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**EXPLORACIÓN DE LA INSOSTENIBLE  
DESIGUALDAD CHILENA A TRAVÉS DE UNA  
SIMPLE MAGNITUD ECONÓMICA EN PRIMERAS  
DÉCADAS DEL SIGLO XXI**

**CHILEAN UNSUSTAINABLE INEQUALITY EXPLORED  
THROUGH A SIMPLE ECONOMIC MAGNITUDE DURING  
FIRST DECADES OF 21TH CENTURY**

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## Exploración de la insostenible desigualdad chilena a través de una simple magnitud económica en primeras décadas del siglo XXI

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### RESUMEN

La insostenible desigualdad chilena parece estar relacionada con el estallido social observado en este país desde octubre de 2019 y el reciente cambio de escenario político. Más aún, este fenómeno social derivó recientemente en un acuerdo sociopolítico para cambiar la Constitución chilena, dictada por el general Pinochet en 1978. ¿Cómo explicar un hecho tan tectónico cuando la economía chilena parecía ser un ejemplo de éxito en América Latina, es decir, una especie de "oasis regional" como pocas semanas antes del estallido de octubre el Presidente Piñera citó con orgullo durante una conferencia de prensa internacional? En este trabajo, proponemos una nueva magnitud que nos permite cuantificar, y luego comparar, la dinámica económica chilena en su contexto regional y con algunas de las economías del "primer mundo económico", como las utilizadas por Piketty. A partir de este autor, tomamos variables clave y las combinamos en un modelo simple, que produjo profundas percepciones sobre la dinámica económica insostenible en Chile, pero también en otras democracias occidentales.

**Palabras Clave:** desigualdad insostenible, crecimiento económico sostenible, desigualdad chilena, desigualdad OCDE, distribución de la riqueza individual OCDE.

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# Chilean Unsustainable Inequality Explored Through a Simple Economic Magnitude During First Decades of 21th Century

## ABSTRACT

Chilean unsustainable inequality seems related to the social outburst observed in this country since October 2019 and the recent change in political scenario. Moreover, this social phenomenon recently derived into a socio-political agreement to change the Chilean Constitution, dictated by General Pinochet in 1978. How to explain such a tectonic fact when the Chilean economy seemed to be a successful example in Latin America, namely a kind of “regional oasis” such as few weeks before the October outburst President Piñera proudly quoted during an international press conference? In this paper, we propose a new rationale allowing us to quantify, and, then to compare the Chilean economic dynamics in its regional context and with some of the “first economic world” economies, such as those used by Piketty. From this author, we took key variables and combined them into a simple model, which produced deep insights into unsustainable economic dynamics in Chile but also in other western democracies.

**Keywords:** Unsustainable Inequality, Sustainable Economic Growth, Chilean Inequality, Oecd Inequality, Individual Wealth Distribution Oecd.

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## INTRODUCTION

Recently, on February 6, 2020, during a public lecture at the London School of Economy, inequality in Chile was pointed out by Thomas Piketty as the main factor explaining the on-going social outburst (Piketty, 2020). Therefore, we decided to dig deeper into the Chilean inequality following Piketty's rationale.

In his book "Capital in the XXI Century" (Piketty, 2013), the author proposed to quantify the divergence between the rates of return on capital, exceeding the growth rate of the economy. For doing so he sorts out the variables "R" calculated as the net wealth of a country and "G" as the. With these particular variables, through a simple mathematical model, he built an accurate analysis of the evolution of wealth in Europe during the last century. He proposed that there are periods of divergence between wealth and production that follow the model  $R > G$ . His analysis was performed in France and some other European countries, but it did not include any Latin-American nations or regional entities. Henceforth, we decided to combine variables R and G, such as defined as net wealth and GDP, to characterize the Chilean conflict derived from a given period ( $p=19$  years) of unsustainable social inequality.

We chose Chile because it is a good example of a developing nation showing constant economic growth during the last 45 years. Moreover, the country jumped from a GDP of 500 US\$ per capita in the 70's up to 22,000 US\$ per capita in 2019 (World Bank, 2020). This economic transformation started with the total liberalization of the economy imposed in 1975 by General Pinochet during the second half of the '70s and the first quarter of the '80s (Del Sol & Kogan, 2007; Del Sol, 2004; French-Davis, 1979). Undemocratic Pinochet's regime lasted until the late quarter of 1989, but all the governments after him have kept his economic inheritance until today (Ghemawat & Del Sol, 1998; Kogut & Singh, 1988; Drake & Frank, 2004). As a consequence, Chile reached the quantitative economic threshold to be invited as a full member of the OECD on December 15, 2009, carrying the inequality left by these successful quantitative economic policies (Riveros Cornejo & Baez Cartillo, 2014).

