwan	2340	19.38	18.90
2007	China	4849	20.92	20.40
	Japan	3843	20.45	20.41
	United States	3600	17.69	18.17
	Singapore	3466	17.55	18.25
	Taiwan	2379	19.55	19.20
2008	China	5271	20.97	20.94
	Singapore	4148	18.16	18.97
	Japan	4137	20.93	21.10
	United States	3648	16.95	18.44
	Taiwan	2586	19.72	19.73
2009	China	4514	20.22	20.27
	Japan	3997	20.29	20.54
	United States	3322	16.25	17.84
	Singapore	3250	17.45	18.36
	Taiwan	2452	19.59	19.38
2010	China	5274	20.53	20.60
	Japan	4285	20.96	21.19
	United States	3369	16.28	18.27
	Singapore	3359	17.30	18.64
	Taiwan	2770	19.87	19.88
2011	China	5721	20.49	20.69
	Japan	4618	21.06	21.35
	United States	3595	16.66	18.37
	Singapore	3487	17.44	18.50
	Taiwan	3092	20.10	20.12

Table A.4: Top 5 countries of origin for iron and steel imports by value.

Year	Top 5 origins	# of shipments	ln(import weight)	ln(import value)
2006	Japan	4007	20.18	20.20
	China	4059	20.42	19.80
	Korea, Republic of	1824	19.25	19.17
	India	491	19.18	19.04
	Taiwan	2340	19.38	18.90
2007	Japan	3843	20.45	20.41
	China	4849	20.92	20.41
	Korea, Republic of	1860	19.56	19.52
	Taiwan	2379	19.55	19.20
	India	594	18.62	18.86
2008	Japan	4137	20.93	21.10
	China	5271	20.97	20.94
	Korea, Republic of	2132	20.03	20.19
	Taiwan	2586	19.72	19.73
	Malaysia	1790	19.43	19.30
2009	Japan	3997	20.29	20.54
	China	4514	20.22	20.27
	Korea, Republic of	2208	19.90	19.97
	Taiwan	2452	19.59	19.38
	Malaysia	1463	19.07	18.79
2010	Japan	4285	20.96	21.19
	China	5274	20.53	20.60
	Korea, Republic of	2494	20.12	20.12
	Taiwan	2770	19.87	19.88
	Malaysia	1523	19.18	19.04
2011	Japan	4618	21.06	21.35
	China	5721	20.49	20.69
	Korea, Republic of	2771	20.73	20.65
	Taiwan	3092	20.09	20.12
	Malaysia	1645	19.13	19.23

Table A.5: Pre-trends test using Bilinski and Hatfield (2026).

	# of shipments (1)	# of countries (2)	Import value (3)	Import weight (4)
Treated $\times$ time	−0.001 (0.001) [0.287]	−0.001 (0.001) [0.366]	0.006 (0.008) [0.447]	0.000 (0.005) [0.985]

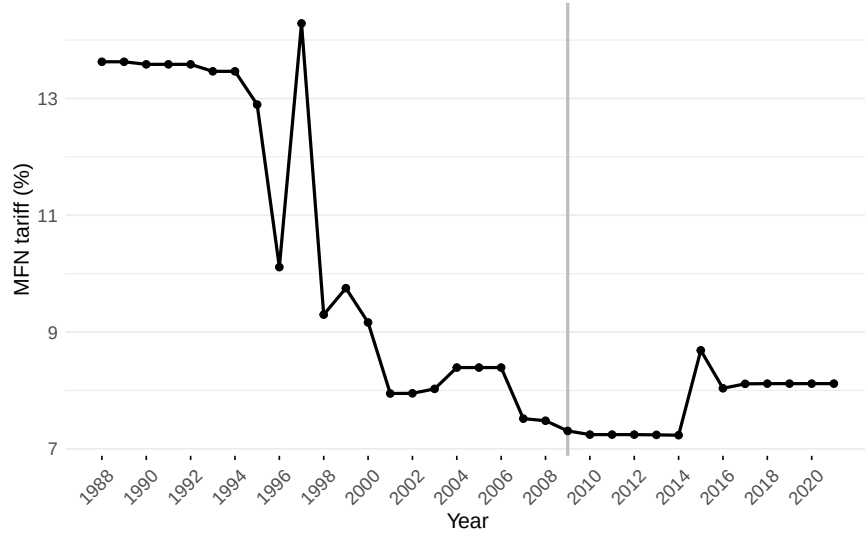
Notes: Table reports PPML regression coefficients of the interaction between the treatment indicator and a linear time trend (Treated $\times$ time) to test for differential pre-trends following Bilinski and Hatfield (2026). The dependent variables are the number of shipments (column 1), number of countries of origin (column 2), import value (column 3), and net weight of imports (column 4). All regressions include product and time fixed effects as well as treatment-by-period indicators. Standard errors clustered at the product level (6-digit HS Code) are reported in parentheses. p -values are reported in square brackets. ***, **, * denotes significance at the 1%, 5%, 10% levels, respectively.

