

DISSERTATION

FROM REVOLUTIONS TO REALITIES: AN EMPIRICAL INVESTIGATION OF THE
ARAB SPRING'S CONSEQUENCES

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ABSTRACT

FROM REVOLUTIONS TO REALITIES: AN EMPIRICAL INVESTIGATION OF THE ARAB SPRING'S CONSEQUENCES

With the irrevocable change in the Arab world over the last decade, fully understanding the economic and political impact of the Arab Spring is paramount for policymakers. This dissertation consists of three empirical essays on the Arab Spring which attempt to capture causal relationships between Arab Spring and some political and economic factors. Exogenous shocks such as the experiences of revolution are treated as natural experiments which minimize problems of endogeneity and selection. Therefore, these essays are analyzed based on the synthetic control method and synthetic difference-in-differences.

The first essay concerns the impact of the Arab Spring on economic growth, corruption and democracy. I focused on Tunisia and Libya as a case study of Arab Spring countries using the synthetic control method (SCM). I found that there was a negative impact of the Arab Spring on economic growth after 2010 for both Tunisia and Libya. On the other hand, the results suggested that although there was a substantial increase in democracy after the Arab Spring for both Tunisia and Libya, democracy sharply decreased in 2015 in Libya due to armed conflict. Surprisingly, the results showed that there was a substantial increase in corruption in both Libya and Tunisia after the Arab Spring.

In the second essay, I estimated the Arab Spring's impact on foreign aid by using the synthetic difference-in-difference method. I examine whether the Arab Spring affects the distribution of foreign aid. I argue that conflict may respond differently to different types of aid because of the objectives and aid-giving motives. The results indicate that, following the Arab Spring, there was a general increase in total foreign aid to affected countries, with exceptions for certain donors and a stronger increase for "non-traditional Western allies," with the United States being the largest contributor. Also, the findings suggest that, following the Arab Spring, various donors increased foreign aid to affected nations, particularly in government and civil society support, as well as humanitarian aid, with the United States focusing on government and civil society aid in Tunisia, Libya, and Syria, European countries emphasizing government and civil society aid in Libya and Tunisia, and Multilateral aid generally increasing, except for government and civil society aid in Yemen.

In the third essay, I studied the spillover effect of the Arab Spring by investigating its influence on nearby countries concerning economic growth, bilateral trade, and foreign direct investment. I aimed to address how proximity to Arab Spring countries impacts the economic growth, bilateral trade, and foreign direct investment of neighboring economies. The results found that countries located within 2000 kilometers of Arab Spring nations experienced a significant negative impact on both real GDP and net inflow of foreign direct investment (FDI). However, the negative effects on bilateral trade were not statistically significant, suggesting that engaging in trade with Arab Spring countries did not necessarily harm the economic growth of neighboring countries.

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DEDICATION

To the resilient youth of Libya, who courageously stood against tyranny, seeking a brighter future for themselves and generations to come, fighting passionately for freedom and dignity.

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Chapter 1 Democracy, Corruption and Economic Growth Post-

Arab Spring in Tunisia and Libya

1.1 Introduction

In December 2010, Tunisian fruit vendor Mohammed Bouazizi set himself alight to protest against mistreatment by a police officer. His desperate act caused nationwide outrage and sparked protests across the country on the following days leading to what became known as the Arab Spring. Street protesters forced President Zayn al-Abidin Ben Ali into exile on January 14, 2011. Within a matter of days, a series of anti-government protests spread across much of the Arab world, overthrowing some long-standing authoritarian regimes. Since the beginning of the Arab Spring, there has been a stream of literature focused on studying the effect of the Arab revolutions on democracy and social justice from a descriptive perspective. Although corruption and economic stagnation were among the major factors leading to the Arab Spring (Salih, 2013), few of the papers studied the economic consequences of the Arab Spring. The purpose of this paper is to study the effect of the Arab Spring on economic growth, democracy and corruption from a quantitative perspective in Libya and Tunisia as a case study by using the synthetic control method (SCM) as proposed by Abadie and Gardeazabal (2003) and extended by Abadie et al. (2015). This method constructs a synthetic Tunisia and Libya by optimal weighing of countries in the donor pool which are countries that were not influenced by the Arab uprising, such that the dependent and explanatory variables of Tunisia and Libya and its equivalent synthetic are as close as possible for the pre-Arab Spring period of 2003-2010. I use data from 56 developing countries from 2003 to 2018 where 2010 was the treatment event (Arab Spring).

A central question here is, what is the importance of studying the effect of the Arab Spring on economic growth, democracy and corruption? The Arab Spring has highlighted many challenges in Arab countries that have already existed for decades. These challenges include institutional, economic and political reform. However, after 2011, some Arab countries have adopted legislation, and institutional and economic reforms aimed at improving the living conditions and quality of life in these countries and supporting democratic processes, institution-building, human rights and enhancing transparency (The Arab Republic Egypt Presidency, 2022, Faleh and Ahmad, 2019). A decade has passed since the Arab Spring began and it is time to evaluate the popular demands for which the masses took to the streets which are improving economic conditions, fighting against corruption and creating a successful democratic transition.

Previous studies have shed light on the consequences of the Arab Spring by studying its impact on economic growth (Echevarría and Enríquez 2020, Echevarría and Enríquez 2019, Matta et al. 2019). They found that the Arab Spring had a negative impact on economic growth. Another study (Abdel-Latif et. al., 2019) explored how the Arab Spring affected economic growth, corruption, and democracy. They found that while the Arab Spring hampers economic progress, it could possibly lead to improving institutional performance by increasing the level of transparency and fighting the spread of corruption. This paper contributes to the existing literature by focusing on specific countries, providing a comprehensive understanding of the Arab Spring's effects. It offers context-specific insights that may be overlooked in broader studies covering multiple MENA countries (Abdel-Latif et al., 2019; Kumar Jha and Kirsanli, 2023). In contrast to Ali's (2014) study, which explored the impact of political transitions on democracy, corruption, and growth within Arab Spring countries, after only two years from the Arab Spring, through qualitative insights, this paper employs a quantitative methodology, particularly the SCM, enhancing the

analysis with depth and precision. This rigorous approach not only contributes valuable insights to academic discourse but also holds significance for policymaking. It establishes a solid foundation for evaluating the impact of the Arab Spring on democracy and corruption. Unlike previous research that utilized similar methodologies but had limitations in their data scope (Matta et al. 2019; Echevarría and Enríquez 2020) – which analyzed data only until 2013 and 2014 respectively - this study stands out by incorporating more recent and comprehensive data, extending the analysis until 2018. This extended timeframe provides a nuanced and updated perspective on the long-term effects of the Arab Spring, capturing a broader range of post-conflict challenges and recovery efforts in Tunisia and Libya.

The findings show that the Arab Spring had a negative impact on economic growth in Tunisia and Libya. Contrarily, the findings highlight a significant improvement in democracy and anti-corruption in both countries following the Arab Spring. The findings highlight important policy implications for Tunisia and Libya. Policymakers should address the post-Arab Spring economic challenges through international cooperation through targeted policies that focus on diversification, infrastructure and human capital development to stimulate economic growth. Furthermore, the post-Arab Spring boom in democracy provides an opportunity to strengthen democratic institutions, emphasizing structural reform, political inclusion and the rule of law. In the fight against corruption, the observed reductions indicate the effectiveness of post-Arab Spring anti-corruption measures, emphasizing the need for continued strong policies, transparency, and judicial independence. International cooperation and the sharing of best practices can significantly enhance anti-corruption efforts.

This paper will be structured as follows: the initial section will explore the connection between conflict, economic growth, and institutions. In the subsequent section, the data and methodology

employed in the analysis will be presented. The third section will assess the influence of the Arab Spring on economic growth, democracy, and corruption, utilizing Tunisia and Libya as a case study. The fourth section will concentrate on the robustness tests, including an "in-space placebo test" and a "Leave-one-out test". Following this, the fifth section will analyze and discuss the obtained results. Lastly, the paper's final section will be dedicated to drawing conclusions and offering recommendations.

1.2 Conflict, Economic Growth and Institutions

A large literature has studied the impact of conflict on economic progress. For instance, Alesina et al. (1996), Barro (1996a) and Uddin et al. (2017) all found that there is a negative correlation between conflict and economic growth. This relationship goes in both directions: conflict severely hampers economic growth; and failure to achieve sustainable development increases the risk of conflict (Starr 2010). For example, Collier and Hoeffler (2004) showed that weak economic growth tends to be associated with an increased likelihood of violent civil conflicts because lower incomes increase the motives and opportunity to rebel against governments that have been denounced by the people. On the other hand, conflict can negatively impact economic growth through reduced investment and capital accumulation (Elbadawi, 1999).

Greater economic growth may suggest an improvement in underlying institutions. However, the direct evidence for the impact of conflict on institutional quality is mixed. For example, previous literature has shown that there is a positive relationship between conflict and democratic transition in the long run where war promotes democracy (Cheeseman et al. 2018, Bermeo 2003). On the other hand, Lederman et al. (2005) found that political stability is extremely important in determining the prevalence of corruption.

There is also compelling evidence that conflict, growth, and institutions are intertwined. For example, Karnane and Quinn (2019) found that both ethnic fractionalization and corruption contribute to a rise in instability that undermines economic growth. Similarly, Abu et al. (2015) found that corruption hinders economic growth by increasing political instability in West Africa, but political instability is also a primary reason for corruption. Related work has found that corruption is the most important obstacle to the attainment of lasting stability (Schwickerath, 2018). Other research has focused on the link between democracy and corruption. For example, Ogundiya (2010) found that political and bureaucratic corruption have a negative impact on democratic stability in Nigeria. Okafor (2004) found that corruption is a major challenge to democracy in African countries more broadly.

1.3 Data and Method

To estimate the impact of the Arab revolution on economic growth, democracy and corruption in Tunisia and Libya, as case studies, I use the synthetic control method (SCM) proposed by Abadie and Gardeazabal (2003) for the period of 2003-2018¹. In the analysis of how the Arab Spring impacted democracy and corruption in specific countries such as Tunisia and Libya, a crucial challenge arose. Traditional econometric methods typically require enough comparable control countries and heavily rely on the assumption of parallel trends between treated and control units. However, this case presented difficulties due to the unique political and social contexts that prevailed in Tunisia and Libya before the Arab Spring. Finding suitable control countries exhibiting parallel trends proved to be challenging. Given the limitations of conventional methods in this specific context, I chose to utilize SCM. This approach effectively addresses the challenge of identifying by creating a synthetic control unit that closely resembles the pre-intervention

¹ The data utilized in this study is limited to the year 2018 due to the political uprisings in some Arab countries in 2019, including Sudan and Algeria, as well as exogenous shocks such as the spread of COVID-19.

characteristics of the treated countries. By constructing a composite control unit using available data from various countries, SCM allows for a precise and credible estimation of the counterfactual scenario. This particular methodology was crucial in establishing a trustworthy foundation for evaluating the impact of the Arab Spring on democracy and corruption in Tunisia and Libya.

1.3.1 Data

I use panel data from Tunisia, Libya and 56 developing countries from 2003 to 2018 (16 years), where the 56 developing countries are a group of countries that were not impacted by the Arab revolution. I excluded countries with missing data, countries that are directly affected by the Arab Spring and countries that were impacted by external shocks such as natural calamities or conflict. All data is obtained from the World Bank Open Data² and the Varieties of Democracy (V-Dem). The synthetic control method will not work on a data set with missing values. Therefore, I only considered countries with complete data for the 2003-2018 period.

I consider three outcome variables: First, a log of real GDP per capita to measure economic growth. More precisely, I used the production-side real GDP at chained PPPs (2010US\$) which allows us to compare across countries. Second, a liberal democracy index to measure democracy. I obtained liberal democracy data from the Varieties of Democracy (V-Dem) project³. The liberal democracy index captures electoral and liberal sides of democracy including civil liberties, quality of elections, media freedom, rule of law, horizontal accountability and minority rights (Coppedge et al. 2011).⁴ The scale goes from 0 (low liberal democracy) to 1 (high liberal democracy) (V-Dem, 2018). Third, a political corruption index to measure corruption. Data on political corruption was

² World Bank. (2020). Data Bank. Retrieved from <https://databank.worldbank.org/databases>

³ Varieties of Democracy (V-Dem) is an approach to measuring democracy by using more than eighteen-million data points relevant to democracy around the world. <https://www.v-dem.net/>

⁴ Varieties of Democracy (V-Dem). (2018). Codebook. Available at: https://www.v-dem.net/media/filer_public/e0/7f/e07f672b-b91e-4e98-b9a3-78f8cd4de696/v-dem_codebook_v8.pdf

obtained from the Varieties of Democracy (V-Dem) project. This index was calculated by averaging scores from the public sector corruption index, executive corruption index, as well as indicators for legislative and judicial corruption (Coppedge et al. 2011). The scale goes from 0 (less corrupt) to 1 (more corrupt) (V-Dem, 2018).

Previous literature has shown that there are many social, economic, and political variables that determine economic growth, democracy and corruption (Barro, 1996b, 1999). I used eight explanatory variables: (i) life expectancy at birth in years, (ii) government expenditure as a percentage of GDP, (iii) rule of law, ranges from -2.5 (weak) to 2.5 (strong) governance, (iv) trade as a percentage of GDP, (v) annual population growth rate, (vi) female labor force as a percentage of the total, (vii) urban population as a percentage of total population and (viii) region which is a dummy variable where Arab countries takes the value 1, and 0 otherwise. I further include real GDP per capita as an important explanatory variable that determines democracy and corruption.

1.3.2 Synthetic Control Method

The aim of this paper is to analyze the impact of the Arab Spring on economic growth, corruption and democracy using the synthetic control method (SCM). The empirical model is built based on annual country-level panel data for the period 2003–2018. As the Arab Spring happened in 2010, this yields eight years as a pre-intervention period. To detail the synthetic control method, assume that I observe $J+1$ countries and only the last country $J+1$ is exposed to the Arab Spring (Tunisia or Libya) in a period $T_0 + 1$, such that there are T_0 pre-Arab Spring periods, $1 \leq T_0 \leq T$. I consider the J remaining countries as potential candidates in the donor pool and $t = 1, \dots, T$ time periods from 2003 to 2018. To estimate the influence of the Arab Spring with the synthetic control method, it is required to create a “synthetic control country” by considering weighted combinations of other countries, not exposed to the Arab Spring. Consider a weight vector $W = (w_1, \dots, w_J)$ such that w_j

≥ 0 for $j = 1, \dots, J$ and $\sum_{j=1}^J w_j = 1$. Given a set of weights, W , the synthetic control estimators of outcomes are:

$$\hat{Y}_{SYNTH,t} = \sum_{j=1}^J w_j^* Y_{j,t} \text{ for } t = 2003, \dots, 2018. \quad (1)$$

Where $Y_{j,t}$ represents the observed outcome (economic growth, democracy or corruption) for donor countries and w_j^* is a vector of optimally chosen weights.

The estimated Arab Spring effect for $t \in \{T_0+1, \dots, T\}$, would be the difference between the actual values and synthetic values of an outcome after the intervention period:

$$\hat{\alpha} = Y_{c,t} - \hat{Y}_{SYNTH,t} \text{ for } t = 2010, \dots, 2018. \quad (2)$$

The key idea here is that the synthetic control describes what could have been the trajectory of the outcomes if the Arab Spring had not happened by using a weighted average of donor countries. To find the optimal weights, according to Abadie and Gardeazabal (2003), the weights should best resemble the pre-Arab Spring characteristics of the treated country. Let X_j be a $(K \times 1)$ vector of pre-Arab Spring characteristics for an Arab Spring country, and X_0 be $(K \times J)$ matrix of the predicting values for the J untreated countries. I obtain the vector of optimal weights, W^* , by minimizing the mean square prediction error (MSPE), given by $\|X_1 - X_0W\|$, subject to $w_1 \geq 0, \dots, w_J \geq 0$ and $w_1 + \dots + w_J = 1$. Hence, the synthetic control method creates two-time series plots, one for the actual outcome and one for the synthetic.

1.4 Results

To study the effects of the Arab Spring on economic growth and institutional quality, three outcomes are conducted using the Synthetic Control Method. Additionally, two robustness tests are performed to assess the validity of the estimated results.

1.4.1 The Impact of the Arab Spring on Economic Growth

Figure 1.1 plots the trajectory of log real GDP per capita in Tunisia (panel A), Libya (panel B) and the mean across the rest of 56 donor pool countries. Tunisia and Libya have different paths in log real GDP compared with the 56 donor countries before 2010. Therefore, the raw average across donor countries does not provide an appropriate comparison for the treated countries in the pre-Arab Spring period. However, Figure 1.2 shows that the synthetic control can accurately reproduce the pretreatment log real GDP trend. Each panel in Figure 1.2 presents two-time series lines, one for the treatment country (solid) and one for their synthetic control (dashed). The space between the two lines was very small before the Arab Spring, 2003–2010, suggesting the synthetic control almost exactly reproduces the observed per capita GDP in both countries (more detailed comparison below). However, starting in 2011, a remarkable divergence between the estimated trend for the synthetic and observed Tunisia appears suggesting a negative impact of the Arab Spring on economic growth.

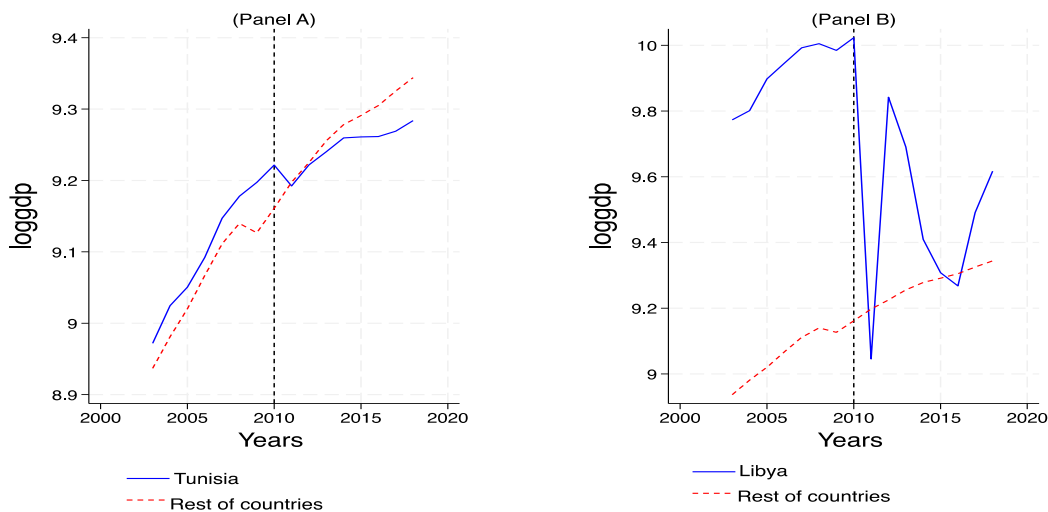


Figure 1.1: Trends in (log) per capita GDP of Tunisia and Libya versus the Rest of the 56 countries

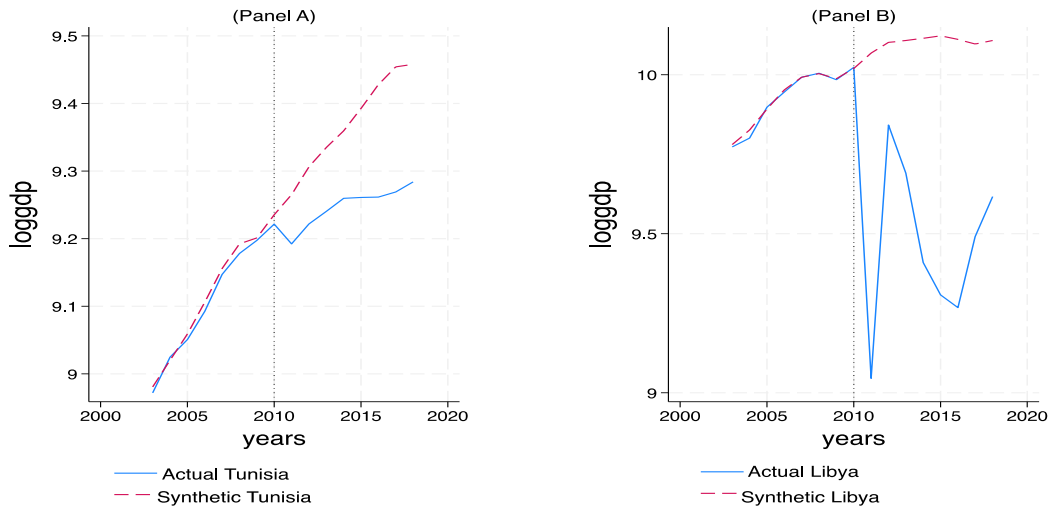


Figure 1.2: (log) per capita GDP: Tunisia and Libya vs. Synthetic

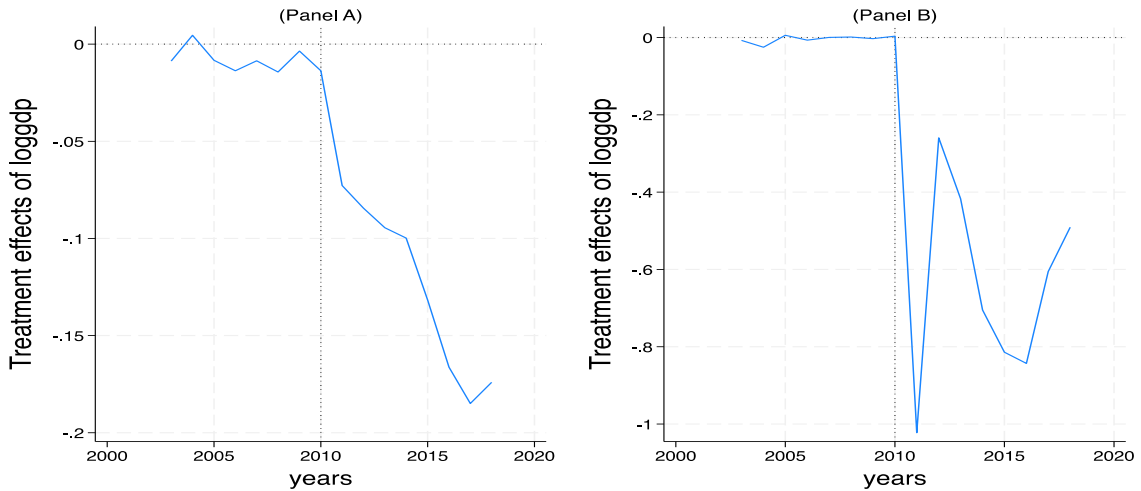


Figure 1.3: Trend in (log) per capita real GDP gap: Tunisia and Libya vs. synthetic

Specifically, the impact of the Arab Spring on economic growth is the difference between the (log) real GDP per capita of actual and synthetic Tunisia from 2010-2018. Libya showed a similar initial slowdown of economic growth after the Arab Spring in 2011, but this is followed by a sharp increase in 2012 before another gradual decrease between 2012 and 2016. The notable fluctuation in per capita GDP in Libya after 2010 likely stems from the economic dependence on oil, which was severely impacted by the civil war in the country during this period.

