

# Can democratic transition lead to more foreign aid inflow? A synthetic control method analysis of Senegal, 1985–2018

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This paper is concerned with the question of whether democratic transition causes more foreign aid inflow to recipient countries. By focusing on Sub-Saharan Africa, a novel econometrics method, the synthetic control method (SCM) developed by Abadie et al. (2010), is applied to assess the causal effect of a “treatment”, i.e., democratization. The treatment unit is Senegal, which underwent democratization in 2000 and has since been a stable democracy; the untreated units are five other Sub-Saharan countries. The results indicate that democratization resulted in the “treated” country, that is, Senegal receiving significantly more foreign aid than it would have received if it had remained an autocracy, a finding that is robust to various robustness checks. Converting the detected extra foreign aid into an extra growth rate indicates a substantial (3.217 percentage points) additional growth rate for Senegal, *ceteris paribus*. However, the results should be interpreted with great caution, as they may not be generalizable and applicable to all cases; that is, general policy implications cannot be drawn based on a single case.

**Keywords:**

foreign aid,  
democratic transition,  
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## Introduction

From the perspective of economic development, one could “divide” the world into two parts, the “North” and the “South”. While the North is associated with wealth, a high standard of living and an overall better quality of life, the South suffers from serious poverty and the violation of human and property rights, among others. Reducing poverty has been on the world’s “to-do list” for a very long time, and this issue remains unresolved to date.

One of the “tools” to reduce poverty could be to give struggling countries foreign aid to promote economic development. Aid to developing countries is primarily provided by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD). The DAC clearly determines

what should be considered foreign aid: the specific term they introduced is Official Development Assistance (ODA), which is defined by the DAC as governmental aid, the primary goal of which is to promote economic development and welfare enhancement in developing countries.<sup>1</sup>

The empirical literature on the question of whether foreign aid can help developing countries escape abject poverty has provided us with some evidence that more aid leads to higher growth rates, at least when some favorable conditions are present in the recipient country and/or if income per capita in the recipient country is below a certain threshold level (see literature review).

In parallel with this line of research, the question of what factors influence donor countries in providing more foreign aid has also been investigated. In regression analyses, democracy has been found to be one of the affecting factors. A paper that stands out is by Alesina–Dollar (2000), who studied the relationship between democracy as measured by the democracy index of the Freedom House (on a scale of 1–7) and changes in foreign aid inflow. Their results suggest that *ceteris paribus*, a country that is more democratic receives more foreign aid; more precisely, one standard deviation of the democracy index leads to a 39 percentage-point increase in foreign aid.

The aim of my paper is to dig deeper into the relationship between democracy and foreign aid. My hypothesis is that democratic donor countries<sup>2</sup> are “sensitive” to the level of democracy in the sense that what truly matters for donors is whether a recipient country has transformed into a stable democracy or not: we might expect that democratic donor countries would provide more aid to a country that has transformed into a stable democracy compared to the amount they would have given to this country had it remained an autocracy. Note, however, that a “more democratic” country in the spirit of Alesina–Dollar (2000) can easily, in fact, be a nondemocratic one since democracy is measured on a scale. Therefore, my research question is different from that of the literature, including Alesina–Dollar’s (2000), and is as follows: Does democratic transition cause more foreign aid inflow to a country compared to how much aid this country would have received had it remained an autocracy?

However, an analysis of this issue is justified only if we can demonstrate that aid positively affects growth. Since a recent study by Harb–Hall (2019) using a new, more

<sup>1</sup> Because of data availability, this paper will be concerned only with developmental aid provided by DAC countries. Note, however, that the rationale behind giving foreign aid can be different from promoting development. For instance, looking at the example of one of the biggest foreign aid providers, the United States (US), its foreign aid policy has undergone major changes, as Bortolletto (2010) explains. In the era of the Cold War the most important reason for giving foreign aid was “preventing the spread of communism” (Bortolletto 2010: p. 10). Only since the end of the Cold War has more emphasis been put on humanitarian needs and the encouragement of economic development. Political factors might have motivated foreign aid provided by countries such as the former Soviet Union or China, which will not be considered either, due to the lack of data availability.

<sup>2</sup> Note that DAC donor countries are OECD countries, and accordingly, they all are democratic.

sophisticated model (panel smooth transition regression) has substantiated this positive link for the Least Developed (LDC) and Lower Middle Income Countries (LMIC), my research question can be considered relevant.

To provide an answer to the above research question requires a counterfactual analysis in which I will restrict my focus to the Sub-Saharan African countries for two reasons. First, almost all Sub-Saharan African countries belong to LMICs for which we have convincing evidence that more foreign aid leads to higher growth (see Harb–Hall 2019), which “justifies” an analysis of my research question, namely, whether democratic transition causes more foreign aid. Second, since democratic transitions in the region are very rare and democratic transitions without U-turns are even rarer, this setting makes it possible to estimate a causal effect of a “treatment” (democratic transition) on the treated country (that has transformed into democracy) with the help of some untreated countries (that have remained autocracies). In Sub-Saharan Africa, Senegal is a country that switched to democracy in 2000, and since then, the country has been a stable democracy. However, the other Sub-Saharan countries – with a few exceptions such as Cape Verde from 1991 or Kenya from 2002 – which are very similar to Senegal in many other respects that may influence foreign aid (i.e., income per capita, literacy, mortality rate, primary school enrollment ratio, etc.), have remained autocracies. This setting allows me to take Senegal as a “treated” country and examine whether donors have given more aid to Senegal after the democratic transition compared to the amount of aid they would have given had Senegal remained an autocracy.

Instead of using the difference-in-differences (DID) method, which is still standard in counterfactual analysis, I will apply a recent econometric method developed by Abadie et al. (2010, 2015) and Abadie (2021), namely, the synthetic control method (SCM). The SCM offers some advantages over DID. First, DID analysis should be best applied in cases where we have a substantial number of units that are exposed to the treatment (Arkhangelsky et al. 2021); however, in my concern, we only have one treated unit. Second, and more importantly, the DID method relies on the assumption of parallel trends which cannot be considered a valid assumption for my concern.

The significance of this paper is twofold. My results can serve as evidence for the recent behavior of some of the major donors, such as the US and the European Union (EU), who have gradually become more “attracted” to helping poor countries on the basis of “positive conditionality” (Hackenesch 2019). This behavior basically relies on questioning the effectiveness of foreign aid inflow to poor countries unless democracy is in place in the recipient country. Second, my research can connect the two separate lines of the literature, namely, the one dealing with the factors influencing foreign aid inflow and the one analyzing the impact of foreign aid on economic development since I will use regression analysis to identify factors influencing foreign aid that I will use then in SCM.

