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Publication bias in export promotion impact on export market entry: evidence from a meta-regression analysis

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ABSTRACT

Export promotion policies and programmes (EPPs) serve as crucial governmental trade instruments, encouraging firms to explore the realm of exporting. These policies encompass various activities designed to assist firms in overcoming obstacles in foreign markets, facilitating their entry into the export domain. To substantiate the justification for such publicly funded measures, the body of firm-level econometric evidence on EPPs' impact on the probability of export market entry has expanded considerably. Our extensive review of empirical studies conducted up to and including 2020, has identified 479 reported estimates, enabling us to examine the presence and extent of publication bias. Employing meta-regression analyses, our results reveal a sobering reality. We consistently uncover significant and severe positive evidence of publication bias across various specifications, ranging from 3.133 to 5.673. This suggests that the empirical EPPs effect size on the probability of export market entry appears significantly larger than its actual limited effect. Importantly, our findings indicate that in this research field, publication bias is predominantly a consequence of self-censorship rather than interference by journal reviewers and editors. The evidence in the primary studies has, therefore, exaggerated the actual export market entry effect, influencing both with respect to scientific conclusions and policymakers' decisions.

I. Introduction

Export Promotion Policies and Programmes (EPPs) are significant trade policy instruments employed by governments. EPPs are tailored with diverse activities aimed at offering information on foreign markets. These activities include matching firms with clients, aiding firms in establishing distribution channels, organizing missions and trade fairs, as well as navigating foreign customs and export procedures. The primary economic justifications for trade policy instruments utilized by governments are to mitigate trade barriers, including informational asymmetries. This policy tool was primarily established in the late 1990s to facilitate the entry of non-exporters into foreign markets.[1]

To justify such publicly policy, there have been a substantial growth in firm-level econometric evidence related to EPPs. To ensure a uniform analysis of policy outcomes and improve comparability, this study concentrates on micro-econometric evidence related to the initiation of exporting by non-exporters. To warrant a rigorous scientific approach, we adhere to the established guidelines for Meta-Analysis in Economics Research. Applying this recent guideline, this study identified 479 reported estimates conducted up to 2020 across 19 countries.[2] Figure 1 presents the significance and sign of the reported estimates. The horizontal axis represents the reported t-statistics, while the vertical axis indicates their frequency.

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[1]The literature contends that the rationale for government intervention, driven by information asymmetry, is expected to predominantly impact the initiation of exporting by non-exporters (the firm-extensive margin), rather than the exports volume/sales. It is argued that the provision of information on foreign markets by government agencies is more likely to influence the decision of whether to enter export markets, as opposed to determining the quantity of exports. In this paper, we concentrate on the firm-extensive margin for the sake of homogeneity and comparability of the reported outcomes. However, in a broader context, impacts classified as: intensive margin – export expansion in markets served by existing exporters only, firm-extensive margin – drawing new firms into the export, destination and product extensive margins – firms diversify their exports by reaching destination markets or different products, respectively.

[2]These are Argentina, Belgium, Bolivia, Brazil, Chile, China, Colombia, Denmark, Ecuador, Egypt, France, Germany, Ireland, Italy, Peru, Portugal, UK, Uruguay, and Vietnam.

