UNIVERSIDAD DEL CEMA
Buenos Aires
Argentina

Serie
DOCUMENTOS DE TRABAJO

Área: Economía

DID DOLLARIZATION HELP ECUADOR?

Nicolás Cachanosky, Emilio Ocampo, Karla Hernández y John Ramseur

Julio 2024
Nro. 877

DID DOLLARIZATION HELP ECUADOR?

Nicolás Cachanosky
Center for Free Enterprise
The University of Texas at El Paso
500 W. University Ave.
El Paso, TX 79968
ncachanosky@utep.edu

Emilio Ocampo*
Centro de Estudios de Historia Económica
Universidad del CEMA
Av. Córdoba 374, (C1054AAP)
Ciudad de Buenos Aires, Argentina
eo@ucema.edu.ar

Karla Hernández
Department of Economics and Finance
The University of Texas at El Paso
500 W. University Ave.
El Paso, TX 79968
kchernandez1@miners.utep.edu

John Ramseur
Department of Economics
Metropolitan State University of Denver
Campus Box 77, P.O. Box 173362
Denver, CO 80217
jramseur@msudenver.edu

12-Jul-24

Abstract
This paper studies the impact on income per capita of dollarization in Ecuador using synthetic control analysis (SCA). The results support the hypothesis that dollarization can have a positive impact on economic growth. Such conclusion is very relevant for countries with high, persistent and volatile inflation considering dollarization as a currency regime.

JEL Codes: E42; E50; O43

Keywords: Ecuador, dollarization, synthetic control analysis

1.   Introduction

Dollarization, the *de jure* replacement of the domestic currency with an international one (such as the U.S. dollar), is a policy-relevant issue with limited empirical studies in the academic literature. Ecuador's experience with formal dollarization over the past 20 years provides a valuable case study for countries considering *de jure* dollarization, such as Argentina and Venezuela. However, empirical analysis of Ecuador's case faces challenges due to dollarization occurring simultaneously with a surge in oil prices, a crucial export. This coincidence raises questions about the driving force behind Ecuador's rise in GDP per capita post-2000—was it the adoption of dollarization or the rebound in crude prices? Theoretically, the positive effects of the latter might have outweighed the possible negative impacts of the former. Studies using a before-and-after methodology to evaluate dollarization struggle to disentangle the relative contributions of these factors. Employing Synthetic Control Analysis (SCA) on Ecuador's experience with dollarization can shed new light on the relative impact of this monetary regime. This is particularly interesting now that formal dollarization is again a topic of discussion in Argentina.[1]

Why would adopting a foreign currency benefit Ecuador's economy? It is crucial to understand that choosing dollarization did not imply relinquishing an independent and well-behaved central bank. The alternative to dollarization would have entailed grappling with a politicized central bank, high and volatile inflation, and likely, a hyperinflation crisis.

---

[1] For Argentina's dollarization proposal endorsed by President Javier Milei during the presidential campaign, see Ocampo and Cachanosky (2022).

Achieving long-lasting credible price stability was unattainable for Ecuador under those circumstances.

This work contributes to the recent surge of interest in dollarization. Scholars have explored various facets, including the institutional role of dollarization and the strengths and weaknesses of its institutional design (Cachanosky et al., 2022, 2023). Additionally, research has delved into the behavior of central bank balance sheets in dollarized economies (Erraez & Reynaud, 2022) and dollarization as a commitment mechanism (Ocampo, 2023). This study also complements Synthetic Control Analysis (SCA) applied to the cases of Ecuador and Latin America (Absher et al., 2020; Grier & Maynard, 2016; Hallren, 2014; Londoño-Espinosa et al., 2022; Ontaneda, 2017; Spruk, 2019; Yepes, 2016). Overall, this research enriches the expanding body of literature on dollarization and SCA analysis in Latin America.

Our analysis finds positive economically significant results on real GDP per capita (PPP), the statistical significance of which depends on the model's specification. It is important to note that the counterfactual is built on Ecuador's historical standards (rather than an ideal scenario), thus offering a more realistic alternative grounded in historical evidence than relying on an arbitrary counterfactual.

2.   Dollarization in Ecuador

A major concern with dollarization is the abandonment of domestic monetary policy. In theory, a dollarized economy would be unable to manage foreign shocks or have a central bank serve as a lender of last resort. In practice, countries considering dollarization as a necessity lack a central bank that can handle foreign shocks or effectively serve as a lender

of last resort (since the domestic market does not demand the local currency).[2] They may even suffer from chronic high inflation. This is the situation in countries currently contemplating dollarization, such as Argentina or Venezuela.[3]

This was also the case in Ecuador, where the alternative to dollarization was enduring high and volatile inflation with a central bank subject to political influence. Achieving credible price stability was not feasible for Ecuador under those circumstances. To avoid hyperinflation, Ecuador adopted dollarization in January 2000. Dollarization proved to be an effective measure in this regard (as it was in Zimbabwe's 2009 dollarization).