The results indicate that democratization resulted in the “treated” country, that is, Senegal receiving significantly more foreign aid than it would have received if it had remained an autocracy, a finding that is robust to various robustness checks. Combining my results with those of Harb–Hall (2019) allows me to convert the detected extra foreign aid into an extra growth rate, which indicates a substantial (3.217 percentage point) additional growth rate, *ceteris paribus*.

The paper is structured in the following way. First, I will summarize the literature on the impact of foreign aid on growth. Then, a presentation of the SCM together with the regression analysis, whose findings serve as inputs for the SCM analysis, will be discussed. Later, I will show and interpret the results of the SCM analysis together with robustness checks. Finally, I conclude the paper.

## Literature review

The literature on the effect of foreign aid on economic growth is relatively rich, reaching its “peak” approximately in the period 1995–2005.<sup>3</sup> The preponderance of empirical investigations on the topic can primarily be attributed to the popularity of growth regressions in economics, an empirical framework that has been applied in the field. The findings of the studies have not been straightforward; far from it, the topic has been at the center of numerous debates among researchers, and it is still being approached by scholars from multiple perspectives.

In what follows, I will give an account of this literature by distinguishing five different perspectives of scholars on how foreign aid affects economic growth. These are the following: (1) foreign aid affects growth positively, (2) the impact of foreign aid on growth is negative (detrimental), (3) the impact is positive but conditional on the quality of governance, (4) foreign aid has no effect on growth, and (5) the effect of aid is positive but exhibits diminishing returns.

Studies that have found an *unconditional* positive effect of foreign aid on economic growth are rather limited in number. Karras (2006) is an important study in this field that relies on a panel of 71 developing countries for the period 1960–1997. The dependent variable is the growth rate of real gross domestic product (GDP) per capita, and the independent variables used are investment as a fraction of GDP, population growth rate, government purchases as a fraction of GDP, log ODA/population and log ODA/GDP. According to his findings, foreign aid has a statistically significant positive effect on economic growth. After conducting robustness checks using different lag lengths and two different dependent variables (aid per capita, aid as a fraction of GDP), the results remained significant. However, Hansen–Tarp (2001) show that when investment and human capital are included in the model, no positive (and

<sup>3</sup> Since then, the foreign aid-economic growth topic has been given less attention for reasons unknown to me. However, recently researchers have studied new areas in relation to foreign aid, such as its link with the complexity of the economy (Kamguia et al. 2022), and with institutional quality and CO<sub>2</sub> emissions (Arvina et al. 2022).

unconditional) effect of aid is found. Consequently, due to the sensitivity of the model, no clear conclusion can be drawn from the authors' results.

Dalgaard et al. (2004) have further augmented the “classical” model of Burnside–Dollar (2000) by including variables of their own, namely, the fraction of land in the tropics and its interaction term with aid. The results based on their pooled ordinary least squares (OLS regression) have shown that aid has a significant and positive effect on economic growth, and this effect is smaller in countries with large fractions of land in the tropics.

Scholars arguing that foreign aid has a detrimental effect on economic growth are mainly concerned with corruption and fragile institutions, which are included in the regressions. At the heart of Alesina–Weder's article (2002) is the question of whether corrupt governments receive less foreign aid. The main conclusion of their empirical work is that there is no hard evidence to support the claim that less corrupt countries receive more foreign aid.

Djankov et al. (2008) is an important paper in the field that emphasizes the detrimental effect of foreign aid. In their argumentation, they link this relationship to an analysis of the relationship between foreign aid and institutions. The authors go so far as to even call foreign aid a “curse” for developing countries, a phenomenon that occurs in the case of natural resources, such as oil. Essentially, what Djankov et al. (2008) emphasize is the rent-seeking behavior of people in power and the toll this behavior takes on developing countries. For this to happen, however, there needs to be a weak and unstable institutional framework. They provide evidence that the more aid a country gets, the worse its institutional framework becomes. In line with the above, Ravetti et al. (2018) argue that the foreign aid “curse” can go hand in hand with the natural resources “curse” in autocratic countries. When this happens, foreign aid provides distorted incentives for autocrats, which results in poor economic performance in these countries.

Perhaps one of the most prominent studies on the effectiveness of foreign aid is the paper by Burnside–Dollar (2000), which highlights the conditional effect of foreign aid on economic growth. The authors look for answers to two questions. The first is whether the effect of foreign aid is conditioned on economic policies, and the second is whether donor governments and agencies allocate more aid to countries with “good” policy. In the empirical analysis, they apply a growth model including institutions and policy distortions as two of the key variables. On a panel of 56 countries for the periods 1970–1973 and 1990–1993, by using both OLS and a two-stage least squares (2SLS) regression, they find that aid in itself has little impact on growth, but in countries with sound policies, aid serves as an accelerant for economic growth. Regarding their question of whether donors allocate more aid to countries with a “good” policy, the answer is no.<sup>4</sup>

<sup>4</sup> In a recent paper (Arvina et al. 2022), in which the main emphasis is on the question of whether more foreign aid Granger causes lower CO<sub>2</sub> emissions, the authors also show that strong institutions increase foreign aid inflows to the poorest countries.

Easterly et al. (2004) revisit the above paper and further augment it by extending the time period by 4 years and adding additional countries to the regression. An important finding is that with their extended data, the significance of the interaction term between aid and the policy variable vanishes. In the same line, Easterly (2003) looks for statistical evidence for the idea that “aid [only] works in a good policy environment” (ibid p. 27). According to Easterly (2003), there exists an increasing need for selectivity in foreign aid, i.e., a careful decision about which country could be a recipient. This selectivity manifests itself in conditions being placed upon loans and aids, as well as in evaluation after the completion of a given aid program. As conditions, sound institutions such as the rule of law, strong property rights, and democracy can be needed. In his regression analysis for the time period 1984–2003, he finds it is not so straightforward whether a country’s development can be attributed to the foreign aid they have been granted or to other unaccounted factors.

Maruta et al. (2020) seem to be in agreement with what Easterly (2003) and Burnside–Dollar (2000) argue. In spite of the fact that the authors use sectoral aid as a dependent variable instead of an aggregated measure of aid, the conditionality seems to be present and significant. The authors found that there are significant differences in the effectiveness of sectoral aid: agricultural aid is more effective in Africa, educational aid is more effective in South America and health aid is more effective in Asia.

