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"Big Mac affordability" and real income inequality across countries

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CROSS-NATIONAL
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“Big Mac Affordability” and Real Income Inequality Across Countries

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Abstract

Using the Big Mac Index and focusing on the deciles of the income distribution, we produce a descriptive study of real income inequality from households in 29 countries and for period 2000 to 2013. Using daily Big Mac Affordability (BMA), we rank and show differences in the living standards and the purchasing power of individuals belonging to different income deciles in these countries. We also provide a multidimensional “Big Mac real” income inequality analysis by looking at Coefficient of Variation as well as the share of bottom to top decile BMA (as a measures of dispersion) across countries.

Keywords— Big Mac Index, Affordability, Income Inequality, Income Distribution Decile, Comparative Country Studies

JEL Classification— D31, O57

1 Introduction

The Big Mac Index was humorously introduced by The Economist magazine in 1986 as an alternative to the consumer price index, in which the market basket consisted of a single product—McDonald’s Big Mac burger. The index provided a more digestible alternative to measure and compare the purchasing power of currencies of different countries. Using this index simplifies the cross-country purchasing power parity across income deciles and more importantly, it tells us the real income of an average income holder in an income decile in terms of only one commodity (food).

Researchers have been using Burgernomics to study various aspects of the economy (San Vicente Portes and Atal (2014), Gharehgozli and Atal (2019), Daniele and Malanima (2017), Loveridge and Paredes (2018),). By utilizing this index, we revisit the living standards of households around the world and provide a multidimensional income inequality comparison.

2 Sample and Data

The income decile data presented in this study is extracted from the Luxembourg Income Study (LIS) Database (LIS, 2019). It is the largest available database of harmonized micro-level income and wealth at household and individual-level. Our main variable of interest is nominal “Equivalised Disposable Household Income” which is the “total household monetary and non-monetary current income net of income taxes and social security contributions, equivalised by dividing by the square root of the number of household members.”

For the Big Mac Index, we use The Economist database which provides the nominal price of a Big Mac burger across countries going back to 1986 (Economist, 2019).

The crosswalk of the two datasets provides time-series of data on 29 countries. In order to avoid any significant number of missing data-points, we focus on the time-period 2000-2013

in our study. We also use “World Economic Outlook” database, provided by International Monetary Fund (IMF, 2019), to explore GDP per capita for the countries.

3 GDP per Capita and the Big Mac Affordability

We look into the Big Mac Affordability (BMA) of the 29 countries under study for the year 2018. We define BMA as the total number of Big Mac burgers an average individual can afford in each country per day (following Atal (2014)). Table 1 below presents the BMA, as well as GDP per capita and the Big Mac price in the countries for 2018.

Table 1: GDP Per Capita and Big Mac Affordability

Rank	Country	GDP per Capita (USD)	Big Mac Affordability
1	Luxembourg	113,954.42	65.93
2	Ireland	75,192.29	43.51
3	Norway	82,372.38	43.21
4	Denmark	61,226.98	35.56
5	Switzerland	83,583.00	34.99
6	Australia	56,698.10	34.40
7	United States	62,517.53	31.09
8	Netherlands	52,931.16	30.63
9	Austria	51,707.56	29.92
10	Finland	50,068.08	28.97
11	Germany	48,669.63	28.16
12	United Kingdom	42,260.92	27.36
13	Canada	46,733.03	25.27
14	France	42,930.77	24.84
15	South Korea	32,046.00	21.77
16	Italy	34,349.22	19.87
17	Czech Republic	23,085.19	18.61
18	Spain	31,059.51	17.97
19	Slovenia	26,586.05	15.38
20	Poland	14,468.83	14.47
21	Russia	10,950.49	14.34
22	Hungary	16,016.04	14.27

Table 1: GDP Per Capita and Big Mac Affordability

Rank	Country	GDP per Capita (USD)	Big Mac Affordability
23	Uruguay	17,379.66	10.65
24	Mexico	9,614.28	10.24
25	China	9,633.10	8.53
26	South Africa	6,560.04	7.75
27	Peru	7,118.43	6.08
28	Brazil	9,126.86	5.68
29	Colombia	6,761.22	4.47

Rank of Countries From Rich to Poor in Terms of Average BMA

According to the calorie value provided on McDonald’s website, a 2000 KCal diet is equivalent to having approximately 3.7 burgers daily. In the 29 countries under study, Colombia with BMA of 4.47 passes this number with a small margin. However, when we look at more detailed decile level of income distribution in the next section, we find that the bottom deciles of low ranked countries do not make it.