The decision to unilaterally embrace dollarization resulted in several positive outcomes. Firstly, it led to a rapid decrease in the inflation rate, bringing it down to levels comparable to those in the United States (see Figure 1). Since dollarization, Ecuador has not experienced high inflation rates, even during the tenure of the left-leaning populist regime led by Rafael Correa from 2007 to 2017. Inflation, interest rates, and output have also shown resilience against sovereign debt defaults and foreign shocks, such as those seen during the 2008 financial crisis. Dollarization has provided a solid foundation for price stability, as demonstrated by the failure of Correa's attempts to introduce a Central Bank Digital Currency (CBDC) (Arauz et al., 2021; Cachanosky et al., 2022). Moreover, adopting the dollar as the official currency also facilitated other regulatory reforms. Rapid and credible price stability helps enable the completion of other necessary reforms.

---

[2] Differnet may be the case of countries that dollarize due to conviction (instead of necessity), as El Salvador's dollarization in 2001 exemplifies.

[3] For a more complete analysis of the pro and cons of dollarization, see Ocampo and Cachanosky (2022) and contributions included in Levy-Yeyatti and Sturzennegger (2002) and Salvatore et al. (2003).

Figure 1. Inflation rate in Ecuador
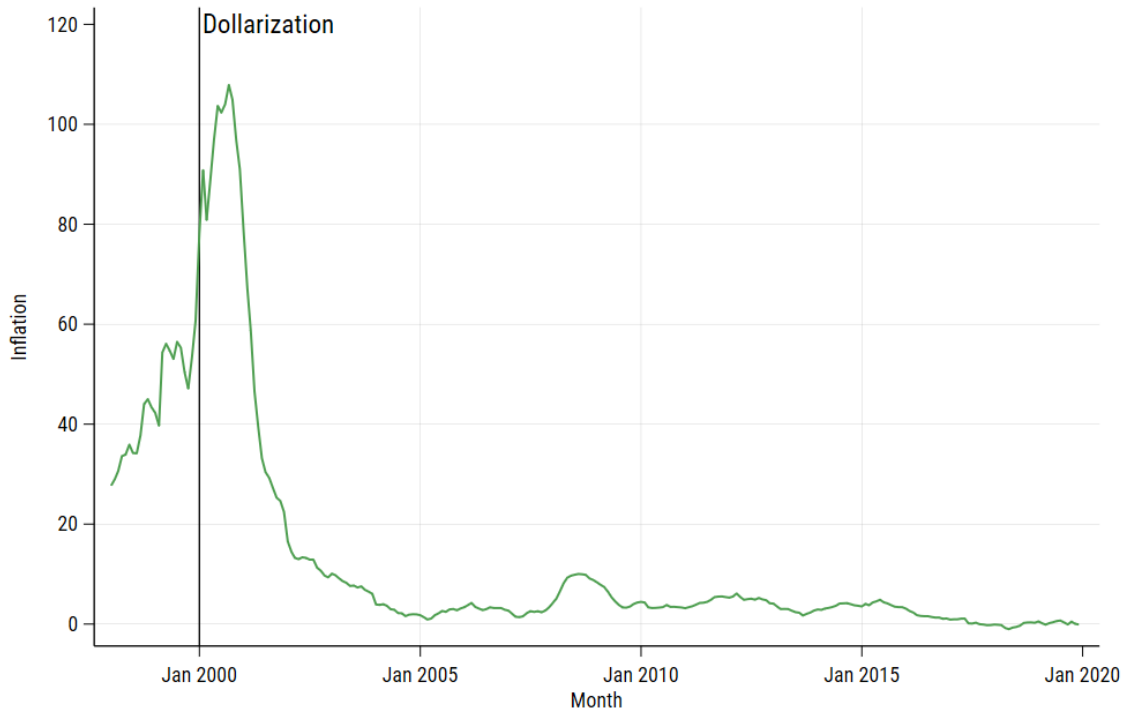
Source: Central Bank of Ecuador

However, price stability alone is insufficient to remedy a troubled economy. It is important to remember that dollarization is neither designed nor intended to be a fiscal or electoral reform. Dollarization does not automatically lead to a balanced budget or prevent the democratic election of a populist regime. Particularly during Correa's presidency (2007–2017), Ecuador faced imbalances such as fiscal deficits and a sovereign debt default in 2008. Correa also tapped into bank reserves through the central bank, eroding the banking sector (Cuevas & Díaz, 2022; Erraez & Reynaud, 2022). Yet, dollarization imposed an institutional constraint on Correa, making it more challenging for his populist policies to take root (Cachanosky et al., 2022). For example, when Correa defaulted in 2008, interest rates and credit availability to the private sector remained largely unaffected.