Similarly, Figure 1.3 illustrates the yearly estimated impact of the Arab Spring on economic growth in Tunisia and Libya by plotting the gap between the estimated log real GDP per capita of the synthetic control with the actual values. The figure suggests that the Arab Spring had a significant effect on GDP per capita and that this effect grew stronger over time for Tunisia, while for Libya it decreased sharply in the first year before fluctuating afterward. The results indicate that for the entire period of 2010-2018, the log GDP per capita was reduced in both Libya and Tunisia, indicating a negative economic impact from the Arab Spring. To more formally examine the potential impact of the Arab Spring on economic growth, this analysis proceeded in two steps. First, I compared economic growth and the set of explanatory variables in Tunisia and Libya with that of their synthetic donor countries for the period 2003-2009.

This step helps us to understand how closely growth and other features of the treatment and donor countries align prior to the Arab Spring. Second, I measured the year-by-year deviation in GDP between the treatment and donor countries during the 2010-2018 period, which is when the Arab Spring was expected to have the most significant impact on economic growth.

Table 1.1 presents the comparison of the economic characteristics of the actual and synthetic Tunisia and Libya before the Arab Spring. The results reveal that the characteristics of the synthetic Tunisia and Libya are similar to those of the actual countries before the Arab Spring. This indicates that the SCM was successful in replicating the characteristics of Tunisia and Libya in the pre-treatment period and that the method can be used to study the effect of the Arab Spring on real GDP per capita. Table A.1 in the Appendix lists the donor countries that contribute to the construction of a synthetic Tunisia, in terms of real GDP per capita. Table A.1 shows that out of 56

donor countries, six countries contributed to this synthetic Tunisia: Nicaragua, Oman, India, China, Malaysia and Saudi Arabia. The share of other countries in the donor pool is zero. Nicaragua and Oman have the highest weight at 28.3% and 23.5% respectively, while Malaysia and Saudi Arabia have the lowest weight at 15.3% and 0.3% respectively.

Table 1.1: GDP predictor means before the Arab Spring

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Life expectancy	4.31	4.28	4.28	4.23
Government expenditure % of GDP	0.17	0.14	0.14	0.17
Female to labor	0.26	0.31	0.33	0.28
Rule of law	0.04	-0.09	-0.94	-0.33
Urban	0.66	0.56	0.77	0.69
Region	1.00	0.24	1.00	0.62
Open	0.96	0.90	0.99	0.86
Population growth	0.93	1.81	1.42	2.24
Real GDP per capita (2007)	9.15	9.16	9.99	9.99
Real GDP per capita (2005)	9.05	9.06	9.90	9.90
Real GDP per capita (2003)	8.97	8.98	9.77	9.78

Similarly, Table A.2 in the Appendix presents the countries in the donor pool and their respective contributions to the synthetic control for Libya. Saudi Arabia has the largest weight, with Azerbaijan, Zimbabwe, Kuwait, Armenia, Bangladesh and Vietnam also contributing to the synthetic control with decreasing weight. The rest of the donor countries do not contribute to the synthetic control for Libya. Saudi Arabia and Azerbaijan have the highest weight at 53.4% and 19.9%, respectively, while Bangladesh and Vietnam have the lowest weight at 1.9% and 1.4%, respectively. To demonstrate the quantitative effect of the Arab Spring on economic growth, Table 1.2 shows the year-by-year difference between observed and synthetic GDP for Tunisia and Libya. The observed average log real GDP per capita for Tunisia from 2010 to 2018 was 9.25, while the synthetic log real GDP per capita for Tunisia was 9.37 for the same time frame. Similarly, the

observed average log real GDP per capita for Libya from 2010 to 2018 was 9.46 compared to 10.10 for synthetic Libya. As a result, the average loss in real GDP per capita after the Arab Spring was 12% for Tunisia and 64% for Libya. That means if it was not for the political and economic instability resulting from the Arab Spring, Tunisia's per capita real GDP between 2011 and 2018 would have been 11,223.22 higher (measured in PPP 2011 international dollars), equivalent to an average annual increase of \$1,402.90. Moreover, the total real GDP for Tunisia during this period would have been \$126.03 billion higher, equivalent to an average annual rise of \$15.75 billion. Similarly, in the case of Libya, the per capita real GDP for 2011-2018 would have been 89,889.08 higher (measured in PPP 2011 international dollars), averaging an annual increase of \$11,236.13. In terms of aggregate real GDP, Libya would have seen a rise of \$577.40 billion during this period, equivalent to an average annual increase of \$72.17 billion, had it not been for the same political and economic instability.

Table 1.2: The impact of the Arab Spring on log per capita real GDP.

Period	Y Tunisia	Y^s Tunisia	The difference	Y Libya	Y^s Libya	The difference
2011	9.19	9.26	-0.07	9.05	10.07	-1.03
2012	9.22	9.31	-0.09	9.84	10.10	-0.26
2013	9.24	9.33	-0.09	9.69	10.11	-0.42
2014	9.26	9.36	-0.10	9.41	10.11	-0.70
2015	9.26	9.39	-0.13	9.31	10.12	-0.81
2016	9.26	9.43	-0.16	9.27	10.11	-0.84
2017	9.27	9.45	-0.18	9.49	10.10	-0.61
2018	9.28	9.45	-0.17	9.62	10.11	-0.49
2010-2018	9.25	9.37	-0.12	9.46	10.10	-0.64

Y: annual log real GDP per capita; Y^s: annual log real GDP per capita for the synthetic country; The difference = Y – Y^s.

1.4.2 The Impact of the Arab Spring on Institution Quality

In this section, I investigate the impact of the Arab Spring on institutional quality by examining corruption and democracy. My question is whether the Arab Spring enhances the quality of institutions by advancing democracy and diminishing corruption.

1.4.2.1 The Impact of the Arab Spring on Democracy

Initially, I present time-trend graphs of democracy in Tunisia (panel A), Libya (panel B) and the remaining 56 developing countries to check if the countries in the donor pool provide a suitable comparison for Tunisia and Libya. Figure 1.4 illustrates that the average democracy among the donor countries is unable to replicate the trajectory of democracy for Tunisia and Libya. However, Figure 1.5 depicts the trajectory of democracy for Tunisia and Libya and for a synthetic control group. The figure suggests that a weighted average of control countries closely approximates the trend of democracy for Tunisia and Libya before the Arab Spring. It is apparent that there is a significant increase in democracy for both countries, as the observed democracy trend deviates from the synthetic democracy trend in the pre-treatment periods, indicating an overall positive effect of the Arab revolution on democracy. Figure 1.5 illustrates that Tunisia experienced a significant increase in democracy after the Arab Spring, and this increase was relatively stable afterwards. On the other hand, Libya initially had a significant increase in democracy after the Arab Spring, but it later declined due to armed conflict.

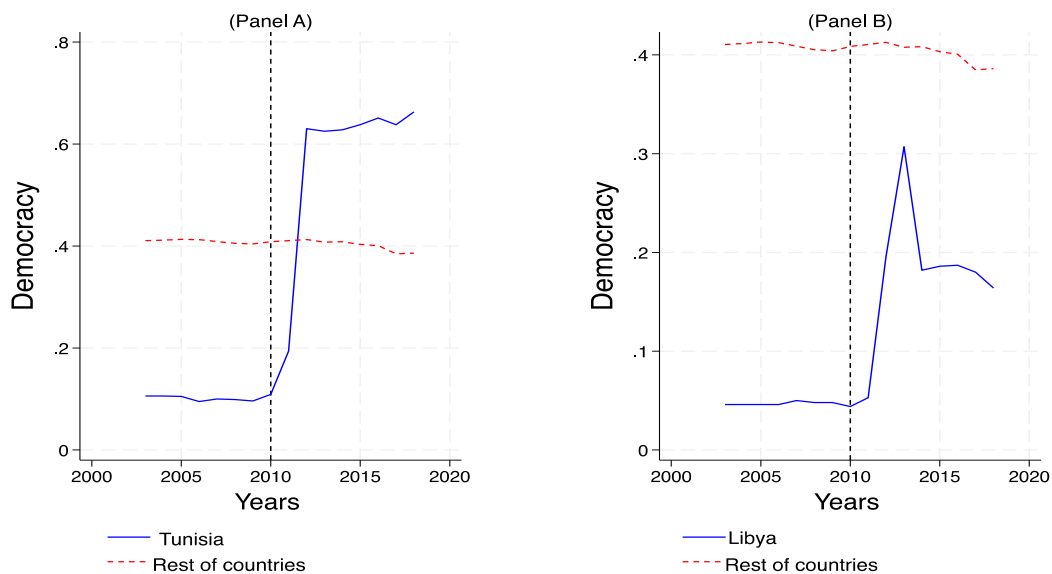


Figure 1.4: Trends in democracy of Tunisia and Libya versus the Rest of the 56 countries

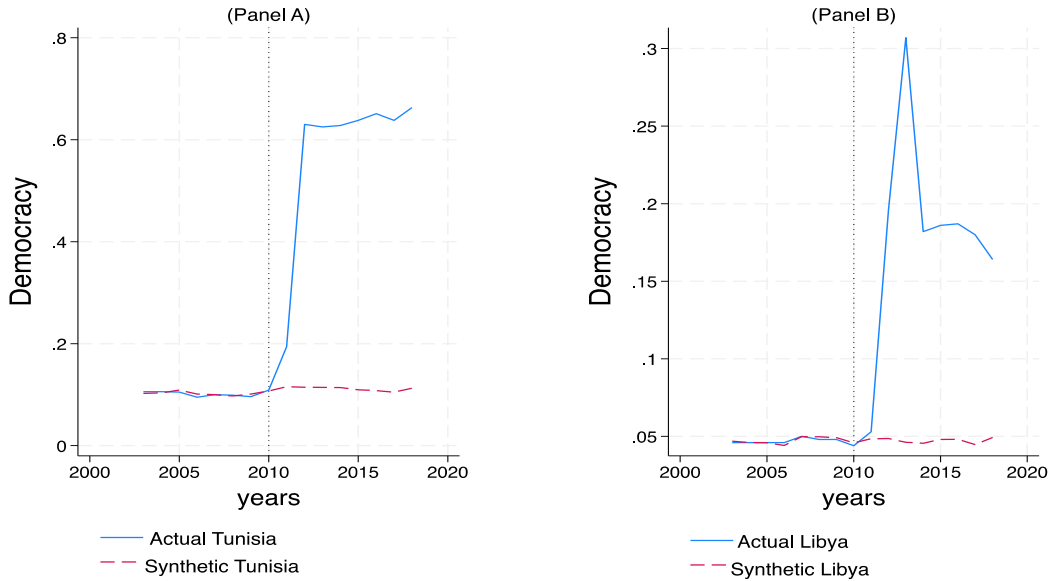


Figure 1.5: Democracy: Tunisia and Libya vs. Synthetic

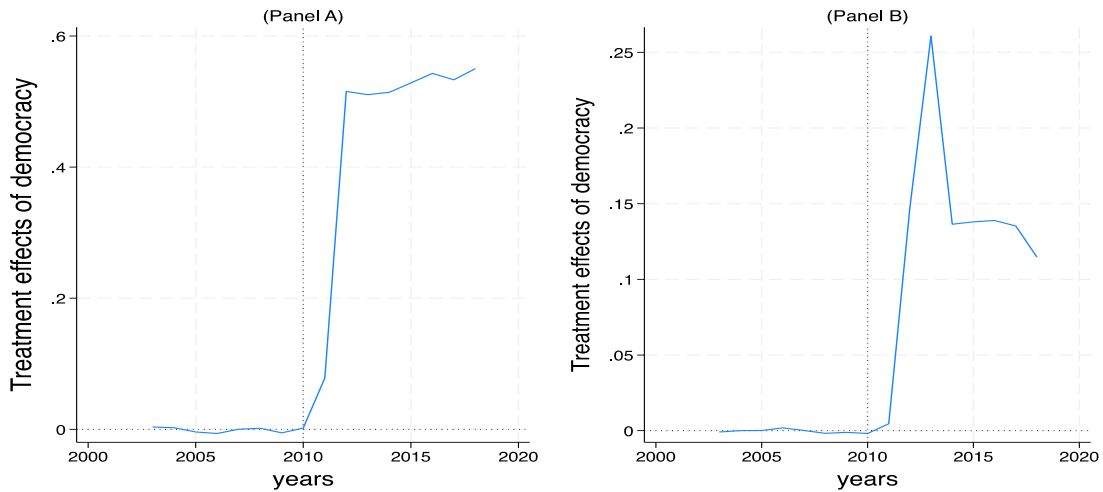


Figure 1.6: Trend in democracy gap: Tunisia and Libya vs. synthetic

Figure 1.6 further supports the previous findings, as it also illustrates the gap between the observed democracy for Tunisia and Libya and the synthetic democracy for these countries, which confirms the positive impact of the Arab Spring on democracy.

Table A.3 in the "Appendix" demonstrates that the synthetic control method effectively replicated the characteristics of Tunisia and Libya prior to the Arab Spring and was suitable for analyzing the impact of the Arab Spring on democracy.

Table A.4 and Table A.5 in the appendix suggest that the synthetic control method identified some countries as the most similar to Tunisia and Libya in terms of democracy prior to the Arab Spring, and they were used to create a synthetic control for the two countries. The positive weight was assigned to Saudi Arabia, Vietnam, Armenia, Oman, Moldova, Nicaragua, Bangladesh and Bulgaria in the synthetic control for Tunisia, and Saudi Arabia, Azerbaijan, China and Vietnam in the synthetic control for Libya. Saudi Arabia and Vietnam have the highest weights, with 52.6% and 18.0% respectively, in the formation of synthetic Tunisia. Bangladesh and Bulgaria, on the other hand, have minimal weights, with 2.0% and 0.3% respectively. In the case of synthetic Libya, Saudi Arabia and Azerbaijan are the countries with the highest weight, at 64.9% and 19.8% respectively, while China and Vietnam have the lowest weight, at 12.1% and 3.2% respectively.

Table 1.3: The impact of the Arab Spring on democracy.

Period	d	d^s	The difference	d	d^s	The difference
	Tunisia	Tunisia		Libya	Libya	
2011	0.19	0.12	0.07	0.05	0.05	0.00
2012	0.63	0.11	0.52	0.20	0.05	0.15
2013	0.62	0.11	0.51	0.31	0.05	0.26
2014	0.62	0.11	0.51	0.18	0.04	0.14
2015	0.64	0.11	0.53	0.19	0.05	0.14
2016	0.65	0.11	0.54	0.19	0.05	0.14
2017	0.64	0.10	0.54	0.18	0.04	0.14
2018	0.66	0.11	0.55	0.16	0.05	0.11
2010-2018	0.58	0.11	0.47	0.18	0.05	0.13

d: Actual democracy; d^s: Democracy for the synthetic country; The difference = d – d^s.

Table 1.3 displays the numerical results of the impact of the Arab Spring on democracy by comparing the observed democracy index with the synthetic democracy index for Tunisia and Libya. The result shows that the observed democracy index for Tunisia was 0.58, which is higher than the synthetic democracy index of 0.11 for the same period. Similarly, for Libya, the observed

democracy index of 0.18 was higher than the synthetic democracy index of 0.05. Overall, the results indicate that there was a significant increase in democracy after the Arab Spring, with an increase of 0.47 for Tunisia and 0.13 for Libya.

1.4.2.2 The Impact of the Arab Spring on Corruption

By following the same procedure as before, I plot the corruption trends for Tunisia, Libya, and an average of 56 control countries. As shown in Figure 1.7, it is not appropriate to use the average of the control group to compare with countries that were affected by the Arab uprising. However, Figure 1.8 illustrates that using a synthetic control method allows for the close reproduction of the corruption trends before the Arab uprising. Figure 1.8 shows a divergence between the estimated corruption trend for synthetic Tunisia and actual Tunisia as well as synthetic Libya and actual Libya after 2010. These differences suggest a significant decline in corruption in Tunisia and Libya following the Arab Spring.

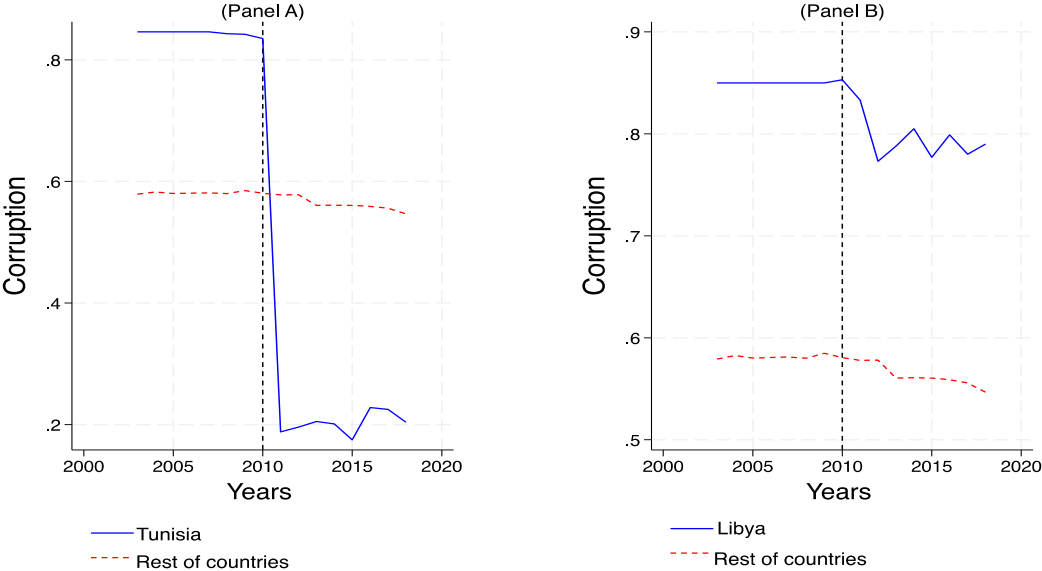


Figure 1.7: Trends in corruption of Tunisia and Libya versus Rest of 56 countries

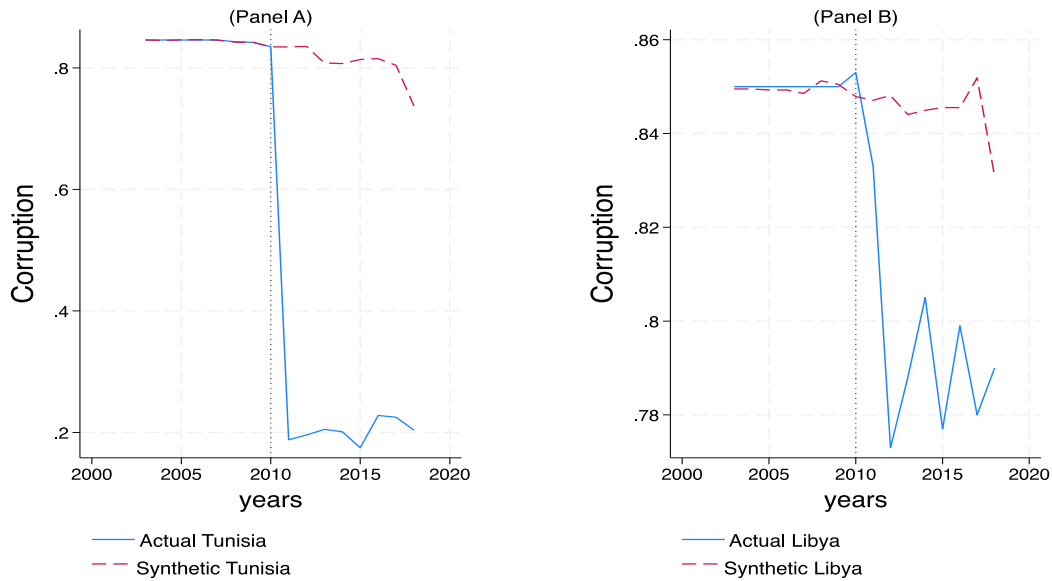


Figure 1.8: Corruption: Tunisia and Libya vs. Synthetic

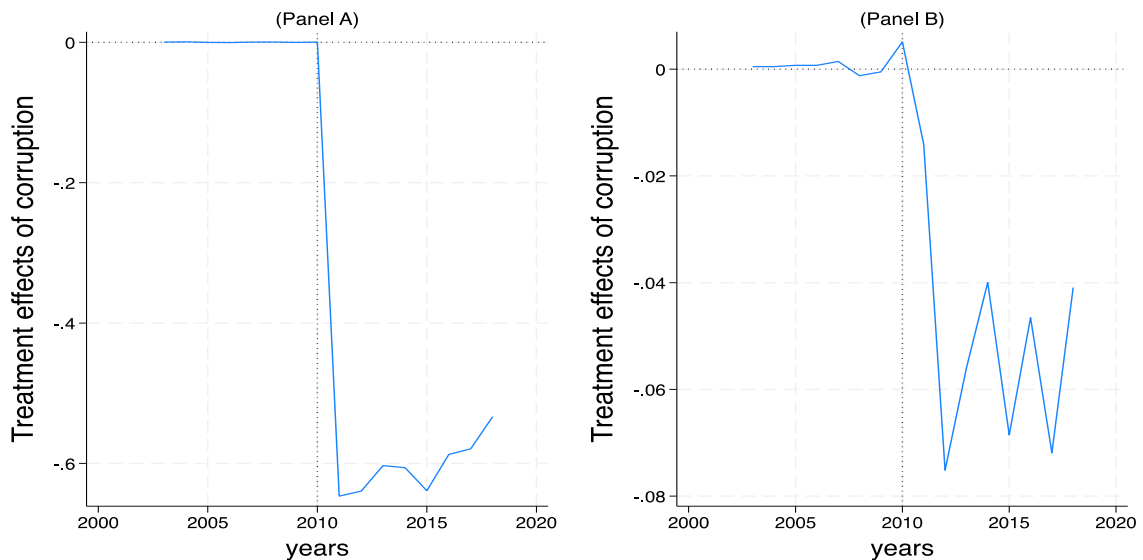


Figure 1.9: Trend in corruption gap: Tunisia and Libya vs. synthetic

Likewise, Figure 1.9 indicates a substantial decrease in corruption in Tunisia and Libya following the Arab Spring, attributable to the implementation of a Commission for Good Governance and Anti-corruption in the new constitutions of both countries. Figure 1.9, Panel A, shows a slight increase in corruption in Tunisia after 2015. This rise can be attributed to the decision made by post-revolutionary governments to align themselves with corrupt businessmen associated with the

previous regime, rather than holding them accountable or initiating a comprehensive reconciliation process (Becheikh, 2021).

