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The Economic Consequences of Democratization in Benin

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Abstract. In the 1990s, several West African countries transitioned from autocracy to democracy, and this wave of democratization originated and spread from Benin. This paper aims to assess the impact of democratization on the economy of Benin through the use of the synthetic control method. The analysis deploys the synthetic control method to compare outcomes under the democratization in Benin against an estimated counterfactual scenario in the hypothetical absence of democratization. Relative to the control group, I find that real GDP per capita increased following democratization. While infant mortality decreased and human capital and life expectancy increased following democratization, these outcomes also improved in the synthetic control group. Hence, the decrease in infant mortality and improvements in life expectancy and human capital cannot be explained by democratization. In conclusion, the impact of democratization on economic development in Benin was positive if measured by real GDP per capita. The results are robust to three sensitivity checks: in-place, in-time, and leave-one-out tests. This paper complements the existing literature on political economy by providing estimates on the impact of democratization on economic growth and development in an emerging market economy.

Keywords: Benin, democratization, economic growth, synthetic control

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1. Introduction

The literature on economic growth is divided into three main strands of research (Nannicini & Ricciuti, 2010). The first strand consists of neoclassical models developed in the 1950s and 1960s, which investigate how changes in capital accumulation and technological advancements through exogenous factors drive economic growth (Cass, 1965; Solow, 1956). The second strand analyzes how endogenous forces, including investment in human capital and innovation, facilitate sustainable long-term economic growth (Lucas, 1988; Rebelo, 1991; Romer, 1986). The third strand focuses on how institutions create a supportive framework for economic development (Acemoglu et al., 2001; Glaeser et al., 2004; North, 1991). One of those fundamental institutional characteristics concerns whether the nature of the state is democratic or autocratic (Stiglitz, 2019). The existing empirical literature, however, is divided and inconclusive regarding the relationship between the nature of the political system and economic growth,¹ especially in studies analyzing African countries (Cooper, 2019).

Following the end of the Cold War, a wave of democratization spread across francophone Africa (Haggard & Kaufman, 2016). While many observers hoped that the emergence of multiparty democratic systems in Africa would foster economic and social development (Helliwell, 1994), others have emphasized that the newly established democratic governments faced the chronic legacy of poor legal systems, the absence of accountability and control mechanisms constraining actions of governments, which, among other factors, created a weak institutional framework (Sachs, 2005). Weak institutions could, in turn, be exploited by democratically elected leaders for personal reasons, which would impede economic growth (Menocal et al., 2010). It is, however, challenging to estimate the impact of democratization without establishing the counterfactual scenario. A widely deployed approach in the literature on political economics is the synthetic control method developed by Abadie and Gardeazabal (2003) and Abadie et al. (2010). In this method, the effect of an intervention on a unit is compared to a synthetically constructed control group consisting of similar units that were not exposed to the intervention.

This paper deploys the synthetic control method with the aim of investigating the impact of democratization on the economic development of Benin. Benin serves as an interesting case study for three reasons. First, the democratic diffusion in francophone Africa in the 1990s started in and spread from Benin (Igue, 2000). The democratization in Benin also inspired democratic movements in several non-francophone African countries (Gisselquist, 2008). Second, the democratization in many francophone African countries was short-lived and interrupted by a series of coup d'états and the re-establishment of autocratic regimes, but Benin is an exception (Meredith,

¹ For a comprehensive review, see Ghardallou and Sridi, (2020).

2021). The ethnically diverse Benin has continued to be a thriving democracy since democratization began in 1990 (Houngnikpo & Decalo, 2012).² Therefore, the analysis of Benin allows investigation of not only short-term but also middle- and long-term effects of democratization. Third, the existing literature is unsettled regarding the contributions of democratization to economic development in Benin. While some researchers have shown that democratization facilitated the creation of supportive institutions and the adoption of pro-growth policies (Dissou, 2002) others argue that the positive impact of democratization is overestimated since autocratic countries with similar characteristics as Benin also experienced a period of economic growth (Igue, 2000). Through the use of a counterfactual scenario, the synthetic control method helps to identify whether democratization impacted growth.

The results show that the real GDP per capita rose significantly more quickly under democracy than it would have under autocratic rule, as illustrated by the outcome for the synthetic Benin. Furthermore, the observed difference between the actual and synthetic Benin is substantial. There is, however, little evidence that Benin's reduced infant mortality and improved human capital and life expectancy exceed the progress in the synthetic control. These results are robust to three sensitivity checks: in-time, in-place, and leave-one-out analysis. In summary, Benin experienced higher real GDP per capita but did not experience any significant improvements in terms of human capital, life expectancy, and infant mortality as compared to the synthetic group following democratization.

While this study investigates whether democratization affected the economy of Benin, it does not provide a causal explanation for exactly how democratization affected the economy. The results can be explained by the importance of institutions. As discussed in Section 3 and 6, democratization began with the adoption of a new constitution that allowed the creation of a multiparty democratic system and limited the executive decree of the government, which reduced the misappropriation of public funds intended for economic growth and attracted foreign direct investments into the country. Overall, democratization in Benin drastically changed the institutional framework.

This paper contributes to the existing literature in two dimensions. First, it is the first empirical study, to the best of my knowledge, investigating quantitatively the impact of democratization on the economic development of Benin. While cross-disciplinary studies have qualitatively analyzed the impact of democratization on the economy of Benin (see, for instance, Bierschenk [2009], Houngnikpo & Decalo [2012], and Keho [2015]), the existing literature does

² Between 1965 and 1989, Benin received an average Polity score of approximately -7. Following democratization in 1990, the Polity score increased from -7 to +6 in 1991 and later to +7 in 2006. The Polity score illustrates the degree of a regime's authority on a scale from -10 (hereditary dictatorship) to +10 (flourishing democracy) (Marshall et al., 2016).

not provide a comprehensive quantitative analysis on the effect of democratization. Second, the existing literature is divided and inconclusive with respect to the relationship between democracy and economic development (Ghardallou & Sridi, 2020). By analyzing the case of Benin, this paper presents an additional case study that demonstrates a positive relationship between democracy and real GDP per capita in an emerging market economy.

The rest of the paper is organized as follows. Section 2 summarizes the existing literature on the impact of democracy on economic development and growth. Section 3 provides background on the democratization process in Benin. Section 4 describes the synthetic control method and explains the choice of control countries and covariate variables. Section 5 provides the main results and robustness checks on the four outcome variables: real GDP per capita, human capital, life expectancy, and infant mortality. Section 6 provides a discussion about the results, and Section 7 concludes.

2. Literature Review

The existing literature is divided and inconclusive regarding the relationship between democracy and economic growth (Ghardallou & Sridi, 2020). By deploying a cross-section of dozens of countries between 1960 and 1990, Barro (1996) argues that the establishment of free-market policies and low government expenditure, among other factors, are more detrimental to economic development than a democratic system. Those results are conducted through an instrumental variable approach in which instruments include the five-year value of log GDP and life expectancy. The outcome variable is the growth rate of real GDP per capita. While the regression coefficient of democracy is negative and not statistically significant from zero, Barro (1996) argues that the relationship between democracy and growth is nonlinear, meaning that a low amount of democracy contributes to economic growth, but a moderate level of democracy can reduce growth.

By applying United Nations Industrial Development Organization data for 180 economies from 1963 to 2003, Aghion et al. (2008) analyze the impact of democratization on economic growth through productivity changes in different industries. Aghion et al. (2008) find that the impact of democratization on productivity growth varies significantly across sectors. For instance, democratic institutions combined with political rights foster productivity growth in more technologically advanced industries but not in technologically inferior sectors. According to Aghion et al. (2008), barriers to entry tend to be lower in democracies than in autocracies because political accountability reduces the ability and willingness of policymakers to protect large industries. This is growth-inducing in technically advanced industries since a low degree of barriers to entry increases competition, which in turn fosters innovation. Due to a large share of industries close to the technological frontier, developed economies benefit more from democratic institutions than emerging market economies.

Using a difference-in-difference estimation and data on 140 countries over the period between 1960 and 2000, Giavazzi and Tabellini (2005) analyze the relationship between economic liberalization and democratization, taking into consideration time-invariant unobservable heterogeneity across countries. On average, Giavazzi and Tabellini (2005) find a positive relationship between democratization and economic growth. However, countries that adopt economic liberalization before becoming democracies have, on average, higher growth than those that do so after. Since democratization increases economic growth and average income, Persson and Tabellini (2009) find that it also boosts investment returns. Papaioannou and Siourounis (2008) deploy an event study approach to analyze the impact of democratization on growth for over 60 countries that experienced a democratic transition during the so-called third wave of democratization. During the first two years of the democratic transition, economic growth is often

low and, in certain cases, even negative. In the third year, however, growth increases to a permanently higher level.

The theoretical evaluation of the effects of democracy is also not unequivocal. Knutsen (2011) argues that a democratic system fosters a framework for the efficient enforcement of property rights due to institutional constraints and control mechanisms, including the participation of various parties in the election system, the existence of a constitution and the separation of power. Those boundaries tend to become stronger when a democracy matures, which in turn, reduces corruption (Rock, 2009). Claims for redistribution within democratic systems, however, can lead to a deterioration of property rights and therefore impede growth (Przeworski & Limongi, 1993). For instance, if the majority of the constituency is poor, democratically elected politicians may be incentivized to redistribute the income of the more affluent minority with the aim to shape the electorate in their favour (Acemoglu & Robinson, 2000). Those policies can impair the structure of property rights (Ghardallou & Sridi, 2020) and weaken the incentives for investments, which impedes economic growth (Glaeser & Shleifer, 2005).

The aforementioned inconclusive results are observed in studies not only on property rights but also on political stability, human capital accumulation and technological innovation.³ Democratic systems tend to be associated with political stability due to transparent and robust rules and control mechanisms for succession, while autocratic regimes tend to deploy extrajudicial and destabilizing approaches to maintain power (Siegle et al., 2004). Furthermore, the powers and limits of democratically elected policymakers are enshrined in a constitution, which represents a legal framework (Weber, 1922). Those constraints, in turn, are associated with a high degree of predictability and stability in the economic policy and regulatory environment (Ghardallou & Sridi, 2020). However, politicians seeking re-election might be incentivized to orchestrate economic booms in election years, followed by economic contractions, leading to “political business cycles” and economic instability (Alesina et al., 1997).

McGuire and Olson (1996) aim to explain why economic performance varies across autocratic countries through the application of the stationary bandit model of government, in which an autocratic government maximizes its consumption subject to the likelihood of staying in power. For example, an autocratic regime is incentivized to foster economic development if it anticipates staying in power because economic growth can increase the private consumption of regime members through higher tax revenues. Persson and Tabellini (2008) estimate the impact of autocracy on growth and find a negative relationship. 4 out of 18 autocratic transitions they examine experienced positive economic growth. However, this growth was marginal. Similarly,

³ For a comprehensive review, see Ghardallou and Sridi, (2020).

