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# The Long-Run Impact of Agricultural Diversity on Economic Freedom at the Local Level

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## Abstract

This brief research note extends the work of Fiszbein (2017) regarding the lasting effects of agricultural diversity in 1860 on outcomes at the county level in the United States to its effects on institutional quality, specifically economic freedom. The baseline specifications for agricultural diversity yield very modest, statistically insignificant results for its effects on economic freedom.

## Introduction

How important are the path dependencies of history for the U.S. states today? Recent work in economics has investigated historical and deep cultural roots of economic development and institutional quality. Putterman and Weil (2010), for instance, find in the international context that the length of time a culture has been exposed to agriculture (agricultural history) as well as length of time the culture has been exposed to centralized states (state history) have meaningful effects on outcomes today. State history, for instance, is relevant for the quality of modern day institutions and scores for some cultural variables (Putterman and Weil, 2010, p. 1654). However, this is less conclusive as it pertains subnationally to institutional quality thought of in terms of economic freedom (Murphy and Nowrasteh, 2018).

A recent working paper by Fiszbein (2017) describes a new historical variable for the U.S. states in a similar vein—the agricultural diversity at the county level in 1860 for the United States. Fiszbein finds that the variable has important, lasting effects for U.S. counties, and argues it acts as a catalyst for introducing new skills and ideas into regions. While Fiszbein emphasizes this as a means of human capital accumulation, it may also indirectly lead to improvements in institutional quality. Previous work in economic history has studied the effects of agriculture on economic institutions (Hoffman and Libecap, 1991; Lauck, 1996; Schmid and Soroko, 1997; Prasad, 2012) often how the agricultural sector sought protection from the Federal Government (diversity of agriculture can be thought of as a barrier to such organizing).

The purpose of this note is to determine whether agricultural history has any effect on institutional quality as measured by economic freedom. Economic freedom has been shown to have a robust effect on economic growth (De Haan et al., 2006) and has seen a wide array of applications (Hall and Lawson, 2014). Positive economic effects of economic freedom hold not only for countries, but regions and localities as well (Ashby et al., 2013; Bologna et al., 2016). A number of recent articles have explored the sources and causes of economic freedom.<sup>1</sup> Elsewhere, scholars have argued that cultures supporting commerce and cosmopolitanism, and related mores and values, are supportive of the institutions economic freedom (Hayek, 1988; McCloskey, 2010; Williamson, 2011, 2000); there also appears to be a strong empirical link between

<sup>1</sup>For some examples, see March et al. (2017), Young and Sheehan (2014), Clark et al. (2015), & Murphy (2016).

education and support for liberal economic policies and institutions (Caplan, 2001; Caplan and Miller, 2010). There may therefore be some role by which agricultural diversity ultimately impacts a region’s institutions, by opening a region to new ideas and a more open culture.

## Empirics

Mathematically, the agricultural diversity variable is the complement of the Herfindahl-Hirschman Index of the cash value of 36 different agricultural outputs as measured by the Census. The measure of economic freedom we will use is economic freedom at the level of Metropolitan Statistical Areas (MSAs) as of 2002 (Stansel, 2013). We match the county-level data to each individual modern-day MSA.<sup>2</sup> This allows us to reproduce the baseline regressions performed by Fiszbein. This also allows for another test of how deep, historically-rooted variables may ultimately influence institutions. Descriptive statistics for these variables are found in Table 1.

Table 1: Descriptive Statistics

Variable	n	Mean	Std. Dev	Min	Max
Agricultural Diversity	275	0.743	0.111	0	0.902
MSA Freedom	276	6.634	0.795	4.191	8.393

Fiszbein (2017) uses a wide array of control variables and an instrumental variables approach to confirm the robustness of his result, however, he emphasizes the minimalistic specifications similar to those we use to avoid the issue of “bad controls” (Fiszbein, 2017, p. 12).<sup>3</sup> For the purposes of this brief research note, we provide four specifications, first a simple regression (Regression 1), a regression which includes dummy variables for each state (Regression 2), and a regression which includes dummy variables from agricultural regions<sup>4</sup> (Regression 3). These three regressions each utilize robust standard errors. Then another specification, Regression 4, reproduces Regression 3 while clustering the standard errors by agricultural region. These results are found in Table 2. It should be noted that the effects of a state’s status as a slave state is subsumed in the state dummy variable in Regression 2, since the identity of mid-eighteenth century slave states is a fixed characteristic. It should be noted that since agricultural regions are defined as groups of states, additional information is not introduced by using agricultural regions in place of states, although it is another way of looking at the data.

Table 2: Regression Results

Variables	(1)	(2)	(3)	(4)
Agricultural Diversity	-1.010*** (0.463)	0.731 (0.466)	0.023 (0.497)	0.023 (1.236)
Constant	7.388*** (0.341)	6.325*** (0.329)	5.838*** (0.394)	5.838*** (0.938)
Dummies	None	State	Regional	Regional
$R^2$	0.020	0.772	0.223	0.223
n	275	275	275	275
Standard Errors	Robust	Robust	Robust	Clustered by Region

Standard errors are robust. \* denotes 10%. \*\* denotes 5%. \*\*\* denotes 1%.

In the absence of the dummy variables, agricultural diversity has a *negative*, statistically significant

<sup>2</sup>When multiple modern day counties correspond to a modern day MSA, the raw dollar amounts for each product are summed prior to constructing the diversity measure.

<sup>3</sup>This is in following Angrist and Pischke (2008: 64-68). We should note, however, that in his preferred specification he includes an array of geo-climatic controls; nonetheless, which sets of controls Fiszbein includes appears to have very little impact on his primary findings (2017: 13), and geo-climatic variables to various extents are already included in a state-level fixed effect.

<sup>4</sup>Data on agricultural regions originates with the USDA’s ARMS III Farm Production Expenditure Regions.

effect on economic freedom. However, upon the inclusion of the state dummies, the sign flips to positive. After including dummies for agricultural regions in place of state dummies in Regressions 3 and 4, the sign remains positive but without statistical significance, whether robust standard errors or clustered standard errors are used. Back in Regression 2, robust standard errors yields statistical insignificance ( $t=1.57$ ), though conventional standard errors do not ( $t=2.27$ ). This pattern is not found in Fiszbein (2017), and at the overall state level, several states with high degrees of modern day economic freedom are in the American South. Low agricultural diversity in once plantation economies is situated in many states that today have smaller government and lighter labor market regulations. This could lead to higher agricultural diversity ostensibly associated with lower economic freedom. Once the institutional factor leading this to arise, i.e., the historical effects of slavery, is controlled for, the positive, though statistically insignificant relationship re-emerges. All this may be an artifact of the modern economic freedom data favoring the modern Southeast over the modern Northeast, while such a pattern is infrequent for other social indicators.

Regardless of the reason for the difference, when MSAs are compared against each other within states, as happens upon the inclusion of the state dummies, there is very little evidence that historical agricultural diversity positively impacts modern day economic freedom. The size of the effect, if it exists, is small, with the point estimate, corresponding to Regression 2, suggesting a one standard deviation increase in agricultural diversity yielding a 0.10 standard deviation increase in MSA economic freedom.

## Conclusion

If Fiszbein's reasoning that agricultural diversity sparks the spread of new ideas and skills to localities is correct, the subsequent accumulation of human and social capital may enable societies to improve their institutional quality. However, agricultural diversity is not statistically significant at any conventional level of significance, and the calculated point estimate does not correspond to a very meaningful impact on institutions. This upholds the position that, while historical variables do contribute to explaining differences across regions of the United States, it is not clear what, if any, role they have in determining each state's level of economic freedom.

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