Figure 1.9, Panel B, demonstrates a slight decrease in corruption in Libya after the Arab Spring. However, corruption levels fluctuated subsequently due to escalating conflicts between transitional governments and the rising influence of militia groups. These challenges hindered authorities' efforts to enforce the law effectively (Bertelsmann Foundation, 2014). Comparing the pretreatment characteristics of the observed corruption in Tunisia and Libya with those of the synthetic, Table A.6 in the appendix demonstrates that the fit for all the corruption predictors is quite remarkable. Table A.7 and Table A.8 in the appendix provide information on the countries and their weights used to construct the synthetic versions of Tunisia and Libya. Table A.8 shows that synthetic Tunisia is most closely replicated by a combination of Armenia, Gabon, Azerbaijan, Saudi Arabia, Moldova, Madagascar, Bolivia and Bangladesh, with Armenia and Gabon having the highest weight of 38.0% and 24.2% respectively and Bolivia and Bangladesh having the lowest weight of 1.2% and 0.5% respectively. Similarly, Table A.8 shows that synthetic Libya is most closely replicated by a combination of Azerbaijan, Saudi Arabia and Albania with Azerbaijan and Saudi Arabia having the highest weight of 73.7% and 19.7% respectively and Albania having the lowest weight of 6.5%.

Table 1.4 demonstrates that the actual corruption index for Tunisia between 2011 and 2018 was 0.20, while the synthetic corruption index for Tunisia during the same period was 0.80. Additionally, the actual corruption index for Libya between 2011 and 2018 was 0.79, while the synthetic corruption index for Libya during the same period was 0.84. This suggests that the total loss in terms of corruption after the Arab Spring was -0.60 for Tunisia and -0.05 for Libya.

Table 1.4: The impact of the Arab Spring on corruption.

Period	C	C^s	The difference	C	C^s	The difference
	Tunisia	Tunisia		Libya	Libya	
2011	0.19	0.84	-0.65	0.83	0.85	-0.02
2012	0.20	0.84	-0.64	0.77	0.85	-0.08
2013	0.21	0.81	-0.60	0.79	0.84	-0.06
2014	0.20	0.81	-0.61	0.81	0.85	-0.04
2015	0.18	0.82	-0.64	0.78	0.85	-0.07
2016	0.23	0.81	-0.58	0.80	0.85	-0.05
2017	0.23	0.80	-0.57	0.78	0.86	-0.08
2018	0.20	0.74	-0.54	0.79	0.83	-0.04
2010-2018	0.20	0.80	-0.60	0.79	0.84	-0.05

C: Actual Corruption; C^s: Corruption for the synthetic country; The difference = C – C^s.

1.5 Robustness

I perform an in-space placebo test, a leave-one-out test, and an analysis involving additional control variables to ensure the reliability and robustness of the results.

1.5.1 Placebo Test

One way to ensure that the results of an analysis are not due to chance is to conduct an in-space placebo test. In this scenario, Tunisia and Libya are taken out of the treated units and added to the group of donor countries, then the SCM is applied to each of the donor countries as if they had been treated. This allows us to obtain a distribution of effects for countries that did not experience the same treatment as Arab Spring countries. By comparing the results for Tunisia and Libya, to this distribution, I can determine if the observed effect is likely to be caused by the treatment or if it is simply a statistical coincidence (Ferman and Pinto, 2017). A key assumption of the SCM is that the synthetic control can sufficiently match the pre-treatment trends of the treated units. However, for some donor countries, the prediction error (Mean Squared Prediction Error, MSPE) before the intervention is significantly larger than the prediction error for the treatment countries. This raises doubts about the reliability of SCM for these donor countries and reduces confidence

in the results of the post-treatment analysis. Therefore, I exclude the countries that have pre-treatment MSPEs that are more than two times higher than the pre-treatment MSPE for treatment countries.

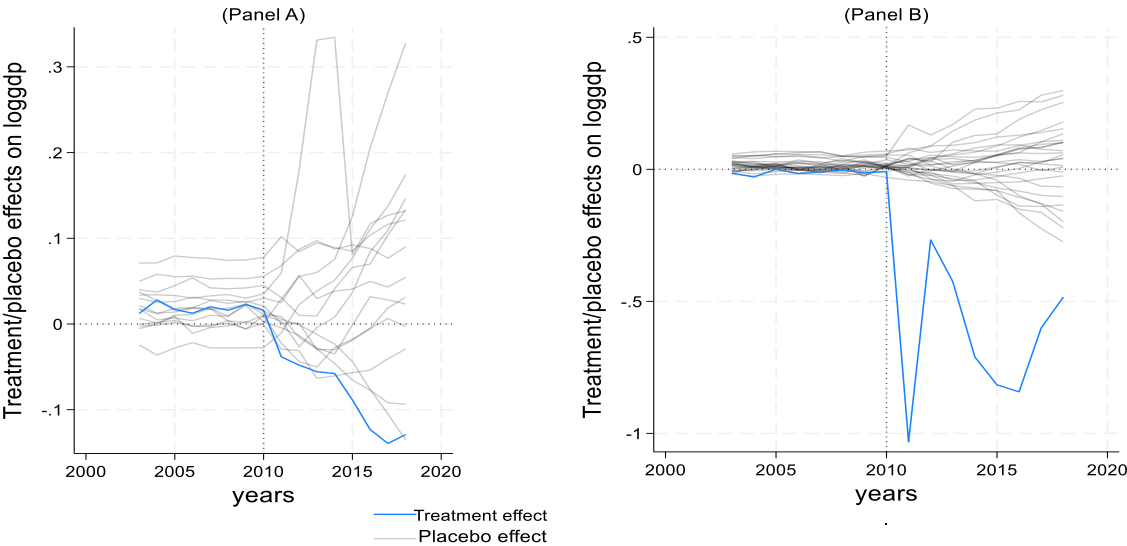


Figure 1.10: In-space placebo test for economic growth in Tunisia and Libya

Figure 1.10 shows the estimated treatment gaps in GDP for Tunisia (panel A), Libya (panel B) and the placebo gaps for all remaining donor countries. The figure indicates that the model's predictions match the observed outcomes relatively well before the intervention for the included countries. The gap between Tunisia and Libya stands out as highly unusual when compared to the distribution of gaps for the remaining control countries. It is clearly seen that the negative effect in Tunisia and Libya is by far the lowest of all, this further confirms the evidence that the intervention had a significant negative impact on economic growth in Tunisia and Libya, and it's not just a random fluctuation or a chance. Figures A.12 and A.13 in the appendix section of the study provide similar results when analyzing the effect of the Arab Spring on corruption and democracy. These figures use the same methodology as Figure 1.10, by excluding the countries with pre-treatment MSPEs that are more than two times higher than the pre-treatment MSPE for the treatment countries and

comparing the gaps for the remaining control countries to the gap for Tunisia and Libya. Figure A.12 provides strong evidence that the Arab Spring has had a significant positive impact on democracy in Tunisia and Libya. The magnitude of the positive effects observed in the two countries greatly exceeds those observed elsewhere, suggesting that these effects are not coincidental or random changes. This data strongly suggests that the Arab Spring distinctly and significantly enhanced democratic processes in Tunisia and Libya. Similarly, Figure A.13 supports that the Arab Spring has had a substantial negative effect on corruption measures in Tunisia and Libya. The result presented in Figure A.13 highlights Tunisia's remarkable progress in anti-corruption efforts, showing it as the lowest among all control countries. Meanwhile, Figure A.13 shows the substantial positive impact of Libya, above all other control countries except Côte d'Ivoire—a country making significant progress in rebuilding and strengthening the criminal justice system, which includes the adoption in 2012 of the African Union Convention on Prevention and Compacting Corruption (AUCPCC) (Transparency International, n.d.). These findings strengthen the argument that the Arab Spring interventions significantly strengthened anti-corruption policies in Tunisia and Libya.

1.5.2 Leave-one-out Test

To ensure the robustness of the findings, I perform a leave-one-out analysis (Abadie et al, 2015). This method involves excluding one comparison country with a non-zero weight from the donor group and repeatedly running the SCM to check if the result is influenced by any specific donor country. Figure 1.11 demonstrates that even after excluding countries with positive weights, there is no significant alteration in the estimated (log) real GDP per capita trend for Tunisia when compared to Figure 1.2. Similarly, Figure 1.11 indicates that after excluding countries with non-zero weights, there is no significant variation in the original synthetic (log) real GDP per capita for Libya when compared to Figure 1.2. This result suggests that the calculated negative impact of

the Arab Spring on economic growth remains unchanged and reliable, even after disregarding any specific donor country.

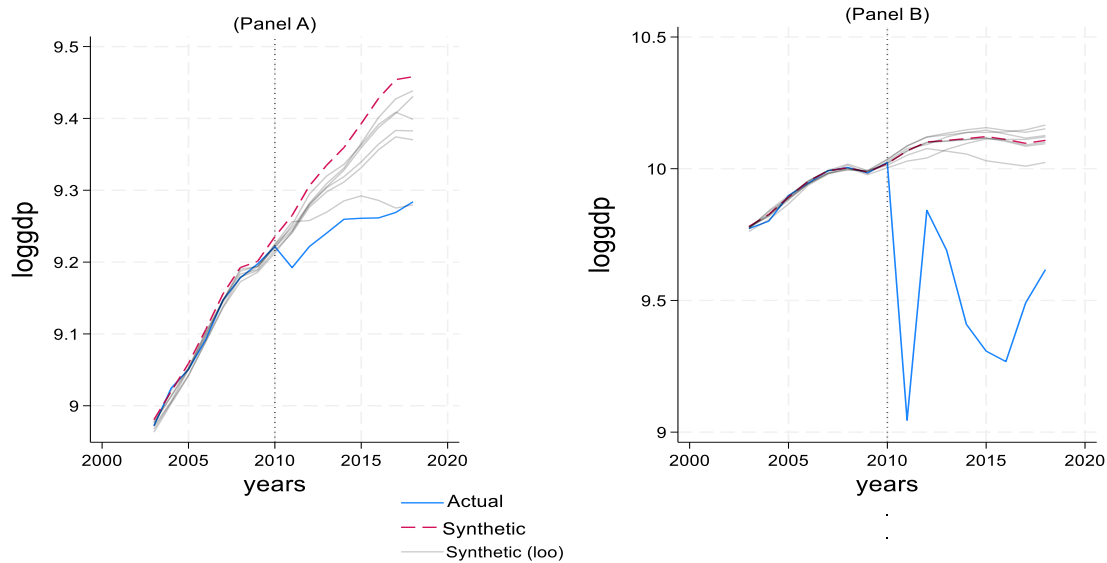


Figure 1.11: Synthetic control leaves one control country out for economic growth.

This supports the conclusion that there is no single country driving the results and reinforces the assumption that the Arab Spring only impacted Tunisia and Libya. Additionally, I conducted a leave-one-out test to validate the robustness of democracy results. For Tunisia, Figure 1.12 demonstrates that after excluding countries with non-zero weights, the results align well with the original synthetic Tunisia displayed in Figure 1.5, further reinforcing the reliability of the estimated results. Using the leave-one-out test for Libya, Figure 1.12 reveals that all synthetic controls are distinct due to Libya's distinct dictatorship regime prior to the Arab Spring. Libya's democracy index was 0.046 in 2003, lower than 95% of the donor countries. Thus, after excluding Saudi Arabia (which had a democracy index of 0.031 in 2003), Libya became the least democratic country among those with positive weights for synthetic Libya, causing the results to be heavily influenced by Saudi Arabia. Despite this, I observed a significant increase in Libya's democracy

after the Arab Spring, with the democracy index rising from 0.046 in 2003 to 0.307 in 2013 before decreasing to 0.164 in 2018 due to the civil war.

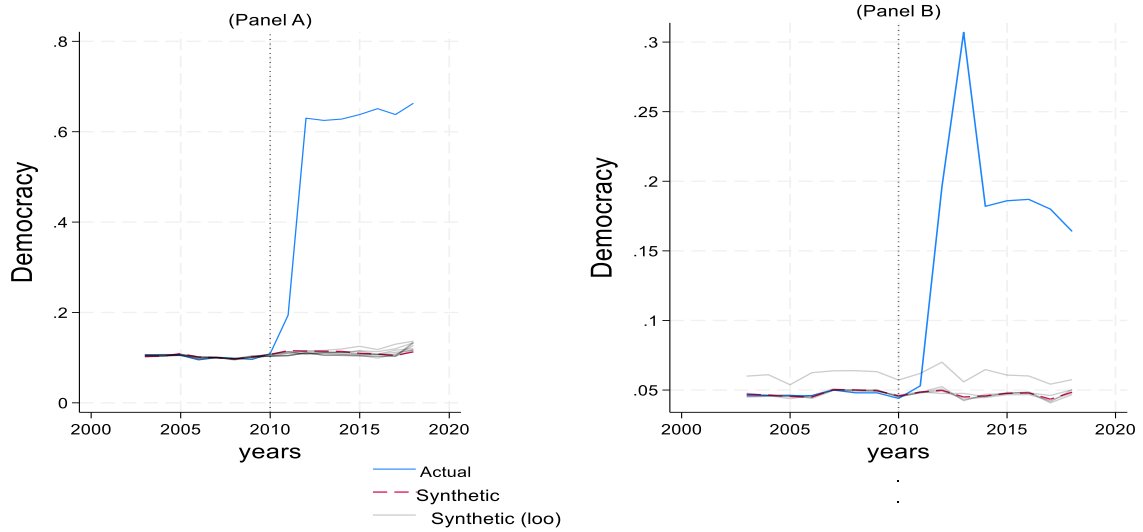


Figure 1.12: Synthetic control leaves one control country out for democracy.

I examined the robustness of corruption results. Figure 1.13 indicates that there is not a significant change in the original synthetic Tunisia after iteratively excluding countries with non-zero weights. This demonstrates that the original estimate is not significantly affected by the presence of any specific country.

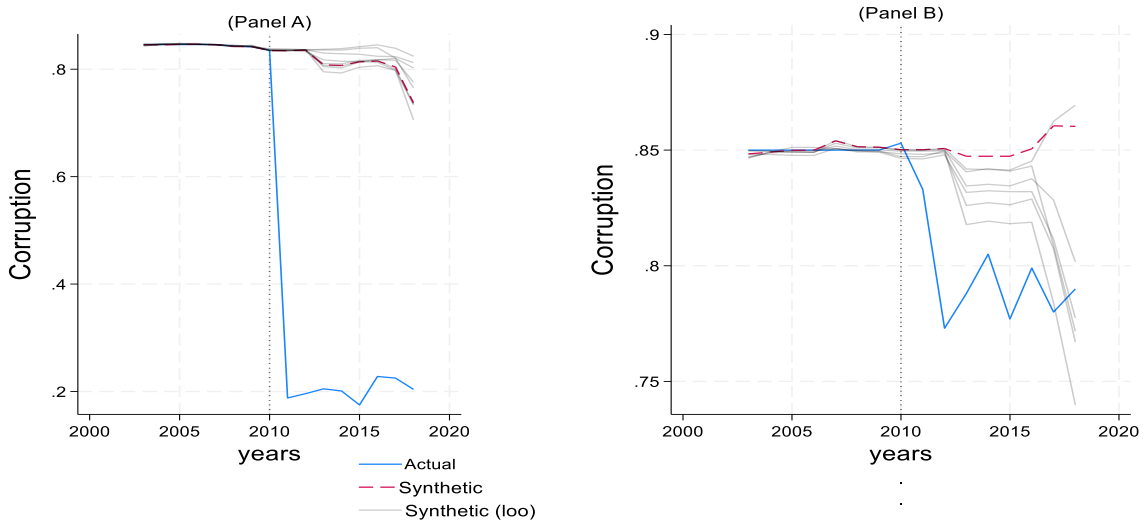


Figure 1.13: Synthetic control leaves one control country out for corruption.

Figure 1.13 shows that in constructing the synthetic control for the analysis of corruption dynamics in Libya, the initial approach identified three donor countries with positive weights. However, during the leave-one-out test, this number increased to six, reflecting a wider range of countries that contributed to the synthetic Libya. This contradiction may be due to Libya's severe corruption, shaped by many social, economic, and political factors.

1.5.3 Control Variables

To enhance the robustness of the analysis, I include additional explanatory variables, such as natural resources as a percentage of GDP, mean years of education, oil rent as a percentage of GDP, unemployment rate, and income inequality (top 10% to bottom 50% ratio), in order to test the sensitivity of the results. These variables are crucial for understanding the outcomes and comprehensively evaluating the factors influencing the results. Tables A.9, A.10 and A.11 in the appendix present the comparison of the characteristics of the actual and synthetic Tunisia and Libya in terms of real GDP per capita, democracy and corruption before the Arab Spring. Interestingly, the behavior of these added variables closely mirrored their counterparts in the synthetic control, emphasizing the robustness of my findings.

Table 1.5 presents the extent of the Arab Spring's effect on real GDP, democracy, and corruption after the incorporation of the aforementioned control variables into the analysis. This is calculated by deducting the average of the actual outcomes and average synthetic outcomes for Tunisia and Libya from 2010 to 2018. It is noteworthy that the addition of supplementary control variables did not substantially change the outcomes obtained through the initial analysis. The convergence between the actual outcomes and the synthetic, even with the inclusion of more variables, reaffirms the reliability of my conclusion and strengthens the validity of the results.

Table 1.5: The impact of the Arab Spring on log per capita real GDP.

Outcome	Period	Actual Tunisia	Synthetic Tunisia	The difference	Actual Libya	Synthetic Libya	The difference
Real GDP per capita	2010-18	9.25	9.32	-0.07	9.46	10.06	-0.60
Democracy	2010-18	0.58	0.12	0.46	0.18	0.05	0.13
Corruption	2010-18	0.20	0.79	-0.59	0.79	0.85	-0.04

Similarly, Figures 1.14, 1.15 and 1.16 show the accuracy of the synthetic control method in reproducing the pre-treatment trends in log real GDP, democracy, and corruption. Each of these figures shows two lines: one for the treatment country (solid) and the other for its synthetic control (dashed). The proximity of these lines in the period from 2003 to 2010 prior to the Arab Spring shows strong consistency with my initial analysis. Also, the convergence post-2010 reinforces my initial findings, demonstrating the negative impact of the Arab Spring on economic growth, as well as a positive impact on democracy and anti-corruption.

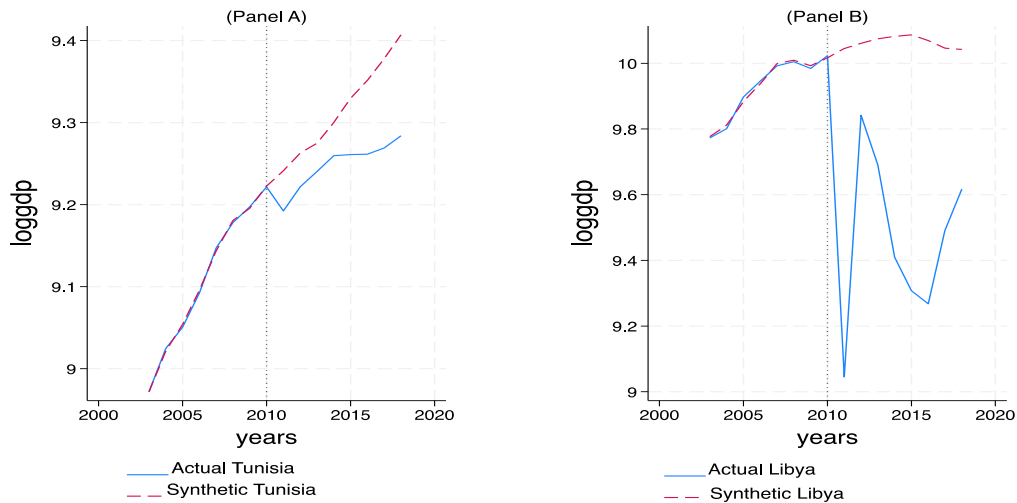


Figure 1.14: (log) per capita GDP: Tunisia and Libya vs. Synthetic after adding more control variables.

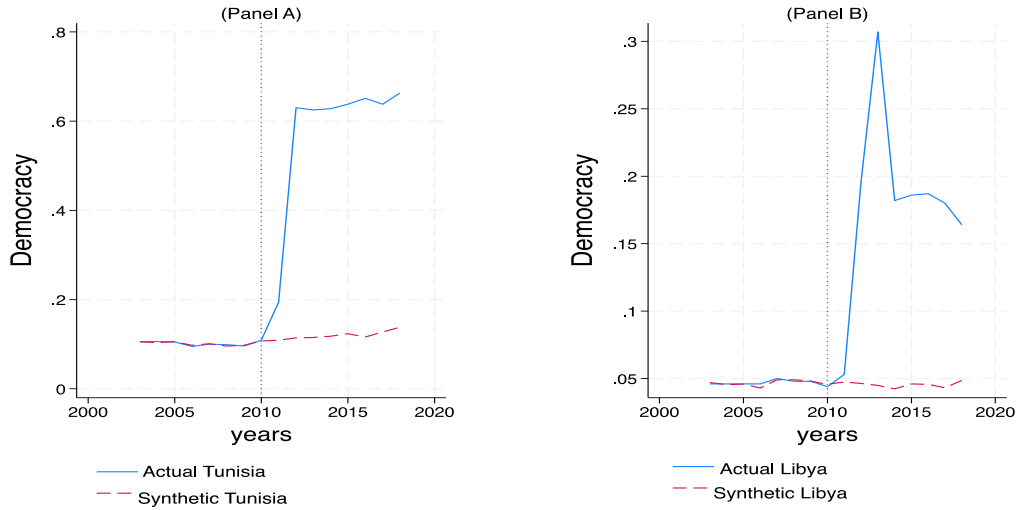


Figure 1.15: Democracy: Tunisia and Libya vs. Synthetic after adding more control variables.

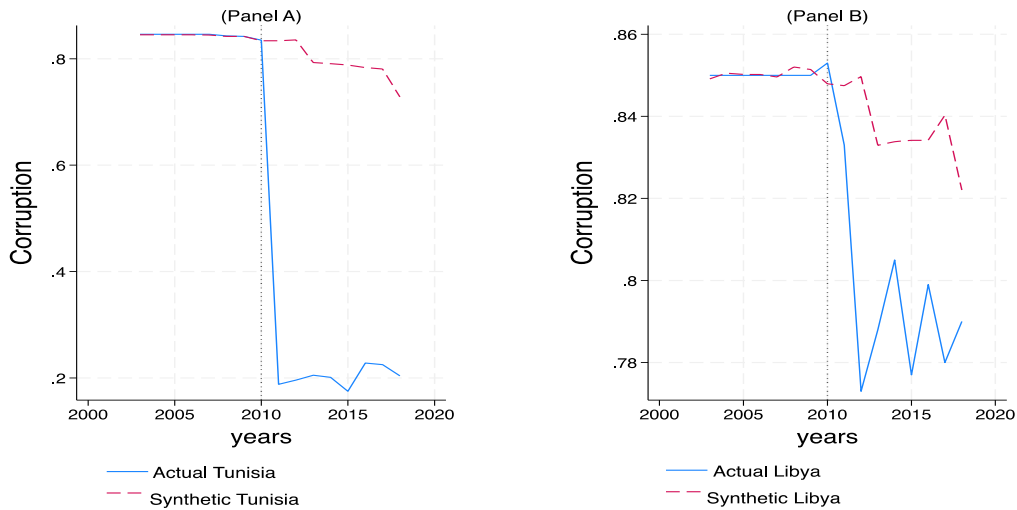


Figure 1.16: Corruption: Tunisia and Libya vs. Synthetic after adding more control variables.

