

Does export promotion enhance firm-level intensive margin of exports? Evidence from a meta-regression analysis

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Abstract

Purpose – The impact of export promotion programs (EPPs) on the intensive margin of exports remains somewhat uncertain. This study tackles a crucial question: does export promotion enhance firm-level intensive margin of exports?

Design/methodology/approach – We draw upon comprehensive empirical research conducted up to 2023. We collected 951 estimates, constructed 22 variables, captured diverse contexts and employed a meta-analytical approach to scrutinize the considerable variation in findings.

Findings – The overall meta-effect, after filtering out publication bias, is positive and statistically significant. Firms receiving EPP support exhibit an export intensity that is 1–9% higher than firms not participating in such programs. Assessing the mechanisms through which EPPs bolster this, we observe that support in the form of various services plays a more substantial role compared to assistance in the form of financial resources.

Research limitations/implications – Evaluating EPPs and their activities in terms of social welfare falls beyond the scope of this paper, which specifically focuses on the benefits of EPPs to export intensity. Subsequent research should undertake a comprehensive evaluation, considering both economic impacts and costs for accurate assessments of welfare. We also suggest that future meta-analyses explore other dimensions of firm-level performance linked to EPPs.

Practical implications – Publication bias distorts the impacts of EPPs, leading to an overstatement of their actual effects. Adjusting for publication bias, the practical significance of EPPs for a country's trade intensity appears to be limited. Additionally, the provision of diverse activities and services primarily contributes to the amplification of export margins as compared to subsidies and grants. While larger firms initially benefit more from EPPs, these effects are found to be transitory.

JEL Classification — F13, F14, L25, O11

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Originality/value – This is the first meta-analysis scrutinizing the impact of EPPs, specifically concentrating on the firm-level intensive margin of exports.

Keywords Export promotion, Firm export performance, Intensive margin, Meta-analysis

Paper type Research paper

1. Introduction

Governments globally employ diverse policy instruments to boost business export performance, including export promotion policies and programs (EPPs) initiated in the late 1990s. EPPs encompass multifaceted initiatives aiding domestic firms in navigating foreign markets, from customizing products to facilitating international relationships. Activities aim to diminish informational barriers and costs associated with expanding into export markets. EPPs also involve financial measures such as export subsidies, aiding firms in meeting export requirements and overcoming market challenges. These strategies, highlighted by studies like [Shamsuddoha *et al.* \(2009\)](#), [Martincus and Carballo \(2010a\)](#), [Lederman *et al.* \(2010\)](#), [Cadot *et al.* \(2015\)](#), [van Biesebroeck *et al.* \(2016\)](#), [Munch and Schaur \(2018\)](#), [Buus *et al.* \(2022\)](#), [Faroque *et al.* \(2021, 2022\)](#), [Srhoj *et al.* \(2023\)](#) and [Boutorat and Franssen \(2023\)](#), collectively contribute to the overarching goal of enhancing global competitiveness and market presence for businesses.

To justify the focus on this trade policy, the expanding field of international trade literature assesses the impact of publicly funded EPPs on firm-level export performance. Utilizing empirical design based on micro-econometric causal effects, these impact evaluations compare treated firms with control firms across four dimensions: increasing export levels in existing markets (intensive margin), attracting new firms to export (firm-extensive margin) and diversifying exports across products and destinations (extensive margin). [Munch and Schaur \(2018\)](#) underscore the ambiguous nature of the hypothesis regarding the impact of EPPs. In a positive scenario, reduced information costs and improved international experience could sustain success for firms engaged in export markets, potentially causing those without export promotion to exit ([Broocks and van Biesebroeck, 2017](#); [Munch and Schaur, 2018](#)). Similarly, according to [Shamsuddoha *et al.* \(2009\)](#), the utilization of EPPs equips managers with additional information and expertise, enabling them to surmount export barriers and gradually elevate their prior export engagement. In a similar vein, [Faroque *et al.* \(2021\)](#) contend that diminishing informational disparities between exporters and foreign markets empowers firms to craft effective strategies for market selection and marketing mix, consequently enhancing firm performance.

On the other hand, in an adverse scenario, firms may become discouraged from further exporting once they recognize limitations through the information they have acquired ([Munch and Schaur, 2018](#)). In addition, while EPPs can address market failures, they may lead to government failures if low-productive firms are encouraged to expand exports. Apart from low productivity, there could be other hindrances to exporting, such as institutional barriers ([Manolopoulos *et al.*, 2018](#)). If perceived as bureaucratic, EPPs may have an insignificant or negative impact on international firm-level performance. As emphasized by [Manolopoulos *et al.* \(2018\)](#), bureaucratic interventions in export processes result in excessive costs, time delays and red tape, hindering firms' advancement in internationalization. Moreover, they argued that these interventions may even prompt firms to consider a complete withdrawal from overseas operations.

Considering these ambiguous hypotheses, the literature suggests that government intervention is more likely to affect the extensive margin than the intensive margin of firm-level performance ([Martincus and Carballo, 2008](#); [Cadot *et al.*, 2015](#); [van Biesebroeck *et al.*, 2016](#); [Broocks and van Biesebroeck, 2017](#)). For instance, [van Biesebroeck *et al.* \(2015\)](#) found consistent evidence supporting export support policies aiding the extensive margin, while

evidence on the intensive margin remains mixed. In a study involving Peruvian firms, [Martincus and Carballo \(2008\)](#) found that the PROMPEX (Peru's national export promotion agency) effect primarily manifested along the extensive margin of firms, affecting both the expansion into new export markets and the introduction of new products. However, it had no robust significant impact on the intensive margin of exports. Similarly, analyzing exporter data in Uruguay, [Martincus and Carballo \(2010b\)](#) underscored that EPPs (Uruguay XXI) predominantly influenced export performance along the extensive margin. Another study involving Latin American firms, [Lederman et al. \(2016\)](#), demonstrated that export promotion aids firms in entering and surviving in export markets, but its effect on the intensive margin is limited. Similarly, in an examination of Belgian firms, [Broocks and van Biesebroeck \(2017\)](#) corroborated that export promotion primarily impacts the extensive margin.

