



Does Trade Promote State Capacity in Ghana? A Synthetic Control

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Abstract

Can changes in trade volumes explain improvements in the capacity of African states to collect revenue and to provide public services? Applying European trade literature, this paper analyzes whether Ghana's state capacity is stronger than it would have otherwise been, due to its recent trade growth. This research represents a departure from most economics literature on trade, which typically focuses on improvements to economic performance. Instead, this paper addresses a frequently overlooked aspect of trade—its impact on a state's political economy. Identifying the roots of stronger African state capacity is an important objective, in light of the concern expressed by Thies (2009) that African states, in their current form, may just limp along, hampered by their endowment of inhospitable geography. Improvements in a state's capacity for governance mean it can better provide public goods, combat corruption, and attract private investment. The findings presented in this paper not only are consistent with the hypothesis that trade growth has had a measurable impact on Ghana's state capacity, but—using a synthetic control—also demonstrate the rate of change. Although the weakness of African states has received much attention, the findings in this paper suggest that capacity levels can be directly bolstered through trade-promotion policies.

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Introduction

In the 1990s, Ghana's trade liberalization program effectively reduced the country's level of tariff revenue while its total tax revenue collections increased—a result that runs contrary to traditional expectations.¹ The increase in tax revenue is puzzling in part because a state's capacity to tax is expected to increase only incrementally, as shown in seminal works on European taxation that study tax revenue trends over a span of centuries (Tilly 1990). It is also puzzling because tariff revenue collection comprises one prong of a revenue dilemma for developing states.

The argument goes that lower-capacity countries pursuing trade reforms enjoy economic welfare benefits (OECD 1998; Frankel and Romer 1999) at the cost of foregone collection of total revenue—because tariff revenue decreases and tax revenue does not increase to compensate for the shortfall (Agbeyegbe, Stotsky, and Mariam 2004; Baunsgaard and Keen 2010). In other words, states must choose between the economic benefits of increased trade liberalization and the associated loss of tariff revenue, or higher tariff revenues and lower levels of trade and economic gains. Keen and Ligthart (2002) attribute the persistence of this conundrum for developing countries to the relative importance of large informal sectors that resist paying income taxes (Emran and Stiglitz 2005); the revenue gap this generates explains the prevalence of trade-constraining tariffs. In part, the Ghana case may lie outside the bounds of existing literature that considers only the direct impact of trade taxes on total tax revenue. Instead, “commercialist” theory² suggests that trade can improve the relative capacity of the state and, in turn, improve total revenue collection capacity and actual tax revenue in lower-income countries.

Institutional capacity is important, as it means that states can pursue effective policies (Snider 1996) and are less likely to suffer from internal conflict (Buhaug 2010) while enjoying higher rates of private investment (Le 2004). Conversely, ineffective and nonresponsive states—states with low capacity—tend to display higher levels of corruption (Kaiser and Streatfeild 2016; Shleifer and Vishny 1993; Zenger 2011) and an absence of “rule of law” (Foltz and Bromley 2011). In low-capacity states, bureaucrats do not tax effectively (Streatfeild 2017a; Oeschlin 2010, 631), they do not provide enough public goods (Osafu-Kwaako and Robinson 2013: 7; Streatfeild 2017b), and they do not invest in infrastructure or law enforcement (Buhaug and Rød 2006; Berman n.d., 1). Further, weakly institutionalized states provide few public goods. In short, states with low capacity suffer from poor economic performance (Robinson and Parsons 2006: 101–2).

European models offer insights into why states vary in their level of capacity (Acemoglu, Johnson, and Robinson 2005; Tilly 1990). Specifically, they argue that modern states in sub-Saharan Africa (SSA) are weak, in part, because they did not fight neighbors for territory (Herbst 1990, 2014; Thies 2009). However, the recent increase in trade volumes across the continent provides an opportunity to test whether some states are now starting along a commercialist, or

¹ From 1993 to 2000, Ghana's tariff revenue (as a percentage of GDP) fell by 33 percent, but total tax revenue [also as a percentage of GDP] increased by 24 percent. ICTD, “The Government Revenue Dataset,” 2017.

² I coin this term to denote a pathway to state formation that focuses on the impact of trade (e.g. Acemoglu et al. 2005, Bates 1987; Cohen 1965; Tilly 1990), much as bellicist theory focuses on the impact of war.

trade-oriented, path to building capacity. This second strand of research is timely, as 5 of the 10 countries with the fastest trade growth over the last three decades are in SSA. Ghana leads that global list, and with an average annual growth rate of 9.7 percent between 1982 and 2012, the pace of growth in Ghana was double that of the next-place country, Chad.³

In addition to its trade volume, Ghana's institutional capacity has also grown in recent years as measured by total tax revenue as a percentage of GDP, which grew from 6 percent of GDP in 1990 to 13 percent of GDP in 2009.⁴ The picture has not always been so positive, however. As Leith and Söderling (2000) point out, in the 1960s, following its independence, Ghana's government could not effectively carry out its administrative duties; Ghana provided few public goods, nearly precipitating a state collapse.

A turnaround began with tentative economic reforms from 1983, which started to reduce tariffs in some sectors while continuing to protect against imports in others.⁵ A more wide-reaching turning point came in 1992, when the winning party's platform in Ghana's presidential and parliamentary elections called for deep, domestically driven economic reforms (Leite 2000). For example, private traders could compete with the state-owned cocoa board for the first time, and the government also privatized trade in other key export commodities, including coffee and Shea nut. Also in 1992, the government introduced a floating exchange rate, poisoning the economy "for significant, sustained growth."⁶ It was that year that Ghana's trade, as a percentage of GDP, finally surpassed the continental average.

To test the hypothesis that there is a relationship between expanded trade volumes and Ghana's improved capacity I use a synthetic control method introduced by Abadie, Diamond, and Hainmueller (2015).⁷ This model creates a "synthetic" Ghana that charts the counterfactual trajectory of its extractive power over time to demonstrate what would have happened to the country's capacity if it had not been "treated" by the 1992 trade reforms. This derived outcome is then compared on a year-to-year basis with the actual performance level of capacity in order to calculate the impact of international trade reforms in 1992 upon the capacity of the Ghanaian state.

³ The other three countries are Mozambique, the Democratic Republic of the Congo (DR Congo), and Seychelles. World Bank, Trade (% of GDP) database, <http://data.worldbank.org/indicator/NE.TRD.GNFS.ZS>.

⁴ Tax revenue is a widely accepted proxy measure of state capacity. (Cite an example of where this has been used as a proxy). Between 1992 and 2002, data from the International Centre for Trade and Development (ICTD) showed that Ghana's tax revenue as a percentage of GDP grew by 85 percent, and its income tax as a percentage of GDP rose from 14th from the bottom to 64th from the bottom between 1992 and 2000. Similarly, World Bank data show a 62 percent increase in tax as a percentage of GDP for Ghana during the same period.

⁵ WTO, GATT/1535 (March 2, 1992: 1).