1.6 Discussion

This study confirms that the Arab Spring had a negative impact on real GDP per capita, which aligns with previous research findings (Echevarría and Enríquez, 2020; Echevarría and Enríquez, 2019; Matta et al, 2019). However, the effect of the conflict varies greatly between Tunisia and Libya, influenced by the type of conflict and economic structure. The results suggest that the Arab Spring had a greater impact on Libyan economic growth than on Tunisian economic growth. This

difference may stem from two reasons: (1) Libya's economy heavily relies on hydrocarbon exports, which were greatly impacted by political unrest, disruptions to oil output, and declining oil prices. (2) The Libyan protests quickly escalated into an international intervention and a civil war. In Tunisia, the decline in economic growth led the government to implement policies promoting economic growth, resulting in signs of recovery such as an increase in real GDP growth, reduced inflation, and a rebounding tourism sector.

This study also confirms that the Arab Spring had a positive impact on democracy in Tunisia and Libya, although the impact was higher in Tunisia. The results show that Tunisia made substantial progress towards democracy, with a constitution that guaranteed and protected the fundamental rights of its citizens. Meanwhile, the results indicate that democracy significantly increased in Libya after its first parliamentary election in 2012, before declining due to the civil war in 2014. The findings also indicate that the Arab Spring influenced corruption levels in Tunisia and Libya. Tunisia and Libya showed a decline in corruption after the Arab Spring as the government implemented reforms to fight corruption and improve governance. However, the civil war in Libya resulted in a decrease in government authority, causing corruption levels to fluctuate. The results suggest that political and economic stability plays a significant role in the fight against corruption. Tunisia and Libya experienced simultaneous increases in democracy after the Arab Spring, in line with decreases in corruption. However, the 2019 Corruption Perceptions Index report reveals that both countries are failing to make significant progress in fighting corruption over the past decade. According to Arafa (2020), the Tunisian government lacks the necessary capability and power to effectively tackle corruption. Additionally, the anti-corruption strategy put forth by the Tunisian government is not feasible. In Libya, corruption is further complicated by the lack of strong public institutions, ongoing internal conflict, and instability. Despite the findings indicating a slight

decrease in average corruption in Libya following the Arab Spring, it's noteworthy that Libya has consistently been ranked among the most corrupt countries globally since 2012 (CPI, 2021). The findings indicate that due to the widespread political upheaval caused by the Arab uprising, corruption rates in Tunisia and Libya have increased after 2015 as a result of declining incomes and living standards, which has eroded the once thriving middle class in these countries (Congressional Research Service, 2021). This research contradicts the majority of prior literature that demonstrates a negative correlation between corruption and economic growth (Pellegrini and Gerlagh, 2004; Mo, 2001; Anoruo and Braha, 2005). In contrast to previous research, this study reveals a different pattern in the relationship between democracy and economic growth. However, it aligns with prior research concerning the relationship between democracy and corruption. A large number of previous studies showed that there is a positive relationship between democracy and economic growth (Huber et al. 1993; Barro 2002; Kurzman et al. 2002; Ghosh and Gregoriou 2009), and a negative relationship between democracy and corruption (Treisman, 2000; Brueckner, 2021; Schneider et. al, 2010; Shleifer and Vishny, 1993). This finding is usually attributed to the notion that democratic systems create a more stable and predictable environment for trade and investment. The observed relationship between increasing democracy and decreasing levels of corruption highlights a general principle: as countries move towards more transparent and accountable governance, corrupt practices decrease. Democratic governance often comes with increased checks, balances and accountability mechanisms, making it harder for corrupt activities to go unnoticed. However, the process of creating or strengthening democratic institutions is inherently complex and can pose challenges for economic stability and growth. This transition period requires significant political, legal and economic reforms. Political power shifts, new laws are enacted, and economic policies can be realigned to democratic values. These changes could

create uncertainty in the trading environment, causing investor caution and potentially slowing economic activity. Moreover, the implementation of democratic reforms may require considerable resources and time. Government resources that could otherwise be invested in economic development programs may need to be redirected to support the establishment and development of democratic institutions. Moreover, there may be controversy and disagreement over policy guidelines at that time, delaying decision-making and implementation of economic reforms.

1.7 Conclusion

In this paper, I used a synthetic control method (SCM) to capture the aftermath of the Arab Spring, investigating its complex effects on economic growth, democracy and corruption levels in Tunisia and Libya. The analysis covered the years from 2003 to 2018, and I used a robust dataset of panel data from Tunisia, Libya and 56 developing countries that have not been affected by the Arab Revolution. The findings shed light on the aftermath of the Arab Spring. Notably, I found stronger and negative effects on economic growth in Tunisia and Libya compared to the trajectories predicted by their synthetic control counterparts. However, in the midst of these economic challenges, the Arab Spring brought significant and positive changes in terms of democracy and anti-corruption efforts. The reliability and robustness of these findings were rigorously examined through various analyses, including in-space placebo tests, leave-one-out tests, and the inclusion of additional control variables. These methodologies were instrumental in ensuring the validity of the results and strengthening the credibility of my conclusions.

These findings carry profound policy implications for Tunisia and Libya. Recognizing the challenges of the post-Arab Spring economy, policymakers should focus on targeted economic policies and international cooperation to renew economic growth. Sectoral diversification, infrastructure development and human capital development can play an important role in reviving

this economy. Furthermore, the democratic progress observed in the aftermath of the Arab Spring presents an opportunity to further strengthen democratic institutions. Policy makers can focus on structural reform, ensuring the strengthening of democratic processes, promoting political inclusion, and supporting the rule of law. This step is crucial for maintaining and enhancing the newfound democratic progress. In the fight against corruption, the observed reductions indicated the effectiveness of anti-corruption measures introduced after the Arab Spring. Policymakers should continue to introduce strong anti-corruption policies, promote transparency and judicial independence. Furthermore, international cooperation in anti-corruption efforts and the sharing of best practices could further strengthen these efforts.

While this study provides valuable insights, it is important to acknowledge its limitations. While robust, the analysis is based on historical data and does not account for ongoing developments. Future research could use more up-to-date data to capture post-Arab Spring dynamics. Additionally, examining the social and cultural dimensions of these changes can provide a more nuanced understanding.

Finally, in this study, I investigated the impact of the Arab Spring on economic growth, democracy, and corruption. While I made efforts to exclude certain confounding factors such as natural disasters and conflicts, it is important to note that there are other potential variables that were not accounted for in this analysis. One such factor is natural resources. Previous research (Hotte, 2001; Hotte, 2013; Elbadawi and Soto, 2014) has established a connection between natural resources and conflicts, as well as political instability.

Chapter 2 Arab Spring and Foreign aid

2.1 Introduction

More than ten years ago, the Arab Spring led to the overthrow of four long-standing governments in Tunisia, Libya, Egypt, and Yemen. However, despite facing political unrest, six Arab kingdoms, Saudi Arabia, Morocco, Oman, Bahrain, Jordan, and Kuwait were not similarly impacted. The Arab Spring did have significant economic repercussions, which impacted economic growth and increased the need for overall assistance and aid for sectors that could help mitigate the crisis. The U.S. and European countries announced their support for those advocating for human rights and democracy during the Arab Spring. However, the amount of official development assistance (ODA) provided to the countries affected by the Arab Spring has been inconsistent. A large portion of the variation in foreign assistance is due to the responses of bilateral donors to Arab Spring countries and its effects on the Middle East and North Africa region. Furthermore, the importance of geopolitics in the process of allocating aid to Arab countries should not be underestimated (UNU-WIDER, 2011). On the other hand, Arab donors have had different reactions to the Arab Spring. A study by SK Isaac (2014) discovered that some countries in the Gulf Cooperation Council (GCC) placed a priority on supporting counterrevolutionary efforts by increasing aid to Jordan, Morocco, Tunisia, and Egypt. This finding was supported by another study, which found that while Gulf monarchies and Arab financial institutions pledged to provide assistance to countries undergoing transition, the majority of aid disbursements were directed to Egypt and Morocco (Rouis, 2013). Figure 2.1 illustrates that the overall ODA to Tunisia, Libya, Yemen, Syria, Jordan, Morocco and Egypt experienced a significant increase following the uprising.

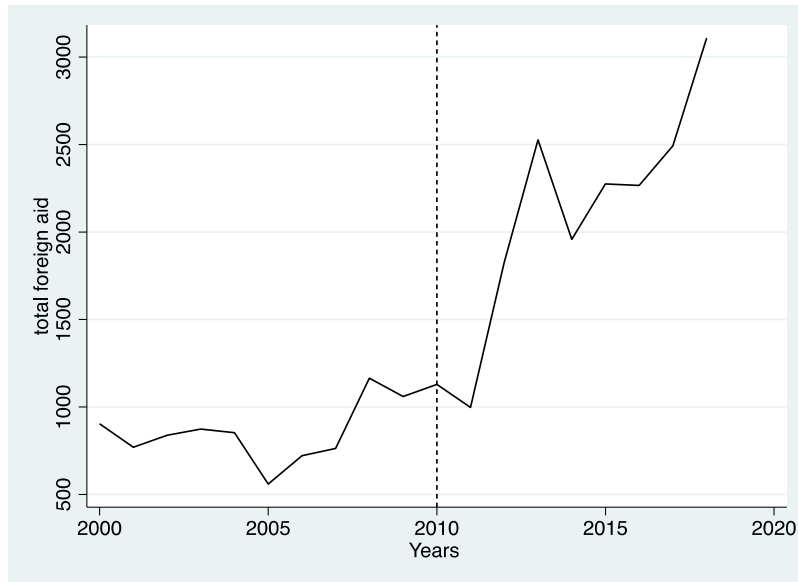


Figure 2.1: Total net official development assistance to Tunisia, Libya, Yemen, Jordan, Morocco, Syria and Egypt

Source: The OECD's Development Assistance Committee (DAC)

There are numerous reasons why countries affected by the Arab Spring may receive assistance and support. The Arab Spring brought about significant challenges that threatened security in the region, including uprisings, civil wars, a rise in irregular migration, and military coups. These challenges not only resulted in heavy human and material losses, but also hindered governments' ability to effectively address various issues such as economic structure and terrorism in the Middle East and North Africa (MENA) region. While the official goal of foreign aid is to redistribute resources from donor countries to recipient countries to combat poverty and promote economic growth, some studies have found that foreign aid may also serve strategic interests for donor countries, such as strengthening political and economic influence (Lis, 2018; Alesina & Dollar, 2000).

The purpose of this paper is to examine the effect of the Arab Spring on overall foreign aid to affected countries and to analyze how donor countries and international organizations have responded to this political conflict. The focus is on how donors allocate aid for government and

civil society, comparing it with humanitarian aid and other forms of aid to determine whether aid is motivated by strategic considerations. In addition, this research investigates the potential indirect effect of the Arab Spring on the allocation of foreign aid to Arab countries that were not directly impacted by the event. The aim is to assess whether there has been a reallocation of foreign assistance, both from unaffected Arab nations to those affected by the Arab Spring after 2010, and vice versa. To achieve this, I study the impact of the Arab Spring on aid given by Development Assistance Committee (DAC) countries, the U.S, European countries and international institutions (multilateral). I use the synthetic difference-in-differences method (SDID) introduced by Arkhangelsky et al. (2021). SDID is a causal inference estimation technique that combines both difference-in-difference (DID) and synthetic control (SC) settings by reweighting and matching pre-treatment time periods (as in SC), instead of using parallel trend assumptions and using unit fixed effects (as in DID). In this case, the SDID is presented as a weighted estimation with both time and unit fixed effects. This study utilizes data from 124 developing countries from the years 2000 to 2018, with 2010 being the treatment event (the Arab Spring). The data was obtained from the World Bank Open Data and the OECD's Development Assistance Committee. This study addresses a gap in the existing literature by analyzing the impact of the Arab Spring on overall foreign aid and investigating donors' reactions to the Arab Spring through their allocation of aid to government and civil societies.

2.2 Foreign Aid and Conflict

There is a substantial amount of literature that examines the relationship between aid and conflict. One aspect of this literature argues that armed conflicts can have a negative impact on foreign aid allocation. Donors who prioritize development assistance are likely to reduce or discontinue aid to countries that are experiencing armed conflicts. This is because these conflicts impose significant

economic costs, including the destruction of human capital and physical infrastructure, which can limit recipients' ability to utilize the aid effectively. (Alesina and Weder, 2002, Blomberg et al., 2004, Gaibulloev and Sandler, 2009). Lis (2018) studied the impact of conflict and terrorist attacks on the allocation of bilateral and multilateral foreign assistance for governance, education, social and health sectors, which are considered important for consolidating peace and stability. Lis found that multilateral donors tend to avoid providing aid to countries experiencing unrest and violence. However, the presence of conflict does not have any effect on the likelihood of a country receiving bilateral aid, although it may result in reduced levels of aid being offered. Furthermore, Lis discovered that in both the selection and allocation stages, bilateral aid for government, education, social, and health sectors had significant positive effects on both international and domestic terrorism. On the other hand, Gang and Lehman (1990) found that political conflict does not have any impact on foreign aid.

Several studies have examined the role of aid in both instigating and resolving conflicts. Ree and Nillesen (2009) examined the effect of foreign assistance on the risk of civil war in sub-Saharan African countries. They found that increasing the level of foreign aid increases the likelihood of a conflict ending. Additionally, they found no evidence that foreign assistance flows contribute to increasing the potential for conflict. On the other hand, Burnside and Dollar (2000) revealed that the impact of foreign assistance on resolving civil conflict could be positive or negative, contingent on the government's capability to implement effective economic policies to maximize the foreign aid received. Thus, the effectiveness of foreign aid flows may be linked to the influence of conflict on economic conditions in countries experiencing conflict.

Previous studies have taken into account donors' attitudes towards social and political conditions in the countries receiving foreign assistance. For some bilateral donors, foreign aid may be used

as a political tool to support one of the parties involved in the conflict. Chauvet (2002) demonstrated that during the Cold War, El Salvador experienced a significant increase in bilateral aid during the civil conflict (1979-1992) while multilateral aid remained relatively unchanged during the same period. Similarly, Mosley (1987) suggested that donors may allocate aid to a developing country with the aim of securing future political or economic cooperation from the recipient. In such cases, aid is provided to assist the recipient in responding to the donor's requests, to ensure the recipient's loyalty, or to promote collaboration with the donor on global issues.

2.3 Foreign Aid and the Arab Spring

There are two main channels through which foreign aid can allow donors to potentially exert significant influence on the course of change in Arab Spring countries. Donors who are motivated by strategic interests may interfere in the internal affairs of Arab countries by providing aid for government and civil society. This sector is divided into two sub-categories, namely "General Government and Civil Society" and "Peace and Security, Conflict Prevention and Resolution." The goal is to aid the establishment of stable governance and peaceful circumstances in developing countries. Conversely, donors who are not driven by strategic interests may direct their assistance towards humanitarian and development purposes. In this context, I explore the transformations in foreign aid offered by significant donors, including the United States, European Union (EU), and multilateral agencies, both prior to and following the occurrence of the Arab Spring.

Before the Arab Spring, the United States provided aid to several countries in the region, including Egypt, Tunisia, and Yemen. This aid was focused on a range of issues, including economic development, democracy promotion, and security assistance (Dixon, 2011; Selim, 2013). However, after the uprisings began, the U.S. government was forced to reassess its relationships with some of these countries and adjust its aid accordingly. The U.S. government's aid to countries

in the Middle East and North Africa shifted after the Arab Spring to focus more on supporting democratic reforms and civil society organizations, as well as addressing ongoing humanitarian crises. Similarly, the Arab Spring had significant implications for the EU's relations with countries in the MENA region. The EU provided aid to several countries in the region before and after the Arab Spring, but the nature and focus of the aid changed in some ways as a result of the events (Dadush & Dunne, 2011). The EU provided both financial and technical assistance to support democratic transitions and promote economic and social development in these countries. Geographical proximity was one factor that may have influenced the EU's aid response to the Arab Spring, as countries such as Tunisia, Libya, and Morocco are located close to Europe and their stability and development are seen as important for the EU's own security and prosperity.

Multilateral aid response to the Arab Spring was an important part of the international community's efforts to support the democratic transition and economic reform in the affected countries. Many multilateral aid organizations increased their funding to support the transition to democracy and economic reform in the Arab Spring countries (Eran, 2011). In addition to supporting political and economic reforms, multilateral aid organizations also provided humanitarian assistance to those affected by the conflicts and unrest that followed the Arab Spring. This included support for refugees, internally displaced persons, and other vulnerable populations. However, the response of multilateral aid organizations to the Arab Spring was not without criticism. Some argued that the focus on economic stabilization and political transition ignored the underlying causes of the uprisings, such as poverty, corruption, and political repression (Nafie, 2021).

Previous studies have analyzed the role of foreign aid in Arab Spring countries from a political perspective. Bicchi (2014) examined how European assistance to Arab states surrounding the Mediterranean Sea increased in response to the Arab Spring. He found that the EU's aid did not

represent a new strategy for rapidly changing countries in the region. The EU increased the amount of ODA to Arab countries in response to the Arab Spring. However, the EU's aid failed to have as significant an impact as was anticipated. Additionally, Hollis (2012) argues that Europe played a negative role in the genesis of the Arab Spring by supporting authoritarian regimes in the region for strategic and economic reasons. European countries, including France, Germany, Italy, and the UK, provided military, economic, and diplomatic support to regimes such as those in Egypt, Tunisia, and Libya, which suppressed democratic aspirations and violated human rights. The U.S. government was initially hesitant about how to respond to the millions of Arab youths who took to the streets to protest against U.S. allies (Cooper et al, 2014). However, the U.S. government was eventually forced to express support for the Egyptian demonstrators, despite decades of providing foreign assistance to the Egyptian government (Selim, 2013).

There is a significant amount of literature that examines the impact of conflict on foreign aid, but there are relatively few studies that focus on the impact of the Arab Spring on overall foreign assistance, and how donors' allocations differ across Arab Spring countries. In order to empirically test the impact of conflict on foreign aid, I propose the following hypotheses:

1. The U.S. provided significant assistance to its closest Arab allies (Egypt and Jordan) following the Arab revolutions. The majority of U.S. aid is directed towards supporting the governments in these countries due to strategic considerations.
2. The European countries increased their aid to the government and non-government sectors in Tunisia, Libya and Morocco due to geographical proximity.
3. Multilateral donors increased their aid to all Arab Spring countries. Most of the multilateral aid is directed towards non-government sectors because multilateral channels are less politicized than bilateral channels.

The reason for proposing these hypotheses is that the Arab Spring presented an opportunity for foreign governments and organizations to provide aid and support to the affected countries, both as a gesture of goodwill and to advance their own interests. The first hypothesis suggests that the United States, as a major player in the region, provided significant aid to its closest Arab allies, Egypt and Jordan, in the wake of the Arab Spring. This aid was plausibly motivated by strategic considerations, such as maintaining regional stability and ensuring the continued support of these key allies. The second hypothesis suggests that European countries, due to their closer proximity to Tunisia, Libya, and Morocco, increased their aid to both government and non-government sectors in these countries. This aid may have been motivated by a desire to promote stability in their neighboring regions, as well as to foster economic ties and partnerships. Finally, my third hypothesis suggests that multilateral donors, such as the World Bank and the United Nations, increased their aid to all Arab Spring countries, with a greater focus on non-government sectors. This is likely due to the fact that multilateral channels are perceived as less politicized than bilateral channels, and therefore may be seen as a more neutral and effective means of providing aid to these countries. Overall, my hypotheses reflect a thoughtful consideration of the various factors that may have influenced the distribution of aid and support following the Arab Spring, taking into account both strategic and humanitarian considerations.

2.4 Data and Method

In this paper, I use synthetic difference-in-differences (Arkhangelsky et al. 2021) to estimate the causal relationship between the Arab Spring and foreign assistance using a dataset of 124 control countries and 7 treatment countries (Tunisia, Libya, Egypt, Jordan, Morocco, Syria and Yemen)

from 2000 to 2018. Control countries include all developing nations⁵ that were not exposed to the Arab Spring and for which data was available over the entire study time period. I argue that donors may respond differently to the Arab Spring based on their strategic interests. Therefore, it is important to consider aid flow sources separately. The core concept of the SDID approach is that it introduces weights for pre-exposure time periods and weights for control units to quantify the impact of the Arab Spring. The SDID improves the precision of the DID and SC estimators by constructing both unit- and time-specific weights to minimize the mean squared error of the average treatment effect (ATT). By assigning weights to both similar units and closely related periods, I am able to create a reliable counterfactual scenario that closely aligns with the outcomes observed for the treated group during the pre-treatment periods. This parallel counterfactual allows for a robust comparison and evaluation of the treatment's effects.

2.4.1 Data

I obtained data on total ODA and official assistance to specific sectors, in constant dollars, from the OECD's Development Assistance Committee (DAC). This paper uses foreign aid commitments for total foreign aid, total foreign aid to government and civil society, total foreign aid to other sectors and total foreign aid to humanitarian purposes as reported in the Creditor Reporting System (CRS) available on stats.oecd.org. The reason for using the commitments, which refer to funds allocated to an aid project by a donor, instead of using disbursements, which refer to actual fund transfers, is that disbursements are available for only 48.6% of records, while commitments are reported 99.2% of the time (Nielsen et al, 2011; Young and Findley, 2011; Lis, 2018).

⁵ According to the OECD's Creditor Reporting System (CRS) definition, data refers to developing countries or territories eligible to receive official development assistance (ODA).