As opposed to the abovementioned lines of the literature, which assume some kind of relationship between foreign aid and economic growth, be it negative, positive or conditional, Boone (1996) argues that there is no relationship at all. Throughout his paper, he emphasizes that the policies introduced by the hungry elite will lead to the demise of the impact of foreign aid. In accordance with Boone (1996), Rajan–Subramanian (2008) also argue for the lack of a missing relationship between foreign aid and economic growth. Their paper contradicts a very important argument from one of the most prominent studies on foreign aid, Burnside–Dollar’s (2000) view: Rajan–Subramanian (2008) argue that institutional stability does not enhance the effectiveness of aid. The two scholars also look at foreign aid from the perspective of the donors and analyze which factors could influence a donor to give foreign aid to a country. For the results, they have found that colonial relationships are statistically significant.

Skarbek–Leeson (2009) ask the question of “what can foreign aid do”. Their answer based on Austrian economics is that practically, aid cannot do anything: neither donors nor domestic aid planners know how to use aid in ways that generate economic growth. The argumentation in Williamson (2010) follows the same lines: neither the donors nor the recipients are able to overcome the incentives and information problems arising from the “central planning like style of foreign aid” (ibid p. 31).

A paper using a more sophisticated method that leads to novel results as opposed to those presented above is by Harb–Hall (2019). This study is unique because it shows that neither corruption nor institutional quality plays a role in the effectiveness of foreign aid; instead, what matters for the effectiveness of aid is income per capita

and the threshold level of aid per GDP. The major finding is that in country groups with higher income, foreign aid's impact on growth disappears, and in this sense, the effect of aid exhibits diminishing returns.

Harb–Hall (2019), by applying a new model called panel smooth transition regression (PTSR), are able to endogenously determine threshold levels for foreign aid, above which the positive effect works. The starting point for the authors is that pooling all countries together can lead to biased and inconsistent results; accordingly, they investigate three groups of countries based on their income levels (according to the standards of the World Bank). In the best specification, for LDCs, the threshold level of foreign aid is 11.385% of GDP, which is significant at 1%, while this level is 4.334% for LMICs, which is significant at 5%. What this means is that foreign aid received in an amount above 11.385% of the country's GDP (for an LDC) and 4.334% of GDP (for an LMIC) has a statistically significant positive impact on growth. However, if an LDC or LMIC receives less aid than 11.385% or 4.334% of GDP, respectively, then the positive impact of foreign aid is not statistically significant. In regard to the Upper Middle Income Countries (UMICs), the 1.221% threshold level is not significant. Therefore, LDCs and LMICs “are in need for more aid flows” (ibid p. 199).

## Methodology

### Justification of the method

As stated in the introduction, my research question is whether a country receives more foreign aid after a democratic transition compared to how much it would have received had it remained an autocracy. However, this question can be justified only if we “believe” that foreign aid is beneficial to economic growth and development. While the literature on the effect of aid is not straightforward, as we have seen in the above literature review, the most recent results, more specifically those of Harb–Hall (2019), have provided evidence that foreign aid is crucial for LDCs and LMICs, while its impact on the growth of countries with higher income per capita is missing. Since my concern centers on Sub-Saharan Africa (see Introduction) this finding, namely, that aid is “big push”, should be a reasonable starting point for my analyses, substantiated by the fact that countries in this region are LMICs<sup>5</sup>, and what is more,

<sup>5</sup> Countries in the Sub-Saharan African region (45 countries in total in my sample) that are significantly outside the threshold per capita income of LMIC (1006\$–3955\$) are Botswana, Cape Verde, Gabon, Equatorial Guinea, Mauritius, Namibia, Swaziland, Seychelles, and South Africa. The other Sub-Saharan African countries are more or less within a respectable boundary of LMIC countries.

the ODA/GNI<sup>6</sup> is more or less around the threshold level determined by Harb–Hall (2019). Accordingly, I will build my empirical analyses on these new empirical findings.

Thus, in my empirical analysis – on the basis of the fact that aid is beneficial to growth in LMICs – I will investigate whether stable democracy influences foreign aid. My hypothesis is that if democracy matters for donors, then they will give more aid to a country that transformed into stable democracy compared to the amount they would have given to this country had it remained an autocracy. Thus, providing an answer to the research question requires a counterfactual analysis. As explained in the introductory section, a recent econometric method developed by Abadie et al. (2010, 2015) and Abadie (2021) for policy impact evaluation, namely, the synthetic control method, outperforms the standard DID method in a setting with a single treated country and many untreated countries.

### The synthetic control method

The synthetic control method is a counterfactual analysis that assesses the causal effect of a “treatment” (policy intervention) on a unit that is exposed to the treatment (the treated unit). Several untreated units that did not undergo the treatment are used as a synthetic control unit in the analysis. SCM estimates the value of an outcome variable that would have been observed for the treated unit in the absence of the treatment, called synthetic control. The synthetic control itself is calculated by the method as a weighted average of the outcome variable of several untreated units (synthetic control unit). The method is based on the premise that “a combination of comparison units often does a better job of reproducing the characteristics of the unit or units representing the case of interest than any single comparison unit alone” (Abadie et al. 2015: p. 496). The method chooses the weights such that the resulting combination best resembles the values of the predictors of the outcome variable for the treated unit for the pretreatment period, a method that minimizes the distance between the outcome value of the synthetic control unit and the treated unit, measured by the root mean square prediction error (RMSPE) (Abadie et al. 2015: p. 505). Once the synthetic control values are calculated, we can compare them with the actual outcome values of the treated unit in the posttreatment period: if the synthetic control values are different from the actual ones, then the deviation is to be attributed to the treatment.

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<sup>6</sup> LDCs in Sub-Saharan Africa seem to meet the threshold of Harb–Hall (2019), namely, the 11.385% of ODA/GDP. For LMICs this ratio is within a respectable boundary of 4.334% of ODA/GDP. Note however that I use ODA/GNI, and not ODA/GDP since the World Development Indicators (WDI) dataset [1] includes only these data. Calculating ODA/GDP by using GDP data from the Penn World Table 10.0 (Feenstra et al. 2015) will lead to a significant decrease in the number of countries in my panel dataset because of missing GDP data. Since, of course, there is a difference between ODA/GDP and ODA/GNI measures, I accept tolerable boundaries around the values determined in Harb–Hall (2019).



