The Mainstreaming of Marx: Measuring the Effect of the Russian Revolution on Karl Marx's Influence

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Karl Marx's high academic stature outside of economics diverges sharply from his peripheral influence within the discipline, particularly after nineteenth-century developments rendered the labor theory of value obsolete. We hypothesize that the 1917 Russian Revolution is responsible for elevating Marx into the academic mainstream. Using the synthetic control method, we construct a counterfactual for Marx's citation patterns in Google Ngram data. This allows us to predict how often Marx would have been cited if the Russian Revolution had not happened. We find a significant treatment effect, meaning that Marx's academic stature today owes a substantial debt to political happenstance.

I. Introduction

In the decades following Karl Marx's death in 1883, the socialist economist's theories fared poorly under the scrutinizing eyes of the discipline he sought to reshape through his magnum opus, *Capital: A Critique of*

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Political Economy. Near-simultaneous dissections of Marx's system emerged in the late nineteenth century—first from within the classical or Ricardian tradition where Marx focused his attention, then from the novel theory of value offered by the famous Marginal Revolution of 1871. While Marx's followers continued to develop his theories toward the creation of a socialist economic system, mainstream economics charted a different course. The low esteem for Marx's *Capital* at the turn of the century was succinctly captured by C. Violet Butler's (1907, 560) dismissive assessment in the *Economic Journal*, "Who should tilt at such a windmill?" By 1925, no less a source than John Maynard Keynes ([1925] 1931, 258) would describe the same work as "an obsolete economic textbook . . . without interest or application for the modern world."

A century later, Marx enjoys an immense scholarly stature—albeit almost entirely outside of economics. His critiques of capitalism are taught as foundational texts in sociology, political theory, philosophy, and literary criticism, and his socioeconomic doctrines of alienation, class consciousness, and historical materialism exert heavy influence through the academically fashionable analytical frameworks of critical theory, postcolonial theory, and cultural studies. An outpouring of commemorations on the 200th anniversary of Marx's birth confirms the acclaim he currently attracts in academic writing.[1] David McLellan (1987, 322) summarized this reputation in the *Blackwell Encyclopedia of Political Thought*: "Over the whole range of the social sciences, Marx has proved probably the most influential figure of the twentieth century."

Several empirical measures illustrate Marx's substantial intellectual reach today. Using a discipline-normalized *h*-index of 35,000 authors estimated from Google Scholar citation counts, Van Noorden (2013) reported that Marx was the single "most influential scholar" in history as of 2013. Appearing in 3,856 syllabi as of 2015, Marx's *Communist Manifesto* is consistently among the most frequently assigned texts in American college classrooms. Excluding textbooks and grammar manuals, only Plato's

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[1] See, e.g., Jason Barker, "Happy Birthday, Karl Marx. You Were Right!" (*New York Times*, April 30, 2018); Andrew Hartman, "Marx at 200: Just Getting Started" (*Dissent*, May 4, 2018); and Adam Tooze, "Why Karl Marx Is More Relevant than Ever" (*Financial Times*, May 4, 2018). As a further indicator of Marx's influence, 17.6% of social science faculty and 25.5% of sociology faculty personally identified as Marxists in a 2006 national survey of the professoriate. See Gross and Simmons (2007, table 12).

Republic (3,573) appeared with comparable frequency. Marx's writings were assigned at roughly twice the rate of principal works by other famous thinkers, including John Stuart Mill (1,969), Charles Darwin (1,701), Adam Smith (1,587), and Martin Luther King Jr. (1,985). Although Marx's more sophisticated *Capital* fell below the comparatively accessible *Manifesto*, in 1,798 syllabi it still outranked not only Smith but also Jean-Jacques Rousseau's *Social Contract* (1,427), John Locke's *Second Treatise* (1,045), and John Rawls's *Theory of Justice* (1,248).[2]

In this study, we investigate the academic "mainstreaming" of Marx's ideas, following his early rejection within the economics profession. We posit that the primary reason for Marx's modern reputation traces to a historical event: the successful seizure of the Russian state by a Marxist movement in 1917. To examine this theory, we obtain yearly print citations of Marx's work as derived from the Google Ngram database. Ngram approximates the frequency that a specific phrase or author name is referenced in printed books over time and permits comparative analysis with other authors, subject to the limitations of the database. Our hypothesis is that Marx was an occasionally acknowledged but relatively minor figure between his death and the events of 1917. With the Soviet takeover of Russia, Marx's stature quickly rose. His economic theories subsequently entered the academic mainstream as they began to reshape other noneconomic disciplines.

We test our hypothesis using the synthetic control method (SCM) to project an expected citation pattern for Marx's work relative to its pre-1917 trajectory. SCM allows us to construct a composite index of other authors: contemporary writers in the nineteenth and early twentieth centuries and canonical thinkers in general. These authors are algorithmically weighted so that, collectively, they are cited at the same rate as Marx was before 1917. SCM thereby provides a plausible means of causally inferring a counterfactual historical scenario in the absence of treatment.

For the period after 1917, we compare the historical Marx to a synthetic counterpart, representing a projected counterfactual citation pattern in the absence of the Russian Revolution. We focus on the years 1917–32, corresponding to the rise of the Soviet state and the period in which Marx's works enter into mainstream discussion.[3] We find that the actual Marx is cited at a noticeably higher frequency than his synthetic counterpart following the treatment event. This suggests that historical accident

[2] Calculated from the Open Syllabus Project (https://opensyllabus.org/), October 2015. As of February 2020, Marx's *Manifesto* (7,057) maintained its parity with Plato's *Republic* (7,088).

[3] We acknowledge that this pattern continues beyond 1932 and examine it accordingly by projecting a trend line for the synthetic Marx to the present day for illustration in fig. 2. We intentionally limit our hypothesis testing and robustness tests to 1917–32, however, for two related reasons: (1) a longer posttreatment period potentially increases extrapolation bias, and (2) to avoid confounding treatments, such as the diaspora of Marxist intellectuals during the Nazi era and World War II.

played an important role in elevating Marx's intellectual prominence from that of a secondary or tertiary figure in economics to that of a preeminent thinker, albeit largely outside of the economics discipline. To be clear, our results do not indicate that the Russian Revolution rescued Marx from irrelevancy or negate his earlier influence within non-Soviet radical political movements. It is more conceivable that Marx would have shaped a specialized socialist literature, albeit with greater competition from other radical traditions and less mainstream dissemination. Our findings nonetheless suggest that Marx's modern intellectual prominence must be reconciled with the essential historical role of the Soviet Union in elevating Marxist doctrine.

II. Marx's Place in the History of Economic Thought

The course of Marx's academic dissemination has long intrigued intellectual historians. Qualitative assessments of his works almost uniformly acknowledge the slow pace at which they penetrated the British (Willis 1977), American (Amini 2016), and even German (Steinberg 1979) academies. As Alan Ryan (2013, xxvi) observed in his preface to Isaiah Berlin's classic study of the thinker, Marx's economics "were not taken seriously other than on the Marxist Left" in the early part of the twentieth century.

The process by which the ideas of economists—usually starting as conceptual models of human behavior—imprint upon the interpretation of socioeconomic events enjoys an extensive literature (Morgan 2006, 2012; Hausman 2021). Marx presents a curious complication to this pattern. Following an early and decisive rejection by other economists, Marx's theories nonetheless spread to the academic mainstream of multiple other disciplines, shaping how they interpret economic matters. A number of authors have speculated about the Russian Revolution's role in this dissemination. Frederick Copleston's influential *History of Philosophy* (2003, 305) identified Marx as the beneficiary of an "association with an extraphilosophical factor, a powerful social-political movement . . . [that] saved Marxism from undergoing the fate of other nineteenth century philosophies by turning it into a faith." Loren Lomasky (1989, 131) develops this insight further by identifying "two divergent strands in [Marx's] expositions"—a conventional economic theory of the "rise and fall of capital" and a second strand of political interpretation that "has enlivened socialist advocacy, and continues to animate it despite the demise of nearly all the economic pure theory that Marx himself regarded as his truly important scientific contribution." This observation leads Lomasky to suggest that if Marx was evaluated only on the extent of his economic contributions, his "visible presence . . . today would probably be roughly the same number of textbook footnotes enjoyed by other defunct nineteenth-century economists of similar stature—Nassau Senior, for example."

Although counterfactual historical exercises are necessarily speculative, we may say with certainty that most early reactions from economists treated Marx's theories as (1) internally inconsistent and (2) superseded by contemporary developments in the literature. Marx constructed his system around the labor theory of value, closely tying his conceptualization of economic exploitation to the derivation of what he called surplus value. This relationship purports to quantify the difference between the value of a good and the compensation to the laborer who produced it. While Marx's 1867 book *Capital* predicted an inherent contradiction of capitalism arising from this measured difference, the economics profession began to abandon its underlying premises in 1871.