⁶ Pereira Leite et al. (2000).

⁷ They developed this methodological tool to address shortcomings in both the comparative case study method and traditional regression techniques. The advantage of synthetic control is that it corrects for ambiguity and subjectivity in the case selection process by applying quantifiable metrics to a group of countries used as comparators. The program then assigns weights for each country in order to derive a weighted average (Abadie and Gardeazabal 2003). In addition, the synthetic control accounts for uncertainty in the post-treatment trajectory of the comparator group, whereas standard errors in regression results do not (Abadie, Diamond, and Hainmueller 2010).

In sum, the paper rejects the null hypothesis that trade growth caused no measurable improvement in the capacity of Ghana's state, finding that the counterfactual level of capacity would have remained mostly below actual levels if the government had not implemented deep trade reforms in 1992. Instead, capacity expanded immediately and rapidly when trade reached competitive levels, driving the Ghanaian state to invest more heavily in its trade facilitation infrastructure—e.g., it doubled the size of its road network between 1984 and 2008—while it expanded its capacity to collect more urban and rural taxes (Ghana, Internal Revenue Service data, personal interview, June 2013). Ghana's extractive capacity remained at or above counterfactual or synthetic levels for more than a decade after the reforms took effect, contradicting the thesis that cutting tariff levels to attract trade lowers tax revenue in developing countries. This points to an alternative hypothesis in which a commercialist pathway boosts capacity and tax revenue, at least for low-capacity states. This would mean that some low-capacity states, like Ghana, can have it both ways by lowering tariff barriers to gain more trade while not losing revenue.

Trade and the African State

This paper helps to fill a gap identified by Keen and Baunsgaard (2005), who note that very little empirical attention has been paid to the relationship between government revenue and taxes on trade. To help remedy this omission, they use panel data for 117 countries over 32 years to argue that low-income countries do not easily replace foregone trade tax revenue. But they also find that trade has a positive and significant effect on non-trade tax revenue in low-income countries. Khattry and Rao (2002) concur that the transition from relying on trade taxes for government revenue to building up the capacity to collect other domestic taxes can be a challenge in developing countries due to structural conditions, and Emran and Stiglitz (2005) explain that this problem is rooted in a large informal economy that is difficult to assess and tax.

While collecting taxes is onerous for weak states, trade can help to overcome structural constraints on this activity by encouraging institutional growth to develop state capacity—to tax and to provide public goods. A review of commercialist theory is helpful to understanding this relationship. Kipp and Schortman (1989) note that the state values the relative ease of revenue generation from trade and so administers that trade, protecting it through force if needed. As Spruyt (1994) summarizes, the state must step in to foster market growth because traders require property protection. Bates (1987) stresses that pre-modern states developed by consolidating power over nearby markets and by setting attractive tax rates, both of which served to encourage traders, while Kindleberger (1958) clarifies that markets grew out of the state's investment in its transport networks. In this way, commercialism drove the developing capacity of the Western European state (Tilly 1990).

But the commercialist path to capacity growth was not exclusive to Europe. Thakur (1996) observes a correlation between Indian long-distance trade and the formation of capacity of India's states over the course of two thousand years. In pre-modern SSA, chiefs consolidated their capacity along major trade routes (Gluckman 1965; Braudel 1972). Similarly, Sundiata (1994) describes the close ties between trade and state formation in Bioko (equatorial SSA). In addition, Cohen (1965) provides historical evidence that successful trading communities attracted population growth at ports and at the end of trade routes in the Benin kingdom (West Africa), where they enjoyed earlier political centralization than counterparts in the hinterland.

Kea (1974) details how trade in the Akan, Akwamu, and Asante kingdoms of present-day Ghana generated centralized bureaucracies around trade centers in western Africa and routes into northwest Africa between the late 15th and late 17th centuries. In sum, there is historical evidence that trade has had a strong impact on government capacity.

The Case of the Commercialist Ghanaian State

Ghana is a helpful test case for using a synthetic control model to study the relationship between trade and capacity, as there is an existing qualitative case for this hypothesis. Earlier in this century, Chalfin (2001, 202) observed an active trade zone in northern Ghana which brought with it “numerous layers of state personnel—police, border guards, customs agents and army officers—[who] occupy this site with the aim of regulating trade.” It also brought income tax collectors who, according to informal interviews by this author, acted as Bates (1987) would expect by focusing their efforts along trade routes and, specifically, in market towns. These income tax agents were deliberate about this focus by carrying out programs to facilitate paying domestic taxes while also publicizing services they could deliver to traders in return.

Reforms enacted in 1992 had a clear impact on Ghana’s relative economic competitiveness. Note that SSA was the most protectionist of any region in the 1960s, with tariff rates four times the Organisation for Economic Co-operation and Development (OECD) average (Van de Walle 2001). This was the outcome of an ill-fated import substitution policy to promote domestic industry in which African states closed off their economic borders after independence—a trend that continued until economic reforms took root in the 1990s. Van de Walle (2001) observes that, as a whole, SSA was the only region that did not improve its economic openness through the 1980s and that 4 of the 10 largest declines in trade as a percentage of GDP between 1982 and 2012 were in SSA. These high tariffs worsened the states’ vulnerabilities on world markets, and Ghana led the list as the most protectionist of 31 African economies in the 1980s (Agarwala 1983).

Ghana’s import-substitution policies proved a drastic failure, as trade volumes declined from more than 60 percent of GDP in 1961 to just 6 percent of GDP two decades later. To rectify the problem, starting early in the 1980s Ghana gradually reduced its tariff rates and import taxes,⁸ and within a few years it had one of the lowest tariff rates in SSA (Jebuni 1995). In addition, Ghana instigated “sweeping reforms” to reverse decades of economic stagnation under its protectionist and inward-looking trade policies. It did so through technical assistance from international donors and its own Economic Recovery Programs, with funding from the International Monetary Fund (IMF) and World Bank in the form of Structural Adjustment Programs (SAPs).⁹ Once the government initiated reforms, Ghana’s trade began a steady expansion beginning in 1983 (Brooks, Croppenstedt, and Aggrey-Fynn 2007).