2.4.2 Synthetic Difference-in-Differences

SDID involves choosing optimal weights for both control countries and time periods such that foreign aid to Arab Spring countries and the weighted average of foreign aid to control countries approximate a parallel trend. The SDID aims to address the bias of the DID estimator by adjusting it in two dimensions. One way this is done is by generating unit weights, denoted as ω_i , which help align the time trends between the counterfactual (untreated) units and the treated units. However, it's important to note that while the constructed counterfactual aims to match the trend of the treatment group, it may not perfectly align with it. For the second adjustment, SDID employs time-specific weights. These weights are assigned in a way that gives greater importance to the most recent pre-treatment periods. This approach allows us to further reduce the bias between the two trends and focus on the time period closer to the implementation of the treatment. By assigning higher weights to these periods, SDID aims to refine the estimation and minimize potential biases. To perform the SDID, I introduce a revolution dummy variable, which takes a value of one after 2010 for countries that experienced the Arab Spring and zero otherwise. In this study, when the analysis is conducted using only one treatment country separately except for Libya, the dataset includes 10 pretreatment periods (2000-2009) denoted as T_0 and 9 posttreatment periods (2010-2018) denoted as T_1 . The total number of periods, denoted as T , is calculated as $T_0 + T_1$. On the other hand, when Libya and all treatment countries are considered together the pretreatment periods are from 2005 to 2009, resulting in $T_0 = 5$. The posttreatment periods remain the same, $T_1 = 9$. There are 124 control countries, denoted as N_c , and 1 treatment country, denoted as N_a , when the analysis is conducted using only one treatment country separately. However, when all treatment countries are considered together, the number of treatment countries, denoted as N_a , increases to 7 and $N = N_c + N_a$. Let $\ln \text{Infaid}_{it}$ denote the natural logarithm of foreign aid for country i in period t , and $W_{it} \in \{0,1\}$ denote the revolution dummy variable (binary treatment). The SDID

estimator makes the assumption that the process generating the data adheres to a latent factor model:

$$\text{Lnfaid} = \Gamma Y^T + W_{it} \tau_{it} + \varepsilon \quad (1)$$

Where W_{it} represents binary treatment indicator, Arab Spring, Γ represents a vector of latent time factors, Y represents a vector of latent unit factors, τ is the average treatment effect and ε represents an error matrix. The average treatment effect in this data generating process is defined as:

$$\tau = \frac{1}{N_a T_1} \sum_{i=N_c+1}^N \sum_{t=T_0+1}^T \tau_{it} \quad (2)$$

The definition of the estimator for the average treatment effect, denoted as $\hat{\tau}$, is as follows:

$$\hat{\tau} = \left[\frac{1}{N_a} \sum_{i=N_c+1}^N \hat{\delta}_i \right] - \left[\sum_{i=1}^{N_c} \hat{\omega}_i \hat{\delta}_i \right] \quad (3)$$

$$\hat{\delta}_i = \left[\frac{1}{T_1} \sum_{t=T_0+1}^T \text{lnfaid}_{it} \right] - \left[\sum_{t=1}^{T_0} \hat{\lambda}_t \text{lnfaid}_{it} \right] \quad (4)$$

Where $\hat{\omega}_i$ is the optimal control countries weights and $\hat{\lambda}_t$ is the optimal time weights. The overall estimator can be expressed as follows:

$$\hat{\tau} = \left[\frac{1}{N_a} \sum_{i=N_c+1}^N \left(\frac{1}{T_1} \sum_{t=T_0+1}^T \text{lnfaid}_{it} - \sum_{t=1}^{T_0} \hat{\lambda}_t \text{lnfaid}_{it} \right) \right] - \left[\sum_{i=1}^{N_c} \hat{\omega}_i \left(\frac{1}{T_1} \sum_{t=T_0+1}^T \text{lnfaid}_{it} - \sum_{t=1}^{T_0} \hat{\lambda}_t \text{lnfaid}_{it} \right) \right] \quad (5)$$

To construct counterfactual foreign aid for Arab Spring countries, I obtain optimal control countries weight $\hat{\omega}_i$ and time weight $\hat{\lambda}_t$.

The optimal time weights can be defined as follows:

$$(\hat{\lambda}_0, \hat{\lambda}^{sdid}) = \underset{\lambda_0 \in \mathbb{R}, \lambda \in \Lambda}{\operatorname{argmin}} \left\{ \sum_{i=1}^{N_c} (\lambda_0 + \sum_{t=1}^{T_0} \lambda_t \operatorname{lnf}aid_{it} - \frac{1}{T_1} \sum_{t=T_0+1}^T \operatorname{lnf}aid_{it})^2 \right\} \quad (6)$$

Where $\Lambda = \{ \lambda \in \mathbb{R}_+^T : \sum_{t=1}^{T_0} \lambda_t = 1, \lambda_t = T_0^{-1} \text{ for all } t = T_0 + 1, \dots, T \}$

Similarly, optimal country weights are defined as:

$$(\hat{\omega}_0, \hat{\omega}^{sdid}) = \underset{\omega_0 \in \mathbb{R}, \omega \in \Omega}{\operatorname{argmin}} \left\{ \sum_{t=1}^{T_0} (\omega_0 + \sum_{i=1}^{N_c} \omega_i \operatorname{lnf}aid_{it} - \frac{1}{N_t} \sum_{i=N_c+1}^N \operatorname{lnf}aid_{it})^2 + \xi^2 T_0 \|\omega\|_2^2 \right\} \quad (7)$$

Where $\Omega = \{ \omega \in \mathbb{R}_+^N : \sum_{i=1}^{N_c} \omega_i = 1, \omega_i = N_a^{-1} \text{ for all } i = N_c + 1, \dots, N \}$,

$\|\omega\|_2$ refers to the Euclidean norm and the regularization parameter ξ is defined as:

$$\xi = (N_a T_1)^{\frac{1}{4}} \hat{\sigma} \quad \text{with} \quad \hat{\sigma}^2 = \frac{1}{N_c(T_0-1)} \sum_{i=1}^{N_c} \sum_{t=1}^{T_0-1} (\Delta_{it} - \bar{\Delta})^2, \quad (8)$$

Where $\Delta_{it} = \operatorname{lnf}aid_{i(t+1)} - \operatorname{lnf}aid_{it}$, and $\bar{\Delta} = \frac{1}{N_c(T_0-1)} \sum_{i=1}^{N_c} \sum_{t=1}^{T_0-1} \Delta_{it}$

The weights used in the SDID analysis, denoted as $\hat{\omega}^{sdid}$, share similarities with the weights employed in the study by Abadie et al (2010), with a few minor differences. Firstly, in SDID, an intercept term ω_0 is introduced, allowing for greater flexibility in the weights. This means that the weights $\hat{\omega}^{sdid}$ no longer need to perfectly match the pre-treatment trends of the untreated group with the treated group, but rather ensure that the trends remain parallel. Secondly, following the approach of Doudchenko and Imbens (2016), a regularization penalty, ξ , is included to increase the dispersion and ensure the uniqueness of the weights. This regularization penalty helps to prevent extreme or overly concentrated weights in the analysis. If the intercept term ω_0 is omitted and the regularization parameter ζ is set to zero, the formulations 6 and 7 align precisely with the weight selection discussed in Abadie et al. (2010) when $N_a = 1$, indicating the case of a single treated unit (Arkhangelsky et al, 2019).

2.5 Results

This section will present the empirical results covering the years 2000 to 2018, with the exception of Libya, whose data begins in 2005. Table 2.1 provides an overview of the dataset used in this study, focusing on different types of foreign aid provided by various donors to both treatment and control countries.

Table 2.1: Descriptive statistics

Aid type	Donor	Obs.	Mean	St. dev.	Min	Max
Total foreign aid	All	2484	859.01	1370.32	0.52	24174.64
	DAC	2484	542.49	1050.69	0.15	24039.37
	USA	2484	159.51	491.37	0	12679.14
	EU	2484	190.39	349.50	0	5777.14
	Multilateral	2484	299.68	494.33	0	4896.93
Total foreign aid to government	All	2484	94.19	219.63	0	3214.33
	DAC	2484	61.78	193.92	0	3198.55
	USA	2484	27.42	143.76	0	3067.61
	EU	2484	17.28	40.02	0	530.56
	Multilateral	2484	32.14	67.38	0	911.78
Total foreign aid to other sectors	All	2484	690.80	1146.86	0.16	20256.62
	DAC	2484	425.28	874.82	0.10	20138.82
	USA	2484	103.56	335.46	0	9222.57
	EU	2484	160.04	327.47	0	5769.29
	Multilateral	2484	252.35	432.97	0	4712.51
Total foreign aid to humanitarian purposes	All	2484	74.02	266.62	0	8248.19
	DAC	2484	55.43	181.01	0	2965.58
	USA	2484	28.54	104.36	0	2345.75
	EU	2484	13.07	52.33	0	1048.07
	Multilateral	2484	15.19	44.87	0	609.32

Note: The data presented in this table was obtained from the OECD's Creditor Reporting System (CRS), available at stats.oecd.org. The values in the table represent the amounts of foreign aid provided by different donors and are denoted in millions of dollars (USD).

The average total foreign aid among all donors amounts to approximately 859 million dollars. Notably, the United States has the lowest average foreign aid, standing at around 159 million dollars. Furthermore, the mean total foreign aid allocated to governments by all donors is roughly 94 million dollars, with the European countries having the lowest mean foreign aid at 17 million dollars. Similarly, the mean total foreign aid directed towards other sectors is approximately 691 million dollars. Once again, the United States displays the lowest average foreign aid, amounting to about 104 million dollars. Additionally, the mean total foreign aid for humanitarian purposes

across all donors is roughly 74 million dollars, with the European countries having the lowest mean foreign aid at 13 million dollars.

2.5.1 Total foreign aid

I begin by analyzing the impact of the Arab Spring on total foreign aid given by different donors: Development Assistance Committee countries (DAC), The United States of America (U.S.A), European countries that are members of the DAC (EU), Multilateral agencies (Multi), and all donors. Table 2.2 shows that all types of donors increased their foreign aid after the Arab Spring, with the exception of aid given by DAC countries to Morocco, aid given by the U.S. to Egypt and Morocco, and aid given by Multilateral agencies to Yemen.

Table 2.2: Total foreign aid and the Arab Spring

	Total aid from DAC	Total aid from USA	Total aid from EU	Total aid from Multilateral	Total aid from All donors
Tunisia	0.35 (0.46)	3.79*** (0.97)	0.28 (0.57)	1.23*** (0.47)	0.59 (0.47)
Egypt	0.14190 (0.61)	-0.85 (0.93)	0.17 (0.66)	0.34 (0.64)	0.51 (0.58)
Libya[^]	1.58*** (0.55)	1.79* (1.01)	1.73** (0.69)	2.49*** (0.66)	1.73*** (0.51)
Jordan	0.87 (0.60)	0.60 (0.96)	0.75 (0.68)	0.15 (0.65)	0.68 (0.57)
Morocco	-0.004 (0.60)	-1.07 (0.98)	0.33 (0.70)	0.37 (0.64)	0.18 (0.57)
Syria	1.75*** (0.45)	3.13*** (0.98)	1.46** (0.57)	0.81* (0.46)	1.42*** (0.47)
Yemen	0.72** (0.36)	1.30 (0.96)	0.49 (0.57)	-0.13 (0.38)	0.37 (0.39)
Arab Spring countries[^]	0.74*** (0.26)	1.31** (0.63)	0.71*** (0.26)	0.66* (0.38)	0.78*** (0.26)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. [^] 2005-2018. () represents the robust standard errors.

The results suggest a positive and significant effect of the Arab Spring on total foreign aid given by all types of donors to Libya and Syria. Similarly, the results show that the Arab Spring has a positive and significant effect on aid given by DAC members to Yemen and the U.S, and Multilateral to Tunisia. Generally, the results indicate that foreign aid increased the most to "non-

traditional western allies" (Syria, Libya, Tunisia, Yemen) regardless of the donor, while foreign aid increased less or not at all for "traditional western allies" (Egypt, Jordan, Morocco). In general, the findings presented in Table 2.2 indicate a significant increase in total foreign aid provided by various types of donors to all treatment countries collectively following the Arab Spring. Among the donors, the United States emerges as the largest contributor.

In order to gain a fuller picture of ODA trends in treated countries, Figure 2.2 displays the results of the SDID estimation by generating countries weights, $\hat{\omega}_i$, and time-specific weights, $\hat{\lambda}_t$, to construct the counterfactual, and then comparing the counterfactual with the treated trend.

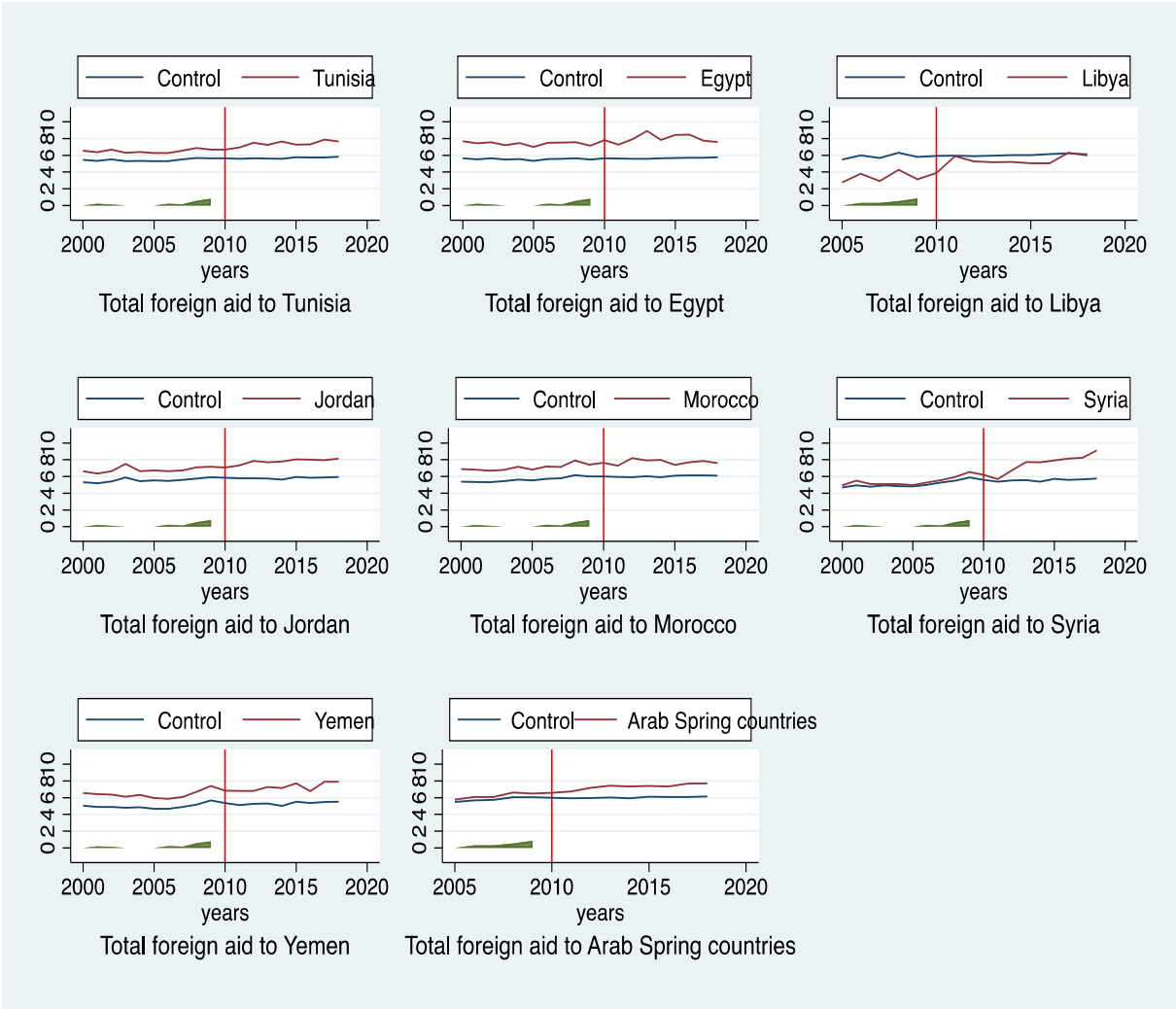


Figure 2.2: Total foreign aid to Arab Spring countries before and after the Arab Spring

It is clearly seen that SDID allows the counterfactual to shift up or down by a constant, which allows us to put weight on more units. So, the parallel trend is not required to be identical to the treated pre-intervention trend. Moreover, SDID puts most of the weight on recent time periods to reduce the bias of the estimation. Figure 2.2 illustrates the trend of total foreign aid to Arab Spring countries in comparison to control countries prior to the Arab Spring. It is evident that the aid patterns for Arab Spring countries were similar to those of the control group before this period. However, a notable increase in overall foreign aid from all donors to all Arab Spring countries combined is observed after the Arab Spring. This increase is particularly pronounced for Libya and Syria, suggesting that the Arab Spring had a positive impact on the allocation of foreign aid to these countries. On the other hand, the total foreign aid provided by all donors to Tunisia, Egypt, Jordan, Morocco, and Yemen did not undergo a significant change during the same timeframe.

2.5.2 Sectoral aid

In this section, I analyze foreign assistance to government and civil society and compare it with foreign aid to humanitarian aid and all other aid for the Arab Spring countries to check whether the allocations were driven by geopolitical goals rather than by alleviating the impact of the conflict. Table 2.3 reports the estimated effect of the Arab Spring on foreign aid by sector. The findings indicate that the model predicts a general rise in the amount of foreign aid provided by various donors to nations affected by the Arab Spring, with a few exceptions. Columns 1, 2 and 3 demonstrate the aid provided by DAC countries to alternate sectors. The results reveal that DAC countries focused on providing additional aid to government and civil societies, as well as humanitarian goals, in countries affected by the Arab Spring. The findings show a significant increase in aid for government and civil society in Tunisia, Libya, Jordan, Syria and Yemen, but a small and insignificant change in aid for Egypt.

Table 2.3: Foreign aid from different donors to different sectors in Arab Spring countries

	(1) Government aid from DAC	(2) Other aid from DAC	(3) Humanitarian aid from DAC	(4) Government aid from USA	(5) Other aid from USA	(6) Humanitarian aid from USA
Tunisia	3.33*** (0.67)	0.26 (0.47)	2.07** (0.82)	3.64*** (0.92)	4.54*** (1.21)	-0.57 (0.96)
Egypt	-0.12 (0.73)	0.10 (0.70)	0.54 (1.02)	-0.75 (0.90)	-0.80 (1.38)	-0.07 (1.05)
Libya[^]	4.78*** (0.78)	0.20 (0.66)	4.78*** (0.96)	3.88*** (0.95)	-0.83 (1.33)	1.82* (1.06)
Jordan	1.26* (0.73)	0.38 (0.67)	2.60*** (0.98)	1.39 (0.96)	-0.02 (1.28)	2.47** (1.01)
Morocco	0.67 (0.75)	0.07 (0.68)	1.21 (0.97)	0.71 (0.98)	-1.07 (1.29)	-0.32 (1.00)
Syria	2.87*** (0.68)	-0.05 (0.46)	3.38*** (0.80)	2.79*** (0.96)	-0.41 (1.22)	2.92*** (0.91)
Yemen	1.12* (0.63)	-0.43 (0.41)	3.27*** (1.13)	1.25 (0.90)	-0.26 (1.19)	2.93*** (0.96)
Arab Spring countries [^]	1.88*** (0.62)	0.08 (0.12)	2.59*** (0.61)	1.92*** (0.71)	0.21 (0.77)	1.43** (0.63)

	(7) Government aid from EU countries	(8) Other aid from EU countries	(9) Humanitarian aid from EU countries	(10) Government aid from Multi	(11) Other aid from Multi	(12) Humanitarian aid from Multi
Tunisia	2.68*** (0.85)	0.20 (0.64)	1.90* (1.07)	2.41*** (0.72)	1.36*** (0.49)	1.10 (1.07)
Egypt	0.55 (0.87)	0.17 (0.75)	1.02 (1.21)	0.29 (0.89)	0.35 (0.64)	1.59 (1.17)
Libya[^]	4.81*** (0.98)	0.40 (0.79)	2.83*** (1.08)	4.78*** (0.99)	0.67 (0.68)	1.32 (1.17)
Jordan	1.88** (0.92)	0.52 (0.71)	3.63*** (1.14)	1.22 (0.97)	0.11 (0.63)	1.11 (1.17)
Morocco	0.39 (0.93)	0.31 (0.77)	0.66 (1.09)	1.09 (0.96)	0.48 (0.63)	1.65 (1.13)
Syria	2.04** (0.85)	0.02 (0.65)	4.68*** (1.03)	0.39 (0.74)	0.19 (0.48)	3.50*** (1.08)
Yemen	0.34 (0.76)	0.04 (0.65)	3.60*** (1.07)	-1.06 (0.72)	-0.14 (0.52)	2.59** (1.07)
Arab Spring countries [^]	1.84** (0.75)	0.19* (0.11)	2.77*** (0.47)	1.44* (0.74)	0.40** (0.18)	1.92*** (0.34)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. [^] 2005-2018. () represents the robust standard errors.

This trend appears to be driven by the allocation decisions of the United States and European countries. The estimation also found that DAC countries significantly increased their humanitarian aid for Tunisia, Libya, Jordan, Syria and Yemen. However, the impact of the Arab Spring on other forms of aid provided by DAC members was low and statistically insignificant for all recipients.

Point estimates in columns 4 indicates that the United States increased government and civil society aid to all recipients, with the exception of Egypt. However, the United States' allocation towards other forms of aid tends to be negative, except for Tunisia. Furthermore, when it comes to humanitarian aid, the allocations from the United States are positive, except for Tunisia, Egypt, and Morocco (where result are negative but insignificant). In terms of overall magnitude and statistical significance, the U.S primarily focused on providing aid to support government and civil society in Tunisia, Libya and Syria, other aid in Tunisia and humanitarian aid in Libya, Jordan, Syria and Yemen.

Columns 7, 8 and 9 show that the allocation of aid by European countries to the countries affected by the Arab Spring is generally positive for all recipients. The results indicate that European assistance primarily focuses on government and civil society and humanitarian aid. Yet, Libya and Tunisia receive a higher percentage increase in aid for government and civil society than other recipients. Additionally, the results found that the percentage increase of European aid to other sectors was low and statistically insignificant. Lastly, columns 10, 11 and 12 show that Multilateral aid generally increased for all recipients, with the exception of government and civil society aid to Yemen. Multilateral aid is statistically significant for government and civil society aid to Tunisia and Libya, other aid to Tunisia and humanitarian aid to Syria and Yemen.

2.5.3 Spillover effect

In this section of the study, I investigate the potential indirect effect of the Arab Spring on foreign aid to Arab countries that did not experience the event directly. I use SDID estimation as a method of analysis and exclude Arab countries that experienced the Arab Spring and those with missing data. Table 2.4 shows the results of the analysis on the potential indirect effect of the Arab Spring on foreign aid to Arab countries that were not directly impacted by the event. The results indicate that the impact on foreign aid to Algeria, Sudan, Mauritania, Lebanon, Comoros, Djibouti, Iraq,

and Somalia is minimal and statistically insignificant. The exception is foreign aid from all donors and DAC members to Iraq, which is negative and significant at the 10% level. The decrease in aid to Iraq is due to the withdrawal of U.S. troops, which had a detrimental effect on the amount of aid from both the U.S. and other donors. (Connable et al, 2020).

Table 2.4: Foreign aid from different donors to different sectors in some Arab Spring countries not directly impacted by the Arab Spring events.

