The Politics of the American Knowledge Economy

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Abstract

Many scholars now accept that, at some point during the last forty years, the United States transitioned from a Fordist economy rooted in mass production to a post-Fordist "knowledge economy." And yet, there is surprisingly little consensus about how we should define or characterize the American knowledge economy (AKE) we now inhabit. At the same time, though the AKE has become a subject of increasing interest for political scientists, especially those studying American political economy, we still know relatively little about how American political institutions shaped knowledge economy development in the United States, about the mechanisms by which the knowledge economy transition has exacerbated various forms of inequality, and about the relationship between the knowledge economy transition and the Democratic Party's dramatic shift in its attitude towards antitrust enforcement. In this four-paper dissertation, I address each of these questions.

In the first paper, I argue that we should understand the AKE not as a growth regime geared towards the production of knowledge, per se, nor as a growth regime driven by middle-class demands for policies that promote human capital formation like education, but as a growth regime organized around the production and utilization of commodified technological knowledge or intellectual property (IP). Drawing predominately on historical sources and archival data, I show that the knowledge economy became the Democratic Party's alternative to Keynesian macroeconomic management in the 1980s and 1990s, but American political institutions—especially bi-cameralism—forced the Party to abandon policies that would have given the government a

significant role in shaping AKE development in favor of market-oriented policies to strengthen and expand the geographic reach of IP rights. In this way, the AKE developed in a way that responded more to the demands of organized business interests and less to the demands of decisive middle-class voters.

In the second paper, I argue that this distinctive form of knowledge economy exacerbates geographic, economic, and political inequalities and intersects with increasing financialization in doing so. Drawing on novel time series data and prior studies of inequality, I argue that the Democratic Party abandoned policies that would have stoked knowledge economy formation across more geographic space in favor of policies that magnified the pre-existing advantages of those regions that benefited from Cold War defense spending. The Party also abandoned institutions and policies that might have promoted greater knowledge economy participation among the working and middle classes in favor of policies that confer enormous benefits on relatively small groups of already affluent workers. And in a setting of rising financialization, the businesses that produce valuable IP have distinguished themselves, even when compared to other large companies, in their power to charge high markups, in their willingness to spend huge sums acquiring potential competitors, and in their ability to avoid paying taxes.

In the third paper, I investigate whether the Democratic Party's turn towards the knowledge economy has delivered electoral benefits among the knowledge economy's most valuable constituency: American inventors. Drawing upon a unique dataset showing campaign contributions made by more than 30,000 American inventors from 1980 to 2014, I show that the Democratic Party has become much more competitive within this constituency, but that American political institutions—especially majoritarian elections in single-member districts—have caused most inventor donations to come from only a few regions and flow to only a few candidates, thereby limiting their electoral impact. Similarly, while American inventors that donate to Democrats have become

more liberal, that behavioral shift is driven mostly by regional changes as American inventors who contribute to Democrats increasingly find themselves working and living in liberal enclaves.

In the fourth paper, I explore how the Democratic Party's turn towards the knowledge economy has influenced its approach to antitrust enforcement. In a series of empirical exercises utilizing observational data, I show that the federal government began challenging large mergers and acquisitions at much lower rates in 1981 and that subsequent Democratic presidents did not revert to more robust enforcement. This shift in administrative priorities has delivered concrete economic benefits to those regions that participate heavily in the knowledge economy, and the younger and more affluent people who work in these regions have in turn developed somewhat unique preferences with respect to antitrust enforcement: in all other states, increasing Democratic partisanship is associated with increasing support for more robust enforcement, but in knowledge economy states, Democratic partisanship leads to more opposition.

Taken together, the findings in these papers have a few broader implications for the study of American political economy. Foremost, the findings suggest that American political institutions have the potential for "double marginalization" in economic policymaking, first by confining the policy choice set to those "neoliberal" policies that enhance existing geographic disparities then by confining the electoral benefits to those candidates who represent regions with pre-existing advantages. In this sense, AKE development can be seen as a case study in the ways that American political institutions can inhibit the formation of cross-regional coalitions needed to undertake ambitious economic reforms. The findings also reinforce prior work in political geography, especially that of Jonathan Rodden, in showing that AKE development has more strongly influenced regional rather than individual identities and political behaviors. Finally, the findings also suggest that partisan realignment, and not just federal policymaking, can be driven by policy feedbacks. As the Democratic Party became the party of technology and relied on policies that are known to

exacerbate market power to promote technological change, the regions that benefited from these policies have developed distinct policy preferences that may inhibit the Party's ability to pursue needed reforms.

Contents

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1 The Politics of the American Knowledge Economy

1.1 Introduction

Though many scholars now accept that, at some point in the last forty years, the United States transitioned from a Fordist economy rooted in mass production to a post-Fordist "knowledge economy," there is surprisingly little consensus about how we should define or characterize the knowledge economy we now inhabit. One view, popular among economists since the emergence of new growth theory in the 1990s, suggests that the knowledge economy is rooted in rapid technological change and the prospect that firms and nations can generate competitive advantages by focusing on the generation of ideas rather than the manufacturing of products (Helpman, 2004, 43–46). In this perspective, though many forms of state action can promote technological change, the most important policies are those pertaining to intellectual property (IP), as these policies surmount a free-rider problem endemic to the innovation environment: firms and nations that invest in developing new technologies often struggle to appropriate the economic benefits of those investments in the absence of some form of legal protection because subsequent actors can simply copy the first mover (Scotchmer, 2004, 34-39). Because certain forms of IP, especially patents and trade secrets, resolve this problem and enhance the incentive to invest in technological development, "Economists have long seen the patent system as a crucial lever through which policymakers affect the speed and nature of innovation in the economy" (Lerner, 2009). From this perspective, one would accordingly expect the knowledge economy transition to intensify the degree to which business managers and government actors come to view intangible IP, rather than labor and machines, as the "key economic asset that drives long-run economic performance" (Jaffe and Trajtenberg, 2002, 1; Haskel and Westlake, 2018).

Despite its prevalence in economic thinking, the view that the knowledge economy is

organized around the production and utilization of IP has gained only marginal acceptance among political scholars (but see Sell, 2003; Schwartz, 2020). Rather, the knowledge economy is more often conceptualized as a byproduct of technologically-based shifts in the occupational structure and the increasing economic and political power of educated workers, an idea that dates back at least to Daniel Bell's theory of the post-industrial society (Bell, 1974). Accordingly, some follow Bell in relating the knowledge economy to the "service transition," the long gradual shift in the share of national income flowing from the provision of services rather than the production of goods, and to post-industrialism more broadly (Ansell and Gingrich, 2022). Others contend that IP plays only a marginal role in the knowledge economy because technology is more firmly rooted in the skills of educated workers (Iversen and Soskice, 2019). Though also rooted in economic thinking, these perspectives borrow less from new growth theory and more from the theory of skill-biased technological change, in which technological advances in computing asymmetrically reward those middle-class, better educated workers who can use computers to become more productive (Iversen and Soskice, 2019, 12-13, 39-41; Goldin and Katz, 2008). To the extent such theories identify an economic asset at the root of the knowledge economy, they generally point to human capital or "skills" and downplay the role of IP (Iversen and Soskice, 2019, 2-3, 12-13, 31).

If there is disagreement about whether the institutions of the American knowledge economy are geared towards IP production or human capital formation, there is also disagreement about the political forces shaping American knowledge economy development. Two prominent theories, those associated with Iversen and Soskice (2019) and Hacker et al. (2022), agree that knowledge economies are politically constructed and that the state plays a major role in shaping knowledge economy development. But the theories have starkly different views on which actors have political power in relation to the state and the ways in which those actors have shaped the institutions of the American knowledge economy. Iversen and Soskice (2019) contend that knowledge economy

policies are produced at the behest of decisive middle-class voters who strongly demand policies that promote human capital formation. They write, for example, that because the "advanced sectors" of the knowledge economy are "skill intensive," education is "by far the most important path" to inclusion in the knowledge economy, and so decisive aspirational voters who are invested in the knowledge economy or want their children to participate in it support policies that favor these sectors, "notably through investment in education and research and development, coupled with strong competition rules" (Iversen and Soskice, 2019, 20-21). The authors also contend that, when combined with the geographic immobility of knowledge economy workers on which the advanced sectors depend, this intense electoral connection means that capital does not have structural power and that business interests are therefore politically weak (Iversen and Soskice, 2019, 11-12, 19, 39).

In contrast, a group of scholars working to establish a new field of American political economy suggests that American political institutions are unique in ways that give a strong advantage to organized business interests (Hacker et al., 2022). For this group of scholars, American political institutions are exceptional in the extent to which they divide political power among multiples venues, both horizontally between branches of government and vertically between the national and sub-national levels of government. In this perspective, separation of powers, bicameralism, federalism, the representation of geographic entities in the national legislature, super-majoritarian requirements like the filibuster, an entrenched two-party system, extreme decentralization in the bureaucracy, and a uniquely strong and independent judiciary–these and other characteristics of American political institutions converge to make policy change extremely difficult in the United States, especially when it comes to national policies that shape the macroeconomic order. These factors also give a decisive advantage to organized interests over ordinary voters by opening multiple venues to contest proposed policy changes and defend the status quo, especially for those organized *business* intests that have the resources and patience to navigate the nation's complex

institutional landscape and repeatedly defend their interests over long time frames. Accordingly, "despite frequent elections and the valorization of representative government, voter influence in American politics is highly mediated and conditional" (Hacker et al., 2022, 3). These scholars also contend that these forces explain why the United States has lost its dominant position in providing key public goods that promote knowledge economy development, like higher education and the public financing of research and development (Hacker et al., 2022, 41-42; Barnes, 2022).

The key claim advanced in this chapter is that, when we focus on the policy outputs and institutional changes that facilitated the knowledge economy transition, the theory advanced by the American political economy group better fits the historical data. During the crucial years of knowledge economy formation, from 1980-1994, many of the policies demanded by aspirational middle-class voters, from increased spending on research and development or higher education to more robust forms of industrial policy, failed to materialize while the policies demanded by technology firms and their business managers, chiefly patent reform and decreased antitrust scrutiny, enjoyed easy bi-partisan support. Iversen and Soskice's theory of advanced capitalist democracies does describe some of what happened within the Democratic Party in the United States, as some within the Party tried to advance policies that had broad appeal to highly educated, increasingly suburban, middle-class constituents. But from 1980 to 1994, the Democratic Party enjoyed unified control over government in only two years and faced significant obstacles to policymaking even then. Accordingly, in a setting of divided government and an increasing partisan divide over the proper role of the state in managing the macroeconomic order, Democratic aspirations were effectively narrowed to a subset of market-oriented reforms that would strengthen and expand the global reach of IP rights and reduce antitrust scrutiny of high-tech businesses. It is in this sense that the American knowledge economy (AKE) is organized around the production and private sector utilization of IP and not human capital formation.

The argument can be summarized pictorally with the four graphs displayed in Figure 1, each of which shows the time series evolution of an important knowledge economy policy indicator for the sixty year period between 1960 and 2020. Panel A shows that per capita tax appropriations for higher education (spending per adult aged 18-24) grew dramatically during the prior Fordist period, but grew much more slowly between 1980 and 1994 and ultimately plateaued around the year 2000. Similarly, Panel B shows that the average cost of tuition and fees at four-year colleges relative to the median family income declined during the prior Fordist period but then increased dramatically after 1980. Together, these two graphs suggest that, to the extent there was a period in which decisive voters succeeded in demanding increased public financing to make higher education more affordable for the median family, it was the prior Fordist period. When Ronald Reagan took office in 1981, a majority of adults in nationally representative surveys believed that the nation was spending too little on improving the nation's education system (a margin that grew to 67 percent during his tenure) and much larger majorities of registered voters (78 percent) opposed seeking a balanced budget if it meant spending less on education.[1] And yet these demands failed to materialize into policy changes that would make a college education more affordable for the median family. Similarly, Panel C shows that federal outlays as a share of the total budget (the trends are similar when shown as a share of GDP) declined substantially after the mid-1960s and that trend has continued to the present day. In these and other ways, as the knowledge economy transition accelerated, the U.S. government failed to meaningfully respond to the demands of aspirational middle-class voters in the way predicted by Iversen and Soskice (2019). But elected officials were capable of generating bi-partisan consensus in favor of patent reform, as described

[1]The Roper Organization, Roper Reports 1981-01: Politics/Media/Environment/Business, Question 9, USROPER.81-1.R03G (Cornell University, Ithaca, NY: Roper Center for Public Opinion Research, 1980); National Opinion Research Center General Social Survey 1989, with funding from the National Science Foundation, Question 2161, USNORC.GSS89.R069G, (Cornell University, Ithaca, NY: Roper Center for Public Opinion Research, 1989); Time Magazine, Yankelovich/Time Magazine Poll: Time Soundings–Economy/Reagan/Foreign Affairs, Question 48, USYANK.818609.Q09EG, Yankelovich, Skelly & White, (Cornell University, Ithaca, NY: Roper Center for Public Opinion Research, 1981).

herein, and the outpouring of new legislation and policy they passed dramatically reversed the long slow decline in domestic per capita patent applications that characterized the prior Fordist period, as shown in Panel D.

In the argument that follows, I adhere to a long tradition in comparative political economy by assuming that modes of economic production (or growth regimes) are politically negotiated, and I turn to the historical record to understand the political moment in which the idea of a knowledge economy took hold in American politics and to analyze the ways in which that political movement altered central institutions of American political economy (Hall and Soskice, 2001; Hall, 2019). The analysis reveals, first and foremost, that the AKE is not about the production of knowledge per se—which was equally important during the Fordist era and the Cold War—nor is it a growth regime geared towards increasing economic opportunities for the electorate through education and training. It is instead a growth regime organized around the production and private sector utilization of IP. Political representatives remained committed to producing technological knowledge to maintain military supremacy and produce economic prosperity in both periods. Where the AKE differed was in the political consensus about who would own and control the dissemination of that knowledge. Accordingly, I define the AKE as a politically negotiated plan for generating economic prosperity wherein the production of *commodified* technological knowledge, or IP, is the primary means for achieving economic development.

Beyond identifying the relationship between the AKE and IP, an analysis of AKE development produces other important insights for political scholars. I will emphasize three such contentions in the argument that follows. The first is that, while the AKE ultimately generated strong bi-partisan support, the Democratic Party was always its most forceful advocate. In the crucible of the 1970s and early 1980s, a neoliberal faction within the Democratic Party—the "Atari Democrats"—successfully pushed the Party to embrace the knowledge economy as an alternative

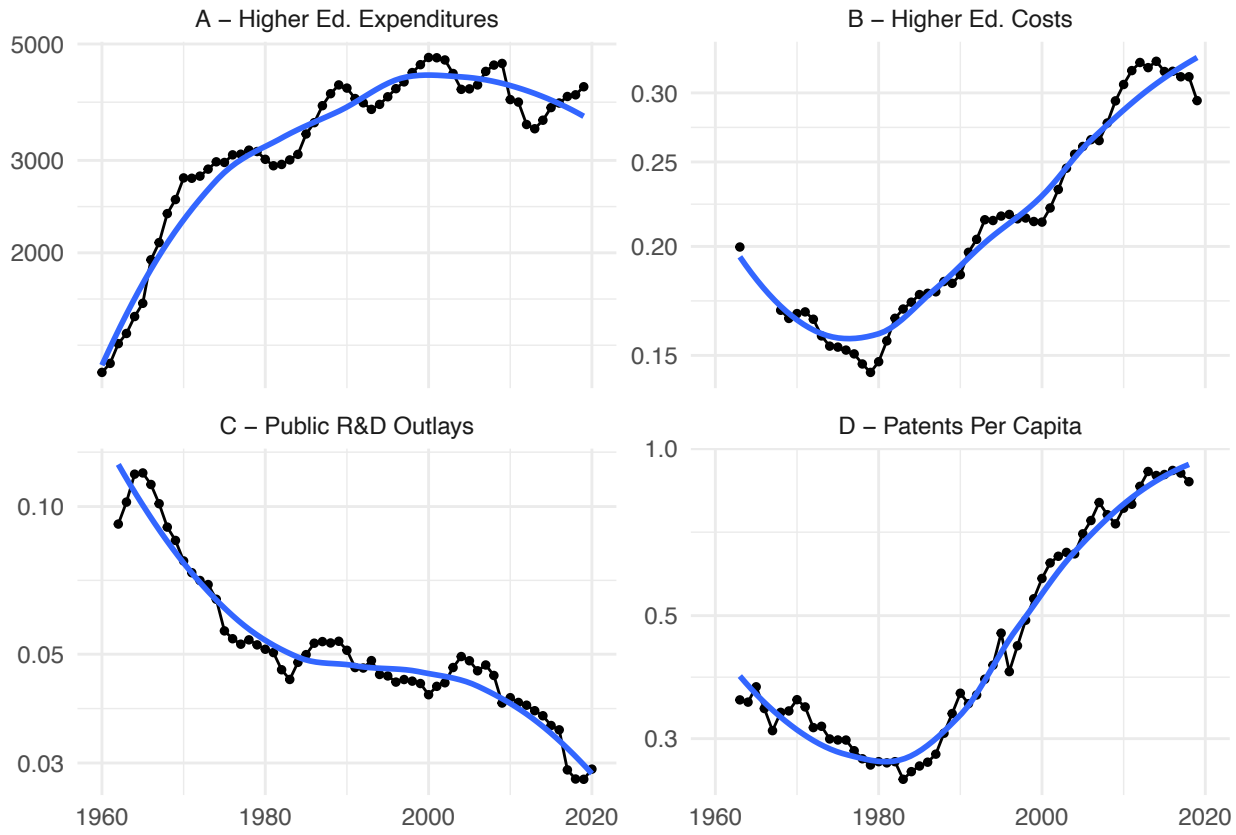

Figure 1: Each panel in this figure displays a time series showing how various economic indicators evolved between 1960 and 2020. Panel A shows total state tax appropriations for higher education at the state level, in 2019 dollars, per collage age adult (18-24). Panel B shows the average undergraduate tuition and fees paid to degree granting institutions as a percentage of the national median family income. Panel C shows federal outlays for research and development as a share of the total budget. Panel D shows the annual number of utility patents of U.S. origin applied for on a per capita basis (patents per thousand people). The vertical axes in all plots is displayed on the log scale to make it easier to visualize changes within periods. The blue line in each plot is a smoothed representation of the data that enables better visualization of the underlying trends. Higher education expenditures come from annual Grapevine reports housed by the College of Education at Illinois State University. Data on the population (both the college age population and total population) and the median family income comes from the Federal Reserve Bank of St. Louis. Data on undergraduate education costs comes from the 2020 Digest of Education Statistics housed by the National Center for Education Statistics, Table 330.10. Data on federal research and development outlays comes from the Historical Trends in Federal R&D datasets maintained by the American Association for the Advancement of Science. Annual patent data comes from the U.S. Patent Statistics Chart of the U.S. Patent and Trademark Office.