We started our research collecting data to be used to apply Piketty's rationale, to analyze the Chilean inequality phenomena (SI 1a). Rapidly, we obtained figures as predicted by the model  $R > G$ . Nevertheless, if we followed the comparison between curves offered by the aforesaid model (*e.g.* Chile



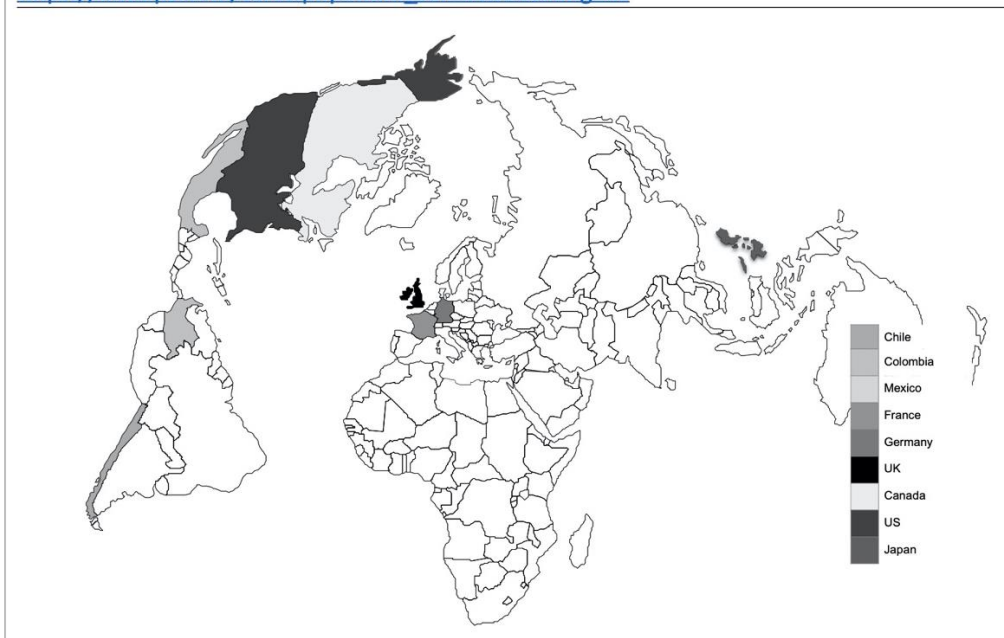
${}_{2000}R = 174$  billion US\$ and Chile  ${}_{2000}G = 77.86$  billion US\$; Chile  ${}_{2007}R = 457$  billion US\$ and Chile  ${}_{2007}G = 173.61$  billion US\$), we visually caught the divergence predicted by Piketty. In our example  $R$  is major than  $G$ . Although the visual observation of the trend was self-evident, it did not explain by itself the very violent outbursts in our country.

We decided to create the “ $R/G$ ” ratio to best define the predicted divergence as the potential cause of social violence. We explored this new magnitude by applying it to Chile and other regional entities (Figure 1) to shed light on the social conflict derived from the current social-economic scenario.

**Figure 1**

Countries designed following the Lambert projection

[https://d-maps.com/carte.php?num\\_car=13181&lang=es](https://d-maps.com/carte.php?num_car=13181&lang=es)



## MATERIALS AND METHODS

Following Piketty (2013), we used wealth expressed as  $R$  and economic growth expressed as  $G$ . We combined both variables in a ratio  $R/G$  as an economic tracer. Data sources to calculate variables are found in open data (World Bank, 2020; Credit Suisse 2019, and OECD 2020) included in (SI 1a). The variables were calculated in current United States dollars (US\$). In a formal way to describe and characterize the economic tracer  $R/G$ , we utilized distribution analysis, variance, and covariance.

We worked with the figures from OECD Latin-American countries Chile, Colombia, and Mexico. Also, we developed a comparison with other OECD countries, specifically Canada and the US in America, plus three European OECD countries France, Germany, and the United Kingdom (Figure 1).

We applied the economic tracer  $R/G$  to Chilean wealth distribution. In order to do so, we extracted from the Credit Suisse database (Credit Suisse, 2019) the information about wealth distribution per percentile (SI 3a). Then, we calculated  $R$  per each percentile (SI 3b) and we calculated  $R/\text{adult}$  per percentile, dividing the amount of wealth shared in the percentile by the total amount of adults belonging to the percentile (SI 3c). Finally, we divided  $R$  (per adult and percentile) per the average  $G$  per adult to obtain the magnitude  $R/G$  per adult and percentile, e.g., for Chile, Credit Suisse indicates the top 1%, which concentrates 37.7% of the wealth produced. This percentile, the top 1%, shared an amount of wealth equal to  $37.7\% \times 759$  billion US\$ in current values, or 286 billion US\$ in current values. Then we obtained the number of adults belonging to the percentile, 13.3 million adults ( $1\% = 133$  thousand adults). Then we divided the total amount of wealth shared by the percentile over the number of adults belonging to the percentile:  $286 \text{ billion US\$ in current values} / 133 \text{ thousand adults} = 2.146$  million US\$ in current values. Finally, we calculated the ratio  $R/G_{1\%}$  dividing  $R$  per adult and percentile over the average  $G$  per adult (21,178 US\$ in current values). Using this procedure, we obtained the economical tracer  $R/G$  for each one of the percentiles for Chile and the other OECD countries we are working with. In the case of the percentile 1% -  $R/G_{1\%}$  for Chile - is equal to 101.36.