The above can be formalized as follows (Abadie 2021). Let us assume that we observe  $J + 1$  units, the first unit is exposed to the treatment at time  $1 < T_0 < T$ , and the remaining  $J$  units are not affected by the treatment either directly or indirectly. Let  $Y_{it}$  indicate the observed value of the outcome for the  $i$ -th unit at time  $t = 1, 2, \dots, T$ , and  $Y_{it}^N$  be the value of the outcome variable that would be observed for unit  $i$  in the absence of the treatment. For units  $i \neq 1$ ,  $Y_{it}^N = Y_{it}$ . The treatment effect can be denoted by

$$\alpha_{1t} = Y_{1t} - Y_{1t}^N$$

at time  $t = T_0 + 1, \dots, T$ , where  $Y_{1t}$  is the observed (actual) outcome of the treatment unit and  $Y_{1t}^N$  is the counterfactual (synthetic control).

Let  $X_i$  be a  $(k \times 1)$  vector of pretreatment characteristics of the treatment unit, and similarly,  $X_0$  be a  $(k \times J)$  matrix containing the same variables for the untreated units. Then, we need to find a vector of nonnegative weights that sum to one,  $W^* = (w_2^*, w_3^*, \dots, w_{j+1}^*)$ , that brings the weighted value of  $X_0$  as close as possible to  $X_1$ . Then,  $Y_{1t}^N$  can be approximated by  $\sum_{j=2}^{J+1} w_j^* Y_{jt}$ .

Let  $V$  be the diagonal weight matrix of each variable predicting the synthetic control. Now, we need to minimize the distance between the pretreatment characteristics of the treated unit and those of the  $J$  control units given by:

$$|X_1 - X_0W| = \sqrt{(X_1 - X_0W)' V (X_1 - X_0W)}$$

Accordingly, an unbiased estimate of the treatment effect is given by:

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

### Fixed effects regression analysis

Before turning to SCM, I will also run regressions on my panel of the Sub-Saharan countries to look at the determinants of ODA/gross national income (GNI) given to these countries. My goal is not simply to repeat the analysis of Alesina–Dollar (2000) – although using a different sample, time period, explanatory variables, and more importantly, using fixed effects estimation instead of a pooled OLS could provide us with new evidence – but mainly to substantiate which explanatory variables should be used in the SCM analysis.

I will estimate the following model on my panel dataset containing data for 45 Sub-Saharan African countries for the period from 1985 to 2018 by using fixed effects regression in which  $\alpha_i$  is country-fixed effect and  $u_{i,t}$  is the idiosyncratic error term (year dummies are also included, which is indeed corroborated by the joint hypotheses test):

$$\ln(\text{oda/gni})_{i,t} = \beta_1 \ln_{\text{gdppc}}_{i,t} + \beta_2 \ln_{\text{pop}}_{i,t} + \beta_3 \text{dem}_{i,t} + \beta_4 \text{openness}_{i,t} + \beta_5 \text{rol}_{i,t} + \alpha_i + u_{i,t}$$

The dependent variable is the natural logarithm of ODA/GNI in country  $i$  in year  $t$ . Data were gathered from the World Bank's World Development Indicators [1]. For the explanatory variables, inspiration was taken from Alesina–Dollar (2000), but note that the choice of these variables is quite straightforward, even without being

familiar with the abovementioned paper. These are as follows. As a measure of per capita income ( $\ln\_gdppc_{i,t}$ ), I take the natural logarithm of GDP per capita in millions of 2017USD from the Penn World Table 10.0 (Feenstra et al. 2015). From the same dataset, I also use the population of a country (in millions) ( $\ln\_pop_{i,t}$ ). To measure democracy ( $dem_{i,t}$ ), I use the polity2 index from the Polity5 Project [2]. This modified version of the polity index makes it feasible to use the polity regime measure in time-series analyses. The original polity index ranges from -10 (strongly autocratic) to +10 (strongly democratic). I also include a measure of trade openness ( $openness_{i,t}$ ), measured by the KOFGI subindex of the KOF Globalisation index [3], which is composed of measures of the economic, social and political dimensions of globalization. Rule of law ( $rol_{i,t}$ ) is proxied by the Area2 subindex of the Economic Freedom of the World index (Gwartney et al. 2021), which measures the quality of the legal system and property rights.

The results are summarized in Table 1. Income per capita seems to be the key determinant of ODA/GNI. As shown in Column 1, log GDP per capita ( $\ln\_gdppc$ ) is statistically significant at 1%, and its coefficient has a negative sign, which is in line with what I expected.

Table 1

### Fixed effects regression results

dependent variable: log ODA/GNI								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
cons	10.586*** (0.552)	2.240*** (0.113)	10.376*** (0.540)	12.835*** (0.588)	13.190*** (0.588)	11.435*** (0.567)	9.232*** (1.056)	6.730*** (0.870)
$\ln\_gdppc$	-1.110*** (0.071)		-1.067*** (0.070)	-1.071*** (0.069)	-1.020*** (0.070)	-1.147*** (0.064)	-0.900*** (0.120)	-0.884*** (0.119)
$\ln\_pop$				-1.937*** (0.201)	-2.194*** (0.210)	-2.026*** (0.200)	-1.280*** (0.316)	
dem		0.032*** (0.006)	0.024*** (0.005)		0.020*** (0.005)	0.025*** (0.005)	0.041*** (0.008)	0.040*** (0.008)
openness						0.076*** (0.006)	0.040*** (0.008)	0.044*** (0.008)
rol							0.159** (0.050)	0.177*** (0.046)
no. obs.	1397	1341	1341	1397	1341	1341	726	726
no. groups	45	43	43	45	43	43	41	41
adj. R <sup>2</sup>	0.7773	0.7451	0.7848	0.7907	0.8013	0.8254	0.8751	0.8722

Cluster-robust standard errors are in parentheses. \*\*\* significance at 1%, \*\* significance at 5%, \* significance at 10%.

For the logged population ( $\ln\_pop$ ), surprisingly, it has a negative coefficient (and is statistically significant in all of the specifications it is included in), meaning that the greater population a country has, the less foreign aid it is likely to receive, ceteris

paribus.<sup>7</sup> The most important variable of interest in this study is the measure of democracy (*dem*), for which I used the polity2 index. It has a positive impact and is statistically significant, meaning that the more democratic a country is, the more foreign aid it will receive, ceteris paribus.

The measure of trade openness (KOFGI) in specifications (6)–(8) has a positive coefficient and is statistically significant, which is also in line with what I have expected: a country that is more open to trade receives more ODA/GNI, ceteris paribus. The rule of law measure (*rol*) is statistically significant and has a positive effect. A problem with using this index in my regressions is that it halves the observations because these data are not available for every year before 2000. In the full specification in Column 7, all variables are statistically significant.