🔓 Supplemental data for this article can be accessed online at https://doi.org/10.1080/13504851.2024.2306185
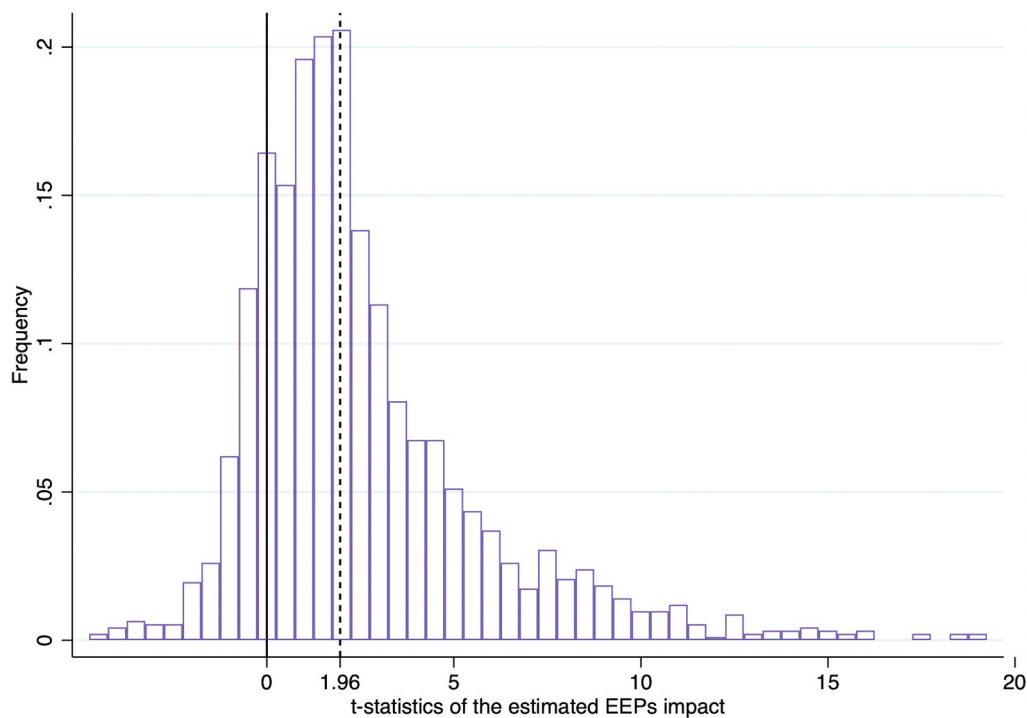
Figure 1. Reported t-statistics of EPP impacts on export market entry (*N* = 479). The figure depicts t-statistics reported in the individual empirical studies. The solid vertical line indicates the sign change in *t*-statistics, whereas short-dashed vertical line is associated with the statistical significance at 5%.

The figure primarily indicates a preference for positive sign estimates, although not necessarily reaching statistical significance. The frequency of the *t*-statistics is skewed towards the right side of the solid vertical line, suggesting a concentration of estimates changing sign, particularly up to the 5% significance level denoted by the short-dashed vertical line. This skewed pattern raises the possibility of positive publication bias.

Publication bias represents a subtle form of bias in empirical research arising from selecting research findings based on their statistical significance or alignment with preconceived theoretical expectations (Demena 2015). Many meta-analysts contend that such bias is pervasive, widespread, and poses a serious empirical challenge. Consequently, research papers demonstrating statistically significant results, or a substantial effect often receive preferential representation, while studies with smaller effects or statistically insignificant outcomes may go unpublished or be under-represented. To systematically investigate the potential presence and magnitude of such publication bias, it is imperative to move beyond the visual assessment presented in Figure 1. To accomplish this, we employ a meta-analysis.

II. Data

Data construction

We use the Google Scholar database to search for prospective empirical studies. We searched using the broad combination of keywords: 'export promotion + probability of exporting', 'export promotion + firm level performance', and 'export promotion + export market entry'. We also performed both forward and backward searches to enhance the comprehensiveness of our study selection process. This thorough search process was carried out between September 2019 and March 2020. Furthermore, we implemented a unique approach, supplementing the standard web-based engine search. This involved seeking expert suggestions from scholars who had recently contributed to an edited volume on Economic Diplomacy.

Having identified prospective studies, we applied the inclusion criteria: English language studies reporting regression-based firm-level export market entry outcomes of EPPs applying quasi-experimental or randomized controlled trials (RCTs). These criteria resulted in 20 studies for coding. Recognizing the common practice of presenting multiple estimates

in economics research papers to ensure robustness, we adhere to the recommendation of Stanley and Doucouliagos (2012) and we collected all estimates of the empirical studies. When studies don't report the required information, we reached out to the authors of the studies via email rather than omitting them. Only one study representing 2 reported estimates was excluded from the analysis, as the authors couldn't provide the missing information. To uphold the highest scientific standard of meta-dataset, two independent reviewers conducted the search and data extraction.