That year, economists William Stanley Jevons (1871) and Carl Menger ([1871] 2007) almost simultaneously proposed an alternative solution to the labor theory of value. Classical economists had interpreted short-term price fluctuations as a consequence of changes in supply and demand, whereas they explained that in the long run, exchange value is determined by the labor cost of production. But the classical economists themselves realized the labor theory of value was flawed. For example, it could not explain the value of irreplaceable goods or the value of goods that were produced without labor. In a letter, David Ricardo confessed, "I cannot get over the difficulty of the wine which is kept in a cellar for three or four years, or that of the oak-tree, which perhaps had not 2*s.* expended on it in the way of labor, and yet comes to be worth £100" (Hollander 1991, 12).[4] Classical economists also struggled with the well-known "diamond-water paradox." Jevons and Menger answered that value derives from neither labor nor cost but from subjective preferences revealed by a decision at the margin. Although Marx does not appear to have engaged the unfolding Marginal Revolution in his lifetime, it quickly overtook his theory of value in the subsequent decades. Philip Wicksteed (1885) published the first marginalist critique of Marx just two years after his death. Alfred Marshall (1890, 619–20) challenged the logic of surplus-value theory in his influential economics textbook, accusing Marx and other adherents of the doctrine of "argu[ing in] a complete circle" and silently assuming the validity of their own conclusion "that the value of a thing consists exclusively of the labour that has been spent in making it." In Marx's case, wrote Marshall, the sleight of hand was "shrouded in mysterious Hegelian phrases" but ultimately self-referential. The same decade, Menger's student Eugen von Böhm-Bawerk (1890, 367–92; [1898] 1949) penned parallel marginalist and

[4] Ashenfelter (2008) finds that variation in the price of Bordeaux wine is largely explained by weather and age (vintage). Moreover, in 1855, different chateaux (vineyards) in Bordeaux were classified by their wines' prices (F176). Thus, even in 1855, it was known that labor cost was not the only determinant of wine prices.

classical critiques of Marx's system in German, which saw translation into English by the end of the nineteenth century.[5]

A near-simultaneous economic critique of Marx emerged from attempts to reconcile his internal inconsistencies within the classical framework. In the first volume of *Capital*, Marx (1867) argued that capitalists obtain surplus value by selling goods at value (labor cost) and then underpaying workers with subsistence wages. This implies that profit should be greatest where production is most labor-intensive.[6] Instead, Marx (1867, chap. 11) observed, the rate of profit is approximately equal across all industries and firms regardless of the capital composition. This contradiction was termed the "transformation problem": how are labor values transformed into competitive market prices? Marx's solution appeared in the posthumously published (1894) third volume of *Capital*. There, Marx argued that market prices do *not* reflect labor values. Instead, market prices are determined by the process of competition, which redistributes total surplus value among firms proportionally according to their total capital employed—including equipment and labor.[7]

Böhm-Bawerk ([1898] 1949) argued that Marx's "solution" in volume 3 abandoned the labor theory of value put forth in volume 1—a criticism more recently echoed by Paul Samuelson (1971, 400). Moreover, Böhm-Bawerk ([1898] 1949, 83–84) noted, Marx's argument is circular. According to Marx, skilled labor is a multiplication of unskilled labor. But it is market prices that reveal how much skilled labor is worth relative to unskilled labor. The labor theory of value is supposed to explain prices, but Marx requires prices to explain the value of labor.

In the early twentieth century, some of Marx's followers attempted to defend his economic doctrines against these critiques. Rudolf Hilferding ([1902] 1949), of the "Austro-Marxian" school, replied to Böhm-Bawerk ([1898] 1949) that labor is the determinant of value not because it is "technically relevant" but because it is "the social bond uniting an atomized society" (Hilferding [1902] 1949, 134). The labor theory of value is "not . . . the means for ascertaining prices, but . . . the means for discovering the laws of motion of capitalist society" ([1902] 1949, 139; see also Landreth and Colander 2002, 365).[8] But Hilferding's defense failed to sway most economists.

[5] See also the Cambridge capital controversy, which disputed whether the interest rate is the marginal productivity of capital and whether the scarcity of capital determines the interest rate. See Cohen and Harcourt (2003).

[6] In Marx's terms, those are the processes with the smallest "organic composition of capital," defined as the ratio of "constant capital" (equipment and resources) to "variable capital" (labor).

[7] These issues are lucidly restated by Hilferding ([1902] 1949, 149–53, 160) and Foley and Duménil (2008).

[8] Hilferding ([1902] 1949, 147) implicitly rejected the attempts of other Marxists to use labor calculations as a basis for economic calculation under socialism. Today, Hilferding is mainly known for *Das Finanzkapital* (1910), which reevaluated the core of capitalism as banking and finance rather than heavy industry.

Other authors responded to Böhm-Bawerk ([1898] 1949) by attempting to prove the existence of a mathematical solution to the transformation problem (Meek 1956; Seton 1957; Hunt and Glick 1987; Foley and Duménil 2008). Marx's own arithmetic assumed that inputs are priced by labor values. But inputs are purchased at competitive market prices. Thus, the system of equations must be solved simultaneously, not sequentially. Marx required that two conditions be satisfied: that total profit equals total surplus value and that total prices of production equal total labor value. But only one of these two can be true when some goods are inputs. Ladislaus Bortkiewicz's ([1907] 1949) classic solution equalizes total profit and total surplus value but fails to equate total price with total labor value.[9] Bortkiewicz's critique signified the impasse at which orthodox Marxist doctrine had arrived by the turn of the century. After offering his own mathematical solution, Francis Seton (1957, 160) concludes that while "Marx's conception of the transformation process . . . [possesses] internal consistency and determinacy," "the underlying doctrine . . . loses much of its substance and *raison d'etre*" because "the denial of productive factor contributions other than those of labour, on which the whole doctrine of the surplus rests, is an act of *fiat* rather than of genuine cognition."

Facing both these internal criticisms and the external challenge to its value theory presented by marginalism, Marxian theory arrived at a dead end within economics. Its academic influence in other scholarly disciplines was minimal before the First World War, and in some cases practically nonexistent (see table 1). This peripheral level of academic influence remains a feature of Marx's imprint on the history of economic thought. As Anthony Brewer (1995, 111) argues, "By any normal standard, [Marx] should not be accorded a significant position in the history of economics at all [because] . . . his ideas . . . were never seriously discussed by mainstream economists, either during or after his lifetime." Paul Samuelson (1962, 12) put it more bluntly in his presidential address to the American Economic Association: "From the viewpoint of pure economic theory, Karl Marx can be regarded as a minor post-Ricardian." Yet, as we have seen, Marx's academic influence—particularly outside of economics—has arguably never been stronger.

The Russian Revolution presents an intriguing explanation for the revival of Marx's academic fortunes, although—significantly—one that arises from geopolitical events rather than scholarly debates around Marx's ideas. This tumultuous episode played out rapidly between 1917 and 1923. It took only 7 months from the protest-instigated abdication of Tsar Nicholas II in

[9] Bortkiewicz's ([1907] 1949) work was not fully appreciated until its rediscovery by Marxist economist Paul Sweezy in 1942. Winternitz (1948) equates total price with total labor value, but total profit does not equal total surplus value (Meek 1956, 102). Hunt and Glick (1987) and Foley and Duménil (2008) review other solutions.

TABLE 1
JOURNAL MENTIONS BEFORE 1917

	Founded	Karl Marx	Herbert Spencer	Adam Smith	Henry George	John Stuart Mill
Journal of Education	1875	4	138	24	18	39
Publications of the Modern Language Association (*PMLA*)	1884	1	2	0	1	1
Political Science Quarterly	1886	53	47	165	70	63
Quarterly Journal of Economics	1886	18	11	95	25	34
American Journal of Psychology	1887	0	35	3	0	10
Annals of the American Academy of Political and Social Science	1890	16	34	70	15	31
The Economic Journal	1891	64	32	299	33	44
Yale Law Journal	1891	1	5	7	3	4
Journal of Political Economy	1892	10	5	59	12	25
American Historical Review	1895	5	8	24	3	4
American Journal of Sociology	1895	26	90	59	15	29
Total		198	407	805	195	284

March 1917 to the Bolshevik seizure of the Russian government. The October Revolution (technically in November under the "New Style" Gregorian calendar) ousted the competitor non-Marxian socialist government of Alexander Kerensky and enabled the Bolsheviks to consolidate their power. This outcome plunged the country into almost five years of civil war, with Lenin's Reds eventually defeating the anticommunist White movement as the latter suffered a succession of military setbacks and political dysfunction. While Marxist ideology exerted a pronounced influence upon the Bolshevik conceptualization of their own revolutionary actions, that movement did not achieve control by academic appeals to Marx's economic theories. Instead, military and political outcomes—including the missteps of its opponents and a fair amount of luck—determined its success.

The Bolshevik political ascendance drew widespread attention to Marx's system—particularly as the Western press sought to contextualize the revolution. Newspapers that seldom noticed Marx before this movement rushed to explain its obscure theoretical underpinnings.[10] For many observers abroad, Marx became a clue to understanding the "Bolshevik threat," particularly as rumors and actual attempts to instigate similar upheavals in Europe spawned a Red Scare and associated political backlash.

Lenin's political rise simultaneously enabled a sizable boost to the academic study of Marx's doctrines. In 1919, the Soviet state created the

[10] For example, "The Ideas of the Russian Extremists" (*Baltimore Sun*, November 4, 1917), "Lenine [sic] by Own Word Brands Self a Despot" (*New York Tribune*, December 30, 1918), and "Blame for Russia's Tragedy Shared by the Socialists" (*Boston Globe*, June 2, 1918). A handful of papers with closer ties to labor activism scrutinized Lenin's claim to being Marx's heir, e.g., "The Philosophy of the Bolsheviks" (*Manchester Guardian*, January 23, 1918).

Marx-Engels Institute, directed by David Riazanov (Ryazanov, Rjazanov).[11] Working with the newly established Frankfurt Institute of Social Research (the "Frankfurt School"),[12] the Marx-Engels Institute published 12 volumes of the *Marx-Engels-Gesamtausgabe* ("MEGA[1]") in German (Levine and Rojahn 2002, 28; Bellofiore and Fineschi 2009, 2–3; Fineschi 2010; Datta Gupta 2012).[13]

The Soviet state became the primary translator of Marx's works through the government-funded Progress Publishers, founded in 1931. Marx played a similarly prominent role in Soviet propaganda through artwork and statuary, dating to Lenin's personal direction (Brown and Taylor 1993). Indeed, Lenin initiated the practice of pilgrimage to Marx's grave in 1903 and personally supervised the first of several unsuccessful Soviet attempts to have his remains relocated to Moscow in 1918. While other factors certainly shaped Marx's reception in the mid-twentieth century, including the diaspora of the German-speaking academic Left in the face of Nazi persecution, the catalyzing event in the elevation of Marx's intellectual stature appears to be the Russian Revolution.

