Effects of Mass Incarceration in Turkey Following Political Events

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1 Introduction

In the last decade, Turkey experienced a month-long nationwide protest in 2013, a failed peace process with the Kurdish separatist group PKK in 2015, and a failed coup attempt in 2016. All these events have been followed by incarceration of thousands of individuals. This carried Turkey to second place in incarceration rate among OECD countries right behind United States.

In this paper, I investigate how these political arrests show up in data and whether there are visible welfare effects of these mass incarceration events. I find that provinces with high levels of prison growth experienced less economic growth (in GDP per capita) and more divorces per hundred people. To establish a causal link, I utilize difference in differences method and repeat the analysis with multiple cutoff points as robustness check.

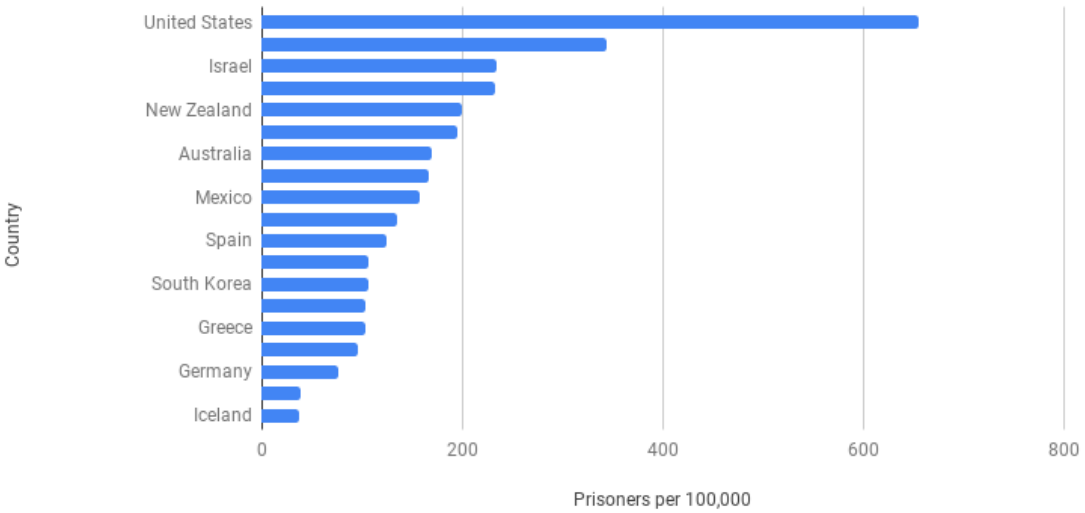

Figure 1: Incarceration rates in OECD countries as of May 2020

2 Data and Exploration

I am using data from TurkStat website on incarceration in Turkey. The data covers 20 years from 2000 to 2019. I look at the number of people received into prison by the province they used to reside in, their educational background, and type of crime.

