Debt-to-GDP Ratio Is *Increased* by Unemployment, Stock Trading, and Inequality, *Decreased* by Inflation, and *Unaffected* by Interest Rates

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Received: June 16, 2023 Accepted: July 12, 2023 Online Published: December 27, 2023

doi:10.5430/rwe.v14n2p1 URL: https://doi.org/10.5430/rwe.v14n2p1

Abstract

We demonstrate that the debt-to-GDP ratio is well predicted by five closely watched variables that include inflation. The Federal Reserve, economists, and stock market traders have recently expressed concern about the "the worst inflation in 100 years" (CNBC and Aljazeera, 20 May, 2022). Despite their semantic massage, we demonstrate that this outbreak occurred long after the time series studies here, indicating that inflation drove our debt-to-GDP ratios well before it broke out of control in 2022. This suggests that inflation may be an endemic and uncontrollable phenomenon. We contradict the growing concern about "the worst inflation in 100 years" by showing that inflation *lowers* the debt-to-GDP ratio. Our data driven discovery (DDD) shows that the debt-to-GDP ratio, acting as a dependent variable, is *increased* by unemployment, stock trading, and inequality, *decreased* by inflation, and *unaffected* by interest rates, all acting as independent variables.

Keywords: China, Data Dependent Discovery (DDD), data endemicity, federal reserve, fractional polynomial regression, India, Netherlands, Pairwise Correlation, Rosseau's social contract

JELs: C, E, G

1. Rosseau's Social Contract

Inequality was first treated as a social, political, and moral issue by Jean-Jacques Rousseau in 1755 in his *Discourse on the Origin of Inequality Among Men*. Rousseau closes his discourse with the assertion that "... inequality which prevails in all civilized countries ... is plainly contrary to the law of nature, however defined, that children should command old men, fools wise men, and that the privileged few should gorge themselves with superfluities while the starving multitude are in want of the bare necessities of life (Robbins and Coleman, 1938, p. 839). Centuries later, Corrado Gini (1884–1965), who was Italy's leading econometrician and the mainstay of the newly formed Econometric Society until the 1940s, rejected econometrics and joined a new generation of social scientists whose aim was to combine economics, statistics, and mathematics.

"The Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus, a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality (Source: World Bank, Development Research Group). Data are based on primary household survey data obtained from government statistical agencies and country departments monitored by the World Bank. For more information and methodology, see PovcalNet (iresearch.worldbank.org/PovcalNet/index.htm).

America's Gini index is vital to the global economy because the United States has the world's largest national economy, with the greatest impact on all other national economies. A contracting American economy endangers global prospects, as well as American livelihoods. This endangerment is addressed by Bishop Barber II's *Poor People's Campaign: A National Call for Moral Revival* (www.wbur.org/hereandnow/2021/06/04/rev-william-barber-vision).

In contrast to Barber's *moral* attack on inequality, Pew Research has employed an *economic* approach: "Barely 10 years past the end of the Great Recession in 2009, the U.S. economy is doing well on several fronts. The labor market

is on a job-creating streak that has rung up more than 110 months straight of employment growth, a record for the post-World War II era. The unemployment rate in November 2019 was 3.5%, a level not seen since the 1960s. Gains on the jobs front are also reflected in household incomes, which have rebounded in recent years. But not all economic indicators appear promising. Household incomes have grown only modestly in this century, and household wealth has not returned to its pre-recession level. Economic inequality, whether measured through the gaps in income or wealth between richer and poorer households, continues to widen." (https://www.pewresearch.org/social-trends/2020/01/09/).

2. Debt-to-GDP Ratio

The debt-to-GDP ratio is the metric comparing a country's public debt to its gross domestic product (GDP). By comparing what a country owes with what it produces, the debt-to-GDP ratio reliably indicates that particular country's ability to pay back its debts. Often expressed as a percentage, this ratio can also be interpreted as the number of years needed to pay back debt if GDP is dedicated entirely to debt repayment. The U.S. government finances its debt by issuing U.S. Treasuries, which are widely considered to be the safest bonds on the market.

When a country defaults on its debt, it often triggers financial panic in domestic and international markets alike. As a rule, the higher a country's debt-to-GDP ratio climbs, the higher its risk of default becomes. Although governments strive to lower their debt-to-GDP ratios, this can be difficult to achieve during periods of unrest, such as wartime or economic recession. In such challenging climates, governments tend to increase borrowing to stimulate growth and boost aggregate demand. This macroeconomic strategy is attributed to Keynesian economics.

