

Referee Report on “Essays on Stock Market Integration and on the Curse of Natural Resources” by Alexandr Černý

Summary: I have enjoyed reading this interesting dissertation, which provides useful insights and an extension of existing literature in two distinct areas—the transmission of information in the stock market and the impact of natural resource endowment on economic performance. In my view, the dissertation is ready for defense. I offer the following comments for the author’s consideration, some minor ones could be usefully incorporated before the dissertation is finalized, the rest can be used for further research or when the essays are revised for journal publication.

Essay 1: “Stock Market Integration and the Speed of Information Transmission”

The first essay uses high frequency data and Granger causality and cointegration tests to study the speed and direction of information transmission among stock markets in the U.S. and Europe, including three stock markets in Central Europe. The author found that market reaction to information revealed in other markets is quite fast, mostly within one hour. Both the methodology of the paper and the results are interesting, it is one of the first papers that uses high frequency data to study this type of information transmission. High frequency data have been used for some time for “event-study” type analysis, but not for analyzing transmission among markets. More detailed comments:

- The key finding of the paper is that markets react quickly and that daily data may be misleading when analyzing information transmission among markets, rather than whether any specific market’s reaction is relatively fast or slow. This point could be made more prominent in the abstract and in the paper. However, this argument should be based on the empirical findings of the paper (reaction found in high-frequency data rather than in daily data), not simply stated as on page 6. In general, even if markets react relatively quickly to any specific information, analysis based on daily data does not need to be misleading because information is coming throughout the day and the change in daily closing price can be viewed as the aggregation of the information revealed during the day.
- As the author correctly observes (pages 6 and 7), the analysis cannot distinguish whether information is revealed in one market and transmitted to a second market or whether both markets react to common information (perhaps at different speed). Therefore, he should be more careful when interpreting the relationship between the Prague and Budapest markets; to me, it sounds more likely that the Prague market reacts with a delay to the same information rather than reacting to information revealed in the Budapest market, particularly as the paper also shows a slower reaction of the Prague market to development of the DAX index.
- It is not that surprising that the cointegration estimation does not yield any significant results—cointegration is about *long-run equilibrium* relationship and while it is open to debate whether such relationship exists among stock indices, it is very unlikely it

exists in high frequency data. Some papers in the literature use cointegration, but often when there is a strong fundamental reason for a (tight) relationship, e.g., when looking at the stock of one company traded at different markets. Also, the reported cointegration relationship in the literature may be a result of data problems, as suggested on page 20, and the use of econometric techniques that are not appropriate for the stock market. More generally, market integration does not mean that markets move together all the time—the same shock can have different impact on different markets, depending on the composition of a given economy—but that financial instruments with similar risk are priced consistently across markets.

- Some technical issues: (i) the author mentions couple of times that potential Monday effects are not controlled for; it should not be too difficult to control for this effect and, if it is not significant, report this in a footnote; (ii) using DJIA and S&P500 indeed creates potential bias of uncertain size (page 12); the stocks in DJIA are a subset of the stocks in the S&P500 and DJIA is weighted differently, so it is hard to interpret what is actually measured by the Granger causality test. The author should at least not use these biased results as a benchmark for other markets; (iii) in several cases in Table 4 we see significant results for one hour and not insignificant results for one day. The author's interpretation is that the market reaction occurs within one hour, but without results for two or three hours, it is hard to conclude that the *full* reaction occurs within one hour; (iv) I wonder why the author paired DAX with the Central European stock markets, when the FTSE or S&P may be more relevant—as far as I remember, most counterparts for Czech traders used to be based in London and New York; and (v) the finding that the degree of integration of a given time series depends on the observations used for testing (pp. 18-19) reveals the limitations of the econometric techniques that were used rather than some fundamental pattern, in my view.

Essays 2 and 3: “The Curse of Natural Resources and the Role of Democracy” and “Are Natural Resources Innocent in Their Curse?”

The two related essays bring additional insight into one of the growth theory puzzles—why are countries with higher natural resource endowment (at least as conventionally measured) growing more slowly? This is an interesting and policy-relevant question and this dissertation addresses the curse from two angles: (i) what role do the quality of democracy, regime stability, and the level of civil liberties play in explaining slower growth; and (ii) do natural resource abundance and dependence impact economic growth differently. The second essay finds that the negative impact of natural resources on growth is not explained away by political system characteristics and finds some evidence that the intensity of the curse depends on the level of civil liberties. The third essay replaces the conventional measures of the importance of natural resources with newly constructed measures of natural resource abundance and finds that abundance does not have a negative impact on growth. This is, in my view, the main result of the two essays, which could be usefully explored in further research. More detailed comments:

- Neither of the two measures of dependence on natural resources used in the second essay is appropriate for investigating the curse, in my view. Both the share of natural capital in total capital and the ratio of primary exports to GDP are influenced by growth, investment, and general economic developments in previous years and reflect economic structure of a given economy rather than their natural resource endowment. These measures are used in the literature and it is legitimate to use them in the second essay which extends the existing models, but the fact that they are rejected in the third essay makes the dissertation sound little schizophrenic.
- In the growth regressions in the second essay, I wonder how the potential endogeneity of growth, political system characteristics, and economic structure (natural resource dependence) was addressed.
- Splitting the countries into several groups in the second (and third) essay is tricky—it does not seem to give enough observations to estimate the parameters precisely enough and it is difficult to argue that the estimates of the curse in different groups are significantly different (this certainly holds for Figure 2 and to some extent also for Figure 4, which shows estimates after the most resource-dependent countries were excluded). An alternative strategy may be to use the full sample and include an interaction term into the baseline regression (natural-resource dependency*political system characteristics).
- I find the statement that the curse becomes even stronger if extremely resource dependent countries are excluded counterintuitive (first paragraph of section 2.1.). Figure 1 suggests that these economies have been among the slowest growing economies. No matter how non-linear the relationship may be (and not much nonlinearity is found later in the paper), I would expect that excluding such countries will weaken the curse.
- It may be useful to follow up on the result of the third essay. If it is natural resource dependence (i.e., economic structure) that causes slower growth and not natural resource abundance, some countries with large natural resource endowment were able to escape the curse, i.e., develop an economy that is not too dependent on their abundant natural resources. It would be useful to explore, in further research, what are the characteristics of these successful countries—this could lead to important policy implications.

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