3. Synthetic Control Analysis of Ecuador's Dollarization

3.1. The donor pool

Synthetic Control Analysis (SCA) utilizes a donor pool to create a synthetic counterpart of the treated unit. In very simple terms, SCA uses a donor pool to create a replica of Ecuador where dollarization did not take place. This is done by matching pre-dollarization behavior to Ecuador, and then projecting the estimated behavior of Ecuador had not dollarized in 2000. In our scenario, the treated unit is Ecuador, and the shock is the dollarization reform. A synthetic Ecuador is formed as a weighted average of donor countries. Constructing a donor pool is both an art and a science. If the donor pool is too extensive, the estimation may suffer from overfitting. The ideal donor pool consists only of countries comparable to the treated country, with the treated country being the sole one affected by the shock (dollarization). In practice, achieving the ideal is not always feasible. Like any empirical method, SCA also has its limitations.[4]

In our Synthetic Control Analysis (SCA), our donor pool extends beyond countries in Latin America. This approach helps reduce any potential influence of Ecuador's dollarization on neighboring economies, thereby minimizing potential biases in the results. Another reason for including non-Latin American countries is the limited size of such a sample. Our donor pool aligns with those used in other Latin American studies, particularly those by Absher et al. (2020) and Spruk (2018) (see Table 1). Each country in our donor pool is present in at least one of these studies, except for Australia, which is often compared to Argentina due to

---

[4] On synthetic control methodology see Abadie (2021), Abadie and Gardeazabal (2003), Abadie et al. (2015a),

geographic and economic similarities. Our donor pool excludes dollarized countries like El

Salvador or Panama.

Country	Table 1. Comparison of donor pools		
	Spruk (2018)	Absher et al. (2020)	This paper
Argentina		X	X
Australia			X
Austria	X		
Belgium	X		X
Bolivia			X
Brazil	X	X	X
Canada		X	X
Chile	X	X	X
Colombia	X	X	X
Costa Rica		X	X
Denmark	X		X
Egypt		X	
France	X		X
Germany	X		X
Greece	X		
Guatemala		X	X
India		X	
Indonesia		X	
Iran	X	X	
Italy	X		X
Japan	X		X
Mexico	X	X	X
Nepal	X		
Netherlands	X		X
Nigeria		X	X
Norway	X	X	X
Panama		X	
Paraguay			X
Peru		X	X
Portugal	X		X
Spain			
Sweden	X		X
Switzerland	X		
Thailand			
Turkey	X		X
United Kingdom	X		X
United States	X	X	
Uruguay	X	X	X
Venezuela	X		
Latin America	6	9	11
Non-Latin America	18	9	15
Total	24	18	26

3.2. Dependent variable and covariates

Our dependent variable is real GDP per capita (PPP, 2011).[5] Our covariates are predictors of the outcome variables. Data starts in 1980, twenty years before dollarization took place. Table 2 includes all the covariates and their source.

Table 2. SCA predictor variables

Variable	Source
Dependent variable	
Real GDP per capita (PPP, 2011)	Maddison Project Database (2018)
Covariates	
Total Natural Resource Rents	WDI, World Bank
FDI, net inflows (% GDP)	WDI, World Bank
Industrial production (% GDP)	WDI, World Bank
Inflation (log)*	WDI, World Bank
Inflation (standard deviation)*	WDI, World Bank
Merchandise exports (% GDP)	Penn World Table
Terms of trade	Penn World Table
Capital-Output ratio	Penn World Table
Government consumption (% GDP)	Penn World Table
Economic Freedom of the World	Bridwell Institute for Economic Freedom

* For Argentina, we use private estimations of inflation during the government tampering of official data under the Kirchner administration.

We tried using different estimations of real GDP per capita, namely, measured in local currency, in US dollars, and PPP adjusted. We were unable to find usable fits for the first two estimations. For PPP estimations, we use the one that offers the best pre-treatment fit to Ecuador's data.[6]

---

[5] It is common in the literature to look at PPP-adjusted GDP per capita. See, for instance, Abadie, Diamond, and Hainmueller (2015b), Absher, Grier, and Grier, (2020), Cavallo, Galiani, Noy, and Pantano (2013), Campos, Coricelli, and Moretti (2019), and Lawson, Grier, and Absher (2019).

