Who benefits from financial development? New methods, new evidence

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ABSTRACT

This paper takes a fresh look at the impact of financial development on economic growth by using recently developed kernel methods that allow for heterogeneity in partial effects, nonlinearities and endogenous regressors. Our results suggest that while the positive impact of financial development on growth has increased over time, it is also highly nonlinear with more developed nations benefiting while low-income countries do not benefit at all. We also conduct a novel policy analysis that confirms these statistical findings. In sum, this set of results contributes to the ongoing policy debate as to whether low-income nations should scale up financial reforms.

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1. Introduction

Empirical evidence indicating that the development of the financial sector of a country greatly facilitates its economic growth is abundant (e.g., King and Levine, 1993a,b; Jayarathe and Strahan, 1996; Demirgüç-Kunt and Maksimovic, 1998; Rajan and Zingales, 1998; Carlin and Meyer, 2003). The broad consensus emerging from the vast amount of work is that improving the operating financial environment and mitigating financial regulations can result in higher growth (see e.g., Levine, 2005). However, many countries display underdeveloped financial sectors (Rajan and Zinagles, 2003).

In our study of how financial development affects economic growth, we address many of the criticisms commonly placed on growth models and plan to provide a robust perspective. Moreover, while many of our key results can be linked to theoretical models explicating a positive link between the level of financial development and economic growth, we uncover an ambiguous effect for countries with limited financial development, suggesting a threshold type effect similar to that found in Aghion et al. (2005).[3]

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   [3] This ambiguous effect has also been touched upon in the work of Deidda and Fattouh (2002) and Rioja and Valev (2004 a, b) though in an admittedly [their emphasis] ad hoc and strictly linear context.

One way of empirically assessing the importance of financial development on economic growth would be to examine its impact in the context of other growth determinants using Bayesian Model Averaging (BMA). Since Brock and Durlauf (2001) and Fernandez et al. (2001a,b) deployed BMA to estimate growth regressions, the model averaging methodology has been making its mark as a constructive tool in growth empirics.[4] To date, studying the impact that financial development has on growth has yet to be included in a BMA growth analysis. However, as shown by Ciccone and Jarocinski (2010), the promise of model averaging methods depends crucially on further research seeking answers to concerns related to the sensitivity of results to small changes in the modeling framework. In this paper we take an alternative approach by examining the empirical content of financial development within a model of economic growth using the most up-to-date nonparametric (including instrumental variable) methods.

The use of nonparametric methods to analyze growth data (Liu and Stengos, 1999; Durlauf et al., 2001; Maasoumi et al., 2007; Henderson et al., 2012) is becoming increasingly popular. It has been recognized that misspecification of functional form can have both a detrimental impact on policy prescriptions and the general understanding of the underlying economic structure. This paper is the first to account for endogeneity in growth regressions while in a fully nonparametric framework. More generally, this is only one of a handful of applications of nonparametric instrumental variable estimators in economics. Further, we extend the empirical policy methodology of Cohen-Cole et al. (2012), which was designed for nonlinear models, to the nonparametric realm.

The methodology that we deploy to produce robust conclusions about the financial development-growth nexus stems from recent advances in the nonparametric regression literature. Contemporary techniques have shown how to improve estimator efficiency in the face of continuous and discrete regressors. Individual and joint tests have been developed for significance testing of regressors. Additionally, we are able to handle the presence of irrelevant variables that are mistakenly included in an empirical analysis. We also deploy a newly developed estimator that can handle endogenous regressors via instrumental variable techniques.[5] Beyond these new statistical techniques that we bring to bare, we also develop a bootstrap policy analysis framework that will allow assessment of optimal policies across a range of models and policies for a pre-specified loss function for the policymaker. This framework should prove useful beyond the bounds of empirical growth analysis. This ensemble of modifications enables us to assemble an empirical study that is robust to functional form misspecification, admits (potentially) heterogenous partial effects across covariates, provides valid inferential statements and allows us to assess the impact of policies designed to increase financial development.

Employing these recently developed estimators, we find that financial development impacts growth in a highly nonlinear fashion. Specifically, we find that while on average the impact of financial development on growth has increased over time, more developed nations have benefited most favorably from financial development while low-income countries do not show any significant benefits from improvements in their financial sectors. This finding is closest to Aghion et al.'s (2005) financial threshold effects, albeit with a different econometric methodology and data. This result is re-enforced when using the optimal policy methodology of Cohen-Cole et al. (2012) indicating that about one quarter of the countries in our sample (most of them at the bottom of the income distribution) see an optimal policy of not increasing financial development. In the context of the ongoing policy debate regarding the relevance, timing and effect of structural reforms, our findings suggest rethinking whether low-income nations should scale up financial reforms early in the reform process, if at all. This result echoes the sentiments of Acemoglu et al. (2008) who find that macroeconomic reforms in developing countries often fail to provide the desired effect.

The results of our study can complement findings from several other existing studies. In the Rajan and Zingales (1998) context, our results suggest that low-income nations are likely to grow from sources that do not require financial deepening. However, as they make their way to emerging markets, the role of finance becomes more important. In the context of Rostow's (1960) stages of development, this paper provides fresh evidence that in the initial stages of development, finance may not be a key determinant of a country's ability to grow, but in later stages could play a crucial part.

The remainder of this paper is organized as follows: Section 2 presents an intuitive description of our nonparametric kernel regression methods. Section 3 briefly discusses the data used for this study while Sections 4 and 5 report our parametric and nonparametric results, respectively. Section 6 examines policy implications of a counterfactual change in financial development. Conclusions and potential extensions are discussed in Section 7. Technical aspects of the estimation and inference procedures used are contained in the Appendix.

2. Empirical methodology

Nonparametric kernel regression is becoming an increasingly popular method of estimation in applied economic milieus. The main perceived benefit is that it allows for consistent estimation when the underlying functional form of the regression function is unknown. While this is true, there are many other benefits which may prove to be just as useful in our context. In this section we will discuss nonparametric regression, and address the issue of bandwidth selection which can expose

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[4] Model averaging in growth empirics has become common practice; see Sala-i-Martin et al. (2004), Ley and Steel (2007), Durlauf et al. (2008), Masanjala and Papageorgiou (2008), Ciccone and Jarocinski (2010) and Amini and Parmeter (2012) just to name a few.

[5] In addition to being the first paper that we know of to apply this technique, we further augment this estimator by considering estimation with discrete regressors, developing a bootstrap procedure to construct confidence intervals for our estimates as well as proposing a novel method to pick instruments in a nonparametric framework.