Table A.6: Effect of import licensing procedures: alternative specifications and placebo tests.

	(1) Baseline	(2) Only FTA countries	(3) FTA excl. China	(4) FTA developing	(5) FTA developed	(6) Placebo tests
Dep. variable: # of shipments						
Import licensing procedures	-0.151** (0.070)	-0.159*** (0.058)	-0.147*** (0.056)	-0.208*** (0.062)	-0.114* (0.059)	-0.022 (0.066)
Dep. variable: # of countries of origin						
Import licensing procedures	-0.168*** (0.039)	-0.154*** (0.033)	-0.168*** (0.034)	-0.197*** (0.036)	-0.123*** (0.035)	0.002 (0.055)
Dep. variable: value of imports						
Import licensing procedures	-0.035 (0.107)	-0.051 (0.121)	-0.030 (0.126)	-0.173 (0.188)	0.033 (0.130)	-0.071 (0.221)
Dep. variable: net weight of imports						
Import licensing procedures	-0.067 (0.149)	0.117 (0.198)	0.159 (0.208)	0.016 (0.280)	0.188 (0.220)	0.217 (0.262)
<i>N</i>	43,488	43,200	43,056	41,904	42,984	40,752

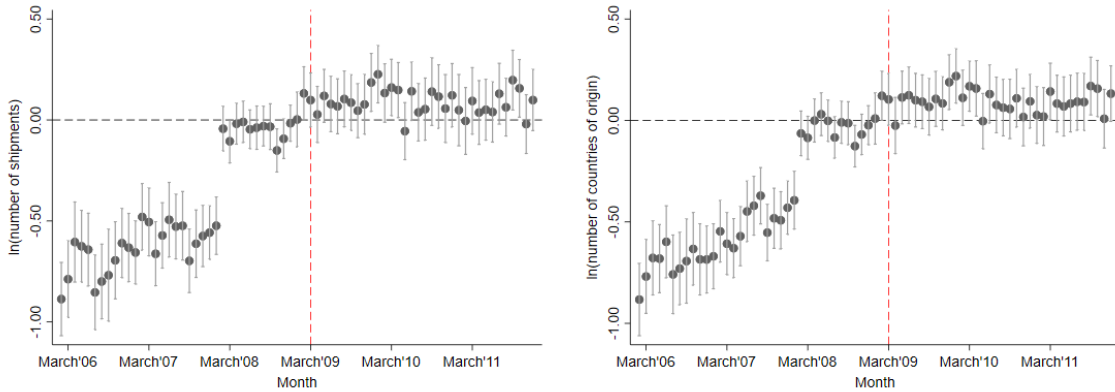
Notes: Table reports PPML regression coefficients of estimating the average treatment effects on the treated (ATT) on imports' extensive and intensive margins following the import licensing procedures announced in February 2009. All regressions include product and time fixed effects. Standard errors clustered at the product level (6-digit HS Code) are reported in parentheses. ***, **, * denotes significance at the 1%, 5%, 10% levels, respectively. Column (1) reports the estimates of our baseline specifications from Equation (1). Column (2) reports estimates when we restrict our dataset to countries of origin that have an FTA with Indonesia. Column (3) further restricts the FTA sample by excluding China. Columns (4) and (5) restrict the FTA sample to developing and developed countries of origin, respectively. Note that as the unit of observation is a HS6 code and month combination, dropping shipments from a particular country only reduces the number of observations if a HS6 code is no longer imported from any other source country, and hence the number of observations from columns (4) and (5) do not add up to the number of observations in column (1). As placebo tests, column (6) reports the estimates of our baseline specifications for a restricted sample that only contains shipments arriving into ports in the Special Economic Zones, i.e., the Batam-Bintan-Karimun archipelago.