A study by the World Bank found that countries whose debt-to-GDP ratios exceed 77% for prolonged periods experience significant slowdowns in economic growth. Every percentage point of debt above this level costs countries 0.017 percentage points in economic growth. The U.S. debt-to-GDP ratio for the fourth quarter of 2021 was almost double early 2008 levels but down from the all-time high of 133.92% in the second quarter of 2020. The U.S. has had a debt-to-GDP ratio over 77% since the first quarter of 2009. This unhealthy economic performance has persisted until the latest readings in 2021 as revealed in Table 1. Note that the debt-to-GDP ratios in Table 1 continue our 1991 -- 2017 time series.

Table 1. Recent Debt-To-GDP Ratios in Percents

2015	96.75,	2016	98.82,	2017	105.98,	2018	107.06,	2019	108.46,	2020	133.92,	2021	123.39

The record-breaking 133.92% occurred in the fourth quarter of 2020 with the COVID19 shock.

3. Fractional Polynomial Regression and Pairwise Correlation

Data and Results. The DDD's over the yearly values 1991--2017 are resulted from the following fractional polynomial regression and five pairwise correlations (cf. Royston and Altman 1994 and StataCorp. 2011). For brevity the six variables in the title of this article are renamed in Stata commands (1)--(6).

fracpoly reg	Debt	Unemployment	Inflation Interest Stocks Gini, noscaling	(1)
pwcorr	Debt	Unemployment,	obs sig	(2)
pwcorr	Debt	Inflation,	obs sig	(3)
pwcorr	Debt	Interest,	obs sig	(4)
Pwcorr	Debt	Stocks,	obs sig	(5)
pwcorr	Debt	Gini,	obs sig	(6)

Data Endemicity. fracpoly regression (1) returns an R^2 of .6918 whose F is significant at the .0004 level. Pairwise correlations (2)--(6) are -.4735, .4258, -.2710, .6086, and .4472 with significant levels at .0145, .0301, .1805, .0010, and .0220. Interestingly, the largest pairwise correlation of .6086 occurred between debt to GDP ratio and stock market trading, indicating that market trading, unfortunately, *raises* the debt to GDP ratio, impeding the Federal Reserve's control of inflation. This, as well as the shocks of Covid19, the Ukraine war, and recession, constitute a perfect storm confronting the FED.

The DDDs returned by Stata commands (1)--(6) occurred over the period 1991--2017. The periodicity of these data implies that factors such as cyclicality and jawboning pundits, enhance the perfect storm lamented by economists and stock market traders, who proclaim the "*the worst inflation in 100 years*" (CNBC and Aljazeera, 20 May, 2022). However, the Fed's criticized delay in acting in 2022 was long after the 1991 -- 2017 period when the debt-to-GDP ratio was *increased* by unemployment, stock trading, and inequality, *decreased* by inflation, and *unaffected* by interest rates. Inflation drove inequality and debt-to-GDP ratios well before it broke out of control in 2022. This suggests that inflation may be an uncontrollable, endemic phenomenon. We note that endemicity renders the time-worn concepts of exogeneity and endogeneity dispensible.

4. Frontiers of 21st Century Economics

Measurement. In the fractional polynomial regression in the preceding section, the dependent and independent variates are all percents, which exceed interval scales in the hierarchy of scientific measurement Stevens (1946 and 1951). For almost half a century interval scales have been beset with skepticism about their incremental benefits over and above percentage scales already in use. (cf, Shapiro, 1972, p. 371). The subjectivity associated with interval scaling, i.e. survey sampling, questionnaire interrogation, probabilistic inference, and significance testing, are absent from percentage scales which circumvent the host of long-standing, and now acute issues daunting micro-data collection and analysis. These issues are circumvented by the fractional polynomial regression and pairwise correlations in the preceding section, which rest on percentage-scaled variates.