Meta-dataset

Utilizing the 20 studies, we constructed a dataset containing all reported coefficients, yielding 479 estimates.[3] The mean and maximum number of estimates extracted from a study are 24 and 70, respectively. The median estimate is 16. The dataset encompasses both peer-reviewed (12) and unpublished studies (8). The temporal distribution spans from the first study in 2005 to the most recent one in 2020, with the median study emerging in 2016. This indicates that half of the studies have been produced in the last 6 years, highlighting the dynamic and evolving nature of the field. Therefore, the main question whether such EPPs can effectively assist non-exporters in entering the export market for the first time is still debated lively.[4]

III. Testing for publication bias

Our empirical approach comprises graphical inspection and statistical analysis. First, we utilize a common graphical approach, the funnel plot. A funnel plot is a scatter diagram depicting estimates of a given effect on the horizontal axis and their precision on the vertical axis. The simple visual inspection follows that, in the absence of publication bias, a funnel plot should be symmetrical and resemble an inverted funnel, because as precision drops (often with small sample size), the dispersion of the reported estimates rises and thus widely dispersed at the bottom of the funnel (Floridi, Demena, and Wagner 2021). Conversely,

large sample studies with usually more precise estimates exhibit a more compact distribution at the top of the funnel. Thus, in the absence of any potential publication bias the funnel looks symmetrical around the most precise estimates, indicating all imprecise estimates will have similar chance of being reported (Stanley and Doucouliagos 2012).

Contrastingly, an asymmetrical funnel plot suggests the presence of bias, as seen in Figure 2. This indicates that some estimates are either discarded or unreported, resulting in an asymmetrical shape. The reported effect sizes create an asymmetrical funnel, where the most precise estimates are close to the overall inverse variance weighted mean of 0.035 (short-dashed vertical line). However, there are many imprecise estimates reported larger than 0.035 compared to those smaller than this effect. The plots are therefore somewhat skewed towards the right-hand side of the diagram, implying a relatively too many larger positive effect sizes being reported.

Nonetheless, this approach is based on visual inspection, is subjective, and thus less convincing. Consequently, we apply a more objective approach through statistical meta-regression analysis (MRA), specifically testing the asymmetry of the funnel plot. This commonly known as the regression-based funnel asymmetry test (FAT), presented below:

$$t_{is} = \beta_1 + \beta_0(1/SE_{is}) + e_{is} \qquad (1)$$

where t_{is} is t-value of the ith reported effect from the sth study and $1/SE_{is}$ is the associated precision. β_1 and β_0 measure publication bias and the overall genuine effect, respectively. Using $\beta_1 = 0$, we test for publication bias and if present the size of the bias. We initiate the analysis with the study-level ordinary least square clustered data analysis (CDA). We then implement the wild-bootstrap clustering method tailored for situations with a small or limited number of clusters. Subsequently, we employ fixed-effect (FE) estimation that may also address concerns related to individual within-variation. Finally, we used multi-level or hierarchical model to account for the between-study data-dependence, controlling for beyond within-study data-dependence. To account for potential outliers, we winsorize our meta-data at the 5% level.

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[3]Appendix 1 presents list of included studies. Appendix 2 offers an overview of the evidence base. We express our gratitude to the anonymous referee for this insightful suggestion.
[4]The study design of the included studies are RCTs (6%) and quasi-experimental impact assessments (94%).
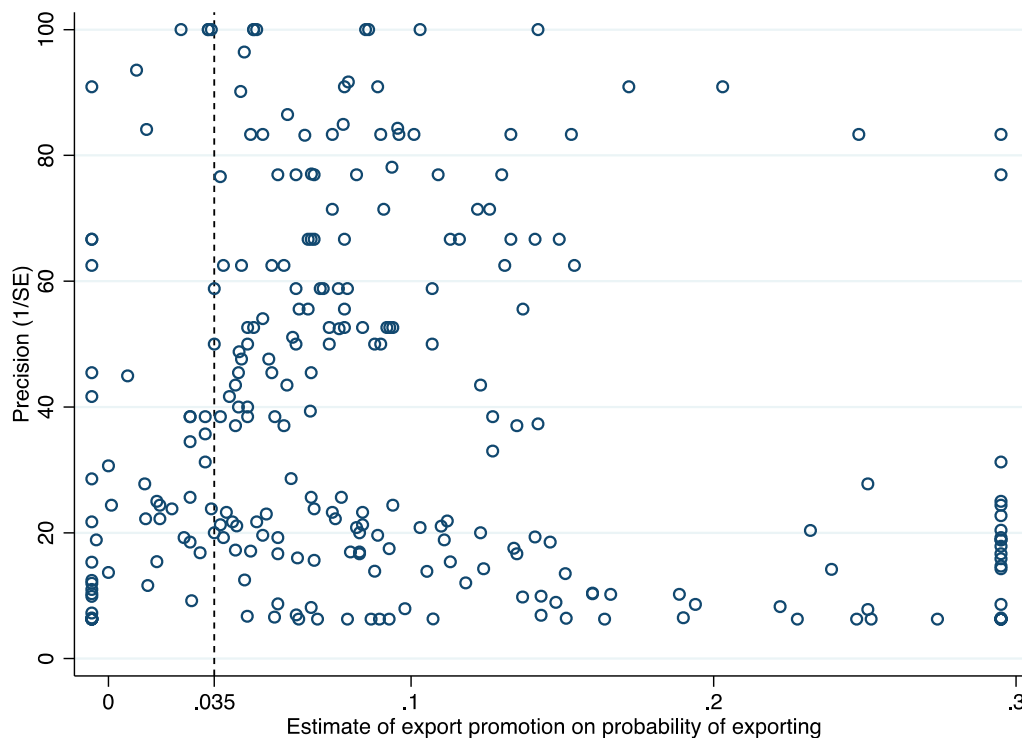
Figure 2. Funnel plot suggests positive publication bias: all studies (*N* = 479). The short vertical dashed line represents the overall inverse variance weighted average effect (0.035).