to Keynesianism that was distinct from the Republican alternative, which was oriented around market fundamentalism. Their initial visions were relatively ambitious as they saw technology not only as a means to provide hope for communities experiencing deindustrialization but also as a means to address social problems like environmental degradation and resource depletion. But those more capacious visions of the AKE foundered in a divided government led by a President who believed the state had a limited role to play in a capitalist society. The consensus that emerged therefore centered on a much more limited set of market-oriented reforms to strengthen and expand IP rights. The "lost alternative" of this formative period, from 1980-1994, is one where the state could have played a much stronger role in facilitating and harnessing technological development to produce desirable social outcomes (Orren and Skowronek, 2004, 66). Some of the most politicized moments of AKE development involve Democratic attempts to recapture this lost alternative, as President Clinton discovered with the Advanced Technology Project and President Obama discovered with Solyndra (Negoita, 2011; Stephens and Leonnig, 2011; Schow, 2012).

The second contention is that, in addition to Democratic Party leaders, IP producers and the subset of professionals that service IP producers, like IP attorneys and venture capitalists, are the key political actors in the story of AKE development, not decisive middle-class voters. Though knowledge economy rhetoric naturally offers much to those who value education as a source of status and a vehicle for economic mobility, and though this made the knowledge economy more attractive to Democratic rather than Republican Party officials in the 1980s, political discourse about the AKE in its formative years was fundamentally about identifying the decisive businesses, not the decisive voters, that would restore the nation's military and economic supremacy. Accordingly, organizations representing IP producers, not middle-class voters, played a pivotal role in altering central institutions of American political economy—from the courts, to universities, to institutions for negotiating multilateral trade agreements—to hasten AKE development.

The lobbying successes that IP producers enjoyed from 1980 to 1994 are somewhat striking and counter-intuitive because IP producers are an extremely heterogeneous bunch. Private sector IP producers hail from many different industries and sectors of the economy and include brand name (Pfizer and Merck) rather than generic drug companies, the designers of genetically modified plants and seeds (Monsanto and DuPont) rather than farmers, and a host of well-known internet search (Google), software (Microsoft), and computer technology (IBM and Apple) companies. But universities and the consortia in which they partner with private firms are also IP producers. Despite their diversity, IP producers are united by a common interest in maximizing the rents they can generate from their most important capital asset, their IP.[2] Bound by this common interest, and backed by political leaders who believed the nation's economic and military supremacy depended on that same outcome, IP producers successfully negotiated dramatic changes in the institutions of American political economy[3]. And these institutional changes, in turn, dramatically reversed the slow reduction in domestic IP production that unfolded throughout the 1960s and early 1970s (see Figure 1 Panel D) and which symbolized, for many, American technological decline.

A third insight is that, by making AKE development depend so intensely on IP, Democratic Party leaders all but had to abandon their Party's historical animosity towards rising industrial concentration and market power. The ideological pressures on the Party to jettison its historical commitments to robust antitrust enforcement came from several quarters, including a broader

[2]Patents on new technologies have value because they provide, for a limited time, a legal monopoly within a technological domain. The monopoly power inherent in each patent therefore provides its owner or producer with a temporary opportunity to generate rents or substantial economic returns beyond what would otherwise be observed in a more competitive economic environment (Stiglitz, 2013, 54). Though a single blockbuster patent can confer tremendous economic power to its owner, a more conventional source of power lies in the ability of corporations to aggregate many patents into large portfolios, either through sustained in-house research and development or by purchasing or licensing patents developed by other firms. While a startup firm may develop one or a handful of patents, the IP producers that dominate the AKE today hold tens of thousands of patents.

[3]The state's participation makes it difficult to raise causal claims about business influence, but the story of IP producer lobbying from 1980-1994 potentially contravenes those studies which find that business interests have limited influence on government policy, that business power depends on economic crisis, or that business' lobbying successes in the 1980s were mostly defensive (Baumgartner et al., 2009; Vogel, 1989; Waterhouse, 2014). On the importance of the counterfactual perspective, see Carpenter and Moss (2014).

neoliberal critique that global integration, rather than government oversight through antitrust agencies, would better secure the conditions needed to keep American businesses engaged in intense competition (Greenspan, 1986; Thurow, 1980, 145-53). But the Party's newly developed commitments to the AKE also motivated this shift. When President Reagan took office, the two biggest antitrust suits that remained on the books were those against technological leaders AT&T and IBM, and Reagan's top antitrust official quickly dispatched with both (Stoller, 2019, 386-89). When Democrats regained the presidency in 1992 and had the opportunity to enhance antitrust enforcement, the political consensus behind the AKE had gathered substantial momentum and companies like AT&T and IBM had become the U.S. equivalent of national champions. After going to such great lengths to broaden and strengthen IP rights to increase the global market power of the nation's technology titans, the Party could not reasonably restore a system of more interventionist antitrust oversight that might halt the titans' progress. The ideological tension created by this aspect of AKE development continues to generate intra-party conflict today, as progressive reformers call for breaking up some of the nation's biggest technology firms.

Many popular accounts of the Democratic Party's turn towards the knowledge economy emphasize the work of the New Democrats, led by Bill Clinton, after his victory in the presidential election of 1992. Admittedly, the Democratic Party's relationship to Silicon Valley was fully evident by the late 1990s when John Doerr, one of the nation's most prominent venture capitalists, had the Vice President's personal phone number on his speed dial and routinely organized teams of high-tech business managers to lobby the Clinton administration on everything from securities litigation reform and stock-option accounting to H1-B visas and charter schools (Miles, 2001). But in this chapter, I view Clinton's victory in 1992 as the logical culmination of political forces that came into being roughly 20 years earlier when George McGovern won the Democratic Party's nomination in the presidential race of 1972. Those forces produced substantial institutional change

hastening AKE formation during the Reagan and H.W. Bush administrations, but had mostly played out by the time Bill Clinton took office.

The argument is organized as follows. In Section 1.2, I characterize the "historical site of change" encapsulated by the post-war consensus on macroeconomic policy and technological development, emphasizing the network of inter-related institutions that this consensus produced (Orren and Skowronek, 2004, 21). To emphasize that technological innovation was extremely important during this period, I will refer to this institutional matrix collectively as the American knowledge society (AKS). In Sections 1.3 and 1.4, I show how Atari Democrats and IP producers substantially altered this institutional matrix to hasten AKE development focusing on three different geographies of political activism. Though the AKE is mostly a product of national politics, it is situated within a global knowledge economy from above and is abutted by entrepreneurial states from below. The history of AKE development conveyed in this section supports the claim that the AKE is fundamentally about IP, that Democratic Party officials and IP producers played a pivotal role in designing the institutions that continue to shape AKE development today, and that the Democratic Party's turn towards the AKE forced it to abandon its past concerns about market power. In lieu of analyzing a single component of AKE development or offering a single in-depth case study, I survey multiple important institutional changes to provide an overarching framework for understanding AKE development that might motivate future studies in greater historical depth. In Section 1.5, I conclude by summarizing the argument and suggesting ways in which contemporary politics is still shaped by the difficult political choices and outcomes generated in the AKE's formative years.

1.2 Political Institutions of the American Knowledge Society

The post-war political consensus on economic policy and technological development, and the institutional matrix that this consensus produced, has nine major components, which are summarized in Table 1. First, in terms of macroeconomic management, both parties relied primarily on Keynesian tools for increasing aggregate demand, like robust social welfare policies that would increase consumption. In doing so, both parties were guided by the belief that these tools would create an economic environment conducive to maximizing aggregate private sector investments in research and development (Hart, 1998, Ch. 6). In contrast, the United States did not engage in the kinds of targeted, microeconomic, investment policies, or industrial policies, that—when paired with more orthodox fiscal policies for running budget surpluses—lay at the heart of post-war economic management in Germany and Japan. At the same time, international economic policy remained subservient to a foreign policy that prioritized the security benefits attained from rebuilding the economies of formerly fascist powers over the economic interests of domestic manufacturing firms. Accordingly, domestic manufacturers found themselves competing not with foreign firms, but with foreign governments, in an increasingly global marketplace (Stein, 2010).

The political consensus underneath this form of diplomatic Keynesianism slowly evolved to recognize two domains in which the federal government would take a more pro-active role in facilitating technological development. In 1950, Congress created the National Science Foundation (NSF) to invest federal money in the kinds of pre-commercial scientific research usually conducted in universities, and to distribute those monies according to a meritocratic system of peer review. In articulating the NSF's role, Congress sided mostly with MIT engineer and Raytheon founder, Vannevar Bush, over alternatives advocated by progressive Senator Harley Kilgore. Kilgore had hoped to create a robust central agency for coordinating a science policy developed not just by

Table 1: **The AKS and AKE Differ Mostly in their Approach to IP**

Institution	American Knowledge Society (1945-1979)	American Knowledge Economy (1980 - present)
Macroeconomic management	Political consensus: diplomatic Keynesianism relying heavily on R&D tax credits while ignoring interventionist strategies abroad for the sake of post-war reconstruction	Political divisions: market fundamentalism (R) or Schumpeterianism (D)
Norms amongst public innovators	Openness and sharing	Appropriation and rent extraction
Federal agencies	Heavily decentralized approach to investing in scientific and technological development	Heavily decentralized approach to investing in scientific and technological development
Core policy motivation	National security	National security and comparative economic advantage
Antitrust oversight	Aggressive enforcement against IP producers and deep concern about market power flowing from patents; frequent use of compulsory patent licensing	Little if any enforcement against IP producers and diminished concern about market power; no use of compulsory licensing
Judiciary	Patent cases treated like any other federal case; many circuit court justices skeptical of patents	Appeals in patent cases handled in specialized court committed to strengthening patent rights
Common law	Legal constraints on patent power, like research exemptions and patent misuse liability, ensure patents promote public interest	Legal constraints on patent power narrowed or eliminated
Global and domestic trade institutions	Global IP issues handled by UN where one-nation, one-vote procedures give developing nations substantial power; substantial "domestic industry" (people or plant) required for those who seek remedies before ITC	Global IP issues handled by WTO where link to tariffs increase IP producer leverage and diminish developing nation power; investments in research or IP licensing considered sufficient ties to US to permit remedies before ITC
Dominant strategy at state level	Zero-sum devices using weak labor laws or special tax advantages to lure jobs from one region into another	Cultivating local innovation hubs through venture capital and university-industry research consortia

Note:
This table shows the main differences and similarities between the political institutions and policies that shaped innovation during the Fordist period, which I refer to as the American Knowledge Society (AKS), and those that shaped and continue to shape the American Knowledge Economy (AKE) of today.

elite scientists but by a broader range of interests, including labor. Kilgore also believed the NSF should promote competition rather than IP-based monopolies by investing in applied research and using non-exclusive licenses to disseminate the fruits of publicly funded research. Bush proved more politically adept. Congress ultimately created an agency that would be somewhat insulated from politics and would not interfere with corporate prerogatives on technological development or practice industrial policy (Kleinman, 1995; Hart, 1998).

At the same time, ownership of patents on publicly funded technologies remained with the federal government and federal institutions developed a practice of broadly distributing IP through non-exclusive licensing, consistent with Kilgore's preferences. These norms of sharing and openness, held by government and university officials alike, are the AKS's second major feature. Some universities did petition federal agencies for the power to manage their own patents, but in their licensing agreements with private firms, those same universities often followed the federal government's practice of using IP to promote competition. For example, Stanford University licensed the Cohen-Boyer patents on recombinant DNA technology, the patents that launched the biotechnology revolution, on a non-exclusive basis to hundreds of organizations, despite private opposition from firms like Genentech and Cetus, because that approach was believed to be more consistent with the public-service ideals of the university (Feldman, Colaianni, and Liu, 2007). As this example reveals, IP producers in the AKS were often divided because they had different institutional motivations, with public IP producers like government agencies and universities expressing norms of openness and sharing over norms of appropriation.

Slowly, a political consensus also emerged that existing financial institutions did not sufficiently invest in the small businesses, or startup companies, that could create new technological products to compete with those offered by more established firms. Accordingly, President Eisenhower first agreed to create a modestly funded Small Business Administration (SBA) if Congress

would eliminate the Reconstruction Finance Corporation in 1952. And in 1958, Congress gave the agency the power to support and oversee privately operated Small Business Investment Companies (SBIC) that would lend to and purchase stock in promising small businesses. The Kennedy administration aggressively promoted SBICs and while, in the early years, only 10 percent of SBIC funds accrued to technology startups, the SBICs would ultimately lay the groundwork for the modern venture capital industry (Hart, 1998, 171-2).

The way in which these early political debates unfolded ultimately committed the United States to a heavily decentralized and unplanned form of science and technology policy, which is the third component of the AKS's institutional matrix (Block, 2008). Part of the reason the NSF could not obtain a broader mandate is that, in the eight years (from 1942 to 1950) that it took to achieve consensus over its founding, Congress created other agencies—the Atomic Energy Commission, the Office of Naval Research, the Joint Research and Development Board, and the National Institutes of Health—that had jurisdictional claims in the nation's technological development. These institutions then opposed the political effort to consolidate and centralize power under the umbrella of the NSF. The AKS achieved some coordinating power with the creation of the Office of Science and Technology (the predecessor of the modern Office of Science and Technology Policy) within the White House in 1962, but having no power over the aggregate research budget, it would play a more limited role by wrangling the pluralist system of agencies with scientific priorities (Kleinman, 1995, 152, 176-77).

As the Cold War unfolded, the basic Keynesian consensus that produced the AKS merged much more deeply with the national interest in developing technologies to meet national security imperatives, the fourth component of the AKS's institutional setting. In 1950 the Korean War began and in 1957, the Soviet Union placed the first artificial satellite into orbit. Though national security imperatives influenced most if not all federal institutions of scientific and technological

development (Hurt, 2011; Weiss, 2014), those imperatives found their most influential expression in the nascent venture capital industry with the creation of the Defense Advanced Research Projects Agency, or DARPA, in 1958. The federal government always had the power to shape the technological prerogatives of its defense contractors through the procurement process, but this required massive amounts of investment and the government's flexibility virtually dissolved upon entering into a contract. DARPA proved that the government could use much smaller amounts of money to generate intense competition for the development of new technologies on ambitious time frames, especially since its legislative authorization removed the elaborate grant writing and refereeing procedures utilized by the NSF and gave the agency the discretion to start and *stop* funding as it deemed necessary (Block, 2011). But even outside of DARPA, the AKS nurtured deep ties with the national security state in both civilian venture capital and academic research (Hart, 1998, 172).