Results. Stata command (2) demonstrates that unemployment *lowers* the debt-to-GDP ratio. The correlation the between the debt-to-GDP ratio and unemployment is -.4735, which is significant at the .0145 level, alleviating the Federal Reserve's burden in controlling unemployment. Sensitive to the FED's concerns the IMF's Chief Economist Gita Gopinath predicted a drop in economic outlook in 2020 (CNBC, 24 June, 2020; Aljazeera, 24 June, 2020). In the second quarter of 2020 the American economy, at an annualized rate, contracted by one third of its value (CNBC and Aljazeera, 30 July, 2020). The United Nations humanitarian agency then alerted the United States, the IMF, and the World Bank that mitigating economic contraction is crucial for endangered poor nations (Aljazeera, 26 September, 2020). The results returned by Stata commands (1) -- (6) provide data driven support for this UN alert.

Future Directions. The United States is the largest global economy, with the greatest effect on all other economies, and itself beset by inflation, unemployment, the trade war with China, and the Russian assault on Ukraine. The United States, The United Nations, the IMF, and the World Bank are undergoing global change that transfigures corporate capitalism and state socialism. This transfiguration was predicted in 2022 with the "end of globalization as we know it" (Scott Wapner, CNBC, 24 March, 2022), threatening uncontrolled inflation and recession. In March, 2022 Fed Chair Powell began his press conference by stressing that the Russian assault on Ukraine has financial and economic implications for the global and American economies that are highly uncertain (CNBC, March 16, 2022). Currently, the Federal Reserve is struggling to avoid inflation expectations from becoming entrenched, generating further inflation due to rising consumer demand that drives itself by rapid consumer purchasing before prices rise further. The results returned by Stata commands (1), (2), (3), (4), (5), and (6) demonstrate that this spiral is endemic over the years 1991--2017.

Final Words from the United States, the Netherlands, India, and China.

United States. Over a year after Powell's caution about inflation expectations (CNBC, May 12, 2023), Richard Curtin, director of Michigan's consumer sentiment surveys since 1976, stressed that inflationary psychology has set in (Curtin 2019). "Dislodging it won't be easy. There is a high probability that a self-perpetuating wage-price spiral will develop in the next few years. Households have already become less resistant to paying higher prices and firms have become less resistant to offering higher wages. Prices and wages will continue to spiral upward until the cumulative erosion in inflation-adjusted incomes causes the economy to collapse in recession. It is like the children's game of musical chairs: Everyone knows the game will end, but they feel compelled to keep racing around the circle at an ever-faster pace hoping their forced exit will leave them in the best possible position—even if it still means an inflation-adjusted loss. This situation has been termed inflationary psychology. Consumers purposely advance their purchases in order to beat anticipated future price increases. Firms readily pass along higher costs to consumers, including the future cost increases that they anticipate. That's what happened in the last inflationary age, which started in 1965 and ended in 1982: Expected inflation became a self-fulfilling prophecy. Many commentaries assert that the current situation is nothing like the situation faced in 1978-80. That's true, but irrelevant. The more apt comparison would be to the five to ten years prior to that period, when inflation had not yet reached crisis levels. Government officials claimed they had the policy tools that could easily reverse inflation, just as they claim now. Those policies, however, repeatedly failed across administrations, from Lyndon B. Johnson's surtax, to Richard Nixon's wage and price controls, to Gerald Ford's

public relations ‘Whip Inflation Now’ campaign, and Jimmy Carter's fireside pleas to diminish material aspirations. Only after Paul Volcker was appointed Federal Reserve chair and raised the fed funds rate to 20% in 1980 did inflation begin to fall. He pushed up rates aggressively, by 10 percentage points in just six months. The resulting 10% unemployment rate was needed to reduce inflation by 10 percentage points. Today's mantra is, ‘This time is different.’ Supply disruptions were said to be transient, and the inflation rate would soon fade. The University of Michigan's survey confirmed that shortages were important, and those shortages played an initial role in raising inflation expectations. Awareness of shortages has remained high, mentioned by half of all consumers in the past nine months. Nonetheless, shortages are no longer associated with higher inflation expectations -- their inflation expectations now differ by less than one-tenth of a percentage point. Consumers quickly adopted the notion that inflation had multiple causes, focusing on growth in federal spending and expansionary monetary policy as the dual driving forces. Pandemic transfers and relief payments produced extraordinary increases in household incomes. The income gains meant that household budgets could easily withstand higher prices. These transfers meant survival for many households, with some quickly exhausting their funds. Most workers still remained employed and boosted their spending. A good deal of those funds were added to their savings and reserves, which will constitute a more-lasting offset to higher prices.