## RESULTS

- a) As we can see in Table I and SI 1b, the economic tracer  $R/G$  built with Chilean figures, based on total net wealth and economic growth from 2000 to 2019, shows that the ratio is centered around the magnitude 2 (in Piketty's model  $r$  equal 2 times  $g$ ) during all the period through, but the year of the sub-prime crisis (SI 1b).
- b) The ratio captures well the subprime crisis through a significant negative departure from magnitude  $R/G = 2$ . The fall of 2008 represents 28%, when the difference is measured from the year 2007 that is the year before the crisis (Table I and SI 1b).
- c) It is a noteworthy fact the rapid recovery of  $R$ , which measures net wealth.
- d) The ratio also captures the year 2000-2001 "dot.com" crisis and the eurozone debt crisis of 2010 not captured by other indicators (Riveros Conejero & Baez Castillo, 2014).
- e) The dynamism of the ratio allows us to observe the momentum of each crisis over (during) the interval 2000-2019 (SI 1b).



**Table 1** Chile R and G and the economic tracer magnitude R/G for the period 2000-2019

Time	Wealth “R” (Billion US\$ actual value) (1)	GDP “G” (billion US\$ actual value) (2)	R/G (3)
2000	US\$174	US\$77.86	2.23
2001	US\$149	US\$70.98	2.10
2002	US\$163	US\$69.74	2.34
2003	US\$207	US\$75.64	2.74
2004	US\$269	US\$99.21	2.71
2005	US\$312	US\$122.97	2.54
2006	US\$374	US\$154.79	2.42
2007	US\$457	US\$173.61	2.63
2008	US\$339	US\$179.64	1.89
2009	US\$431	US\$172.40	2.50
2010	US\$521	US\$218.54	2.38
2011	US\$527	US\$252.25	2.09
2012	US\$627	US\$267.12	2.35
2013	US\$643	US\$278.38	2.31
2014	US\$599	US\$260.54	2.30
2015	US\$603	US\$243.92	2.47
2016	US\$646	US\$250.34	2.58
2017	US\$775	US\$277.75	2.79
2018	US\$762	US\$298.23	2.56
2019	US\$759	US\$282.32	2.69

Statistical sources: (1) World Bank 2020 (web) and (2) Credit Suisse 2019, (3) this paper

- f) The leading trend is a 20% increase in the tracer “R/G” during the period 2000 – 2019.
- g) The recovery from the crises of 2000, 2008 and 2010, is characterized by a rapid increase of the ratio R/G mostly explained by the recovery in wealth (R).

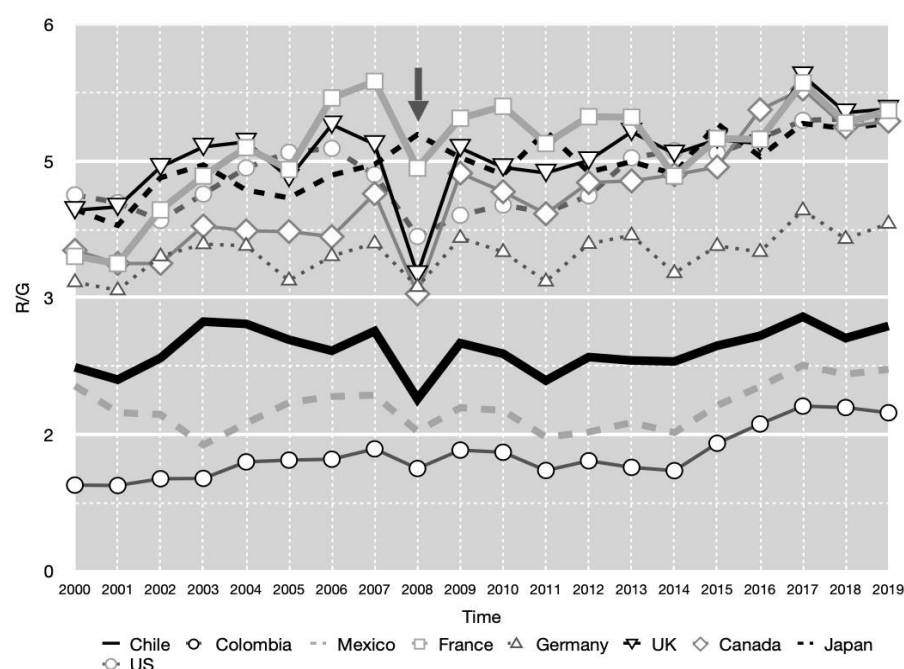
To test the ratio R/G we expanded our observation out of Chile (SI 2a) to a couple of Latin American countries also admitted by the OECD (Figure 2). The comparison of Chilean R/G magnitudes with those



from Colombia (SI 2b) and Mexico (SI 2c) clearly shows differences among their economic tracer R/G, since the latter countries do not display the magnitudes that characterize the former (Figure 2).

**Figure 2**

The economic tracer R/G for Chile, Colombia, Mexico, France, Germany, UK, US, Canada and Japan during the interval 2000- 2019



The arrow shows the significant impact of sub-prime crisis.

German economy displays non-catastrophic magnitude at the sub-prime crisis, showing strength and stability. Japan economy also show no impact during the subprime crisis

In fact, it seems that there is a limit at  $R/G$  equal two that distinguishes countries above or below it. Expanding the Piketty's rationale, it appears a boundary-like among countries with  $R$  two times  $G$ . In a very particular way, Mexico attains  $R$  two times  $G$  only at both extremes of the available statistical series and falls below it from 2001 until 2015 (SI 2c).