Minier (1998) finds that countries experiencing autocratic transitions have lower growth than countries that stay democratic. Nannicini and Ricciuti (2010) apply the synthetic control method to analyze 14 cases of autocratic transitions, including the military coup d'état in South Korea in 1961 and the adoption of martial law in 1972 in the Philippines, which initiated the dictatorship of Ferdinand Marcos. The authors find that the impact of the transition from democracy to autocracy on economic growth is inconclusive and varies across countries. For instance, the autocratic transition positively influenced economic growth in South Korea, Panama, and Uruguay but negatively in some African countries (e.g., Gambia, Nigeria, and Uganda).

3. From Autocracy to Democracy

Following its independence from France in 1960, the Republic of Dahomey experienced a short-lived period of multiparty democratic rule (Decalo, 1997). The newly established democracy was interrupted by numerous coup d'états and military dictatorships. On October 26, 1972, military forces led by Major Mathieu Kérékou successfully overthrew the government and established a military dictatorship (Kneib, 2001). In the following year, Kérékou renamed the country from the Republic of Dahomey to the People's Republic of Benin and installed a Marxist-Leninist political and economic system in which the People's Revolutionary Party of Benin became the only legitimate party (Houngnikpo & Decalo, 2012). The election for the parliament, the National Revolutionary Assembly, was held in 1979. However, only members of the ruling party could participate (Dissou, 2002), while members of the opposition were imprisoned without trials (Gisselquist, 2008).

Similarly to other Marxist-Leninist countries in Africa, the government of Benin borrowed ideas from the Soviet economic model (Gazibo, 2005). By deploying a newly created revolutionary guard, the government nationalized critical industries in the economy, installed cooperatives in the countryside, and established campaigns to eradicate tribalism and ethnic diversity (Pryor, 1992). The economic development program based on central planning resulted in a short-lived positive economic performance, partly due to significant misallocation of resources, extensive mismanagement, and widespread corruption (Heilbrunn, 1997; Kneib, 2007).

In terms of social infrastructure, the military government made primary school compulsory in 1975 and expanded the construction of primary and secondary schools around the country (Deschênes & Hotte, 2019). Combined with other educational campaigns and reforms, school enrollment increased for both boys and girls between 1977 and 1990, which in turn contributed to higher human capital (Igue, 2000). Education was considered a national priority, and political motives largely drove the expansion of and investments in the educational sector (Comhaire & Mrsic-Garac, 2007). Biao (2021) argues that the curriculum was designed to embrace the Beninese cultural identity and indoctrinate students into the Marxist-Leninist ideology while making them reject French culture and ideological values. The rise in the education levels of the citizens resulted in spillover effects on other areas of society, including health-related outcomes. For example, education raised awareness of sanitary precautions, contributing to a higher life expectancy (Dissou, 2002). In addition, women with higher levels of education started more actively seeking medical care, were more aware of sanitary precautions, and were more able to recognize severe child health conditions, contributing to lower infant mortality (Capo-chichi & Juarez, 2001). The key driver for the reduction in infant mortality and improvement in other health-related outcomes like life

expectancy can be traced back to substantial public investments in the healthcare sector. During the Marxist-Leninist years, the government of Benin fostered close ties with the USSR (Ginsburgs & Slusser, 1981). Through those relations, Benin received external aid from the USSR, which was partially used to finance the healthcare sector that was almost nonexistent in 1972 (Deschênes & Hotte, 2019). As a result, the healthcare sector expanded between 1972 and 1990, contributing to lower infant mortality and a higher life expectancy (Waal, 2015).

In the mid-1980s, the government faced difficulties providing salaries to civil servants, and the chronic budget deficit accelerated the accumulation of external debt (IMF, 2000). Furthermore, the Commercial Bank of Benin, which was the largest retail bank in the country, faced solvency and liquidity issues, and the state apparatus was paralyzed due to the absence of adequate financing; the agriculture sector, which was the primary contributor to the economic growth, was disorganized due to the government's policies (IMF, 1996). On the verge of a debt crisis in 1987, Benin received financing from the IMF with the condition of adopting structural reforms and fiscal consolidation measures, including wage-tax hikes and public servant wage freezes (Horton, 2010).

Kérékou declared the abandonment of the Marxist-Leninist state ideology and the closure of the central committee of the People's Revolutionary Party of Benin in 1989 (Mensah, 2011). With the fall of communism in Eastern Europe and internal pressures, Kérékou stepped down as leader of Benin in 1990 (Houngnikpo & Decalo, 2012). In the same year, the government established the National Conference, a conference forum that consisted of members from various political movements (Gisselquist, 2008). The participants of the National Conference wrote the new constitution and created a democratic election process; at the same time, a new provisional government was established in 1990, which paved the way for a multiparty democratic rule (Decalo, 1997). The name of the country was changed from the People's Republic of Benin to the Republic of Benin. A presidential election was held in 1991, in which opposition candidate Nicéphore Soglo defeated Kérékou (Kneib, 2001).

Under the democratic government, most state-owned enterprises were privatized, while government subsidies to existing public enterprises were significantly reduced (IMF, 1996). The government also abolished the monopoly status enjoyed by state-owned enterprises (IMF, 2000). The establishment of new business laws and labor and investment codes inspired by French law supported the emergence of the private sector (IMF, 1996). According to Igue (2000), the creation of new political institutions fostered foreign direct investments in the country. Democratization involved efficient enforcement of property rights as a result of institutional constraints and control mechanisms, including the participation of various parties in the election system and the existence of the separation of powers (Mensah, 2011). The transparent and robust rules also contributed to

higher political stability and predictability in the economic policy and regulatory environment, which attracted foreign direct investments into Benin and contributed to economic growth (Dissou, 2002). The autocratic regimes disincentivized foreign investments due to their history of nationalizing enterprises and land in the countryside to create agricultural collectives (Kneib, 2001).

While the democratically elected government continued to pursue fiscal consolidation measures to balance the budget and repay debt, funds that were previously used to finance inefficient projects and personal expenses of the members of the autocratic regimes were now reallocated to finance public goods, including repairs and expansion of the infrastructure system (IMF, 2000). Besides the policies and changes in the political framework enacted during the democratic system, the economy of Benin benefited from the devaluation of its legal tender, the West African CFA, in January 1994 and the creation of the West African Economic and Monetary Union (WAEMU) in 1994, which is a customs union and currency union (Igue, 2000).

Following democratization, the flow of external aid from the USSR abruptly stopped as a result of the USSR's dissolution (Dissou, 2002). Since a substantial fraction of the external aid was allocated to healthcare, the democratically elected government feared that the lack of financing would result in declining health-related outcomes. Benin, however, began receiving aid from France, United States Agency for Internal Development (USAID), and World Bank (Kohnert & Preuss, 1992). In addition, several countries withdrew demands for sovereign debt payments and agreed on a debt moratorium (Igue, 2000). Through those actions, the trends in the allocation of funding to the healthcare sector continued as before democratization (Dissou, 2002). According to Meredith (2021), some sub-Saharan countries that stayed autocratic also started receiving funding from Western financial institutions following the dissolution of the USSR. In terms of education, the democratically elected government made some adjustments to the main curriculum; but there were no significant changes in the trends in enrollment numbers, literacy outcomes, and the average years of schooling, as compared to the period under autocratic rule (Igue, 2000).

4. Creating the Synthetic Control

4.1. The Methodology

The synthetic control method, introduced by Abadie and Gardeazabal (2003) and later extended by Abadie et al. (2010), is applied to analyze the impact of democratization on the economy of Benin. The method applies a weighted average of comparison units to create a synthetic control that is used to approximate relevant characteristics of the units exposed to the treatment. In this study, the synthetic control method provides an estimate of a counterfactual scenario in which Benin did not experience a regime change from autocracy to democracy.

To summarize the methodology, the database consists of $J + 1$ countries in years $t = 1, 2, \dots, T$. Benin is denoted as $j = 1$ and is not exposed to the intervention (i.e., democratization) during $1, 2, \dots, T_0$ but is affected by the intervention from $T_0 + 1, T_0 + 2, \dots, T$. Countries $j = 2, 3, \dots, J + 1$, which have similar pre-democratization characteristics as Benin, are not exposed to the intervention during the entire time period $t = 1, 2, \dots, T$. The year of intervention is 1990. Y_{jt}^N denotes the outcome of country j in the absence of democratization. Y_{jt}^I is the outcome of country j if exposed to democratization in periods $T_0 + 1, \dots, T$. Hence, Y_{jt}^N equals Y_{jt}^I for each j for $t = 1, \dots, T_0$. Y_{jt}^N , however, is not observed for country $j = 1$ following the beginning of democratization and has to be estimated by using a weighted average combination of countries not exposed to democratization.

The synthetic control can be illustrated through a vector $(J \times 1)$ consisting of weights $W = (w_2, \dots, w_{j+1})'$, in which each weight has to satisfy the following two conditions: (i) $0 \leq w_j \leq 1$ for $j = 2, \dots, J + 1$, and (ii) $w_2 + \dots + w_{j+1} = 1$. \hat{Y}_{1t}^N denotes the aforementioned weighted average of the countries in the donor pool and represents the generated synthetic control unit. The weights W are chosen to closely resemble key attributes between Benin and the synthetic control. K_1 stands for a vector $(k \times 1)$ of pre-democratization attributes of Benin, while K_0 denotes a $(k \times j)$ matrix for the same attributes but for the donor pool.⁴ The weights that minimize the gap between pre-democratization attributes of Benin and the synthetic control ($\min \|K_1 - K_0 W\|$) subject to the aforementioned constraints imposed on w_j generate the vector W^* , which according to Abadie et al. (2015) is chosen through:

$$\sum_{m=1}^q v_m (K_{1m} - K_{0m} W)^2$$

⁴ Please see Abadie et al. (2010) for a detailed explanation for how weights are calculated.

where v_m is the weight that denotes the relative significance that is assigned to the m -th variable when calculating the difference between K_1 and K_0W . V is chosen in a way to weigh the covariates corresponding to the predictive ability on the outcome variables. The value of W^* will match W for the aforementioned minimization exercise, given that V diagonal equals (v_1, \dots, v_k) . The formula for the \hat{Y}_{1t}^N is given by:

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} w_j^* Y_{jt}$$

As argued by Abadie et al. (2010), an appropriate estimation of the counterfactual outcome Y_{jt}^N occurs when the treated unit characteristics K_1 closely resemble synthetic control characteristics in the pre-treatment period, making $\hat{Y}_{1t}^N - Y_{jt}^N \approx 0$. In the post-intervention period, the effect of the treatment is estimated by taking the gap between the realized outcome and the synthetic control:

$$Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}$$

4.2. Robustness Checks and Inference

To test the claim that the performance of Benin was driven by democratization, it is necessary to perform robustness tests. The in-time placebo tests are performed to investigate whether the difference between the performances of Benin and the synthetic group are influenced by any pre-democratization trends. In the in-time placebo test, the start of democratization is hypothetically moved from 1990 to 1983, which is chosen since it is the middle of the pre-democratization period, between 1975 and 1990. Since democratization is hypothetically assigned to 1983 as a placebo, it should have no influence on the synthetic Benin.

While an in-time test helps to analyze the sensitivity of the obtained results across time periods, it does not provide any information about the statistical significance of the estimated influence of the treatment effect. For that reason, an in-space permutation analysis is also performed. This placebo test involves applying the synthetic control estimator to units not exposed to democratization. This cross-country comparison helps to identify whether the impact in Benin was relatively large. Since democratization occurred solely in Benin, the impact of democratization should be non-existent across nations in the donor pool.