	Total aid from DAC	Total aid from USA	Total aid from EU	Total aid from Multilateral	Total aid from All donors
Algeria	-0.10 (0.69)	0.50 (0.79)	-0.46 (0.92)	-0.48 (0.60)	-0.24 (0.64)
Sudan	-0.86 (0.59)	-0.99 (0.84)	-0.75 (0.78)	0.07 (0.65)	-0.63 (0.56)
Mauritania	0.23 (0.64)	0.03 (0.87)	0.15 (0.76)	0.49 (0.58)	0.50 (0.61)
Lebanon	0.41 (0.64)	0.35 (0.88)	0.46 (0.76)	0.51 (0.58)	0.35 (0.62)
Comoros	0.31 (0.66)	0.45 (0.79)	0.25 (0.79)	-0.32 (0.56)	0.20 (0.59)
Djibouti	0.24 (0.67)	0.35 (0.92)	0.21 (0.76)	0.45 (0.57)	0.58 (0.61)
Iraq	-1.11* (0.64)	-1.42 (0.88)	-1.08 (0.76)	-0.36 (0.58)	-1.19* (0.62)
Somalia	0.66 (0.59)	0.47 (0.84)	0.97 (0.78)	0.24 (0.65)	0.48 (0.56)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

These findings suggest that there was not a significant reallocation of foreign aid away from Arab countries that were not affected by the Arab Spring towards countries that were affected by it after 2010. Additionally, Table B.1 in the appendix shows that the change in foreign aid for government and civil society, other aid and for humanitarian purposes is minimal and statistically insignificant for these additional Arab countries, with a few exceptions.

2.6 Robustness

It is important to verify the robustness of the main findings of the study by conducting sensitivity analysis using different choices of time and different compositions of the recipient pools used to estimate the counterfactuals. This can help to ensure that the results are not specific to a particular

time period or group of recipients, and that they hold across different scenarios. This can provide greater confidence in the validity of the study's conclusions. In this section, first the treated countries are divided into two groups: Western traditional allies (Egypt, Jordan and Morocco) and non-Western allies (Tunisia, Libya, Syria and Yemen). Then, I examine the evolution of foreign aid over time by running the analysis with different end dates. Specifically, three years after the Arab Spring, six years after the Arab Spring, and nine years after the Arab Spring. This approach helps to see if the foreign aid allocation changes differently for these two groups of countries and also to understand the changes of foreign aid in the different time periods. Table 2.5 presents the estimated effects of the Arab Spring on foreign aid given by various donors to Western traditional Arab allies and non-Western traditional Arab allies for the period of 2005-2012. The starting point in 2005 is chosen to incorporate data on Libya, as there is missing data available before 2005. Table 2.5 illustrates that comparing the outcomes of aid provided to Western allies and non-Western allies, several patterns emerge. In terms of government aid from DAC, Western allies experience relatively lower average effects compared to non-Western allies. Although the effects are positive for both groups, they are statistically significant for non-Western allies, while not consistently significant for Western allies. Regarding other forms of aid from DAC, Western allies exhibit mixed results with no consistent significant effects, while non-Western allies tend to have slightly negative or non-significant effects. The impact of humanitarian aid from DAC is generally positive for both Western and non-Western allies, but the results show more variability. The effects do not consistently reach statistical significance for either group.

Table 2.5: Foreign aid to Western and non-Western Arab allies

	Government aid from DAC	Other aid from DAC	Humanitarian aid from DAC	Government aid from USA	Other aid from USA	Humanitarian aid from USA
Western allies						
Average effect (3Years)	0.10 (0.16)	0.19** (0.09)	0.55 (0.59)	-0.17 (0.24)	-0.48 (0.41)	0.45 (0.91)
Average effect (6Years)	0.31* (0.16)	0.14 (0.09)	1.23* (0.65)	0.04 (0.41)	-0.64 (0.43)	0.85 (1.00)
Average effect (9Years)	0.62 (0.39)	0.18* (0.11)	1.42** (0.66)	0.34 (0.72)	-0.65* (0.38)	0.72 (0.97)
Non-Western allies						
Average effect (3Years)	1.76** (0.72)	-0.17 (0.15)	2.60*** (0.64)	1.85*** (0.64)	-1.61** (1.74)	1.94*** (0.34)
Average effect (6Years)	2.44*** (0.69)	-0.16 (0.16)	3.11*** (0.48)	2.62*** (0.59)	0.17 (1.05)	2.00*** (0.52)
Average effect (9Years)	2.83*** (0.78)	-0.01 (0.15)	3.46*** (0.54)	3.10*** (0.71)	0.80 (1.04)	1.95*** (0.73)
	Government aid from EU countries	Other aid from EU countries	Humanitarian aid from EU countries	Government aid from Multi	Other aid from Multi	Humanitarian aid from Multi
Western allies						
Average effect (3Years)	0.37*** (0.11)	0.19 (0.14)	1.43*** (0.38)	0.98*** (0.37)	0.32 (0.29)	0.67 (0.47)
Average effect (6Years)	0.53** (0.21)	0.27** (0.11)	1.78*** (0.52)	0.82** (0.37)	0.34* (0.20)	1.52*** (0.33)
Average effect (9Years)	0.78** (0.37)	0.33** (0.15)	1.96*** (0.75)	0.88** (0.35)	0.28 (0.18)	1.70*** (0.41)
Non-Western allies						
Average effect (3Years)	1.51 (0.98)	-0.20 (0.16)	1.97*** (0.23)	1.64 (1.27)	0.41 (0.26)	1.44*** (0.40)
Average effect (6Years)	2.16** (0.92)	-0.08 (0.18)	2.60*** (0.35)	1.78 (1.10)	0.43 (0.27)	2.01*** (0.42)
Average effect (9Years)	2.56** (1.06)	0.08 (0.17)	3.27*** (0.44)	1.85*** (1.26)	0.48 (0.29)	2.05*** (0.40)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

For government aid from the USA, Western allies display mixed outcomes, including some negative effects, none of which are statistically significant. In contrast, non-Western allies consistently benefit from government aid from the USA, with statistically significant positive effects. When it comes to other forms of aid from the USA, Western allies experience negative average effects, but they are not statistically significant. Non-Western allies also face negative effects, which are significant in certain cases. Regarding humanitarian aid from the USA, both Western and non-Western allies derive benefits, but the effects do not consistently reach statistical significance for either group.

In terms of government aid from EU countries, Western allies consistently benefit from such assistance, with statistically significant positive effects. Non-Western allies also benefit, but the effects do not always reach statistical significance. For other aid from EU countries, Western allies exhibit mixed results, including some positive effects that are not consistently significant. Non-Western allies generally experience effects that are not statistically significant. Finally, with regard to humanitarian aid from EU countries, Western allies benefit from it, although the effects are not consistently significant. Non-Western allies consistently benefit from such aid, with statistically significant positive effects.

For government aid from Multinational institutions has a statistically significant positive effect on Western allies, indicating its beneficial impact. However, non-Western allies do not experience a statistically significant effect, despite the average effect being positive. Regarding other aid from Multinational institutions, neither Western allies nor non-Western allies show significant effects, suggesting a lack of consistent impact on either group. On the other hand, humanitarian aid from Multinational institutions significantly benefits non-Western allies, with a positive and statistically

significant effect. In contrast, Western allies do not experience a statistically significant effect, despite the average effect being positive.

Overall, non-Western allies tend to receive more significant positive effects across various types of aid compared to Western allies. However, it's important to note that the results may vary depending on the specific time period under consideration.

2.7 Discussion

The Arab Spring, characterized by widespread protests and political upheavals in various Arab countries, had a significant impact on foreign aid allocation by different donors. The key results of this study provide valuable insights into the patterns and motivations behind the allocation of foreign aid to Arab Spring countries.

Hypothesis 1 proposed that the United States provided substantial assistance to its closest Arab allies, Egypt and Jordan, following the Arab revolutions. In contrast, my results indicate that the U.S. foreign aid increased its overall aid the most to "non-traditional U.S. allies" (Syria, Libya, Tunisia, Yemen), while U.S. foreign aid changed much less for "traditional western allies" (Egypt, Jordan, Morocco). In Egypt, for example, the U.S. had been providing military aid to the government of Hosni Mubarak, who was overthrown in 2011 (Atlas, 2012). After Mubarak's ouster, the U.S. government suspended military aid to Egypt and redirected some of its assistance towards supporting democratic reforms and civil society organizations (Aftandilian, 2021). This observation may suggest that there has been a shift in the policies of the United States towards authoritarian regimes, potentially indicating a change in alliances and the formation of new partnerships within the regions affected by the Arab Spring.

Hypothesis 2 suggested that European countries increased their aid to the government and non-government sectors in Tunisia, Libya, and Morocco due to geographical proximity. The results

confirm this hypothesis, indicating that European assistance was plausibly influenced by geographical factors. The European countries allocate a significant portion of their aid budget towards supporting the government and civil society sectors in Tunisia and Libya, where geographical proximity likely plays a role in shaping this allocation. However, when it comes to humanitarian aid, the EU provides substantial assistance to countries like Syria, Jordan, and Yemen, prioritizing their needs regardless of geographical proximity. This demonstrates the EU's commitment to addressing humanitarian crises and offering support to countries facing challenging circumstances, irrespective of their geographic location.

Hypothesis 3 proposed that multilateral donors increased their aid to all Arab Spring countries, with a greater focus on non-government sectors due to lower politicization in multilateral channels. The results largely support this hypothesis, indicating an overall increase in multilateral aid allocations to Arab Spring countries. The emphasis on non-government sectors aligns with the perception that multilateral channels are less politicized and can provide impartial support for areas such as humanitarian assistance and development initiatives.

The key results collectively suggest that the allocation of foreign aid to Arab Spring countries was driven by a combination of geopolitical goals and humanitarian considerations. Donors, particularly DAC countries, focused on supporting government and civil societies, highlighting their strategic interests in promoting stability and democratic governance. Humanitarian goals were also prioritized from all donors. These findings have important implications for policymakers and international organizations involved in foreign aid. Understanding the geopolitical context and strategic interests of donors is crucial in predicting and shaping aid allocation decisions. Additionally, recognizing the influence of proximity, as seen in the European donors' aid patterns, can inform targeted assistance and regional cooperation efforts.

It is important to note that while the results generally support the proposed hypotheses, there are limitations to consider. The analysis is based on available data and may not capture the full complexity of aid allocation dynamics. To further enhance our understanding of aid allocation, future studies could explore additional factors that were not considered in this research, such as historical relationships between donors and recipients, economic interests, and domestic political considerations. These factors could provide additional insights into the complexities of aid decision-making processes and help us better comprehend the nuances of foreign aid allocation. Future research could delve deeper into understanding the specific mechanisms through which geopolitical goals and humanitarian considerations interact in aid allocation processes. Exploring the intricate dynamics between these two factors would shed light on how donors strike a balance between their strategic interests and their commitment to addressing humanitarian needs. This could involve examining the decision-making processes within donor organizations, analyzing policy documents and official statements, and conducting interviews with key stakeholders involved in aid allocation. A comprehensive understanding of these mechanisms would provide a more nuanced understanding of the motivations behind aid decisions. Additionally, further investigation into the long-term impacts of foreign aid on recipient countries is crucial. While this study focused on the allocation of aid, understanding the effectiveness of aid in achieving development goals is equally important. Future research could evaluate the outcomes of foreign aid projects and assess their impact on recipient countries' economic growth, social development, and political stability. By examining the long-term effects of aid, I can gain valuable insights into the effectiveness of different aid approaches and policies, which can inform future aid strategies and improve the overall impact of foreign assistance.

2.8 Conclusion

In conclusion, the Arab Spring had a significant impact on foreign aid given by different donors to Arab Spring countries. Overall, foreign aid increased to non-traditional western allies (Syria, Libya, Tunisia, Yemen) after the Arab Spring, regardless of the donor. The results suggest that the allocation of aid was driven by geopolitical goals, as DAC countries focused on providing aid to government and civil societies, as well as humanitarian goals. The United States primarily provided aid to support government and civil society in Tunisia, Libya, and Syria, non-government and civil society in Tunisia, and humanitarian purposes in Libya, Jordan, Syria, and Yemen. European assistance primarily focused on humanitarian goals, with Libya and Tunisia receiving a higher percentage of aid for government and civil society than other recipients. Multilateral aid generally increased its allocations to all recipients, except for government and civil society aid to Yemen. In summary, the Arab Spring had a positive effect on foreign aid to Arab Spring countries, but the allocation of aid was influenced by geopolitical considerations.

Chapter 3 The Spillover Effect of the Arab Spring on Economic

Growth, Bilateral Trade and Foreign Direct Investment

3.1 Introduction

The Arab Spring, a series of uprisings and social movements that swept across the Middle East and North Africa region, brought about profound political and socio-economic changes in the affected countries. While the primary focus of scholarly research has centered on the internal dynamics and consequences within these countries, there remains a compelling need to investigate the potential spillover effects of the Arab Spring on the economic growth of neighboring countries. This paper aims to explore the existence of such spillover effects and, more specifically, examines the trade and foreign direct investment (FDI) channels as potential factors contributing to this phenomenon.

One aspect of the spillover effect under scrutiny is the trade channel. Trade between nations plays a vital role in fostering economic growth and development, and disruptions caused by the Arab Spring could have reverberating effects on neighboring countries' trade patterns. This paper seeks to analyze the extent to which the Arab Spring has influenced trade flows and whether there exists a significant spillover effect. Another channel through which the Arab Spring may have exerted spillover effects is foreign direct investment. FDI is an essential driver of economic growth, technological transfer, and employment generation, and changes in the political and social landscape resulting from the Arab Spring could have altered investment patterns in neighboring countries. By investigating the potential linkages between the Arab Spring and FDI inflows, this study aims to shed light on the spillover effects and ascertain the role of this channel in shaping

the region's economic dynamics. To achieve these objectives, this paper employs a synthetic difference-in-differences method (SDID), drawing upon a variety of data sources, including the World Bank Open Data and the International Monetary Fund's Direction of Trade Statistics (DOT) for bilateral trade. By employing SDID, I aim to provide robust empirical evidence regarding the presence of spillover effects of the Arab Spring on the economic growth of neighboring countries, with a specific focus on the trade and FDI channels. The study analyzes data spanning from 2003 to 2018, encompassing 117 countries, and considers the year 2010 as the treatment event, representing the occurrence of the Arab Spring.

This research contributes to a better understanding of the consequences of the Arab Spring beyond the initial affected countries. Moreover, by examining the trade and FDI channels as potential mechanisms for spillover effects on economic growth, policymakers and stakeholders can gain insights into the broader regional dynamics and formulate informed strategies to address the challenges and opportunities that arise as a result of such transformative events. In the subsequent sections of this paper, I will delve into a comprehensive literature review, present the research methodology and discuss the empirical results. Through this investigation, I aspire to enhance our understanding of the spillover effects of the Arab Spring on economic growth, with a particular focus on the trade and FDI channels and contribute to the existing body of knowledge in this domain.

3.2 Literature Review

Conflict and its associated consequences have long been recognized as significant factors influencing economic growth, trade patterns, and foreign direct investment (FDI) flows (Meyer & Habanabakize, 2018; Collier, 1999; Heilmann, 2016; Gao et al, 2018). The spillover effect of conflict refers to the impact of a conflict in one country on neighboring countries or the wider

region, transcending political borders and affecting various aspects of economic development. This literature review aims to provide an overview of existing research on the spillover effects of conflict on economic growth, trade, and FDI.

3.2.1 Economic growth

Numerous studies have explored the relationship between conflict and economic growth, revealing a complex and multifaceted interplay. While conflict can have detrimental effects on economic growth within the directly affected country, evidence suggests that spillover effects can extend beyond borders, affecting neighboring economies. For instance, Dunne and Tian (2015) investigated the spillover effects of conflicts in African countries, considering both direct and indirect channels through which conflicts influence neighboring economies. The findings of the study indicate that conflicts have a significant and adverse transnational impact on the economic growth of countries that share direct borders. However, the study did not observe any discernible effect of conflict on the growth of non-contiguous countries. This highlights the importance of considering geographical proximity when examining the transmission of conflict's effects and suggests that spillover effects are primarily limited to neighboring countries near the initial conflict zone. Some studies differentiate between the short-term and long-term effects of conflict on neighboring countries. For example, Murdoch and Sandler (2002) found that civil war has a negative correlation with economic growth in the short term within the country and its neighbors, but these spillovers have a weaker effect on economic growth in the long term (after 25 years). Collier and Hoeffler (2004) supported the idea that conflict has a strong impact on economic growth for neighboring countries in the short term but found that this impact can persist in the long term.

3.2.2. Trade

Conflict can significantly disrupt international trade patterns, affecting both the directly involved countries and their trading partners. Studies demonstrated that conflicts could lead to a decline in bilateral trade flows between nations, regardless of their direct involvement in the conflict. Sundström (2014) examined the effects of armed conflicts on trade in neighboring countries. The findings revealed that conflict tends to reduce trade in neighboring countries, even if they are not directly engaged in armed conflict. Interestingly, the study indicated that the most substantial impact on trade in neighboring countries was observed one year after the outbreak of conflict, suggesting that the negative effects of conflict on trade take time to manifest and are not immediately apparent. This underscores the long-term and delayed nature of the adverse impacts of conflict on trade in neighboring countries. Similarly, Qureshi (2014) found that there is a significant negative impact of conflict between states and conflict within states on international trade between neighboring countries, even if one of the trading partners is not directly involved in a conflict in a neighboring country. Additionally, the literature demonstrates that the impact of conflict on international trade varies based on the nature of the conflict. Marano et al. (2013) found that conflict within countries has a greater negative effect on trade than conflict between countries. Considering another form of conflict, specifically focusing on the impact of terrorist attacks on trade, Pham and Doucouliagos (2017) examined the spillover effect of terrorist attacks on trade between neighboring countries. They concluded that an increase in each additional terrorist attacks in a neighboring country would on average reduce trade between neighboring countries by 0.013%.

3.2.3 FDI

Conflicts can have profound implications for FDI flows, deterring investors and hindering economic development. The literature highlights several channels through which conflict spillovers can affect FDI. Based on the research conducted by Chih et al. (2022), which examines

different degrees of civil conflict intensity, the findings demonstrated that the maintenance of political stability plays a critical role in ensuring that FDIs have a positive and significant impact on economic growth in sub-Saharan Africa. Increased political and security risks associated with conflicts can undermine investor confidence and lead to a reduction in FDI inflows. Easterly & Levine (1998) found that the presence of ethnic divisions in Africa has resulted in several adverse consequences that have directly influenced economic growth. These consequences include the flight of direct foreign investment from the region, deterioration of earnings for labor emigrants, and difficulties in regional transportation. These factors have collectively contributed to a vicious circle of negative effects, exacerbating the challenges faced by the region's economies. On the other hand, some studies provided evidence indicating that countries in Africa that are surrounded by neighboring countries with well-functioning institutions tend to have better institutional quality themselves. This, in turn, leads to lower levels of civil conflict, increased political stability, and indirectly attracts higher flows of foreign direct investment (FDI). This suggests that the presence of positive institutional spillovers from neighboring countries can have a significant impact on enhancing the investment climate and economic prospects within a given country (Pinar & Stengos, 2021).

3.2.4 Spillover effect of the Arab Spring

The repercussions of the Arab Spring on neighboring countries have been a subject of investigation in previous studies, with a focus on understanding the phenomenon of spillover effects. The sudden emergence of the Arab Spring introduced a high level of uncertainty for both consumers and merchants (Veninga and Ihle, 2018). This period of political instability and violence accompanying the protests resulted in trade disruptions, such as the closure of ports, border controls, and disturbances in transportation routes. Consequently, the costs of goods escalated while trade volumes dwindled (Sundström, 2014). Additionally, some countries faced the

imposition of sanctions and trade restrictions, further impeding regional trade. However, the Arab Spring also created new opportunities for trade in certain nations. The removal of oppressive regimes led to improved business environments and a greater openness to foreign investment in some countries, facilitating trade expansion (Öncel and Malik, 2015). This, in turn, supported economic growth and employment generation.

In examining the impact of the Arab Spring, Groizard and Santana (2016) investigated the tourism sector, which plays a significant role in the GDP of several Arab economies. Their findings revealed that not only were the countries directly affected by the Arab Spring impacted, but neighboring countries also experienced consequences. Alsharairi and Abubaker (2016) focused on the performance of the Dubai stock market and discovered that, with the exception of the transportation and telecommunications sectors, the overall stock market indexes in the Dubai Financial Market were not significantly affected.

The literature reviewed in this section underscores the significant spillover effects of conflict on economic growth, trade, and FDI. Conflicts not only impact the directly involved countries but also have far-reaching consequences for neighboring nations and the wider region. Disruptions in trade, reduced economic integration, and diminished investor confidence contribute to a downward spiral in economic development. This paper aims to study the economic effects of Arab Spring for a panel of developing and developed countries. To the best of my knowledge, this paper represents the pioneering attempt to investigate the spillover effects of the Arab Spring on various aspects such as economic growth, trade, and foreign direct investment. The paper employs a synthetic difference-in-differences approach, utilizing the geographical distance between countries as a key factor in the analysis. The underlying hypothesis posits that the Arab Spring exerted a detrimental influence on the economic growth of neighboring countries. It is anticipated that this negative

impact is primarily attributed to the adverse effects of the Arab Spring on both trade dynamics and foreign direct investment in these countries.

3.3 Data and Method

The research employed the SDID approach as proposed by Arkhangelsky et al. (2021) to estimate causal effects by comparing changes in outcomes before and after a treatment or intervention. In this research context, the variable under consideration is the treatment, which involves the specific condition of proximity to a country that experienced the Arab Spring after its occurrence. By employing the synthetic DID method with distance as a key variable, this study seeks to provide a rigorous and robust analysis of the spillover effects of the Arab Spring on various economic indicators, such as trade patterns and foreign direct investment. This methodological framework enables a deeper comprehension of the potential mechanisms through which the Arab Spring might influence neighboring economies.

3.3.1 Data

The empirical analysis in this study incorporates various data sources for the investigation. Bilateral trade (in millions of dollars) is sourced from the International Monetary Fund's Direction of Trade Statistics (DOT). Real GDP (in millions of dollars) and net inflow of FDI (as a percentage of GDP) are obtained from the World Bank. The analysis was conducted using a dataset comprising 117 countries, excluding any countries directly involved in the Arab Spring. In order to ensure data completeness, any observations with missing data were excluded from the analysis. The dataset covers the period from 2003 to 2018, providing a comprehensive timeframe for the examination of the research questions. In this study, distance variable⁶ is employed as an explanatory variable. This variable takes on a value of one if the capital of a country is within a

⁶ The measurement indicates the theoretical aerial distance (great circle distance) between the two capital cities. The data was acquired from Time and Date AS and is available for reference at www.timeanddate.com.

radius of 2000, 1500, and 1000 kilometers from the capital of Libya, Tunisia or Egypt. Conversely, it takes a value of zero if the distance between the capitals exceeds the specified range, indicating that the country is not within the designated proximity range. This study focuses on Tunisia, Libya and Egypt as they went through regime change during the Arab Spring, coupled with their more important economies. In contrast, Yemen and Syria were excluded due to the heightened instability in those countries and their relatively small economies.