Hence, to better understand the Chilean case in a global economy required us to calculate the same rationale for France, the UK, the US, and Canada (Table 2), which are among those countries analyzed in C21 by Piketty. Doing so, we found the Chilean  $R/G$  (SI-2a) magnitude floating in between the "northern block", including France (SI-2d), Germany (SI-2e), the UK (SI-2f), Canada (SI-2g), and the US (SI-2h), and the Latin America block. Chile did "leave" the latter block and is located in between both but approaching German data.



**Table 2** - The economic tracer R/G for Chile, Colombia, Mexico, Germany, France UK, USA, Canada and Japan – Period 2000-2019

Time	Chile	Colombia	Mexico	France	Germany	UK	Canada	US	Japan
2000	2.23	0.94	2.03	3.45	3.17	3.96	3.52	4.13	3.97
2001	2.10	0.94	1.74	3.37	3.08	4.00	3.37	4.04	3.79
2002	2.34	1.01	1.72	3.96	3.45	4.43	3.37	3.85	4.32
2003	2.74	1.01	1.38	4.34	3.59	4.66	3.79	4.14	4.46
2004	2.71	1.20	1.62	4.65	3.57	4.71	3.73	4.43	4.18
2005	2.54	1.22	1.85	4.41	3.19	4.31	3.73	4.60	4.10
2006	2.42	1.23	1.91	5.19	3.46	4.90	3.67	4.64	4.35
2007	2.63	1.34	1.93	5.37	3.60	4.68	4.14	4.35	4.46
2008	1.89	1.12	1.53	4.42	3.12	3.25	3.04	3.67	4.79
2009	2.50	1.33	1.79	4.97	3.66	4.64	4.37	3.91	4.54
2010	2.38	1.30	1.76	5.10	3.50	4.43	4.16	4.02	4.35
2011	2.09	1.10	1.47	4.69	3.18	4.37	3.92	3.93	4.83
2012	2.35	1.21	1.52	4.99	3.59	4.51	4.26	4.12	4.38
2013	2.31	1.14	1.63	4.98	3.68	4.82	4.28	4.54	4.49
2014	2.30	1.10	1.52	4.34	3.27	4.58	4.35	4.61	4.36
2015	2.47	1.40	1.82	4.75	3.57	4.74	4.43	4.59	4.91
2016	2.58	1.61	2.02	4.74	3.50	4.69	5.06	4.75	4.55
2017	2.79	1.81	2.26	5.36	3.96	5.44	5.29	4.95	4.91
2018	2.56	1.79	2.16	4.92	3.65	5.03	4.87	4.96	4.86
2019	2.69	1.74	2.21	5.06	3.81	5.07	4.94	4.95	4.92

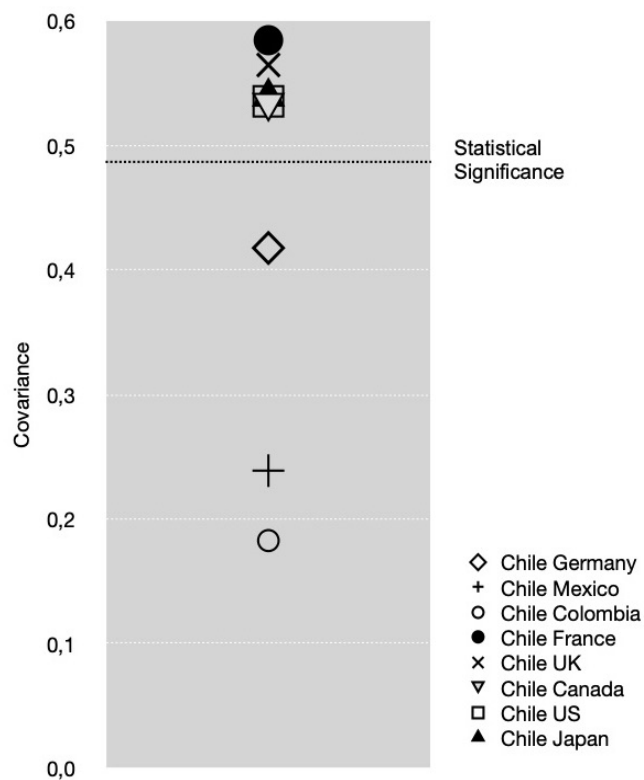
Statistical sources: this paper, see SI 2a until SI-2h, data source World Bank 2020, and Credit Suisse 2019



Consequently, to further evaluate the Chilean results compared with OECD countries, we calculated the statistical covariation of the Chilean R/G magnitudes to those of the countries shown in both Figure 1, SI-2, and Figure 2. The Chilean R/G tracer covariates mainly with France followed by the UK (Figures 3a and Table 3) This covariance ( $cov > 0.5$ ) is significant with France, the UK, the US, and Canada. Chile and Germany covariate less significantly ( $0.4 < cov < 0.5$ ) but higher than Chile with Mexico and Colombia ( $cov < 0.25$ ).

**Figure 3**

**a) Covariance of Chilean economic tracer R/G vs R/G of other OECD countries during the period 2000 - 2019.**



It is a fact of observation, that Chilean R/G magnitude covaries significantly with France, the UK, the US, Canada and Japan.