4 Income Inequality

4.1 Poor vs. Rich: How Many Burgers Daily?

We measure the total number of Big Macs per day an individual in an income decile in a given country can afford. In Figure 1, we present a summary of this measure focused on the bottom decile across the countries of this study and we follow the trend of this index for 5 years: 2000, 2004, 2007, 2010, and 2013. Figure 2 provides the same information for the top decile.

As observed in Figure 1, in regards to the bottom income decile, Luxembourg has the highest BMA. The average of their *bottom* decile (12.3 burgers) was more than the average of the *top* decile in Colombia (10 burgers) and overall average of China (8.5 burgers) and

Mexico (10.2 burgers). On the other hand, an average person in the bottom income deciles of Colombia and Peru could not afford even *half* a Big Mac a day.

Overall, for countries such as Luxembourg and the U.S.A., we observe a downward trend in the BMA in the bottom decile. In comparison, Russia's BMA in the bottom decile has been increasing. In 2000, the number of Big Macs affordable daily by their bottom decile was 0.3, putting Russia at the lowest in ranking, while the number went up to 2.6 in 2013 which brought them to only three ranks below the U.S.A.

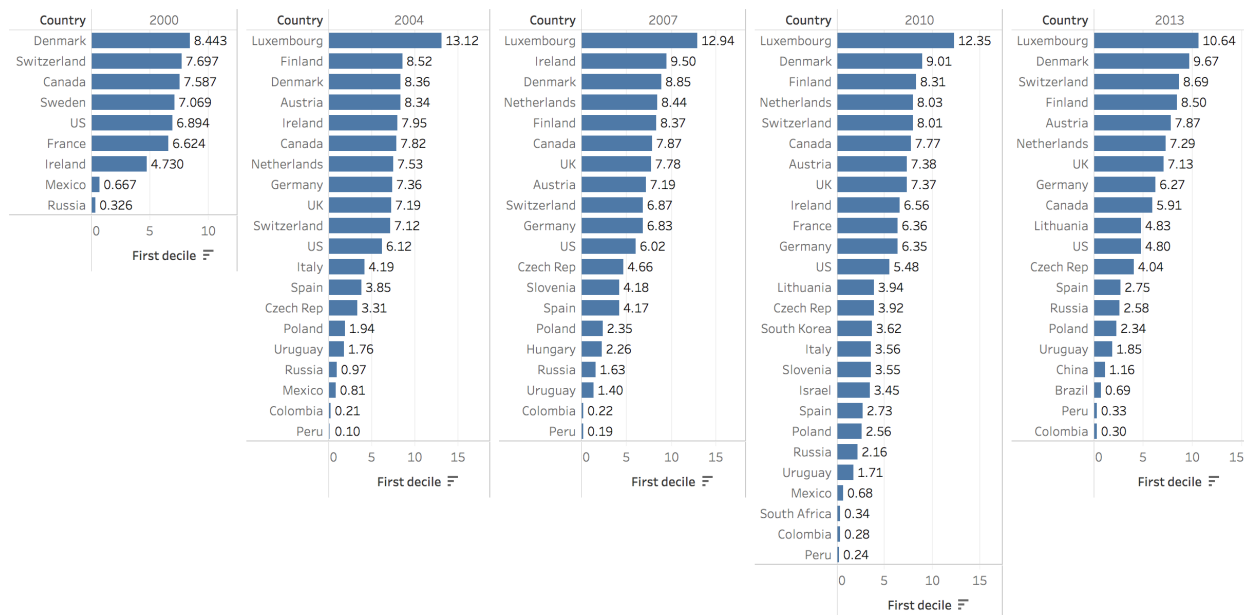


Figure 1: Rank of Countries in Big Mac Affordability, Numbers Show the Number of Big Macs the First Decile of Income Can Afford for Each Country in Each year.

