What is the impact of the energy transition on the current account? The cost of fulfilling the environmental commitments.

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Overview

Climate change, along with economic and political actions aimed at combating it, poses unprecedented challenges for the management of global socio-economic and financial systems. This is a problem that requires international cooperation to drive coordinated solutions towards a global economy with lower carbon emissions. In this regard, almost all countries in the world have committed[2] to mitigating climate change and transitioning to a more decarbonized economy by adopting measures such as reducing the production of fossil fuels as was proposed in different fora.

Global commitments to combat climate change will increasingly constrain countries' production and exports in "brown" sectors like non-renewable energies (NREs). This will impact foreign exchange inflows and, consequently, the current account balance, posing challenges to balance of payments, fiscal sustainability, economic growth, employment, and income distribution. Despite the significance of this impending scenario, empirical studies linking NRE production to current account balances are scarce. Moreover, while changes in NRE production are expected to affect external balances differently for net exporters and importers, as well as developed and developing nations, few studies have examined these impacts across a large and diverse sample of countries.

This work attempts to fill this gap in the literature by focusing on the impact of a reduction (considered as an exogenous policy *shock*) in the value of NREs production on current account balances for a broad sample of countries and by analysing the differences in *shock* impacts among countries based on their structural characteristics. We address the following questions: What are the effects of a shock reducing the value of NRE production on the current account balances of economies? How do these effects differ between net NRE exporters and importers economies? How do these effects vary between advanced economies and developing economies? Examining the effects of a reduction in NREs production on each country's energy matrix and macroeconomy becomes relevant to know how every country will be affected and the potential demand for coordinating and for financing the energy transition.

We made a detailed literature review. On the one hand, regarding the impacts of the transition on the balance of payments and international trade, several alternative approaches to the problem are discussed: a dynamic computable general equilibrium model with global coverage and international trade flows (Dellink et al., 2017), a global macroeconometric model called E3ME-FTT (Volz et al., 2021), structural vector autoregressive models (Lebrand et al., 2023), among others. On the other hand, based in the previous discussion we also analyse the works on current account determinants, we follow the latest version of the well-established IMF's External Balance Assessment (EBA) methodology for the current account (Allen et al., 2023), which maintain the same principles of the original EBA (Phillips et al., 2013).

After analysing each of the possible methodological alternative, we present a different econometric approach consisting of two stages. In the first stage, we implement an automatic model selection technique (Global Search Regression -GSREG-) on our panel data by conducting an exhaustive search on the list of covariates commonly used in the literature plus our variable of interest (NREs production value) to explain the current account to GDP ratio. Then, based on the specification resulting from the previous stage, we proceed to estimate a dynamic panel model through Fixed Effects and System GMM, to subsequently compute impulse-response functions, which account for the effects of a shock in the NREs production value on the adjustment trajectory of the dependent variable.

As the main independent variable, we construct a ratio between the value of NREs production and GDP (*foss* variable). For the numerator product, on the one hand, we use the amount of energy production generated from fossil fuels (coal, crude oil, natural gas and others). The data originates from the "World Energy Balances" database maintained by the International Energy Agency (IEA) for the period 1992-2019. On the other hand, the prices of that production obtained through the "Fuels (Energy) Index" from the "Primary Commodity Price System" database prepared by the IMF.

Methods

Stage 1: Automatic model selection technique for panel data. Automatic model selection is a common technique in machine learning and artificial intelligence, which involves using algorithms to identify the most appropriate model

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[2] Currently, the Paris Agreement is the primary global environmental commitment and sets, as its central objective, to limit global warming by the end of this century to less than 2°C, and preferably to 1.5°C.

(based on information criteria) for a particular dataset. Thus, given a set of covariates, the choice of a subset of them is delegated by the researcher to this selection algorithm. In this work, we use the GSREG algorithm (Glüzmann and Panigo, 2015), which bases the choice of the best model on an exhaustive search, allowing residual behavior tests for each alternative model and providing a complete dataset with descriptive statistics of results.

Stage 2: Dynamic models. An additional methodological aspect relates to the static or dynamic specification of the current account equation. The methodological problem surrounding this distinction concerns not only the regressors that should be included on the right-hand side of the equation (lags of the dependent variable) but also the estimation method to use. In this work, in line with the existing literature, we will use the generalized method of moments (Arellano and Bond, 1991; extended by Blundell and Bond, 1998, for the case of dynamic models with persistent series (System GMM), considering that the dependent variable exhibits a high level of persistence and because it is robust to the use of potentially endogenous regressors (provided they are instrumented appropriately).

Results

We find that the sign of the relationship between the current account and the value of NRE production (both as a proportion of GDP) depends on: a) the level of development of the country; b) the productive and foreign trade structure; c) the four interactions between the previous characterizations. For both Fixed Effects and SGMM estimation, we find that the coefficient of NRE production value on GDP is statistically significant at 1% and has a positive sign.

Specifically, a decrease in production value will have a more pronounced effect on reducing the current account balance for countries that are net exporters of NRE compared to those that are net importers of NRE. Likewise, a negative shock in production will have a greater negative effect for developing economies than for advanced ones. When we have the four clusters, we find that developing economies that are also net exporters of NRE face the most complex situation.

Using these estimates, we compute impulse-response functions, considering a negative policy shock that is the reduction in *foss* given by a sample standard deviation. We find that, from the second computed period onwards, there is a greater deterioration in the current account balance in response to this shock for emerging and developing economies, as is also the case when analysing net NREs exporters economies.

Additionally, we provide a ranking of the predicted impact for each country. This identification proves invaluable in offering more targeted policy advice regarding the timing and scale of policy actions, as well as considerations for financing that take into account the unique characteristics of each country.

Conclusions

It is possible to establish an ordering of impact according to the country structural characteristics. Thus, the most affected countries are developing energy net exporters, followed by developing net energy importers. In the case of advanced countries, both when they are net energy importers and even when they are net energy exporters, there does not seem to be any statistically significant impact of implementing the reduction in fossil energy production. So possibly advanced countries are the ones prepared to star first this type of policies.

This has very relevant domestic and global policy implications. Global decisions to fight climate change, such as the one analysed here, must consider the strong differentiated impact between developing and advanced countries. One important policy recommendation is that, to implement direct actions in production affecting the external sector's current account, it is necessary to increase the available financing to carry out the energy transition. At the same time is important to sustain the right of these developing countries to catch up with advanced countries. This increased financing of the energy transition in developing countries is only possible with broad interaction between IMF, multilateral development banks, the private sector, and direct bilateral financial lines from advanced countries to developing ones.

Selected References

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