**Table 3** Covariation of Chilean economic magnitude tracer R/G: with other OECD countries during the period 2000 – 2019

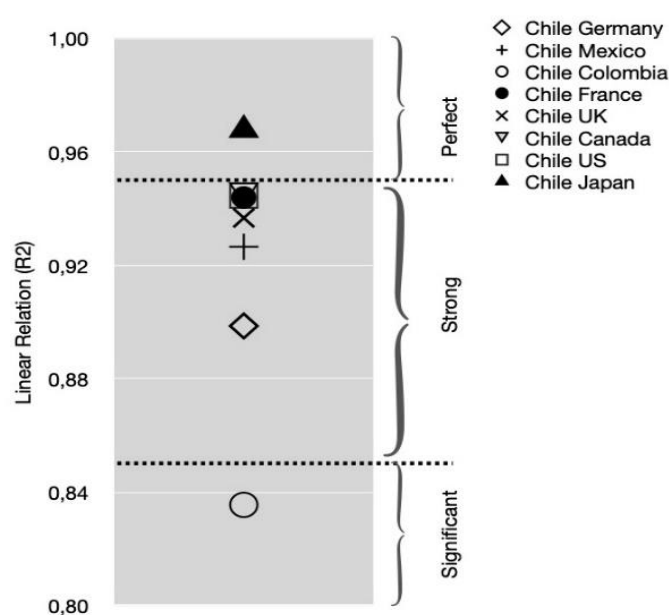
	Covariance
Chile Germany	0.41747
Chile Mexico	0.23877
Chile Colombia	0.18265
Chile France	0.58421
Chile UK	0.56432
Chile Canada	0.53055
Chile US	0.53515
Chile Japan	0.53897

Statistical sources: this paper, data source world bank (2020), and Credit Suisse (2019).

If we take into account linear correlation among R/G magnitudes as shown in Table 4, the Chilean economic tracer R/G displays a significant linear correlation ( $0.7 < r^2 < 0.84$ ) with Colombia, but a strong correlation ( $0.85 < r^2 < 0.95$ ) with the other 5 countries (Figure 3b and Table 4).

**Figure 3**

**b)** Chilean economic magnitude tracer R/G: linear correlation with the economic tracer of other OECD countries during the period 2000-2019



Statistical sources: this paper, data source world bank (2020), and Credit Suisse (2019).

**Tabla 4** Linear Relation of Chilean economic magnitude tracer R/G: with other OECD countries during the period 2000 – 2019

	R2
Chile Germany	0.8987
Chile Mexico	0.9266
Chile Colombia	0.8357
Chile France	0.9440
Chile UK	0.9368
Chile Canada	0.9453
Chile US	0.9447
Chile Japan	0.9679

Statistical sources: this paper, data source world bank (2020), and Credit Suisse (2019).

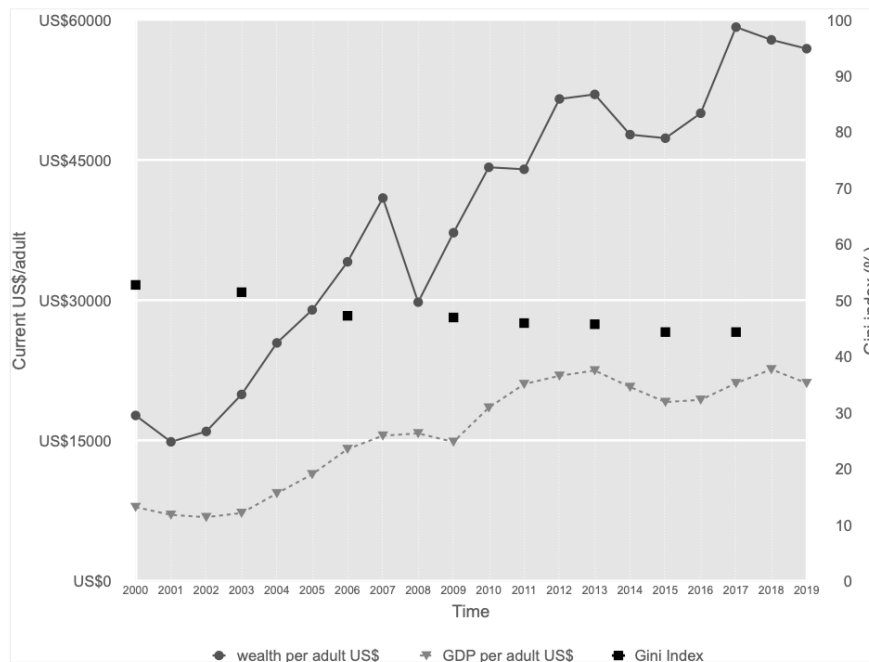
## DISCUSSION

Besides taxonomical results, how does this R/G magnitude help us to better understand unsustainable social inequality in Chile and in other countries as it is used herein? We point out that this magnitude R/G quantifies more clearly the share of hyper-concentrated wealth in a given nation or regional entity, since we can use the resulting magnitudes to dig deep into the statistics of unsustainable social inequality at a global scale in short, middle, and long terms.

In order to compare the resulting use of our R/G magnitude with BAU (business as usual) methods, let us start with the well-known GINI index (Lange et al, 2018), which shows in our Chilean case figures almost evenly floating around 45 during the last decade (Figure 4a and Table 5). From other quarters, using both the definition and the data provided by the World Bank (2020), the Chilean poverty decreased from 11.4% in 1987 to 0.4% in 2013. Besides, the Institute of Freedom and Development (LyD, according to its acronym in Spanish) indicates, although, that the interval 2013 – 2015 shows a slight increase in Chilean poverty (LyD, 2017; MSDF, 2019; Vasquez, 2014; Pino Alarcón, 2011).