Table 1. Linear tests for publication bias: all studies versus peer-reviewed studies.

Variables	CDA	Wild-bootstrapped	FE	MEM
Panel A: All studies				
Publication bias	3.133***	3.133***	3.454***	2.896***
	(0.697)	0.000	(0.389)	(0.575)
Effect beyond bias	0.009***	0.009**	0.006*	0.007***
	(0.003)	0.040	(0.003)	(0.002)
Observations	479	479	479	479
Studies	20	20	20	20
Panel B: Peer-reviewed studies				
Publication bias	3.807***	3.807***	3.973***	3.182***
	(0.989)	0.002	(0.342)	(0.828)
Effect beyond bias	0.006	0.006	0.005	0.004*
	(0.005)	0.35	(0.003)	(0.002)
Observations	256	256	256	256
Studies	12	12	12	12

*** stands for 1% significance- level. Standard errors reported in parentheses are clustered at study-level. CDA is ordinary least square clustered data analysis; Wild bootstrapped is regression bootstrapping the standard error (a non-standard cluster adjustment) reported with *p*-values; FE is fixed-effect estimation clustered at the study level; and MEM is mixed-effects multilevel estimated through the restricted maximum likelihood.

Panel A of Table 1 gives the FAT outlined in Equation 1. Across all estimations, the publication bias detected through the visual test is affirmed. The FAT uniformly indicates a substantial positive upward bias, supported by large and highly statistically significant estimates. The results remain consistent both in size and statistical significance, ranging from 2.896 (MEM) to 3.454 (FE), with the median estimates of 3.133 (CDA or Wild-bootstrapped). Applying the meta-analysis guidelines by Doucouliagos and Stanley (2013), the magnitude found in this study is deemed severe. Both the visual inspection of Figure 2 and the objective FAT present compelling evidence of severe upward bias: the reported firm-extensive margin effects are considerably overstated in the literature.[5]

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[5]Appendix 3 offers nonlinear tests for publication bias.

To investigate if additional bias stemming from editors and reviewers of journals, and for the sake of comparison, Figure 3 illustrates the funnel plots for peer-reviewed studies exclusively. If there were additional bias, the entire distribution of the funnel plot in Figure 3 would have shifted further to the right compared to the funnel plot in Figure 2. However, aside from the plots being denser in Figure 2 and lighter in Figure 3, the shapes are comparable. Furthermore, employing Eq.1, Panel B of Table 1 presents whether journal reviewers and editors, in their selection and acceptance of papers, contribute to additional bias. Examining the reported magnitude, it appears to be more bias for peer-reviewed studies. However, based on formal statistical tests, this bias in Panel B is not statistically different from the bias of all studies in Panel A. In other words, except for self-censorship, primary studies are not significantly influenced by additional pressure from journal reviewers and editors to favour positive and significant findings.[6]