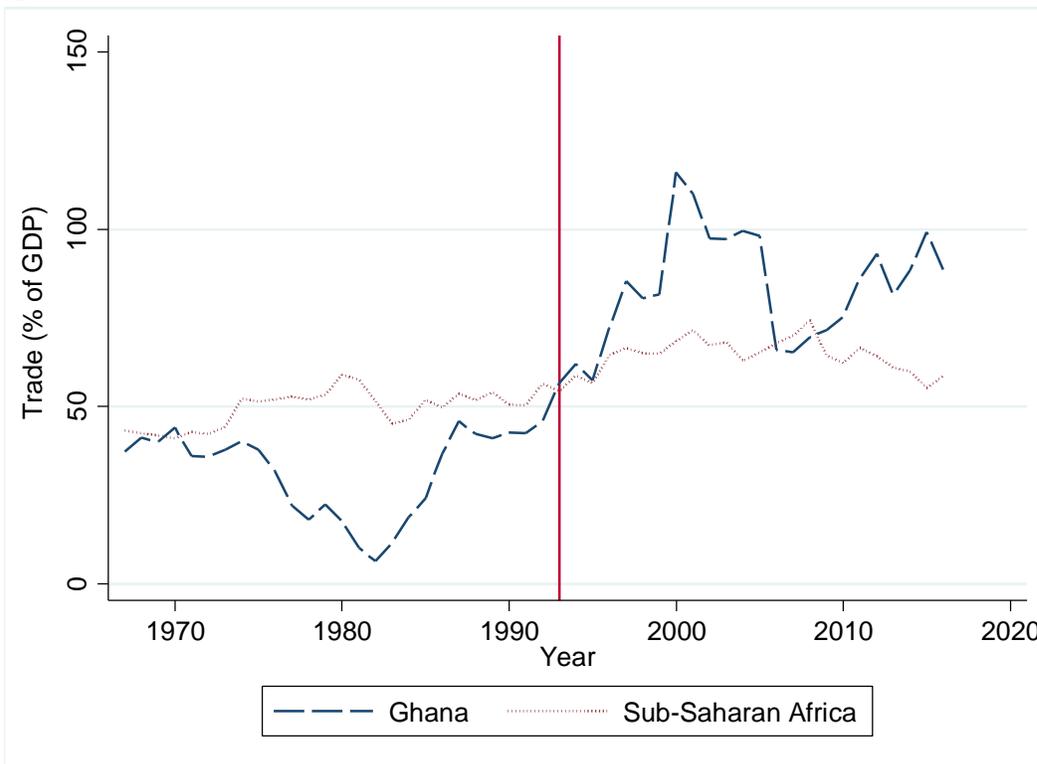
Nevertheless, Ghana’s trade volumes continued to lag behind those of the rest of the continent until 1992, when trade in key export commodities like cocoa, coffee, and Shea nuts was

⁸ WTO, C/RM/M/21 (May 13, 1992: 13).

⁹ WTO, GATT/1535 (March 2, 1992).

privatized and a floating exchange rate was introduced.¹⁰ The average tariff for all goods fell, and trade as a share of GDP, which had stagnated at around 45 percent for the previous five years, reached more than 80 percent within the next five years. It was in 1992 that Ghana's level of trade rose above that of the SSA average for the first time in decades (see figure 1).

Figure 1: Trade levels in Ghana and Sub-Saharan Africa (1967–2016)



Source: World Bank, World Development Indicators, 2017.

Clearly, structural reforms had a strong effect on Ghana's trade volumes, but they did not seem to directly affect capacity in the early 1990s. For example, in 1992 Ghana's Internal Revenue Service reported a steady decline in tax revenue starting in the mid-1980s. A year later, the second round of SAP-funded reforms was completed, but with little apparent effect on state capacity; as Jebuni (1995) states, the "attempt to reform and improve the capacity of the bureaucracy from 1987 onward did not succeed."

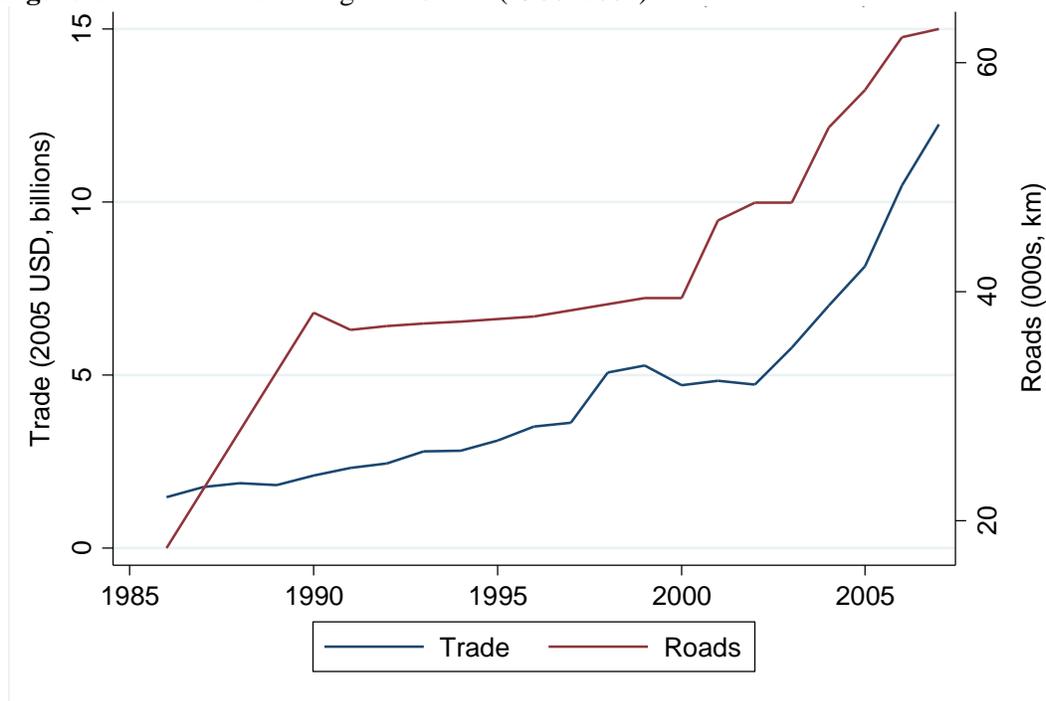
Jebuni attributes this lack of results, in part, to a serious disconnect between Ghana and the international development community at that time, quoting a high-ranking official in the Ministry of Finance and Economic Planning who reported that the government "did not feel related to the formulation of the SAP by the World Bank and IMF" (Jebuni 1995, 38). Weissman (1990, 1630) adds that while political and economic elites may have appreciated the potential economic impacts of the SAPs, these reforms did not reach the "average urban dweller." Jebuni (1995) confirms that Ghana's bureaucracy had little motivation to support the SAPs economic

¹⁰ Pereira Leite et al. (2000).

reforms anyway, as government officials were the largest beneficiary of the controlled economy. In sum, the series of SAPs successfully influenced Ghana's economic performance but appeared to have little direct impact on the capacity of the state.

On the other hand, trade did motivate the government to reform by driving the centralization and organization of its public services and tax collection (Osei, Darko, and Quartey 2005; Von Soest 2008). With these improvements, civil society became increasingly accepting of the reforms, while the ensuing trade growth (Leith and Lofchie 1993, 272) helped to pay for expanding the capacity of the state to extract revenue in rural areas and to provide more infrastructure to those regions, as foreseen in the theories of Kipp and Schortman (1989). For example, the World Bank recounts that the economic crises of the 1970s and 1980s saw the "collapse" of the country's road network because maintenance and construction were funded through fuel levies, which tapered off, in large measure, as a result of lower trade.¹¹ When the government turned its attention to policies to promote road investments that serviced cocoa, timber, and mineral production (Jebuni 1995, 21), maintenance revenues also increased: figure 2 shows similar growth in trade and in road network size during this time.