**Figure 4**

Chile, year 2019: Wealth per adult, GDP per adult and Gini Index.



Statistical sources: (3) this paper, Table I, (2) data source world bank 2020, (3) Credit Suisse 2019 and OECD 2020

Gini index shows an even tendency, while difference between wealth and GDP increases over the years. Here we show the magnitudes R and G separately, as proposed by Piketty, representing inequality phenomena in a clearer way than Gini index.

We show in Figures 5a and 5b within this period, wealth per adult (R/adult in current US\$) increased 3.2 times on average; meanwhile, GDP per adult (G/adult in current US\$) increased 2.7 times on average (World Bank, 2020; Credit Suisse, 2019). Nevertheless, as already aforesaid, during the same period, the Chilean GINI index did not decrease significantly, e.g. while in Chile the wealth per adult increased 3.2 times on average, his GINI index decreased a fifth only.

Thereby, using the economic tracer R/G, a quite different scenario emerges, as shown in Figures 5a, and 5b. It shows a hundred times difference between the top one percent richest adults and the remaining ninety-nine percent of Chilean adults.

**Table 5-** Wealth per adult, GDP per adult, Economical magnitude tracer and Gini index for Chile period 2000 to 2019

<b>Time</b>	<b>Wealth per adult US\$ (1)</b>	<b>GDP per adult US\$ (2)</b>	<b>Economical magnitude tracer r/g (3)</b>	<b>Gini Index (2)</b>
<b>2000</b>	17,726	7,932	2.23	52.8
<b>2001</b>	14,909	7,102	2.10	
<b>2002</b>	16,018	6,853	2.34	50.7(*)
<b>2003</b>	19,973	7,299	2.74	51.5
<b>2004</b>	25,483	9,398	2.71	
<b>2005</b>	29,012	11,434	2.54	
<b>2006</b>	34,149	14,133	2.42	47.3
<b>2007</b>	40,968	15,563	2.63	
<b>2008</b>	29,839	15,812	1.89	
<b>2009</b>	37,258	14,902	2.50	46.99
<b>2010</b>	44,254	18,563	2.38	
<b>2011</b>	44,041	21,081	2.09	46.05
<b>2012</b>	51,558	21,965	2.35	
<b>2013</b>	52,044	22,532	2.31	45.8
<b>2014</b>	47,744	20,767	2.30	45.4 (*)
<b>2015</b>	47,365	19,159	2.47	44.4
<b>2016</b>	50,035	19,397	2.58	
<b>2017</b>	59,237	21,176	2.79	44.4
<b>2018</b>	57,876	22,654	2.56	44.4
<b>2019</b>	56,935	21,178	2.69	44.4

Statistical sources: (3) this paper, Table I, (2) data source world bank 2020, (3) Credit Suisse 2019, (\*) OECD 2020.

The economic tracer R/G dissects the inequality distribution of wealth in a more accurate quantitative way than the Gini index and other BAU economic instruments do, such as wealth and GDP themselves, or percentiles of the income distribution.

We decided at this point to explore deeper Chilean inequality and wealth distribution. Furthermore, as we show in Figure 5a, the unsustainable distribution of wealth arrives at a point where 50% of the





Chilean adults shared just 2.8% of the wealth generated by the country (SI 3a). 50% of Chilean adults received just 3,190 US\$ of wealth or approximately 5% of the average wealth per adult generated by the country that year. As shown in Figure 5a, we shockingly realized the distance between  $R/G_{1\%}$  and  $R/G_{90\%}$  is equal to 101 times, while the relation between  $R/G_{50\%}$  and  $R/G_{1\%}$  is equal to 673 times. Moreover, the Chilean  $R/G$  per percentile follows an almost perfect exponential distribution with a strong significant correlation of  $r^2=0.916$  (SI 4).

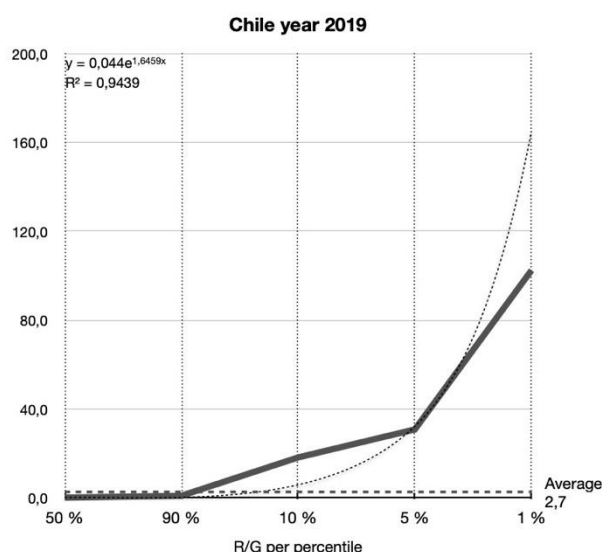
**Table 6** - Chile, wealth distribution and inequality - year 2019

	Bottom					Top		
	50%	60%	70%	80%	90%	10%	5%	1%
% wealth distributed per percentile (1)	2.80%	7.00%	12.90%	20.80%	32.90%	67.10%	56.70%	37.70%
Wealth per percentile (billion US in current values)	\$21	\$53	\$98	\$158	\$250	\$510	\$431	\$286
Wealth per adult US\$ current values	\$3,190	\$6,647	\$10,499	\$14,813	\$20,826	\$382,282	\$646,062	\$2,147,844
r/g per percentile	0.15	0.31	0.50	0.70	0.98	18.05	30.51	101.42
Distance between r/g top 1% and r/g for each percentile	673.2	323.1	204.6	145.0	103.1	5.6	3.3	

Statistical sources: This paper, Table I, data source world bank 2020, Credit Suisse 2019, and OECD 2020.