3.3.2 Methodology

SDID is a method that aims to achieve a comparable trend between the outcomes (economic growth, bilateral trade, and FDI) for Arab Spring countries and control countries. This is done by choosing optimal weights for control countries and time periods. The goal is to find weights that result in a similar trajectory of outcomes between the two groups. To use SDID, a distance dummy variable is set to one if the capital of a country is located within a range of 2000, 1500, and 1000 kilometers from any of the capitals of the treatment countries (Egypt, Tunisia and Libya). Conversely, if the distance between the capitals exceeds the specified range, the distance dummy variable is assigned a value of zero. This variable allows us to distinguish between countries that are geographically close to the Arab Spring countries and those that are farther away, potentially affecting the treatment effect. The SDID framework used in this context consists of $T_0=8$ pretreatment periods spanning from 2003 to 2010, and $T_1=8$ post-treatment periods covering the years 2011 to 2018. This results in a total of $T = T_0 + T_1$ periods. The study involves N_c , which represents the control countries located beyond distances of 2000, 1500, or 1000 kilometers from the Arab Spring countries, and N_t , which signifies the treatment countries encompassing those positioned within a range of 2000, 1500, or 1000 kilometers from the Arab Spring countries. This totals $N = N_c + N_t$ countries that are taken into account for the analysis. The outcomes of interest for each country i in period t include the natural logarithm of real GDP, the natural logarithm of

bilateral trade as a percentage of initial GDP (2003), and the cube roots of FDI as a percentage of initial GDP (2003). The utilization of initial GDP serves as a reference point or baseline for assessing how changes in bilateral trade and FDI evolve over time, while also mitigating the influence of changes in GDP. The use of cube roots helps address the issue of negative signs in the FDI variable. Furthermore, the distance dummy variable is represented by $W_{it} \in \{0,1\}$. To construct counterfactual outcomes (y) for neighboring countries of Arab Spring countries, optimal control countries weight ($\hat{\omega}_i$) and time weight ($\hat{\lambda}_t$) are obtained. Optimal time weights are determined by solving the minimization problem which aims to minimize the squared distance between the weighted average outcomes in the pre-treatment period and the average outcomes in the post-treatment period.

$$(\hat{\lambda}_0, \hat{\lambda}^{sdid}) = \underset{\lambda_0 \in \mathbb{R}, \lambda \in \Lambda}{\operatorname{argmin}} \ell_{time}(\lambda_0, \lambda) \text{ where}$$

$$\ell_{time}(\lambda_0, \lambda) = \sum_{i=1}^{N_c} (\lambda_0 + \sum_{t=1}^{T_0} \lambda_t y_{it} - \frac{1}{T_1} \sum_{t=T_0+1}^T y_{it})^2, \quad (1)$$

$$\Lambda = \{ \lambda \in \mathbb{R}_+^T: \sum_{t=1}^{T_0} \lambda_t = 1, \lambda_t = T_0^{-1} \text{ for all } t = T_0 + 1, \dots, T \}$$

Similarly, optimal country weights are determined by solving the minimization problem, which aims to minimize the squared distance between the treated countries and the weighted average of control countries.

$$(\hat{\omega}_0, \hat{\omega}^{sdid}) = \underset{\omega_0 \in \mathbb{R}, \omega \in \Omega}{\operatorname{argmin}} \ell_{unit}(\omega_0, \omega) \text{ where}$$

$$\ell_{unit}(\omega_0, \omega) = \sum_{t=1}^{T_0} (\omega_0 + \sum_{i=1}^{N_c} \omega_i y_{it} - \frac{1}{N_t} \sum_{i=N_c+1}^N y_{it})^2 + \xi^2 T_0 \|\omega\|_2^2, \quad (2)$$

$$\Omega = \{ \omega \in \mathbb{R}_+^N: \sum_{i=1}^{N_c} \omega_i = 1, \omega_i = N_t^{-1} \text{ for all } i = N_c + 1, \dots, N \}$$

Where the regularization parameter ξ is defined as:

$$\xi = (N_t T_1)^{\frac{1}{4}} \hat{\sigma} \quad \text{with} \quad \hat{\sigma}^2 = \frac{1}{N_c(T_0-1)} \sum_{i=1}^{N_c} \sum_{t=1}^{T_0-1} (\Delta_{it} - \bar{\Delta})^2, \quad (3)$$

Where $\Delta_{it} = y_{i(t+1)} - y_{it}$, and $\bar{\Delta} = \frac{1}{N_c(T_0-1)} \sum_{i=1}^{N_c} \sum_{t=1}^{T_0-1} \Delta_{it}$

After determining the optimal weights, $\hat{\lambda}^{sdid}$ and $\hat{\omega}^{sdid}$, the average treatment effect, $\hat{\tau}$ can be estimated using the following equation:

$$\hat{\tau} = \left[\frac{1}{N_t} \sum_{i=N_c+1}^N \left(\frac{1}{T_1} \sum_{t=T_0+1}^T y_{it} - \sum_{t=1}^{T_0} \hat{\lambda}_t y_{it} \right) \right] - \left[\sum_{i=1}^{N_c} \hat{\omega}_0 \left(\frac{1}{T_1} \sum_{t=T_0+1}^T y_{it} - \sum_{t=1}^{T_0} \hat{\lambda}_t y_{it} \right) \right] \quad (4)$$

This equation calculates the difference between the treated countries and the weighted average of control countries based on the optimal weights.

The synthetic difference-in-differences estimator assumes a latent factor model is described as following equation:

$$y = L + (W\tau)_{it} + \varepsilon \quad (5) \quad \text{where } L = \Gamma Y^T \text{ and } (W\tau)_{it} = W_{it} \tau_{it}$$

The binary treatment indicator, represented by W_{it} , is a variable that denotes whether a country is treated or not. In this case, it specifically indicates the proximity or closeness of a country to the Arab Spring countries after the year 2010. If a country is located within a specified range (2000, 1500, and 1000 kilometers) from any of the capital cities of Egypt, Tunisia or Libya, which were affected by the Arab Spring, the binary treatment indicator, W_{it} , is assigned a value of one. On the other hand, if a country is located outside of this range, the indicator is assigned a value of zero, indicating that the country is not considered part of the treatment group in terms of geographical proximity to the Arab Spring countries, Γ represents a vector of latent time factors, Y represents a vector of latent unit factors, ε represents an error matrix.

3.4 Results

Table 3.1 provides summary statistics for the three outcome variables: Real GDP, FDI/initial GDP (2003), and Bilateral Trade/initial GDP (2003). The mean real GDP across the observed countries is approximately \$555,972.60 million.

Table 3.1: Summary statistics and data sources.

Variable	Obs.	Mean	St. dev.	Min	Max	Data source
Real GDP	1872	555972.600	1715074	751.534	1800000	databank.worldbank.org
FDI/ initial GDP	1864	13.141	34.175	-99.052	653.241	databank.worldbank.org
Bilateral Trade/initial GDP (Trade with Libya, Tunisia and Egypt)	1872	0.706	2.054	0	35.017	IMF's Direction of Trade Statistics

Note: The values in the table represent real GDP, expressed in millions of US dollars, foreign direct investment as a percentage of GDP, and bilateral trade between the Arab Spring countries and their trading partners is measured as a percentage of the initial GDP of the countries that engage in trade with the Arab Spring countries.

The average FDI as a percentage of initial GDP is 13.14%. The average bilateral trade as a proportion of initial GDP, specifically average trade with Libya, Tunisia and Egypt, is 0.71%.

3.4.1 Economic growth

I begin by analyzing the spillover effect of the Arab Spring on the economic growth of countries located within a 2000, 1500 and 1000 kilometer from the capital cities of Egypt, Tunisia or Libya.

Table 3.2: Real GDP

Variable	Proximity	The average treatment effect
ln GDP	Countries located 2000 KM	-0.064*** (0.012)
	Countries located 1500 KM	-0.070*** (0.022)
	Countries located 1000 KM	-0.061** (0.029)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

Table 3.2 shows that the estimated average treatment effect for countries located within a 2000-kilometer radius of Arab Spring countries, measuring the impact on the dependent variable (log real GDP), is determined to be -0.06. This negative value signifies that being in close proximity to

Arab Spring countries has a statistically significant negative influence on real GDP. Specifically, countries within 2000 kilometers of Arab Spring countries experience an average decrease in real GDP by 0.06 units compared to control countries situated outside this range. This negative effect indicates that the Arab Spring had an adverse impact on the economic performance of neighboring countries. Likewise, the average treatment effect for countries located within a 1500- and 1000-kilometer radius of Arab Spring countries on the dependent variable (log real GDP) is negative, statistically significant, and greater in magnitude for countries within the 1500-kilometer compared to countries within the 2000-kilometer and 1000-kilometer range, with a value of -0.07. Figure 3.1 illustrates the results of the SDID estimation. The estimation involves generating country weights, $\hat{\omega}_i$, and time-specific weights, $\hat{\lambda}_t$, to construct the counterfactual and then comparing it with the treated trend. The key observation is that SDID allows the counterfactual to shift up or down by a constant, which enables weighting more units. Therefore, it is not necessary for the parallel trend to be identical to the treated pre-intervention trend. Additionally, SDID assigns greater weight to recent time periods to reduce estimation bias.

In Figure 3.1, it is observed that the (log) real GDP of neighboring countries of Arab Spring countries exhibits a similar trend before the Arab Spring when compared to control countries, suggesting a negative impact on their economic output. This decrease in real GDP indicates that the Arab Spring had an adverse effect on the economic performance of these neighboring countries.

The findings indicate a negative spillover effect of the Arab Spring on economic growth in countries located within 2000, 1500 and 1000 kilometers away from the Arab Spring countries (specifically Libya, Tunisia and Egypt). To further investigate the reasons behind this negative impact, the study examines two potential channels: trade and FDI. The goal is to determine which

channel could have been influenced by the Arab Spring, ultimately leading to the decrease in real GDP.

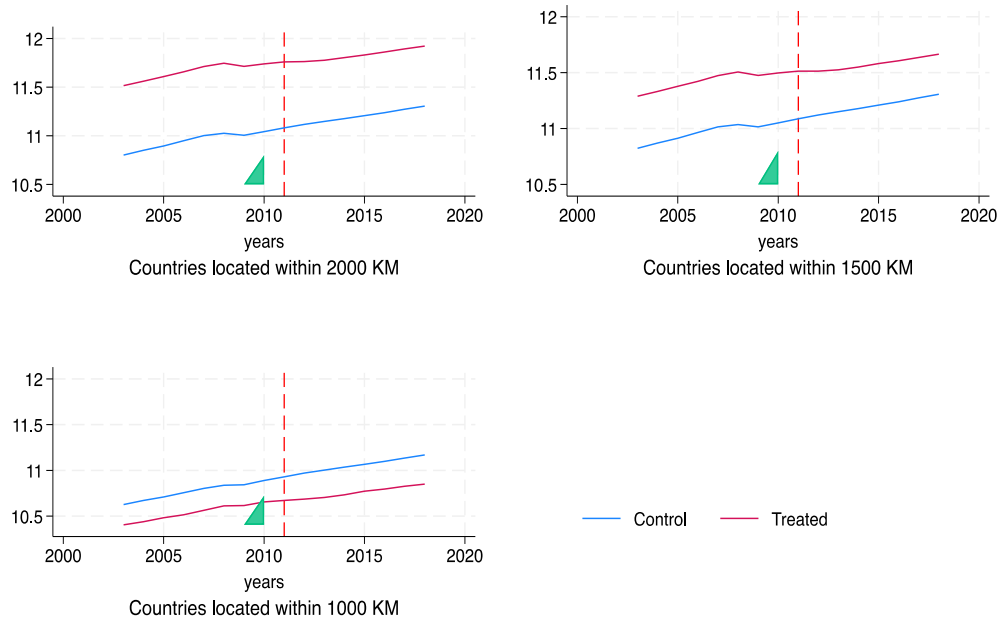


Figure 3.1: illustrates a comparison between the real GDP of countries located within 2000-, 1500- and 1000-kilometer radius from any of Arab Spring countries and the real GDP of control countries before and after the Arab Spring.

3.4.2 Trade

In this part, I examine how the Arab Spring affected the countries that traded with the Arab Spring nations (Libya, Tunisia and Egypt). I employ the SDID method and incorporate a dummy variable for measuring distance as an explanatory factor. According to Table 3.3, it appears that the average treatment effects of proximity to Arab Spring countries on bilateral trade, measured as a percentage of the initial GDP in 2003, are negative but statistically insignificant. This suggests that the Arab Spring's impact on bilateral trade partners within a 2000-, 1500-, and 1000-kilometer radius is not statistically significant. Based on the obtained results, it can be deduced that engaging in trade with Arab Spring countries might not necessarily have a detrimental impact on the economic growth of neighboring countries.

Table 3.3: Bilateral trade

Variable	Proximity	The average treatment effect
Bilateral Trade/initial GDP	Countries located 2000 KM	-0.020 (0.340)
	Countries located 1500 KM	-0.168 (0.401)
	Countries located 1000 KM	-1.135 (1.685)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

As a result, these findings highlight the need for further examination of alternative factors or channels that could shed light on the reasons for the decrease in economic growth. By exploring other possible avenues, I can deepen our understanding of the factors influencing the decline and identify additional variables that might have played a role in the economic downturn.

3.4.3 Foreign direct investment

I examine how the Arab Spring affected FDI. Similarly, I employ the SDID method and incorporate a dummy variable for measuring distance as an explanatory factor. The findings presented in Table 3.4 suggest that the Arab Spring had an adverse effect on FDI in countries situated at distances of 2000, 1500, and 1000 kilometers from the treatment countries. The findings show that as the proximity cutoff for the affected countries shifts from 2000 to 1500 kilometers or closer to the Arab Spring countries, the adverse effect of the event becomes less significant. However, it is important to note that the statistical significance of these results is evident only for countries located within 2000 and 1000 kilometers from the Arab Spring countries.

This implies that being within the 2000- and 1000-kilometer distance threshold is associated with a lower cube root of FDI compared to being beyond that distance. In other words, proximity to these countries has a negative influence on FDI inflows. However, for countries situated 1500 kilometers away from treatment countries, the results indicate a negative impact, although it is not statistically significant. Therefore, it is not possible to determine if the treatment effect varies

among the three cut-points. Based on the obtained results, a clear conclusion can be drawn that countries located 2000 and 1000 kilometers away from Arab Spring nations experienced a negative impact on FDI as a result of the Arab Spring.

Table 3.4: FDI

Variable	Proximity	The average treatment effect
FDI/initial GDP	Countries located 2000 KM	-0.460*** (0.176)
	Countries located 1500 KM	-0.378 (0.243)
	Countries located 1000 KM	-0.619* (0.354)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

It is worth contemplating the possible role of this negative impact on FDI in influencing the decline of economic growth in these countries. Consequently, the decline in economic growth can be attributed to the lack of FDI in these countries. The findings indicate that the Arab Spring disrupted the inflow of FDI, thereby contributing to the economic downturn observed in these countries.

3.5 Robustness

The objective of this robustness analysis is to assess the dependability and accuracy of the key findings in this study regarding the spillover effect of the Arab Spring on economic growth in countries located within different proximity ranges (2000-, 1500-, and 1000-kilometer distances). This study revealed a negative impact of the Arab Spring on economic growth for countries in closer proximity to the Arab Spring countries, primarily attributed to a decline in foreign direct investment (FDI) and bilateral trade. It is important to highlight that the statistical significance of the results regarding economic growth and FDI was found exclusively for countries located within the 2000- and 1500-kilometer proximity ranges from the Arab Spring countries. However, for countries within the 1000-kilometer range, the results did not demonstrate statistical

significance. Similarly, when examining bilateral trade, none of the proximity ranges exhibited statistically significant results.

To address potential concerns and enhance the reliability of the results, I conducted a set of robustness tests to examine the impact of the Arab Spring on economic growth, bilateral trade, and FDI within the neighboring countries of each Arab Spring country individually. Additionally, I refined the analysis by excluding European countries directly affected by the Euro debt crisis, including Portugal, Italy, Ireland, Greece, and Spain. This deliberate exclusion enables us to isolate and examine the specific effects of the Arab Spring on economic growth, bilateral trade, and FDI, while minimizing potential confounding factors stemming from the overlapping crises.

The outcomes of the robustness analysis, presented in Table 3.5, depict the spillover impact of the Arab Spring on economic growth. This impact was examined for countries situated at varying distances from Tunisia, Libya and Egypt. The findings indicate that, when located 2000 km away, the Arab Spring has a notable adverse influence on economic growth. This effect remains consistent when considering Tunisia and Libya, but it is less prominent in the case of Egypt. Moreover, for countries located 1500 km away, the Arab Spring continues to exhibit a significant negative effect on economic growth. This effect remains robust for Tunisia and Libya; however, no significant impact is observed for Egypt. On the other hand, for countries located 1000 km away, apart from Egypt, there is no discernible significant effect on economic growth resulting from the Arab Spring.

Table 3.5: Economic growth robustness

Variable	Proximity	Treatment country	The average treatment effect
In GDP	Countries located 2000 KM	Libya	-0.062*** (0.015)
		Tunisia	-0.071*** (0.014)
		Egypt	-0.038* (0.022)
	Countries located 1500 KM	Libya	-0.081*** (0.025)
		Tunisia	-0.079*** (0.018)
		Egypt	-0.103 (0.076)
	Countries located 1000 KM	Libya	0.065^ (0.094)
		Tunisia	-0.045 (0.036)
		Egypt	-0.158*** (0.028)

Note: ^ only one treatment country (Malta). *, ** and *** show significant levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

Table 3.6 presents the outcomes of a robustness test conducted to analyze the spillover effect of the Arab Spring on bilateral trade, focusing on trade relationships with Libya, Tunisia, and Egypt individually.

Table 3.6: Bilateral trade robustness

Variable	Proximity	Treatment country	The average treatment effect
Bilateral Trade/initial GDP (Trade with Libya, Tunisia and Egypt separately)	Countries located 2000 KM	Libya	0.084 (0.085)
		Tunisia	-0.029 (0.082)
		Egypt	0.488* (0.284)
	Countries located 1500 KM	Libya	0.107 (0.201)
		Tunisia	-0.012 (0.107)
		Egypt	0.552** (0.265)
	Countries located 1000 KM	Libya	1.747***^ (0.114)
		Tunisia	-0.006 (0.477)
		Egypt	0.947*** (0.262)

Note: ^ only one treatment country (Malta). *, ** and *** show significant levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

The results indicate that, except for Egypt, which experienced a positive effect, there is no significant impact on bilateral trade for countries situated 2000 km away. When examining countries situated 1500 km away, no significant effect on bilateral trade is observed with Libya and Tunisia. However, there is a significant positive effect on bilateral trade with Egypt. For countries located 1000 km away, a significant positive effect on bilateral trade is observed with Libya and Egypt, while no significant effect is found with Tunisia. It is worth noting that these results are influenced by the inclusion of only one treatment country (Malta), which can affect the outcomes.

Table 3.7 displays the results of an analysis focusing on FDI. The findings indicate that countries located 2000 km away experience a significant negative impact on FDI from Tunisia and Egypt, while no significant effect is observed from Libya.

Table 3.7: FDI robustness

Variable	Proximity	Treatment country	The average treatment effect
FDI/initial GDP	Countries located 2000 KM	Libya	-0.300 (0.193)
		Tunisia	-0.479** (0.209)
		Egypt	-0.285* (0.152)
	Countries located 1500 KM	Libya	-0.341* (0.194)
		Tunisia	-0.373* (0.209)
		Egypt	-0.064 (0.204)
	Countries located 1000 KM	Libya	-1.471*** (0.415)
		Tunisia	-0.616 (0.441)
		Egypt	-0.309 (0.260)

Note: ^ only one treatment country (Malta). *, ** and *** show significant levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

Furthermore, for countries located 1500 km away, there is a significant negative effect on FDI from Libya and Tunisia, but no significant effect is observed from Egypt. Similarly, for countries

located 1000 km away, there is a significant negative effect on FDI from Libya, while no significant effect is observed from Tunisia or Egypt. It is important to note that these results may be influenced by the inclusion of only one treatment country (Malta), which can potentially impact the outcomes.

Overall, the robustness test suggests that the Arab Spring has a consistent negative impact on economic growth across different proximity ranges. The effect on bilateral trade and FDI is less consistent and varies depending on the distance and the specific treatment countries (Tunisia, Libya, or Egypt). Furthermore, the outcomes indicate that none of the individual Arab Spring countries significantly drive the analysis. These findings indicate the necessity for further robustness tests. Consequently, the next step involves conducting a test to enhance the robustness of the analysis by excluding European countries that were directly affected by the Euro debt crisis including Portugal, Italy, Ireland, Greece, and Spain. This test aims to assess whether the results remain consistent and reliable when removing the influence of the Euro debt crisis on the European countries involved.

Table 3.8 summarizes the impact of the Arab Spring on different variables. In terms of Economic Growth (ln GDP), countries 2000 km away continue to show a significant negative influence from the Arab Spring, albeit slightly diminished compared to the initial analysis. Similarly, nations 1500 km away still experience a significant and comparable negative effect on economic growth as observed initially. Additionally, countries located 1000 km away continue to be negatively affected by the Arab Spring's impact on economic growth, though with lack of significance.

Regarding Bilateral Trade/initial GDP, countries 2000 km away exhibit no significant impact, consistent with the initial analysis. Similarly, nations 1500 km away maintain an insignificant

negative effect on bilateral trade. Countries situated 1000 km away still display a negative effect on bilateral trade, though with a lack of significance.

Concerning FDI/initial GDP, countries 2000 km away continue to experience a significant negative effect on FDI due to the Arab Spring, with a magnitude akin to the initial analysis. Similarly, countries 1500 km away maintain a significant negative effect on FDI, albeit with increased significance. Moreover, nations located 1000 km away still face a negative effect on FDI, although the significance level is diminished compared to the initial analysis.

Table 3.8: Excluding Euro countries with debt crisis.