Figure 2: Trade and road length in Ghana (1986–2007)



Source. World Bank, World Development Indicators, 2015.

In sum, starting from a very low base, Ghana was able to put new revenue back into its road network. The improved infrastructure, in turn, helped to improve access to rural areas, generating still more revenue. Rural citizens were providing almost 60 percent of Ghana's GDP in 1982 (compared to 24.4 percent for all of SSA in that year). With this increase in capacity, there was a

¹¹ If fuel levies do not get channeled into maintenance this increases trade costs by two or three fold, between a well and a poorly maintained roads. World Bank (1996).

sharp rise in tax revenue from 1992. While total tax revenue had experienced a volatile but negative trend from the mid-1980s, with the start of the first SAP, it enjoyed a sharp turnaround from 1992 until at least the early 2000s. The growth of Ghana's road network grew alongside the increase in trade volumes, in the 1990s¹² lends support to the hypothesis that the state expanded its infrastructural reach to attract more trade and that revenue expanded as a result.

Data and Methodology

This paper uses a **synthetic control** to arrive at its conclusions. As mentioned earlier and as explained more fully in appendix A, this approach calculates a weighted average performance from comparator countries, using a range of political and economic variables. The outcome variable is **relative political capacity (RPC)**,¹³ a measure of state capacity. This variable is used because few of the data needed to calculate RPC are missing from available datasets (synthetic controls require balanced datasets); it is thus often used to measure relative performance in longitudinal analyses (see appendix B for further explanation). RPC measures state capacity as a fraction, consisting of:

$$\frac{\text{actual extraction}}{\text{predicted extraction}} = \text{relative political capacity,}$$

where actual extraction (measured by tax as % of GDP) and predicted levels of extraction are determined by a country's income, level of agriculture and mining, and oil production. An RPC value of 1 indicates that the state collects exactly as much tax as would be expected, while values of less than 1 mean that the state is extracting less than would be expected (see appendix B for further explanation).

The variable was developed by Organski and Kugler (1978, 1980) and taken on by Thies (2010) to be "used in a wide array of studies as a more precise indicator of the strength of the state than the tax ratio." Specifically, RPC measures the "ability of government to obtain resources from a population given their level of economic development," as poorer states with fewer resources have less to allocate. (In addition, controlling for income accounts for problems with collinearity.¹⁴) Moreover, RPC tries to capture "effective" rather than "good" governance. As Kugler and Domke (1986) note, the resources that governments extract consist of "material resources, which governments tax and borrow from the pool of societal resources, because

¹² The last few years of road data reflect an almost implausibly high rate of expansion. If looking at data through 2007, the correlation coefficient expands from 0.58 to 0.73.

¹³ Traditional problems with variables that measure government capacity fall into one of two categories. There are those that rely on the outcome, such as levels of public goods, and those that measure levels of democracy, as a proxy for the structure of the government. Both of these inherently assume that the state has the capacity to meet economic, policy, or social objectives, even though this may not be the case. See Arbetman-Rabinowitz and Johnson (2008) for more discussion.

¹⁴ For a further discussion, see Arbetman-Rabinowitz and Johnson (2008), and see appendix A for an explanation of how the variable is constructed. In addition, RPC is widely used as a measure of relative state capacity (recent publications include Thies 2010; Thies and Sobek 2010; Buhaug 2010; Hendrix 2010; Thies 2009). It has been used in research linking state capacity to the waging of war (Organski and Kugler 1980); internal conflict (Kugler et al. 1997; Buhaug 2010); inflation (Alcazar 1997); private investment (Chen and Feng 1996; Feng 2001); and economic growth (Leblang 1997).

revenue extraction is an unambiguous and continuous derivative of political capacity.” Inefficient states are those that extract fewer resources through taxation than the size of the country's resource pool would lead one to expect.

Lu and Thies (2010) favor RPC over other tax measures because it controls for various endogenous factors, making for more meaningful cross-national comparisons. To help illustrate the added value of RPC as compared to total tax as a share of GDP, consider that Algeria and Sudan now have similar levels of total tax revenue as a percentage of GDP even though Sudan ranked first (worst) while Algeria ranked 89th on the State Failure Index.¹⁵ Consequently, unlike tax as a share of GDP, RPC weighs other factors—Sudan draws more than three times as much of its GDP from agriculture as Algeria does. In addition, Algeria exports more than twice as much, as a share of GDP, as Sudan. Most significantly, Algeria collects four times as much revenue per capita as Sudan. It is important to note that this contrast is somewhat atypical; while RPC may offer a multi-dimensional measure of state capacity, it still correlates with tax as a share of GDP for most countries (the two indicators were closely related over time, sharing a Pearson correlation coefficient of 0.55 in 1983, 0.61 in 1992, and 0.58 in 2000).

The synthetic control uses **Polity2**¹⁶ as a control variable, because some political science theory sees a negative relationship between levels of democracy and tax rates as a measure of state capacity (Tilly et al., 1993). This dataset is commonly used in political science research, covering all independent states of populations greater than 500,000 people. Scores range from -10 to 10, with autocracies scoring -6 or less, anocracies scoring between -5 and 5, and democracies scoring 6 and above.

Trade (as a percentage of GDP) is a key independent variable of interest in the model, as provided by the World Bank. It is calculated as a combination of the value of exports and imports of goods and services as a share of GDP, which Thies (2010) also uses as a measure of trade openness. Although economic factors weigh in the calculation of RPC, there is only a small negative correlation (Pearson coefficient of -0.04) with this trade variable, so endogeneity should not be a factor.

Arbetman-Rabinowitz and Johnson (2008: 4) also argue that governments are constrained by their level of wealth when it comes to pursuing their policy objectives. After all, even if they have capacity, there is only so much they can do from a small economic base and an even smaller pool of economic resources. Furthermore, Fearon and Laitin (2003) as well as Collier and Hoeffler (1998) both use income as a proxy for state capacity, which is why the **natural log of GDP per capita** is used as a control variable. Each variable helps to better specify the model.

I use the World Development Indicator's **general government final consumption expenditure (% of GDP)**, which captures most government spending on goods and services.

Population density of arable land is included because this was a key force behind European state formation. Beginning in the 15th century, increasing density drove inter-state rivalry for territory and motivated the state-formation process in Europe (Mattingly 1955; Tilly 1990).

¹⁵ Fund for Peace, State Failure Index, <http://ffp.statesindex.org/rankings-2007-sortable>.

¹⁶ Center for Systematic Peace, Polity Project, <http://www.systemicpeace.org/polityproject.html>.

Conversely, the low population densities of modern African states constrain such political development (Thies 2009; Herbst 2014). Stevenson (1968) also notes the positive correlation between population density and state formation, and Vengroff (1976) expands this analysis more extensively across SSA using George P. Murdock's *Ethnographic Atlas* to identify the same correlation in those African societies (Murdock 1967). For more valid comparisons, it is important that the land area used in the denominator be habitable, excluding large desert wastes or inaccessible mountaintops. For this reason, I borrow from Bandyopadhyay and Green (2012), who use estimates of arable land made by the United Nations Food and Agriculture Organization in their denominator, rather than total land area.