All in all, my results reconfirm the findings of the literature but, more importantly, provide me with grounds to demonstrate that the democratic nature of the destination country plays a role in attracting foreign aid flows. However, per capita GDP seems to be the major determinant of ODA/GNI, based on standardized beta coefficients (not reported here).

In the next step, I will apply an SCM analysis to dig deeper into the impact of democracy on foreign aid. My research question in “SCM language” is the following: How would the ODA/GNI of the treated country have evolved after the year of democratization if treatment (democratization) had not occurred?

## Synthetic control method analysis

### The treated country, the donor pool, and predictors

To build the counterfactual, we need three elements: (1) the treated country, (2) the donor pool, and (3) predictors of the counterfactual. Let me discuss these elements in more detail.

The treated country is Senegal, for which the most important requirement of the SCM is that the treatment effect be large in absolute terms (for real-life economic inferences). Relying on a widely used measure of democracy, the polity2 index (which was  $-1$  before the treatment and has reached 8 since democratization), we can conclude that the treatment in Senegal was adequate; accordingly, the country could be a good candidate for the analysis.

With Senegal as the treatment country, we need a donor pool. To select the donor pool, following the suggestions of Abadie et al. (2015), I first selected those countries that, on the one hand, did not experience the treatment, i.e., did not switch to democracy in any year in the posttreatment period, and on the other hand, for which the dependent variable (ODA/GNI) is available for the whole period (because the

<sup>7</sup> Maybe the negative sign of the population does not come as a surprise, because Collier–Dollar (2002) also documented this finding in their regression analysis.

panel dataset must be strongly balanced for SCM). After checking the Sub-Saharan countries in my dataset according to the above criteria, I was left with 17 countries.

In a second step of the donor pool selection, as suggested by Abadie (2021), we should discard those units (countries) that are deemed to be too different from the treated unit and those that experienced an important idiosyncratic shock during the study period if that shock would have not affected the treated unit in the absence of the treatment (Abadie et al. 2015). The assessment of the above is largely subjective, and the selection of the donor pool is inherently arbitrary to some extent. In addition, we should take into account the fact that the more countries we have in the donor pool, the higher the risk of overfitting (Abadie et al. 2015, Abadie 2021). After checking the data for the 17 countries and taking some historical-cultural-geographical factors<sup>8</sup> and idiosyncratic events (e.g., civil war, ideology) into consideration, I ended up with a selection of five countries, which are as follows: Burkina Faso, Cameroon, Gabon, Guinea, and Equatorial Guinea.<sup>9</sup>

Before determining the predictors for the SCM analysis, we need to choose the pre- and posttreatment periods. To address the issue of the seemingly arbitrary choice of the pretreatment period, Abadie (2021) argues that this period should be long enough for accurate econometric inferences but short enough to avoid any problems associated with structural breaks within the time-series data. Additionally, data availability constrains my choice. For the above reasons, my choice of the pretreatment period is 1985–1999. The posttreatment period will be 2001–2018.

Abadie et al. (2015) and Abadie (2021) make clear propositions as to what kind of explanatory variables should be included. We are advised to use, first, pretreatment values of the outcome variable or its values averaged over (part of) the pretreatment period, second, other predictors values in some years during the pretreatment period and/or averaged over (part of) the pretreatment period. Accordingly, the selection of predictors is to some extent arbitrary, which makes room for robustness checks by using different predictors and/or different periods for averaging. However, instead of “picking up” explanatory variables on an ad hoc basis, I will rely on my panel

<sup>8</sup> An important historical factor is being a former British colony, which established common law in these countries, leading to significantly different institutions from those in countries with civil law tradition. Of course, besides similar historical-cultural factors, similar economic policy matters, too. See, for instance, Senanu et al. (2022) which shows that foreign exchange rate policy was similar in the donor pool countries.

<sup>9</sup> Note that Equatorial Guinea is a big oil exporter, which might make us think that we should discard the country from the donor pool. However, the SCM calculation gives a relatively high weight to this country in making the synthetic Senegal, and in addition, the model including the country “performs” well (see below). Note that I experimented with several donor pools, both including and excluding Equatorial Guinea, and when the country was included, it was always given a positive weight, and when it was excluded, the model performed worse. For these reasons, I decided not to discard this country from the donor pool. Therefore, it seems that Equatorial Guinea being an oil exporter does not make the country very different from Senegal in terms of the characteristics of the country (such as life expectancy, openness etc.). The case of Equatorial Guinea might confirm what Abadie (2021) suggests, namely, that the selection of the donor pool is not always straightforward.

regression results to determine variables to be used in SCM. Of course, at the end of the day, data availability for my donor pool affects which variables can be used.

Since per capita GDP has proven to be a major determinant of ODA/GNI based on the standardized beta coefficients (not reported here), I will use this variable and, as suggested by Abadie (2021), will average it over part of the pretreatment period (1985–1992). I will not use all statistically significant explanatory variables that I included in the regression analysis for various reasons: first, the coefficient on population had a negative sign, which is somewhat unusual; second, the measure of democracy must not be used since the treatment itself refers to democracy; and third, for some countries in the donor pool, the Economic Freedom of the World index is not available for the whole pretreatment period. Given these limitations, I will use the economic globalisation subindex of the KOF index as a measure of trade openness for 1985, and I will also include the 1975 value of life expectancy at birth taken from WDI [1], which controls for the historical development of countries. Finally, as required by the method, I will also use an averaged value of the outcome variable (for 1985–1990), i.e., ODA/GNI.

### SCM results

Table 2 contains information on several key components of the SCM analysis. First, in Column 2, we have the weights associated with the covariates endogenously calculated by the SCM. As seen, the averaged outcome variable has the highest weight, 33.8%, while the averaged log GDP per capita has a weight of approximately 31%, but the remaining two variables also have an important share (at least 8.9%) in making the synthesized Senegal. The third column indicates the actual values of the four covariates for Senegal, while in the fourth column, the values for synthetic Senegal are shown, that is, Senegal synthesized from some of the donor countries. It is of paramount importance that the actual (treated) data and the data for synthetic Senegal are close to identical, which immediately gives an indication of how “good” our model is. As Column 5 indicates, the differences between the treated and synthetic control values are close to 0%, meaning that the countries in my donor pool that are given a positive weight “approximate” Senegal with near perfection.