In the AKS of the post-war period, patents were an established but contentious policy tool for promoting technological development. In 1938, President Roosevelt appointed patent reformer, Thurman Arnold, to lead the antitrust division of the Department of Justice (DOJ). Arnold viewed patents as a monopolistic device that enabled corporate managers to inhibit technological development, create cartels, raise prices, and stifle economic growth. Arnold and his successor, Wendell Berge, could not convince Congress to reform the nation's patent laws, so they instead deployed the full force and power of the DOJ against established corporations with large patent holdings. During Arnold's five-year tenure, the DOJ instituted 213 investigations and 93 lawsuits, almost as many has had been filed over the prior 48 years, and Arnold and Berge together succeeded in forcing corporations to license their patents more broadly (compulsory licensing) in at least 107 cases involving about 40,000 patents. Aggressive levels of antitrust enforcement in turn influenced business strategy, as established firms turned away from the practice of acquiring the technology of

emerging competitors to focus instead on promoting in-house research and development (Hart, 1998, 2001). Patents remained a constitutionally sanctioned tool to protect upside investments in new technologies, but antitrust officials heavily policed the downside anti-competitive risks. The DOJ's commitment to policing patent abuse constitutes the fifth feature of the AKS.

A sixth feature of the AKS was that patent lawsuits were treated just like any other case involving federal law: the case was first tried in a local district court and then, if either of the parties appealed the case, the appeal went to the regional circuit court. This institutional structure created opportunities for circuit splits on important legal questions as the circuit courts adopted conflicting perspectives that only the Supreme Court could reconcile. Patent cases were no exception and most of the circuit courts viewed patents with skepticism (consistent with prevailing attitudes at the DOJ) though at least three circuits developed a more pro-patent reputation. Members of Congress accepted the conflict that this structure created because it tended to sharpen legal arguments before the Supreme Court was asked to intervene. But they also believed that distributing power among several circuit courts helps to avoid the problems of regulatory capture that can arise with courts of specialized jurisdiction. In 1975, for example, a special Commission rejected a proposal to create a special court that would hear all appeals in patent cases nationwide, warning that the judges would suffer from "tunnel vision" and be susceptible to the influence of special interests (Scherer, 2009).

Seventh, the anti-patent skepticism protected by the judiciary's structure inspired the development of a body of federal case law that imposed restraints on the use of patents. For example, though exploratory research and development could technically cause a firm to be liable for patent infringement, a common law "research exemption" protected those who made or used a patented invention for purposes of testing the patent's written disclosure and determining whether

the invention works as claimed.[4] Similarly, the doctrine of sovereign immunity shielded state universities and agencies from patent infringement liability.[5] The defense of "patent misuse" allowed those accused of infringement to avoid liability by showing that the patent holder acted in derogation of federal patent policy (Feldman, 2003). When the Supreme Court intervened in patent disputes it would often emphasize the limits of patent law. In 1969, for example, the Court argued that the Sherman Act "made it clear that the grant of monopoly power to a patent owner constituted a limited exception to the general federal policy favoring free competition."[6] Legal doctrines like these created uncertainty in the legal framework governing IP rights which in turn made it difficult for IP producers to leverage their patents to extract rents.

Eighth, the AKS remained situated in a global economy that prioritized democratic procedures for determining how nations across the globe would leverage IP. The Paris Convention for the Protection of Industrial Property of 1883 remained the dominant legal framework at the global level, but the World Intellectual Property Organization (WIPO) within the United Nations took over its administration after 1974. IP issues that did not fall within WIPO's jurisdiction were generally handled by the United Nations Conference on Trade and Development (UNCTAD) which sought to maximize trade, investment, and economic development but also to integrate developing countries into the world economy on an equitable basis, a goal that, according to some, could not be achieved under the General Agreement on Trade and Tariffs. As agencies of the United Nations with broad membership, both WIPO and UNCTAD gave developing nations, including many former colonies, substantial political power in shaping negotiations over global IP rights through its one country, one vote procedures.

As has been true throughout American history, much of the initiative for engaging in

[4] *Whittemore v. Cutter*, 29 F. Cas. 1120 (Cir. Ct. Mass 1813).
[5] *Atascadero State Hosp. v. Scanlon*, 473 U.S. 234, 242 (1985).
[6] *Lear, Inc. v. Adkins*, 395 U.S. 653, 663 (1969).

more activist policies to promote economic development in the AKS resided within the states. At the same time, the dominant policy tools that state governments used to promote economic development were zero-sum devices like promising tax benefits or anti-labor policies to lure established businesses away from one region and into another. This dominant approach to regional economic development is the AKS's ninth major feature. The Southern states largely pioneered the use of the devices, and they may have been effective in luring manufacturing into the region, but they also had limitations. State governments often granted these incentives with no strings attached, leaving many in the position of the cuckold after choosing a partner with a history of being unfaithful. Firms that are willing to leave New England for South Carolina might, after all, be just as willing to leave South Carolina for Mexico or China. The zero-sum nature of the incentives also created inter-jurisdictional conflict and as more states came to offer the same set of incentives, the devices lost some of their ability to significantly influence managerial decision-making. These limitations would become more troubling in the 1970s. Throughout most of the post-war period, these devices remained the primary tool for shaping economic development at the state level, and state leaders used them not to promote technological development but to relocate jobs from one state to another (Eisinger, 1988; Graham, 1992).

In sum, the AKS was rooted in a diplomatic form of Keynesian economic management that subsidized the reconstruction of formerly fascist powers and that used broad, untargeted tools like R&D tax credits to spur investment in new technologies paired with a decentralized matrix of new institutions, like DARPA and the NSF, committed to ensuring the nation's technological supremacy during the Cold War. Firms could and did patent their inventions, but Keynesian tools, not IP, were the preferred mechanism for incentivizing technological investment in the private sector. On the contrary, antitrust officials aggressively policed anti-competitive abuses by the largest private IP producers while public IP producers, for their part, remained committed to norms of openness

and sharing rather than appropriation. The politics of the AKS was inherently federal as state officials pursued economic prosperity through zero-sum devices that lacked any coherent vision for promoting local innovation, and the skepticism developing nations had towards IP kept global institutions focused on other objectives. Both the institutional structure for adjudicating patent cases and the substance of federal patent law perpetuated a skepticism as to whether IP played a valuable role in the American political economy.

In all but two of these characteristics, the AKS is distinct from the AKE. When it comes to these nine institutions, the only ways in which the AKE resembles the AKS is in its continued reliance on a heavily decentralized mode of investing in technological development at the federal level and in its deep ties to the national security state. As the Democratic Party turned towards the AKE, and as IP producers became the heroes in the nation's story of economic salvation, the seven remaining components of the AKS would either be abandoned or experience substantial reform.

1.3 Political Alternatives to Keynesian Decline and the Atari Democrats

The 1970s unraveled the Keynesian consensus that lay at the foundation of the AKS. The post-war project of rebuilding the Japanese and German economies by giving their firms preferential access to American consumers succeeded on a much quicker timescale than anyone had anticipated. As the United States found its dominant position in global technology and commodity markets threatened, its elected officials struggled to develop post-Keynesian alternatives for producing economic prosperity. Traditional tools like tax cuts and government spending could still be used to increase consumption, but as domestic markets became more exposed to foreign imports, more and more of that consumption would accrue to the benefit of foreign producers. Financing more spending through deficits brought additional challenges, as foreign governments could purchase the dollar-denominated assets that underwrote deficits (government bonds) which would prevent

the dollar from naturally adjusting against foreign currencies and would allow trade imbalances to persist. The Federal Reserve could lower interest rates to try and stimulate investment, but at a risk of exacerbating inflation and, with no capital controls, that investment could simply move overseas. Food shortages, rising mortgage rates, and America's dependence on foreign oil cartels produced exceptionally high levels of inflation that elected officials from both parties tried to manage on the backs of American workers, freezing wages and advocating for yet more global competition to reduce prices (Stein, 2010). And that inflation accelerated in the midst of economic stagnation, not expansion as Keynes had predicted, creating a pervasive anxiety that the old order was broken and that the nation had found itself in a new and unforeseen state of "stagflation" (Salant, 1989).

The political failures at the heart of this economic calamity produced, in turn, dramatic changes within both political parties. The Republican Party somewhat quickly settled on an alternative based on the market fundamentalism associated with economists like Freidrich von Hayek and his followers at the Chicago School of Economics. President Reagan interpreted his victory in 1980 as an absolute mandate against Keynesian economics and pursued a radically different vision rooted in tax cuts financed by foreign borrowing, expansive deregulation, and greater global economic and financial integration (Stein, 2010; Appelbaum, 2019).

The Democratic Party's response emerged only gradually over the course of the 1970s. In some ways, the Democratic turn towards the knowledge economy began in 1972. In the presidential election of that year, George McGovern became the first Democratic candidate to overtly court suburban knowledge economy workers in places like Boston's Route 128 corridor and Southern California with an economic message of patent reform and technological innovation. McGovern's target audience worked primarily in the defense and aerospace industries and faced increasing unemployment from severe cuts in military spending during President Nixon's first term; they connected with McGovern's message of igniting an economic conversion in which

federal science and technology policy would be deployed to achieve peacetime objectives, like energy independence and environmental protection, rather than military preparedness. As political activists, these same workers played a crucial role in propelling McGovern to victory in the Democratic primary (Geismer, 2015, Ch. 6).

The evolution of Democratic Party platforms in this period similarly suggests that, in 1972, McGovern attempted to change the Party's conception of the relationship between technology and the economy. The Party's 1964 platform, for example, argues that conventional macroeconomic policy will be used to continue the "42 months of uninterrupted [economic] expansion" that began with President Kennedy's tenure in 1961. The document mentions "technology" 14 times, but mostly in relation to the space program. It acknowledges a link between technological change and increasing productivity and higher living standards but conceived of such a relationship as flowing mostly from automation. (Peters and Woolley, 1964) The Party's 1968 platform displays similar notions. It is the first to contain that all important buzzword of the AKE—innovation—but the Party's pledge, in this context, was to "[a]ssist small business in taking advantage of technological innovations," not to promote small business (or startups) as engines of innovation. Many of the remaining references to technology indicate the Party's commitment to ameliorating the social and environmental "hazards" and "complexities" that the "march of technology" had wrought. The document asserts that the United States was supreme in its technological capacity and that the Party's challenge was to deal with the social and environmental costs of that supremacy, consistent with escalating regulatory demands of the third-wave consumer movement (Cohen, 2003; Peters and Woolley, 1968).

But the Party's 1972 platform begins with an entirely different proposition: that the nation's technology supremacy was in decline because the Nixon administration had let defense and aerospace programs languish. The Party therefore pledged to substantially increase public

and private sector investment in research and development, to rethink the relationship between government and industry when it comes to technological development, and to apply the fruits of technological experimentation in aerospace and defense "to the city, the environment, education, energy, transportation, health care and other urgent domestic needs" (Peters and Woolley, 1972). McGovern's early effort to redefine the Party's relationship to technological change was famously unsuccessful, however. In the general election against Richard Nixon, McGovern lost in every state except Massachusetts leading to one of the most lopsided electoral college victories (520-17) in the nation's history. Unsurprisingly, technological development was a marginal concern in the Party's 1976 platform, which focuses much more heavily on dealing with unemployment and inflation (Peters and Woolley, 1976).

But as the economic crisis of the 1970s accelerated during the Carter Administration, it became clear that the Democratic Party, in the throes of the New Left, had no vision for producing economic prosperity. In tilting so hard against the corruption of the Watergate era and challenging the legitimacy of the entire system of democratic capitalism, activist voices within the Democratic Party failed to produce any meaningful alternative to Keynesianism. In fact, their acerbic attack on capitalism ignited a dramatic response by the managers of manufacturing firms who bridled at the accusation that they were responsible for all of the nation's social and economic turmoil (Silk and Vogel, 1976; Vogel, 1989). Many business managers became active in politics in the middle of the decade to halt what they accurately perceived to be the decline in domestic manufacturing and its roots in poor economic management, with persistent budget deficits that crowded out private borrowing, reduced capital formation, and structurally disadvantaged exports. The New Left remained aloof to their plight. The pejorative many Democratic officials used to refer to American manufacturers—"smokestack industries"—succinctly captured their indifference to American industrial decline and the havoc it was wreaking across the nation. That indifference extended not

just to corporate employers but also to blue collar employees as organized labor found itself on the outside looking in at the Party's 1976 convention (Stein, 2010; Waterhouse, 2014).

Ultimately, if slowly, the Democratic Party found its alternative to Keynesianism at the very end of the decade in the idea of the AKE, as domestic economic malaise juxtaposed with the miraculous ascendance of Japanese and German industry became politically intolerable. To restore global competitiveness and increase productivity, the nation would try to leverage its advantage in producing not knowledge, per se, but IP—a commodified form of knowledge embodied in patents that would allow IP producers to extract substantial economic rents in global marketplaces. The Party's rhetoric about innovation and entrepreneurship found easy support among those liberals for whom an economy that conferred yet more wealth and status on the highly educated sounded ideal. But the Party's vision for the AKE was primarily shaped by other actors and constraints. As indicated below, it was profoundly shaped by the IP producers that rewrote global trade agreements and advised presidential administrations on industrial innovation policy and economic competitiveness. And it was shaped by the unique nature of American political institutions, as the imperatives of divided government forced a significant narrowing of Democratic aspirations. But it was also substantially shaped by the political entrepreneurship of a faction within the Democratic Party who came to be known (sometimes derisively) as the Atari Democrats.

The Atari Democrats were a group of neoliberal Democrats, many of them "Watergate babies" from the class of 1974, who grew increasingly indifferent in the late 1970s to the social welfare programs of the prior decade that mostly defined the Party's legacy. The most prominent Atari Democrats in Congress included Colorado Senator Gary Hart (George McGovern's former campaign manager), his successor Tim Wirth, Massachusetts Congressman (and later Senator) Paul Tsongas, and Tennessee Senator Al Gore. But they also included some newly elected Democratic governors with aspirations for federal office, like California's Jerry Brown, Massachusetts' Michael

Dukakis, and (later) Arkansas' Bill Clinton. As a subset of the Party's emerging neoliberal faction, the Atari Democrats were bound together by the tenets of the neoliberal perspective: that the Party's primary role was to promote economic growth not implement economic redistribution, that doing so required proactively thinking about the future rather than reactively fighting against injustices of the past, and that the government had to accept hard constraints on what it could accomplish and look for ways of collaborating with the private sector to achieve its goals. But the Atari Democrats additionally believed that technological innovation and small-business entrepreneurship were the key to generating economic prosperity and remedying a host of social and environmental problems (Rothenberg, 1984, 15-25, 79-91; Geismer, 2015, 268-71).

The Atari Democratic vision for the AKE was shaped by economic thinking, especially the theory of Joseph Schumpeter and the empirical findings of David Birch, but also by their individual experiences in dealing with American industrial decline and the challenge of producing economic growth in a world of limited resources (Schumpeter, 2012; Birch, 1979; Rothenberg, 1984, Chs. 6-7). As a Senator, Paul Tsongas helped negotiate an agreement in the early 1980s to convince computer company, Wang Laboratories, to locate in his hometown of Lowell, Massachusetts, a longstanding hub of textile manufacturing that was, at the time, being torn asunder from deindustrialization. Jerry Brown spoke of similar motivations based on an epiphany he had while touring New England during his 1980 presidential bid. Cognizant of the resource constraints at the heart of "no growth" liberalism and observing first-hand what no growth meant to communities experiencing deindustrialization, Brown came to see the successes of the Silicon Valley (already evident in 1980) as a path forward. As Brown's chief economic advisor described Brown's transformation, "When he came home from the campaign all of a sudden it was crystal clear. His concerns had been fused: One, industrial decay; two, the resource trap; and three, high-tech" (Rothenberg, 1984, 64-67, 81-83).

The intra-party debates over the Party's future were fractious, and the Atari Democrats did

not succeed in realigning the Party towards the AKE overnight. When President Reagan decisively defeated incumbent, Jimmy Carter, in 1980, their movement gained momentum, but they still faced resistance from other parts of the Party membership. In 1982, Tim Wirth worked with Dick Gephardt of Missouri and Gillis Long of Louisiana to develop and publish the House Democrats' new vision for economic growth rooted in technological development, partnerships with private industry, and adjustment assistance for displaced workers (Cowan, Sept. 19, 1982). Only nine months later, a rival faction of 148 House members produced a contrary statement, one which failed to win the Speaker's endorsement but nevertheless revealed the growing schism within the Party (Cowan, May 30, 1983).