[6] The 2020 Maddison database does not produce a very good fit, and Ecuador's data looks less reliable than the 2018 version.

3.3.   SCA results

We conducted two SCA estimations. The first includes the full donor pool (SCA 1), while the second one excludes the larger donor (SCA 2). The larger donor, Nigeria, was under a military dictatorship until 1999. As expected, SCA 2 has a lower quality fit than SCA 1, but it still provides point estimates where dollarized Ecuador outperforms its non-dollarized counterpart (RMSPE increases from 108.89 to 315.61). In summary, SCA 1 yields statistically and economically significant positive results, whereas SCA 2 yields statistically insignificant but economically significant positive results (starting in 2004).

As shown in Table 3, Ecuador is only replicated by a few countries in the donor pool, with Latin America bearing most of the weight. There is an important trade-off between the results of SCA 1 and SCA 2. The former offers a closer pre-treatment replication of dollarized Ecuador, but Nigeria's shock may influence the post-shock estimation. Conversely, the latter provides a lower quality fit, but the donor pool may be considered more "pure" since it excludes Nigeria's shock. SCA 2's estimation indicates a potential negative bias in the pre-treatment period that favors non-dollarized Ecuador. To the extent that there is a bias, it is a conservative one.

Table 3. SCA country weights

Country	SCA 1	SCA 2
Argentina	-	-
Australia	-	-
Belgium	-	-
Bolivia	0.243	0.646
Brazil	-	-
Canada	-	-
Chile	-	-
Colombia	-	-
Costa Rica	-	-
Denmark	-	-
France	-	-
Germany	-	-
Guatemala	-	-
Italy	-	-
Japan	-	-
Mexico	0.245	0.351
Netherlands	-	-
Nigeria	0.256	-
Norway	-	-
Paraguay	0.256	-
Peru	-	-
Portugal	-	-
Sweden	-	-
Turkey	-	-
United Kingdom	-	-
Uruguay	-	-
Latin America	0.744	1.00
Non-Latin America	0.256	-

Table 4. Real GDP per capita (PPP) SCA, predictor balance

	Treated	Synthetic SCA 1	Synthetic SCA 2
Total Natural Resource Rents	8.07	7.35	5.18
FDI, net inflows (% GDP)	1.31	1.55	2.34
Industrial production (% GDP)	28.41	30.99	29.85
Inflation (log)	3.48	3.16	3.49
Inflation (standard deviation)	12.35	363.69	943.21
Merchandise exports (% GDP)	0.12	0.12	0.11
Terms of trade	0.96	0.99	1.06
Capital-Output ratio	46,009.30	28,200.77	27,137.65
Government consumption (% GDP)	0.25	0.12	0.20
Economic Freedom of the World	5.62	5.01	5.06
Real GDP per capita (PPP) (1980)	5,826.00	5,836.80	5,417.48
Real GDP per capita (PPP) (1985)	5,358.00	5,248.36	5,097.87
Real GDP per capita (PPP) (1990)	4,836.00	4,983.84	4,846.71
Real GDP per capita (PPP) (1994)	4,985.00	5,017.64	5,255.20
Real GDP per capita (PPP) (1999)	4,797.00	4,978.63	5,621.58
RMSPE		108.89	315.61

Table 5. SCA effects and standardized *p*-values

|	SCA1		SCA 2	
Year	Effect (%)	Std. p-value	Effect (%)	Std. p-value
2000	-0.26	0.92	-15.37	0.25
2001	5.13	0.28	-11.10	0.38
2002	9.20	0.12	-4.14	0.71
2003	10.50	0.12	-2.32	0.92
2004	15.00	0.08	1.30	0.96
2005	22.32	0.04	6.35	0.71
2006	23.36	0.00	7.35	0.67
2007	18.53	0.04	6.72	0.71
2008	24.94	0.00	11.36	0.63
2009	21.65	0.00	11.66	0.58
2010	20.00	0.04	11.69	0.58
2011	23.68	0.00	13.10	0.58
2012	25.73	0.00	15.35	0.50
2013	29.64	0.00	18.23	0.50
2014	29.71	0.00	19.62	0.38
2015	26.10	0.04	15.65	0.54
2016	21.58	0.04	10.37	0.58