Table 2

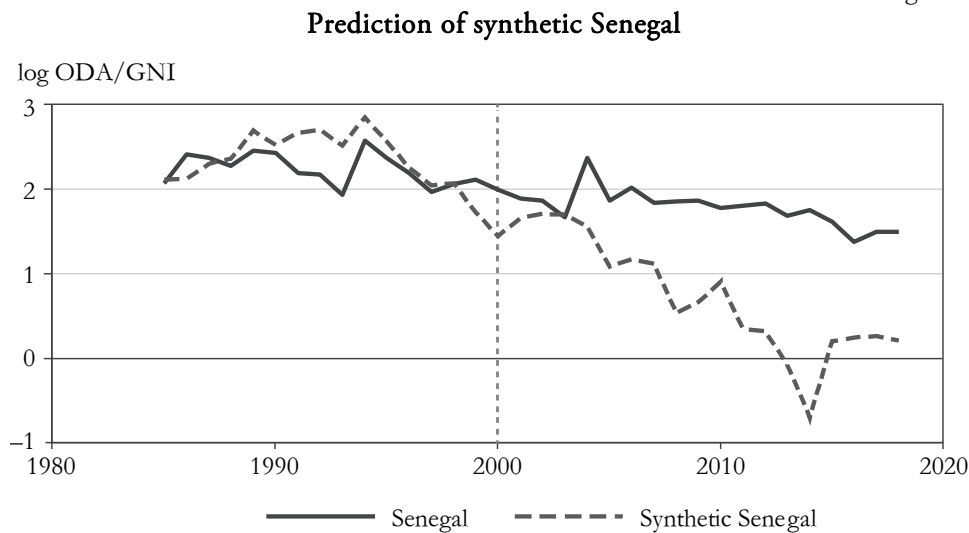
**Predictors balance in the pretreatment period**

Covariate	Weight	Treated	Synth. control value	Synth. control bias, %
log ODA/GNI averaged for the period 1985–1990	0.3382	2.2375	2.3434	0.68
log GDP per capita averaged for the period 1985–1992	0.3066	7.7314	7.7549	0.30
1975 life expectancy at birth	0.0887	43.5210	43.6744	0.35
KOF economic globalization subindex in 1985	0.2665	39.8797	39.7542	–0.31

After running the SCM, one country out of the five in the donor pool, Gabon, was given zero weight by the method, and the others' weights ranged between 13.8% and 33.3%.

Perhaps the best illustration of my analysis is given by Figure 1, which shows the prediction of synthetic Senegal along with the actual data. As the figure suggests, the gap between Senegal and synthetic Senegal continued to grow after the year of treatment, i.e., the democratic transition in 2000. More precisely, the synthetic Senegal curve deviates sharply from the actual one only 2-3 years after the treatment period, which is fully understandable: ODA providers were only able to change their "behavior" vis-à-vis Senegal a couple of years after they had perceived the democratic change in the country.<sup>10</sup> Before the treatment period, the synthetic Senegal and Senegal curves are more or less moving together, a fact that has already been corroborated in Table 2 (the treated and the synthetic control values are very close to each other). The fact that after the treatment period, a considerable difference between the two curves can be observed means that the model proves to be successful in explaining the effect of the democratization of Senegal: if Senegal had remained an autocracy, the synthetic Senegal curve would be the one to rely on in terms of how much ODA/GNI the country would have received. Since Senegal's actual curve is positioned upward, we can conclude that democracy "has increased" ODA/GNI in Senegal.

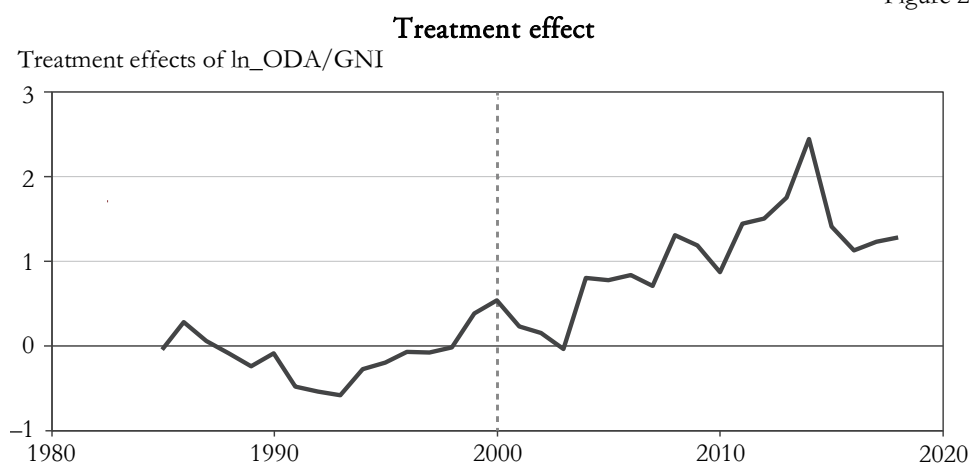
Figure 1



<sup>10</sup> My finding concerning this time gap is in line with what Abadie et al. (2015) found when they analyzed the impact of German reunification in 1990 on Western Germany's per capita GDP: the "negative" effect of the reunification appeared approximately 2 years after the treatment year (see Figure 6 in Abadie et al. 2015: p. 506).

What is presented in Figure 1, namely, that the “difference” between Senegal and synthetic Senegal is sufficiently large in the posttreatment period, can be transformed into an analysis of the treatment effect in Figure 2. As shown, the treatment effect averaged zero in the pretreatment period, but after the treatment in 2000, this effect became positive and large: its mean value is 1.0606, while the mean of the actual outcome is 1.7733 and that of the predicted outcome is 0.7127. These numbers can be translated into percentage point difference in ODA/GNI: if Senegal had remained an autocracy, its ODA/GNI would have been  $\exp(0.7127)=2.039\%$  on average; however, due to democratization, its ODA/GNI increased to  $\exp(1.7733)=5.89\%$ , on average. Thus, Senegal has received on average a 3.851 percentage point extra ODA/GNI. Now, the question is how much extra growth rate has arisen from this extra aid? Relying on Harb–Hall’s (2019) estimations, we can calculate this extra growth impact for Senegal. The estimated coefficient on ODA/GDP is 0.8356 (Harb–Hall 2019: p. 198, Table 4), implying a  $(0.8356 \times 3.851) = 3.217$  percentage point extra growth rate, *ceteris paribus*<sup>11</sup>, which is substantial, taking the actual growth rates into account: after 2000, Senegal’s growth rate ranged between  $-3.5\%$  and  $4.4\%$ .