Before we proceed to our empirical analysis, a secondary implication of our thesis warrants mention. By elevating Marx's external academic stature, the events of 1917 likely altered the reception of Marx's works in radical and socialist circles. We hypothesize that the Soviet embrace of Marx not only elevated Marx absolutely but also crowded out other socialist traditions. Several of these competing thinkers linger in relative obscurity today, despite being closely matched contemporaries of Marx in the eyes of late-nineteenth-century socialists. As such, they offer a plausible baseline for estimating Marx's own counterfactual citation pattern.

Johann Karl Rodbertus (1805–75), originator of a competing theory of surplus value, presents an intriguing counterfactual. Many of Rodbertus's ([1837] 1946, 1842, 1850, [1871] 1890, 1875, 1898) arguments resemble

[11] Riazanov was exiled in 1931 after the Menshevik Trial, one of Stalin's purges (Barber 1981, 122; Levine and Rojahn 2002; Fineschi 2010), and executed in 1938 (Levine and Rojahn 2002, 28).

[12] Riazanov worked with Carl Gruenberg of the Frankfurt School to obtain manuscripts from the archives of the Social Democratic Party of German (SDP), led by Eduard Bernstein (Datta Gupta 2012, 126–27). After Lenin's death in 1924, the Soviet government began to discourage collaboration between the Marx-Engels Institute and any adherents of social democracy, including the Frankfurt School and the SDP (Datta Gupta 2012, 128–29).

[13] The first eight volumes were published in 1927–32 in Frankfurt and Berlin and the last four volumes in the Soviet Union because of Nazi suppression (Levine and Rojahn 2002, 28). Their contents are summarized by Bellofiore and Fineschi (2009, 10–11, table 1.1). This "MEGA[1]" was the first source to publish several of Marx's works, including the *Economic and Philosophical Manuscripts of 1844* in 1930, the *Criticism of Hegelian State Law* in 1927, and *The German Ideology* in 1932 (Bellofiore and Fineschi 2009, 2–3; Fineschi 2010). The institute also published an 18-volume Russian edition of the works of Marx and Engels and two journals, *Arkhiv Karla Marksa i Friderikha Engel'sa* ("Archive of Karl Marx and Frederick Engels") and *Letopis' marksizma* ("Chronicle of Marxism"; Barber 1981, 16.). These activities all coincide with our primary period of analysis (1917–32).

Marx's: that labor's share of the national income is on the continual decline, that wages tend toward subsistence, and that rent and interest are forms of exploitation. Unlike Marx, however, Rodbertus worked within the Prussian national assembly to advance state socialism. Marx and Engels viewed Rodbertus as a primary intellectual competitor, criticizing him in *Anti-Dühring*, *Theories of Surplus Value*, and volume 2 of *Capital*. Indeed, Engels's preface to the posthumously published volume 2 devotes substantial energy to refuting the charge that Marx had plagiarized the concept of surplus value from Rodbertus. In *Capital and Interest*, Böhm-Bawerk (1890, 322–23) chose Rodbertus for his primary opponent, saying, "As regards the history of theory [of exploitation] Rodbertus is the weightiest personage we have to mention in this chapter." Böhm-Bawerk (1890, 323) continued, "Karl Marx is . . . after Rodbertus, the most important theorist of Socialism."[14] Marshall (1890, 619–20) similarly assigned equal credit for the doctrine of surplus value to Rodbertus and Marx. If the events of 1917 had proceeded differently, perhaps we would speak of "Rodbertianism" rather than Marxism.

The notoriously quarrelsome landscape of nineteenth-century labor movements offers several other candidates for our analysis. Ferdinand Lassalle (1825–64) rose to prominence among socialists as a primary competitor to Marx in his lifetime, rejecting the latter's revolutionary theories in favor of social-democratic labor reform under an existing system of constitutional monarchy. After an early friendship, Marx soured on Lassalle, and their relationship devolved into deeply personal antipathy.[15] Perhaps because of Lassalle's broader political acumen, German Chancellor Otto von Bismarck described him as "one of the most intelligent and likable men I had ever come across" (Footman 1946, 175). He shared some similarities with Rodbertus, and his explicit rejection of Marx's revolutionary dictatorship of the proletariat in favor of social-democratic means suggests an alternative evolutionary course for socialist theorizing. Today, he is primarily remembered as the founder of the social-democracy movement in Germany's political system, further confirming his viability as an alternative to Marx within the socialist tradition.

Similar considerations might be given to the work of Pierre-Joseph Proudhon (1809–56) and the left-anarchist theorists he inspired, including Mikhail Bakunin (1814–76) and Pyotr (Peter) Kropotkin (1842–1921). Proudhon's falling-out with Marx in 1847 triggered the primary schism

[14] On the other hand, Böhm-Bawerk (1890, 326) said "Marx['s theory] is the one which has won most general acceptance, and the one which may to a certain extent be regarded as the official system of the Socialism of to-day." While this speaks to Marx's stature among socialists at the turn of the century, it does not explain his outsized prominence in the social sciences today, which is our primary concern.

[15] In a viciously racist and anti-Semitic letter to Engels, Marx denounced the "Jewish n****r Lassalle" as an "importune" and "interbred" "enlightened Bonapartist" (Marx 1862; Blanchard 1984)

of radical labor activism in the nineteenth century: that pitting the Marxist wing of the International Workingman's Association against its anarchist wing over the question of the socialist state. Proudhon advocated placing the means of economic production under a "mutualist" cooperative of decentralized labor associations, whereas Marxism envisioned a transitional "dictatorship of the proletariat" to seize power through a centralized authority. After Proudhon's death, Bakunin became a primary interlocutor of Marxian socialism, ultimately leading to his expulsion from the First International by Marx and the disbanding of the organization in 1876. A former admirer of Marx who began a Russian translation of *Capital*, Bakunin ([1873] 1971, 332) charged Marxism with producing authoritarian outcomes, writing that "the so-called people's state will be nothing other than the quite despotic administration of the masses of the people by a new and very non-numerous aristocracy of real and supposed learned ones." The criticism spawned an internal rift among socialists, with Engels (1872) responding on behalf of the Marxists, "Do away with capital . . . and the state will fall of itself" (Gouldner 1985, 152–53; Caplan n.d.). We may again imagine a very different trajectory in twentieth-century socialist thought had Bakunin, rather than the Marxists, carried the day on this point.

A final competing theorist who warrants mention is Henry George (1839–97), an American journalist and economic writer best known for proposing a de facto socialization of land as a strategy for eliminating poverty. Drawing on influences from classical economics, free trade, and social reform, George's campaign for a "single tax" on land inspired followers in both the liberal and socialist political traditions. George was aware of and harshly critical of Marx's doctrine, predicting that it would end in despotism. In the decades before the Russian Revolution, George's economic philosophy exercised considerable influence on competing socialist political movements—for example, Sun Yat-sen's proclamation of a socialist republic in China in 1912 while citing explicit Georgist inspiration (Trescott 1994). Although George's own legacy remains an object of contest between socialist and nonsocialist claimants, his influence matched or exceeded that of Marx in the late nineteenth century, making him an intriguing candidate for counterfactual observations.[16]

These names are by no means exhaustive, yet they illustrate a number of competing paths that radical political doctrine might have taken, absent the Soviet elevation of Marx. Of similar note, even Marx's own personal claimants proved notoriously schismatic, particularly on questions surrounding the implementation of his system. Competing interpretations

[16] The self-taught George experienced a tumultuous relationship with academic economists during the professionalization of the discipline, including a prolonged public dispute with Francis Amasa Walker, the first president of the American Economic Association (Samuels 1983). As per table 1, Marx's pre-1917 academic citations compared closely to George's despite lagging behind those of other economists.

of revolutionary Marxism fractured his followers in the early twentieth century, while also producing numerous attempts to synthesize elements of Marx with democratic institutions, such as Eduard Bernstein's Revisionism.[17] While we cannot construct a precise alternative course for Marx's influence, our examination suggests that even among socialist thinkers on the radical periphery, Marx's modern-day preeminence was far from assured before the Soviet uprising. Absent that event, the degree and magnitude of Marx's incorporation into mainstream scholarship is therefore even less certain.

III. Data and Method

Ideally, we would estimate the effect of the Russian Revolution by observing citations in two different universes: one in which the Russian Revolution occurred and another in which it did not. Because this is not feasible, we use SCM, which is ideal for causal inference in case studies with one treated unit (Abadie and Gardeazabal 2003; Abadie, Diamond, and Hainmueller 2010, 2015; Abadie 2021). SCM combines aspects of the matching and difference-in-difference techniques to facilitate counterfactual comparisons. It has been used in a variety of fields, including political science (Abadie, Diamond, and Hainmueller 2010, 2015; Grier and Maynard 2016; Geloso and Grier 2021), economic policy and growth (Billmeier and Nannicini 2013; Cavallo et al. 2013; Lawson, Grier, and Absher 2019), health and drug policy (Abadie, Diamond, and Hainmueller 2010; Kreif et al. 2016; Furton 2018), criminology (Saunders et al. 2014), immigration (Powell, Clark, and Nowrasteh 2017; Nowrasteh, Forrester, and Blondin 2020), and urban economics (Gautier, Siegmann, and Van Vuuren 2009). To our knowledge, we are the first to use SCM for text analysis.[18]

[17] We call attention to the sharp divides between Marx's revolutionary claimants, including Lenin and the famous Bolshevik-Menshevik split of 1903; the revolutionary German Spartacist movement in 1919; the "orthodox" theoretical Marxism of Engels's protege Karl Kautsky (1854–1938); the Social Democratic "evolutionary revision" of Marx into a political reformist cause by Eduard Bernstein (1850–1932); and the pre-Soviet adoption of Marxist theory by elements of the Social Democratic Party of Germany in the late nineteenth century (Bonnell 2002). Werner Sombart's (1863–1941) early writings, including correspondence with Engels, reveal further attempts to synthesize Marx into the German Historical School of economics, albeit with tensions over the economic determinism of Marxist historical methodology and a critical assessment of its connection to British classical economics (Harris 1942; Tribe 2003). These and other examples illustrate that Marx had many competing claimants among radical movements before the events of 1917, even as his mainstream influence remained limited.