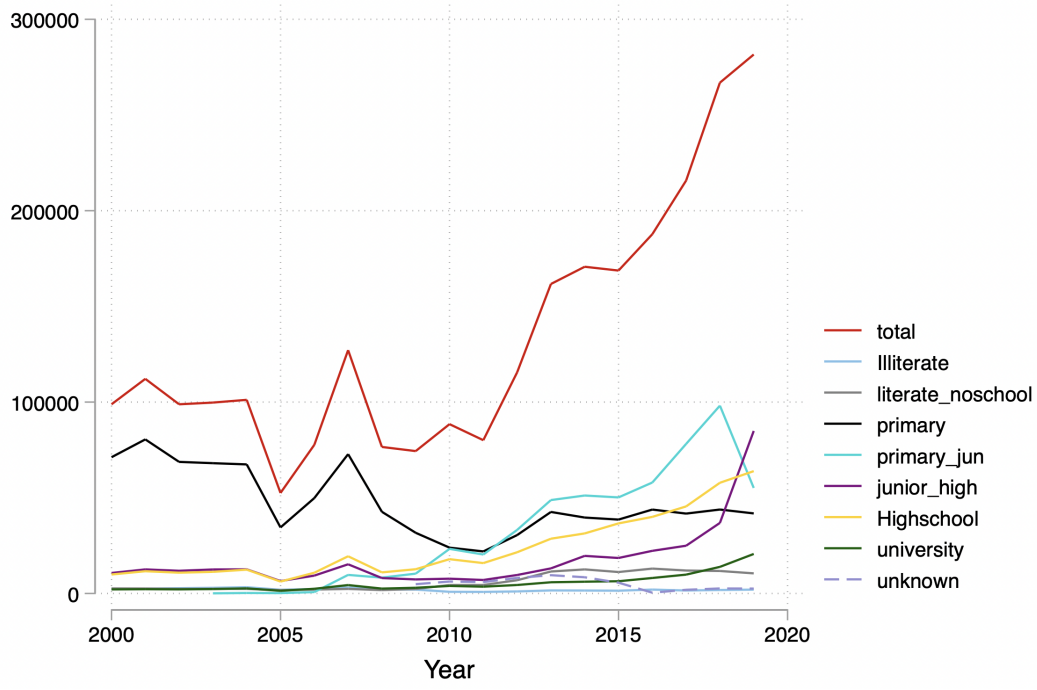

Figure 2: Convicts in Turkey Received Into Prison by Educational Status

In Figure 3, I combine the variables into two broader categories: those with at least eight years of education vs those with below eight years of education. We see that the rise in convictions are driven by educated prisoners. I utilize the rise in educated prisoners to classify provinces as high vs low incarceration growth.

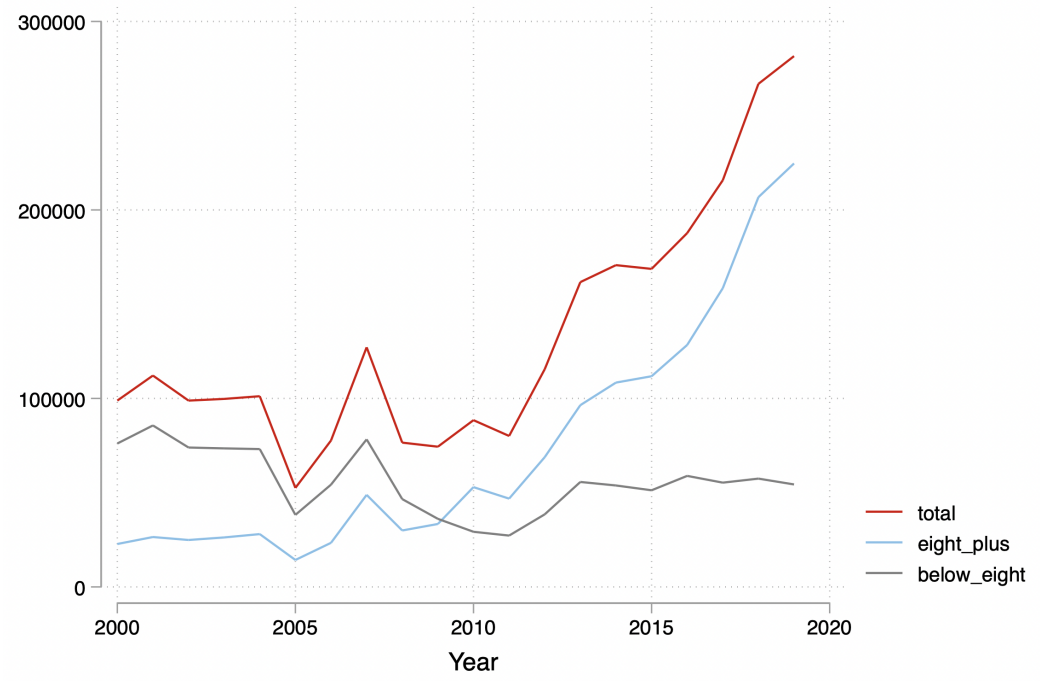

Figure 3: Imprisonment in Turkey by Educational Status

The first difference in Figure 4 captures the mass imprisonment of political opponents followed by 2013 Gezi Protests and 2016 coup attempt. There seems to be some seasonality. I tried to see if it was related to election cycles but did not turn out significant nor add any explanatory power.