However, the impact of EPPs on the intensive margin is not uniformly absent. [Cadot et al. \(2015\)](#) demonstrated a positive effect using Tunisia's EPPs (FAMEX), although it tends to be short-lived. [Girma et al. \(2009\)](#) report a positive influence along the intensive margin in China, focusing on subsidies. Similarly, using firm-level data for Ireland, [Görg et al. \(2008\)](#) found that export subsidies and grants prompt exporting firms to intensify their exports. In Chile, [Martincus and Carballo \(2010a\)](#) find that smaller firms are more likely to benefit from export promotion services (PROCHILE). Additionally, [van Biesebroeck et al. \(2016\)](#) revealed that export promotion aids Belgian and Peruvian firms in surviving export markets during the Great Recession.

Given this ambiguous literature on EPPs' effect on the intensive margin of exports, we reviewed 951 estimates from 40 studies across 26 countries [1], published until 2023. [Figure A1 \[2\]](#) supports the evidence on mixed findings, with 41% finding a positive and significant effect, while 53% show both positive and negative but insignificant effects. [Figure A2 \[2\]](#) indicates a slight increasing trend over time but emphasizes substantial disagreement among individual studies. The divergent results emphasize the need for international trade policies to assess EPPs' effectiveness on the firm-level intensive margin of exports by comparing the average performance of firms with and without EPPs.

To date, there have been limited systematic reviews addressing the mixed results of EPPs. [Makioka \(2019\)](#) conducted a recent traditional literature review, while [Freixanet \(2022\)](#) offered a comprehensive integrative systematic analysis and conceptual model of export promotion. The most recent systematic study by [Srhoj et al. \(2023\)](#) examined 33 studies evaluating EPPs across all 4 firm-level performance dimensions. Despite providing a comprehensive overview by merging all possible supply-side impacts for studies published until 2020, a formal meta-analysis of quantitative estimates was deemed unfeasible, leading to a qualitative summary. Meta-analysis serves as a valuable statistical tool for addressing mixed results in empirical studies on similar hypotheses or research questions ([Stanley and Doucouliagos, 2012](#)). Recent applications in international economics by [Moons and van Bergeijk \(2017\)](#), [Demena and van Bergeijk \(2017\)](#), [Bajzik et al. \(2020\)](#), [Demena and Afesorgbor \(2020\)](#), [Afesorgbor et al. \(2024\)](#) and others contribute significantly. [Coudounaris \(2018\)](#) made an initial attempt at a mini meta-analysis of EPPs using a generic correlation coefficient analysis, though it included only 19 reported parameters from 16 studies and did not deal directly with the mixed results discussed above.

This study seeks to surpass these reviews by incorporating advanced applications of meta-analysis. Our study contributes to the ongoing debate by synthesizing the existing literature to assess whether EPPs enhance the overall underlying effect of the intensive margin of exports. Through advanced meta-analysis techniques, we tackle publication bias, providing the first empirical evidence in this regard. Beyond our primary objective of determining the genuine impact of EPPs on the intensive margin, this paper extends its contribution by examining whether this effect varies among different categories of firms based on size, temporal patterns and the types of support provided. Additionally, we

differentiate between the effects of EPPs and the publication characteristics of the included studies.

The remainder of the paper is organized as follows: [Section 2](#) delves into the construction of data and meta-data, along with the methodological approach of MRA; [Section 3](#) presents detailed results and discussion and [Section 4](#) offers concluding remarks.

2. Data and methods

2.1 Search strategy and selection criteria

To identify the relevant studies, an extensive search started with Google Scholar and supplemented with the Web of Science database. We started searching using Google Scholar employing the following broad combination of keywords: “exporting + productivity,” “export promotion + productivity,” “export promotion + intensive margin” and “export promotion + firm level performance.” Doing so, the search identified a huge set of literature. For instance, using “export promotion + firm level performance” hit 17,800 prospective studies. We applied a quick inspection of the titles, in some cases, to the abstracts of the preliminary studies in the Google Scholar list. Furthermore, following the identification of the final selected studies, we conducted an additional search by looking at studies that cited these identified studies using Google Scholar.

We search for all peer-reviewed/published and unpublished studies. Exploring both published and unpublished studies offers a significant advantage, particularly in addressing the issue of publication bias, a matter we delve into for the first time in this particular field of inquiry. Publication bias, characterized by the tendency of published studies to favor larger, statistically significant effects that align with prior theoretical expectations, is a well-recognized challenge that is prevalent across empirical economics ([Demena and van Bergeijk, 2017](#)). Relying solely on published studies poses risks due to the potential bias against the null hypothesis, as highlighted by [Cooper \(2017\)](#). In literature devoid of publication selection bias, the exclusion of unpublished papers may seem inconsequential ([Stanley and Doucouliagos, 2012](#)). However, various early and recent guidelines and meta-analyses advocate for the inclusion of unpublished papers to counteract bias against null findings and to address publication bias ([Greenwald, 1975](#); [Demena and van Bergeijk, 2017](#); [Iršová et al., 2023](#)).

