

The report of revisions to Reviewer 1's comments

After reading the comments, we realize that the paper lacks explanation on some key points. We accept all suggestions and revise the manuscript. It is expected that the manuscript is significantly improved. We greatly appreciate the reviewer's rigorous reading and kind suggestions.

This report consists of the reviewer's comments and our responses. We include all revisions in this report. For reading convenience, we provide responses in blue and highlight all revisions in this report and the revised manuscript.

Reviewer 1's comments and our responses

Major comments:

One major concern is that the authors fail to capture the colonialism properly. As the only main explanatory variable, the colonialism is captured as a dummy variable, which leads to severe bias.

Thank the reviewer for this kind reminder. We have realized that the measurement of colonial power has concerns. We have actually undertaken tests to lessen the concern. However, we are sorry for that we have not clearly explained how to do it. Now, we address the specific concerns as follows.

First, most of these colonised regions are coastal regions, which warn us that the geographic endogeneity needs to be carefully addressed. Using dummy fails to do so.

For instance, how can we know that it is because the geographic advantage of these regions has a positive effect or the colonialism

As the reviewer mentions, colonial regions are partially overlapped with the coastal region. We realized this concern, so we controlled for this confounding factor in Section 4.2, specifically, the dummy for opening cities. The Chinese government undertook “open-door policy” since 1980s; it specifically opened 5 special economic zones (that are in coastal regions) and 14 coastal cities. Our results show that the effect of interest is robust.

“Given that the 19 open cities have incomparable role in economic growth, our results reveal that the effect of interest is robust to the later economic reform. Moreover, all the open cities are located in coastal regions, so our results suggest that our measurement of colonial power is less of the concern due to the geographic advantage in development.” (See the last paragraph of Section 4.2 in P15)

Second, most of the regions are colonized by different countries, for example, western countries and Japan. As such, dichotomous choice cannot distinguish one institutional impact from the other.

The reviewer suggests a very interesting topic. The existing literature has a hot debate on the roles of different colonialisms. It is far always from providing a general answer to the debate. In our view, the institutional impacts of different colonialisms need to be considered with their respective embedded backgrounds. At this stage, we do not explore the different institutional impacts because we do not know which country’s colonial power has a greater value in economics (Olsson, 2009). This explains why

most of the relevant literature uses qualitative evidence to measure colonialism (see Lange et al., 2006). At the same time, we will explain later, the colonial power enters China at the same time. If we quantize the measurement to identify the potential difference, this kind of quantization will be misleading. Our measurement of liberal colonialism is based on the colonial history of China during 1896-1911 with qualitative evidence. It may be imprecise, but it is at least safe and credible. Thus, this paper at least can make a marginal contribution to reveal the effect of *liberal colonialism*:

“We are also interested in institutional impacts of different colonialisms; unfortunately, the existing literature suggests that the question regarding different colonialisms has no generally-accepted view (see Acemoglu et al., 2001 and 2002; Acemoglu and Robinson, 2012; Lange et al., 2006; Olsson, 2009). Instead of answering that question at once, this paper makes marginal contribution with the focus on the liberal colonialism. It shows that liberal colonialism has a generally positive effect because, even when we separate the identities of liberal colonialism, the effect of interest is also significantly positive, respectively. Results are provided upon request.” (see Footnote 8, which we especially add in the new manuscript)

Third, the authors emphasize that they exploit the colonial history of China during 1896 to 1911 to measure the colonialism. However, the measurement for this period is missing. For example, as an extreme case, one can also argue that it is the *Han* or *Tang* Dynasty in this regions leaving favourable institution, exerting a long run positive impact on current economy.

As a convention, “economic institutions” represents “economic institutions of capitalism” (see Williamson, 1985). This paper focuses on “economic institutions,”

that is why we rarely use the item “institutions” alone in the manuscript. Because economic institutions in China are first formally transplanted during 1896 to 1911, we should focus on this period. To lessen the concern of the reviewer, we add a new footnote (Footnote 1) as follows:

“This paper focuses on economic institutions of capitalism (see Williamson, 1985). Because economic institutions in China are first formally transplanted during 1896 to 1911, this study does not involve other institutions before this period.”

A new reference is added as the following.

Williamson, O.E., 1985. *The economic institutions of capitalism*. The Free Press, New York.

Moreover, colonial countries forced the Qing government to assign the treaties with time difference by one or two years. From the treaty-assigning to the implementation, there is still time difference that is impractically identified. More theoretically, this paper investigates the persistent effect to this day, so it is much less important to distinguish the period length.