Figure 2



Statistical inference methods are not yet available for SCM because it is a very recent method. As suggested by Abadie et al. (2010, 2015) and Abadie (2021), we can use placebo tests to “replace” the statistical significance test, in which we ask the following: would we find the treatment effect if we assured that other untreated units

<sup>11</sup> Note that this estimation can be accepted with many caveats. First, since Harb–Hall’s (2019) dataset covers the period from 1984 to 2008, we have to assume that the relationship between aid and growth has not changed since 2008. Second, there is no information about the composition of their sample, so we need to assume that the estimation is not sensitive to sample composition, meaning that the estimated coefficient on ODA/GNI based on my sample would be very similar. Third, the two scholars used ODA/GDP and not ODA/GNI, the use of the latter would certainly have resulted in (slightly) different estimated coefficients (see also footnote 6).

were treated? In practice, in the placebo test, we estimate the treatment affect for each untreated unit in the donor pool; that is, we calculate synthetic control estimates for countries that did not experience democratization. If we do not find the treatment effect for untreated units, we can conclude that our result is statistically significant. Figure 3 shows the series of placebo tests.

By looking at the figure, we can compare the estimated effect of the democratization of Senegal (black curve) with the placebo effects obtained for the five countries in the donor pool (gray curves). We can think that the estimated effect of democratization of Senegal on ODA/GNI is significant for Senegal if this estimated effect for Senegal is much larger relative to the placebo effects (see Abadie et al. [2015] for the placebo test on the case of German reunification).

As seen on the figure, the curves for the “fake treatment units” (gray curves) are basically below the blue one (Senegal’s), where “below” indicates a lower treatment effect for the “fake treatment units”, that is, a much larger treatment effect for Senegal. Accordingly, a simple visualization of Figure 3 suggests that my finding concerning the treatment effect for Senegal can be considered significant. However, in addition to a simple visualization of the curves, we can calculate the ratio of the posttreatment and pretreatment RMSPE, which should be unusually large for the treated unit to consider the treatment effect significant. In Figure 4, we can see that this ratio is more than 15 for Senegal, while it is much lower for the donor pool countries, which clearly substantiates that we can reject that there is no treatment effect for Senegal.

Figure 3

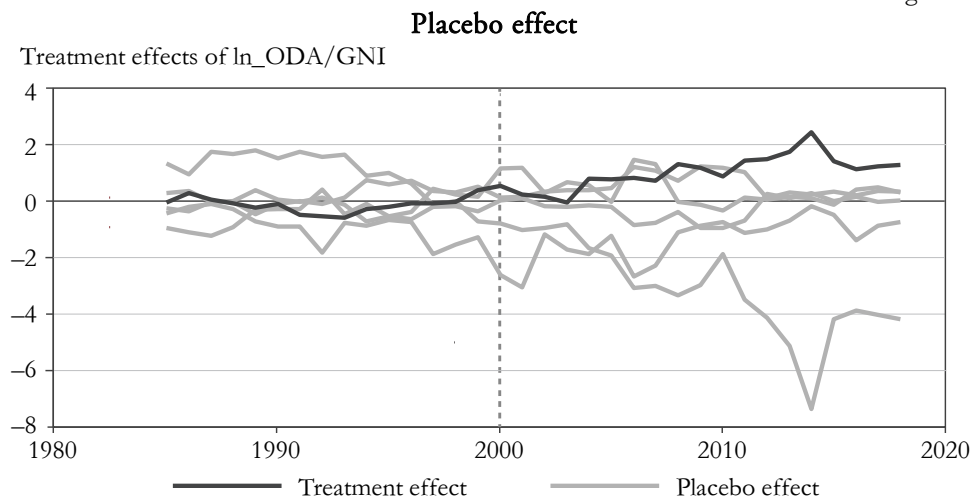
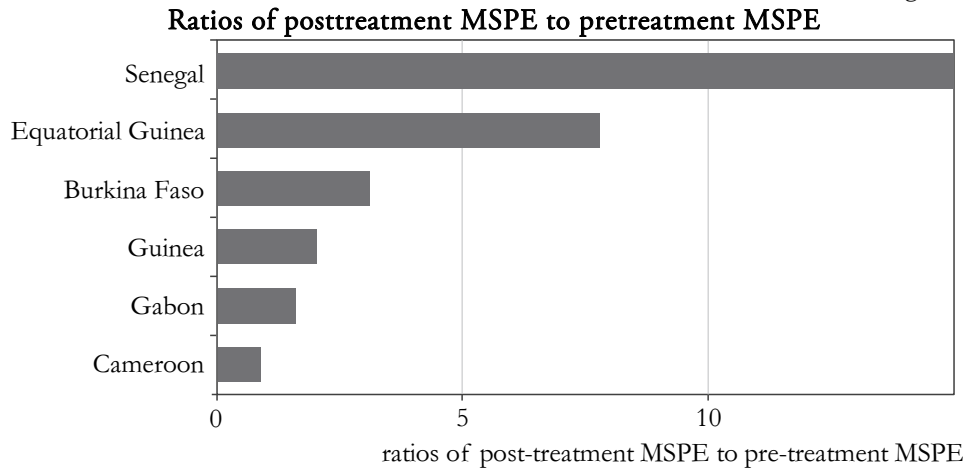


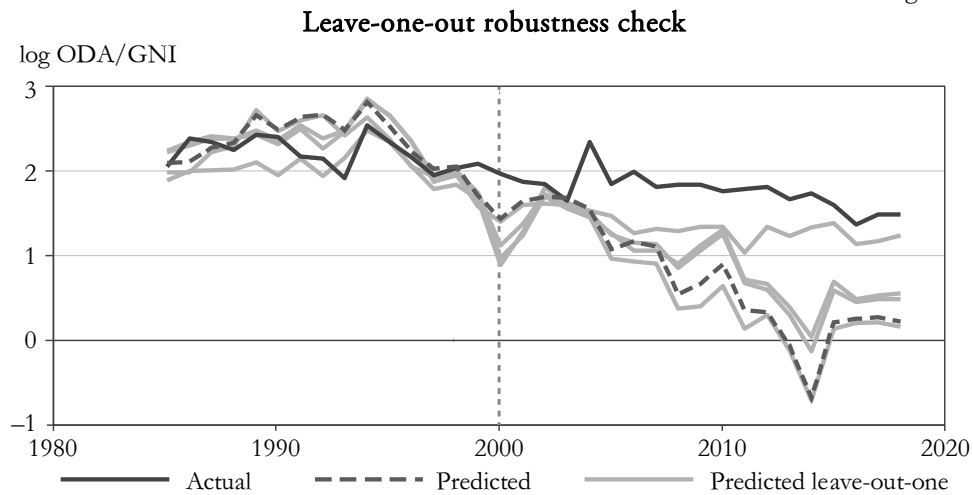


Figure 4



For robustness checks, Abadie (2021) proposes three kinds of tests. The first consists of a leave-one-out analysis. Here, we look at how the estimated treatment effect changes if one untreated unit is discarded from the donor pool. In this analysis, we drop all units with positive weight out of the pool, one by one. The results are shown in Figure 5.