Several other associated findings from the University of Michigan's consumer sentiment survey are also relevant. Although consumers have increasingly expected higher inflation, they have also expected a strong job market and rising wages, especially among consumers under age 45. In the year ahead, wage gains will continue to reduce resistance to rising prices among consumers, and the ability of firms to easily raise their selling prices will continue to reduce their resistance to increasing wages. Thus, the essential ingredients of a self-perpetuating wage-price spiral are now in place: rising inflation accompanied by rising wages. The Federal Reserve has the difficult task of balancing reductions in inflation against job losses. When consumers were recently asked which was the more critical problem facing the nation, nearly nine-in-ten cited inflation. The erosion in living standards due to rising inflation was the most common complaint when consumers were asked to describe in their own words how their finances had recently changed. While the initial rise was among the lowest-income households, those complaints have rapidly spread to middle- and upper-income households. Surging gas, food, and housing prices have forced nearly all families to go through the painful process of deciding which normally purchased items they could no longer afford. Importantly, the majority of today's consumers did not experience the accelerating inflation of the 1970s. Most have personally experienced only very low inflation, with a few short-lived spikes in oil prices. This lack of experience has magnified their reactions to the higher inflation rate that now prevails. Another critical characteristic of the earlier inflation era was frequent temporary reversals in inflation, only to be followed by new peaks. That same pattern should be expected in the months ahead. Most consumers expect the government to undertake policy actions to curb inflation. Indeed, the largest proportion of consumers in the past half-century have expected the Fed to hike interest rates. Given that the fed funds rate had lingered for an extended period near zero, that was not a hard call to make. What was perhaps more surprising was that the quarter-point hike the Fed adopted in March was simply too small to signal an aggressive defense against rising inflation. Instead, it signaled the continuation of a strong labor market along with an inflation rate that would continue to rise. Much more aggressive policy moves against inflation may arouse some controversy. Nonetheless, they are needed. Adam Smith's legendary invisible hand describes how individuals acting in their own self-interest can create unintended benefits for the entire society. Unfortunately, the country now faces the potential for an inflationary hand that can transform self-interested decisions into losses for the entire economy.

Curtin’s 2019 DDDs were enhanced in 2023 by Zhu Feng, a professor of international relations at Nanjing University, who told the Global Times newspaper that Treasury Secretary Yellen's emphasis on national security meant the U.S. was unlikely to stop the economic and technological suppression of China. “Yellen will emphasize that the United States does not support decoupling and call for greater transparency by China on its new espionage law, as well as progress in resolving international debt distress.

Even though no major breakthroughs are expected, U.S. officials say Yellen will push to open new lines of communication and coordination on economic matters, and stress the consequences of supplying lethal aid to Russia, an assertion China has adamantly rejected. When Chinese ambassador Zhu Feng met Yellen in Washington on Monday, he urged the U.S. to "pay great attention" and move to tackle China's main concerns on the economy and trade.

Trade tariffs imposed by the Trump administration and sanctions against Chinese firms are the country's chief concerns, said Wu Xinbo, an American studies specialist at Fudan University, who is familiar with Beijing's thinking.

Yellen's long-anticipated trip comes weeks after a visit to China by Secretary of State Antony Blinken, who agreed with Chinese President Xi Jinping that their mutual rivalry, amid a freeze in talks between their militaries, should not veer into conflict. Both visits, and a trip by Biden's climate envoy John Kerry, are part of a push to thaw icing relations after the U.S. military shot down a Chinese government balloon over the United States. These trips come ahead of a possible meeting between Biden and Xi as soon as September's Group of 20 (G20) Summit in New Delhi or the Asia-Pacific Economic Cooperation (APEC) gathering scheduled for November in San Francisco.

Biden's effort with Xi is likely to be an issue in his re-election battle next year, as Republicans look to fault his handling of foreign policy. "Biden is falling over himself to make nice with China, and Xi Jinping is laughing at us," said Nikki Haley, a former U.N. ambassador now seeking the Republican presidential nomination. "We should believe our enemies when they tell us who they are" (Reuters: June 28, 2023).