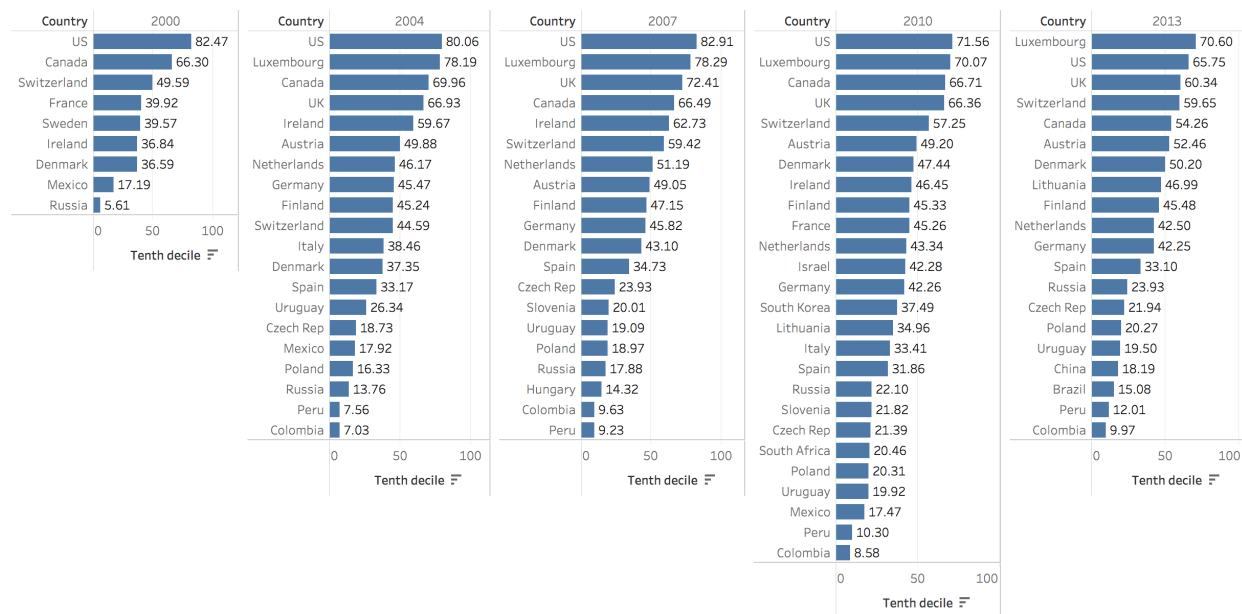


Figure 2: Rank of Countries in Big Mac Affordability, Numbers Show the Number of Big Macs the Tenth Decile of Income Can Afford for Each Country in Each year.

As we can see in Figure 2, the BMA of the top decile in the U.S.A. was 65.8 burgers in 2013, whereas Luxembourg's top decile could afford 70.6 burgers. Despite both countries having high BMAs in their top deciles, the U.S.A. has noticeably higher income inequality than Luxembourg. Whereas the ratio between the bottom to top deciles' BMA in the U.S.A. has been roughly 8%, the same for Luxembourg has been double of that, at roughly 17%, meaning higher income inequality in the U.S.A.

In 2013, the bottom decile's BMA in the U.S.A. was 4.8, a 30% decrease from what it was in 2000, whereas for the top decile it was 65.8, a 20% decline. Although the overall decrease in the BMA can be explained by the economic recession of 2007-09, as shown above, the poorest decile has experienced a larger impact compared to the richest ones.

One special consideration should be given towards Russia, whose BMA for their top and bottom deciles have increased dramatically since 2000. The affordability of the bottom decile increased almost seven-fold (691% increase) from 2000 to 2013, whereas it increased more

than three times (327% increase) for the top decile. Hence, we should expect a larger income inequality for countries such as the U.S.A. as opposed to Russia.