[18] See Grundmann and Stehr (2001, 272), who use a method resembling difference-in-difference, comparing the numbers of citations for Werner Sombart and Martin Heidegger before and after World War II to reject the claim that Sombart lost his popularity in sociology because of his association with Nazism. Gentzkow, Kelly, and Taddy (2019), in a review of "text as data," briefly discuss *n*-grams (539) but do not mention the SCM. Barron et al. (2018) study the transcripts of the debates in the French Revolution's first parliament, using

SCM approximates a treated unit's outcome by using a weighted average of the outcomes of control units, called "donors." These weights are chosen to minimize the RMSPE (root mean squared prediction error) during the pretreatment period. The weights are constrained to be nonnegative and sum to 1 to avoid extrapolation bias. To illustrate, suppose that before 1917, Marx's citations were estimated as equal to 0.6 times those of Lassalle plus 0.4 times those of Rodbertus. Using these same weights, the synthetic control's outcome is predicted after 1917. If a weighted average of donors predicts Marx's citations before 1917 but not after, then the deviation between the real Marx and the synthetic Marx after 1917 is considered a treatment effect. Thus, SCM is similar to difference-in-difference, except that control units are selected to minimize pretreatment differences. SCM resembles matching as well because the weights are chosen not only to approximate the outcome but also to achieve balance on observed indicator variables. Therefore, the synthetic Marx will share underlying attributes with Marx. SCM's identification principle is that no other intervening treatment or idiosyncratic shock systematically affects the donor units (Abadie 2021, 409).[19]

Our donor list is compiled from four sources. First, we brainstormed a list of relevant economic, sociopolitical, and socialist thinkers up to the time of Marx's death. This list produced 52 authors. Second, we consulted two primary-source readers in political philosophy—namely, Rosen, Wolff, and McKinnon (1999) and Cohen (2018)—and added any authors from Marx's era or earlier whom we had not already included. This contributed 19 authors to our list. Third, we added almost all authors from the first 39 volumes of the 50-volume *Harvard Classics* (Eliot 1909), also known as *Dr. Eliot's Five-Foot Shelf*. This added 79 authors to our list.[20] Finally, we employed several German-language encyclopedic anthologies to compile a list of 77 prominent German-language writers whose lives preceded or overlapped Marx's. Our final list includes 227 authors.[21] These authors are listed in table 2.

Kullback-Leibler divergence to measure novelty and transience of various ideas and rhetorical strategies.

[19] A limitation of SCM is that treatment is defined as a structural break in time, not as a variable with a coefficient. Thus, SCM cannot estimate dosage or interaction effects. SCM requires a discrete before-after.

[20] First published in 1909, the *Harvard Classics* contains a rough approximation of the common intellectual canon at the turn of the century. Marx was not included among its volumes. We restricted ourselves to the first 39 volumes because the latter volumes are mostly devoted to ballads and poetry. From the included volumes, we omitted a few authors—whom we detail in app. A.2—because their names are difficult to isolate in Google Ngram.

[21] Not every author can be used in every permutation test to obtain *p*-values because sometimes the numerical optimizer cannot converge. Stata's synth_runner gracefully drops any units when the SCM fails to converge. Each table of *p*-values lists how many authors were successfully used.

TABLE 2
List of Authors (Alphabetical by Search Term)

Abraham Lincoln	Dryden	Herbart	Malthus	Schmoller
Adam Smith	Durkheim	Herbert Spencer	Marcus Aurelius	Schopenhauer
Aeschylus	E. T. A. Hoffmann	Herder	Marlowe	Schäffle
Aesop	Ebbinghaus	Hermann Cohen	Martin Luther	Sigismund Beck
Alessandro Manzoni	Edmund Burke	Hermann Lotze	Marx	Simmel
Alexander Hamilton	Edmund Spenser	Herodotus	Max Stirner	Simon Newcomb
Alexander Pope	Eduard Beneke	Hippocrates	Mazzini	Sismondi
Amadeus Wendt	Eduard Bernstein	Hippolyte Taine	Molière	Sombart
Ambroise Paré	Eduard Zeller	Hobbes	Montaigne	Sophocles
Aquinas	Eduard von Hartmann	Homer	Montesquieu	Spinoza
Archibald Geikie	Edward Bellamy	Hume	Moses Hess	Tacitus
Aristophanes	Edward Haies	Hölderlin	Moses Mendelssohn	Theodor Fontane
Aristotle	Edward Jenner	Immanuel Kant	Nassau Senior	Theodor Lipps
Arnold Ruge	Epictetus	Izaak Walton	Natorp	Thomas Abbt
Auberon Herbert	Eugen Dühring	James Fitzjames Stephen	Newton	Thomas Browne
August Bebel	Euripides	James Madison	Nietzsche	Thomas Carlyle
Auguste Comte	Faraday	Jean Racine	Oliver Goldsmith	Thomas Jefferson
Augustine	Ferdinand Lassalle	John Bunyan	Oliver Wendell Holmes	Thomas Mann
Bakunin	Ferdinand Tönnies	John C. Calhoun	Oscar Wilde	Thomas More
Barthold Georg Niebuhr	Fichte	John Calvin	Otto Liebmann	Thoreau
Bastiat	Francis Bacon	John Knox	Otto Pfleiderer	Thucydides
Benjamin Constant	Francis Pretty	John Locke	Pasteur	Thünen

Benjamin Franklin
Bentham
Bernard Bolzano
Bigges
Blanqui
Bruno Bauer
Bruno Hildebrand
Carl Stumpf
Cellini
Cervantes
Charles Darwin
Charles Fourier
Chaucer
Christian Schreiber
Christian Wilhelm von Dohm
Cicero
Clausewitz
Copernicus
Dante Alighieri
David Ricardo
Descartes
Dietrich Tiedemann
Dilthey
Dostoyevsky
Franz Brentano
Frederick Douglass
Frege
Friedrich Ast
Friedrich Carl von Savigny
Friedrich Heinrich Jacobi
Friedrich Krause
Friedrich List
Friedrich Schiller
Friedrich Schlegel
Fritz Schultze
Froissart
Goethe
Gotthold Ephraim Lessing
Gottlob Ernst Schulze
Grimmelshausen
Gustav Freytag
Gustav Schönberg
Hamann
Hans Christian Andersen
Heinrich Feder
Helmholtz
Henry Fielding
Henry George
John Milton
John Ruskin
John Stuart Mill
John Woolman
Jonathan Swift
Joseph Lister
Kafka
Karl Knies
Karl Marx
Kelvin
Kempis
Kropotkin
Külpe
Kuno Fischer
Laspeyres
Leibniz
Lord Acton
Lord Byron
Ludwig Büchner
Ludwig Feuerbach
Lujo Brentano
Machiavelli
Mainländer
Malory
Pedro Calderón de la Barca
Percy Bysshe Shelley
Pericles
Philip Nichols
Pierre Corneille
Plato
Pliny the Younger
Plutarch
Proudhon
Ralph Waldo Emerson
Ranke
Renan
Richard Cobden
Rilke
Robert Browning
Robert Burns
Robert Owen
Rodbertus
Rousseau
Rudolf Haym
Sainte Beuve
Samuel Johnson
Scheler
Schleiermacher
Tocqueville
Victor Hugo
Virgil
Voltaire
Walt Whitman
Walter Raleigh
Wentscher
Wilhelm Drobisch
Wilhelm Roscher
Wilhelm von Humboldt
William Caxton
William Godwin
William Graham Sumner
William Harrison
William Harvey
William Penn
William Roper
William Wordsworth
Windelband
Wollstonecraft
Wundt
de Gouges

Our outcome variable is citations from the Google Ngram Viewer. Our list of indicator variables includes the following: (1) citations averaged over 3 years, taken every 6 years;[22] (2) year of publication of the author's most notable work; (3) whether the author originally published in English, German, French, Greek, Latin, Spanish, or Italian (seven binary indicators; Russian is left out); (4) year of translation to English (equal to the year of publication if originally published in English); (5) whether the author was a socialist; and (6) whether the author was "political." The publication and language indicators are designed to ensure that Marx is matched with authors who wrote at roughly the same time and who were roughly equal in their accessibility to English-speaking audiences. The socialist and political indicators are designed to ensure that Marx is matched with authors who wrote on similar themes and who would have been read and cited by similar people. Ideally, our synthetic Marx will be composed of other socialist contemporaries. To account for potential regional biases introduced by the primary language of each donor, as well as the texts considered, section IV.B.3 repeats our test measuring outcomes using Google Ngram's German- and French-language collections rather than English. In German, we test using only German-language authors as well as our full set of authors.[23]

Coding an author as "socialist" is self-explanatory. Examples of socialists in our data set are described in section II.[24] "Political" refers to any author whose works are cited for their clear connections to political theory. All socialists are political, but not all political authors are socialists. Examples of nonsocialist political authors include Adam Smith, Machiavelli, and Aristotle. Nonpolitical authors include Darwin, Durkheim, and Kant. These authors' works may have political theory dimensions, but they are known primarily for contributions in other areas.[25]

Our treatment is defined as 1917, when the Russian Revolution began. In reality, the treatment developed over the course of the entire Russian

[22] We average citations because annual citations can be erratic, with sharp, temporary spikes. We leave gaps of 3 years in order to avoid overfitting. Kaul et al. (2022) show that including too many outcomes as indicators causes other indicators to receive too little weight.

[23] All nonbinary variables—both outcomes and indicators—are min-max normalized to [0, 1] to facilitate convergence by a numerical optimizer and to reduce CPU and RAM usage. Because the sample minimum citation is originally zero, relative proportions of citations are preserved.

[24] The one questionable author is Henry George. In a robustness test (not reported), we switch George's coding to nonsocialist, and the results do not meaningfully change.