Haley’s comment about China was sharply contraindicated by Mustaffe Suleyman (2023) who has advocated redesigning incentives in the technology industry to steer business leaders toward prioritizing social responsibility alongside their fiduciary duties. Suleyman co-founded DeepMind Technologies, a leading artificial intelligence (AI) company and became its chief product officer. DeepMind was bought by Google in 2014 and he became head of applied AI at DeepMind. Within DeepMind he set up a research unit called DeepMind Ethics & Society to study the real-world impacts of AI and help technologists put ethics into practice. This formulation best practices for AI technologies advances the public's understanding of AI, and serves as an open platform for discussion and engagement about AI and how it affects people and society. Its board of directors has equal representation from non-profit and for-profit entities.

Suleyman has worked as a policy officer on human rights for Ken Livingstone, the Mayor of London before going on to start Reos Partners, a systemic change consultancy that uses methods from conflict resolution to navigate social problems. As a negotiator and facilitator, Suleman has worked for a wide range of clients such as the United Nations, the Dutch government, and the World Wide Fund for Nature.

Mustafa Suleyman is one of the three co-founders of the artificial intelligence and machine learning company DeepMind Technologies, and started out as its chief product officer. The company quickly established itself as one of the leaders in the AI sector and was backed by Founders Fund, Elon Musk and Scott Banister amongst others.

In 2014 DeepMind was acquired by Google for a reported £400 million--the company's largest acquisition in Europe at that time. Following this acquisition, Suleyman became head of applied AI at DeepMind, taking on responsibility for integrating the company's technology across a wide range of Google products.

In 2016 Suleyman led an effort to apply DeepMind's machine learning algorithms to help reduce the energy required to cool Google's data Centers. The system evaluated the billions of possible combinations of actions that the data center operators could take, and came up with recommendations based on the predicted power usage. The system discovered novel methods of cooling, leading to a reduction of up to 40% of the amount of energy used for cooling, and a 15% improvement in the buildings' overall energy efficiency.

In August 2019, Bloomberg reported that Suleyman had been placed on administrative leave following controversy about him. In 2021, the Wall Street Journal revealed that he had been placed on leave in 2019 following an investigation into employees' allegations of bullying as their manager. The company hired an external lawyer to investigate the allegations before placing him on leave at the time, and shortly thereafter Suleyman left to take a VP role at parent company Google. An email circulated by DeepMind's leadership to staff after the story broke, as well as additional details published by Business Insider, said Suleyman's management style fell short of expected standards.

In December 2019 Suleyman announced he would be leaving DeepMind to join Google, working in a policy role. However, he left Google in January 2022, joining Greylock Partners. In March of that year he co-founded Inflection AI, a new AI lab venture with Greylock's Reid Hoffman. The company was founded with the goals of leveraging AI to help humans talk to computers and recruiting former staff from companies such as Google and Meta. Inflection AI raised $225 million in its first funding round.

In 2023, Inflection AI launched a chatbot named *Pi* for Personal Intelligence. The bot remembers past conversations and seems to get to know its users over time. According to Suleyman, the long-term goal for *Pi* is to be a *digital chief of staff*, with the initial design focused on maintaining conversational dialogue with users, asking questions, and offering emotional support.

Suleyman is prominent in the debate over the ethics of AI and has spoken widely about the need for companies, governments and civil society to join in holding technologists accountable for the impacts of their work. He has

advocated redesigning incentives in the technology industry to steer business leaders toward prioritizing social responsibility alongside their fiduciary duties.

Suleyman is also a founding co-chair of the Partnership on AI--an organization that includes representatives from companies such as Amazon, Apple, DeepMind, Facebook, Google, IBM, and Microsoft. The organization studies and formulates best practices for AI technologies, advances the public's understanding of AI, and serves as an open platform for discussion and engagement about AI and how it affects people and society. Its board of directors has equal representation from non-profit and for-profit entities. (This detailing of Mustafa Suleyman's contributions to artificial intelligence and social responsibility rests upon wikipedia).

Netherlands. Mustafa Suleyman's life and works support those of the acclaimed Dutch philosopher Rutger Bregman (2021), who has opined that governments, by simply giving everyone money, will induce them to do the right thing for themselves and others, supporting Ann Frank's belief, even as she sat in a Nazi concentration camp, that "people are good at heart" (Aljazeera, Up Front, January 27 2023). "Most people deep down are pretty decent but power corrupts," argues Bregman. "For centuries, philosophers and historians from Machiavelli to Thucydides to Thomas Hobbes have said human beings are primarily motivated by self-interest, inherently competitive, or even born evil. This idea has permeated Western culture for centuries and influenced major social, economic and foreign policy decision-making. But Bregman challenges this conventional wisdom and believes "people are, well, actually fundamentally pretty decent". His latest book, *Humankind: A Hopeful History*, proposes a new worldview predicated on what he refers to as survival of the friendliest (cf. *UpFront, Marc Lamont Hill talks to Rutger Bregman about why he believes history should make us hopeful about the future of humanity*, Aljazeera, January, 27 2023). Under intensive probes by Marc Lamont Hill, Bregman reverted to his book, published in English in 2021 and a New York Times best seller.