Figure 2. Ecuador and SCA estimations

economic
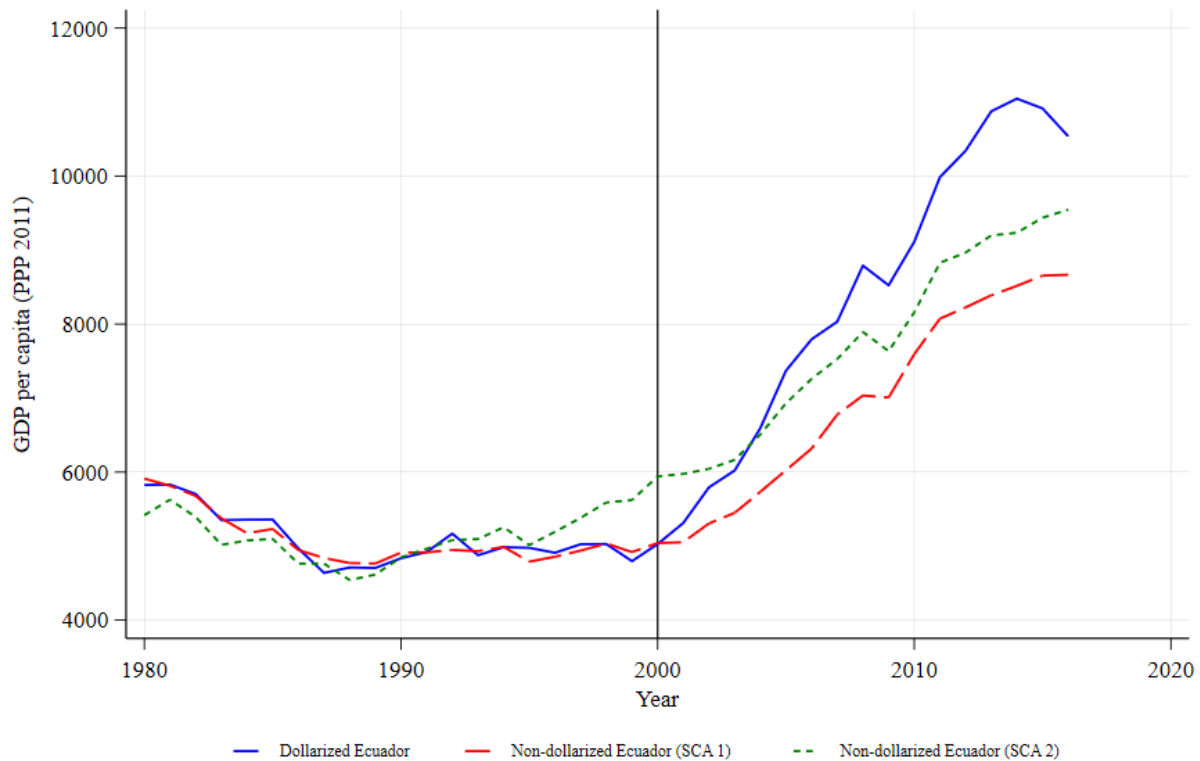
The economic significance of these results is easier to interpret if depicted in percent deviations from the counterfactual. That is, by how much, in percent terms, dollarized Ecuador outperforms its two non-dollarized counterfactuals. The results are economically significant, with deviations ranging from 10% (SCA1) to 20% (SCA2) over five years (refer to Table 5). Deviation peaks in 2014, with a value of 29.7% and 19.6% in 2014 for SCA 1 and SCA 2 respectively.