[25] We considered alternative means of coding authors, but other methods were subject to bias as well. Any classifications made after 1917 would threaten to introduce hindsight bias. For example, we considered coding whether an author's modern-day encyclopedia article mentions "Marx" or vice versa. But this would threaten to introduce biases that reflect Marx's current influence. We also considered coding whether an author was a "sociologist" or "descriptivist," as opposed to a "prescriptivist," to distinguish Marx from the so-called utopian socialists. However, this would introduce contemporary academic influences, which may themselves be affected by political events.

Civil War, from 1917 until 1922. Unlike panel linear regression methods, backdating a treatment date does not introduce bias in SCM (Abadie 2021, 410). Therefore, we conservatively set the treatment to its earliest possible date, knowing that there is no biased estimation if the treatment actually began later.

Treatment effects are estimated in Stata by the synth module (Abadie, Diamond, and Hainmueller 2011). The *p*-values are obtained from in-space placebo tests, that is, running synth for each untreated donor unit, which is automated in Stata by the synth_runner module (Galiani and Quistorff 2017).[26] The *p*-value is estimated by the proportion of untreated units whose treatment effects are at least as large as Marx's. If more than a certain percentage of the untreated units experience treatment effects, we suspect that Marx's treatment effect is due to random chance. Treatment effects are standardized by dividing a unit's treatment effect by that same unit's pretreatment RMSPE. Intuitively, if a unit was subject to large pretreatment prediction error, then we would place less weight on any posttreatment deviations. Furthermore, dividing treatment effects by RMSPE standardizes the effect sizes; authors whose average outcomes are greater in magnitude will tend to have larger treatment effects but also larger random prediction errors.

However, these *p*-values can be difficult to interpret because each posttreatment period (year) has its own treatment effect and *p*-value. Our posttreatment period is 1917–32, and we have 16 different *p*-values. Therefore, we chiefly rely on a single "joint post standardized" (hereafter joint post std) *p*-value, which defines the treatment effect as the ratio of posttreatment RMSPE to pretreatment RMSPE. A genuine treatment should cause the posttreatment period to be estimated with more error than the pretreatment period, causing the ratio to exceed 1. The joint post std *p*-value is the proportion of authors with a ratio at least as large as Marx's. The annual *p*-values are useful as a sanity check because we can expect these *p*-values to become more significant over time.

We also aggregate the annual *p*-values by using two forms of meta-analysis. Our intuition is simple: just as one uses meta-analysis to judge the joint significance of several independent studies, we may use meta-analysis to evaluate the joint significance of the treatment effects in each individual posttreatment year. The problem is that our treatment effects are not independent of one another. Wilson (2019a) shows that the harmonic mean of several *p*-values (HMP) can be interpreted similarly to a *p*-value computed by Fisher's method of meta-analysis, except that unlike Fisher's method, the HMP does not assume independence.[27] The HMP is merely

[26] In app. A.1, we provide technical details about our synthetic control methodology and parameters.

[27] Wilson (2019a) builds on Good (1958), as noted by Held (2019) and Wilson (2019e). On Wilson's HMP, see also Goeman, Rosenblatt, and Nichols (2019) and Wilson (2019b, 2019d).

approximately equivalent to a p-value, and to interpret it exactly like a p-value, one either consults a table of critical values (Wilson 2019a; table 1) or integrates the Landau distribution from HMP to infinity to form an asymptotically exact p-value (AEP).[28]

Wilson's HMP and AEP are designed to be robust to arbitrary dependence among tests. However, depending on the form of dependence, the HMP method may not always have the desired strength; that is, it may have a higher type I (false-positive) rate than is desired (Goeman, Rosenblatt, and Nichols 2019; Wilson 2019d). Wilson (2019d) advises combining the HMP with the Bonferroni correction and/or the Simes method. Therefore, we also aggregate the annual p-values using Simes's (1986) method, which is generally valid when tests are dependent (Samuel-Cahn 1996; Sarkar and Chang 1997; Rødland 2006). Simes's method addresses the problem of multiple comparisons by penalizing p-values by the number of tests, similarly to the Bonferroni correction but less conservatively.[29] Using the Wilson (HMP) and Simes methods, we can aggregate the annual standardized p-values into two overall p-values, which we call "AEP std p" and "Simes std p." These can be interpreted similarly to the joint post std p-value that is ordinarily reported by synth_runner.[30]

Our outcome data—citations—come from the Google Ngram Viewer (Google n.d.; Google Ngram Viewer Team n.d.; Michel et al. 2011; Lin et al. 2012), an online search engine that plots the relative frequency with which different search strings occur in a subset of the Google Books collection ("corpus"). An n-gram is a string of n one-grams, where a one-gram is a string of characters without spaces (Michel et al. 2011, 176). For example, a user may search for the one-gram "Marx" or the two-gram "Karl Marx." We therefore proxy citations by measuring how often an author's name occurs as a phrase in Google's subset of its own Google Books collection.[31]

[28] HMPs and AEPs are estimated in R by the harmonicmeanp package (Wilson 2019c). To run R commands within Stata, we used the rcall module by Haghish (2019b). To install rcall in Stata, we used the github module by Haghish (2019a). For details, see Haghish (2019c).

[29] The p-values are ordered from smallest to largest, with each p-value indexed by i, and each p-value is multiplied by N/i, where N is the number of p-values. The meta p-value is the minimum of all these modified p-values. By contrast, the Bonferroni correction multiplies every p-value by the number of tests N, or equivalently, it divides the critical alpha significance level by the number of tests. On the Bonferroni correction's conservatism, see Wilson (2019a).

[30] As far as we know, we are the first to adapt the Wilson and Simes methods to SCM. SCM's placebo method permits p-values of exactly zero. But the harmonic mean is undefined when any value is zero, while the Simes p-value is unbelievable: if even a single p-value is zero, then $\min(p \times (N/i))$ is also zero, even if every single other p-value is insignificant. Therefore, when estimating the Wilson and Simes p-values, we replace zeroes with $1/M$—where M is the number of donor placebos—which is the smallest possible nonzero p-value that SCM could have estimated.

[31] Ideally, we would directly measure citations, but a reliable and complete count is not available. While library checkout rates and print runs are theoretically superior to n-grams,

The original Google Ngram collections ("corpora") were generated by OCR (optical character recognition) in 2009, 2012, and 2019, but new collections are continually created as Google scans new books, and Google continues to improve the accuracy of its OCR (Google n.d.). The Google Ngram Viewer measures *n*-grams in percentage points, as the number of instances of a given *n*-gram in a given year divided by the total number of *n*-grams that year (Michel et al. 2011, 176). This normalizes by the number of books published each year to avoid skewing results (Google n.d.). In addition, a given *n*-gram is measured only if it occurs in at least 40 books, in order to reduce the data set to a manageable size (Google n.d.). Google's Ngram collection is only a subset of its Google Books collection, chosen on the basis of the quality of the metadata and OCR. Periodicals are excluded by Google (Michel et al. 2011, 176). In early 2011, Google Ngram included 4% of all books ever published (Michel et al. 2011, 176). By 2012, this had been expanded to 6% (Lin et al. 2012, 170). We used the "English (2019) corpus" (collection), and our procedures for obtaining these data are detailed in appendix A.2.1.

The Google Ngram Viewer is not a perfect measure of citations, for several reasons. First, as noted, the Google Ngram collection includes only a fraction of all books published, and it excludes periodicals. Our measures do not include citations in magazines, newspapers, and so on. Second, it does not measure citations per se but only occurrences of specific phrases. Third, an author's name can be rendered or spelled in multiple ways, yet we select only one spelling.

This limitation on spelling is important because some authors have names that are difficult to identify, forcing us to rely on forms that are not always consistent among authors. For example, Adam Smith's last name is too common by itself, so we counted "Adam Smith" instead. By contrast, it is uncertain whether Kropotkin's first name should be rendered as "Pyotr" or "Peter," so we simply counted "Kropotkin." For every author, we selected the most easily identifiable iteration that was least likely to be conflated with that of another famous individual. Unfortunately, this means that some authors are identified by last name only, while others are identified by first and last names. This may introduce bias because counting "firstname lastname" may undercount some authors' citations, compared to other authors whom we count by "lastname" only.

Some authors were excluded from our main analysis because Ngram offers no way to reliably isolate them from other persons with shared surnames. Unfortunately, this includes Georg Wilhelm Friedrich Hegel (1770–1831), who was cited in our treatment period at a rate roughly comparable to that of his son, the historian Friedrich Wilhelm Karl, Ritter von

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the potential measurement biases from lost records and illegal prints are even larger. This bias may be correlated with each book's author, genre, and language and each country's record-keeping and copyright enforcement.

Hegel (1813–1901).[32] We similarly excluded "Claude Henri de Rouvroy, comte de Saint-Simon," who is variously known as "Henri de Saint-Simon," "Comte de Saint-Simon," and "St. Simon" and is further confounded by at least 10 different geographical regions of France and Canada named "Saint-Simon." Recognizing that the elder Hegel had a substantial intellectual influence upon Marx, we account for the possibility that his exclusion biases our results by running a robustness test that includes "Hegel" as a donor. In appendix A.7, we find that including Hegel does not meaningfully alter our results.

In the face of multiple sources of measurement bias, we assume that Google Ngrams can identify relative rates of change over time. Suppose that Karl Marx was really cited seven times as often as the phrase "Karl Marx" occurred in Google's Ngram collection. If a weighted average of several authors' names reliably predicts outcomes for the name "Karl Marx" before 1917 but not after 1917, we consider this evidence of a treatment effect, which changed the relative citation rate even though we cannot identify absolute levels. In section IV.B.4, we summarize two tests of our identification strategy that are reported in more detail in appendix A.6.