4.2 Real Income Dispersion Across Countries

We calculate the Coefficient of Variation (COV) to measure the *dispersion* of the BMA across deciles and how spread out they are from the overall average for each country in each year. In order to remove the effect of the magnitude of a country's wealth, we calculate the COV, which is defined as the standard deviation divided by the overall average; the higher the COV, the larger the income inequality.

One might ponder over the reliability of COV as a measure of inequality against the most widely used measure—the Gini coefficient. Figure 3 provides a side-by-side comparison of the Gini coefficient of the 29 countries in our study, as well as the COV. As evident from this figure, in general both the measures rise and fall together suggesting a very high correlation except for China. Interestingly, for China, except for the bottom decile, the ratio for all other deciles to the top decile income has gone up, hence causing a decline in the COV.

In the left panel of Figure 4, we measure the ratio of BMA of the bottom decile to the top decile of income distribution. We also measure the BMA ratio of the 9th decile to the top one to see the concentration of wealth, with that being listed on the right panel of Figure 4. For both sides of the figure, the smaller the number, the higher the inequality.

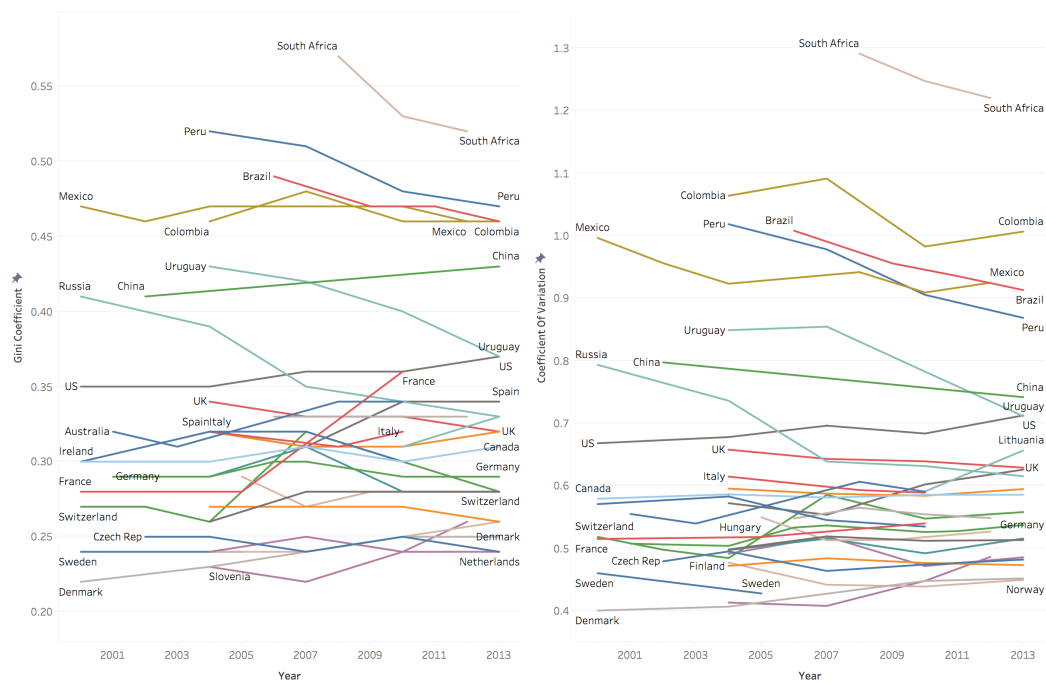


Figure 3: Gini Coefficient, as well as the Coefficient of Variation.