In the physical world, Newton's third law suggests every action is met with an equal and opposite reaction; in the social world, similar laws suggest that most attempts to create new forms of political or economic power are often met with forceful counter-mobilizations or, to use an economic term, the creation of countervailing power (Dahl, 2005; Galbraith, 2012b). Predictably, then, as the Atari Democrats pushed the Democratic Party to speak more forcefully on behalf of the suburban, middle-class professionals invested in the knowledge economy, they encountered forceful resistance from the Republican opposition. The Republican Party's alternative to Keynesianism, rooted in market fundamentalism, sought to promote economic growth by minimizing the role of the state in the economy and party leaders could not support policies that sought to enhance the state's role, even if for the sake of stoking technological development. Political conservatives therefore began portraying deindustrialization as a myth and, with the support of organized business interests, argued that new industrial policies would devolve into an exercise where the state was "picking industrial winners" or protecting industrial losers (Graham, 1992, Ch. 7). As early as 1975, Irving Kristol, the godfather of neoconservatism, blamed "mass education" for creating a "New Class" of liberals who were "sent to college in order to help manage its affluent, highly technological,

mildly paternalistic, 'post-industrial society' " and warned that this New Class was an elitist and vehemently anti-capitalist group (Kristol, 1975, 134-35; Waterhouse, 2014, 42). In later years, sensing that the Democratic Party's emphasis on college education might allow liberals to build a durable multi-racial and worker-inclusive political coalition, political conservatives initiated a long-lasting culture war to discredit public universities and undermine the political status of the knowledge economy workers that they produced (Newfield, 2008, Ch. 1).

In a setting of divided government, these developments significantly narrowed the set of potential institutional reforms that were available to hasten knowledge economy formation. In a sense, as the Democratic Party turned towards Schumpeter and the Republican Party turned towards Hayek, the fragmented power of American political institutions all but guaranteed that new laws and institutions promoting the AKE would have to occupy the small space where Schumpeter and Hayek agreed. And that small space was defined by new policies, like patent reform, that sought to rectify what economists referred to as "market failures" in the innovation environment while minimizing the state's role in shaping economic outcomes.

The archival records and legislative record of one Atari Democrat, Paul Tsongas, illustrates this narrowing of Democratic aspirations. First and foremost, those records suggest that Tsongas went to great lengths to ensure his policy proposals aligned with the demands of high-tech business managers. For example, the records show Tsongas surveying business leaders, like J.A. Marshall of DataCon, to better understand high-tech's position on U.S.-Japanese trade relations.[7] They show him advertising his legislative "record in high technology" to business managers like John Moriarty of Data General.[8] And they show him soliciting feedback on new policy proposals from

[7]Paul E. Tsongas, "Letter to J. S. Marshall from Senator Paul E. Tsongas requesting help on a matter of great importance to the high technology industry of Massachusetts," Paul Tsongas Digital Archives, accessed October 21, 2021, https://ptsongasuml.omeka.net/items/show/3725.

[8]Mitchell G. Tyson, "Tsongas record in High Technology," Paul Tsongas Digital Archives, accessed October 21, 2021, https://ptsongasuml.omeka.net/items/show/1244.

business managers like Fred Garry of General Electric.[9] In these and other ways, Tsongas worked to keep his new policy proposals consistent with high-tech business demands and those demands tended to focus on policies that shunned any meaningful new role for state action. In providing comments for Tsongas' proposal to create a new Agency for Technological Innovation, for example, Fred Garry of General Electric rejected the idea of creating new agencies to match Japan's MITI as these agencies would substitute "government judgment for that of business managements in the allocation of industrial resources. . . ," but he favored proposals that would strengthen patent rights, give industry exclusive rights to IP develop with federal funds, and increase the tax write-offs for "acquired technology, including unpatented know-how." [10]

Tsongas also tried to advance new policies that arguably would have met middle-class demands, but when he did so, he was generally unsuccessful. He introduced the High Technology Morrill Act (98 S.631), which would have sequestered a tax on resource extraction from federal lands to create a $2.5 billion trust fund to improve the quality of science and technology education in the United States. But the bill was ultimately whittled down to a much smaller experimental effort with $90 million appropriated in two fiscal years, and it was incorporated into a much larger bill disbursing conventional block grants consistent with conservative demands (98 S.1285). Even here, on an issue promoting middle-class demands to improve educational access and quality, Tsongas designed his proposal in a way that would only disburse funds to universities that partnered with industry. Tellingly, when he took to the floor of the Senate to support the proposal, he did so not on grounds that the bill had broad popular support, but that it was firmly supported by the members of the Massachusetts High Technology Council, a lobbying consortium of over 100 high-tech business managers. In the same Congress, Tsongas also introduced bills that would have promoted skills

[9] Fred W. Garry, "Letter to Paul E. Tsongas from Fred W. Garry: Improving federal policies affecting technological innovation and industrial competitiveness," Paul Tsongas Digital Archives, accessed October 21, 2021, https://ptsongas uml.omeka.net/items/show/3299.

[10] Ibid.

training and education for U.S. workers (98 S.2111), required the National Academies to form panels with industry representation to advise Congress on economically strategic technologies (98 S.248), and created a new Agency for Technological Innovation with the power to coordinate the government's role in promoting technological development (98 S.3071). None of these proposals advanced beyond introduction.

In contrast, Tsongas generally succeeded in promoting new policies that either reduced the role of the state in the economy or sought to rectify market failures in the innovation environment. In advertising his legislative record on high-tech issues, he claimed to be "one of the first to introduce and advocate legislation in 1982 to relax antitrust laws to encourage the formation of joint R&D ventures" and he "supported the industry position which provides for ... full immunity...."[11] This proposal was again advanced in the 98th Congress by Strom Thurmond (R-SC) and ultimately became law (PL98-462). Tsongas also held himself out as a major supporter and co-sponsor of legislation that ultimately became the Small Business Innovation Research Act (PL97-219).[12] That Act effectively created a federal venture capital fund within the Small Business Administration to remediate the market failure flowing from the concentration of technological investment within large firms and established universities despite evidence that small businesses were the principal source of technological innovation in the United States. The bill that created these funds (97 S.881) also generated significant bi-partisan support and was co-sponsored by three Republicans, including Orrin Hatch (R-UT).

In short, Tsongas succeeded when he advanced bills that met business demands and that aligned with conservative thinking about macroeconomic management, but he generally failed when he attempted to advance bills that met much broader middle-class demands to improve the

[11] Mitchell G. Tyson, "Tsongas record in High Technology," Paul Tsongas Digital Archives, accessed October 21, 2021, https://ptsongasuml.omeka.net/items/show/1244.

[12] Ibid.

quality of the nation's educational system, increase opportunities for job training and "up-skilling," or to align the full force of the national government behind a set of concretely defined technological objectives. Tsongas even seems to have been aware of the power imbalance between organized business interests and the middle-class voters committed to the project of building a knowledge economy. For example, Tsongas joined an organization called the National Coalition for Science and Technology and signed a letter urging other members of the "science and technology community" to join on grounds that their interests were "near the very bottom of the list" when it comes to special interest representation in Washington and that, if this situation continued, "we risk seeing this country fall behind other nations that do give appropriate emphasis to science education and research."[13] Paul Tsongas was only one Atari Democrat, though his position as the head of the Innovation Working Group of the Senate Democratic Policy Committee made him an important representative of the group's demands. And yet, the struggles he faced in advancing his own legislative agenda largely explain, at a granular level, why policies that would have promoted AKE formation through human capital formation and public investment largely failed, while those that focused on IP and rectifying market failures largely succeeded, as documented in Figure 1.

In many ways, the Democratic Party's relationship with the AKE would not become settled until 1992, when Bill Clinton's victory in that year's presidential race demonstrated that the neoliberal vision of an AKE had electoral viability. And yet ironically, by 1994, only two years into Clinton's first term, the AKE's formative period came to a close as most of the policy reforms that define the institutional complex of the AKE had already become law. Against the background of severe electoral losses in presidential elections throughout the 1980s—Jimmy Carter in 1980, Walter Mondale in 1984, and Michael Dukakis in 1988—IP producers and Atari Democrats worked within the constraints of divided government to produce major policy reforms in the one market-

[13]Paul E. Tsongas, "Letter urging support for National Coalition for Science and Technology," Paul Tsongas Digital Archives, accessed October 21, 2021, https://ptsongasuml.omeka.net/items/show/3248.

oriented domain of technology policy on which they could garner substantial bi-partisan support: intellectual property law. The last major such reform came at the end of 1994, when President Clinton signed the Uruguay Round Agreements Act which converted the General Agreement on Trade and Tariffs (GATT) into the World Trade Organization (WTO) and bound member nations to the Agreement on the Trade-Related Aspect of Intellectual Property Rights, or TRIPS.

1.4 Three Geographies of American Knowledge Economy Development

1.4.1 The Global Knowledge Economy

The story of how IP producers in the United States changed institutions for negotiating multilateral trade agreements to create the global knowledge economy (GKE) is a story of surprising corporate influence over global economic policy, though it has failed to elicit much interest in international political economy or the lobbying sub-discipline of American politics. The story culminates with the adoption of TRIPS in 1994. In essence, TRIPS required member nations, including many developing nations, to draft and enforce IP laws that met certain basic criteria. The leaders of many developing nations viewed the agreement as a new form of colonialism. They begrudgingly assented because they needed access to U.S. markets in agricultural products and textiles, and IP producers succeeded in making that access contingent upon accepting TRIPS.

Two business managers—the chief executive of Pfizer, Edmund Pratt, and of IBM, John Opel—played a central role in the passage of TRIPS, but in doing so, they represented a much broader coalition of domestic IP producers that relied intensely on patents to compete in the global economy. In 1986, Pratt and Opel organized an interest group known as the Intellectual Property Committee (IPC) to push global patent reform onto the agenda for the next round of trade negotiations under the GATT. The IPC consisted of the executives of Pfizer, IBM, Merck, General Electric, Du Pont, Warner Communications, Hewlett-Packard, Bristol-Myers, FMC Corporation,

General Motors, Johnson & Johnson, Monsanto, and Rockwell International (Ryan, 1998, 11, 67-68; Scherer, 2009, 204). General Motors was the only firm that could be characterized as a domestic manufacturer and its motives for participating are unknown. The remaining companies were all multinational IP producers in aerospace and defense, pharmaceuticals and chemicals, computer hardware and telecommunications, and agritech.

The IPC's main political achievement was to create an international coalition of IP producers that shifted the forum for negotiations over global patent reform from the UN to GATT. IP producers had first pushed for global patent standards in 1981 and 1982 by way of a revision to the Paris Convention before the UN agency, WIPO. Developing nations opposed these efforts on grounds that turning American patent law into a global standard would undermine their ability to do things like manage public health crises. For example, in the 1980s, South Africa could import patented HIV drugs at low prices to deal with its AIDS crisis because manufacturers could legally locate in places that either had no patent law or had a patent law that did not allow for drug patents or used compulsory licenses to force drug manufacturers to take much smaller royalties on sales in developing nations. Purging this heterogeneity in national patent laws would therefore hobble the South African government in its ability to fight an epidemic. For the leaders of many developing nations, IP producers could already enforce patents and charge supra-competitive prices to affluent consumers in developed countries which provided sufficient rents to encourage innovation. For IP producers, substantial rents were lost on what they perceived as IP theft. Standardizing patent laws would expand the geographic scope of their IP so that each new piece of IP they produced could potentially earn a market position approaching global monopoly.

The political problem that IP producers encountered was that the UN's democratic one country, one vote procedures—an institutional legacy of the AKS—allowed developing nations to form a coalition that opposed global patent standards. Accordingly, IP producers pursued the

same reforms under GATT where developed nations had more influence and where global patent standards could be linked to other issues that developing nations cared about like agricultural tariffs. Such a strategy might have failed if the IPC had pursued it alone, but they built a global coalition of IP producers from within the Japanese Keidanren and the Union of Industrial and Employers' Confederations of Europe (UNICE). Together with some Canadian companies, "the Quad" successfully lobbied their respective governments to add IP standards to the Ministerial Declaration that defined the basis for the Uruguay Round of trade negotiations in 1986. Subsequently, during negotiations, U.S. officials refused to grant any concessions on textile or agricultural subsidies to developing nations in the absence of an agreement over patent reform (Ryan, 1998, 106-11; Scherer, 2009, 204-06).

To procure passage of TRIPS, IP producers settled on a political strategy of unilaterally punishing nations that would not adopt American patent standards to obtain bilateral resolutions that would then provide leverage against other developing nations in multilateral negotiations over TRIPS. In the pursuit of that strategy, they took advantage of some existing institutional mechanisms. The Trade Act of 1974 (Pub. L. 93-618), for example, is best known in scholarly literature for creating "fast track" authority which empowers the President to negotiate international trade agreements that Congress must consider without amendments or filibuster. But another provision, Section 301, required greater executive monitoring of and response to unfair trade practices and also gave American businesses the power to petition the office of the USTR to investigate such practices. Another provision created a new institution—the Advisory Committee for Trade Policy and Negotiation (ACTPN)—so that IP producers could have more direct and systematic input into the substance of U.S. trade policy (Ryan, 1998, 68). President Carter appointed Pratt to the ACTPN in 1979, and Pratt became the Chairman in 1981.

IP producers also successfully lobbied for new laws and institutions that would increase

their negotiating leverage. The first set of policy victories came with the International Trade and Investment Act (Title III of the Trade and Tariff Act of 1984, P.L. 98-573), which revised the Trade Act of 1974 to make the act of denying adequate patent protection a form of unfair trade practice against which the President had the authority to unilaterally retaliate (Scherer, 2009). Other provisions in the bill removed obstacles that the IP producers faced in asserting their patent rights abroad. The bill empowered the USTR to initiate its own investigations of inadequate foreign patent protection so that domestic firms did not have to formally file a petition and risk retaliation abroad. Another provision required the USTR to identify the most significant barriers to foreign investment, estimate the trade-distorting impact, and annually report the results of its investigations to Congress. The bill also gave the President the authority to enter into bilateral or multilateral trade agreements that would "obtain and preserve the maximum openness with respect to international trade and investment in high technology products and related services" (Section 305), and to consider the extent of patent protection when deciding whether to designate a country as a "beneficiary developing country" under the Generalized System of Preferences (Section 503).

Scrutiny of the provision linking patents to the Generalized System of Preferences (GSP) reveals the political tensions inherent in the emerging GKE. Starting in 1976, many developing countries came to rely on the GSP as it provided a non-reciprocal reduction in tariffs that made agricultural and manufactured goods produced abroad competitive in domestic markets. American financial interests supported the system because the foreign companies in which American banks had invested might struggle to repay their debts without preferential treatment (Stein, 2010, 95). IP producers realized that linking GSP access to global patent standards would provide leverage over developing nations as they could now make progress on tariff reductions in agricultural goods and textiles contingent upon the adoption of global patent standards. Section 503 did just that,

and the United States began exercising its bilateral power under Section 503 almost immediately, moving first against Korea and Brazil in 1985 (Ryan, 1998, 12-13,73-79). Far from being the stylized economy in which firms and nations freely develop comparative advantages based on factor prices, the GKE appeared to some as an economy in which wealthy nations dictated the terms and patterns of trade. At the same time, when the United States asserted itself under Section 503, it agreed to expose its own domestic growers and manufacturers to more competition, and even subsidize that competition, so long as IP producers could obtain stronger patent rights abroad.

The second set of policy victories came from various sections of the Omnibus Trade and Competitiveness Act of 1988 (P.L. 100-418). Parts of the 1988 Act escalated the USTR's investigation and reporting requirements and made it easier to retaliate against countries with inadequate IP protection (Scherer, 2009, 203-4). The 1988 Act also amended the Tariff Act of 1930 to explicitly condone the practice of allowing patent holders to seek additional remedies, like an import ban, before the International Trade Commission (ITC). In a move emblematic of the new GKE politics, the law also loosened the "domestic industry" requirement for obtaining remedies in that forum. The ITC traditionally required petitioners to prove that they had a substantial domestic presence before initiating an action, which generally required "significant investment in plant or equipment" or "significant employment of labor or capital" within the United States. To further empower IP producers, the 1988 Act revised this requirement so that it could be met by showing "substantial investment" in the exploitation of a patent, "including engineering, research and development, or licensing" (P.L. 100-418 Section 1342). Petitioners before the ITC no longer needed to be firms that produced something or employed workers in the United States but could also be multinational companies that only developed new technologies in the United States. Small technical provisions like this one, buried in colossal omnibus bills, reveal how the AKE developed under the assumption that American national interests and the interests of IP producers were fully aligned. Institutions

built at the dawn of the twentieth century to respond to the needs of American manufacturers and industrial workers were adapted to respond to the needs of IP producers and investors, even if those interests were at odds with traditional manufacturing.