Our procedure potentially controls for unobservable time-varying, author-specific confounders as well. Assuming perfect balance on observed indicator variables, the bias from unobserved shocks decreases as the unobserved shocks become smaller in magnitude and as the preintervention time period becomes longer (Abadie 2021, 400). Pechenick, Danforth, and Dodds (2015) question the validity of using Google's Ngrams because scientific and academic texts have constituted an increasing proportion of Google's collection over time and because Google counts only the frequency at which a phrase occurred in print, not how often that book was read, discussed, bought, or printed. However, as long as any author is as likely to be affected as any other in the pool, the bias should be small.

The chief advantage of Google Ngram is that it is internally valid, and any measurement error is likely to be random and uncorrelated with author. While other measures might be more externally valid, they lack internal cohesion or are subject to more systematic measurement bias.[33]

IV. Results

A. Primary Results

In figure 1, we graph the results of our primary SCM regression. The treated unit is "Karl Marx," all other authors are donors (controls), the pretreatment period is 1878–1916, and the posttreatment period is

[32] Compare "Friedrich Hegel" to "Karl Hegel" in Google Ngram in app. A.7.

[33] Ngram has another advantage as well: it may capture authors who engaged with the ideas of other authors without citing a specific work by title. We thank Ryan Yonk for this point.

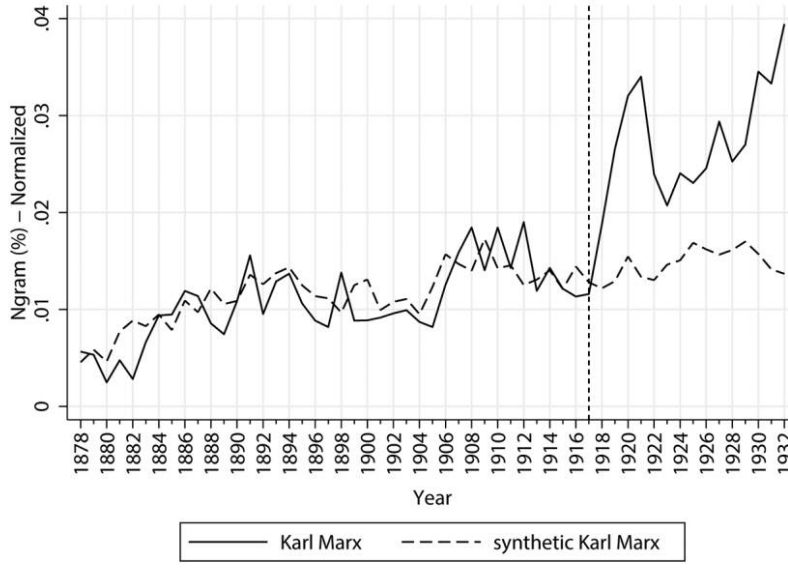

FIG. 1.—Karl Marx Ngram citations in English: actual versus synthetic counterfactual, 1878–1932.

1917–32. The solid line measures outcomes (citations) for the real Marx, while the dashed line displays our synthetic counterfactual. The dashed and solid lines are very similar during the pretreatment period. However, after 1917, they begin to diverge. This indicates a treatment effect caused by the Russian Revolution. By 1932, the real Marx is being cited approximately three times as often as his synthetic counterfactual.[34]

It is worth observing that the outcomes of the real Marx are somewhat erratic, consistent with the history of the Russian Revolution. Marx's citations begin to increase in 1917, temporarily reach a peak in 1921, and then decline until 1923, before increasing almost monotonically. We suggest that this pattern reflects the course of the revolution and its political entrenchment. Furthermore, there had been a previous, abortive socialist revolutionary movement in 1905, referred to by Lenin as the "dress rehearsal" for the events of 1917 (Ascher 1988, 1–2, 2014, 51; Pipes 1991, 4; see app. A.9). Observers may have wondered whether the 1917 revolution would similarly fail, with a return to the status quo ante. The final rise in Marx's citations after 1923 matches closely the culmination of the civil war, when it became most clear that the new communist regime would endure.

[34] In app. A.3, we precisely list these outcomes quantitatively.

TABLE 3
SCM, 1878–1932, English: Synthetic Author Composition

Author	Weight
Ferdinand Lassalle	.520
Rodbertus	.288
Oscar Wilde	.120
Abraham Lincoln	.056
Pasteur	.008
Kelvin	.006
Proudhon	.002

In table 3, we list the author composition of the synthetic Marx. Synthetic Marx is composed of 52.0% Lassalle, 28.8% Rodbertus, 12.0% Oscar Wilde, 0.2% Proudhon, and small amounts of Abraham Lincoln, Louis Pasteur, and Lord Kelvin. Adding to the three socialist candidates we discussed in section II, Wilde's 1891 essay "The Soul of Man under Socialism" espoused a libertarian socialist viewpoint influenced by Kropotkin. In total, socialists contribute 93.0% of the synthetic Marx, confirming the plausibility of our counterfactual analysis.

In figure 2, we input these donor weights from table 3 into Google Ngram Viewer to extend the graph of figure 1 to 2019 (see app. A.3 for details). We would not place great confidence in such a lengthy extrapolation, where the posttreatment period is longer than the pretreatment period. Nevertheless, the results illustrate that the real Marx substantially outperforms his synthetic counterfactual long after 1932.

In table 4, we list the *p*-values for hypothesis testing. The number of placebos indicates how many authors besides Marx were used to generate treatment effects. This number is slightly smaller than the full sample because SCM fails to converge for some donors as placebos. When SCM fails to converge to an optimum solution for one donor, synth_runner gracefully discards this donor and calculates *p*-values using only the treatment effects of those donors whose SCM successfully converges. As discussed above, the joint post std *p*-value is a standardized *p*-value, measured as "the proportion of placebos that have a ratio of posttreatment RMSPE over pretreatment RMSPE at least as large as the average ratio for the treated units."[35] If Marx's treatment effect is genuine, we should expect few placebos to have a ratio larger than his. Our joint post std *p*-value is .047, indicating statistical significance.

We also list the "AEP std" (AEP, standardized) and the "Simes std" (Simes *p*-value, standardized), which can be interpreted similarly to the joint post std *p*-value. The AEP value is .032 while the Simes *p*-value is .083. Finally, we list annual *p*-values, which are statistically significant almost from the outset, beginning in 1918. After 1918, for the one subsequent

[35] Quoting the synth_runner help file.

FIG. 2.—Primary result extended to 2019; generated by the Google Ngram Viewer using the donor weights calculated by SCM.

TABLE 4
SCM, 1878–1932, English: Standardized p-Values

Year	Std p	Placebos	Joint Post Std p	AEP Std p	Simes Std p
Overall		193	.047	.032	.083
1917	.632				
1918	.057				
1919	.016				
1920	.010				
1921	0				
1922	.021				
1923	.083				
1924	.047				
1925	.161				
1926	.088				
1927	.041				
1928	.062				
1929	.083				
1930	.036				
1931	.052				
1932	.031				

year in which the effect is not statistically significant at any level—1925—this lack of significance is likely due to the "spiky" nature of our data. Overall, we find that Marx's treatment effect is both large and statistically significant.

B. Robustness Tests

Citations of Marx appear to have a large and statistically significant treatment effect caused by the Russian Revolution. We nonetheless subject Marx to a series of robustness tests to ensure that the result is genuine. Our robustness tests include (1) replication using an independent Newspapers.com data set, (2) an in-time placebo in which the treatment occurs in 1889, (3) parallel testing of citations in German- and French-language Ngram databases for regional effect, and (4) two tests of our identification strategy, which assumes that we can identify relative rates of change but not levels.[36]

1. Newspapers.com Replication

As noted, one limitation of Google Ngram is that it excludes most periodicals. To compare our Ngram results with print periodicals, we constructed a separate database of 25 authors from the Newspapers.com collection. Authors were selected from a sample of political and socialist

[36] We report additional tests in the online appendix. Appendix A.4 successively restricts the sample to socialists only and then nonsocialists only. Appendix A.5 divides the pretreatment period into separate training and validation periods.

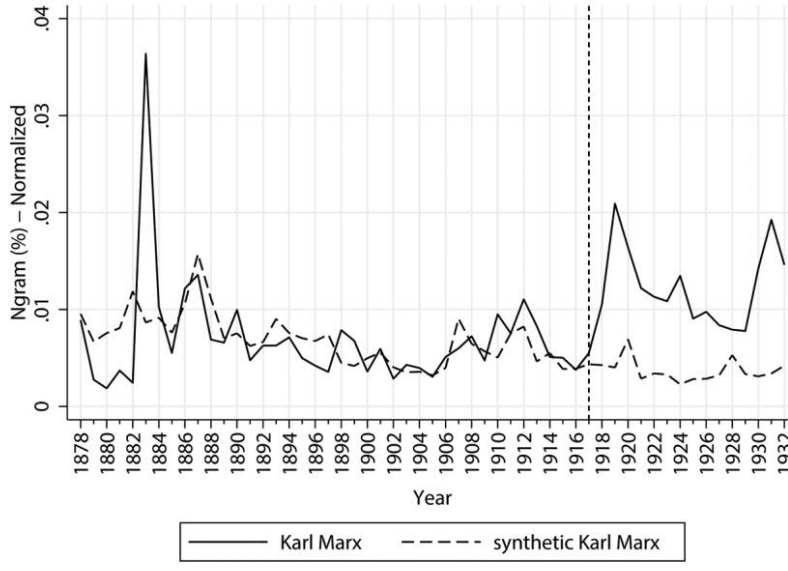

FIG. 3.—Karl Marx Newspaper.com citations in English: actual versus synthetic counterfactual, 1878–1932.

writers in the Ngram database. We calculated their annual citations as a percentage of total scanned newspaper pages for the same year.[37] We then repeated the SCM estimation for Newspapers.com references to Marx in the same period.

In figure 3, we plot the result, and in table 5, we report the *p*-values. We successfully replicate the main Ngram result. The main observed difference is a single-year spike in Marx's newspaper mentions from 1883, reflecting obituaries. Otherwise, the Newspapers.com data set parallels Ngrams in showing a clear post-1917 treatment for Marx.