IV. Concluding remarks

We present the first meta-analysis investigating publication bias in one of the most widely utilized publicly funded trade policy. We have gathered 479 reported estimates on firm-extensive margin effects covering 19 countries published until 2020. We uncover the existence and then the magnitude of the publication bias. The FAT uniformly confirms statistically significant upward bias ranging between 2.896 and 3.454, with the median estimates of 3.133. We continued to find positive and highly statistically significant bias when we relax the linearity assumption. We concluded that the bias found is severe – reported estimates are excessively inflated, with an overrepresentation of positive results in the literature. However, we do not find evidence of additional publication bias emerging from journal editors and reviewers, except through self-censorship.
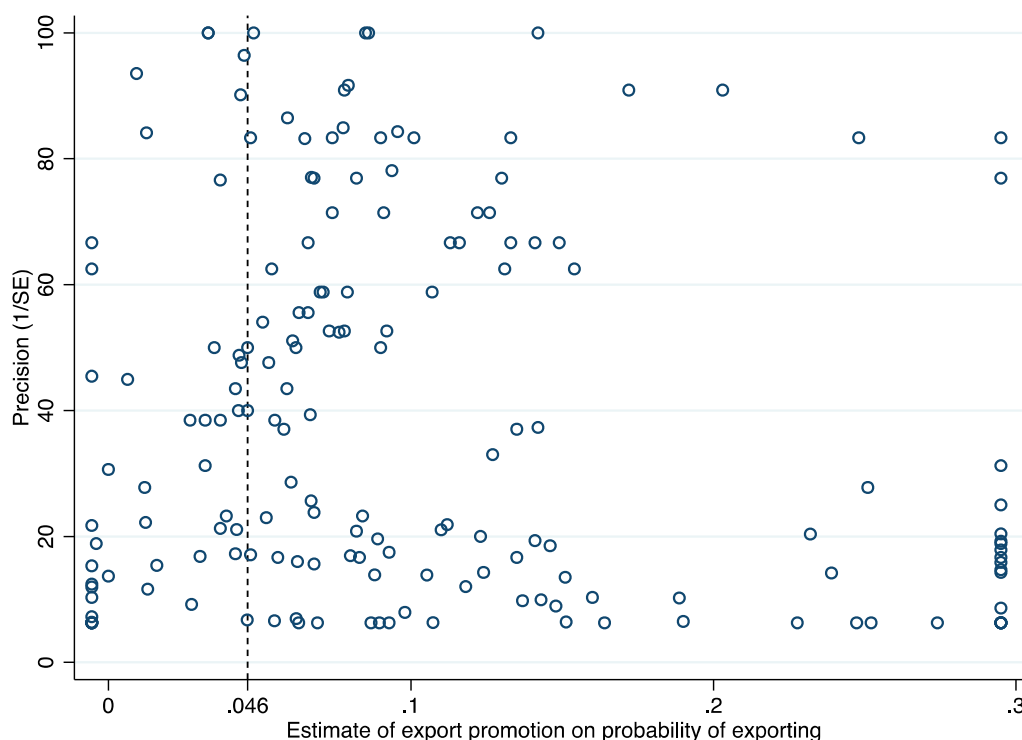

Figure 3. Funnel plot suggests positive publication bias: peer-reviewed studies (*N = 256*). The short vertical dashed line represents the overall inverse variance weighted average effect (0.046).

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[6]We acknowledge this point, which was raised by the anonymous referee.

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Disclosure statement

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References

Demena, B. A. 2015. "Publication Bias in FDI Spillovers in Developing Countries: A Meta-Regression Analysis." *Applied Economics Letters* 22 (14): 1170–1174. https://doi.org/10.1080/13504851.2015.1013604.

Doucouliagos, C., and T. D. Stanley. 2013. "Are All Economic Facts Greatly Exaggerated? Theory Competition and Selectivity." *Journal of Economic Surveys* 27 (2): 316–339. https://doi.org/10.1111/j.1467-6419.2011.00706.x.

Floridi, A., B. A. Demena, and N. Wagner. 2021. "The Bright Side of Formalization Policies! Meta-Analysis of the Benefits of Policy-Induced versus Self-Induced Formalization." *Applied Economics Letters* 28 (20): 1807–1812. https://doi.org/10.1080/13504851.2020.1870919.

Stanley, T. D., and H. Doucouliagos. 2012. *Meta-Regression Analysis in Economics and Business*. Oxford: Routledge.