Figure 3. real GDP per capita (PPP) SCA effects
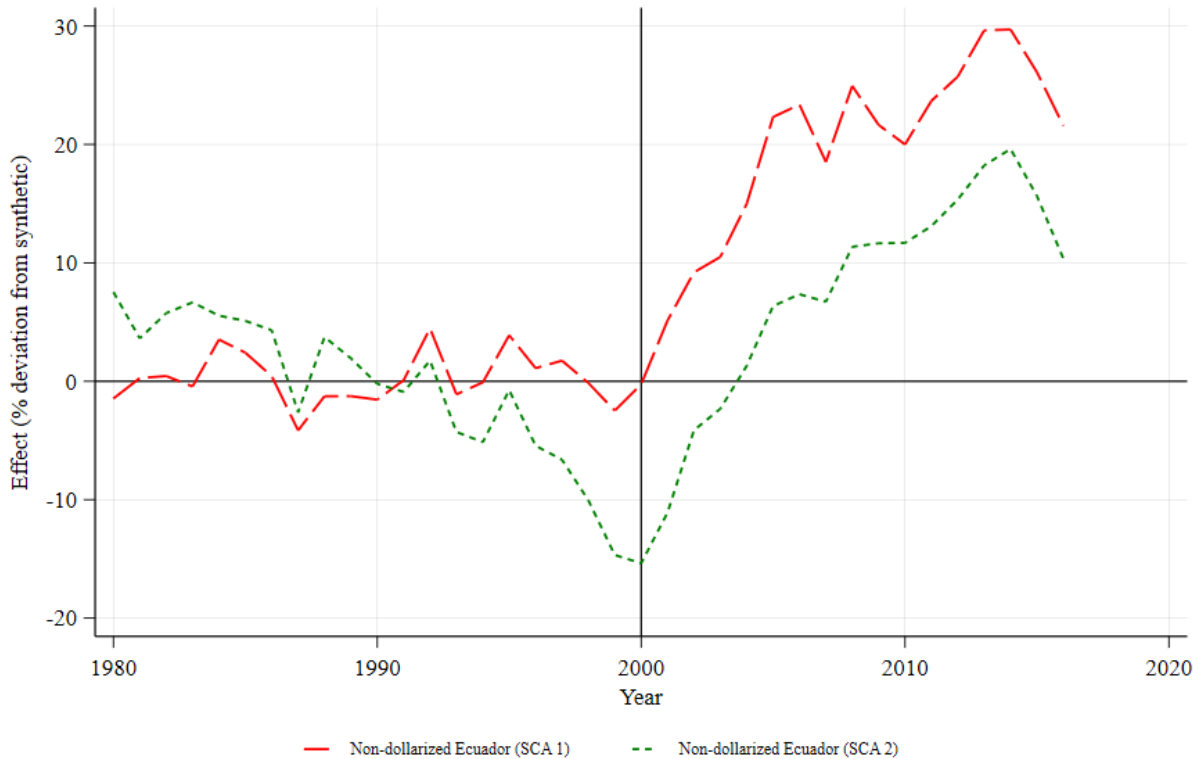
To assess statistical significance, we calculate *p*-values by running an in-place placebo test, where we assume that dollarization took place in each country of the sample at turn. Next, we count the number of times Ecuador's effects are larger than those of the other countries when we assume they are dollarized. Finally, we standardize the *p*-values to adjust for different quality of fits – it is expected that a poor fit would produce larger effects than a better fit.

3.4. Testing the shock year

We also test the year-shock by conducting both SCA estimations, assuming that dollarization occurred before 2000. We test for treatment years 1998, 1996, 1994, and 1992. Moving the year of the shock back results in a loss of pre-treatment observations, especially since missing data is more common before 1980. For example, once we shift the treatment year back to 1998, we lose data on industrial production.

The results (Figure 4 and Figure 5) reveal several interesting points. Firstly, the quality of pre-treatment fit declines, as expected due to the loss of observations. Moreover, due to the scarcity of observations before 1980, the estimated drop in industrial production is observed in 1996, 1994, and 1992. Secondly, in some instances, synthetic estimation exhibits a different level compared to that of 2000. Nevertheless, the overall behavior and the shock to output in 2000 persists throughout the entire post-treatment period in some cases. In other cases, it indicates a transitory effect, lasting up to 2003, followed by a slight downward trend.
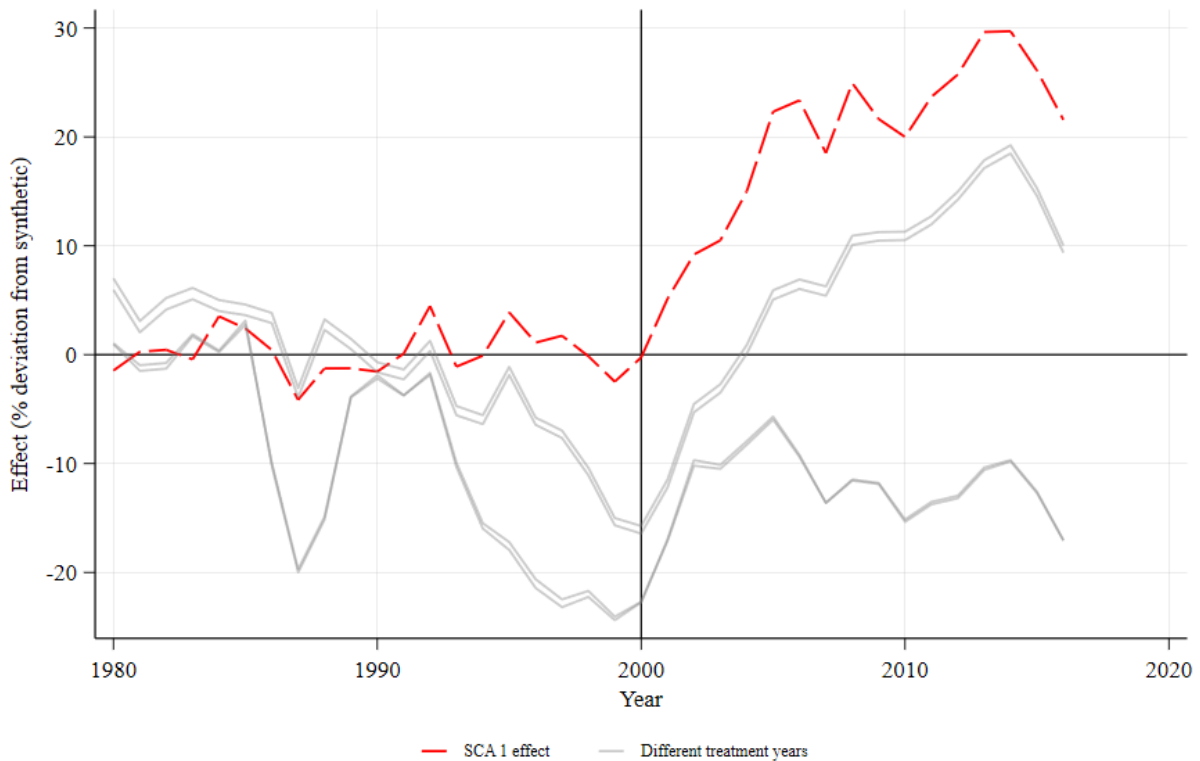
Figure 4. SCA 1 treatment year placebo