The results obtained from the in-place test can be expressed in p -values. In this study, p -value displays an estimated probability to find a treatment effect that is equal to or larger than the estimated treatment effect on Benin. Following the approach of Abadie (2021), the calculation of the p -value can be expressed as:

$$\frac{1}{J+1} \sum_{j=1}^{J+1} I_+(r_j - r_1)$$

where r_j and r_1 denote root mean squared predication error (RMSPE) under democratization divided by pre-democratization RMSPE of control units and Benin, respectively, while I_+ represents an indicator function which equals one for non-negative values and zero otherwise.

The proposed method by Abadie (2021), however, generates high values when the donor pool consists of a relatively small group of control units. Since the donor pool comprises ten countries (detailed in Section 4.3), the lowest possible p -value is given by $1/(10 + 1) \approx 0.09$. Hence, the results cannot be statistically significant at the 5% and 1% level due to the strict exclusion restriction. The p -value would be lower if more countries were included in the selected donor pool. To complement the method of Abadie (2021), this paper deploys the period-specific calculation of a two-sided p -value proposed by Galiani and Quistorff (2017). For each outcome variable, I analyse a two-sided p -value by comparing the gap between actual and synthetic Benin in each period to the distribution of the gap in the corresponding in-space placebos. Following the definition of Galiani and Quistorff (2017), the estimated influence on Benin (unit $j = 1$) in period t is defined as \hat{a}_{1t} . The results from the aforementioned permutation analysis provide information on the distribution on each in-space placebo. This distribution of in-space placebos can be formulated as $\hat{a}_{jt}^{PL} = \{\hat{a}_{jt}^{PL} : j \neq 1\}$. The following equation expresses the two-sided p -value:

$$\Pr(|\hat{a}_{1t}^{PL}| \geq |\hat{a}_{1t}|) = \frac{\sum_{j \neq 1} 1(|\hat{a}_{1t}^{PL}| \geq |\hat{a}_{1t}|)}{J}$$

which is the expression for randomization inference. Even if the treatment did not occur randomly, the p -value can provide an interpretation of the ratios of countries in the donor pool with an estimated treatment impact equal or larger to Benin's. The aforementioned \hat{a}_{jt}^{PL} are adjusted by dividing them with the respective pre-democratization RMSPE. As argued by Galiani and Quistorff (2017), the division by RMSPE standardizes p -value and takes into consideration fluctuations in the goodness of fit of the synthetic control.

In addition to the two aforementioned robustness checks, the leave-one-out test, which analyses whether the results are highly influenced by a single unit in the synthetic control, is also performed. For instance, the exclusion of a country might substantially decrease the difference between actual and synthetic Benin. The approach is especially relevant when a single unit is assigned a high weight in the creation of the synthetic control. The test is performed by iteratively

excluding each country in the donor pool that got assigned a positive weight and reperforming the synthetic control analysis.⁵

4.3. The Donor Pool

Two critical aspects of the creation of synthetic control are the assignment of weights and the choice of countries in the donor pool. In this paper, weights are chosen to minimize the differences between the actual and synthetic Benin in the pre-democratization period. Two restrictions are imposed on the assignment of the weights. First, each weight is non-negative. Second, the sum of all weights equals one.

As emphasized by Abadie and Gardeazabal (2003), the effectiveness of the synthetic control method stands on the choice of units in the donor pool. To avoid any potential interpolation biases, Abadie et al. (2021) state that units in the donor pool should be restricted to units that share similar attributes as the treated unit. An adequate starting point is the inclusion of sub-Saharan countries in the donor pool due to the geographic location, economic and institutional characteristics, and historical legacies similar to Benin. However, the data available for outcome and covariate variables is limited for some sub-Saharan countries. As a result, Cape Verde, Comoros, and Djibouti, among other countries, are excluded from the donor pool. It is also imperative to exclude countries exposed to the intervention (Abadie, 2021), which in this paper is democratization. For this reason, the donor pool consists only of countries that remained autocratic between 1975 and 2000, as identified by Geddes et al. (2014).

Certain other countries are excluded from the donor pool due to economic dissimilarity to Benin. For example, according to estimates by Feenstra et al. (2015), the real GDP per capita in Benin was more than two times lower in 1975 than in Equatorial Guinea. Hence, Equatorial Guinea is excluded from the donor pool. In addition, the economy of Benin between 1975 and 2000 depended on the sector providing soft commodities, including subsistence agriculture, cotton, textiles, and cocoa beans (Bradbury, 2018). In order to control for fluctuating prices of soft commodities, countries whose economies depended on other sectors are excluded from the donor pool. For instance, the economies of Angola and Nigeria were dependent on exports of hard commodities, including oil and gas (Forrest, 1992; Martin, 2018). Due to economic dissimilarity, Angola and Nigeria, among other countries, are excluded from the donor pool. Economic similarity also includes the population size, the currency used, a certain degree of public finance and sovereign debt issues, and close association with the WAEMU, a customs union and currency union. Table

⁵ Appendix A performs additional robustness checks.

1 displays sub-Saharan countries included in the donor pool. For a full explanation of why some sub-Saharan countries are excluded from the donor pool, please see Appendix B.

Table 1. Baseline donor pool

Burkina Faso	Gambia
Cameroon	Guinea
Chad	Guinea-Bissau
Côte d'Ivoire	Mauritania
Gabon	Togo

Besides the aforementioned factors, it is also crucial to exclude countries from the donor pool that have experienced substantial idiosyncratic shocks that could bias the obtained results (Abadie, 2021). Of the ten countries in table 1, some might have experienced idiosyncratic shocks. For instance, Burkina Faso, Chad, and Ivory Coast experienced coup d'états when one form of autocratic regime was replaced by another (Geddes et al., 2014). However, Acemoglu and Robinson (2012) and Persson and Tabellini (2002) argue that transitions from one form of the autocratic regime to another should not be treated as an idiosyncratic shock but rather as an inherent occurrence in and common characteristic of autocratic systems. Another idiosyncratic shock can be captured through militant insurgency. For instance, Guinea and Guinea-Bissau experienced militant insurgency (Waal, 2015). The occurrence of those insurgencies, however, did span the time period from 1975 to 2000, and therefore, they can be treated as fixed effects instead of idiosyncratic shocks in this study.

The start of the democratization is assigned to 1990 since it was during that year that the participants of the National Conference wrote the new constitution and created a democratic election process (Gisselquist, 2008). A provisional government was also established in 1990, which paved the way for a democratic election in 1991 (Decalo, 1997). Democratization, however, might have affected the outcome variable before its official implementation in 1990 due to the anticipation effect. For instance, households and firms might have anticipated an official transition from autocracy to democracy in 1989 when the leader of the autocratic government, Kérékou, announced the abandonment of the Marxist-Leninist state ideology. According to Mensah (2011), the transition to democracy was not anticipated before 1990. The start of the pre-democratization period is assigned to 1975. Although the military dictatorship seized power in Benin in 1972, this paper chooses 1975 as the start of the pre-democratization period because data for Benin is not available from 1972 to 1974.

4.4. Variables

This subsection presents the selection of variables used in this paper. Regarding outcome variables, economic activity is measured in real GDP per capita (constant 2017 national prices, USD) and divided by population size. The data on real GDP per capita and population size is obtained from Feenstra et al. (2015). Average income, however, is not the sole dimension one should analyze when evaluating the impact of democratization. The democratically elected government might not focus on per-capita income but instead prioritize improvements in social variables, including human capital, life expectancy at birth and infant mortality per 1 000 live births. Hence, real GDP per capita is complemented with three additional outcome variables: human capital, life expectancy and infant mortality. Human capital is measured through the human capital index, which is constructed by Feenstra et al. (2015) through the combination of the average years of schooling by gathered by Barro and Lee (2013) and the rate of return on education based on the Mincer equation of Psacharopoulos (1994). Data on life expectancy at birth and infant mortality is taken from the World Bank (2013).

The choice of relevant covariates is imperative since this paper deploys a predictive model where weights assigned to countries in the construction of the synthetic control are chosen based on covariates (Abadie, 2019). The set of covariates includes economic growth, development and institutional variables applied to capture the similarities of Benin with the donor pool. Covariates are categorized into three groups: (i) pre-democratization outcome variable dynamics, (ii) economic and population characteristics and (iii) institutional factors and legal history. Following the approach of Doudchenko and Imbens (2016), Ferman et al. (2020) and Gilchrist et al. (2022), the set of covariates consists of historical values of outcome variables, including one-year lag value and the five-year average value. Lags help to render the issue of omitted variables when the values of outcome variables are heavily determined by their past levels (McClelland & Gault, 2017). Besides improving pre-treatment fitness, the five-year averages ensure that, due to the potential $AR(1)$ process, variation in outcome variables during the pre-democratization period does not absorb the significance of other covariates (Gilchrist et al., 2022).

Economic and population covariates are identified by Feenstra et al. (2015) and Hetson et al. (2011). Institutional covariates consist of PolityII, regime durability and Exconstraint scores (Marshall & Jagger, 2005), while legal origins include common and civil law (LaPorta et al., 2008). PolityII provides index scores based on openness and competition in selecting executives in the governmental branch and is used as an indicator of regime type (Marshall & Jagger, 2005). Regime durability illustrates the number of years since the most recent change in the key regime's characteristics or since the most recent change in regime type (Marshall & Jagger, 2005). EXONST

denotes executive constraints and measures the degree and quality of the bureaucratic and legal system. The data is missing for certain years for some countries (Marshall & Jagger, 2005). I solved this issue through linear interpolation. Table 2 displays the descriptive statistics of variables and provides sources.

Table 2. Descriptive statistics

	Mean	St. Dev	Max	Min	Source
Real GDP per capita	12 428.04	11 962.38	46 869.45	598.72	Penn World Table v.10.01 (Feenstra et al., 2015)
Population (in millions)	7.61	2.58	12.67	0.57	
Investment share (in %)	23.90	13.32	69.48	1.44	
Government share (in %)	13.68	11.46	58.59	2.49	
Human capital index	1.45	0.29	2.31	1.01	
Openness	113.07	200.39	1 059.12	13.81	Penn World Table v7.0 (Hetson et al., 2011)
Life expectancy at birth	53.93	7.03	71.88	40.59	World Development Indicators (The World Bank, 2013)
Infant mortality (per 1 000 live births)	91.45	30.62	180.00	29.00	
PolityII score	-4.80	4.25	8.00	-9.00	Polity IV dataset (Marshall & Jagger, 2005)
Reg. Durability score	15.45	12.77	51.00	0.00	
EXCONST score	-0.48	15.63	5.00	-88.00	
British common law	0.18	0.38	0.00	1.00	LaPorta et al. (2008)
Civil law	0.82	0.38	0.00	1.00	

5. Results

This section illustrates the key results from the generated synthetic control analysis and allows one to observe whether the performance under democratization diverges from the counterfactual scenario. As emphasized in Section 4, real GDP per capita represents a key economic variable, but a democratically elected government might not prioritize per-capita income but instead prioritize improvements in social variables, including human capital, life expectancy at birth, and infant mortality per 1 000 live births. Hence, real GDP per capita is complemented with three additional outcome variables: human capital, life expectancy and infant mortality. Table 3 displays the weights assigned in creating the synthetic controls. Interestingly, the weights vary across the four outcome variables. For instance, the weight assigned to Gabon is substantial in the case of life expectancy and infant mortality but not in the case of real GDP per capita and human capital. As displayed in Table 4, the pre-democratization covariates of the synthetic control groups closely match the values of actual Benin. Table 5 displays the predictor weights assigned to covariate variables and shows that the highest weights are allocated to pre-democratization outcome variable dynamics.