We gathered relevant primary empirical studies from the impact evaluation literature, adhering to the population-intervention-comparison-outcome (PICO) protocol outlined by [Petticrew and Roberts \(2008\)](#), which has been underscored by the *Cochrane Handbook for Systematic Reviews of Interventions*. The adoption of the PICO protocol was particularly suitable for policy-oriented systematic reviews. Within the PICO framework, the population encompasses all formal firms, while the interventions considered are diverse export promotion policies aimed at stimulating the intensive margin of exports. Comparisons are made between treatment and control groups, with the outcome of interest being the intensive margin of firm-level performance. Therefore, our selection criteria encompass English-language primary empirical studies that present regression-based causal effects on the intensive export margin by applying quasi-experimental designs or randomized controlled trials (RCTs). Experimental and quasi-experimental methods are highly valued tools for estimating the causal impact of EPPs ([Martincus and Carballo, 2008](#); [Cadot et al., 2015](#)). When interventions are carefully designed or employ robust identification strategies, the resulting findings on program are considered to possess credible estimates that imply that intervention is causally linked to observed differences in outcomes between treatment and control groups ([Martincus and Carballo, 2008](#)). Accordingly, this review focuses solely on studies that assess intervention impact by comparing treatment (or eligible) and control (or comparison) groups, adhering to the PICO protocol.

The imposition of these criteria resulted in 28 empirical studies published until August 2020, i.e. after excluding 169 studies. These studies were excluded from our analysis for various reasons. We excluded studies that provide a macro perspective by using financial resources or foreign office networks to measure export promotion activities. We also excluded studies that present aggregated export outcomes stemming from economic diplomacy, which heavily relies on international relations facilitated through foreign missions such as consulates, embassies, or state visits. Moreover, we excluded studies that did not offer an interpretation of causal effects. Other grounds for exclusion were the unavailability of full-text access or download options for the studies, as well as the identification of duplicate studies, reporting identical coefficients. [Figure A3 \[2\]](#) presents the flowchart of the steps followed in retrieving relevant studies.

To make sure that our Google Scholar approach does not result in missing any relevant potential studies, we supplement with the Web of Science database. As a result, we found only two additional peer-reviewed studies that were not included through the first web search engine. The final stage of the search strategy utilized the snowballing technique. In addition to conventional web-based engine searches, we employed an innovative approach, i.e. expert recommendations, following [Lahar et al. \(2013\)](#) and [Srhoj et al. \(2023\)](#). By combining backward searches and expert suggestions in this area, we successfully identified an additional four relevant studies, resulting in a total of 34 studies meeting the research criteria.

To ensure the inclusion of any more recent studies, we performed a second round of searching for studies published after 2020. In this second round, we replicated the initial search criteria but focused solely on studies published between 2021 and 2023 [\[3\]](#). As a result of this additional search, we identified six more relevant studies. In total, 40 empirical studies met our inclusion criteria for coding. [Appendix 1](#) contains a comprehensive list of the included primary studies.

2.2 Empirical approach

Our empirical approach unfolds in three distinct steps. Initially, we compute the arithmetic mean. In the second stage, we employ the widely used visual technique known as the funnel plot to address concerns related to publication bias [\[4\]](#). However, this visual inspection-based approach is subjective and not entirely convincing. Therefore, in the third stage, we also employ the MRA to test the asymmetry of the funnel plot, known as the regression-based funnel asymmetry test (FAT):

$$Effect_{ik} = \beta_0 + \beta_1 SE_{ik} + \varepsilon_{ik} \quad (1)$$

where $Effect_{ik}$ represents the i th reported effect of EPPs on the intensity of exports from the k th empirical study and SE represents the standard error associated with estimates effect. β_1 stands for assessing the issue of publication bias, whereas the constant term, i.e. β_0 reflects the overall genuine effect of the EPPs on the intensive margin of exports after controlling for the publication bias. According to [Eq. \(1\)](#), when publication selection bias is absent, the standard error tends toward zero, while the expected EPP effect tends toward the overall genuine effect represented by β_0 . Conversely, the presence of publication bias can be detected if $Effect_{ik}$ is correlated with their associated standard errors, which is SE_{ik} ([Stanley and Doucouliagos, 2012](#)). The last parameter ε_{ik} is the usual error term.

In a classical regression, the ε_{ik} error term should be independent and identically distributed ([Afesorgbor and Demena, 2022](#)). However, estimating [Eq. \(1\)](#) presents an obvious problem of heteroscedasticity. This arises because the independent variable is the standard error of the dependent variable. To address this heteroscedasticity issue, we introduce weights using the inverse of the variance, dividing [Eq. \(1\)](#) by SE_{ik} yields:

$$t_{ik} = \beta_1 + \beta_0(1/SE_{ik}) + e_{ik} \quad (2)$$

In Eq. (2) t_{ik} represents the t -value indicating the statistical significance of the i th reported EPPs effect from the k th primary studies, while $1/SE_{ik}$ represents its precision. The parameters β_1 and β_0 , respectively, denote the magnitude of publication bias and the genuine magnitude of the EPPs effect. In estimating Eq. (2), we applied a set of alternative techniques to address data dependence. First, ordinary least squares clustered data analysis (CDA) involves study-level clustered standard errors to potentially handle within-study data dependence. Second, fixed-effect (FE) estimation addresses the issue of individual within-variation. Third, a multi-level model or hierarchical model (MEM) to capture the between-study data dependence goes beyond controlling for within-study data dependence [5]. Consequently, we consider MEM as our preferred model. Furthermore, to account for outliers, we winsorize the meta-data at the 5% level.

The FAT approach outlined in Eq. (2) operates under the assumption that publication bias is a linear function of the standard error. Any deviation from this assumption could potentially distort our findings related to publication bias and the genuine effect. To address this concern, we employ six nonlinear meta-analytical approaches. Initially, we utilize the top ten method proposed by Stanley *et al.* (2010). Subsequently, we apply the weighted average adequately powered (WAAP) method introduced by Ioannidis *et al.* (2017), the selection model developed by Andrews and Kasy (2019) and the kinked model with a threshold level of the standard error below which publication bias is unlikely, as introduced by Bom and Rachinger (2019). Furukawa (2021) provides a technique for estimating the share of the most precise estimates to consider when determining the genuine effect corrected for publication bias. Finally, van Aert and van Assen (2021) introduce a technique involving no correlation between estimates and standard errors, utilizing the distribution of p -values, which should be uniform around the genuine effect.