Figure 5. SCA 2 treatment year placebo

4.   Conclusions

Given its economic scale and volatile politics, Ecuador's experience with dollarization serves as a valuable case study for countries contemplating, either by choice or necessity, the adoption of dollarization. Prior research has delved into various facets, including the loss of seigniorage (Lange & Sauer, 2005), fiscal policy implications (Marí Del Cristo & Gómez-Puig, 2016), and stock returns in the financial sector (Jansen & Ortiz, 2007). This study adds to this body of literature by investigating a non-dollarized counterfactual.

The data indicates that Ecuador would have seen growth in the 2000s following its financial and political crisis in the late 1990s thanks to the rise in oil prices. However, our results are consistent with dollarization enabling Ecuador to surpass its "normal" (historical) growth trajectory boundaries on top of the positive impact of high export prices.

Both estimations show positive and economically significant results of dollarization. In some sense, this is not shocking given that Ecuador had a history of poor economic performance and was on the brink of hyperinflation. Statistically speaking, one estimation produces significant results and the other does not. Controlling for treatment year shows some volatility in the results, but the overall results are not fully contradicted by this placebo test. Importantly, the analysis does not uncover any negative outcomes, whether economic or statistical, linked to dollarization.

 These results, while not conclusive, are consistent with the thesis that dollarization contributed to a net positive result in Ecuador's economy (other indicators such as poverty rates and income inequality also depict an improvement after dollarization).

5.   References

[1]   Abadie, A. (2021). Using Synthetic Controls: Feasibility, Data Requirements, and Methodological Aspects. *Journal of Economic Literature*, *59*(2), 391–425. https://doi.org/10.1257/jel.20191450

[2]   Abadie, A., Diamond, A., & Hainmueller, J. (2015a). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, *59*(2), 495–510. https://doi.org/10.1111/ajps.12116

[3]   Abadie, A., Diamond, A., & Hainmueller, J. (2015b). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, *59*(2), 495–510. https://doi.org/10.1111/ajps.12116

[4]   Abadie, A., & Gardeazabal, J. (2003). The Economic Cost of Conflict: A Case Study of the Basque Country. *The American Economic Review*, *93*(1), 113–132.

[5]   Absher, S., Grier, K., & Grier, R. (2020). The Economic Consequences of Durable Left-Populist Regimes in Latin America. *Journal of Economic Behavior & Organization*, *177*, 787–817. https://doi.org/10.1016/j.jebo.2020.07.001

[6]   Arauz, A., Garrat, R., & Ramos F., D. F. (2021). Dinero Electrónico: The rise and fall of Ecuador's central bank digital currency. *Latin American Journal of Central Banking*, *2*(2), 1'10. https://doi.org/j.latcb.2021.100030

[7]   Cachanosky, N., Ocampo, E., & Salter, A. W. (2023). Lessons From Dollarization in Latin America in the 21st Century. *The Economists' Voice*.