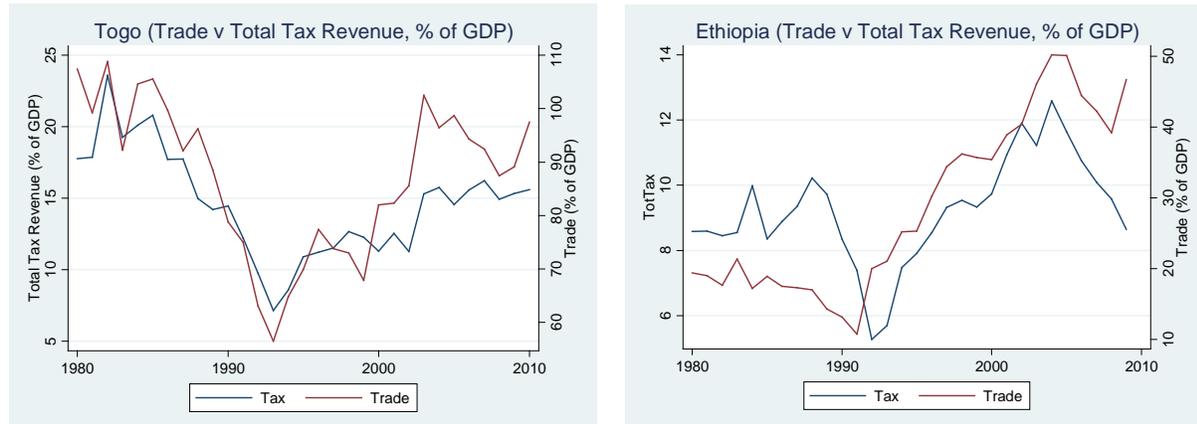
Osafo-Kwaako and Robinson (2013, 8) observe that there have only been three empirical studies of the determinants of political centralization in SSA; I add to this budding body of research using a methodology presented in papers by Abadie and Gardeazabal (2003) and by Abadie, Diamond, and Hainmueller (2010, 2015). They developed the synthetic control in response to limitations they found in current approaches that employ micro-level data to study macro-level policy outcomes. One result of such studies is that problems are often misattributed to sampling error, while a synthetic control methodology mitigates this sampling uncertainty by employing macro-level data. As such, it works well where the effects of policy changes, such as those that expanded Ghana's national trade levels from 1992 on, appear at an aggregated level of analysis.

The comparative case study in a synthetic control uses pre-treatment outcomes and their predictive characteristics to establish weights in the comparator countries that were also recipients of donor assistance and that were not affected by the treatment. In other words, this method calculates the weighted average that forms the counterfactual or "synthetic" Ghana as a baseline from which to measure the impact of that treatment. The method assumes that such a weighted average of comparison countries is better than analyses drawn from only one comparison country. This process then calculates the weighted values of both predictor and country variables and compares these to the actual country outcome to measure the impact of the policy treatment. This process creates a "synthetic" version of Ghana from which to compare the impact on the post-treatment period resulting from the difference between the two measures for a given year.

Insofar as this model can draw generalizable conclusions about SSA, it is helpful to note that the synthetic control works because the comparator countries did not witness a similar surge in trade in the early 1990s.¹⁷ This is not to say that the relationship between trade and the state's extractive capacity is unique to Ghana. The model can shed light on other countries in SSA to study other transition points in their trade growth that may have occurred earlier or later than it did in Ghana. For example, figure 3 shows that Togo and Ethiopia both had their trade closely followed by tax (as a share of GDP) for much of the last 30 years, a pattern which could merit further analysis.

¹⁷ The comparator countries consist of Burundi, DR Congo, Egypt, India, Niger, Sierra Leone, and Sudan.

Figure 3: Trade and tax revenue in Togo and Ethiopia



Source: World Bank, World Development Indicators, 2017.

This section next establishes 1992 as the appropriate treatment year for the synthetic control. The synthetic control often measures the impact of a single policy, but that assumes that a policy has an immediate impact. Rather than gauge the impact of a specific policy, this paper instead looks at the impact of increased trade competitiveness in the 1980s and 1990s, a development that was the result of several policy changes and other factors. It defines competitiveness in terms of how well Ghana performs with respect to the rest of SSA—such that an above-average performance is a sign of its trade strength. Figure 1 shows that Ghana’s trade flows outperformed SSA in the early to mid-1960s and then fell behind until 1992. Consequently, this paper uses 1992 as the treatment year.

Results and Analysis

The timespan of 1985 to 1992 forms the pre-treatment years, just before Ghana implemented the most extensive of its economic reforms. Over this period, the model calculates the weights by minimizing the root mean square prediction error (RMPSE) to construct a synthetic Ghana that offers a basis for measuring the impact of increased trade. In table 1, the pre-treatment characteristics of Ghana, in column (1), are a very close approximation of synthetic Ghana in column (2). By contrast, the levels in column 1 and 2 are closer to each other than the levels for the pre-treatment years than if one took a simple weighted average of countries with an income less than \$1,200 (Ghana’s national income level in 2008), as shown in column (3). This is firm evidence that synthetic controls are a viable tool for selecting and validating comparison countries from Ghana’s donor pool, rather than selecting a group of comparator countries using unweighted or imprecise criteria.¹⁸

¹⁸ DR Congo and Burundi contribute more than 20 percent to the comparator countries in this study and both of these countries suffered from internal violence during the years under study. Consequently, I conducted two robustness checks. First, I found less than a 100 percent probability that the results were achieved by random for years two through seven, following the policy treatment year. Second, I considered tax data from the ICTD, and it did not reflect a decline in tax revenue from the violence during those years (DR Congo actually saw an increase in