These institutional shifts enabled IP producers to exercise tremendous influence on the process of negotiating bilateral and multilateral trade agreements, which culminated in TRIPS. In fact, IP producers seemed to exert substantial influence during the negotiations for TRIPS itself. For example, when the USTR needed concrete evidence of the economics losses associated with "IP theft" to convince foreign negotiators that it was a problem, the agency solicited the IP producers' perspective by entering a notice in the Federal Register which allowed IP lobbyists to formally provide commentary. IP producers and their interest groups participated, virtually alone, in this process and the claims embedded in their economic reports routinely became official statements. A revolving door also opened with former USTR negotiators joining the staffs of IP firms during the Uruguay Round of negotiations. The representatives of IP firms even joined official representatives of the U.S. government at the actual negotiating table, passing notes as the negotiations proceeded (Drahos and Braithwaite, 2003, 94-98, 141). This is not to say that all members of the global IP producer coalition were always aligned. Significant divisions and tensions remained (Drahos and Braithwaite, 2003, 119). But IP producers overcame those differences to align behind a specific set of rules and institutions to govern the GKE and found U.S. government officials deeply receptive to their demands.

In sum, the AKE is situated within a GKE, the institutions of which multinational IP producers substantially shaped. Their goal was both to accelerate global integration so that they could minimize costs by locating the production of goods and commodities abroad while maximizing the global rents they could extract from their IP rights—even if that meant the U.S. government would have to actively subsidize competition against growers and manufacturers at

home. They pursued that goal with singular focus over the course of 14 years, and while TRIPS represents the culmination of this effort, many smaller institutional reforms that IP producers lobbied for throughout the 1980s ultimately made TRIPS possible. The story of these developments is difficult to square with a theory which suggests middle-class voters are decisive in demanding pro-competitive policies, as few voters (indeed, few close political observers) were even aware of these developments, let alone championing them. And the policies demanded did not seek to promote competition across the global economy. They instead sought to expose "smokestack industries" to intense competition while dramatically expanding the monopolistic position of those firms that could produce new and valuable IP. Rather, the story of these developments conforms much more closely with the view that, because the emerging AKE was organized around IP, IP producers found pro-business Republicans and pro-IP Democrats receptive to their policy demands, which enabled IP producers to achieve incredible success in domains of public policy that garnered little attention in the broader public.

1.4.2 The National Industrial Innovation Debate

As Democrats embraced the AKE as a salve to the nation's declining economic competitiveness, an important political debate unfolded about the role the federal government would play in the AKE transition. The industrial policy debate, as it came to be known, was sprawling and expansive. But the debate mostly revolved around the question of whether the United States should create centralized institutions for coordinating federal investments in scientific research and technological development, much like the Ministry of International Trade and Industry did in Japan (Johnson, 1982). It began during the Carter administration and reached its apex during President Reagan's first term, but it fizzled out by 1984 when Walter Mondale decided that Reagan was more vulnerable on the question of fiscal policy in that year's presidential election. An ideological re-framing of the

question as whether the United States should have an industrial policy enabled partisans to take sides but hobbled the overall debate. The question was not whether the United States should have an industrial policy. It already had one. One legacy of the AKS was a de-centralized industrial policy developed ad hoc by a plethora of executive agencies with different legislative mandates and responsibilities to different Congressional oversight committees. The real question was whether the federal government should try to coordinate those policies and investments to some politically consensual end. Confusion also arose as to whether industrial policy should be forward-looking, to facilitate AKE development, or backward-looking, to prevent industrial decline (Graham, 1992).

Partly because of the confusion surrounding the industrial policy debate, the conventional historical narrative is that it ended without generating any policy consensus at the federal level, which left the federal government with the de-centralized architecture of the AKS and paved the way for entrepreneurial states to fill the policy void (Graham, 1992). As suggested above, conservatives bristled against the prospect of an activist government "picking winners" in the marketplace while liberals, despite their passion, failed to produce a coherent vision of what industrial policy in the United States should look like. This perspective is accurate, but it omits an important area in which political consensus did develop and which became essential for the construction of the AKE: industrial *innovation* policy rooted in patent reform.

In early 1978, President Carter assembled an advisory committee of "approximately 500 private sector participants and 250 representatives from 28 federal agencies" to address the nation's productivity slump and to propose a package of industrial policy reforms that would help end the recession (Turner, 2006). The Advisory Committee on Industrial Innovation divided into a series of subcommittees to address a wide range of domestic policies, from trade and environmental policy to federal procurement, but it is the subcommittee on patent and information policy that would go on to chart the path of the AKE transition. IP producers and the service workers that support

them were heavily represented on the subcommittee, as its membership included representatives from machine manufacturer Allis-Chalmers, drug maker Merck, defense contractor Itek, robotics company Unimation, camera technology company Eastman-Kodak, chemical company FMC, and oil company Phillips Petroleum along with eight others who were mostly prominent patent attorneys or lobbyists.

As with the other subcommittees, the patent subcommittee drew its membership largely from corporate managers and legal professionals though a separate public interest subcommittee commented on their final report, and a labor subcommittee submitted its own separate report. The public interest commentary is short and mostly unremarkable, but it opposed further attempts by industry to expropriate economic gains flowing from publicly funded research, and it opposed the practice of assigning all rights in inventions to IP producers with few if any royalty rights going to the actual inventors. The even briefer labor commentary agreed on these points but went further, calling for the use of compulsory licensing when patents have clear social benefits and for expansive federal investments in research and development that did not just meet military and aerospace needs but also supported innovations to address urban, environmental, and other social problems.

But it was the IP producers' final report, issued in 1979, that would go on to provide a prescient blueprint for AKE development in the divided government of the Reagan and Bush administrations, when the House remained under Democratic control. The report made five major patent reform proposals, all of which would come to pass by 1994. First, it recommended the creation of a central court to hear patent appeals to eliminate jurisdictional conflicts, which Congress did when it created the Court of Appeals for the Federal Circuit in 1982. Second, it recommended that Congress give corporations exclusive rights in patents on publicly funded research, which Congress did when it passed the Bayh-Dole Act of 1980 and the Stevenson-Wydler Act of 1980.

Third, it recommended that patent terms be extended when commercialization is delayed due to federal regulations, which mostly impacted drug companies that had to obtain FDA approval before they could go to market with a new patented drug. Congress did so in the context of a much broader overhaul of pharmaceutical patenting with the Hatch-Waxman Act of 1984. Fourth, it promoted a foreign policy that would encourage other nations to adopt American patent standards, which Congress and the USTR achieved with TRIPS. Fifth, it recommended that Congress clarify that emerging technologies like computer software and biotechnology could receive patent protection, which Congress did not do (Advisory Committee on Industrial Innovation: The Industrial Advisory Subcommittee on Patent and Information Policy, 1979, 148-49). But the Supreme Court mostly resolved the question of biotechnology patenting in 1980 and its broader admonition that patent law protected "anything under the sun made by man" gave IP producers what they wanted.[14]

IP producers had another problem, though. Patents promote innovation at the risk of future anti-competitive conduct, and the AKS had emboldened antitrust officials to attack mergers involving the acquisition of patents and to police the ways in which corporations abused their patent rights under the doctrine of patent misuse. Towards the end of their report, IP producers recommended a host of measures to "keep the Department of Justice from inhibiting innovation" (Advisory Committee on Industrial Innovation: The Industrial Advisory Subcommittee on Patent and Information Policy, 1979, 164). In retrospect, their recommendations seem modest. They could not have foreseen that Reagan's commitment to market fundamentalism would all but eliminate antitrust scrutiny of mergers and acquisitions (see Chapter 4). Nor could they have anticipated the rising influence of the Atari Democrats. DOJ officials in the Clinton administration made no attempt to roll back the lax merger guidelines from the Reagan era, but sought instead to clarify, for IP producers, that in the Department's perspective, patents do not confer market power and, even

[14] *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

if such market power is established, the Department will not assume that such power violates the antitrust laws.[15]

To the end of developing the AKE, Congress joined in these efforts. With the National Cooperative Research Act of 1984, it eliminated antitrust liability for joint ventures engaged in research and development. With the Patent Misuse Reform Act (1988), it narrowed the acts that constitute patent misuse. And with the National Cooperative Research and Production Act (1993), it eliminated antitrust liability for joint ventures engaged not only in research and development but in manufacturing as well. As other scholars have noted, federal attitudes towards patents and antitrust policy seem to evolve over time in tandem (Hart, 2001; Christophers, 2016). But the law is not itself an agent that develops according to the internal logic of capitalist imperatives; it is an output of political processes. The Democratic turn towards the knowledge economy, simultaneous with the Republican turn towards the market, motivated and drove these parallel shifts in federal institutions of American political economy (Krippner, 2011).

Figure 2 further reinforces how dramatically Congressional attitudes towards patents and antitrust changed over the post-war period. It shows, for every year from 1945-2020, the share of all Congressional hearings dealing with patent or IP issues (black line) and those dealing with antitrust issues (gray line). Consistent with existing scholarship on antitrust reform, the share of Congressional hearings dealing with antitrust issues rises significantly after 1945, peaks in the early 1980s, but then rapidly declines following President Reagan's decision to substantially narrow antitrust oversight (Khan, 2018; Stoller, 2019). From about 1945-1962, Congressional interest in patent reform is roughly correlated with its increasing concern over antitrust and market power. But after a series of hearings in 1961 and 1962 about monopolistic pricing by drug

[15] *Antitrust Enforcement and Intellectual Property Rights*, technical report (U.S. Department of Justice and Federal Trade Commission, 1995), Section 1 https://www.justice.gov/atr/archived-1995-antitrust-guidelines-licensing-intellectual-property.

companies and making federal patent policy consistent across agencies, IP became decoupled from the Congressional interest in antitrust until the late 1970s. From that point through the middle of the 1990s, IP and patent reform issues began taking up more and more of the Congressional agenda and it has continued to do so since the 1990s, albeit more episodically. As the figure suggests, the period of AKE development, from 1980-1994, was characterized by declining interest in antitrust oversight and accelerating interest in IP reform.

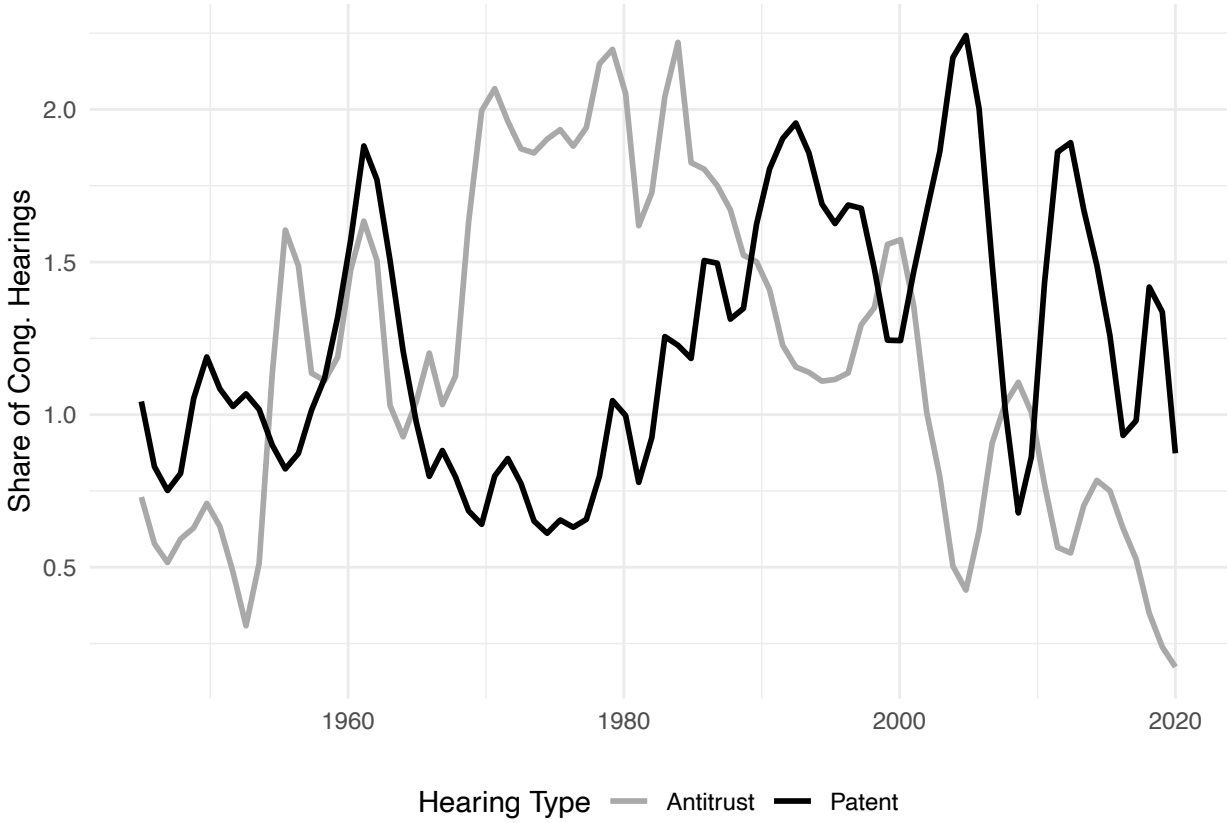

Figure 2: This time series shows the share of all Congressional hearings that involved patent (black line) or antitrust (gray line) issues. Data on hearings comes from ProQuest Congressional. Antitrust hearings include any hearing that contained the terms 'antitrust' or 'anti-trust' in the hearing description; patent hearings include any hearing that contained the terms 'patent' or 'intellectual property' but not 'land' in the hearing description (land grants were historically referred to as land patents). The curves have been smoothed to avoid overplotting.

The politics and legal technicalities behind many of these bills is much more complex than the sketch above suggests, but these complex historical contingencies should not obfuscate

the general trend, which was to strengthen patent laws and diminish antitrust enforcement to the benefit of IP producers. In the process, government officials abandoned most of the tools—institutional legacies of the AKS—that were meant to ensure some public quid pro quo in exchange for stronger patent rights and exclusive rights in publicly funded research and development. The Bayh-Dole Act, for example, gave universities the power to enter into exclusive licenses with IP producers only if the invention would be manufactured substantially in the United States. At the same time, Congress made it quite difficult if not impossible to police this command by exempting these arrangements from the Freedom of Information Act (Rai and Sampat, 2012). As a result, no one knows whether patents developed with public funds have only been licensed to IP producers that commit to domestic manufacturing. The early political consensus seemed to favor an AKE that would benefit American workers, but the interests of multinational IP producers remained protected by a lack of transparency.

The outpouring of patent reform legislation also altered the AKE's political dynamics. In the conventional way that new policies create new interest groups to support them (Campbell, 2003), the Bayh-Dole Act led to the creation of the Association of University Technology Managers, an interest group representing the patent licensing offices of universities. The AUTM has repeatedly blocked efforts to make patented technologies more broadly available for research and development (Short, 2016). Now that universities stand to benefit from the lucrative rents that patents can generate, they more readily align themselves, politically, with their corporate benefactors. In this fashion, many universities abandoned norms of openness and sharing and accepted norms of appropriation, contributing to the creation of the "market university" (Berman, 2012).

In some respects, the creation of the Federal Circuit was the most significant and politically interesting victory as it involved the controversial construction of a novel judicial institution that would not only move the nation from the AKS to the AKE but would also insulate those

developments from political pressure. The period of Congressional activism in patent reform described above, from 1980 to 1994, is actually an anomaly and reflects the intense bi-partisan commitment to hastening the AKE transition. In most periods, most American patent law is made by courts, by federal judges resolving legal questions and disputes that arise under the patent laws. Patent law is therefore an area of law that lawyers can shape while avoiding the demands of coalition building and the multitude of veto points that obstruct federal policy reform. The main problem that IP producers had with the federal judiciary was that patent lawsuits in federal district courts were, like most other cases involving federal law, being appealed to regional circuit courts and eight of the eleven circuit courts still viewed patents as monopolistic devices that should be treated with skepticism (U.S. Congress, House, Committee on the Judiciary, n.d.; Sachs, 2013). IP producers therefore wished to eliminate this institutional and ideological legacy of the AKS.

The solution the IP producers settled on was to create a special appellate court staffed with pro-patent lawyers that would hear appeals in patent cases from all the federal district courts. That is precisely what the Federal Courts Improvements Act of 1982 did. Its passage was by no means guaranteed. Personal accounts suggest two factors made a difference. First, Carter's industrial innovation review transformed the issue from a small technocratic debate about appellate reform pushed by bureaucrats within the Department of Justice to a central plank in the AKE platform. Second, the agency officials who had worked on the issue in the past organized corporate patent lawyers into a vocal interest group to overcome the opposition of trial lawyers. Of the 85 letters signed in support of the bill, 76 were signed by corporate patent counsel, and the companies that turned out in support of the Act represented three quarters of the nation's industrial product (Meador, 1992; Newman, 2002; Scherer, 2009).