3. Results and discussion

3.1 Publication bias and genuine effect

The overall average effect in the sample is 0.134 (Figure A4 [2], indicated by a short-dashed vertical line), suggesting that export levels are approximately 13% higher for supported firms compared to control firms. However, as previously mentioned, a significant concern is that the mean effect, calculated by averaging reported estimates from individual studies, is often influenced by publication bias. As an initial assessment, Figure A4 [2] displays the funnel plot, revealing a positive publication bias. The reported effect sizes form an asymmetrical funnel shape, with the most precise estimates clustering around the overall sample mean of 0.134. However, numerous imprecise estimates fall above 0.134 compared to those below this mean effect. Consequently, the plots are somewhat skewed toward the right-hand side of the diagram, indicating a relatively higher number of larger positive effect sizes reported.

To formally account for publication bias using Eq. (2), Table A1 [2] gives the regression-based FAT analysis by employing different estimation techniques, as outlined in Section 2.2. In all the estimations, the publication bias detected through the visual test was confirmed. The results are consistent both in size and statistical significance across all econometric specifications. Following Doucouliagos and Stanley (2013), the extent of publication bias is substantial.

Going beyond the identified publication selection bias, Table A1 [2] enables testing for the presence of a genuine underlying effect. In two out of the three estimation approaches, the results reveal a statistically significant positive effect, indicating that EPPs are associated

with an enhancement in export intensity after accounting for publication bias. However, the magnitude of this genuine effect is relatively small, particularly in our preferred model, the MEM, with a value of 0.014. This observation underscores the significant impact of publication bias, inflating the overall mean effect of EPPs by approximately tenfold when comparing the overall reported mean of 0.134 to the corrected mean of 0.014.

Furthermore, the results of the nonlinear tests are presented in [Table A2 \[2\]](#). In each case, these findings mirror those detailed in [Table A1 \[2\]](#), where the linear FAT assumption was considered. The genuine effect corrected for publication bias ranges from 0.022 (kinked model) to 0.090 (stem method), with median estimates of 0.032 (top 10) or 0.043 (selection model), closely resembling the value of the MEM model in column 3 of [Table A1 \[2\]](#). This indicates that the linear assumption regarding publication bias is appropriate in this scenario.

In summary, when considering both [Tables A1 and A2](#), the intensive margin of exports ranges from 1 to 9%, indicating a slightly higher performance for firms supported by EPPs compared to control firms. This suggests that the practical impact of EPPs on export intensity appears limited, with the effects being relatively small. Government intervention through EPPs may play a minor role and is unlikely to significantly impact exporters at the intensive margin.

3.2 How do different EPP designs and firm categories influence the genuine effect?

We first explore the mechanisms through which EPPs could potentially augment the intensive margin of exports, considering support provided through services or financial resources. [Table A3 \[2\]](#) presents the outcomes for these two channels. There is compelling evidence indicating that support through various activities serves as the primary channel for enhancing the intensive margin effect compared to support in the form of diverse financial resources. In our preferred model (MEM), Panel A in [Table A3 \[2\]](#) reveals that support related to services has a positive and significant effect. Conversely, support in the form of financial resources exhibits a negative and significant effect, albeit in only one specification (Panel B). It is plausible that studies focusing on financial resource support were primarily centered on production-related subsidies, which may not be directly targeting EPPs, as argued by [van Biesebroeck \(2015\)](#). Regarding bias, both cases display a significantly positive and substantial publication bias, aligning with the estimates of the combined effect in [Table A1 \[2\]](#).

Subsequently, to further explore genuine effects according to the EEP design and firm categories, [Table A4 \[2\]](#) presents sub-sample analyses for specific scenarios. The first set focuses on the types of firms targeted. Small and medium-sized enterprises (SMEs) and large firms face different challenges in international markets. SMEs struggle with significant barriers due to limited resources, while large firms leverage robust financial, human and operational resources to capitalize on opportunities ([Shamsuddoha et al., 2009](#); [Faroque et al., 2022](#)). In contrast, [Martincus et al. \(2012\)](#) suggest that trade-supporting measures impact SMEs more because of their limited access to essential export information. Moreover, [Martincus and Carballo \(2010a\)](#) highlight that export support services are more beneficial for SMEs, which lack the ability to independently gather foreign market information. Similarly, [Munch and Schaur \(2018\)](#) highlighted that larger firms benefit less from such services because of their extensive internal knowledge.

Our findings indicate that SMEs are likely to exhibit less responsiveness to export promotion policies compared with large-sized firms. Consequently, it could be argued that the insignificant impact observed with SMEs suggests that EPP support provided to such firms may lack the capacity to shoulder the costs of international involvement. Larger exporters, on the other hand, are expected to derive greater benefits from trade-supporting policies. Especially in distant markets, the costs of international involvement may be too high for all

types of firms, but the largest firms are better positioned to bear these costs and become successful players in international markets.

The next set of analyses pertains to the evaluation timing for follow-up after treatment provided by EPPs. This subset analysis aims to determine whether the effect of the intervention is short-term, medium-term, or long-term. Our results indicate that the impact generated through EPPs tends to be temporary. The expected policy intervention is associated only with short-term effects, while the effects in the medium and long term disappear. These results support the observations of [Cadot *et al.* \(2015\)](#) regarding the FAMEX program in Tunisia. FAMEX, which offered matching grants to firms, demonstrated a positive impact on export intensity, but this effect was limited to the short run.