Table 1: Ghana synthetic control, 1985–1992

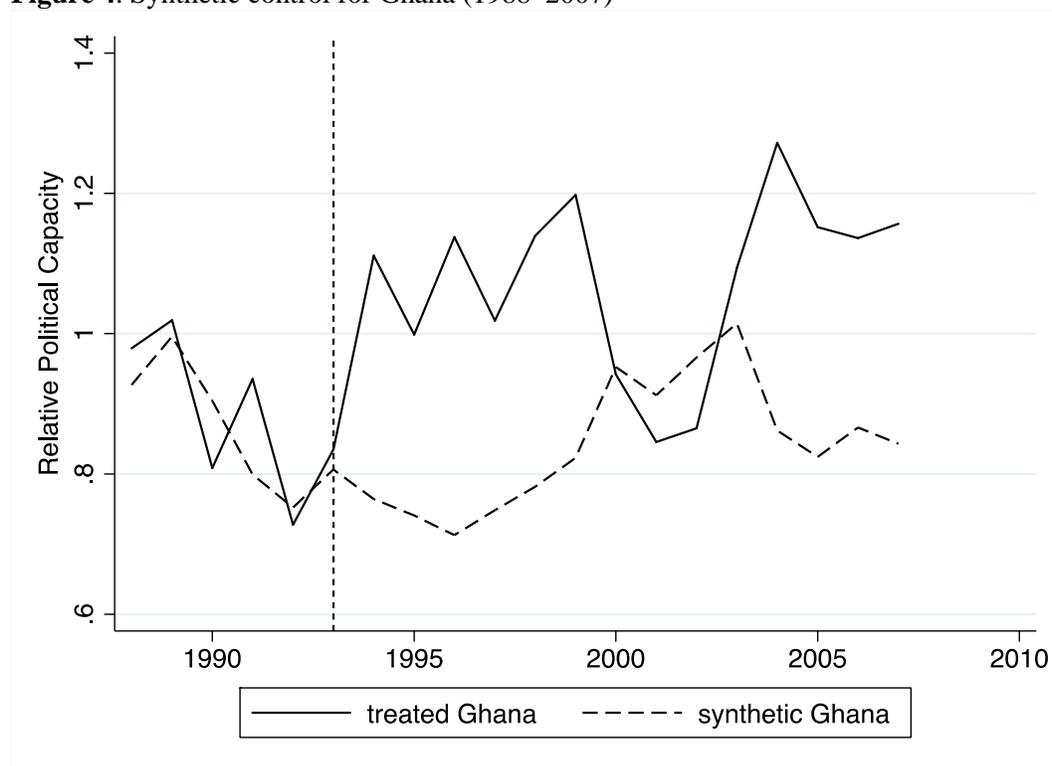
Variables	Ghana		Average (income < \$1,200) (3)
	Treated (1)	Synthetic (2)	
Polity2 (1988–1992)	-5.2	-5.2	-3.83
Trade (percentage of GDP) (1988–1992)	42.9	43.0	49.55
Ln (GDP per capita) (1988–1992)	5.4	5.4	6.12
Gov. consumption (% GDP) (1988)	12.8	12.7	10.945
Pop. density of arable land (1988–1992)	538.9	540.1	478.20

With the weights of the donor pool established for the pre-treatment years, in table 1, the graph below (figure 4) shows that the synthetic Ghana closely follows the treated, or actual, Ghana before 1992.¹⁹ As trade began to exceed competitive levels in that year, there was also an increase in RPC, from well below the expected level to above it within just a few years. By contrast, from 1992 on, synthetic Ghana does not perform nearly as well. Meanwhile, outside of two years in the early part of the 2000s when trade volumes declined for Ghana, the RPC for treated Ghana remains at least 0.2 greater than that for synthetic Ghana. Consequently, Ghana's boost in trade competitiveness from 1992 helps to explain its rapid expansion in RPC, to levels well above what it would have otherwise achieved.

tax revenue as a percentage of GDP). As there is little theoretical or empirical support for removing these two countries from the pool, they remain.

¹⁹ RPC is volatile in Ghana, making it difficult to track it perfectly to a synthetic Ghana. A measure like GDP, by contrast, is smoother over time, making for more closely fitting graphs for pre-treatment years.

Figure 4. Synthetic control for Ghana (1988–2007)



Source. Author’s calculations from Arbetman-Rabinowitz et al (2011).

Table 2 provides the weighted shares of the donor pool of comparator countries that comprise the synthetic Ghana. Before proceeding, it is worth noting that Ghana was subject to two shocks in 1992: (1) it converted to democracy; and (2) it implemented economic reforms that resulted in greater trade competitiveness. By contrast, the performance of the weighted donor pool continued to trail off. To control for any RPC effects from the regime changes sweeping through SSA in the 1990s, I use the categories of regime change in African states in 1995 that are found in Bienen and Herbst (1996). At that time, Ghana had multiparty elections but no transfer of power, as did Burkina Faso (20 percent weight) and Togo (4 percent weight). By contrast, Niger (12 percent weight) had multiparty elections and two transfers of power; Burundi had one transfer of power by an election (19 percent weight); and Sierra Leone (34 percent weight) and the Democratic Republic of Congo (2.4 percent weight) had no multiparty elections. . In short, the African weights in this model run the gamut of the democratic spectrum. In addition, the synthetic control uses polity scores to help control for the impact of democratization effects in the model. After allowing for these controls, Ghana still had a high rate of trade growth that others did not yet enjoy. I can surmise that trade, not democratization, was the relevant treatment in 1992 that motivated the subsequent growth in RPC (see appendix C for additional discussion).

Table 2: Country weights in synthetic Ghana

Country	Weight
Burkina Faso	0.203
Burundi	0.185
DR Congo	0.024
Niger	0.119
Sierra Leone	0.342
Sri Lanka	0.026
Togo	0.044

Conclusion

If war makes the state (Tilly 1990), what are the prospects for the states that do not make war (Herbst 1990, 2014; Thies 2009)? This paper unpacks the commercialist pathway to capacity growth. Even though the bellicist model may have taken centuries to build state capacity in Europe, this paper demonstrates that expanding trade flows quickly coincided with a considerable expansion in Ghana's transportation infrastructure as well as the state's extractive capacity. This fits with a commercialist theory of state formation to help explain the expansion of Ghana's relative political capacity.

The findings are further bolstered by qualitative research to explain when and why Ghana began to increase its competitiveness and relative capacity. From a policy perspective, much of the rationale behind trade liberalization in developing countries is one-dimensional; it is geared to improve economic performance at the risk of losing government revenue from tariffs. This research points to a significant and separate mechanism of interest to motivate these trade liberalization reforms, as increases in trade can also strengthen the state and its capacity to extract other taxes. This can help to supplement—or, in Ghana's case, exceed—pre-liberalization revenue levels. These findings should renew research and deepen policy focus on expanding international trade across the continent.

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Appendix A: Synthetic Control

This tool can be used to study cases in which a discrete treatment affects just one or a few units; where there are insufficient data for matching methodologies; and where there are many years of available data. To borrow terminology from matching methodologies, with synthetic controls there is a counterfactual “donor” group, as well as one treatment, or observed unit, that is studied over an unspecified number of time periods. The synthetic control process uses a balanced panel dataset along with data on comparison countries to best match the counterfactual donor group, in the pre-treatment years, based on the same structural processes as the treated country. The synthetic control minimizes the difference to the country that experiences a policy shock and that of a synthetic amalgam of “donor countries” in a way that most closely corresponds to the treatment country for the relevant pre-treatment time period. It then compares that synthetic and treatment country in the years following the shock in order to measure its effect. For more on this methodology, see Abadie, Diamond, and Hainmueller 2010 as well as Abadie, Diamond, and Hainmueller 2011.