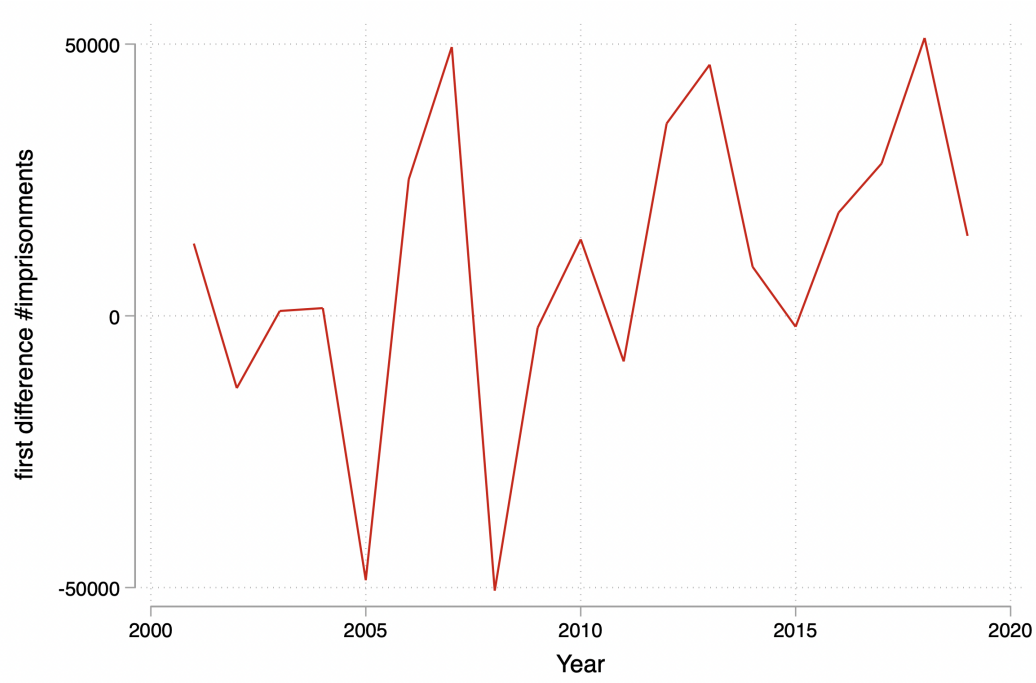

Figure 4: Imprisonment in Turkey First Difference

2.1 Welfare Measures

I use GDP per capita, suicide rates, and divorce rates as my proxy measures for welfare. Province level GDP per capita data for years 2000-2003 was not available on TurkStat, Treasury, or TCMB (Turkish Central Bank) websites. I found a paper that approximated province level GDP per capita for those years using nightlights data (Dusundere, 2019). I use their estimates in this paper. I also extracted data from YSK (Turkish Election Institution) website on party vote, municipality, and seat shares. I plan to use these data to investigate the political motivation behind arrests.

Table 1 shows how these welfare measures and conviction rates differ across Turkish regions. Mediterranean, Aegean, and Interior Anatolian regions have the highest rates of convictions among people with at least twelve years of education (around six people per thousand). This may not be a solely institutional difference, however, as the number of educated Marmara, Mediterranean, and Aegean regions are also leading in schooling. To control for different levels of schooling, I include high school graduation rate as a covariate in my analyses.

Before moving onto difference in differences, I want to see how these welfare measures are associated with increased incarceration following the 2011 and 2016 turning points. To do that, I estimate the effect of increased incarceration on different welfare measures using Ordinary Least Squares. I let the conviction rate have different effects at different periods using period dummies and interaction terms. This specification does not address the problem of spurious correlation and therefore should not be interpreted as a causal relationship.