Finally, regarding publication characteristics, our findings indicate a notably positive impact on reported estimates from peer-reviewed studies (Column 7 of [Table A4 \[2\]](#), compared to Column 3 of [Table A1 \[2\]](#)). This implies that reported estimates from peer-reviewed journals are likely to demonstrate a more positive and significant impact of treatment assignment. However, subjected to formal statistical tests, this observed effect, beyond bias, is not statistically different from the effect derived from all studies. This approach to heterogeneity also enables us to explore whether journal reviewers and editors introduce additional bias in their paper selection and acceptance. While the reported magnitude of publication bias appears higher for peer-reviewed studies (Column 7 of [Table A4 \[2\]](#)) compared to all studies ([Table A1 \[2\]](#)), formal statistical tests reveal no significant difference between the bias in peer-reviewed estimates and all estimates. In essence, except for potential self-censorship, primary studies do not exhibit significant influence from additional pressure by journal reviewers and editors to favor positive and significant findings.

3.3 Do potential heterogeneity factors affect the genuine effect?

Given the within- and between-study heterogeneities observed in [Figure A5 \[2\]](#), an important question arises: can the earlier findings withstand the inclusion of additional potential moderator variables reflecting the context in which individual studies derive their estimated parameters? To address this, we examine the variables outlined in [Table A5 \[2\]](#), considering reported heterogeneity and insights from the literature. Estimating with this multitude of moderator variables poses a potential multicollinearity problem. To handle multivariate MRA model uncertainty, we adopt Bayesian Model Averaging (BMA). BMA involves running regressions with different subsets of possible combinations of moderator variables (2^{22} in our case). It utilizes a Markov-chain Monte Carlo algorithm, walking through the most likely models represented by posterior model probabilities (PMPs) ([Bajzik *et al.*, 2020](#)).

The BMA estimation relies on the unit information prior (UIP) proposed by [Eicher *et al.* \(2011\)](#) and the dilution prior recommended by [George \(2010\)](#), recently re-emphasized by [Iršová *et al.* \(2023\)](#), considering potential collinearity among the included variables. [Table A6 \[2\]](#) presents the numerical results and [Figure A6 \[2\]](#) provides graphical representations of the BMA findings. Explicitly considering moderator variables to explain heterogeneity and adding them to our model reveals a crucial result: publication bias remains robust, consistent with previous findings. BMA results confirm that publication bias inflates the reported impact of EPPs on the intensive margin of trade. This supports the argument that the significant correlation observed in [Eq. \(1\)](#), between the standard errors and reported estimates, is not due to omitted contextual factors, as detailed in [Table A5 \[2\]](#).

The subsequent step involves evaluating whether the underlying genuine effect, after accounting for publication bias and controlling for study heterogeneity, remains intact. In comparison to the underlying effect discussed thus far, the inclusion of potential moderator variables has had no impact on the size and significance of the genuine effect reported in

Table A6 [2] (BMA). This affirms that the earlier findings withstand the inclusion of additional study heterogeneity reflecting the context in which individual studies derive their estimated parameters. This reassures us that the practical impact of EPPs on the export intensity appears limited with the effects being relatively small.

Unlike BMA, which focuses on the relevance of moderator variables in explaining heterogeneity, we also employ Frequentist Model Averaging (FMA). As demonstrated in Table A6 [2], FMA confirms that the genuine underlying effect of EPPs, after controlling for potential moderator variables, is 0.060, which is consistent with the earlier findings of Tables A1 – A3 [2]. Again, the inclusion of moderator variables, reflecting the context in which the primary studies estimate the impact of EPPs, does not alter our main findings discussed thus far.

4. Conclusion and policy implications

Utilizing a meta-analysis, this research addresses a crucial inquiry in the fields of international trade policies: does the EPP enhance the intensive margin of exports for firms engaged in international activities compared to those not treated by the program? Our key findings consistently underscore that the EPP impact on export intensity is significantly influenced by substantial positive publication bias. The literature's reported estimates demonstrate significant inflation, marked by a prevalence of positive results in publications. Relying on reported estimates at face value would likely result in a considerable overstatement of the overall mean effect of EPPs. Therefore, it is essential to investigate publication bias before prescribing any firm policy implications based on the reported estimates.

After filtering out publication bias, export promotion contributes to increased export intensity. EPPs appear to assist existing exporters in amplifying their export volumes. Utilizing varied methodologies, our analyses consistently lead to the same conclusion: firms benefiting from EPPs exhibit export levels 1–9% higher than those without program support. This implies that EPP-supported firms are more likely to sustain activity and export larger volumes. It can be concluded that market failures and information asymmetry provide a rationale for the provision of EPP services to boost export intensity. Nevertheless, the practical significance of this effect appears limited. This may align with the assertion that EPPs primarily have a greater impact along the extensive margin of exports.

To address heterogeneity in policy interventions, we apply our empirical approach to various subsets of the dataset, segmented by key variables collected in the included studies. Our robust evidence emphasizes that the provision of diverse activities and services predominantly drives the intensification of export margin compared with subsidies and grants. This underscores a vital policy implication, highlighting the importance of directing EPP benefits more effectively through services such as access to pertinent export information and facilitation, rather than solely providing financial resources to firms.

Subsequently, we explore whether export-supporting activity impacts firms of varying sizes differently. Our findings indicate that SMEs exhibit a weaker response to EPPs compared with their larger counterparts. This suggests that the observed limited impact on SMEs may stem from a lack of capacity to benefit from EPP support. Conversely, larger exporters appeared to generate benefits from export-supporting policies. This finding aligns with the assertions emphasized by Shamsuddoha *et al.* (2009) and Faroque *et al.* (2022). The significance of the impacts for larger firms underscores the need for policymakers to explicitly state the primary beneficiaries of these activities.

We also consider recent insights from informal firm formalization policies, highlighting the importance of follow-up time for impacts to manifest (Floridi *et al.*, 2020). Incorporating this perspective, we examine the role of the timing of the evaluation follow-up. Our findings

suggest that the impact of EPPs tends to be transient. The anticipated policy intervention is associated solely with short-term effects, with the effects diminishing in the medium and long term. These results align with the observations of [Cadot et al. \(2015\)](#) regarding the FAMEX program in Tunisia. The implication is that policymakers need to evaluate whether export promotion strategies can not only expand export activities but also contribute to establishing a lasting presence in foreign markets.