Bregman's response to Hill emphasized that "If there is one belief that has united the left and right, psychologists and philosophers, ancient thinkers and modern ones, it is the tacit assumption that humans are bad. From Machiavelli to Hobbes, Freud to Pinker, this notion has sunk deep into western thought, driving newspaper headlines and guiding the laws that shape our lives. But what if it isn't true? In *Humankind* Rutger Bregman demonstrates that we are actually hardwired for kindness and cooperation. In fact, this instinct has a firm evolutionary basis that extends from the origin of *Homo sapiens.* … Bregman delivers a taut narrative journey through human history, showing us that a belief in our own generosity and collaboration isn't merely optimistic – it's realistic" (Back cover of *Humankind: A Hopeful History*.) This view is in the spirit of Karl Marx who stressed: "To each according to their needs. From each according to their ability".

Bregman's hardwiring suggests that rising prices press consumers to buy quickly before further increases, thus stimulating a spiral of uncontrollable inflation. Two years later, on February 1, 2023 Fed Chair Powell reminded the media that inflation threatens both of the Fed's congressional mandates, i.e., reducing unemployment and inflation. On it's meeting that day he reported that the 12 Governors were unanimous in their vote to stay the course with ongoing interest rate hikes until this dual mandate is accomplished.

India. The renowned Arundhati Roy has seen the dark side of American history that preceded the social and economic dilemma facing the United States and its Federal Reserve in this century. After tracing the horrific inequality now prevailing, she emphasizes crucial positive effects brought by this suffering:

"the bombing of Hiroshima and Nagasaki to Vietnam, Korea, Latin America, have claimed millions of lives -- all of them fought to secure 'the American way of life'. Today we know that 'the American way of life' -- the model that the rest of the world is meant to aspire toward -- has resulted in four hundred people owning half the wealth of the population of the United States. It has meant thousands of people being turned out of their homes and jobs while the US government bailed out banks and corporations ... The good news is that people have had enough and are not going to take it anymore. The Occupy Movement has joined thousands of other resistance movements all over the world in which the poorest of people are standing up and stopping the richest corporations in their tracks. Few of us dreamed that we would see you, the people of the United States, on our side, trying to do this in the heart of Empire ... We want to put a lid on this system that manufactures inequality" (Roy, 2014, pp. 94-95).

China. A more optimistic and DDD treatment of inequality comes from Zhuang and Li (2016), who studied "underlying factors that could explain the decline in income inequality in the People's Republic of China (PRC) since 2008 and inquired whether the decline indicates that the PRC's income inequality has peaked following the Kuznets hypothesis. Their paper first identifies four key drivers of rising income inequality in the PRC since the mid-1980s: rising skill premium, declining share of labor income, increasing spatial inequality, and widening inequality in the distribution of wealth. It then provides evidence that the reversal of these drivers, with the exception of wealth

inequality, could partly explain the decline in income inequality since 2008. The paper argues that since part of the reversal of these drivers is policy induced, it is important that the policy actions continue for income inequality to decline further. The paper further argues that a critical factor underlying the Kuznets hypothesis is that taxation and transfers play a bigger role in income redistribution as a country becomes more developed, while their role is still limited in the PRC, the future path of the country's income inequality may not be one directional; and reducing income inequality significantly may require personal income tax and transfers to play a greater role over time" (https://ssrn.com/abstract=2811559 (http://dx.doi.org/10.2139/ssrn.2811559).

Acknowledgments

This article is dedicated to the memories of the author's best critic, Maria Cohn Bechtel, and his mentor, Clyde Hamilton Coombs. The author thanks Aryil Bechtel for his contribution to the concept of parsimonious prediction, Timothy Bechtel for describing the global milieu surrounding national debt-to-GDP ratios, and Dr. Bethany Bechtel for her insistence on monitoring nations over time.

Conflicts of Interest

The author declares no conflicts of interest.

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