Table 1: Socioeconomic Variables Across Seven Turkish Regions

Region		**Mean**	**SD**			**Mean**	**SD**
Mediterranean				**Interior Anatolia**			
	GDP per capita	6916.73	2932.42		GDP per capita	7259.56	3123.49
	12 yrs of school (%)	19.93	3.50		12 yrs of school (%)	19.71	5.33
	Convicts wo 12 (pk)	2.04	0.98		Convicts wo 12 (pk)	1.70	0.83
	Convicts w/ 12 (pk)	0.62	0.51		Convicts w/ 12 (pk)	0.51	0.39
	Divorce Rate (%)	1.60	0.43		Divorce Rate (%)	1.70	0.42
	Suicide Rate (pk)	4.36	1.58		Suicide Rate (pk)	4.01	1.46
Eastern Anatolia				**Black Sea**			
	GDP per capita	4731.32	2138.27		GDP per capita	6426.66	2535.98
	12 yrs of school (%)	16.69	5.50		12 yrs of school (%)	18.57	4.69
	Convicts wo 12 (pk)	1.31	0.73		Convicts wo 12 (pk)	1.49	0.72
	Convicts w/ 12 (pk)	0.42	0.36		Convicts w/ 12 (pk)	0.47	0.37
	Divorce Rate (%)	0.61	0.45		Divorce Rate (%)	1.19	0.37
	Suicide Rate (pk)	4.79	2.34		Suicide Rate (pk)	3.87	2.18
Aegean				**Marmara**			
	GDP per capita	7816.13	3032.42		GDP per capita	10347.03	4123.94
	12 yrs of school (%)	18.64	3.51		12 yrs of school (%)	21.69	3.20
	Convicts wo 12 (pk)	2.38	0.94		Convicts wo 12 (pk)	2.01	0.84
	Convicts w/ 12 (pk)	0.62	0.46		Convicts w/ 12 (pk)	0.54	0.38
	Divorce Rate (%)	1.99	0.47		Divorce Rate (%)	1.62	0.31
	Suicide Rate (pk)	5.37	2.79		Suicide Rate (pk)	4.30	1.48
Southeastern Ant.				**Total**			
	GDP per capita	4375.35	1643.68		GDP per capita	6761.81	3375.44
	12 yrs of school (%)	14.53	3.76		12 yrs of school (%)	18.57	4.92
	Convicts wo 12 (pk)	1.36	1.03		Convicts wo 12 (pk)	1.69	0.91
	Convicts w/ 12 (pk)	0.33	0.30		Convicts w/ 12 (pk)	0.49	0.40
	Divorce Rate (%)	0.61	0.37		Divorce Rate (%)	1.29	0.63
	Suicide Rate (pk)	3.60	1.37		Suicide Rate (pk)	4.29	2.04

Initially, I estimate this relationship without making a difference between conviction rates among educated or not educated people. Table 2 shows these estimates. We see that a higher level of incarceration is associated with higher income and higher divorce and suicide rates. The relationship does not change during the second period (2011-2015) or third period (2016-2019) except for divorce rates (as interaction terms are only significant for divorce rates).

Table 2: table

The Relationship Between Mass Incarceration and Various Welfare Measures

	(1) L.ln_gdpk b/se	(2) L.divorce_rate b/se	(3) L.young_divorce b/se	(4) L.divorce_y b/se	(5) L.suicide_rate b/se	(6) L.suicide_yrt b/se	(7) L.suicide_y b/se
Population	-0.000***	-0.000***	-0.000**	0.022***	-0.000***	-0.000*	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
High School	0.000***	0.000***	0.000***	0.239***	0.000***	0.000*	0.000***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Convictions per thousand	0.093***	0.205***	0.008***	2813.577**	0.895***	0.001***	3.866***
	(0.01)	(0.03)	(0.00)	(1037.23)	(0.14)	(0.00)	(0.70)
period2: 2011-2015	0.992***	-0.675***	-0.004	7129.959	-0.453	0.002*	18.175**
	(0.12)	(0.20)	(0.01)	(8434.74)	(1.13)	(0.00)	(6.14)
period3: 2016-2019	0.726***	-0.601**	-0.010	-10673.978	-1.605	0.001	5.142
	(0.13)	(0.22)	(0.01)	(8949.41)	(1.20)	(0.00)	(6.51)
CPK x period2	-0.005	0.134***	0.007***	4220.618**	-0.300	-0.000*	-1.847
	(0.02)	(0.04)	(0.00)	(1549.24)	(0.21)	(0.00)	(1.09)
CPK x period3	-0.037	0.023	0.002	3980.941**	-0.381*	-0.000	-1.089
	(0.02)	(0.03)	(0.00)	(1400.38)	(0.19)	(0.00)	(0.98)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	7.780***	1.202***	0.038***	-12243.581*	3.615***	0.001	-13.048**
	(0.08)	(0.13)	(0.01)	(5394.63)	(0.73)	(0.00)	(3.96)
R-sqr	0.884	0.715	0.701	0.981	0.193	0.269	0.922
dfres	1401	1327	1327	1327	1327	1399	1399