Table 3. Estimated donor country weights for each outcome variable

	Outcome variables			
	Real GDP Per Capita	Hum. Cap.	Life Exp.	Infant Mort.
Burkina Faso	0.32	0.29	0.18	0.22
Cameroon	0.13	0.11	0.08	0.13
Chad	0.00	-	0.02	0.00
Côte d'Ivoire	0.21	0.49	0.37	0.27
Gabon	0.10	0.09	0.25	0.33
Gambia	0.07	0.02	0.02	0.00
Guinea	0.05	-	0.08	0.06
Guinea-Bissau	0.00	-	0.00	-
Mauritania	0.00	0.00	0.00	0.00
Togo	0.13	0.00	0.00	0.00

Note: Rounding errors may prevent weights from summing to 1. The analysis of human capital excludes Chad, Guinea and Guinea-Bissau due to the limited data availability. The analysis of infant mortality excludes Guinea-Bissau due to the limited data availability.

Table 4. Indicators

Variables	Benin	Synthetic Control			
		Real GDP Per Capita	Human Capital	Life Expectancy	Infant Mortality
<i>RMSPE</i>		50.4617	0.0055	0.16680	0.2277
<i>A. Real GDP Per Capita</i>					
GDP Per Capita in 1975	1 234.33	1 234.68	-	-	-
5y. GDP Per Capita (1975-79)	1 255.70	1 280.89	-	-	-
5y. GDP Per Capita (1980-84)	1 450.32	1 450.93	-	-	-
5y. GDP Per Capita (1985-89)	1 499.19	1 483.22	-	-	-
GDP Per Capita (<i>t</i> -1)	1 368.13	1 323.73	-	-	-
<i>B. Human Capital Index</i>					
HCI in 1975	1.09	-	1.07	-	-
5y HCI (1975-79)	1.09	-	1.08	-	-
5y HCI (1980-84)	1.12	-	1.12	-	-
5y. HCI (1985-89)	1.19	-	1.19	-	-
HCI (<i>t</i> -1)	1.18	-	1.18	-	-
<i>C. Life Expectancy at birth (in years)</i>					
Life Exp. in 1975	44.68	-	-	45.06	-
5y. Life Exp. (1975-79)	46.50	-	-	46.40	-
5y. Life Exp. (1980-84)	48.82	-	-	48.86	-
5y. Life Exp. (1985-89)	51.62	-	-	51.60	-
Life Exp. (<i>t</i> -1)	48.32	-	-	48.93	-
<i>D. Infant Mortality (per 1 000 live births)</i>					
Infant Mort. in 1975	139.90	-	-	-	139.81
5y. Infant Mort. (1975-79)	132.50	-	-	-	132.49
5y. Infant Mort. (1980-84)	121.60	-	-	-	121.00
5y. Infant Mort. (1985-89)	110.90	-	-	-	110.45
Infant Mort. (<i>t</i> -1)	118.50	-	-	-	116.75
<i>i. Economic and Population Covariates</i>					
Openness in 1980	63.09	68.62	63.43	103.49	261.51
Openness in 1985	53.82	53.01	61.96	70.29	257.72
Investment Share in 1980 (%)	31.95	23.73	57.38	31.95	36.16
Investment Share in 1985 (%)	21.95	20.88	48.12	24.60	30.09
Government Share in 1980 (%)	8.36	9.29	17.32	13.47	13.84
Government Share in 1980 (%)	8.28	9.24	21.51	11.86	15.07
Log population size	15.19	16.43	16.27	15.98	15.29
Population growth rate (%)	2.641	7.10	1.68	1.93	3.66
<i>ii. Institutional Covariates</i>					
PolityII score in 1980	-7.00	-6.95	-6.98	-8.00	-8.57
PolityII score in 1985	-7.00	-7.15	-6.98	-6.97	-8.12
Durable score in 1980 (in years)	8.00	17.66	8.75	19.39	9.07
Durable score in 1985 (in years)	13.00	22.58	13.75	24.39	14.07
Exconstraints score in 1980	1.00	1.18	1.50	1.67	1.00
Exconstraints score in 1985	1.00	2.09	1.50	1.95	1.33
Civil law	1.00	1.00	1.00	1.00	1.00

Note: Table presents the values of covariate variables for the actual and synthetic Benin. Investment and government share is a fraction of GDP.

Table 5. Predictor weights

	Real GDP Per Capita	Human Capital	Life Expectancy	Infant Mortality
<i>A. Real GDP Per Capita</i>				
GDP Per Capita in 1975	0.14	-	-	-
5y. GDP Per Capita (1975-79)	0.15	-	-	-
5y. GDP Per Capita (1980-84)	0.18	-	-	-
5y. GDP Per Capita (1985-89)	0.21	-	-	-
GDP Per Capita ($t-1$).	0.18	-	-	-
<i>B. Human Capital Index</i>				
HCI in 1975	-	0.16	-	-
5y HCI (1975-79)	-	0.15	-	-
5y HCI (1980-84)	-	0.18	-	-
5y. HCI (1985-89)	-	0.22	-	-
HCI ($t-1$)	-	0.19	-	-
<i>C. Life Expectancy (in years)</i>				
Life Exp. in 1975	-	-	0.15	-
5y. Life Exp. (1975-79)	-	-	0.16	-
5y. Life Exp. (1980-84)	-	-	0.19	-
5y. Life Exp. (1985-89)	-	-	0.21	-
Life Exp. ($t-1$)	-	-	0.20	-
<i>D. Infant Mortality (per 1 000 live births)</i>				
Infant Mort. in 1975	-	-	-	0.13
5y. Infant Mort. (1975-79)	-	-	-	0.21
5y. Infant Mort. (1980-84)	-	-	-	0.20
5y. Infant Mort. (1985-89)	-	-	-	0.20
Infant Mort. ($t-1$)	-	-	-	0.16
<i>i. Economic and Population Covariates</i>				
Openness in 1980	0.01	0.02	0.00	0.00
Openness in 1985	0.01	0.01	0.00	0.00
Investment Share in 1980 (%)	0.01	0.00	0.00	0.00
Investment Share in 1985 (%)	0.00	0.00	0.03	0.00
Government Share in 1980 (%)	0.01	0.00	0.00	0.00
Government Share in 1980 (%)	0.00	0.00	0.00	0.00
Log population size	0.01	0.00	0.02	0.02
Population growth rate (%)	0.00	0.01	0.00	0.00
<i>ii. Institutional Covariates</i>				
PolityII score in 1980	0.02	0.01	0.00	0.01
PolityII score in 1985	0.02	0.01	0.02	0.01
Durable score in 1980 (in years)	0.00	0.01	0.00	0.01
Durable score in 1985 (in years)	0.00	0.01	0.00	0.01
Exconstraints score in 1980	0.02	0.00	0.00	0.01
Exconstraints score in 1985	0.00	0.00	0.00	0.01
Civil law	0.02	0.02	0.02	0.02

Note: Rounding errors may prevent weights from summing to 1.

5.1. Real GDP Per Capita

Figure 1 depicts the actual and synthetic Benin both over the pre-democratization period and under democratization. Overall, synthetic Benin tracks actual Benin closely in the pre-democratization period, with some short-term deviations. When the democratization began in 1990, the gap between the actual and synthetic Benin diverges, and continues to increase in the following years.



Figure 1. Real GDP per capita. *Note:* The solid line illustrates income per capita in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dashed line designates the year democratization began.

To test the claim that the performance of Benin is driven by democratization, it is necessary to perform robustness tests. Figure 2 displays the results of the in-time placebo test and shows that the result is not influenced by the hypothetical change in the treatment year since the trend before democratization in 1990 remains similar as in the main specification and noticeably diverges only after 1990. Furthermore, the value of the covariates in the placebo analysis remains similar to the values in the main results.

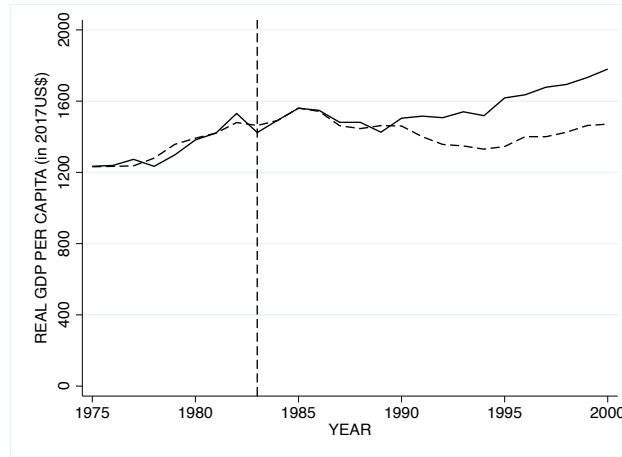


Figure 2. Real GDP per capita. In-time placebo analysis *Note:* The solid line illustrates income per capita in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year hypothetical democratization began.

While an in-time test helps to analyze the sensitivity of the obtained results across time periods, it does not provide any information about the statistical significance of the estimated influence of the treatment effect. For that reason, an in-space permutation analysis is performed. Figure 3 shows that results of the in-space test, which provides evidence that the gap in real GDP per capita between Benin and the synthetic Benin is far above the range observed in other sub-Saharan countries that did not experience democratization. Those results suggest that the increase in real GDP per capita did not occur by chance.

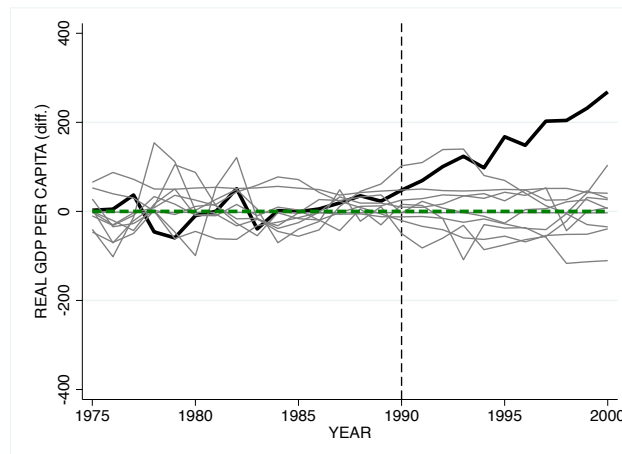


Figure 3. Real GDP per capita. In-space placebo analysis. *Note:* The solid black line illustrates the difference between income per capita in Benin and the synthetic control. The gray lines illustrate the difference between income per capita in a country in the donor pool and the synthetic control. The dashed green line designates the synthetic control which is normalized to zero. The vertical dotted line designates the year democratization began.