Figure 5

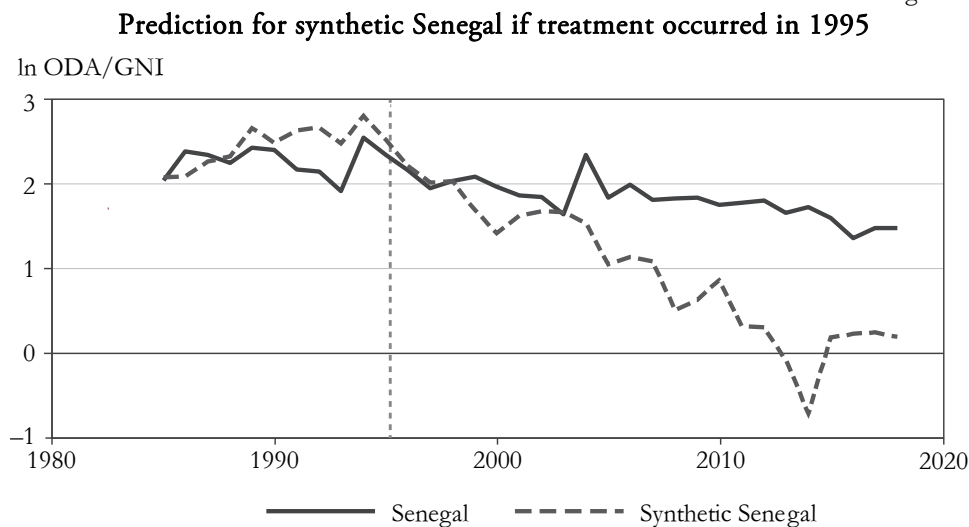


In an absolutely perfect model, the predicted leave-one-out curves should be in a very close vicinity of the predicted curve, meaning that if we leave out each country one-by-one, it will not change our prediction. This is what can be observed in Figure 5: three curves are very close to the predicted curve, and one deviates from the predicted curve slightly but stays below the actual curve, meaning that it also provides

a lower estimation than the actual value. Therefore, I can argue that the series of the leave-one-out analysis tends to support my finding.

As a second robustness check, we can use the so-called backdating test, which means that we set the treatment year at an earlier date in the pretreatment period. This procedure allows the synthetic treated unit to diverge from the actual values before the treatment year, but if we cannot observe any divergence before the true treatment time, this proves the credibility of our results.

Figure 6



In an arbitrary way, I set 1995 as the treatment year, five years before democratization actually happened. Figure 6 shows the results of the SCM analysis, which provide clear support for my previous argument. As seen from the figure, Senegal and the synthetic Senegal move exactly in the same way as in Figure 1 with the true treatment year; that is, using a fake treatment year did not change the “behavior” of the synthetic Senegal. All this means that if the actual and the synthetic Senegal values deviate from one other, it is because of the treatment effect in 2000. In this sense, the backdating test further corroborates the impact of democratization.

The third kind of robustness check, as I have already implicitly mentioned above, is using different predictors or averaging the predictors over different pretreatment periods. I have arbitrarily chosen the whole pretreatment period over which the predictors will be averaged (see Figure 7). As the figure shows, the model is as good as the original model (compare with Figure 1).<sup>12</sup> What this essentially means is that one cannot argue that the model is performing in a good way just because of a meticulously created time period, suggesting that the model is “bulletproof”.

<sup>12</sup> Because of space limits, I do not report the information related to this model, but note that all the statistics are very similar to those of the original model.

Figure 7

**Prediction for synthetic Senegal with variables averaged over the period,  
 1985–1999**



In summary, the SCM analysis has provided us with significant and robust results on the causality relation between the democratization of Senegal and the amount of foreign aid per GNI the country has received. As substantiated above, the democratization of the country substantially reduced the size of the decrease in ODA/GNI<sup>13</sup>, meaning that the (treatment) effect due to this transition has been positive; that is, Senegal could have experienced a more important decrease in ODA/GNI had the country not transformed into a stable democracy.

## Conclusions

This paper has been concerned with the question of whether a democratic transition of a country is followed by receiving more foreign aid compared to how much aid this country would have received had it remained autocracy. This research question is justified, however, only if we “believe” that more foreign aid promotes economic growth. Although earlier research by various scholars points to an ambiguous effect of foreign aid on economic development, a paper by Harb–Hall (2019) clearly shows that for the LDCs and LMICs, the effect is positively significant, while for UMICs, it is not significant. I took this finding as a starting point and basis for my analysis on the relationship between democracy and foreign aid.

My research question implies a counterfactual analysis, and as such I used a recent method, the Synthetic Control Method which is better suited for my concern than the difference-in-differences method. In my analysis, I focused on the Sub-Saharan

<sup>13</sup> An analysis of the reasons behind the decrease in ODA/GNI is beyond the scope of my thesis.

African countries because, as noted above, convincing empirical evidence that foreign aid contributes to growth is available for LDCs and LMICs, to which almost the whole Sub-Saharan region belongs. Senegal was taken as the treated country because it transformed to a stable democracy in 2000.

My results indicate a significant and robust treatment effect of democratization in Senegal; in addition, the treatment effect has been detected to be large in magnitude: since the transition to a democracy, Senegal has received, on average, a 3.851 percentage point extra ODA/GNI, which has manifested in a 3.217 percentage point extra growth rate on average, *ceteris paribus*.<sup>14</sup>

Even though I conducted a placebo test and a series of robustness analyses, my results should be interpreted with great caution, as they may not be generalizable and applicable to all cases. To gain more insight into the credibility of my results, the analysis ought to be extended to different countries, for instance, in Asia and Latin America, to see whether my results obtained in the research of Sub-Saharan African countries are “transferable” to similar treatment cases in other continents. Accordingly, general policy implications cannot be drawn based on the case of Senegal, not only because Senegal might be a specific case but also because there may be a reverse causality between democracy in the recipient country and the amount of foreign aid. In addition, as Bortolletto (2010) explains, the foreign aid policy of major donors has undergone important changes, which, I think, makes it difficult to establish a clear proposition for foreign aid policy that is to a great extent connected to foreign policy. Therefore, an analysis of the policy implications exceeds the boundaries of my current research.

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