Appendix B: Calculating Relative Political Capacity (RPC)

Organski and Kugler (1980) developed the RPC measure to account for structural variation across states that pursue revenue extraction. Arbetman and Kugler (1997) use a three-step process to generate longitudinal values, following an ordinary least squares regression of the following equation:

$$\frac{Tax}{GDP} = \beta_0 + \beta_1(time) + \beta_2\left(\frac{Mining}{GDP}\right) - \beta_3\left(\frac{Agriculture}{GDP}\right) + \beta_4\left(\frac{Exports}{GDP}\right) = \varepsilon$$

Next, the parameter estimates from the above equation are used to calculate the predicted value for the tax ratio, which is then used to calculate the RPC ratio:

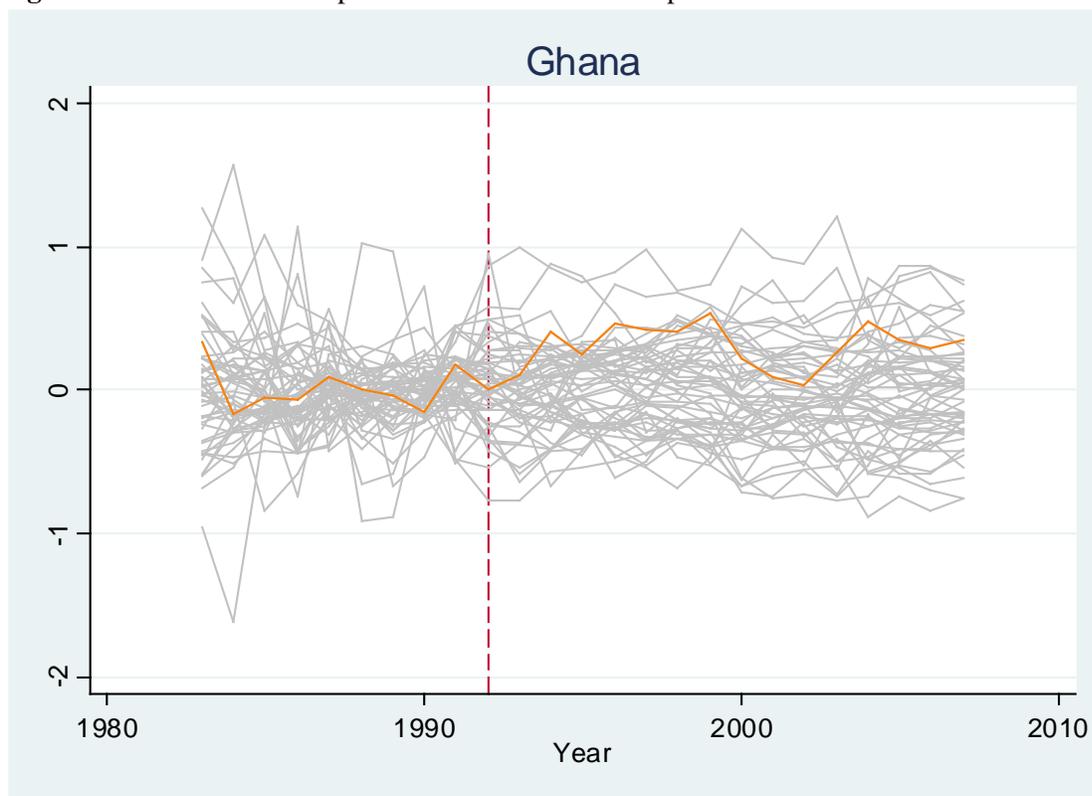
$$\frac{\text{Actual extraction}}{\text{Predicted extraction}} = \text{relative political capacity}$$

where predicted levels of extraction are determined by a country's income, level of agriculture, and levels of mining (as these are proxies for a country's level of political and economic sophistication). An RPC value of 1 indicates that the state collects exactly as much tax as would be expected. Values greater than 1 indicate that the state extracts more than would be expected, given its level of wealth and the size of key sectors, while values of less than 1 mean that the state is extracting less than would be expected.

Appendix C: Diagnostics

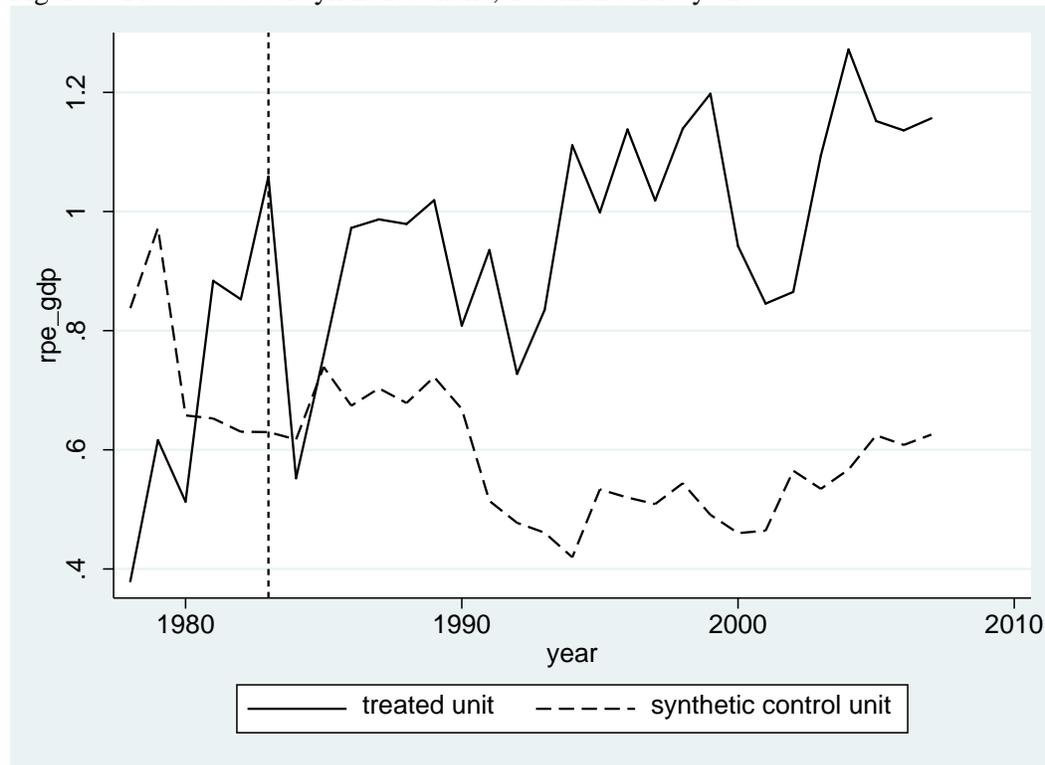
In this first diagnostic, the orange line represents the difference between the observed level and the synthetic level of Ghana's RPC score, and the red dotted line is for 1992. In that year, the orange line is at approximately 0. This means that the observed and synthetic levels are the same in that year, before the line rises into the positive realm—in other words, synthetic levels exceed observed levels after the treatment year. The gray lines in the graph represent the difference between observed and synthetic levels for the other countries in the dataset. By the mid-1990s, Ghana was the third- or fourth-place country in the dataset in terms of outperforming its synthetic RPC level.