As discussed in Section 4.2, results obtained from the in-space test can be used to express p -values through the comparison of post- and pre-treatment RMSPE (i.e., dividing post-treatment RMSPE with pre-treatment RMSPE). Figure 4 displays the results and clearly shows that Benin has the highest ratio. On average, the real GDP per capita gap between the actual and synthetic Benin is about five times larger following democratization than before. The nation with the second-highest ratio is Gambia, whose ratio is less than half of Benin's. Those results enable calculations of p -values proposed by Abadie et al. (2021), which in this case yields a p -value equal to $1/11 \approx 0.09$. Hence, the obtained results are statistically significant at a 10% level, the highest possible value given the size of the donor pool.

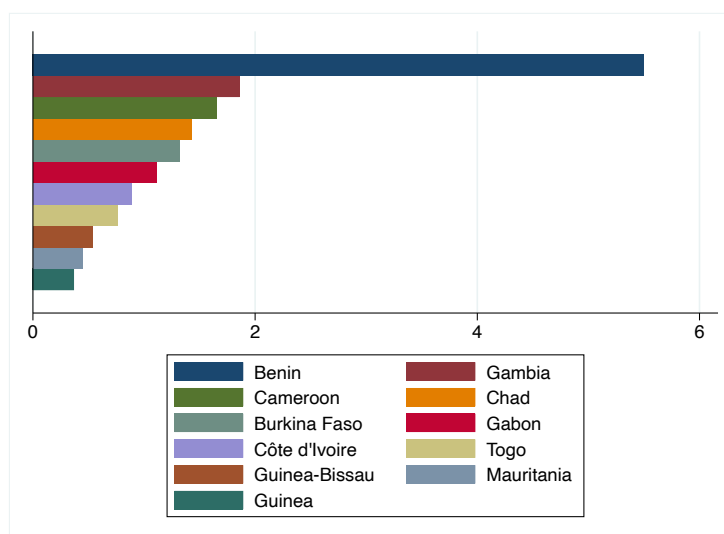


Figure 4. The RMSPE Ratio: Democratization Divided by Pre-Democratization RMSPE

The inference is complemented with a two-sided standardized p -value of Galiani and Quistorff (2017). Table 6 displays the values for the real GDP per capita of Benin, effect size and the corresponding standardized p -values. For 1990 and 1991, the results are not statistically significant at the 5% level. For the following year, however, the results are significant at the 5% level, and the results for the rest of the years are significant at the 1% level. Both inference tests indicate that the increase in real GDP per capita did not occur by chance.

Table 6. Impact size and two-sided p -values

Year	Benin	Effect Size	p -values
1990	1 504.11	47.68	0.07
1991	1 515.61	69.18	0.06
1992	1 507.09	100.65	0.03
1993	1 540.17	123.73	0.00
1994	1 518.37	97.93	0.00
1995	1 618.03	167.59	0.00
1996	1 635.85	148.42	0.00
1997	1 678.07	202.63	0.00
1998	1 693.68	204.24	0.00
1999	1 732.25	231.81	0.00
2000	1 779.81	268.38	0.00

In addition to the in-time and in-space robustness checks, the leave-one-out test is performed, and the results are displayed in Figure 5. The test shows that treatment effects are similar to the main specification. Hence, it appears that the results are not driven by a single country. Those three tests show that the main results on real GDP per capita are not sensitive to robustness checks.

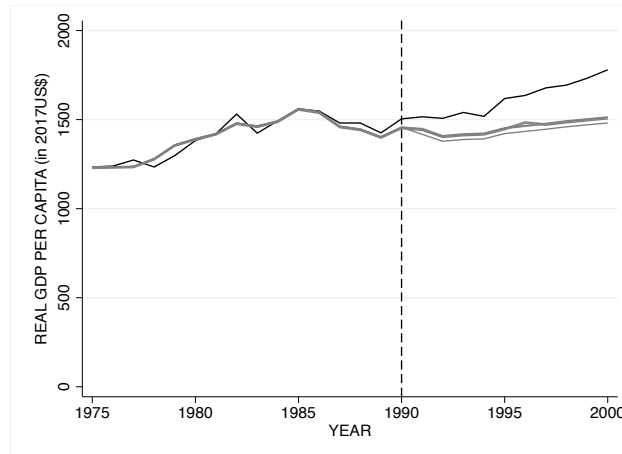


Figure 5. Real GDP per capita. Leave-one-out test. *Note:* The solid line illustrates income per capita in Benin; the gray lines illustrate the performance of synthetic controls. The vertical dotted line designates the year democratization began.

5.2. Human Capital Index

Real GDP per capita is not the sole factor one can analyze when evaluating the impact of democratization. The democratically elected government might not prioritize per-capita income and overall economic growth but instead focus on improvements in social outcomes, including human capital, life expectancy and infant mortality. The rest of this section addresses each of those categories, starting with human capital, which is measured through the human capital index. Figure 6 illustrates that the synthetic control captures well the pre-democratization trend and that following democratization, there was no discernible difference between the actual and synthetic Benin. Figure 7 displays the results from the in-time test, showing no substantial outcome gap between 1975 and 2000.

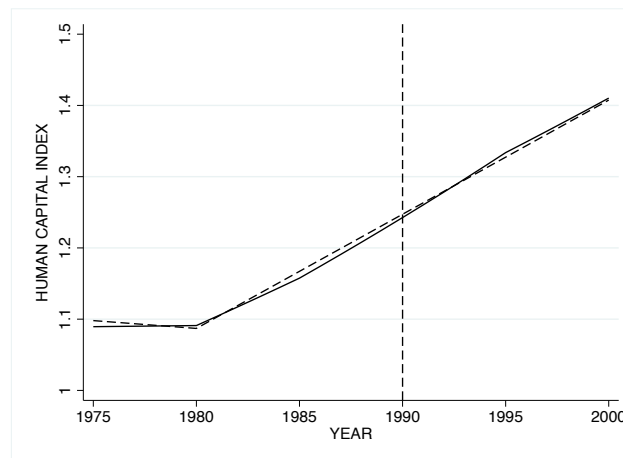


Figure 6. Human capital index. *Note:* The solid line illustrates human capital index in Benin; the dashed line illustrates the synthetic control. The vertical dotted line designates the year democratization began.

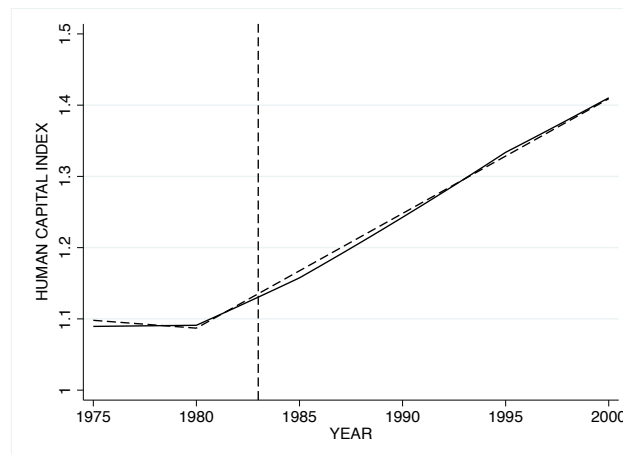


Figure 7. Human capital index. In-time placebo analysis. *Note:* The solid line illustrates human capital index in Benin; the dashed line illustrates the synthetic control. The vertical dotted line designates the year hypothetical democratization began.

Figure 8 shows the results obtained from the in-space test, which provides evidence that the gap in human capital between Benin and the synthetic control is within the range observed in other sub-Saharan nations that did not experience democratization. The results from comparing RMSPE ratios are presented in Figure 9 and give a p -value of $6/8 = 0.75$. Hence, the results are not statistically significant at the 10% level. In a similar vein, the p -values, calculated using the approach of Galiani and Quistorff (2017), also provide statistically insignificant results (see Table 7).

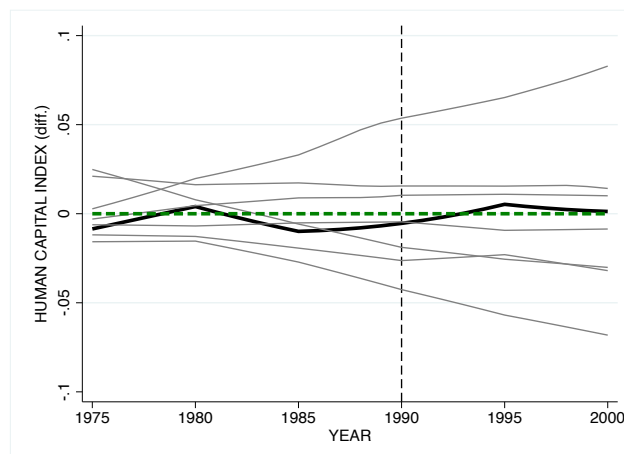


Figure 8. Human capital index. In-space placebo analysis. *Note:* The solid black line illustrates the difference between human capital index in Benin and the synthetic control. The gray lines illustrate the difference between human capital index in a country in the donor pool and the synthetic control. The dashed green line designates the synthetic control which is normalized to zero. The vertical dotted line designates the year democratization began.

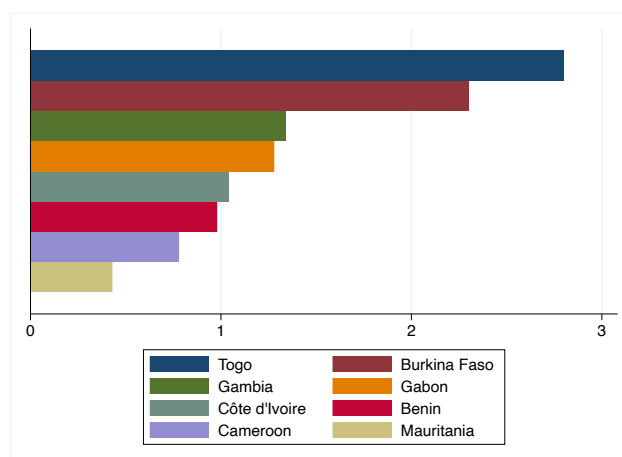


Figure 9. The RMSPE Ratio: Democratization Divided by Pre-Democratization RMSPE

Table 7. Impact size and two-sided p -values

Year	Benin	Effect Size	p -values
1990	1.2426	- 0.0009	0.64
1991	1.2603	0.0012	0.62
1992	1.2783	0.0035	0.57
1993	1.2965	0.0061	0.53
1994	1.3150	0.0089	0.59
1995	1.3338	0.0120	0.61
1996	1.3487	0.0113	0.63
1997	1.3639	0.0108	0.60
1998	1.3792	0.0105	0.64
1999	1.3946	0.0103	0.65
2000	1.4103	0.0103	0.71

The leave-one-out analysis also supports the results that there is no significant difference between Benin and the synthetic control in terms of the performance of the human capital (see Figure 10). It appears that the results are not driven by a single country.