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: table

Relationship Between Incarceration of High School Graduates and Various Welfare Measures

	(1) L.ln_gdpk b/se	(2) L.divorce_rate b/se	(3) L.young_divorce b/se	(4) L.divorce_y b/se	(5) L.suicide_rate b/se	(6) L.suicide_yrt b/se	(7) L.suicide_y b/se
Population	-0.000***	-0.000***	-0.000*	0.019***	-0.000***	-0.000	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
High School	0.000***	0.000***	0.000***	0.252***	0.000***	0.000	0.000***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Convictions wo 12 (pk)	-0.051***	0.193***	0.010***	8954.004***	0.325*	0.000**	3.373***
	(0.01)	(0.02)	(0.00)	(1009.59)	(0.14)	(0.00)	(0.71)
Convictions w/ 12 (pk)	0.839***	0.303*	0.002	-32896.780***	3.333***	0.002**	8.046*
	(0.08)	(0.14)	(0.01)	(5638.49)	(0.77)	(0.00)	(4.01)
period2	0.783***	-0.727***	-0.002	7978.269	-1.212	0.002*	18.037**
	(0.12)	(0.20)	(0.01)	(8311.08)	(1.13)	(0.00)	(6.10)
period3	0.424**	-0.699**	-0.008	-10395.336	-2.243	0.001	10.026
	(0.13)	(0.22)	(0.01)	(9110.53)	(1.24)	(0.00)	(6.68)
Cw/12PK x period2	-0.226*	0.508**	0.025***	34648.970***	-1.442	-0.002**	-9.687*
	(0.09)	(0.16)	(0.01)	(6640.84)	(0.90)	(0.00)	(4.79)
Cw/12PK x period3	-0.424***	0.063	0.009	35336.495***	-2.183**	-0.001*	-9.387*
	(0.08)	(0.15)	(0.01)	(5934.64)	(0.81)	(0.00)	(4.26)
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FEs.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year x Region FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	7.857***	1.188***	0.036***	-13109.966*	3.860***	0.001	-12.955***
	(0.07)	(0.13)	(0.01)	(5217.86)	(0.71)	(0.00)	(3.86)
R-sqr	0.894	0.717	0.701	0.982	0.198	0.269	0.922
dfres	1400	1326	1326	1326	1326	1398	1398
BIC	314.3	1878.5	-7219.0	32841.4	6877.7	-14377.7	12437.5

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

When I examine these relationships having separated educated vs non-educated imprisonments, the estimates change drastically (Table 3). We see that the increased convictions of educated individuals in the 2011-2015 period is associated with lower income per person and higher divorce rates. Specifically, an additional high school graduate prisoner in one thousand individuals is associated with 5 percent increase in divorce rates and 22 percent reduction in GDP per capita. The effect for income is even more stark in the 2016-2019 period: 42 percent reduction in income per capita. Suicide rates do not seem to change with additional incarceration in either periods. If anything, they go down slightly.

Although I control for year and region specific effects, these estimates do not reflect causal relationships. One omitted variable might be civil conflict. It is possible that provinces with civil conflicts have experienced lower levels of economic activity both as a result of the conflicts themselves and due to the mass imprisonments that followed. I included interactions of year and region dummies to partially account for these, however, these interactions would account for such effects only if the conflict is region wide (instead of province specific).