Some of those who helped create the Court would end up serving on it. Pauline Newman, the corporate patent attorney for FMC who served on the patent subcommittee of Carter's industrial

innovation review, was the first judge appointed to the Court in 1984. Randall Rader, counsel to the Senate Judiciary Committee that approved the Act, joined her on the bench in 1990. Even when lawyers with patent backgrounds remained a minority on the Court, they decided a strong majority of the Court's patent cases, and the Court's strong pro-patent perspective played some role in causing a flood of patent applications that were approved and held valid at much higher rates in judicial disputes (Landes and Posner, 2004). Absent Supreme Court intervention, which is rare in patent cases, the Federal Circuit mostly dictates the substance of patent law. As an Article III Court it is staffed by judges who, after surviving Senate confirmation, receive lifetime tenure and remain relatively immune from politics.

The creation of the Court of Appeals for the Federal Circuit, and its staffing with pro-patent judges, emphasizes the prominent role of the judiciary in shaping American political economy, especially its role in defining the exact contours of the property rights that undergird the American form of capitalism (Horwitz, 1977; Skowronek, 1982; Christophers, 2016; Thelen, 2021). Because AKE development was so tightly tethered to stronger IP rights, and because the AKS had institutionalized an ideological aversion to patent rights in the federal judiciary, Congress had to substantially alter the structure the federal judiciary to create a pro-patent haven that had the power to quickly reorient the legal basis of American capitalism.

The substantial body of patent reform legislation from 1980-1994, summarized in Table 2, belies the notion that the industrial innovation debate produced no consensus at the federal level (Graham, 1992). True, the parts of the debate concerning reindustrialization and central planning were quickly dispatched during Reagan's presidency. When the headwinds favoring AKE development confronted a President who believed the state had a limited role to play in a capitalist society, it became clear that the AKS's opaque and decentralized structure for investing in science and technology would remain, as would the strong preference for investments that bolster

national security (Block, 2008). Congress amended the Employee Retirement Income Security Act (ERISA) in 1979 to allow pension fund managers to invest as much as five percent of a fund in venture capital, which caused a massive surge in venture capital investment (Eisinger, 1988; Lazonick and Mazzucato, 2013). As noted above, the Small Business Innovation Research Act of 1982 essentially created a federal venture capital program administered by the Small Business Administration. The NSF began experimenting with university-industry research centers to draw together scientists from across multiple institutional settings. To help the semiconductor industry better compete against Japanese firms, the Reagan administration established a research consortium (SEMATECH) in Austin, Texas in 1987. Starting in 1988, an Advanced Technology Program and a Manufacturing Extension Partnership, both administered by the National Institute of Standards and Technology, provided federal matching grants for promising new technologies and used experts to help manufacturers make use of advanced technologies (Block, 2011). These and other policies tried to fill gaps in the AKS's system of technological production, promote collaboration and the public-private partnerships that were so central to the Atari Democrat's neoliberal vision, and shore up declining industries that impacted national security. They are extensions of the AKS into the modern era.

But within the constraints of divided government, a strong bi-partisan consensus also developed in favor of industrial innovation policies that would be achieved instead through market-oriented devices like patent reform, and that movement altered central institutions of American political economy to hasten AKE development. Table 2 reveals the strong bi-partisan majorities that aligned behind the most significant reforms. For each major piece of patent reform legislation, the table shows the vote on each major House action (usually a vote to pass or a vote to adopt a Senate version), but it also shows comparable votes for more controversial non-patent legislation in similar time frames (rows with gray backgrounds). For example, in the 96th Congress,

when Democrats held 276 seats, the Bayh-Dole and Stevenson-Wydler Acts both breezed through the House by voice vote on suspension with at least a two-thirds majority (290 votes in favor), but a bill to centralize and coordinate federal education programs in a new Department of Education only narrowly survived with 215 votes. Then, in the 98th Congress, when Democrats held 269 seats, three major patent reform initiatives passed by large margins (366, 418, and 368 votes in favor), but a more controversial bill to revise social security financing passed much more narrowly on party lines (284 votes in favor). Many of the Atari Democrats' more ambitious proposals for the AKE foundered in this same time frame. But when they focused on IP rights as a tool for faciliting AKE development, they were able to build commanding bi-partisan majorities. And their successes, in this regard, belie the notion the industrial policy debate produced no meaningful federal action.

Table 2: **IP Reform Had Deep Bi-Partisan Support**

Cong.	Public Law Number	Public Law Title	Main Purpose(s)	Relevant House Actions	Vote (Aye-Nay)
96	PL96-517 (94 Stat. 3018)	Patent and Trademark Laws, amendments (Bayh-Dole)	Give industry the right to obtain exclusive licenses on university patents	Nov. 17, 1980 passed HR6933 by voice vote on suspension (Cong. Rec. 29890-901); Nov. 21, 1980 concurred in Senate amendment by voice vote (Cong. Rec. 30556-60)	>289 aye; >289 aye

Table 2: **IP Reform Had Deep Bi-Partisan Support** *(continued)*

Cong.	Public Law Number	Public Law Title	Main Purpose(s)	Relevant House Actions	Vote (Aye-Nay)
96	PL96-480 (94 Stat. 2311)	Stevenson-Wydler Technology Innovation Act of 1980	Give industry the right to obtain exclusive licenses on federal agency patents	Sep. 8, 1980 amended S.1250 by voice vote on suspension (Cong. Rec. 24560-68); Oct. 1, 1980 receded from House amendments and concurred in Senate amendments by voice vote (Cong. Rec. 28578)	> 289 aye; >289 aye
96	PL96-88 (93 Stat. 668)	Dept. of Education Organization Act	Centralize and coordinate federal education programs across the agencies	July 11, 1979 passed HR2444 by roll call; Sep. 27, 1979 vacated HR2444 and passed S210 by roll call	215-211; 220-205
97	PL97-164 (96 Stat. 25)	Federal Courts Improvement Act of 1982	Create a centralized appellate authority on patent law	Nov. 18, 1981 passed HR4482 by roll call	323-77
98	PL98-417 (98 Stat. 1585)	Drug Price Competition and Patent Restoration Act of 1984 (Hatch-Waxman)	Extend period of patent protection to account for regulatory review; simplify approval process for generic drugs	Sep. 6, 1984 passed HR3605 by roll call	366-0
98	PL98-462 (98 Stat. 1815)	National Cooperative Research Act of 1984	Remove antitrust liability for joint ventures engaged in research and development	May 1, 1984 passed HR5041 by roll call	418-0

Table 2: **IP Reform Had Deep Bi-Partisan Support** *(continued)*

Cong.	Public Law Number	Public Law Title	Main Purpose(s)	Relevant House Actions	Vote (Aye-Nay)
98	PL98-573 (98 Stat. 2948)	Trade and Tariff Act of 1984 (Title III is The International Trade and Investment Act)	Establish unilateral authority under Section 301 of the Trade Act of 1974 to sanction nations without adequate IP protection	June 28, 1983 passed HR3398 by roll call; Oct. 9, 1984 agreed to conference report by roll call	368-43; 386-1
98	PL98-21 (97 Stat. 65)	Social Security Amendments Act of 1983	Revise social security system of financing to assure solvency	March 9, 1983 passed HR 1900 by roll call	284-149
100	PL100-418 (102 Stat. 1107)	Omnibus Trade and Competitiveness Act of 1988	Require USTR monitoring and investigations under Section 301; weaken the domestic industry requirement in ITC proceedings involving patents	July 13, 1984 passed HR4848 by roll call	376-45
100	PL100-703 (102 Stat. 4674)	Patent and Trademark Office Authorizations (Title II is the Patent Misuse Reform Act)	Narrow the acts that constitute patent misuse; make the doctrine an extension of antitrust law and not a tool for enforcing general principles of patent policy	Oct. 5, 1988 passed HR4972 by voice vote on suspension (Cong. Rec. 28593-95); Oct. 20, 1988 concurred in Senate amendments by voice vote on suspension (Cong. Rec. 32293-96)	>289 aye; >289 aye
101	PL101-580 (104 Stat. 2683)	Inventions in Outer Space	Extend U.S. patent laws to inventions made in space	Oct. 26, 1990 passed S459 by voice vote on suspension (Cong. Rec. 35117-19)	>289 aye

Table 2: **IP Reform Had Deep Bi-Partisan Support** *(continued)*

Cong.	Public Law Number	Public Law Title	Main Purpose(s)	Relevant House Actions	Vote (Aye-Nay)
101	PL101-649 (104 Stat. 4978)	Immigration Act of 1990	Change the level and preference system for immigrant admissions	Oct. 3, 1990 passed HR4300 by roll call; Oct. 27, 1990 adopted conference report on S358 by roll call	231-193; 265-119
102	PL102-560 (106 Stat. 4230)	Patent and Plant Variety Protection Remedy Clarification Act	Negate state sovereign immunity from liability for patent infringement (later declared unconstitutional)	Oct. 3, 1992 passed S758 by voice vote on suspension (Cong. Rec. 31182-83)	>289 aye
103	PL103-42 (107 Stat. 117)	National Cooperative Production Amendments of 1993	Remove antitrust liability for joint ventures engaged not only in research and development, but in manufacturing as well	May 18, 1993 passed HR1313 by voice vote on suspension (Cong. Rec. 10094-99)	>289 aye
103	PL103-465 (108 Stat. 4809)	Uruguay Round Agreements Act	Make acceptance of American patent standards a precondition for joining the World Trade Organization (TRIPS)	Nov. 29, 1994 passed HR5110 by roll call	289-145
103	PL103-31 (107 Stat. 77)	National Voter Registration Act of 1993	Establish voter registration by mail or at driver's license application for states that do not allow same day registration	Feb. 4, 1993 passed HR2 by roll call; May 5, 1993 adopted conference report on HR2 by roll call	260-160; 260-164

Table 2: **IP Reform Had Deep Bi-Partisan Support** *(continued)*

Cong.	Public Law Number	Public Law Title	Main Purpose(s)	Relevant House Actions	Vote (Aye-Nay)

Note:
This table shows the Congress number, public law number and title, and main purpose of major patent reform legislation (rows with white background) and, for comparison, some more partisan bills from the same time period (rows with gray background). The table includes the relevant actions in the House of Representative (with parenthetical citations to the Congressional Record) and the House roll call vote where available. Bills passed by voice vote on suspension require a two-thirds majority (or 290) to pass.

1.4.3 The Entrepreneurial States

As the federal debate on industrial policy consolidated around patent reform, entrepreneurial states (and cities) began to address federal policy shortcomings. The move came with a dramatic shift in the way state and local officials conceived of economic development. State and local governments have always played a prominent role in managing economic affairs, but in the days of the AKS, most governors engaged in zero-sum attempts to lure footloose firms away from other states with the promise of special tax incentives and cheap labor. As the nation reoriented its economic priorities and moved towards the AKE, state and local representatives began to align behind a different consensus. State officials began to perceive wage stagnation less as an advantage and more as a sign of economic decline; they focused less on using capital subsidies and cheap labor to steal low-paying jobs from other states and more on incubating new businesses and industries that could export products to other states and even to other nations (Eisinger, 1988, Chs. 1-4).

The movement caught on fast, and by the middle of the 1980s the vast majority of states had designed policies to hasten their integration into the AKE despite, and in the face of, growing budget shortfalls. By 1986, at least 25 states had adopted some form of venture capital program providing a state equivalent to the federal programs administered through the Small Business

Administration, and some developed novel techniques like earmarking portions of public employee retirement funds for local venture capital investment (Eisinger, 1988, 249-65). By 1984, 34 states had sponsored some form of high-technology development program and 44 states had adopted some form of university-industry research center comparable to the federal innovation centers sponsored by the NSF to promote technology transfer (Eisinger, 1988, 275-89). In the 1970s governors mostly traveled abroad to lure foreign capital into their states; by 1984, states spent two thirds of their trade-related expenditures on promoting exports in a manner similar to the federal Export-Import Bank (Eisinger, 1988, 294).

The institutional similarity between these programs and their federal equivalents can obscure their very different motivations: entrepreneurial states tended to adopt knowledge economy policies to redress the severe imbalances of the AKE. State venture capital pools were partly used to remedy the extreme geographic concentration in private venture capital. State sponsored university-industry collaborations were often meant to correct the heavy defense orientation of federal efforts. State export promotion focused on smaller firms that often did not receive assistance from the Export-Import Bank. Though the entrepreneurial political leaders for the states turned to the same policy tools that sculpted the decentralized federal system of investment, they used those tools to achieve local purposes and soften the blow of a federal policy that benefited regions already rich in AKE infrastructure, multinational firms, and defense contractors.

The importance of entrepreneurial states in AKE development is also reflected in the prominent role of state governors in defining the Democratic Party's turn towards the AKE. In fact, in some ways, the Party's evolving commitments to the AKE can be told through the presidential aspirations of three governors: California's Jerry Brown, Massachusetts' Michael Dukakis, and Arkansas' Bill Clinton.

Brown's attempts at winning the presidential nomination in 1976 and 1980 would spectacularly fail, but as Governor of California Brown led the way in articulating the Democratic vision for AKE development. As the debate over industrial policy that began under the Carter administration devolved into a debate over patent reform during the Reagan administration, Brown inaugurated his own Commission on Industrial Innovation and appointed prominent IP producers like Steve Jobs and David Packard and marketing expert Regis McKenna to serve on it. The Commission's final report, issued in September of 1982, called for a fully developed industrial policy that would revitalize existing industries like steel, ensure the competitiveness of new industries like semiconductors, and counter the industrial policies of nations like Germany and Japan. Where conservatives maligned industrial policy as "picking winners," Brown's commission wore that accusation as a badge of honor. To accomplish its goals, the Commission claimed, "we need a national strategy designed to encourage the spread of 'winning technologies'... throughout our entire industrial structure" (Executive Advisory Council, 1982).

Where Brown failed to attain the Democratic nomination, Dukakis eventually succeeded and, in some respects, his career better represents the shifting politics of the Atari Democrat movement. Like other Atari Democrats, Dukakis won his first gubernatorial election in 1974 by distancing himself from the urban, ethnic old guard of the Massachusetts Democratic Party and echoing George McGovern's message of liberating technological development from its dependency upon the Pentagon. Dukakis then lost to Edward King in 1978 after IP producers, organized as the Massachusetts High Technology Council (MHTC), campaigned against him on the issue of limiting property taxes. But Dukakis then mended his relationship with the MHTC—which did not have a single unionized company among its more than one hundred members—during his time out of office and, after cultivating ties with economic advisers at MIT and Harvard like Lester Thurow and Robert Reich, he came back to victory in 1982. During his second term, Dukakis

sought to turn Massachusetts into the "very model of the high tech state" (Geismer, 2015, 268), and the period of economic revitalization that he presided over from 1982 to 1988 came to be known as "the Massachusetts Miracle."

Whether any of Dukakis' policies actually played a role in producing the perceived miracle is uncertain. The state's economic revitalization may have had more to do with the fact that President Reagan dramatically increased defense spending while slashing federal support for state governments under the auspices of the "new federalism," a combination of policies that limited fiscal support for conventional state industrial policy while also bestowing federal largesse in defense heavy states like California and Massachusetts (Eisinger, 1988, 67-69). In 1985, Raytheon alone received $2.3 billion in defense contracts (Geismer, 2015, 270) and aggregate defense production came to roughly $12 billion or 8.3 percent of Massachusetts' net product (Lampe, 1988, 11); in the same year, the state's entire general operating fund came to only $5.6 billion (United States Census Bureau, 1985, 278). The Pentagon's central role has led some to argue that the economic turnaround is not that miraculous and to characterize the governor's role in it as minor (Lampe, 1988, 16). Dukakis claimed political credit, nevertheless. And in doing so, he tied his own political career and the future of the Democratic party to both the broader goal of AKE development and the specific policies that characterized his tenure, like more conservative forms of welfare reform combined with "public-private" partnerships to promote startup formation.

Clinton ultimately succeeded where both Brown and Dukakis failed, and he did so in an election cycle in which knowledge economy politics dominated. To prevail in the Democratic primary, Clinton had to defeat both Brown and Paul Tsongas, the Atari Democrat whose district included the town of Lowell, home to the prominent computing company, Wang Laboratories. Clinton then had to compete in the general election against an incumbent Republican president and a third-party candidate, H. Ross Perot, who founded Electronic Data Systems and effectively created

the industry of information technology outsourcing. In a field crowded with politicians giving voice to the demands of technology entrepreneurs, Clinton prevailed by carefully cultivating relationships with California's Silicon Valley and naming technology wonk, Al Gore, to be both his running mate and his technology czar. Clinton also astutely distanced himself from the "Massachusetts liberal," Dukakis, while embracing virtually all of Dukakis' governing agenda (Geismer, 2015, 278-79). Clinton's calculus paid dividends. He ultimately won the public endorsement of Xerox CEO, Paul Allaire, Apple CEO, John Sculley, Hewlett-Packard CEO, John Young, and twenty-nine other IP executives (O'Mara, 2019, 292-96).