[8]   Cachanosky, N., Salter, A. W., & Savanti, I. (2022). Can Dollarization Constrain a Populist Leader? The Case of Rafael Correa in Ecuador. *Journal of Economic Behavior and Organization*, *200*(August), 430–442. https://doi.org/10.1016/j.jebo.2022.06.006

[9]   Campos, N. F., Coricelli, F., & Moretti, L. (2019). Institutional integration and economic growth in Europe. *Journal of Monetary Economics*, *103*, 88–104. https://doi.org/10.1016/j.jmoneco.2018.08.001

[10]   Cavallo, E., Galiani, S., Noy, I., & Pantano, J. (2013). Catastrophic Natural Disasters and Economic Growth. *Review of Economics and Statistics*, *95*(5), 1549–1561. https://doi.org/10.1162/REST_a_00413

[11]   Cuevas, S., & Díaz, J. (2022). The Monetary and Fiscal History of Ecuador, 1960-2017. In T. J. Kehoe & J. P. Nicolini (Eds.), *A monetary and Fiscal History of Latin America, 1960-2017*. University of Minessota Press.

[12]   Erraez, J. P., & Reynaud, J. (2022). *Central Bank Balance Sheet Expansion in a Dollarized Economy: The Case of Ecuador* (WP/22/234; IMF Working Paper Series). International Monetary Fund.

[13]   Grier, K., & Maynard, N. (2016). The Economic Consequences of Hugo Chavez: A Synthetic Control Analysis. *Journal of Economic Behavior & Organization*, *125*, 1–21. https://doi.org/10.1016/j.jebo.2015.12.011

[14]   Hallren, R. J. (2014). The Impact of Dollarization and Currency Boards on Income and Inflation: A Synthetic Control Analysis. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2486253

[15]   Jansen, D. W., & Ortiz, M. C. (2007). Stock market risk and dollarization in Ecuador. *Applied Financial Economics Letters*, *3*(5), 281–286. https://doi.org/10.1080/17446540601057913

[16]   Lange, C., & Sauer, C. (2005). Dollarization in Latin America: Seigniorage Costs and Policy Implications. *The Quarterly Review of Economics and Finance*, *45*(4–5), 662–679. https://doi.org/10.1016/j.qref.2004.01.002

[17]   Lawson, R., Grier, K., & Absher, S. (2019). You say you want a (Rose) Revolution? The effects of Georgia's 2004 market reforms. *Economics of Transition and Institutional Change*, *27*(1), 301–323. https://doi.org/10.1111/ecot.12205

[18]   Levy-Yeyati, E., & Sturzenegger, F. (Eds.). (2002). *Dollarization: Debates and Policy Alternatives*. The MIT Press.

[19]   Londoño-Espinosa, S., Reza-Paocarina, E., Morales-Noriega, A., Chamba-Bastidas, L., & Leon-Serrano, Lady. (2022). Los Efectos Macrofiscales de la Dolarización en Ecuador. *Revista de Análisis Económico*, *37*(2), 99–130.

[20]   Marí Del Cristo, M. L., & Gómez-Puig, M. (2016). Fiscal sustainability and dollarization: The case of Ecuador. *Applied Economics*, *48*(23), 2139–2155. https://doi.org/10.1080/00036846.2015.1114580

[21]   Ocampo, E. (2023). *Dollarization as an Effective Commitment Device: The Case of Argentina* (848; Documentos de Trabajo). Universidad del CEMA.

[22]   Ocampo, E., & Cachanosky, N. (2022). *Dolarización: Una Solución para Argentina*. Editorial Claridad.

[23]   Ontaneda, D. (2017). El Impacto de la Dolarización Oficial en la Profundización Financiera de Ecuador. *Cuestiones Económicas*, *27*(1), 13–43.

[24]   Salvatore, D., Deam, J. W., & Willet, T. (Eds.). (2003). *The Dollarization Debate*. Oxford University Press.

[25]   Spruk, R. (2018). *The Rise and Fall of Argentina* (Mercatus Working Paper). Mercatus Center.

[26]   Spruk, R. (2019). The Rise and Fall of Argentina. *Latin American Economic Review*, *28*(16), 16. https://doi.org/10.1186/s40503-019-0076-2

[27]   Yepes, J. (2016). *Dollarization and Growth: A Synthetic Control Approach to Ecuador and El Salvador's Cases* [Master of Science Thesis]. Baylor University.