Figure 5: Ghana's RPC compared to rest of the data sample



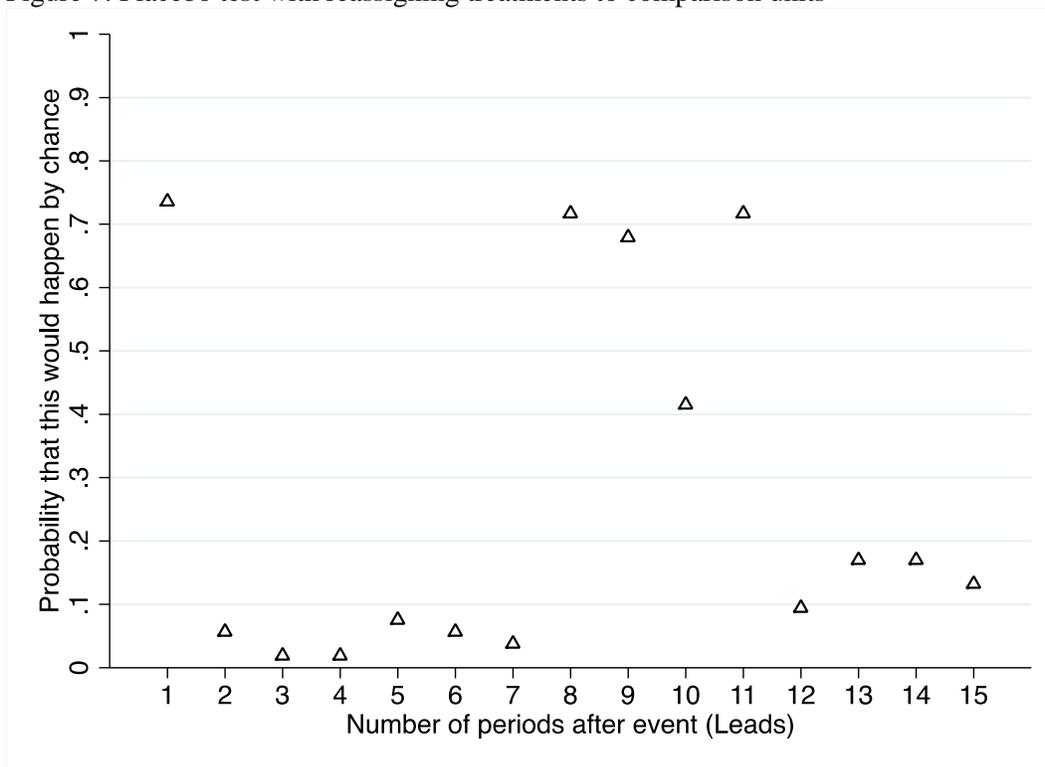
The second diagnostic, below, accounts for the placebo test over time by using the year 1982 as a treatment year. As this was 10 years before the policy treatment, in 1992, synthetic and actual Ghana should be identical—there was no shock to cause a deviation. However, the data in this paper are not smooth as compared to GDP per capita, over time, which may explain why treated and synthetic Ghana are not identical. With that said, from the mid 1980s the data follow a similar path to each other such that the synthetic Ghana is lower but parallel to than the treated.

Figure 6: Placebo test of synthetic Ghana, treatment of 10 years



Abadie et al (2015) offer an option between two placebo tests and the alternative is to conduct the synthetic control by reassigning the treatment to each of the comparison units. Doing so with synth_runner shows that, from year two to year seven, following the treatment year there is less than a 10 percent probability that treated Ghana would perform higher than synthetic Ghana by chance (the probability is less than 6 percent in year two and decreases below 2 percent for the next two years). This means that there is a high probability that the policy treatment of rising trade volumes, by regional standards, does explain why Ghana's relative policy capacity outperforms the counterfactual.

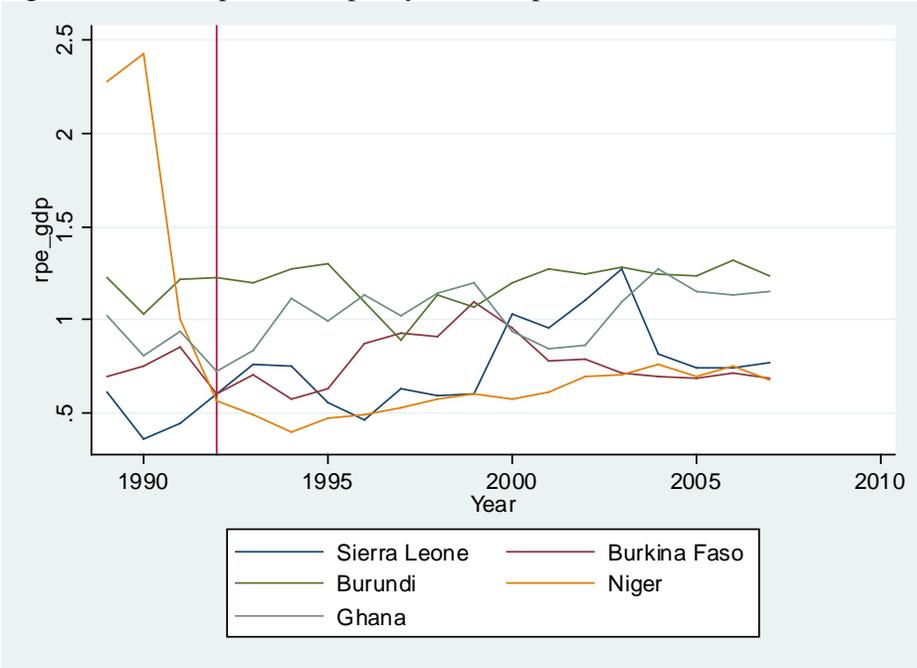
Figure 7: Placebo test with reassigning treatments to comparison units



Finally, the thesis of the paper holds that trade drove state capacity levels in Ghana so spillovers would mean that trade in Ghana had an impact on the capacity of countries in the donor pool with particular attention to Sierra Leone, Burkina Faso, Burundi, and Niger. Ghana’s capacity increases from 1992 and stays high through the mid to late 1990s. There do not appear to be spillovers as there is no uniform effect of Ghana’s relative political capacity on that of the donor pool. For example, Niger’s (12 percent share) capacity drops slightly from 1992 levels then plateaus. Burkina Faso (20 percent share) increases and decreases until the mid-1990s, before rising. Burundi (19 percent share), which starts higher than the other donor pool countries in 1992, stays high and level. Sierra Leone (34 percent share) rises slightly to 1993, levels off, before dropping down. In short, if Ghana’s trade had any effect on state capacity in the rest of the donor pool, even those of its geographical neighbors (Niger fell after 1992 while Burkina Faso rose), such an effect would be difficult to discern from these data.

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Figure 8: Relative political capacity in donor pool countries, 1988-2007



Source. Arbetman-Rabinowitz et al (2011).