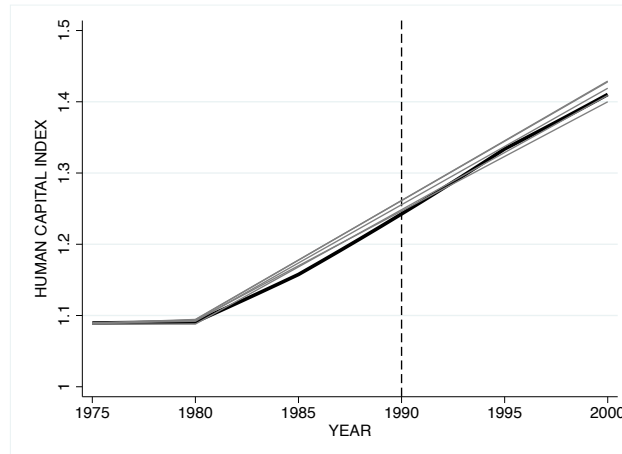


Figure 10. Human capital index. Leave-one-out test. *Note:* The solid line illustrates human capital index in Benin; the gray lines illustrate synthetic controls. The vertical dotted line designates the year democratization began.

5.3. Life Expectancy

The following results cover the life expectancy at the date of birth. Figure 11 shows life expectancy in Benin and in the synthetic control. There is no noticeable difference in life expectancy between the actual and synthetic Benin between 1975 and 2000. When performing the in-time placebo analysis (see Figure 12), the results are similar to the main specification.

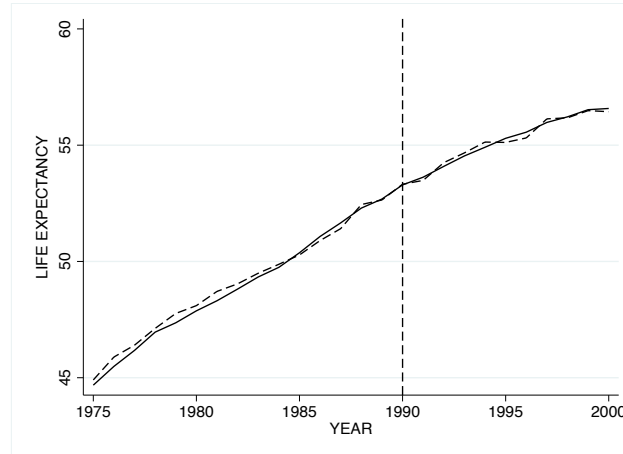


Figure 11. Life expectancy. *Note:* The solid line represents life expectancy in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year democratization began.

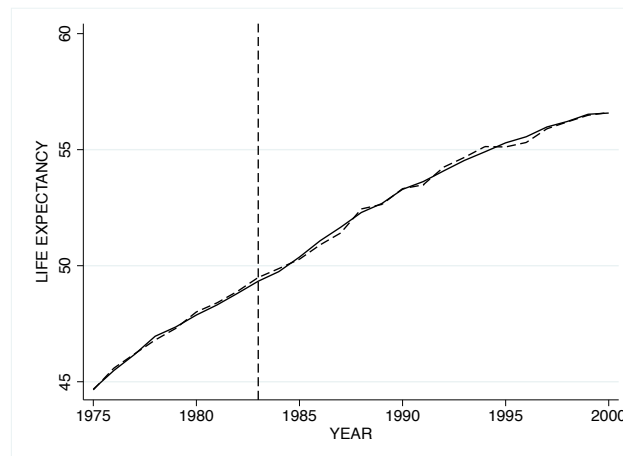


Figure 12. Life expectancy. In-time placebo analysis. *Note:* The solid line illustrates life expectancy in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year hypothetical democratization began.

The results from the in-space permutation test are displayed in Figure 13 and show that the gap in life expectancy between Benin and the synthetic control is within the range observed in other sub-Saharan nations that did not experience democratization. The likelihood of finding an effect larger on life expectancy than that of Benin is shown by the p -value, which displays a value of $10/11 \approx 0.91$. The high values of the p -value indicate that following the start of democratization in 1990, the probability of finding an effect larger than that of Benin is about 91%. Hence, changes in life expectancy might not be related to democratization. Those results are complemented by the standardized p -values obtained through the technique of Galiani and Quistorff (2017), which show similar results (see Table 8).

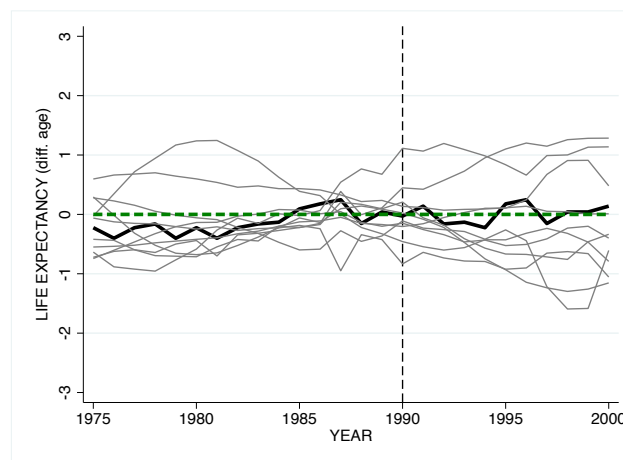


Figure 13. Life expectancy. In-space placebo analysis. *Note:* The solid black line illustrates the difference between life expectancy in Benin and the synthetic control. The gray lines illustrate the difference between life expectancy in a country in the donor pool and the synthetic control. The dashed green line designates the synthetic control which is normalized to zero. The vertical dotted line designates the year democratization began.

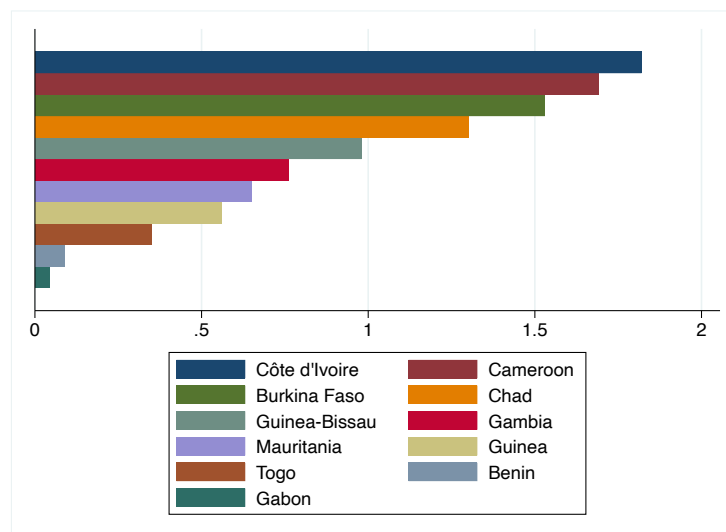


Figure 14. The RMSPE Ratio: Democratization Divided by Pre-Democratization RMSPE

Table 8. Impact size and two-sided p -values

Year	Benin	Effect Size	p -values
1990	53.29	- 0.028	0.745
1991	53.62	0.139	0.784
1992	54.09	- 0.16	0.823
1993	54.54	- 0.13	0.843
1994	54.91	- 0.22	0.832
1995	55.30	0.18	0.854
1996	55.56	0.25	0.831
1997	55.98	- 0.15	0.867
1998	56.22	0.04	0.891
1999	56.53	0.04	0.901
2000	56.58	0.14	0.921

The leave-one-out analysis also supports the results that there is no significant difference between Benin and synthetic control in terms of life expectancy (see Figure 15). It appears that the results are not driven by a single country.

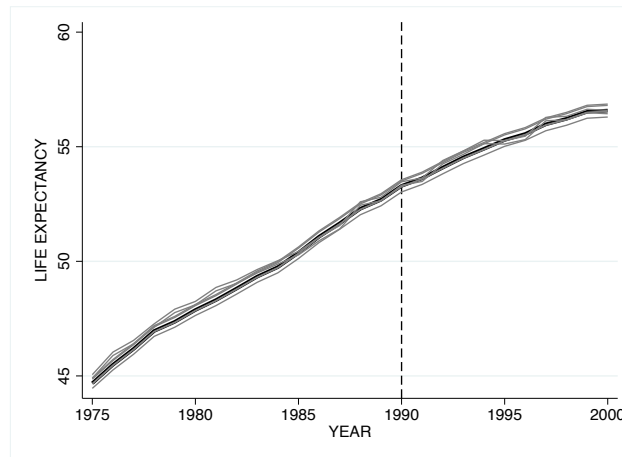


Figure 15. Life expectancy. In-time placebo analysis. *Note:* The solid line illustrates life expectancy in Benin; the gray lines illustrate the performance of the synthetic control. The vertical dotted line designates the year democratization began.

5.4. Infant Mortality

Having considered real GDP per capita, human capital and life expectancy, the following analysis deploys the synthetic control approach to investigate trends in infant mortality. Figure 16 shows that the synthetic control captures well the trend of infant mortality in Benin before democratization in 1990. There is no discernible difference between the actual and synthetic Benin following 1990. Results from the in-time test are displayed in Figure 17 and support main findings.

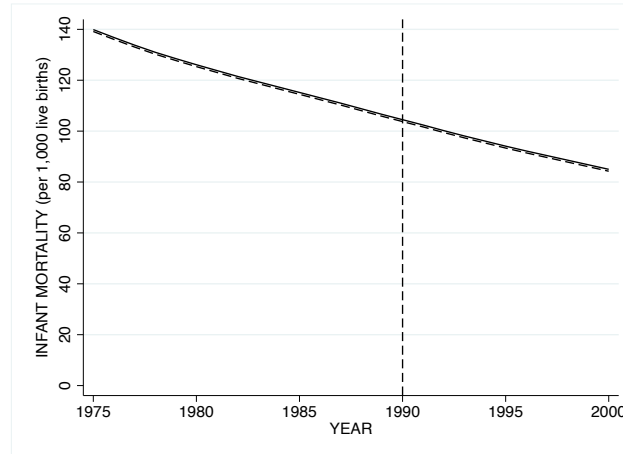


Figure 16. Infant mortality, per 1 000 live births. *Note:* The solid line illustrates infant mortality in Benin, 1975-2000; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year democratization began.

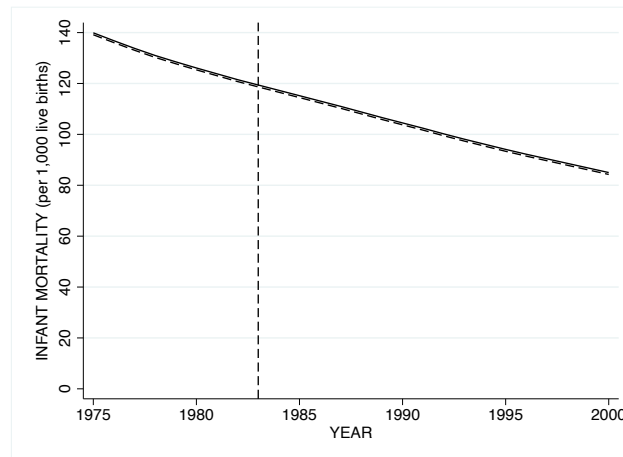


Figure 17. Infant mortality, per 1 000 live births. In-time placebo analysis. *Note:* The solid line illustrates infant mortality in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year hypothetical democratization began.

The results from the in-space permutation test are displayed in Figure 18 and show that the gap in infant mortality between Benin and the synthetic control is within the range observed in other sub-Saharan nations that did not experience democratization. The high values of the p -value, which equals $9/10 = 0.90$, indicate that following the start of democratization in 1990, the probability of finding an effect larger than that of Benin is about 90%. Therefore, the change in infant mortality might not be related to democratization. The standardized p -values obtained through the technique of Galiani and Quistorff (2017) also show similar results (see Table 9).