In order to account for such omitted variables, I classify provinces into low vs high incarceration growth categories based on changes in their levels of imprisonment of educated individuals. Table 4 shows the mechanics of the categorization and difference in differences process. The ten provinces analyzed in Table 4 all experienced high growth (above 90th percentile) in incarceration of high school educated individuals both in from period 1 to period 2 and from period 2 to period 3. We see that the growth of educated incarceration in these provinces were 0.174 per thousand higher than the increase in national average. Furthermore, these provinces experienced -$478.2 lower growth per capita in 2016-2019 period relative to 2011-2015 period.

Table 4: Deviation in GDP per Capita in Provinces With High Rise in Incarceration of Educated People

Province	**Convicts 2000-2010**	**Convicts 2011-2015**	**Convicts 2016-2019**	**Change 1 in ConPK**	**Change 2 in ConPK**	**Deviation**	**Average**
adana	0.27	0.81	1.4	0.54	0.59	0.11	0.174
afyonkarahisar	0.28	0.72	1.32	0.44	0.59	0.11	
amasya	0.26	0.79	1.41	0.53	0.61	0.13	
antalya	0.45	1.09	1.91	0.63	0.82	0.34	
bilecik	0.28	0.72	1.3	0.45	0.58	0.1	
denizli	0.37	0.86	1.57	0.49	0.71	0.23	
izmir	0.29	0.75	1.41	0.46	0.66	0.18	
kayseri	0.23	0.77	1.38	0.54	0.61	0.13	
mersin	0.3	0.8	1.42	0.5	0.62	0.14	
mugla	0.27	0.78	1.53	0.51	0.75	0.27	
National Average	0.22	0.57	1.05	0.34	0.48		
Province	GDPK 2000-2010	GDPK 2011-2015	GDPK 2016-2019	Growth 1 in GDPK	Growth 2 in GDPK	Deviation	Average
adana	4915.73	8500.6	7231.75	3584.87	-1268.85	-10.32	-478.2
afyonkarahisar	4440.09	7953.6	6914.5	3513.51	-1039.1	219.43	
amasya	4846.27	8604.4	7139.75	3758.13	-1464.65	-206.12	
antalya	8792.73	13517.2	10751.75	4724.47	-2765.45	-1506.92	
bilecik	8208.73	14227	11315.75	6018.27	-2911.25	-1652.72	
denizli	6364.36	10712	9191.5	4347.64	-1520.5	-261.97	
izmir	7968.73	13666	11795.5	5697.27	-1870.5	-611.97	
kayseri	6550.27	10186.2	8577	3635.93	-1609.2	-350.67	
mersin	5591	9330.4	8243.75	3739.4	-1086.65	171.88	
mugla	7626	12109.4	10278.25	4483.4	-1831.15	-572.62	
National Average	5143.31	8885.66	7627.14	3742.35	-1258.53		

3 Methodology and Results

I use difference in differences to see if provinces that incarcerated more people experienced better or worse economic outcomes. Figure 5 shows how some provinces have been imprisoning higher numbers of educated individuals since 2010. I used 90th percentile growth in educated incarceration as the cutoff to classify the provinces. Figure 6 shows the different trajectories economies of these provinces take over these two decades.

