THE IMPACT OF INTERNATIONAL TRADE ON ELECTRIC LOADS IN MEXICO

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Overview

We estimate effects relevant to a possible shift in U.S. trade policy on electric loads in Mexico. We find exports to be a highly significant predictor of energy loads and a significant predictor of peak loads in models that do and do not include GDP and a trend toward greater efficiency in the use of electricity. These results are consistent with trade impacting load through high load factor, industrial customers. We conclude that, if a shift in trade policy toward Mexico is seen as a realistic possibility, it would be worthwhile to analyze its impact on loads, especially energy loads, in scenarios.

The North American Free Trade Agreement liberalized trade among Canada, Mexico, and the United States and went into force in January of 1994. From 1990 to 1994, Mexico ran trade deficits with the United States, but every year from 1997 to 2014 it ran trade surpluses, and those surpluses grew at 8.6% p.a. Trade across the Rio Grande was an issue in the 2016 U.S. presidential campaign, and a shift toward a more protectionist stance in U.S. trade policy appears to be a real possibility.

The wholesale electric market in Mexico is restructuring along lines established in other countries. The state utility, *Comisión Federal de Electridad*'s (CFE), is in the process of creating transmission, distribution, supply and six generation subsidiaries, each of which will be managed separately. The different generation subsidiaries will compete with one another and other entrants in spot and forward markets operated by the system operator, , Centro Nacional de Control de Energía (CENACE). The restructuring has prompted a flourish of planning and analysis on the part of existing and new market participants, and the possible shift in U.S. trade policy adds an element of uncertainty to those efforts.

In particular, in modeling the restructured electric power market in Mexico, would base case forecasts of energy and peak loads be substantially affected? Should scenarios be "run" in which Mexico experiences lower exports? How should load forecasts be adapted to account for a possible decline in Mexican exports? How should overall Mexican GDP be adjusted in forecast models in relation to exports?

To help answer these questions, we estimate the effects of Mexico's overall exports on energy and peak loads by Mexican electrical region, controlling for GDP and a trend toward energy efficiency. In Section 2, we present the sample data used in our analysis. Section 3 describes our econometric methods and models. Section 4 presents and discusses results, and we conclude in Section 5.

Methods

We use instrumental variables and seemingly unrelated regression with regional indicator variables. A novelty in terms of method is that we remove variation that depends on exports from our GDP variable, in order not to hold GDP entirely fixed as variation in exports causes variation in loads. Without this modification, controlling for GDP would limit the effects of exports on loads to those of composition of GDP, while, as we show, exports have a powerful effect on both GDP and electric loads.

Results

Exports are a highly statistically significant predictor of energy load, and a significant predictor of peak load. . These results are consistent with international trade substantially involving manufactured goods produced by industrial customers with high load factors.

The largest difference between trend energy and peak load growth in a Mexican electrical region is in the Oriental region, where wages are relatively low and light manufacturing, with its high load factors, is growing rapidly, and is now competitive with light manufacturing in Asia.

Conclusions

If a change in U.S. or other countries' trade policies toward Mexico is seen as real possibility, it would be worthwhile to examine scenarios in which the effects of trade on electric loads, especially energy loads, are taken into account.

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