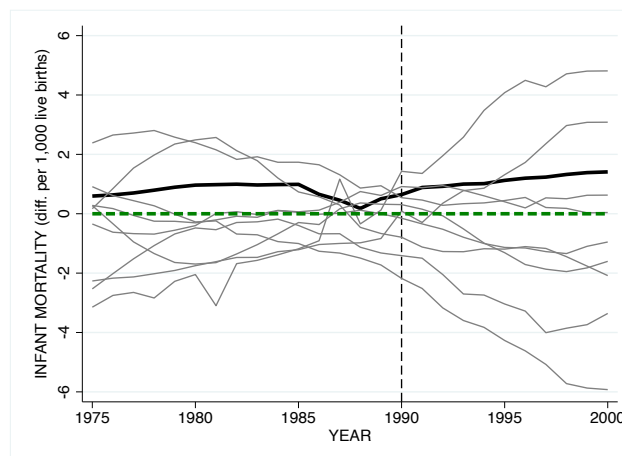


Figure 18. Infant mortality, per 1 000 live births. *Note:* The solid black line illustrates the difference between infant mortality in Benin and the synthetic control. The gray lines illustrate the difference between infant mortality in a country in the donor pool and the synthetic control. The dashed green line designates the synthetic control which is normalized to zero. The vertical dotted line designates the year democratization began.

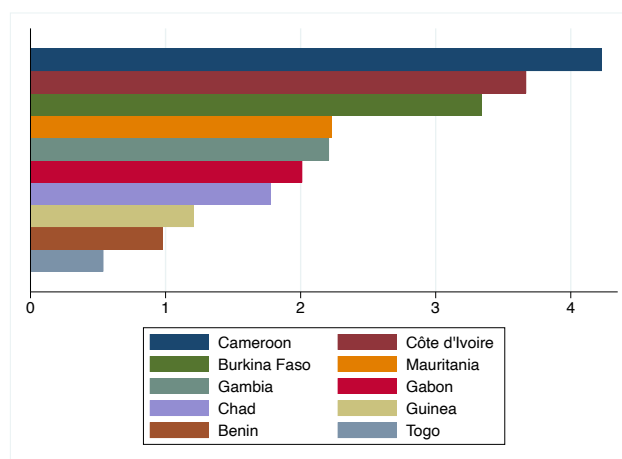


Figure 19. The RMSPE Ratio: Democratization Divided by Pre-Democratization RMSPE

Table 9. Impact size and two-sided p -values

Year	Benin	Effect Size	p -values
1990	104.50	0.85	0.56
1991	102.40	0.87	0.58
1992	100.20	0.98	0.61
1993	98.10	1.02	0.64
1994	96.10	1.08	0.64
1995	94.10	1.19	0.67
1996	92.20	1.25	0.69
1997	90.40	1.39	0.70
1998	88.60	1.43	0.72
1999	86.80	1.50	0.71
2000	85.00	1.69	0.70

The leave-one-out test analysis also supports the results that there is no significant difference between Benin and the synthetic control in terms of the trends in infant mortality (see Figure 20). It appears that the results are not driven by a single country.

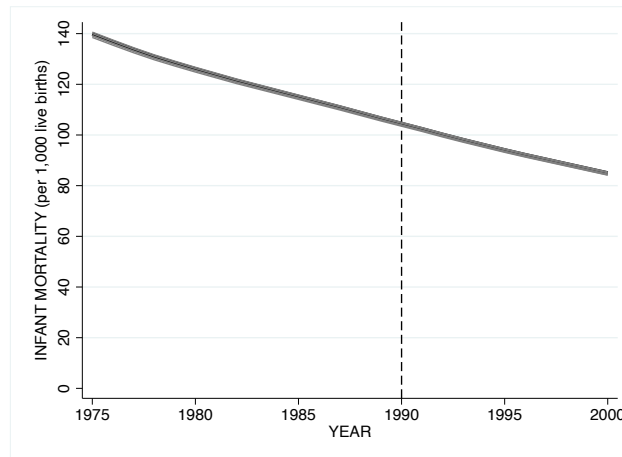


Figure 20. Infant mortality, per 1 000 live births. Leave-one-out test. *Note:* The solid line illustrates infant mortality in Benin; the gray lines illustrate the performance of the synthetic control. The vertical dotted line designates the year democratization began.

6. Discussion

The analysis in the previous section provided robust results that the real GDP per capita rose significantly more quickly under democracy than it would have under autocratic rule, as illustrated by the outcome for the synthetic Benin. Sensitivity checks displayed that the main results are robust to three sensitivity checks: in-place, in-time, and leave-one-out tests. There is, however, little evidence that reduced infant mortality and increased life expectancy and human capital go beyond the progress in synthetic control.

It is critical to emphasize that the method used in this paper illustrates the change in outcome values following an intervention, but it does not display a causal relationship. In this case, the results do not automatically prove that democratization contributed to an increase in real GDP per capita. Hence, the quantitative analysis in Section 5 should be complemented with a qualitative explanation. For instance, the increase in real GDP per capita could be explained by the inflow of foreign direct investments. Capital inflows in the form of foreign direct investments increased substantially following the democratization of Benin in 1990, which, in turn, contributed to increased productivity and economic growth (Igue, 2000). The democratic system created a framework for the efficient enforcement of property rights due to institutional constraints and control mechanisms, including the participation of various parties in the election system, the separation of power, and the existence of a constitution (Mensah, 2011). The transparent and robust rules also contributed to higher political stability and predictability in the economic policy and regulatory environment, which attracted foreign direct investment (Dissou, 2002). The autocratic regimes, however, disincentivized foreign investments due to their histories of nationalizing enterprises and land in the countryside to create agricultural collectives (Bradbury, 2018).

Another explanation for the growth is the fact that the democratically elected government was accountable to its electorate, in contrast to the autocratic regime. Due to the election process and other accountability mechanisms, the democratically elected government used public finances to invest in public goods (Bradbury, 2018). The autocratic regime, however, had expropriated a significant portion of public finances for personal gains (Houngnikpo & Decalo, 2012). There are other arguments for why the economy improved, including the establishment of new business laws and the emergence of the private sector (Mensah, 2011), and those factors should be studied in further detail through further research. While democratization contributed to an increase in real GDP per capita, the results do not support democracy as a cause of the increases in life expectancy and human capital and the reduction in infant mortality. As discussed in Section 2, there were no substantial changes regarding education and health policy. For instance, Benin continued receiving

external aid to finance the healthcare sector, although from different donor countries (Kohnert & Preub, 1992). In terms of education, the democratically elected government made some adjustments to the main curriculum; but there were no significant changes in the trends in enrollment numbers, literacy outcomes, and the average years of schooling compared to the period under autocratic rule (Igue, 2000).

A threat to internal validity is the existence of potential confounders. For instance, the 1994 devaluation of the West African CFA franc – the legal tender in Benin – strengthened the international competitiveness of Benin's exports, which, in turn, fostered economic growth (IMF, 1996). Therefore, the impact of devaluation can overestimate the actual effect of democratization on the real GDP per capita. It is, however, unlikely since several countries in the donor pool, including Burkina Faso and Côte d'Ivoire, also used the West African CFA franc as a legal tender (Meredith, 2021). Since currency devaluation influenced both the treated unit and the synthetic control, the effect of this confounding factor is reduced. Another issue is that democratization in Benin occurred in parallel with structural adjustment programs and substantial external budgetary support from international financial institutions like the IMF, which potentially contributed to economic growth. As a result, one can argue that structural reforms and financial support, rather than the democratic process, lifted the economy of Benin. However, other countries in the donor pool, including Gambia and Côte d'Ivoire, experienced similar debt repayment issues and received similar economic reform prescriptions and funding as Benin (Dissou, 2002).

As mentioned in Section 1, ethnically diverse Benin has been a continuously thriving democracy since 1990, while democratization in many other francophone African countries has been short-lived and interrupted by a series of coup d'états and the re-establishment of autocratic regimes (Meredith, 2021). Hence, Benin represents an outlier. The reason for Benin's long-lasting democratic system can be explained by country-specific characteristics not discussed in this study, and the existence of those factors can represent a confounder effect. Another potential issue is the impact of spillover effects of Benin's democratization on other countries in the donor pool. For instance, an increase in the economic activity in Benin could have contributed positively to the economic growth of neighboring countries that are included in the donor pool, thus underestimating the impact of democratization on economic development. Appendix A includes the results of additional robustness checks, in which the largest trading partners of Benin are excluded from the donor pool. The tests show that the impact on real GDP per capita is robust to the exclusion of neighboring countries.

The results of this study show that democratization in Benin contributed to an increase in real GDP per capita but did not improve life expectancy and human capital or decrease infant mortality. The existence of potential confounders, however, threatens internal validity. Regarding external validity, the obtained results should be taken with caution. As emphasized by Persson and Tabellini (2006), it is imperative to consider cross-country heterogeneity when analyzing the impact of democratization on economic activity. Benin might not share the same economic, social, and institutional legacy as other emerging market economies, which might be a reason why its democratic system was not interrupted by coup d'états and the re-establishment of autocratic rule. Nonetheless, this paper provides evidence that democratization can positively affect growth in a sub-Saharan country.

7. Conclusion

Analysing the impact of democratization on various economic and social outcomes is a crucial – and challenging – endeavour. The analysis deploys the synthetic control method to compare outcomes under the democratization in Benin against an estimated counterfactual scenario in the hypothetical absence of democratization. This paper finds that the real GDP per capita rose significantly more quickly under the democratization than it would have under autocratic rule, as illustrated by the outcome for the synthetic Benin. Furthermore, the divergence between the actual and synthetic Benin is substantial. There is, however, little evidence that reduced infant mortality and increased life expectancy and human capital go beyond the progress in the synthetic control. Hence, Benin experienced higher GDP per income, but did not experience any significant improvement in terms of human capital, infant mortality, and life expectancy as a result of democratization.

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Appendix

Appendix A.1 Additional Robustness Checks

In addition to robustness checks performed in Section 5, the aim of this appendix is to perform three additional sensitivity checks on real GDP per capita by: (i) taking natural log of real GDP per capita; (ii) normalizing the value of real GDP per capita; and (iii) eliminating potential spillover effects. Table 10 and 11 illustrate the weights assigned to each country in the creation of the synthetic control and the value of covariates, respectively. Table 12 displays the predictor weights assigned to covariate variables and shows that the highest weights are allocated to pre-democratization outcome variables.

Table 10. Estimated donor country weights for each outcome variable

Scenario	Outcome variables		
	Natural Log of Real GDP Per Capita	Norm. Real GDP Per Capita	Real GDP Per Capita
Burkina Faso	0.34	0.28	-
Cameroon	0.16	0.19	0.24
Chad	0.02	0.03	0.05
Côte d'Ivoire	0.24	0.19	0.29
Gabon	0.08	0.06	0.20
Gambia	0.03	0.12	0.03
Guinea	0.02	0.08	0.15
Guinea-Bissau	0.00	0.01	0.00
Mauritania	0.00	0.00	0.04
Togo	0.10	0.04	-

Note: Rounding errors may prevents predictor weights from summing to 1.