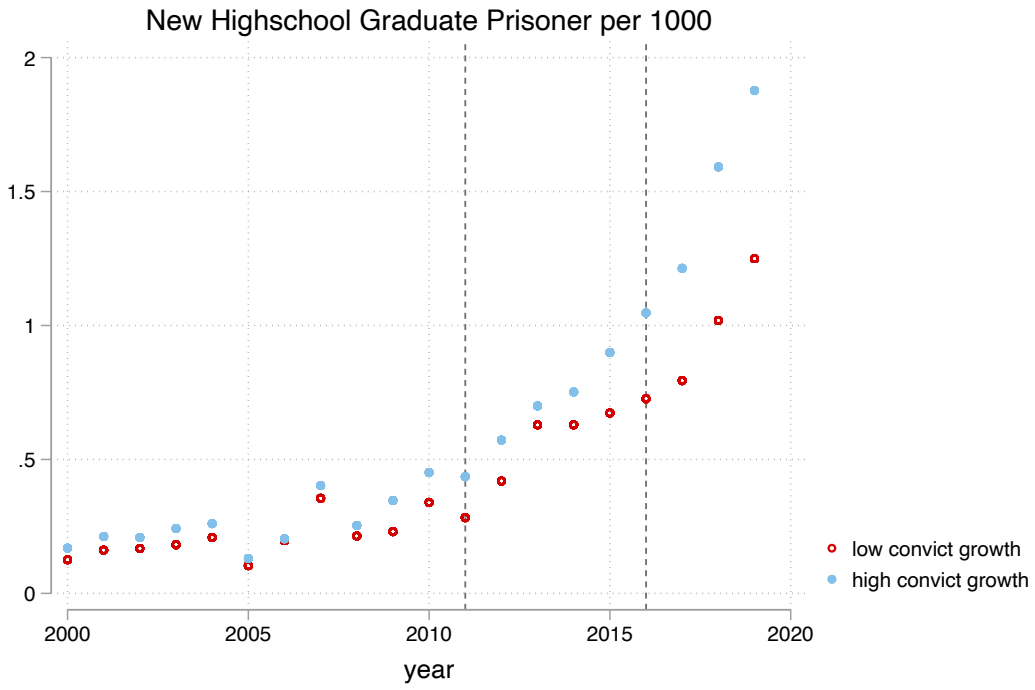

Figure 5: The Evolution of Educated Incarceration Rate

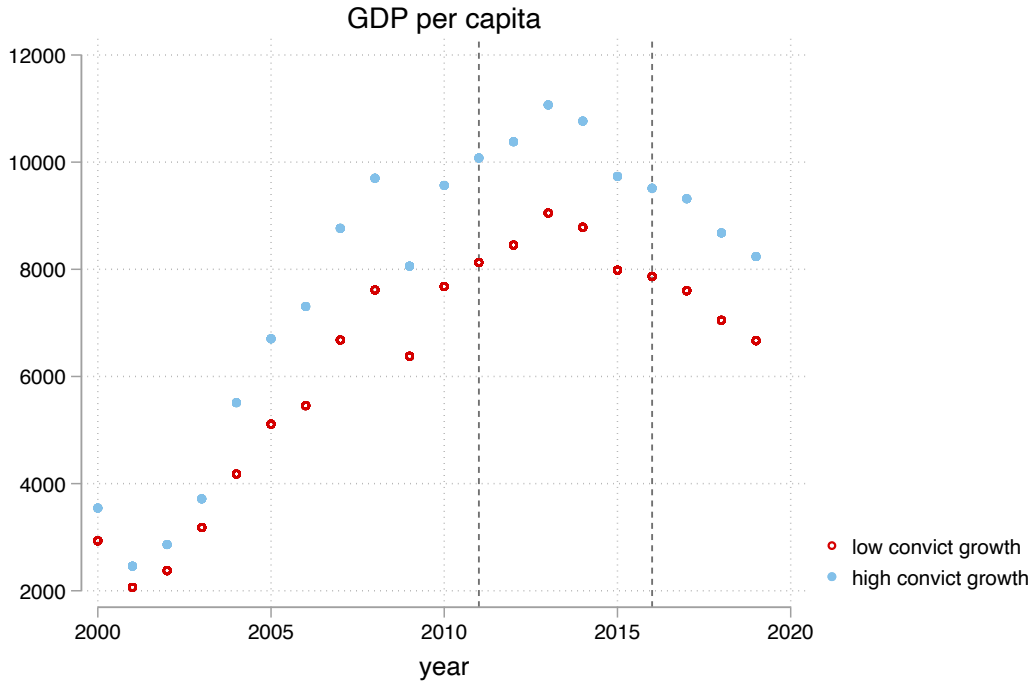

Figure 6: The Evolution of GDPK by Educated Incarceration Rate Category

Table 5 shows the results from OLS estimates of the difference in differences coefficients. We find that the high imprisoning provinces experienced 10 percent lower growth in the 2011-2015 period and 16 percent lower growth in 2016-2019 period. Table 6 shows the same estimates with a different cutoff (75th percentile), and the results are slightly lower in magnitude but similar.