Young's endorsement of Clinton in the 1992 race illustrates the key political shift that took place between 1980 and 1992. Throughout the 1980s, as Democrats began to articulate their allegiance to the AKE, business managers for IP producers largely remained aligned with Reagan and Bush (O'Mara, 2019, 192-95). But the Reagan era also widened political cleavages among these executives in a way that precipitated Young's conversion. When Jerry Brown released his blueprint for national industrial policy in September of 1982, Reagan grew angry at the idea of Democrats claiming the mantle of entrepreneurship and started his own Commission on Industrial Competitiveness, which Young chaired (O'Mara, 2019, 213-15). The Commission released its report in January of 1985. It painted a bleak picture of declining American competitiveness by almost any chosen metric and recommended policies that looked like industrial policy rebranded as "competitiveness strategy." Reagan ignored the report in its entirety despite a joint resolution demanding a presidential response supported by 30 senators in each party (Graham, 1992, 168-69, 220). Reagan abhorred the idea of industrial policy and pursued AKE development mostly through broad untargeted tax cuts intended to promote investment coupled with massive increases in defense spending. If Japan had MITI, the US would have DARPA (O'Mara, 2019, 223-26). Young and the other executives that endorsed Clinton in 1992 believed that the federal government would

have to do much more to resolve the competitiveness crisis, and Clinton quite effectively gave voice to those demands.

The institutional shifts that demarcate the transition from the AKS to the AKE are summarized in Table 1. Though most of these changes took place at the national and global level, political leaders at the state level also played a role in shifting strategies for economic development from the zero-sum devices of the AKS to the innovation-oriented devices of the AKE, and they did so in ways that met local needs and rectified imbalances in the federal framework. And because demonstrated state leadership in facilitating AKE development increasingly became a strong political asset, state leaders—in their attempts at the presidency—played a substantial role in articulating the Democratic Party's relationship to the AKE. Ironically, the Governor of Arkansas, not California or Massachusetts, would become the defining Democratic spokesperson for the AKE. He achieved that victory in part because the industrial policy debate widened political cleavages among technology executives and elected officials during the Reagan and Bush administrations. For those who viewed the Semiconductor Industry Association lobbying for SEMATECH as a handout to "California Crybabies" the future lay with Bush. For those, like John Young, who saw research consortia like SEMATCH as exemplary federal policy, the future lay with Clinton.

1.5 Conclusion

The American knowledge economy is not a foreordained product of globalization or automation or technological development. Nor is it a natural form of political economy that attains when the economic beneficiaries of those outcomes, namely highly educated workers, formulate and express political demands. It is instead a politically generated consensus for producing economic prosperity and economic advantage against other nations in which intellectual property, and the businesses that produce it, play a leading role. As is true in many other domains of American political

development, policy entrepreneurs and organized interest groups, not rational voters, played the most important role in reconfiguring essential institutions to facilitate the transformation. In the actual story of AKE development, Atari Democrats and IP producers, not decisive middle-class voters, had the most enduring legacy.

Intellectual property in general, and patents in specific, are at the center of the AKE, but are by no means the whole story. The AKE relies, for example, on a massive, decentralized infrastructure for investing in scientific and technological development as well as the commercialization of new technologies. But that infrastructure is a legacy of the AKS and as such it does not distinguish the AKE, institutionally, from what came before. Similarly, American businesses can acquire substantial market power through devices other than patents (first-mover effects, network effects, control of internet user information, etc.). But these forms of acquiring market power were never at the heart of the political consensus behind the AKE, even if that consensus accepted rent-seeking by technology firms as an acceptable price to pay for increasing the nation's competitive position. Only when we focus on that consensus, and on the institutional changes it produced, does it become clear that the AKE is unique in its dependence on IP as a source of generating economic advantages for American businesses and for the nation.

Plenty happened after 1994, the end of the period discussed in this chapter, that contributed to AKE development. But those events are mostly contemporary manifestations of dynamic processes that were unleashed in the formative period of AKE development, from 1980 to 1994, when Congress erected the AKE's institutional architecture. New programs were added to the alphabet soup of federal initiatives and TRIPS gave way to TRIPS+ and then the Trans-Pacific Partnership, but these are natural extensions of what happened before. The Democratic Party deepened its commitments to the AKE under Presidents Clinton and Obama and continued to encounter intense conservative opposition only when it imagined a major role for the state other

than addressing national security imperatives. The Democratic Party continued to ignore the social and political ramifications of allowing their chosen national champions to acquire unprecedented market power, and now faces escalating demands to restore the Brandeisian tradition of robust antitrust enforcement (Khan, 2018; Stoller, 2019). And, because the narrow neoliberal vision of the AKE that emerged between 1980 and 1994 inherently exacerbates many forms of existing inequality (see Chapter 2), growing factions within the Party are questioning whether social democracy or some other form for arranging the American political economy would better serve the national interest. These and other contemporary controversies arguably have roots in the political choices made during the AKE's formative period, and their resolution may depend on more direct confrontation with the limits of the Democratic vision for the AKE that emerged in that era.

2 Inequality in an Age of Intellectual Property Production: The Distributional Consequences of The American Knowledge Economy

2.1 Introduction

Over the last forty years, the American political economy has become more unequal in many important ways. Nationwide, both the income and wealth distributions have become substantially more polarized (Piketty, 2014; Saez and Zucman, 2016) while inter-generational mobility has declined (Chetty et al., 2017). These trends also have a distinct geographic expression. While many rural areas and some heavily industrialized cities have endured intense economic stagnation, a relatively small number of metropolitan areas have experienced dramatic economic growth (Moretti, 2013) and, paradoxically, these well-performing regions seem to produce high degrees of income inequality and high levels of mobility at the same time (Chetty et al., 2014; Galbraith, 2012a, Ch. 6), contrary to conventional expectations (Corak, 2013). Similarly, the augmented gap in economic opportunities between rich and poor nationwide has created a widening academic achievement gap (Reardon, 2011; Corak, 2013), and the more affluent and educated segments of the population have become much more geographically segregated (Reardon and Bischoff, 2011; Murray, 2012). And all of this has unfolded in a context where the nation's troubling history of racial oppression has made many of these trends even more stark for Black Americans (Rugh and Massey, 2010; Chetty et al., 2020) and has complicated the creation of social policies designed to ameliorate rising inequality (Soss, Fording, and Schram, 2008; Tesler, 2012).

This complex thicket of troubling socio-economic symptoms emerged while the American political economy navigated two substantial transformations, both generated in response to the political and economic crises of the 1970s. One the one hand, the American political economy became increasingly financialized in the sense that families, governments, and businesses began

to accrue larger shares of profits through financial intermediation rather than through productive investment or trade (Krippner, 2005). In an effort to depoliticize macroeconomic management in the wake of Keynesian decline, the American government—led by Republicans but with the support of many Democrats—engaged in a series of experiments in monetary policy, financing deficits through foreign borrowing, and financial deregulation that expanded the supply of credit for financial intermediation and pushed non-financial firms to increasingly seek revenue through financial markets (Krippner, 2011).

On the other hand, the nation also accelerated its transition into the knowledge economy, but did so in way that depended intensely on the commodification of new technological knowledge in the form of intellectual property (IP) (Coriat and Weinstein, 2012). In a context of declining economic competitiveness, the American government—led by Democrats but with the support of many Republicans—sought to generate economic advantage through the production of new technologies. But, as argued in Chapter 1, in an era of divided government, the political consensus in support of the knowledge economy converged around a set of market-oriented reforms to strengthen IP rights in lieu of other policies that envisioned a more substantial role for the state (see also Schwartz, 2022; Sell, 2003).

In what ways have these two profound transformations in the American political economy contributed to or exacerbated the kinds of inequality described above? The distributional consequences of increasing financialization are somewhat straightforward, theoretically, and relatively well explored in existing scholarship (Davis and Kim, 2015). As argued in one prominent review article, financialization increases the economic returns flowing to the relatively small segment of the population that has disposable assets to invest in financial markets while also causing wage stagnation which forces many wage earners to rely increasingly on debt to maintain consumption (Davis and Kim, 2015). More fundamentally, by making financial speculation more attractive than

productive investment, a financialized economy creates large wage premiums for those highly educated professionals who can engineer lucrative financial opportunities even if (some would say especially if) those opportunities impose great costs on the working class. For example, as argued in Chapter 4, some strategies for producing financial income like large corporate mergers lead to layoffs and economic stagnation for many workers while also generating golden parachutes for executives and enormous advisory fees for legal and financial professionals (see also Philippon and Reshef, 2012). In these and other ways, the relationship between financialization and growing inequality is somewhat manifest.

But if the relationship between financialization and inequality is relatively straightforward, the distributional consequences of the turn towards the American knowledge economy (AKE) are not as apparent and have only recently garnered any systematic treatment from social scientists (Kwon, 2016; Hope and Martelli, 2019; Iversen and Soskice, 2019; Ansell and Gingrich, 2022; Schwartz, 2022). Existing research provides important insights about the connection between the knowledge economy transition and rising inequality in the United States, but also suffers from a common limitation: these analyses lack a precise definition of the AKE rooted in observable facts about institutional change and tend to sweep a vast and growing array of socio-economic trends under the broad banner of the knowledge economy transition. Here, as in Chapter 1, I define the AKE as a politically contested growth regime that relies intensely on the production not of knowledge, per se, but of commodified forms of technological knowledge, like patents and trade secrets, to guide the nation's economic development (see also Coriat and Weinstein, 2012). I then draw on existing research and some newly developed data sets to argue that this peculiar institutional form, in which the state prioritizes IP production over human capital formation, exacerbates many forms of inequality.

From this vantage point, it is possible to focus the analysis by first clarifying what the

American knowledge economy is not. It is not a synonym for the service transition or the broader theory of post-industrialism constructed around the observation of the service transition (Bell, 1974; Kwon, 2016; Ansell and Gingrich, 2022); nor is it a form of political economy tied to any specific changes in the occupational structure or in the supply and demand for any specific kind of labor, skilled or otherwise (Iversen and Soskice, 2019; Autor, 2019); nor is it a form of political economy tied to any particular technological domain, like internet and communication technologies (or ICT) (Iversen and Soskice, 2019; Hope and Martelli, 2019; Soskice, 2022). Importantly, it is also not a political economy organized around the production of any and all forms of "intangible" capital (Haskel and Westlake, 2018; Ansell and Gingrich, 2022), a broad and inchoate category including "soft" (non-technological) forms of intellectual property like copyrights[16] and trademarks and a wide array of other legal rights (licensing rights, operating rights, franchise fees, mineral rights, etc.). It is instead a political economy organized around the production and utilization of specific kinds of intellectual property that promote technological innovation, especially patent rights.[17] The question raised in this chapter is therefore: through what mechanisms has this specific form of knowledge economy made the American political economy more unequal, either alone or in combination with other institutions or policies?

In the argument that follows, I survey existing research and introduce some new empirical observations using patent data to argue that the AKE exacerbates inequality along many dimensions and also to specify in closer detail the plausible mechanisms through which this happens. In this

[16]Before it became clear that software was patentable under U.S. law, copyright was a popular alternative form of legal protection and, to some degree, copyrights on science and engineering textbooks could also be seen as relevant to the knowledge economy development. But by and large, copyrights cover works of artistic expression and have little to do with the knowledge economy even though copyright interests have been quite successful in leveraging the AKE transition to obtain significant policy concessions.

[17]This is not to say that the observations around which these theories are organized are in some way false or incorrect or that they do not shed light on the relationship between the AKE and inequality. It is only to say that they are not constitutive of the American knowledge economy. The shift from a Fordist economy rooted in manufacturing to a knowledge economy rooted in intellectual property (IP) production almost certainly played some role in inducing these and other important changes in our modern political economy. But the key institutional shifts that separate Fordist from the AKE approach to technological innovation in the United States all involve strengthening the legal enforceability and increasing the global reach of certain forms of intellectual property, especially patents (see Chapter 1).

respect, the argument is closest in spirit to Ansell and Gingrich (2022) and Schwartz (2017, 2022). I agree with Ansell and Gingrich (2022, 387) that "[t]he knowledge economy is not destiny" and that it is instead shaped by institutions and policy. But those authors assume that the knowledge economy transition has exacerbated income and regional inequality through standard economic theories like skill-biased technological change (Goldin and Katz, 2008) and agglomeration effects (Moretti, 2013), and then try to identify how the electoral constraints of U.S. political institutions prevented the formation of coalitions supporting a social or industrial policy response after 1990. In contrast, I question the utility of those standard economic frameworks for understanding the distributional consequences of the knowledge economy transition and try to identify the institutions and polices (and combinations thereof) that caused the American political economy to become more unequal from the outset. Schwartz (2017, 2022) examines how the knowledge economy transition intersected with other policies, like the shift towards a shareholder value model of business management and developments in the legal framework governing franchise rights, to induce changes in firm organization that have have exacerbated income inequality. I build on that analysis by considering a broader set of distributional consequences beyond income inequality and by probing in greater depth how the knowledge economy transition and financialization have intersected to magnify inequality.

2.2 Geographic Inequality

The AKE is relatively unique among advanced capitalist democracies in that it relies intensely on market-oriented reforms, like strong patent laws, to promote private sector investments in technological innovation while minimizing or forgoing strategies, like increased investments in education and public research or robust industrial policies, that leverage state action to make participation in the knowledge economy more equitable. As a result, the AKE tends to exacerbate

inequality along many different dimensions, including across various levels of spatial geography.

At the global level, many of the institutions of the global knowledge economy, in which the AKE is situated, arguably reproduce economic inequality between the global North and South by increasing the monopolistic rents that accrue to IP producers of wealthier nations while suppressing the economic and technological development of less developed nations. Consider the case of textbooks. In 1960, many former colonies and other developing nations faced substantial shortages in basic textbooks and their citizens could not afford the high royalties paid by consumers in more affluent nations. But when the leaders of those nations suggested revising the global copyright regime (the Berne Convention for the Protection of Literary and Artistic Works of 1886) to account for their plight, they triggered a political crisis that ended with no meaningful changes to the status quo. From the perspective of IP producers, the economic logic is simple: any lowering of global legal standards would allow individual publishers to break ranks and bilaterally negotiate with developing nations to supply textbooks at much lower royalties, and those copies could be exported back to developed nations. From the perspective of the former colonies, global copyright agreements and the substance of their own copyright laws are legacies of colonialism, and IP producers are stifling the free flow of information that is so crucial to knowledge economy development, all for the sake of maintaining a global cartel (Drahos and Braithwaite, 2003, 74-79). Other examples, like Nelson Mandela's experience trying to import patented HIV medication into South Africa, abound. They all point to possibility that the institutions of global knowledge economy keep less developed nations relatively impoverished.

The AKE also perpetuates a form of North-South divide within the United States and therefore magnifies regional inequalities. As the Democratic Party turned towards the AKE in the early 1980s while also strengthening its ties to the environmental movement and severing its ties to organized labor, many elected officials in the Party became increasingly indifferent to the

"smokestack" industries that were struggling to compete against companies backed by foreign governments abroad (see Chapter 1). Their indifference to the plight of American manufacturers and commodity producers had a concrete geographic bias: by 1980, decades of federal defense spending (Schulman, 1994), right to work laws, and tax incentives had precipitated a substantial relocation of traditional manufacturing from northern states to the southern Sunbelt (Eisinger, 1988, 49, 57-60). Democratic proponents of the AKE claimed to reject a mode of economic production that, in their view, had little prospect for wage growth and harmed the environment. But they also implicitly rejected the regions within the United States where that mode of production still predominated.

The AKE does not simply solidify these kinds of regional advantages but also increases their severity over time. Economists refer to this effect as agglomeration or increasing returns to scale. Agglomeration occurs, in theory, when early movers (firms or regions) capture an advantage that tends to accelerate over time. In this perspective, a region like California's Silicon Valley develops, by some accident, robust institutions for venture capital and an entrepreneurial culture with little risk aversion, those institutions generate some successes (startups that rapidly dominate markets in new technologies), and those successes attract yet more engineers, investors, and businesses that accelerate economic development. Agglomeration tends to occur not because of any single actor, but because the rational decisions of many actors lead to a kind of economic ecosystem that thrives because its constituent elements—thick labor markets of highly educated workers, employers drawn to those types of employees, and local legal and financial services to intermediate the needs of those kinds of employers—are mutually reinforcing. Agglomeration is therefore a theory in which early advantages are largely accidental or unplanned and rational actors generate desirable economic outcomes in the aggregate (Moretti, 2013).