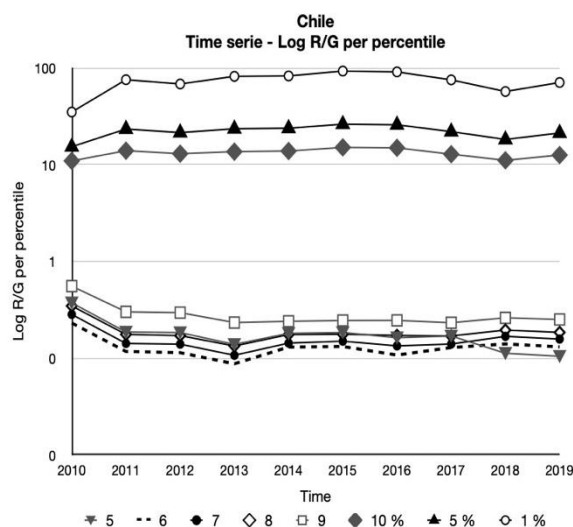
The implications of the result obtained for the distance between economic tracer  $R/G_{50\%}$  and  $R_{1\%}$  (equal 673 times) is on one hand unsustainable and on the other cruelly clear in terms of the wealth distribution in Chile and/or in terms of Chilean Inequality. As we show in Figure 5a,  $R_{50\%} < G_{\text{average}}$ ,  $R_{60\%} < G_{\text{average}}$ ,  $R_{70\%} < G_{\text{average}}$ ,  $R_{80\%} < G_{\text{average}}$ , and  $R_{90\%} < G_{\text{average}}$ . In other words 90% of the Chilean adults receive an amount of wealth below the average wealth of the country per adult and even less than the average

**Figure 5**  
a) R/G per percentile in Chile year 2019



Statistical sources: This paper, Table 5a

**Figure 5**  
b) Chile- R/G per percentile over a time serie year 2000 - 2019



GDP per adult. After those findings we decided to

compare the Chilean economic tracer per percentile with the other countries taken into account in this paper. The details of this R/G analysis are shown in Supplementary Information 4.

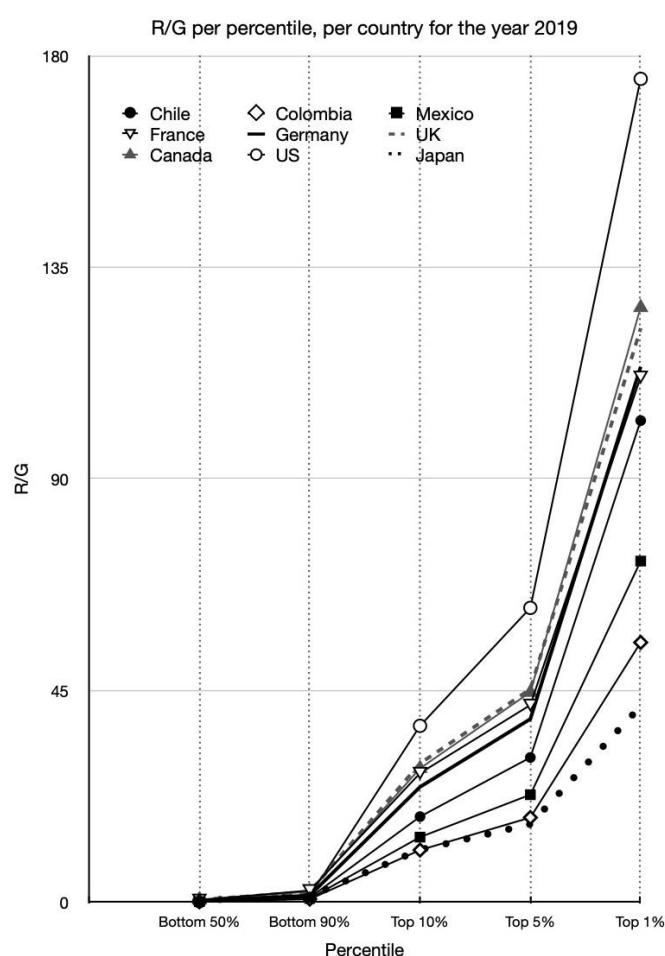
Firstly, we started with Mexico, that shares with Chile an equal Gini index, 45.4% for the year 2018 [last year reported by World Bank (2020) and OECD (OECD et al., 2020)]. Since both countries share the same Gini Index, we expected to find similarities in terms of economic tracer R/G results. Indeed, we also included figures on R/G per percentiles for each OECD country understudy in Supplementary Information 4. Chile and Mexico share the Gini index but not the same unsustainable inequality.