2. In-Time Placebo Test: 1889 as Treatment

Next, we perform an in-time placebo test. If the 1917 revolution had a genuine effect, then we should fail to find an effect if we spuriously designate treatment time in a different year. We set the treatment year to 1889, so that the end of the treatment period is 1904, just before the failed Russian Revolution of 1905. We expect the synthetic Marx to track the real Marx over both the pre- and posttreatment periods because nothing actually happened in 1889. If we do find a treatment effect in

[37] We describe in detail how these data are obtained in app. A.2.2.

TABLE 5
SCM, 1878–1932, Newspapers.com Data, English: Standardized *p*-Values

Year	Std *p*	Placebos	Joint Post Std *p*	AEP Std *p*	Simes Std *p*
Overall		17	0	.109	.078
1917	.529				
1918	0				
1919	0				
1920	.059				
1921	.059				
1922	0				
1923	0				
1924	0				
1925	.176				
1926	.059				
1927	0				
1928	.353				
1929	0				
1930	0				
1931	0				
1932	.118				

1889, this will be evidence against the genuineness of our 1917 treatment effect.

In figure 4, we depict SCM results with a treatment year of 1889. The synthetic Marx tracks the real Marx during the posttreatment period much closer than in figure 1. In table 6, we list the *p*-values. The joint post std *p*-value is .280, the AEP *p*-value is .463, and the Simes *p*-value is .443.

3. German- and French-Language Citations

Our primary concern has been with Marx's reception in the English-language Ngram database. A question remains as to whether Marx's reception in other languages was similarly affected by the 1917 Russian Revolution, potentially introducing a regional bias to our findings. To address this complication, we repeat our SCM procedure using Ngram data from the German (2019) and French (2019) collections.[38] We omit the "year of translation to English" indicator variable. Note that data for each language collection are separately normalized by Google, so absolute levels cannot be compared. Instead, we can investigate only whether the proportional treatment effects are similar; for example, did Marx's citations grow twofold or not?

In figure 5, we graphically depict German citations in the period 1878–1950, using all authors in our data set. We extend the results period to

[38] Some authors' names are spelled differently in French and German than in English. See app. A.2 for details.

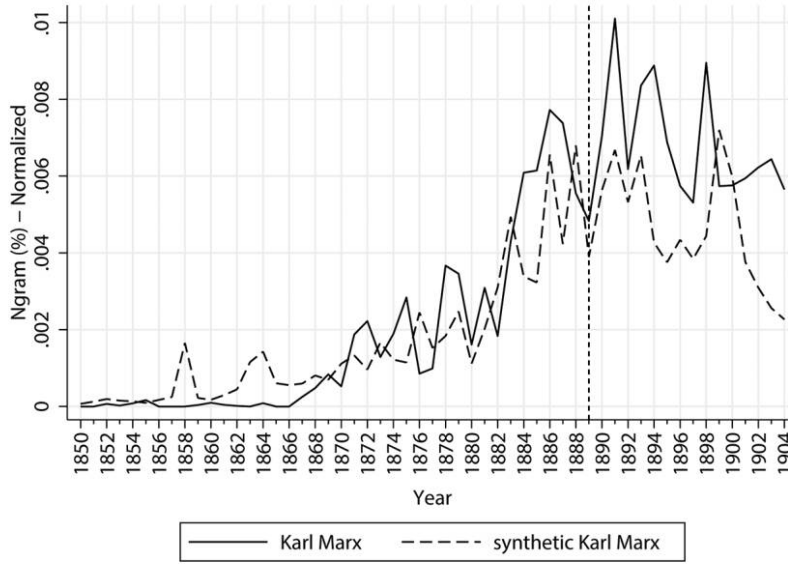

FIG. 4.—1889 in-time placebo. Karl Marx Ngram citations in English: actual versus synthetic counterfactual, 1850–1904.

1950 because of the peculiar citation pattern of the real Marx, which we believe is a consequence of Nazi censorship. We see that until 1933, the real Marx greatly outperforms the synthetic Marx, paralleling our English-language results. However, in 1933, the real Marx begins trending

TABLE 6
SCM, 1889 IN-TIME PLACEBO, ENGLISH: STANDARDIZED *p*-VALUES

Year	Std *p*	Placebos	Joint Post Std *p*	AEP Std *p*	Simes Std *p*
Overall		161	.280	.463	.443
1889	.335				
1890	.292				
1891	.099				
1892	.509				
1893	.255				
1894	.118				
1895	.224				
1896	.435				
1897	.360				
1898	.112				
1899	.342				
1900	.851				
1901	.217				
1902	.168				
1903	.118				
1904	.193				

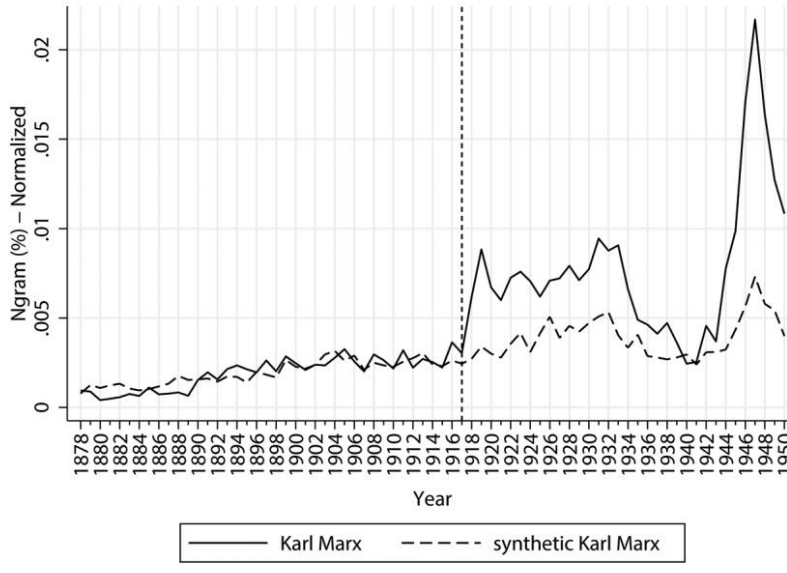

FIG. 5.—Karl Marx Ngram citations in German-language texts (all authors) actual versus synthetic counterfactual, 1878–1950.

downward. This pattern coincides with the Nazi rise to power and continues until the real and synthetic Marx intersect in 1940. In 1941, the real Marx begins ascending again, outperforming the synthetic Marx, and spikes again after 1945—an expected outcome from the establishment of an explicitly Marxist state in East Germany.

In table 7, we list p-values for two periods: 1878–1932 and 1878–1950. We see that the overall p-values are generally significant, but they are more significant for the period ending in 1932 than for the period ending in 1950. Examining the year-by-year p-values, we see that they cease to be statistically significant in 1935 and that they regain significance in 1945. This very nearly coincides with the Nazi period. Similar to our primary result, 1925 and 1926 are the only years between 1917 and 1932 in which the annual p-values are not significant.

The supplemental findings from German-language texts lend further credence to our underlying thesis about the Russian Revolution. Much like 1917, they illustrate two dramatic shifts in Marx's reception in direct response to political events. In this sense, the 1933 Nazi suppression of Marx and the post-1945 rebound might be thought of as additional treatment effects where intentional state actions played a determinative role in shaping citation patterns.

TABLE 7
SCM, 1878–1950, GERMAN-LANGUAGE CITATIONS: STANDARDIZED *p*-VALUES

	All Authors		German Authors Only	
	Through 1932	Through 1950	Through 1932	Through 1950
No. placebos	203	203	81	81
Joint post std *p*	.069	.094	.062	.148
AEP std *p*	.031	.062	.032	.068
Simes std *p*	.063	.134	.040	.084
Year:	Std *p*			
1917	.374	.374	.272	.272
1918	.010	.010	.012	.012
1919	.005	.005	0	0
1920	.020	.020	.025	.025
1921	.030	.030	.012	.012
1922	.020	.020	.012	.012
1923	.059	.059	.086	.086
1924	.015	.015	.012	.012
1925	.153	.153	.111	.111
1926	.163	.163	.062	.062
1927	.064	.064	.074	.074
1928	.084	.084	.049	.049
1929	.094	.094	.062	.062
1930	.099	.099	.049	.049
1931	.074	.074	.049	.049
1932	.084	.084	.062	.062
1933		.059		.074
1934		.084		.099
1935		.463		.235
1936		.227		.185
1937		.266		.210
1938		.153		.185
1939		.473		.259
1940		.567		.259
1941		.862		.259
1942		.241		.160
1943		.631		.284
1944		.138		.198
1945		.089		.123
1946		.084		.160
1947		.059		.099
1948		.059		.123
1949		.099		.148
1950		.064		.136

In figure 6, we repeat the procedure, except that we restrict our donor pool to authors whose original language was German.[39] This allows us to investigate the possibility of regional bias arising from the list of authors. We see that the synthetic Marx is always beneath the real Marx during the posttreatment period. Restricting our examination to strictly German authors slightly alters the resulting *p*-values. Examining the year-by-year

[39] All indicator variables concerning language of publication are naturally omitted.