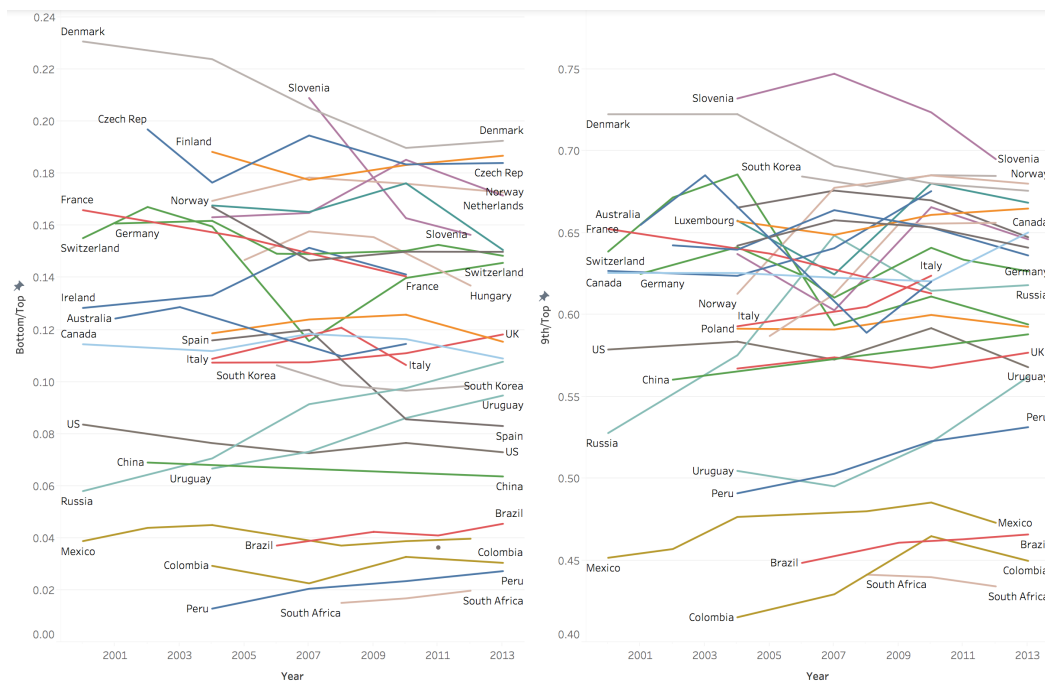


Figure 4: Share of the bottom to the top decile.

Something significant to notice is the opposite ranking of the countries between Figure 3 and Figure 4. For example, South Africa possesses the greatest degree of disparity in their BMA for the years covered while also having the lowest bottom to top decile ratio. This demonstrates the negative correlation between the income ratio of bottom to top decile and income inequality.

This ratio for Denmark is one of the highest. In 1995, it was as high as 24%, i.e., the people in the bottom decile earned almost a quarter as much as that of the people in the top decile. Although it has been declining over time, in 2013 it was still more than 19%. During 2000-2013, this ratio was higher than 10% for Canada and all the European countries in our analysis; for South Korea, it was close to 10%. However, for the U.S.A., this ratio has been declining steadily over 30 years. In 1986, the lowest income decile earned 9% of income of the people in the top decile, whereas in 2016 the ratio dropped to less than 7%. Although Russia and Uruguay started at a lower ratio than the U.S.A., they crossed the U.S.A. in the mid-2000s. The Latin American countries (except for Uruguay) are doing worse in terms of bottom to top decile income ratio; their people in the bottom decile earn less than 5% of income of people in their top decile. The ratio for India is less than 4% whereas for China it is 6%. For South Africa, the ratio is the worst—at only 2%!

We also measure the gap between the 9th and the 10th deciles of individual countries, which can tell us about how far apart a country's upper class is from the upper middle class. In 2013, all European countries' 9th decile income holders made more or less 60% of the 10th decile, whereas for the U.S.A. the ratio fell down to 56% in 2016. In 2013, this ratio for China was 59%. For Mexico, India, Brazil and Colombia, the ratio was less than 50% and for South Africa it was less than 45%.

5 Conclusion

We measure and rank the living standards of individuals of the countries of our study and present a global comparison of simply how many burgers are affordable to an average individual across these countries. We studied income deciles of 29 countries and ran a real income dispersion analysis by looking at the shares of income deciles, Gini coefficient, and the COV over time.

We found that while the Latin American countries had the lowest measures of BMA, they had the highest income inequality. Between 2000-2013, our study confirms that income inequality in developed countries like the U.S.A. and Denmark is increasing, while it is decreasing in developing countries like Mexico, China, and Russia. The reason behind the rising income inequality in developed countries is the outpacing increase in BMA of the top decile in those countries. The contribution of this study is to present a simple approach to explore complex topics including income inequality.

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