Table 5: table

DiD Mass Incarceration in 2011-2015 and 2016-2019 (90th percentile cutoff)

	(1)	(2)	(3)
	L.ln_gdpk	L.suicide_yrt	L.divorce_yrt
	b/se	b/se	b/se
Population	-0.000***	-0.000	-0.000
	(0.00)	(0.00)	(0.00)
High School	0.000***	0.000	0.000
	(0.00)	(0.00)	(0.00)
Convictions wo 12 (pk)	-0.047***	0.000**	0.009***
	(0.01)	(0.00)	(0.00)
Convictions w/ 12 (pk)	0.530***	0.000	0.011**
	(0.04)	(0.00)	(0.00)
period2	0.842***	0.001	0.015*
	(0.10)	(0.00)	(0.01)
Rise11_p90	0.100***	0.001***	0.001
	(0.02)	(0.00)	(0.00)
period2 × Rise11_p90	-0.106**	-0.000	0.002
	(0.04)	(0.00)	(0.00)
period3	0.207	0.001	-0.003
	(0.11)	(0.00)	(0.01)
Rise16_p90	0.142***	0.000*	0.014***
	(0.02)	(0.00)	(0.00)
period3 × Rise16_p90	-0.158***	-0.001*	-0.009**
	(0.04)	(0.00)	(0.00)
Year FEs	Yes	Yes	Yes
Region FEs.	Yes	Yes	Yes
Year x Region FEs	Yes	Yes	Yes
Intercept	7.830***	0.001	0.030***
	(0.07)	(0.00)	(0.01)
R-sqr	0.898	0.279	0.715
dfres	1398	1396	1324

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: table

DiD Mass Incarceration in 2011-2015 and 2016-2019 (75th percentile cutoff)

	(1)	(2)	(3)
	L.ln_gdpk	L.suicide_yrt	L.divorce_yrt
	b/se	b/se	b/se
Population	-0.000***	-0.000	-0.000*
	(0.00)	(0.00)	(0.00)
High School	0.000***	0.000*	0.000**
	(0.00)	(0.00)	(0.00)
Convictions wo 12 (pk)	-0.042**	0.000***	0.009***
	(0.01)	(0.00)	(0.00)
Convictions w/ 12 (pk)	0.562***	0.000	0.010**
	(0.05)	(0.00)	(0.00)
period2	0.804***	0.001	0.015
	(0.11)	(0.00)	(0.01)
Rise11_p75	0.033*	0.000*	0.005***
	(0.02)	(0.00)	(0.00)
period2 × Rise11_p75	-0.070*	0.000	0.001
	(0.03)	(0.00)	(0.00)
period3	0.183	0.001	-0.001
	(0.12)	(0.00)	(0.01)
Rise16_p75	0.066***	0.000*	0.004**
	(0.01)	(0.00)	(0.00)
period3 × Rise16_p75	-0.131***	-0.000	-0.006*
	(0.03)	(0.00)	(0.00)
Year FEs	Yes	Yes	Yes
Region FEs.	Yes	Yes	Yes
Year x Region FEs	Yes	Yes	Yes
Intercept	7.833***	0.001	0.030***
	(0.07)	(0.00)	(0.01)
R-sqr	0.894	0.274	0.707
dfres	1398	1396	1324
BIC	322.9	-14373.6	-7237.3

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Conclusion and Future Steps

- The increased incarceration in Turkey following the mass protests and failed coup attempt brought massive loss in economic activity.
- I will perform more tests on parallel trends assumption in my future studies.
- Can find more results and details in the github page and the do file.

5 References

- Dusundere, Ayşegül Taşöz. 2019. 1992-2018 Dönemi için Gece Işıklarıyla İl Bazında GSYH Tahmini: 2018'de 81 İlin Büyüme Performansı. https://www.tepav.org.tr/tr/haberler/s/4450