The article concludes by exploring heterogeneity in estimates comparing those from peer-reviewed studies to all studies. Notably, there is no evidence of extra bias from editors and reviewers, except for possible self-censorship. Moreover, there is no statistical difference in the genuine effect beyond bias between estimates from all studies and those exclusively from peer-reviewed studies. From a policy perspective, our results suggest that the decision to focus on all reported estimates or peer-reviewed journals may not significantly impact policymaking considerations. In addition to addressing publication bias and analyzing subsets of the dataset based on key variables, we also account for study heterogeneity. Importantly, our results remain consistent when including additional potential moderator variables that reflect the context in which individual studies derive their estimated parameters.

We acknowledge the limitation of not being able to directly assess and compare the other highlighted dimensions of firm-level performance associated with EPPs in our analysis. Therefore, we suggest that future meta-analyses consider incorporating the other three additional firm-level performance dimensions from EPPs to ascertain which aspects are more significantly impacted by these programs.

Notes

1. These are Argentina, Belgium, Bolivia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Croatia, Denmark, Ecuador, Estonia, Germany, Ireland, Italy, Japan, Nepal, Peru, Portugal, Spain, Tunisia, Turkey, The Netherlands, the UK, and Uruguay.
2. Please see it on the online [Appendix](#).
3. We express our gratitude to the anonymous referee for suggestion to extend the review of the included studies beyond 2020 and up to 2023.
4. The concern is that in many fields of economics the mean estimates are distorted by publication bias ([Floridi et al., 2021, 2023](#)). As [Demena \(2024\)](#) already puts it, several recent meta-analyses have already documented that mean estimates reported in many field of international economics are distorted due to strong publication bias, for instance, [Bajzik et al. \(2020\)](#) bias against small and insignificant results of Armington elasticity; [van Bergeijk et al. \(2019\)](#) and [Demena et al. \(2021\)](#) bias on economic determinants of sanctions; and [Demena \(2015\)](#) and [Demena and Bergeijk \(2017\)](#) positive productivity spillovers bias from FDI.
5. Adopting MEM, estimates associated with EPPs that are reported by the primary studies are nested within each study and the estimates are modeled in a two-level model to differ between studies.

References

- Afesorgbor, S.K. and Demena, B.A. (2022), "Trade openness and environmental emissions: evidence from a meta-analysis", *Environmental and Resource Economics*, Vol. 81 No. 2, pp. 287-321, doi: [10.1007/s10640-021-00627-0](https://doi.org/10.1007/s10640-021-00627-0).
- Afesorgbor, S.K., Fiankor, D.D.D. and Demena, B.A. (2024), "Do regional trade agreements affect agri-food trade? Evidence from a meta-analysis", *Applied Economic Perspectives and Policy*, Vol. 46 No. 2, pp. 737-759, doi: [10.1002/aep.13410](https://doi.org/10.1002/aep.13410).
- Andrews, I. and Kasy, M. (2019), "Identification of and correction for publication bias", *American Economic Review*, Vol. 109 No. 8, pp. 2766-2794, doi: [10.1257/aer.20180310](https://doi.org/10.1257/aer.20180310).