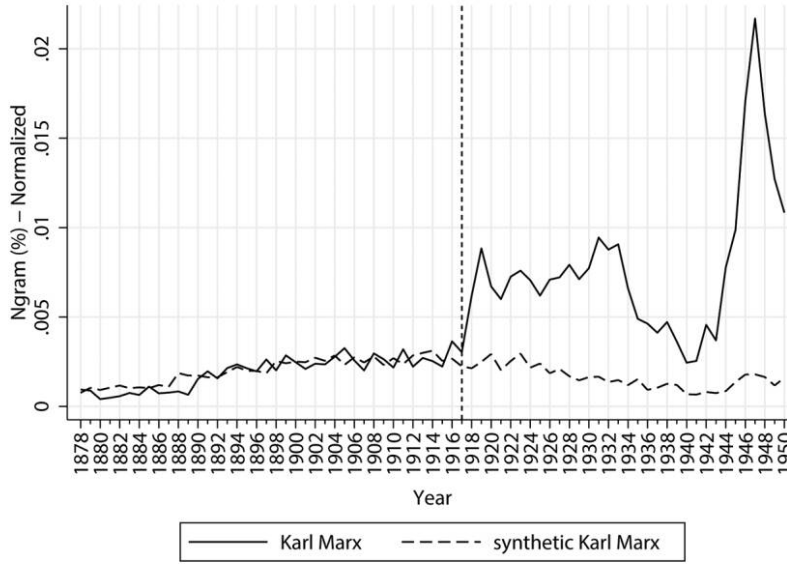

FIG. 6.—Karl Marx Ngram citations in German-language texts (German authors only): actual versus synthetic counterfactual, 1878–1950.

p-values, we see that statistical significance is lost in 1935. Toward the end of the period (1950), the *p*-values approach conventional levels of significance but do not quite pass the threshold. In each examination of German-language sources, Marx's citations increased as a consequence of the Russian Revolution. This finding is consistent with our main thesis and indicates that regional biases do not confound the observed effects of 1917 when constrained to Marx's native language.

Next, we proceed to test using citations in the French language. In figure 7, we depict French citations in the period 1878–1932, and in table 8, we list the *p*-values. Graphically, we can see that there is no treatment effect, because the synthetic Marx closely tracks the real Marx in both the pretreatment and posttreatment periods. Indeed, the joint post std *p*-value is .605, and the AEP and Simes *p*-values are even larger.

Unlike the English and German citations patterns, the Russian Revolution appears to have had no effect on French texts. Future research may investigate this finding. One plausible explanation may look to older established socialist traditions in France. Historians of economic thought have long noted the presence of proto-Marxian ideas in the works of radical French revolutionary François-Noel Babeuf (1760–97) (Weatherly 1907; Higonnet 1979). French socialism gained further political salience in the nineteenth century under thinkers such as Saint-Simon, Fourier,

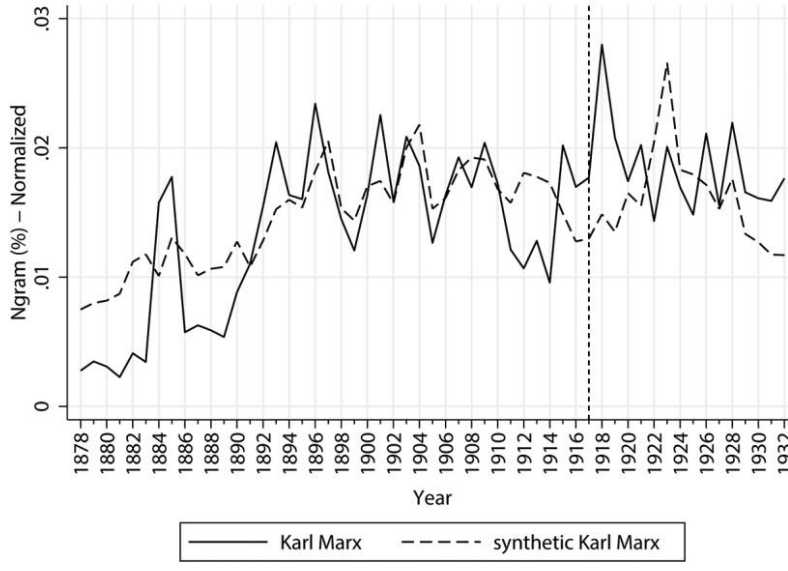

FIG. 7.—Karl Marx Ngram Citations in French-language texts (all authors): actual versus synthetic counterfactual, 1878–1932.

Blanqui, and Proudhon. Aided by events such as the Paris Commune of 1871, French-language texts may exhibit greater ambiguity regarding the position of Marx as a contemporary commentator within an existing socialist literature—a subject that continues to be debated among intellectual

TABLE 8
SCM, 1878–1932, FRENCH-LANGUAGE CITATIONS: STANDARDIZED *p*-VALUES

Year	Std p	Placebos	Joint Post Std p	AEP Std p	Simes Std p
Overall		195	.605	.647	.738
1917	.338				
1918	.046				
1919	.149				
1920	.836				
1921	.400				
1922	.308				
1923	.323				
1924	.851				
1925	.656				
1926	.467				
1927	.944				
1928	.487				
1929	.538				
1930	.595				
1931	.579				
1932	.385				

historians (Harison 2007; Nicholls 2019). Against the backdrop of this existing tradition, Marx's entry into French-language texts might be expected to occur gradually and without the clear treatment effect provided elsewhere by the Russian Revolution. France nonetheless remains an outlier when compared to both English and German citation patterns.[40]

4. Changing Levels

We considered the possibility that our results may be an artifact of imprecise citation levels stemming from the limitations of Ngram data. Ngram Viewer identifies only phrases, and because of the idiosyncrasies of names and spellings, we were forced to mix "lastname" with "firstname lastname" in our sample. This may advantage some authors over others because we would expect that, ceteris paribus, "lastname" occurs more often than "firstname lastname." For example, an author cited as "Proudhon" or "Kropotkin" may be advantaged over "Karl Marx."

Our identification strategy has been the assumption that as long as we can reliably identify within-author relative changes over time, we can identify a treatment effect, even if we cannot identify absolute levels. However, this assumption warrants robustness testing.

In appendix A.6, we implement two tests that change the levels of citations while approximately preserving their relative rates of change. In appendix A.6.1, we use outcomes for "Marx" rather than "Karl Marx," because "Marx" is cited almost exactly seven times as often as "Karl Marx" in all time periods. In appendix A.6.2, we normalize all authors' outcomes to exactly 1 in each of the 39 pretreatment years. In any given year, every author is put on a new level on par with every other author, changing their levels but not their relative rates of change over time. This test produces 39 sets of treatment effects and p-values, so we implement several forms of meta-analysis. Both of these tests estimate a statistically significant treatment effect similar in magnitude to our main result. Therefore, we are confident in our identification strategy.

V. Conclusion and Interpretation

Our findings provide clear empirical evidence that the scholarly mainstreaming of Karl Marx is intimately connected to the events of the Russian Revolution of 1917. Our results are robust to a variety of tests and specifications. Before treatment, the real Marx was cited approximately as often as his synthetic counterfactual. After treatment, the real Marx was cited approximately 2–3 times as often. This evidence helps to explain how Marx, a

[40] In app. A.8, we provide more detail about German-, French-, and Spanish-language citation patterns.

relatively obscure figure in his own lifetime and an outsider to mainstream economic analysis for the first 3 decades after his death, acquired a preeminent position of scholarly influence across multiple noneconomic disciplines in the twentieth century. As intellectual historians have long hinted, the political successes of Lenin played an important role in elevating and securing Marx's academic stature.

In interpreting our findings, we acknowledge several limitations to citation analysis as a measure of Marx's impact. While the treatment effect of the 1917 Russian Revolution is unambiguous, these events were also intertwined with a rapid succession of related political developments that further contributed to Marx's mainstreaming. The failed Spartacist Uprising of January 1919 in Germany and the founding of an academic home for a Western Marxist scholarly tradition (the Frankfurt School) in 1923 illustrate the complex causality of Marx's influence in the immediate posttreatment period. In both cases, the Soviet Union directly influenced successive adaptations of Marxian theory: first as an example for other revolutionary movements to follow and again through Soviet-subsidized academic collaborations on Marx's collected works. At the same time, however, these events reflect a pretreatment salience of Marx's ideas within radical intellectual circles that accelerated shortly after the Bolshevik uprising. Our findings, therefore, should not be interpreted to suggest that Marx would have drifted into obscurity in the absence of the Russian Revolution's outcome. Rather, a plausible counterfactual history might see Marx's works developing into a more specialized area of academic study amid multiple competing socialist traditions. Political adaptations of socialist doctrine in the twentieth century might have also evaluated Marx within a wider range of competitors, including nonviolent approaches that were effectively crowded out by the Soviet elevation of Marxism. Lassallian social democracy in Germany, Georgism in the United States, and the Fabian Society in Britain all exerted some level of influence through electoral politics, emphasizing varying degrees of non-Marxist socialist theory. In this alternate universe, we might accordingly expect to find a more diffuse assortment of socialist and quasi-socialist political movements, though no single dominant figure.

Our results nonetheless present two important implications for the understanding of Marx's academic influence in the present day. First, Marx's intellectual reputation received an important boost from the chance shock of a political event wherein revolutionary figures—acting in Marx's name and aided by both luck and the missteps of their opposition—seized control of the government of a major world power. While this boost alone does not explain the entirety of Marx's later academic reception, it provided a primary impetus for Marx's elevation into the academic mainstream, despite an earlier rejection of his theories among professional economists. Importantly, the boost to Marx's reputation after

1917 vastly overshadows other surrounding developments that may have increased Marx's visibility, including the earlier failed Russian Revolution of 1905 and nonrevolutionary labor movements before 1917 such as the Social Democratic Party in Germany.[41]

Second, our findings renew the challenging questions of how social scientists should interpret Marx's reputation in light of its inextricable connections to the Soviet Union's troublesome historical record. While much of the discussion surrounding the bicentennial of Marx's birth sought to differentiate consideration of his modern relevance from the totalitarian track record of twentieth-century communism, the elevation of Marx's stature provided by the Russian Revolution illustrates that the two cannot be easily separated. It is insufficient to portray Soviet communism as an aberration from true Marxist doctrine, as the intellectual mainstreaming of Marxist theory is intimately intertwined with the political establishment of the Soviet Union. In assessing how this historical link shapes current interpretations of Marx, one must grapple with the implications of Marxism's early twentieth-century intellectual ascendance as a Soviet political project.

Data Availability

Data and code replicating the results in this article can be found in Magness and Makovi (2022) in the Harvard Dataverse, https://doi.org/10.7910/DVN/S14QCI.

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[41] On the Russian Revolution of 1905, see app. A.9.

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