Variable	Proximity	Non-Euro The average treatment effect
Ln real GDP	Countries located 2000 KM	-0.048*** (0.016)
	Countries located 1500 KM	-0.050*** (0.016)
	Countries located 1000 KM	-0.052 (0.037)
Bilateral Trade/initial GDP	Countries located 2000 KM	0.041 (0.398)
	Countries located 1500 KM	-0.105 (0.615)
	Countries located 1000 KM	-1.282 (1.970)
FDI/GDP	Countries located 2000 KM	-0.501*** (0.140)
	Countries located 1500 KM	-0.426** (0.211)
	Countries located 1000 KM	-0.715 (0.489)

Note: *, ** and *** show significant levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

In summary, the robustness test, which excluded European countries impacted by the Euro debt crisis, generally supports the initial findings. The negative effects of the Arab Spring on economic growth and FDI remain significant for countries located at various distances. However, the effects on bilateral trade are not statistically significant, indicating that the Arab Spring may have a more pronounced impact on economic growth and FDI compared to bilateral trade.

3.6 Discussion

According to this study's hypothesis, the Arab Spring had a negative impact on the economic growth of neighboring countries. This negative impact can be attributed to several factors. Nonetheless, this study concentrates on two particular factors: the negative consequences on bilateral trade and the inflow of FDI into these nations. The study's findings indicate that countries positioned closer to the Arab Spring countries encountered a detrimental influence on their economic growth. Part of this negative effect could be associated with a decrease in FDI. The results of this study suggest that the Arab Spring had a negative impact on the economic growth of neighboring countries. The Arab Spring was characterized by widespread protests, political instability, and in some cases, armed conflict. These events had significant repercussions on the economies of the affected countries and their neighboring nations. One of the key findings of this research is that the economic growth of neighboring countries was adversely affected by the Arab Spring. This can be attributed to several factors. First, the political instability and uncertainty led to a decline in investor confidence and increased risk perceptions in the region (AlShammari et al, 2023). Conflict can significantly affect FDI due to security risks, political and regulatory uncertainty, economic instability, asset destruction, human capital flight, and reputational risks. These factors deter foreign investors, create an unfavorable business environment, and limit opportunities for investment in conflict-affected regions. As a result, FDI was negatively impacted, which in turn hindered economic growth. The findings of this study support the notion that conflicts, such as the Arab Spring, can have a significant negative impact on FDI. Second, the Arab Spring resulted in disruptions to regional supply chains and trade networks (Veninga & Ihle). The protests and conflicts disrupted transportation routes, damaged infrastructure, and created barriers to cross-border trade. These disruptions had a spillover effect on neighboring countries,

as they relied on trade and economic cooperation with the affected nations (Qureshi, 2013). The decline in trade volumes and disruptions to supply chains contributed to slower economic growth in the neighboring countries. Nevertheless, the findings indicate that the effect of the Arab Spring on trade is negative, yet statistically insignificant, suggesting that there may be a perceived negative impact on trade, but the available data does not provide enough evidence to confidently establish a significant causal relationship between the Arab Spring and trade outcomes.

There could be several reasons for this result. First, trade is a complex and multifaceted phenomenon influenced by numerous factors, such as global economic conditions, market dynamics, and policy changes. The Arab Spring may have contributed to a decline in trade volumes and disruptions to supply chains, but other factors could have overshadowed or masked its direct impact on trade. Second, statistical insignificance may indicate that the observed negative effect on trade could be due to random variation or measurement error rather than a true causal relationship. The available data may not capture all relevant variables or adequately control for confounding factors that could influence trade outcomes. Lastly, it is important to consider the limitations of the study design and methodology. The analysis might not have accounted for all potential variables or adequately addressed endogeneity issues, making it challenging to establish a clear and significant relationship between the Arab Spring and trade.

3.7 Conclusion

This paper empirically investigates the spillover effects of the Arab Spring on economic growth, bilateral trade, and FDI for countries located at different distances from the Arab Spring countries. Using a synthetic difference-in-differences method and analyzing 16 years of data for 117 countries, the following key findings emerge:

Firstly, the Arab Spring significantly and negatively impacted the economic growth of countries located 2000-, 1500- and 1000-kilometers away from the Arab Spring countries. This suggests that the Arab Spring had a negative effect on economic growth of neighboring countries. Secondly, examining the potential channel of bilateral trade, the Arab Spring displayed a negative but statistically insignificant impact on bilateral trade for countries located at distances of 2000-, 1500-, and 1000-kilometers from the Arab Spring countries. This suggests that while there may be a perceived negative impact on bilateral trade, the available data does not provide sufficient evidence to establish a significant causal relationship between the Arab Spring and bilateral trade outcomes. Lastly, focusing on the role of FDI as a potential channel, the results indicate that the Arab Spring had a negative and significant impact on FDI for countries located 2000- and 1000-kilometers away from the Arab Spring countries. However, for countries within a 1500-kilometer radius, the average treatment effect on FDI was negative but statistically insignificant. This implies that Foreign Direct Investment (FDI) potentially contributed to the adverse impact on economic growth in these countries. Consequently, the decline in economic growth could be associated with the decrease in FDI within these nations.

Overall, the findings highlight the spillover effects of the Arab Spring on economic growth, with FDI emerging as a significant factor in driving the observed reduction in economic growth for countries located further from the Arab Spring countries. The lack of statistical significance in the impact on bilateral trade suggests the need for further research and a more comprehensive understanding of the dynamics between the Arab Spring and trade outcomes. These insights contribute to a better understanding of the economic consequences of political events such as the Arab Spring and provide valuable information for policymakers and stakeholders aiming to

mitigate the adverse effects and promote sustainable economic growth in the aftermath of such events.

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Appendix A

Appendices for Chapter 1

A.1 Country weights of economic growth in the synthetic Tunisia

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0	Saudi Arabia	0.003
Albania	0	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0	Malawi	0	El Salvador	0
Armenia	0	Ghana	0	Malaysia	0.153	Turkey	0
Azerbaijan	0	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0	Hungary	0	Nicaragua	0.283	Uruguay	0
Belarus	0	Indonesia	0	Oman	0.235	Vietnam	0
Bolivia	0	India	0.172	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0
Botswana	0	Kazakhstan	0	Poland	0		
Chile	0	Kenya	0	Paraguay	0		
China	0.155	Kuwait	0	Qatar	0		
Cote d'Ivoire	0	Moldova	0	Romania	0		

A.2 Country weights of economic growth in the synthetic Libya

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0	Saudi Arabia	0.534
Albania	0	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0	Malawi	0	El Salvador	0
Armenia	0.035	Ghana	0	Malaysia	0	Turkey	0
Azerbaijan	0.199	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0.019	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0	Hungary	0	Nicaragua	0	Uruguay	0
Belarus	0	Indonesia	0	Oman	0	Vietnam	0.014
Bolivia	0	India	0	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0.114
Botswana	0	Kazakhstan	0	Poland	0		
Chile	0	Kenya	0	Paraguay	0		
China	0	Kuwait	0.085	Qatar	0		
Cote d'Ivoire	0	Moldova	0	Romania	0		

A.3 Democracy predictor means before the Arab Spring.

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Real GDP per capita	9.11	9.84	9.93	10.07
Life expectancy	4.31	4.29	4.28	4.29
Government expenditure % of GDP	0.17	0.17	0.14	0.18
Female to labor	0.26	0.27	0.33	0.26
Rule of law	0.04	-0.13	-0.94	-0.21
Urban	0.66	0.65	0.77	0.69
Region	1.00	0.61	1.00	0.65
Open	0.96	0.95	0.99	0.86
Population growth	0.93	1.98	1.42	2.21
Democracy (2007)	0.10	0.10	0.04	0.05
Democracy (2005)	0.11	0.11	0.05	0.05
Democracy (2003)	0.11	0.10	0.05	0.05

A.4 Country weights of democracy in the synthetic Tunisia

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0	Saudi Arabia	0.526
Albania	0	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0	Malawi	0	El Salvador	0
Armenia	0.088	Ghana	0	Malaysia	0	Turkey	0
Azerbaijan	0	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0.020	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0.003	Hungary	0	Nicaragua	0.044	Uruguay	0
Belarus	0	Indonesia	0	Oman	0.087	Vietnam	0.180
Bolivia	0	India	0	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0
Botswana	0	Kazakhstan	0	Poland	0		
Chile	0	Kenya	0	Paraguay	0		
China	0	Kuwait	0	Qatar	0		
Cote d'Ivoire	0	Moldova	0.050	Romania	0		

A.5 Country weights of democracy in the synthetic Libya

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0	Saudi Arabia	0.649
Albania	0	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0	Malawi	0	El Salvador	0
Armenia	0	Ghana	0	Malaysia	0	Turkey	0
Azerbaijan	0.198	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0	Hungary	0	Nicaragua	0	Uruguay	0
Belarus	0	Indonesia	0	Oman	0	Vietnam	0.032
Bolivia	0	India	0	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0
Botswana	0	Kazakhstan	0	Poland	0		
Chile	0	Kenya	0	Paraguay	0		
China	0.121	Kuwait	0	Qatar	0		
Cote d'Ivoire	0	Moldova	0	Romania	0		

A.6 Corruption predictor means before the Arab Spring.

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Real GDP per capita	9.11	9.26	9.93	9.44
Life expectancy	4.31	4.22	4.28	4.25
Government expenditure % of GDP	0.17	0.13	0.14	0.13
Female to labor	0.26	0.43	0.33	0.41
Rule of law	0.04	-0.50	-0.95	-0.66
Urban	0.66	0.65	0.77	0.58
Region	1.00	0.08	1.00	0.20
Open	0.96	0.82	0.99	0.94
Population growth	0.93	0.99	1.42	1.47
Corruption (2007)	0.85	0.85	0.85	0.85
Corruption (2005)	0.85	0.85	0.85	0.85
Corruption (2003)	0.85	0.85	0.85	0.85

A.7 Country weights of corruption in the synthetic Tunisia

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0.028	Saudi Arabia	0.082
Albania	0	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0.242	Malawi	0	El Salvador	0
Armenia	0.380	Ghana	0	Malaysia	0	Turkey	0
Azerbaijan	0.171	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0.005	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0	Hungary	0	Nicaragua	0	Uruguay	0
Belarus	0	Indonesia	0	Oman	0	Vietnam	0
Bolivia	0.012	India	0	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0
Botswana	0	Kazakhstan	0	Poland	0		0
Chile	0	Kenya	0	Paraguay	0		
China	0	Kuwait	0	Qatar	0		
Cote d'Ivoire	0	Moldova	0.080	Romania	0		

A.8 Country weights of corruption in the synthetic Libya

Country	Weight	Country	Weight	Country	Weight	Country	Weight
Angola	0	Colombia	0	Madagascar	0	Saudi Arabia	0.197
Albania	0.065	Costa Rica	0	Mexico	0	Senegal	0
United Arab Emirates	0	Ecuador	0	Mozambique	0	Sierra Leone	0
Argentina	0	Gabon	0	Malawi	0	El Salvador	0
Armenia	0	Ghana	0	Malaysia	0	Turkey	0
Azerbaijan	0.737	Guatemala	0	Namibia	0	Tanzania	0
Bangladesh	0	Croatia	0	Nigeria	0	Uganda	0
Bulgaria	0	Hungary	0	Nicaragua	0	Uruguay	0
Belarus	0	Indonesia	0	Oman	0	Vietnam	0
Bolivia	0	India	0	Panama	0	South Africa	0
Brazil	0	Jamaica	0	Peru	0	Zimbabwe	0
Botswana	0	Kazakhstan	0	Poland	0		
Chile	0	Kenya	0	Paraguay	0		
China	0	Kuwait	0	Qatar	0		
Cote d'Ivoire	0	Moldova	0	Romania	0		

A.9 GDP predictor means before the Arab Spring with additional control variables.

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Life expectancy	4.31	4.21	4.28	4.20
Government expenditure % of GDP	0.17	0.16	0.14	0.16
Natural resource % of GDP	0.05	0.06	0.58	0.39
Female to labor	0.26	0.40	0.33	0.32
Rule of law	0.04	0.04	-0.94	-0.38
Urban	0.66	0.52	0.77	0.75
Region	1.00	0.10	1.00	0.40
Open	0.96	0.76	0.99	0.89
Population growth	0.93	1.21	1.42	2.55
Mean years of education	6.03	7.29	6.70	8.16
Oil rent % of GDP	3.96	3.91	56.72	36.62
Unemployment rate	13.16	12.40	19.47	9.96
Income inequality	3.04	4.34	2.79	4.16
Real GDP per capita (2007)	9.15	9.14	9.99	10.00
Real GDP per capita (2005)	9.05	9.05	9.90	9.88
Real GDP per capita (2003)	8.97	8.97	9.77	9.78

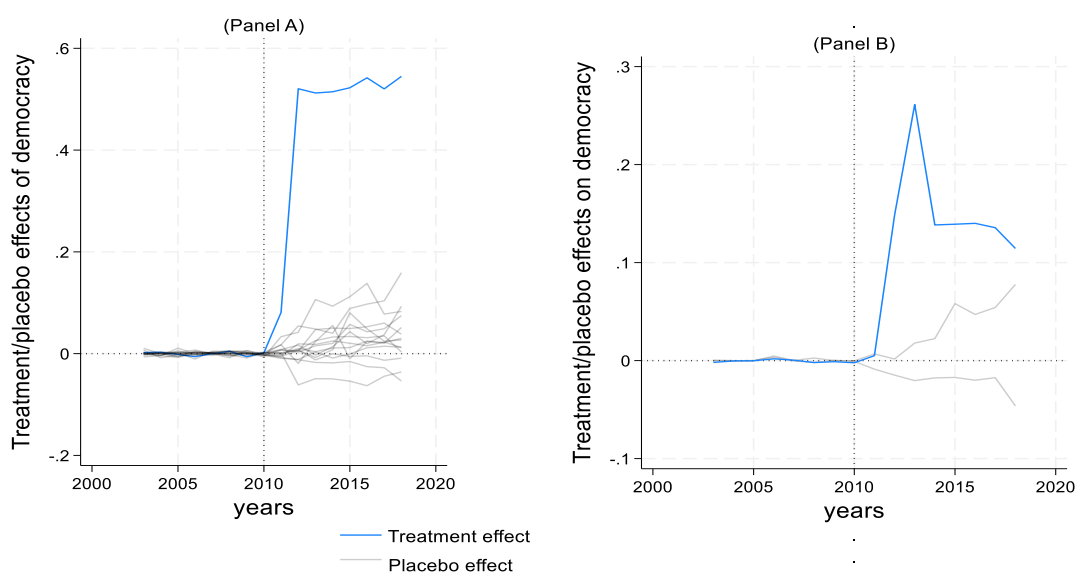
A.10 Democracy predictor means before the Arab Spring with additional control variables.

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Real GDP per capita	9.11	9.26	9.93	10.29
Life expectancy	4.31	4.14	4.28	4.28
Government expenditure % of GDP	0.17	0.16	0.14	0.19
Natural resource % of GDP	0.05	0.26	0.58	0.43
Female to labor	0.26	0.32	0.33	0.23
Rule of law	0.04	-0.62	-0.94	-0.17
Urban	0.66	0.60	0.77	0.74
Region	1.00	0.48	1.00	0.74
Open	0.96	0.77	0.99	0.88
Population growth	0.93	1.77	1.42	2.47
Mean years of education	6.03	7.73	6.70	8.62
Oil rent % of GDP	3.96	21.19	56.72	40.94
Unemployment rate	13.16	5.74	19.47	5.94
Income inequality	3.04	4.68	2.79	4.75
Democracy (2003)	0.11	0.11	0.05	0.05
Democracy (2005)	0.11	0.11	0.05	0.05
Democracy (2007)	0.10	0.10	0.05	0.05

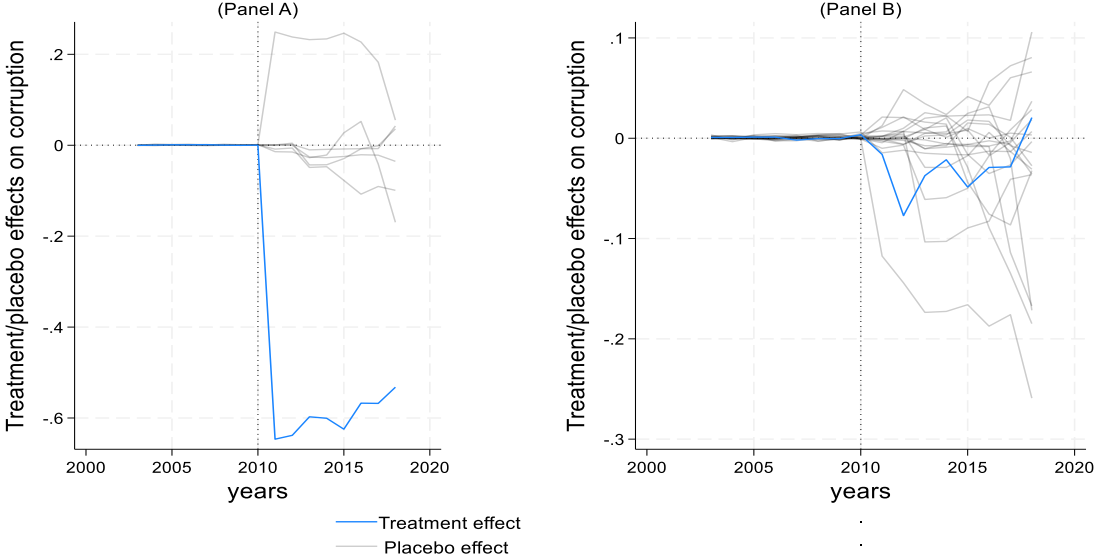
A.11 Corruption predictor means before the Arab Spring with additional control variables.

Predictors	Tunisia	Synthetic Tunisia	Libya	Synthetic Libya
Real GDP per capita	9.11	9.11	9.93	9.54
Life expectancy	4.31	4.22	4.28	4.24
Government expenditure % of GDP	0.17	0.12	0.14	0.13
Natural resource % of GDP	0.05	0.11	0.58	0.35
Female to labor	0.26	0.42	0.33	0.41
Rule of law	0.04	-0.54	-0.94	-0.59
Urban	0.66	0.66	0.77	0.63
Region	1	0.02	1.00	0.20
Open	0.96	0.71	0.99	0.93
Population growth	0.93	0.87	1.42	1.78
Mean years of education	6.03	8.32	6.70	9.40
Oil rent % of GDP	3.96	8.85	56.72	32.62
Unemployment rate	13.16	10.85	19.47	8.14
Income inequality	3.04	3.60	2.79	2.93
Real GDP per capita (2003)	0.85	0.85	0.85	0.85
Real GDP per capita (2005)	0.85	0.85	0.85	0.85
Real GDP per capita (2007)	0.85	0.85	0.85	0.85

A.12 In-space placebo test for Democracy in Tunisia and Libya



A.12 In-space placebo test for Corruption in Tunisia and Libya



Appendix B

Appendices for Chapter 2

B.1 Foreign aid received by Arab countries that were not impacted by the Arab Spring.

	Government aid from DAC	Other from DAC	Humanitarian aid from DAC	Government aid from USA	Other from USA	Humanitarian aid from USA
Algeria	0.39 (0.72)	-0.25 (0.76)	0.23 (0.87)	-0.69 (1.01)	-0.43 (1.54)	0.13 (1.13)
Sudan	-1.40** (0.66)	-0.70 (0.68)	-0.86 (0.90)	-1.59* (0.87)	-1.42 (0.95)	-0.91 (0.98)
Mauritania	0.64 (0.76)	-0.01 (0.71)	0.64 (0.92)	0.85 (0.94)	-1.22 (1.03)	0.73 (1.05)
Lebanon	-0.29 (0.75)	0.25 (0.72)	0.76 (0.87)	-0.36 (0.93)	1.02 (1.10)	0.81 (1.03)
Comoros	0.19 (0.69)	0.38 (0.74)	0.38 (0.88)	1.03 (0.99)	1.10 (1.51)	0.64 (1.01)
Djibouti	0.43 (0.73)	0.09 (0.75)	0.88 (0.92)	-0.18 (1.00)	-0.93 (1.18)	1.15 (1.08)
Iraq	-0.98 (0.75)	-1.53** (0.72)	0.70 (0.87)	-1.64* (0.93)	-3.90*** (1.10)	0.63 (1.03)
Somalia	1.31** (0.65)	0.97 (0.69)	0.31 (0.93)	1.16 (0.85)	1.03 (0.94)	0.01 (1.03)

	Government aid from EU countries	Other from EU countries	Humanitarian aid from EU countries	Government aid from Multi	Other from Multi	Humanitarian aid from Multi
Algeria	0.41 (0.79)	-0.51 (0.88)	-1.11 (1.00)	1.24* (0.75)	-0.84 (0.68)	-0.55 (1.24)
Sudan	-1.05 (0.77)	-0.68 (0.73)	-0.37 (1.01)	-0.23 (0.81)	0.49 (0.71)	-0.39 (1.01)
Mauritania	0.67 (0.79)	0.11 (0.71)	0.40 (1.07)	1.03 (0.81)	0.49 (0.65)	0.91 (1.09)
Lebanon	0.65 (0.79)	0.22 (0.71)	1.70* (0.98)	0.48 (0.80)	0.33 (0.64)	0.93 (1.01)
Comoros	0.58 (0.83)	0.24 (0.75)	0.36 (1.02)	-0.43 (0.75)	-0.05 (0.63)	-0.02 (1.13)
Djibouti	0.69 (0.81)	0.22 (0.72)	0.63 (1.02)	0.87 (0.76)	0.37 (0.64)	-0.05 (1.04)
Iraq	1.00 (0.79)	-2.27*** (0.71)	1.69* (0.98)	0.25 (0.81)	-0.65 (0.64)	0.24 (1.01)
Somalia	1.38* (0.78)	1.18 (0.73)	1.02 (1.05)	2.27*** (0.81)	0.25 (0.71)	-0.30 (1.00)

Notes: *, ** and *** shows significance levels of 10%, 5% and 1%, respectively. () represents the robust standard errors.

C.2 List of Countries Located within 1500 Kilometer

Libya	Tunisia	Egypt	either Libya, Tunisia, or Egypt
Albania	Albania	Cyprus	Albania
Algeria	Algeria	Greece	Algeria
Bosnia and Herzegovina	Austria	Lebanon	Bosnia and Herzegovina
Bulgaria	Bosnia and Herzegovina	Turkey	Bulgaria
Croatia	Bulgaria		Croatia
Greece	Croatia		Greece
Italy	France		Italy
Malta	Greece		Malta
Montenegro	Hungary		Montenegro
North Macedonia	Italy		North Macedonia
Serbia	Luxembourg		Serbia
Slovenia	Malta		Slovenia
	Montenegro		Austria
	North Macedonia		France
	Serbia		Hungary
	Slovak		Luxembourg
	Slovenia		Slovak
	Spain		Spain
	Switzerland		Switzerland
			Cyprus
			Lebanon
			Turkey
12	19	4	22

C.3 List of Countries Located within 1000 Kilometer

Libya	Tunisia	Egypt	either Libya, Tunisia, or Egypt
Malta	Albania	Cyprus	Malta
	Algeria	Lebanon	Albania
	Italy		Algeria
	Malta		Italy
	Montenegro		Montenegro
			Cyprus
			Lebanon
1	5	2	7