- Bajzik, J., Havránek, T., Iršová, Z. and Schwarz, J. (2020), "Estimating the Armington elasticity: the importance of study design and publication bias", *Journal of International Economics*, Vol. 127, 103383, doi: [10.1016/j.jinteco.2020.103383](https://doi.org/10.1016/j.jinteco.2020.103383).
- Bom, P.R. and Rachinger, H. (2019), "A kinked meta-regression model for publication bias correction", *Research Synthesis Methods*, Vol. 10 No. 4, pp. 497-514, doi: [10.1002/jrsm.1352](https://doi.org/10.1002/jrsm.1352).
- Boutorat, A. and Franssen, L. (2023), "Economic missions and firm internationalization: evidence from The Netherlands", *Review of World Economics*, Vol. 159 No. 3, pp. 787-826, doi: [10.1007/s10290-022-00482-1](https://doi.org/10.1007/s10290-022-00482-1).
- Broocks, A. and Van Biesebroeck, J. (2017), "The impact of export promotion on export market entry", *Journal of International Economics*, Vol. 107, pp. 19-33, doi: [10.1016/j.jinteco.2017.03.009](https://doi.org/10.1016/j.jinteco.2017.03.009).
- Buus, M.T., Munch, J.R., Rodrigue, J. and Schaur, G. (2022), "Do export support programs affect prices, quality, markups and marginal costs? Evidence from a natural policy experiment", *Review of Economics and Statistics*, pp. 1-45, doi: [10.1162/rest_a_01274](https://doi.org/10.1162/rest_a_01274).
- Cadot, O., Fernandes, A.M., Gourdon, J. and Mattoo, A. (2015), "Are the benefits of export support durable? Evidence from Tunisia", *Journal of International Economics*, Vol. 97 No. 2, pp. 310-324, doi: [10.1016/j.jinteco.2015.07.005](https://doi.org/10.1016/j.jinteco.2015.07.005).
- Cooper, H. (2017), *Research Synthesis and Meta-Analysis: A Step-by-step Approach*, Sage, Washington, DC, Vol. 5.
- Coudounaris, D.N. (2018), "Export promotion programmes for assisting SMEs", *Review of International Business and Strategy*, Vol. 28 No. 1, pp. 77-110, doi: [10.1108/ribs-06-2017-0050](https://doi.org/10.1108/ribs-06-2017-0050).
- Demena, B.A. (2015), "Publication bias in FDI spillovers in developing countries: a meta-regression analysis", *Applied Economics Letters*, Vol. 22 No. 14, pp. 1170-1174, doi: [10.1080/13504851.2015.1013604](https://doi.org/10.1080/13504851.2015.1013604).
- Demena, B.A. (2024), "Publication bias in export promotion impact on export market entry: evidence from a meta-regression analysis", *Applied Economics Letters*, pp. 1-6, doi: [10.1080/13504851.2024.2306185](https://doi.org/10.1080/13504851.2024.2306185).
- Demena, B.A. and Afesorgbor, S.K. (2020), "The effect of FDI on environmental emissions: evidence from a meta-analysis", *Energy Policy*, Vol. 138, 111192, doi: [10.1016/j.enpol.2019.111192](https://doi.org/10.1016/j.enpol.2019.111192).
- Demena, B.A. and van Bergeijk, P.A. (2017), "A meta-analysis of FDI and productivity spillovers in developing countries", *Journal of Economic Surveys*, Vol. 31 No. 2, pp. 546-571, doi: [10.1111/joes.12146](https://doi.org/10.1111/joes.12146).
- Demena, B.A., van Bergeijk, P.A.G., Reta, A., Jativa, G.B. and Kimararungu, P. (2021), "Publication bias of economic sanction research: a Meta-analysis of the impact of trade-linkage, duration and prior relations on sanction success", in van Bergeijk, P.A.G. (Ed.), *Research Handbook of Economic Sanctions*, Edward Elgar, Cheltenham, pp. 125-150.
- Doucouliaagos, C. and Stanley, T.D. (2013), "Are all economic facts greatly exaggerated? Theory competition and selectivity", *Journal of Economic Surveys*, Vol. 27 No. 2, pp. 316-339, doi: [10.1111/j.1467-6419.2011.00706.x](https://doi.org/10.1111/j.1467-6419.2011.00706.x).
- Eicher, T.S., Papageorgiou, C. and Raftery, A.E. (2011), "Default priors and predictive performance in Bayesian model averaging, with application to growth determinants", *Journal of Applied Econometrics*, Vol. 26 No. 1, pp. 30-55, doi: [10.1002/jae.1112](https://doi.org/10.1002/jae.1112).
- Faroque, A.R., Kuivalainen, O., Ahmed, J.U., Rahman, M., Roy, H., Ali, M.Y. and Mostafiz, M.I. (2021), "Performance implications of export assistance: the mediating role of export entrepreneurship", *International Marketing Review*, Vol. 38 No. 6, pp. 1370-1399, doi: [10.1108/imr-07-2020-0141](https://doi.org/10.1108/imr-07-2020-0141).
- Faroque, A.R., Sultana, H., Ahmed, J.U., Ahmed, F.U. and Rahman, M. (2022), "The standalone and resource-bundling effects of government and nongovernment institutional support on early internationalizing firms' performance", *Critical Perspectives on International Business*, Vol. 18 No. 3, pp. 411-442, doi: [10.1108/cpoib-06-2020-0076](https://doi.org/10.1108/cpoib-06-2020-0076).
- Floridi, A., Demena, B.A. and Wagner, N. (2020), "Shedding light on the shadows of informality: a meta-analysis of formalization interventions targeted at informal firms", *Labour Economics*, Vol. 67, 101925, doi: [10.1016/j.labeco.2020.101925](https://doi.org/10.1016/j.labeco.2020.101925).

