

The Economic Costs of the War in Donbas for the Affected Ukrainian Regions

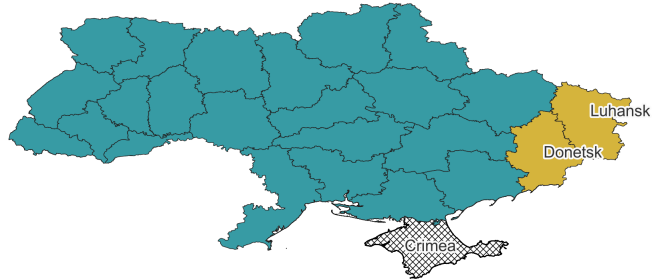
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Introduction

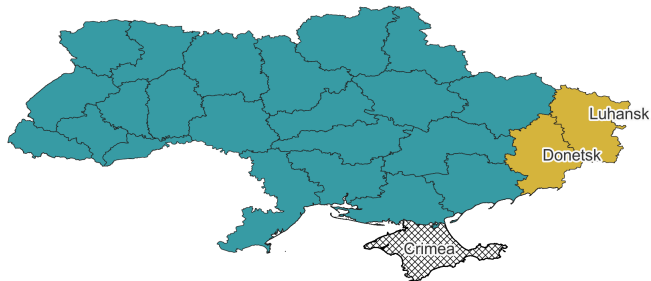
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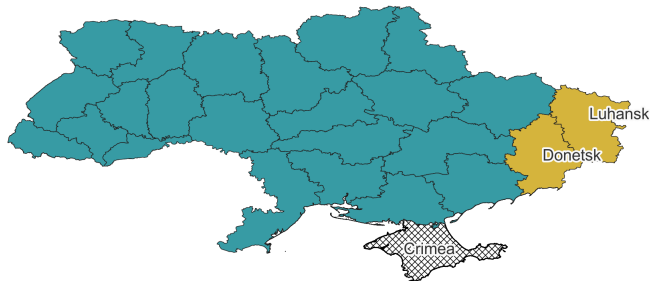
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- We estimate the effect of the invasion on the gross regional product per capita (GRP), disposable income per capita, and the unemployment rates of **Donetsk and Luhansk**.
- To estimate the Average Treatment Effect for the Treated (ATT), we deploy the Synthetic Difference-in-Differences estimator developed by Arkhangelsky et al.(2021).

Data and Methods

Data

- Official data from the State Statistics Service of Ukraine
- Series:
 - Disposable income per capita (2003 - 2019)
 - Gross fixed capital formation (2003 - 2019)
 - Gross Regional Product per capita (2004 - 2019)
 - Unemployment rate (2008 - 2019)
- Series area available for 24 out of 27 Ukrainian regions: Crimea and Sevastopol haven't published data and the city of Kyiv was omitted given its unique economic status.

Methods

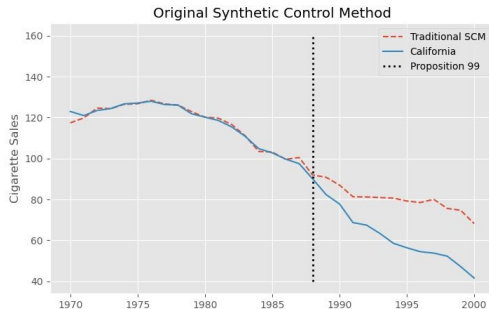
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The Synthetic Control Method

- It estimates the causal effect of an intervention by creating a weighted combination of similar untreated units as a counterfactual comparison to the treated unit.



Methods

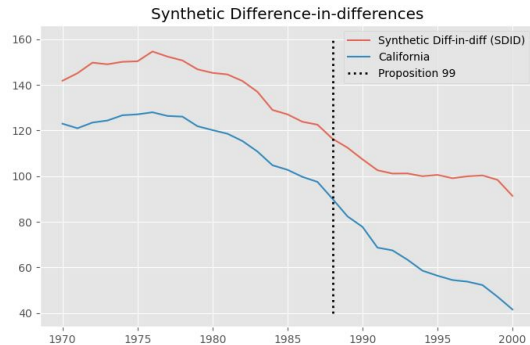
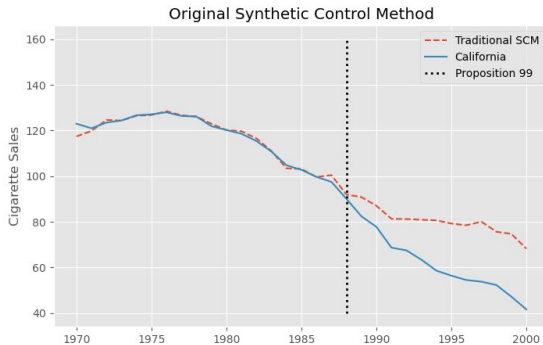
The Synthetic Difference-in-differences

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Results

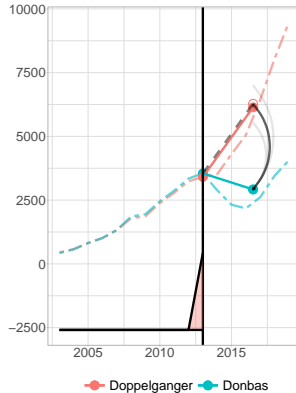
Results - The ATT

Table: The average treatment effects for the treated units and the standard errors for each variable of interest

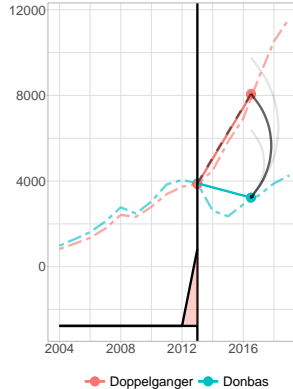
	<i>Income</i>	<i>GRP</i>	<i>Unemployment</i>
Estimate	-3362 (USD)	-4853 (USD)	+5.56 (pp)
Standard error	(164)	(467)	(0.77)

Note: Per capita GRP and per capita disposable income are in constant 2011 USD, and the unemployment rate is in percentage points.