The Mexican distance between  $R/G_{1\%}$  and  $R/G_{50\%}$  is equal to 74.73 times. This is clearly not close to the Chilean distance between  $R/G_{1\%}$  and  $R/G_{50\%}$  which is equal to 101.36 times, e.g. the difference between  $R/G_{1\%}$  and  $R/G_{50\%}$  of both countries is  $74.73 - 101.36 = 26.63$  times or 35.6%. It is a noteworthy fact that Mexican  $R_{1\%}$  per adult is worthy of only the 50% of the Chilean  $R_{1\%}$  per adult (2.147 million US\$ in current values per Chilean adult on the top 1% vs 1.075 million US\$ in current values per Mexican adult at the top 1%). The economic tracer R/G gives a certain sensibility to the analysis that the Gini index does not allow.

When comparing with the US figures, the Chilean Gini Index 45.4% is close to the US Gini index 41.1%. Moreover, we also see a formal closeness between wealth distribution in both countries. The top 1% of Chilean adults share 37.7%; meanwhile, the top 1% of the US adults share 35.4% of the

wealth produced by the country. On the other hand, 50% of Chilean adults share 2.8% of the wealth while 50% of the US adults share 2.6% of the wealth. Besides, the distance between US  $R/G_{1\%}$  to US  $R/G_{50\%}$  is equal to 680.77 times, really close to the distance between Chilean  $R/G_{1\%}$  to Chilean  $R/G_{50\%}$ , which is equal to 673.21 times (Table 6).

**Figure 5**  
c)  $r/g$  per percentile per country



This unsustainable distribution of wealth in both countries seems to approach them through the application of the economic tracer  $R/G$ , besides the obvious differences displayed by both countries in the structure and the size of their economies. Indeed, US  $r_{1\%}$  per adult is worth 6 times Chilean  $r_{1\%}$  per adult [15.3 Million US\$ in current values per US adults at the top 1% vs 2.147 Million US\$ in current values per Chilean adults at the top 1%].

After observing these figures, we actually understand better the ongoing structural inequality that provokes the social unrest in our country. In this vein in April 2016 Ben Ross Schneider pointed out

during his speech at the Chilean Institute of Rational Business Administration Congress, "*Chile does not have a market economy, but a hierarchical capitalism that tends towards monopoly and low productivity*" (Schneider, 2013; Schneider, 2015; Icare 2016). The Chilean neoliberal economic model promotes inequality from Pinochet's time, and democratic governments are not being successful in reducing it. *Volens nolens*, inequality then was transformed into a structural issue resulting from the economic model (Solimano, 2013, Stiglitz, 2019). Thus, neoliberalism led to the creation of a super-capitalist class that hyper-concentrated wealth (Undurraga, 2016). This new super-rich class does not allow the introduction of reforms that could help to reduce inequality (Stiglitz, 2019), which *in fine* is unsustainable absolutely.

### CONCLUDING REMARKS

In this paper we present for the first time the variables R and G within a Latin American country, combining both into an economic tracer through the ratio R/G.

Applying R/G to Chile, we see that our economic ratio unveils in a quantitative way how much Chilean inequality is escalating at an exponential rate, as shown in Supplementary Information 4c. Meanwhile, the GINI index shows a kind of tricky social equilibrium.

Our quantitative tool allows us to place Chile in a clear transitional position between Latin American OECD countries and those studied by Piketty's in his classical C21. Other complementary statistical tools, such as distributions and percentiles, do not show this dynamic reality. Our economic tracer based on Piketty's rationale operates filtering complex variables through a simple mathematical model, which unveils the core divergent structure of the Chilean economy, such as predicted by Piketty but at a pace more dramatic than isolated R and G variables.

In our country the top 1% of adults (namely 133 thousand adults) concentrate one hundred times more wealth than 90% of the country (almost 12 million adults) and six hundred times more wealth than 50% of the country (6.5 million adults). According to international economic reports of the World Bank (Lange et al. 2018), Chile is the wealthiest country in Latin America showing an average GDP per adult of \$21,178 [current US dollars] and an average wealth per adult of \$56,935 [current US dollars] during the year 2019. Nevertheless, applying our tracer, built-up with R and G variables, we found out that 133 thousand adults enjoy on average \$2,147,844 [current US dollars per adult per year]; meanwhile, half



of the country receives on average the crumbs, or \$3,190 [current US dollars per adults a year]. The economic tracer R/G explains in a sensitive and precise way the unsustainable inequality observed in Chile (Piketty & Saez, 2014).

The Chilean economical model established *manu militari* since 1975 explains most of the structural causes of this unsustainable inequality. It would seem that we are approaching the first block of OECD countries but paying a very high social cost, quite probably explaining the ongoing social outburst. Meanwhile, a mere 1% of the richest are the net winners of such a social effort and the natural resources exploitation responsible for a significant percentage of Chilean wealth, as the Chilean Central Bank indicated in 2014 (Chilean Central Bank, 2014).

Are we before a new kind of unsustainable western democracy, where the whole economical system and all its socio-environmental derivatives are exclusively being enjoyed by the top 1%, for the top 1%? Our R/G tool intends to help in the search of new definitions of both the current structures and those that would produce a wider social abyss.

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