Another major concern is that the usage of the IV estimation. First, it is not clear why the authors use IV analysis. The empirical analysis leads to a straight forward understanding: the colonialism is endogenous from the current allocative efficiency. If this is the case, it is confusing that the authors say “liberal colonialism as exogenous source of economic institutions in China” (Paragraph 2, Page 5). If this is not the case, it is also confusing. What kind of endogeneity the authors want to solve?.

Let us explain why IV estimation in this paper: we expect that the colonialism has a

persistent effect on allocative efficiency through economic institutions. In particular, we mention that “liberal colonialism as an exogenous source of economic institutions in China.” On one hand, liberal colonialism affects the current allocative efficiency; on the other hand, the latter cannot affect the former. Regarding economic institutions, they are the channel of colonialism to affect the allocative efficiency. Put it straightly, liberal colonialism is exogenous, whereas economic institutions is endogenous. So for clarity, we especial add the sentence when mentioning endogeneity at the first time in Footnote 3: “Put it differently, we solve the endogeneity of economic institutions by exploiting the historical colonialism.” If the reviewer is still confused, please refer to the following response to the next comment.

Second, the selection of the IV is problematic. The authors say, “the liberal colonialism affects the present development only through economic institutions” (paragraph 3, page 7). Therefore, we can easily understand that economic institution is an important factor for the present economy and omitting it may lead to severe estimation bias. However, as an IV the authors selected, institutional quality will not appear at the second stage estimation, leading to the bias issue. Following the authors’ logic, I see this more like a mediating effect. Capturing the mediating effect may be an option. Yet, this should be on the basis of the proper measurements for the colonialism.

We assert that economic institutions represent an important channel (instead of “factor” that the reviewer mentions) for the present economy. Following Acemoglu et

al. (2008)'s method, we use the first-stage estimates to show the relationship from colonialism to economic institutions today and use the second-stage results to estimate how much liberal colonialism through economic institutions are identified to affect the allocative efficiency (or how much economic institutions stemming from liberal colonialism affect the allocative efficiency). Therefore, we add a new footnote (Footnote 4) in the manuscript:

“In theory, IV strategy identifies a mediation effect of the variable of interest through the IV on the dependent variable. This explains a number of literature uses IV estimation to show the mediation effect (e.g., Bretschger et al., 2012). In comparison, it requires the IV has only one channel (mediator) to affect the variable of outcome, so it is more strict than the traditional mediation-effect estimation, but it helps identify the causal effect from the IV on the variable of outcome though the channel.”

A new reference is added as the following.

Bretschger, L., Kappel, V. and Werner, T., 2012. Market Concentration and the Likelihood of Financial Crises, *Journal of Banking and Finance*, 36(12): 3336-3345.

Last concern is that the channel through which the colonialism affects the allocation of capital is missing, which decreases the quality of the paper.

As we say above, we focus on the channel of liberal colonialism at economic institutions. As our estimates suggest, liberal colonialism satisfies the exclusion restriction at least in our dataset, it manifests that the most important channel is economic institutions and the other channels except economic institutions are insignificant. Hence, the missing in our study is reasonable. Put it differently, there may be other channels, but they should be related to economic institutions. We

especially add the following sentences when explaining the liberal colonialism as an exogenous source of economic institutions:

“We emphasize economic institutions as the channel of liberal colonialism. This may be strong, but it is based on the reality in the regions under colonial powers (see Acemoglu et al., 2008). Specifically in China, most of the product of colonial power disappears because of wars, political changes and economic reforms since 1912; whereas the laws and other types of economic institutions are developed. For example, the Qing government in 1908 established the first constitution in China’s history (Cheng, 2017). Therefore, this paper justifies the application to the allocation of capital from the historical perspective.” (Lines 8-15 in P5)

A new reference is added as the following.

Cheng, J., 2017. Why Late Qing Constitutional Reform Failed: An Examination from the Comparative Institutional Perspective. *Tsinghua Law review*, 107:107-147.

Minor comments

1. The source of the colonized regions should be listed.
2. It would be better to list the colonized regions in a table.

We accept the suggestion; add a new table (Table 1 in the new manuscript) to list the source of the colonized regions and the colonized regions.

3. Some sentences like, “liberal colonialism affects the present development only through economic institutions” in paragraph 3, page 7 should be with a reference or explanation.

After this sentence, we explain this statement by referring to the relevant literature, so for the rigidity, we revise it as “liberal colonialism affects the present development only through economic institutions with reference to the relevant literature.”

The conclusion of this report

As described above, we have revised the paper by clarifying the measurement, linking the later tests to justify the measurement of interest and refining our motivation of IV strategy. These revisions suggested by the reviewer help us to connect our work to the literature and the background. We thank the reviewer for those helpful comments.