Table 11. Indicators

Variables	Actual Benin	Synthetic Benin		
		Log Real GDP Per Capita	Normalized GDP Per Capita	Real GDP Per Capita
<i>RMSPE</i>		0.0443	0.0525	84.54
<i>A. Log Real GDP Per Capita</i>				
Log GDP Per Capita in 1975	7.12	7.13	-	-
5y. Log GDP Per Capita (1975-79)	7.14	7.17	-	-
5y. Log GDP Per Capita (1980-84)	7.28	7.29	-	-
5y. Log GDP Per Capita (1985-89)	7.31	7.28	-	-
Log GDP Per Capita ($t-1$).	7.24	7.24	-	-
<i>B. Norm. Real GDP Per Capita</i>				
Norm. 5y. GDP Per Capita (1975-79)	0.03	-	0.04	-
Norm. 5y. GDP Per Capita (1980-84)	0.18	-	0.17	-
Norm. 5y. GDP Per Capita (1985-89)	0.19	-	0.15	-
Norm. GDP Per Capita ($t-1$).	0.16	-	0.14	-
<i>C. Real GDP Per Capita</i>				
GDP Per Capita in 1975	1 234.33	-	-	1 230.55
5y. GDP Per Capita (1975-79)	1 255.70	-	-	1 250.73
5y. GDP Per Capita (1980-84)	1 450.32	-	-	1 449.41
5y. GDP Per Capita (1985-89)	1 499.19	-	-	1 411.71
GDP Per Capita ($t-1$)	1 421.19	-	-	1 403.12
<i>i. Economic and Population Covariates</i>				
Openness in 1980	63.09	337.28	213.07	83.26
Openness in 1985	53.82	324.94	210.03	47.44
Investment Share in 1980 (%)	31.95	38.34	29.48	27.48
Investment Share in 1985 (%)	21.95	35.76	29.56	24.53
Government Share in 1980 (%)	8.36	14.06	11.67	12.58
Government Share in 1980 (%)	8.28	15.93	12.95	10.81
Log population size	15.19	15.92	15.46	16.19
Population growth rate (%)	2.64	1.10	-1.06	3.43
<i>ii. Institutional Covariates</i>				
PolityII score in 1980	-7.00	-7.39	-7.48	-8.73
PolityII score in 1985	-7.00	-7.35	-8.04	-7.42
Durable score in 1980	8.00	11.15	9.53	20.22
Durable score in 1985	13.00	16.07	14.42	25.22
Exconstraints score in 1980	1.00	0.29	-0.07	1.28
Exconstraints score in 1985	1.00	1.10	1.26	1.08
Civil law	1.00	0.97	0.98	1.00

Note: Table presents the values of covariate variables for the actual and synthetic Benin. Investment and government share is a fraction of GDP.

Table 12. Predictor Weights

	Log Real GDP Per Capita	Normalized GDP Per Capita	GDP Per Capita
<i>A. Log Real GDP Per Capita</i>			
Log GDP Per Capita in 1975	0.13	-	-
5y. Log GDP Per Capita (1975-79)	0.14	-	-
5y. Log GDP Per Capita (1980-84)	0.17	-	-
5y. Log GDP Per Capita (1985-89)	0.15	-	-
Log GDP Per Capita (t-1).	0.18	-	-
<i>B. Norm. Real GDP Per Capita</i>			
Norm. 5y. GDP Per Capita (1975-79)	-	0.18	-
Norm. 5y. GDP Per Capita (1980-84)	-	0.16	-
Norm. 5y. GDP Per Capita (1985-89)	-	0.19	-
Norm. GDP Per Capita (t-1).	-	0.21	-
<i>C. Real GDP Per Capita</i>			
GDP Per Capita in 1975	-	-	0.09
5y. GDP Per Capita (1975-79)	-	-	0.14
5y. GDP Per Capita (1980-84)	-	-	0.17
5y. GDP Per Capita (1985-89)	-	-	0.18
GDP Per Capita (t-1)	-	-	0.16
<i>i. Economic and Population Covariates</i>			
Openness in 1980	0.01	0.01	0.02
Openness in 1985	0.01	0.01	0.02
Investment Share in 1980 (%)	0.01	0.01	0.01
Investment Share in 1985 (%)	0.01	0.01	0.01
Government Share in 1980 (%)	0.01	0.01	0.01
Government Share in 1980 (%)	0.01	0.01	0.01
Log population size	0.04	0.04	0.04
Population growth rate (%)	0.00	0.00	0.00
<i>ii. Institutional Covariates</i>			
PolityII score in 1980	0.03	0.03	0.03
PolityII score in 1985	0.03	0.02	0.03
Durable score in 1980	0.01	0.01	0.01
Durable score in 1985	0.01	0.03	0.01
Exconstraints score in 1980	0.02	0.02	0.02
Exconstraints score in 1985	0.01	0.01	0.02
Civil law	0.02	0.02	0.02

Rounding errors may prevents predictor weights from summing to 1.

Appendix A.2 Log of GDP Per Capita

An alternative measure of real GDP per capita is the use of natural logarithm. The results are presented in Figure 21 and are consistent with the main findings in Section 5.



Figure 21. Real GDP per capita (natural log). *Note:* The solid line illustrates income per capita in Benin; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year democratization began.

Appendix A.3 Normalization of Real GDP Per Capita

An additional robustness checks is performed by normalizing the value of real GDP per capita. Following the approach of Grier and Maynard (2016), the normalized value is obtained by dividing real GDP per capita for each year between 1975 and 2000 by the real GDP per capita in 1975 and later taking the natural logarithm of this value. As a results, the initial value of the outcome variable is normalized to zero across all countries. The results are presented in Figure 22 and are consistent with the main findings in Section 5.

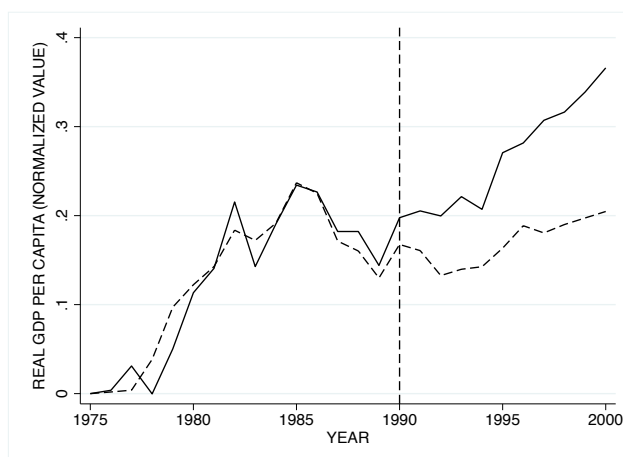


Figure 22. Normalized real GDP per capita (natural log). *Note:* The solid line illustrates income per capita in Benin, 1975-2000; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year democratization began.

Appendix A.4 Spillover Effects

An increase in the economic activity in Benin could have contributed positively to the economic growth of neighboring countries that are included in the donor pool, thus underestimating the impact of democratization on economic growth. To eliminate potential spillover effects, the baseline model for real GDP per capita excludes largest trading partners of Benin in the donor pool. As identified by Kneib (2001), the largest partners of Benin between 1970s and 1990s were Burkina Faso and Togo. The exclusion of Burkina Faso and Togo has no significant impact on the results (see Figure 23).

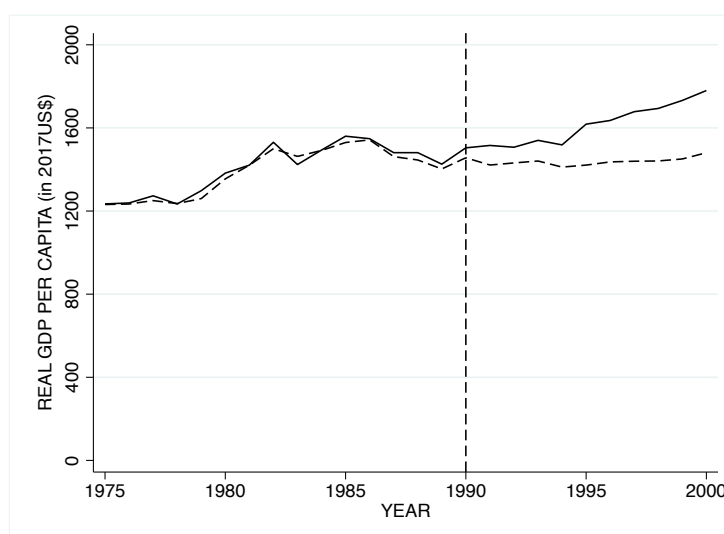


Figure 23. Real GDP per capita. *Note:* The solid line illustrates income per capita in Benin, 1975-2000; the dashed line illustrates the performance of the synthetic control. The vertical dotted line designates the year democratization began.

Appendix B. Rationale for Exclusion of Countries from the Donor Pool

Table 13. Baseline donor pool

Country	Donor Pool	Exclusion Reason
Angola	No	Economic Dissimilarity
Botswana	No	Economic Dissimilarity
Burkina Faso	Yes	
Burundi	No	Democratic Transition (1994-1996)
Cameroon	Yes	
Cape Verde	No	Availability of Data
Central Africa Republic	No	Democratic Transition (1994-2003)
Chad	Yes	
Comoros	No	Availability of Data
Côte d'Ivoire	Yes	
Dem. Rep. of Congo	No	Economic Dissimilarity
Djibouti	No	Availability of Data
Equatorial Guinea	No	Economic Dissimilarity
Eritrea	No	Idiosyncratic Shocks: Independence from Ethiopia in 1993
Eswatini	No	Economic Dissimilarity
Ethiopia	No	Idiosyncratic Shocks, incl. independence of Eritrea in 1993
Gabon	Yes	
Gambia	Yes	
Ghana	No	Democratic Transition (1980-1981)
Guinea	Yes	
Guinea-Bissau	Yes	
Kenya	No	Economic Dissimilarity
Lesotho	No	Democratic Transition (1994-onward)
Liberia	No	Idiosyncratic Shocks: Internal Conflicts
Madagascar	No	Democratic Transition (1994-2009)
Malawi	No	Democratic Transition (1994-onward)
Mali	No	Democratic Transition (1993-onward)
Mauritania	Yes	
Mauritius	No	Democratic Transition (1969-onwards)
Mozambique	No	Economic Dissimilarity
Namibia	No	Economic Dissimilarity
Niger	No	Democratic Transition (1994-1996)
Nigeria	No	Economic Dissimilarity
Republic of Congo	No	Democratic Transition (1993-1997)
Rwanda	No	Economic Dissimilarity
Sao Tome and Principe	No	Availability of Data
Senegal	No	Economic Dissimilarity
Seychelles	No	Availability of Data
Sierra Leone	No	Democratic Transition (1997 & 1999)
Somalia	No	Economic Dissimilarity
South Africa	No	Democratic Transition (1995-onward)
Sudan	No	Democratic Transition (1987-1989)
Tanzania	No	Economic Dissimilarity
Togo	Yes	
Uganda	No	Economic Dissimilarity
Zambia	No	Democratic Transition (1992-1996)
Zimbabwe	No	Economic Dissimilarity