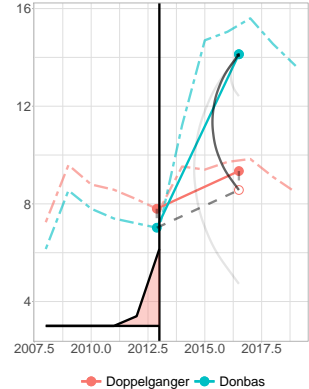
Results - SDID graphs



(a) Disposable Income



(b) GRP



(c) Unemployment

Results - A possible mechanism

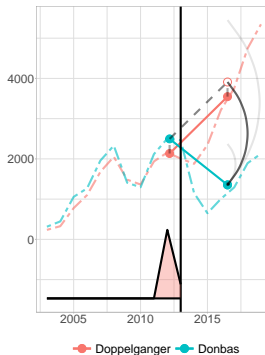
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- The impact on gross fixed capital formation was over 2.5 billion USD (65% lower than it would likely have been without the impact of war).

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Robustness checks

Robustness check - Sensitiveness to estimation method

- To ascertain that our results are relatively insensitive to the choice of SDiD estimator, we also run the estimation using conventional DiD and SCM.

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	<i>Income</i>	<i>GRP</i>	<i>Unemployment</i>	<i>Investments</i>
SDiD				
Estimate	-3362 (USD)	-4853 (USD)	+5.56 (pp)	-2.56 (bn. USD)
Standard error	(164)	(467)	(0.77)	(0.236)
SCM				
Estimate	-3497 (USD)	-5557 (USD)	+5.81 (pp)	-2.67 (bn. USD)
Standard error	(167)	(554)	(0.98)	(0.174)
DiD				
Estimate	-2569 (USD)	-4198 (USD)	+5.81 (pp)	-1.08 (bn. USD)
Standard error	(430)	(1219)	(0.86)	(0.578)

Robustness check - Decomposition of the treatment effect weights

- We apply the decomposition developed by Chaisemartin and D'Haultfoeuille (2020) for our case of two treated units to check whether they satisfy the “no-sign reversal” feature.

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- We apply the decomposition developed by Chaisemartin and D'Haultfoeuille (2020) for our case of two treated units to check whether they satisfy the “no-sign reversal” feature.
- Given that we have six post-treatment periods, we estimate twelve treatment effects, with non showing negative weights.
- We repeat the exercise for all four variables of interest, and the results hold for all of them.
- Consequently, **we believe that the TWFE approach is not problematic from this perspective in this case.**

Robustness checks - Separated effect

- Thus far, we have worked with the ATT on the whole Donbas. We now estimate the effects separately, omitting one region to estimate the other.

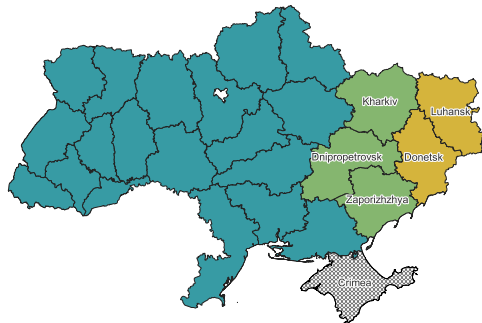
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	<i>Income</i>	<i>GRP</i>	<i>Unemployment</i>	<i>Investments</i>
Luhansk				
Estimate	-3416 (USD)	-4727 (USD)	+6.98 (pp)	-1.38 (bn. USD)
Standard error	(208)	(580)	(1.15)	(0.299)
Donetsk				
Estimate	-3315 (USD)	-4992 (USD)	+4.14 (pp)	-3.65 (bn. USD)
Standard error	(196)	(756)	(1.10)	(0.358)

Robustness checks - Possible SUTVA violation

- Spatial spillovers could bias the results from SDID.
- Recent research in the DiD literature has proposed alternatives to estimate this kind of effect.
- We consider one of these approaches, the Spatial Diff-in-Diff from Butts (2020), and adapt to the Synthetic Diff-in-Diff.



Robustness checks - Possible SUTVA violation

- The indirect treatment effects (spillovers) are not significant for any of the variables of interest.

	<i>Income</i>	<i>GRP</i>	<i>Unemployment</i>	<i>Investments</i>
Direct	-3187 (USD)	-5012 (USD)	+ 5.51 (pp)	-2.39 (bn. USD)
Standard error	(299)	(402)	(0.32)	(0.330)
Indirect (<i>W</i>)	240 (USD)	303 (USD)	-0.16 (pp)	-0.02 (bn. USD)
Standard error	(323)	(435)	(0.34)	(0.356)

Conclusion

- Literature about the regional effects of 2014 Russian invasion on Donbas is still lacking.
- With a recent method from the comparative case literature we estimate the economic effects on GRP, income and labor market conditions.
- We propose one of the key channels that drives the economic slump faced after 2014 in the region.
- To validate our methods, we run a set of robustness check that support our results.

THANK YOU!

Paper, data and codes for replication: github.com/serenini/Ukraine



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