Figure A.1: MFN tariff on base metals and articles of base metals applied by Indonesia.



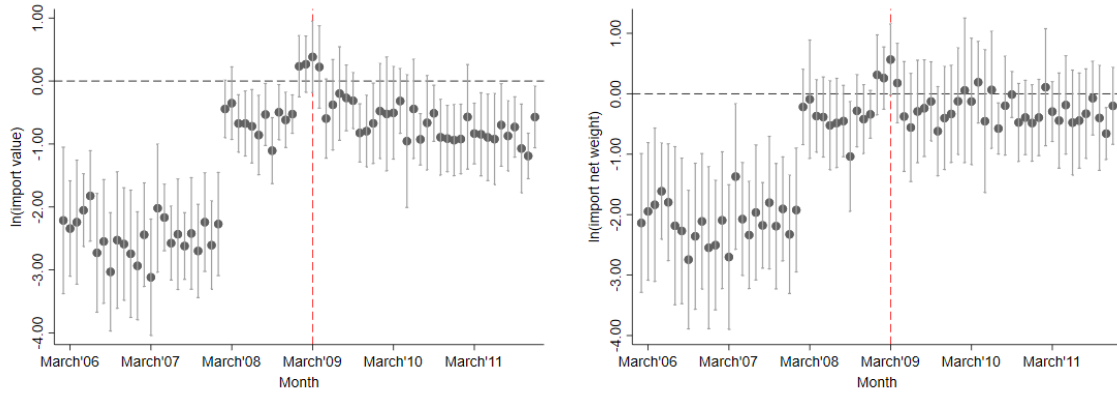
Notes: This figure shows the unweighted average MFN tariff applied by Indonesia on base metals and articles of base metals (HS Section XV). Data are from Feodora Teti's Global Tariff Database (Beta Version v_beta1-2024-12), see Teti (2024). The grey vertical line marks 2009, the year of the onset of the import licensing scheme.

Figure A.2: Effect of import licensing procedures on the extensive margin of imports (treatment group includes only shipments of treated products into SEZs; control group includes all regions): alternative placebo test.



Notes: This figure shows coefficient estimates from PPML regressions of the extensive margin of imports (left: number of shipments; right: number of countries of origin) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have an FTA with Indonesia, along with a set of product and time fixed effects. Note that the placebo treatment group is restricted to shipments of treated products arriving into ports in the BKK Special Economic Zone; the control group includes all shipments into all regions of other metal products. 95% confidence intervals are displayed around each point estimate. The vertical dashed line indicates the onset of the import licensing procedures. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,272.

Figure A.3: Effect of import licensing procedures on the intensive margin of imports (treatment group includes only shipments of treated products into SEZs; control group includes all regions): alternative placebo test.



Notes: This figure shows coefficient estimates from PPML regressions of the intensive margin of imports (left: import value; right: import net weight) per product on a set of dummy variables indicating the interaction between a time variable and the treatment status (being a product listed in the 2009 import licensing policy), only including countries of origin that have an FTA with Indonesia, along with a set of product and time fixed effects. Note that the placebo treatment group is restricted to shipments of treated products arriving into ports in the BKK Special Economic Zone; the control group includes all shipments into all regions of other metal products. 95% confidence intervals are displayed around each point estimate. The vertical dashed line indicates the onset of the import licensing procedures. Standard errors are clustered at the product level (6-digit HS Code). Number of observations: 43,272.