- Floridi, A., Demena, B.A. and Wagner, N. (2021), "The bright side of formalization policies! Meta-analysis of the benefits of policy-induced versus self-induced formalization", *Applied Economics Letters*, Vol. 28 No. 20, pp. 1807-1812, doi: [10.1080/13504851.2020.1870919](https://doi.org/10.1080/13504851.2020.1870919).
- Floridi, A., Demena, B.A. and Wagner, N. (2023), "A game worth the candle? Meta-analysis of the effects of formalization on firm performance", *Journal of Developmental Entrepreneurship*, Vol. 27 No. 4, 2250026, doi: [10.1142/s1084946722500261](https://doi.org/10.1142/s1084946722500261).
- Freixanet, J. (2022), "Export promotion programs: a system-based systematic review and agenda for future research", *Journal of World Business*, Vol. 57 No. 4, 101344, doi: [10.1016/j.jwb.2022.101344](https://doi.org/10.1016/j.jwb.2022.101344).
- Furukawa, C. (2021), "Publication bias under aggregation frictions: from communication model to new correction method", Working paper, Massachusetts Institute of Technology.
- George, E.I. (2010), "Dilution priors: compensating for model space redundancy", in *Borrowing Strength: Theory Powering Applications—A Festschrift for Lawrence D. Brown*, Institute of Mathematical Statistics, Vol. 6, pp. 158-166.
- Girma, S., Gong, Y., Görg, H. and Yu, Z. (2009), "Can production subsidies explain China's export performance? Evidence from firm-level data", *Scandinavian Journal of Economics*, Vol. 111 No. 4, pp. 863-891, doi: [10.1111/j.1467-9442.2009.01586.x](https://doi.org/10.1111/j.1467-9442.2009.01586.x).
- Görg, H., Henry, M. and Strobl, E. (2008), "Grant support and exporting activity", *The Review of Economics and Statistics*, Vol. 90 No. 1, pp. 168-174, doi: [10.1162/rest.90.1.168](https://doi.org/10.1162/rest.90.1.168).
- Greenwald, A.G. (1975), "Consequences of prejudice against the null hypothesis", *Psychological Bulletin*, Vol. 82 No. 1, pp. 1-20, doi: [10.1037/h0076157](https://doi.org/10.1037/h0076157).
- Iršová, Z., Doucouliagos, H., Havránek, T. and Stanley, T.D. (2023), "Meta-analysis of social science research: a practitioner's guide", *Journal of Economic Surveys*, doi: [10.1111/joes.12595](https://doi.org/10.1111/joes.12595).
- Ioannidis, J.P., Stanley, T.D. and Doucouliagos, H. (2017), "The power of bias in economics research", *The Economic Journal*, Vol. 127 No. 605, pp. F236-F265, doi: [10.1111/eoj.12461](https://doi.org/10.1111/eoj.12461).
- Lahar, L., Demena, B.A. and van Bergeijk, P.A. (2013), "Non-trade in the MENA revisited: systematic review and gravity analysis", Working Paper No. 714, ISS, The Hague.
- Lederman, D., Olarreaga, M. and Payton, L. (2010), "Export promotion agencies: do they work?", *Journal of Development Economics*, Vol. 91 No. 2, pp. 257-265, doi: [10.1016/j.jdeveco.2009.09.003](https://doi.org/10.1016/j.jdeveco.2009.09.003).
- Lederman, D., Olarreaga, M. and Zavala, L. (2016), "Export promotion and firm entry into and survival in export markets", *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, Vol. 37 No. 2, pp. 142-158, doi: [10.1080/02255189.2016.1131671](https://doi.org/10.1080/02255189.2016.1131671).
- Makioka, R. (2019), "Are export promotion measures effective? A survey", *Research Institute of Economy, Trade and Industry (RIETI)*, Policy Update 076.
- Manolopoulos, D., Chatzopoulou, E. and Kottaridi, C. (2018), "Resources, home institutional context and SMEs' exporting: direct relationships and contingency effects", *International Business Review*, Vol. 27 No. 5, pp. 993-1006, doi: [10.1016/j.ibusrev.2018.02.011](https://doi.org/10.1016/j.ibusrev.2018.02.011).
- Martincus, C.V. and Carballo, J. (2008), "Is export promotion effective in developing countries? Firm-level evidence on the intensive and the extensive margins of exports", *Journal of International Economics*, Vol. 76 No. 1, pp. 89-106, doi: [10.1016/j.jinteco.2008.05.002](https://doi.org/10.1016/j.jinteco.2008.05.002).
- Martincus, C.V. and Carballo, J. (2010a), "Beyond the average effects: the distributional impacts of export promotion programs in developing countries", *Journal of Development Economics*, Vol. 92 No. 2, pp. 201-214, doi: [10.1016/j.jdeveco.2009.02.007](https://doi.org/10.1016/j.jdeveco.2009.02.007).
- Martincus, C.V. and Carballo, J. (2010b), "Entering new country and product markets: does export promotion help?", *Review of World Economics*, Vol. 146 No. 3, pp. 437-467, doi: [10.1007/s10290-010-0062-x](https://doi.org/10.1007/s10290-010-0062-x).
- Martincus, C.V., Carballo, J. and Garcia, P.M. (2012), "Public programmes to promote firms' exports in developing countries: are there heterogeneous effects by size categories?", *Applied Economics*, Vol. 44 No. 4, pp. 471-491, doi: [10.1080/00036846.2010.508731](https://doi.org/10.1080/00036846.2010.508731).

- Moons, S.J. and van Bergeijk, P.A. (2017), "Does economic diplomacy work? A meta-analysis of its impact on trade and investment", *The World Economy*, Vol. 40 No. 2, pp. 336-368, doi: [10.1111/twec.12392](https://doi.org/10.1111/twec.12392).
- Munch, J. and Schaur, G. (2018), "The effect of export promotion on firm-level performance. American Economic Journal", *Economic Policy*, Vol. 10 No. 1, pp. 357-387, doi: [10.1257/pol.20150410](https://doi.org/10.1257/pol.20150410).
- Petticrew, M. and Roberts, H. (2008), *Systematic Reviews in the Social Sciences: A Practical Guide*, John Wiley & Sons, Malden, MA.
- Shamsuddoha, A.K., Ali, M.Y. and Ndubisi, N.O. (2009), "A conceptualisation of direct and indirect impact of export promotion programs on export performance of SMEs and entrepreneurial ventures", *International Journal of Entrepreneurship*, Vol. 13, p. 87.
- Srhoj, S., Vitezić, V. and Wagner, J. (2023), "Export boosting policies and firm performance: review of empirical evidence around the world", *Journal of Economics and Statistics*, Vol. 243 No. 1, pp. 45-92, doi: [10.1515/jbnst-2022-0019](https://doi.org/10.1515/jbnst-2022-0019).
- Stanley, T.D. and Doucouliagos, H. (2012), *Meta-Regression Analysis in Economics and Business*, Routledge, Oxford.
- Stanley, T.D., Jarrell, S.B. and Doucouliagos, H. (2010), "Could it be better to discard 90% of the data? A statistical paradox", *The American Statistician*, Vol. 64 No. 1, pp. 70-77, doi: [10.1198/tast.2009.08205](https://doi.org/10.1198/tast.2009.08205).
- van Aert, R.C. and Van Assen, M.A.L.M. (2021), "Correcting for publication bias in a meta-analysis with the p-uniform* method", Working paper, Tilburg University and Utrecht University.
- van Bergeijk, P.A., Demena, B.A., Reta, A., Jativa, G.B. and Kimararungu, P. (2019), "Could the literature on the economic determinants of sanctions be biased?", *Peace Economics, Peace Science and Public Policy*, Vol. 25 No. 4, pp. 1-4, doi: [10.1515/peps-2019-0048](https://doi.org/10.1515/peps-2019-0048).
- van Biesebroeck, J., Yu, E. and Chen, S. (2015), "The impact of trade promotion services on Canadian exporter performance", *Canadian Journal of Economics/Revue Canadienne D'économique*, Vol. 48 No. 4, pp. 1481-1512, doi: [10.1111/caje.12148](https://doi.org/10.1111/caje.12148).
- van Biesebroeck, J., Konings, J. and Volpe Martincus, C. (2016), "Did export promotion help firms weather the crisis?", *Economic Policy*, Vol. 31 No. 88, pp. 653-702, doi: [10.1093/epolic/eiw014](https://doi.org/10.1093/epolic/eiw014).

Appendix

The appendix for this article can be found online.

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