For political scholars, this framing ignores the fact that the government often plays a central

role in creating and maintaining early advantages and policy largely determines how the economic benefits of those advantages will be either shared or used to level the playing field. In some ways, this perspective is abutted by the fact that the public institutions that promote technological development in the United States have been so thoroughly depoliticized they have evolved into what Fred Block calls a "hidden developmental state" (Block, 2008). California's Silicon Valley, Massachusetts' Route 128 corridor, and the innovation hub surrounding Seattle may owe a great deal to luck and individual ambition. But it is hard to ignore the fact that aerospace and defense contractors like Lockheed, Raytheon, and Boeing resided at the heart of those regions and profited enormously from the Cold War defense buildup (O'Mara, 2019, 29).

Figure 3 indicates that this relationship is more than hypothetical. To produce the figure, I first calculated the share of per capita defense prime contract awards accruing to the top 210 core based statistical areas in the year 1960, which is plotted on the horizontal axis. These awards account for 86.7 percent of all defense prime contracts over $10,000 in that year. I then calculated each area's per capita patent production from 2010-2015, which is plotted on the vertical axis, using subsequent citations to give more weight to patents that are more valuable. The blue line illustrates the line of best fit generated by running a linear regression of 2010 shares of patent value on 1960 shares of defense spending. As the figure reveals, these two values are significantly correlated despite being separated by 50 years in time. It is worth noting that this significant relationship exists even in simple defense procurement data available to the public, data which does not include the substantial sums spent through other agencies, like the Atomic Energy Commission (which managed the nation's federal laboratories at the time) and the National Aeronautics and Space Administration, or through defense spending that is not publicly available, like investments made by the Defense Advanced Research Projects Agency.

As a result of political contestation, the hidden developmental state promoting technological

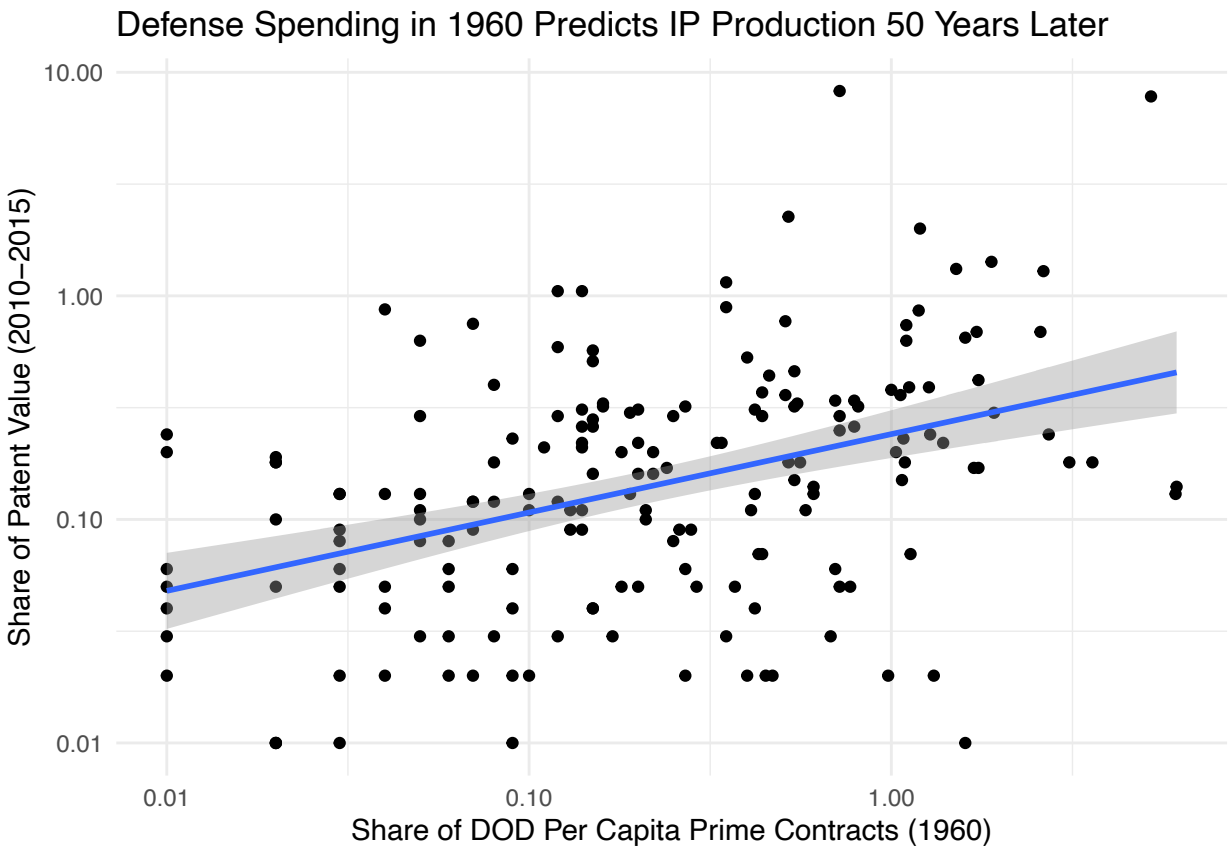

Figure 3: This figure shows the share of per capita prime contract awards from the Department of Defense in the year 1960 for each of 210 core based statistical areas (the horizontal axis) against the share of per capita patent value accuring to the same areas from 2010-2015 (the vertical axis). Areas with no patent value are excluded so that the data can be visualized on the logarithmic scale, but regression analysis (not shown) reveals that the omission does not materially change the results. The linear line of best fit is shown in blue.

innovation in the United States has always exacerbated regional and other forms of inequality, including during the Fordist period. Consider, for example, the political debate that took place between Vannevar Bush and Harley Kilgore over the founding of the National Science Foundation. Bush, Dean of MIT's College of Engineering and founder of Raytheon, wanted the agency to distribute federal funds according to a system of peer-review executed solely by scientists and insulated from the concern of other interests like labor leaders. Kilgore believed that such a system would bestow most of its benefits on a handful of defense contractors and elite universities, like Raytheon and MIT, and proposed more democratic modes of decision-making as well as funding formulas that would have distributed specified shares of federal monies to regions and firms that were relative laggards in scientific and technological development. Both choices are inherently political and have distributional consequences. That Congress sided with Bush demonstrates that Congress wished to maximize scientific output regardless of the distributional consequences (Kleinman, 1995; Hart, 1998).

But additional political choices and economic developments associated with the knowledge economy transition have only served to magnify these effects, especially with respect to the programs that have been layered on top of the hidden developmental state since the knowledge economy transition began around 1980. As a source of private sector technological innovation, venture capital (VC) financing has always tended to exacerbate regional inequality. Inventors are naturally drawn to regions with established and successful VC firms and those firms naturally find it easier to fund and manage (through Board membership) locally-based entrepreneurs. A 1982 law that effectively set up a federal VC fund in the Small Business Administration might have counter-balanced this regional imbalance, and the law was partly motivated by a desire to help minority and disadvantaged persons participate in the knowledge economy. But like the NSF, the program's meritocratic system of review tends to magnify regional imbalances so that about 40

percent of all federal investments consistently accrue to companies in California and Massachusetts, a trend that is known and has drawn Congressional scrutiny in the past (Lerner, 1999). Other (now defunct) programs for promoting technological innovation through the National Institute of Standards and Technology relied primarily on matching grants, a mechanism that is known to exacerbate regional inequality. Similarly, when the Democratic Party failed to generate bi-partisan consensus on some form of federal industrial policy in the 1980s, these efforts devolved to the states, and regions that already had significant knowledge economy infrastructure were in the best position to design effective state-level industrial policies and take advantage of federal matching commitments (Eisinger, 1988).

The regions that are thriving in the AKE therefore owe much of their success not just to the Fordist-era defense spending that erected critical knowledge economy infrastructure, but to ongoing federal investments in innovation and entrepreneurship, investments that are crucial for IP production. Unsurprisingly, then, IP production is geographically concentrated (Ansell and Gingrich, 2022, Fig. 13.1), and while it is difficult to measure geographic patent concentration prior to 1980, there are reasons to suspect it has grown significantly over time.[18] While this may have something to do with agglomeration effects, it is also a byproduct of the AKE's institutional design, a design which relies heavily on legal incentives promoting private sector investments in IP production in lieu of increasing government commitments to education and research (see Chapter 1) but also bestows the lion's share of federal investments to only a few regions with long-standing advantages in technological innovation.

The AKE also magnifies geographic inequalities within regions at more local levels of governance. The largely white and affluent suburban professionals that emerged so forcefully as AKE proponents in the New Democrat coalition were incredibly active in state and local

[18]See Figure 4, herein, showing increasing firm-level concentration in patent ownership.

politics, but as these suburban liberals splintered in the 1970s, they failed to produce policies that would share the benefits of the AKE more broadly. In Boston's Route 128 corridor, for example, suburban residents readily embraced minimum lot sizes and zoning restrictions that propped up housing prices, minimized the tax burden that supported local schools, and restricted the growth of more affordable housing. They also aligned behind anti-growth initiatives that prevented public transportation from making suburban areas accessible to urban residents who did not own a car. Those suburban liberals who supported affordable housing found themselves engaged in intense political combat with their former collaborators during the anti-war movement and civil rights struggles of the 1960s, some of whom now felt that economic exclusion was an acceptable side effect of anti-growth policies that would protect the environment and others who became squeamish in the face of policies that might undermine the excellence of their own children's local public schools. The economic and racial implications of this stalemate did not go unnoticed. Working class whites and blacks in the inner city struggled to gain access to the new knowledge economy jobs of the moment and the educational opportunities that would help their kids grasp the knowledge economy jobs of the future. Many local Democratic politicians championed Route 128 as America's "Technology Highway"; the United States Commission on Civil Rights bemoaned "Route 128: Boston's Road to Segregation" (Geismer, 2015, Chs. 7-8).

2.3 Economic Inequality

Because of its deep reliance on IP, the AKE also magnifies economic inequality. The innovative regions that produce large amounts of IP are largely responsible for the dramatic increase in income inequality since 1980. Aghion et al. (2019) find, for example, that top income shares at the state level are strongly correlated with the value of the region's patents, and that a one percent increase in the number of patents awarded to the firms in a state in a single year will increase the state's top

one percent income share by 0.2 percent (see also Galbraith, 2012a, Ch. 2). And Koh, Santaeulalia-Llopis, and Zheng (2015) contend that all of the decline in labor's share of national income can be attributed to the capitalization of IP in national income and product accounts. At the same time, we also know that IP production is skewed towards the affluent. Using a unique dataset containing demographic information about the inventors named on patents issued from 1996 to 2014, Bell et al. (2016) find that children of low-income parents are much less likely to become inventors than children of higher-income parents and that some of the gap stems from differences in human capital that emerge in early education. This result suggests that the institutional structure of the AKE intersects with suburban exclusivity and the widespread practice of financing primary and secondary education through local property taxes to perpetuate income inequality and decrease opportunities for the less advantaged to participate in the knowledge economy.

Legal doctrine governing IP rights can be designed in ways that dampen the relationship between IP production and income inequality. By definition, patents confer on their owner a form of market power and therefore enable IP producers to generate rents or profits in excess of what would otherwise prevail in a more competitive setting (Stiglitz, 2013, 54). In fact, the promise of excess profits is what provides the financial incentive for businesses to invest in innovation; it is also the reward for disclosing the details of new technologies to the public by applying for a patent. But because patents are effectively legal rights, their strength, enforceability, and geographic reach are all controlled by legal doctrine. During the Fordist period, U.S. law actually contained many such safeguards or checks on patent power. But, as indicated in Section 2.1 and Chapter 1, the state abandoned virtually all of these safeguards during the knowledge economy transition, and these institutional shifts are, in fact, what differentiate the AKE from the Fordist period. To take just one example, from 1941 to 1959, antitrust officials procured 107 consent decrees forcing major technology companies to license their patents more broadly to their competitors, agreements that

covered between forty and fifty thousand patents including some patents in key technological domains like semiconductors and synthetic materials (Hart, 1998, 95-96). Since 1980, antitrust officials have not even attempted to force a single technology company to license its patents more broadly, even in the context of a global pandemic where doing so would dramatically accelerate global vaccine production and distribution.

Though these institutional shifts substantially increased the rents that patents can generate, that alone would not necessarily exacerbate the economic inequality if patent ownership is broadly distributed. Unfortunately, the evidence strongly suggests that patent ownership has always been highly concentrated. Figure 4 shows that concentration in the ownership of patents rose dramatically between 1935 and 2010. To generate the figure, I used IFI Claims patent data hosted on Google BigQuery, which has standardized names for the institutional owner of each patent including corporations and public entities. I excluded patents owned by individuals, aggregated the institutionally owned patents into portfolios by simply adding up new grants and depreciating prior patent value on a time scale of 17 years, and then calculated the share of patent portfolio value held by the top 1 percent of organizations. From 1945 to the early 1970s, concentration in the ownership of patents rose rapidly, but political institutions—especially antitrust enforcement—counterbalanced this trend by forcing corporations to license their IP more broadly. Since 1980, concentration in the ownership of patents has continued to rise and is now reaching unprecedented heights, with the top 1 percent of organizations owning around 65 percent of all patents. And these figures substantially underestimate the true extent of concentration because they only capture patents developed in-house and do not account for patents the companies purchase or acquire through mergers and acquisitions. Additional studies have found that the largest firms purchase substantial amounts of new patents (55 percent in 2010) by acquiring small emerging competitors and that patent ownership since 2000 is strongly correlated with broader measures of industrial

concentration (Akcigit and Ates, 2019; Grullon, Larkin, and Michaely, 2017).

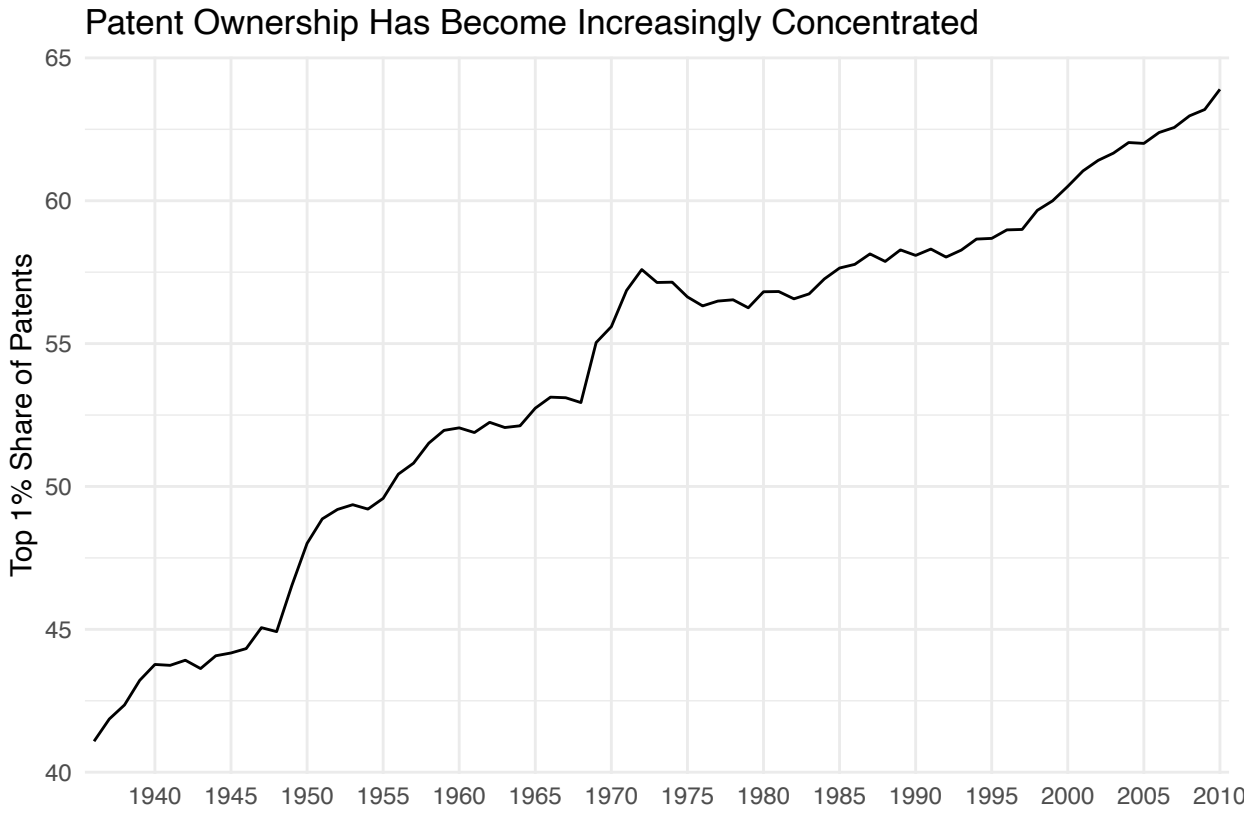

Figure 4: This figure shows the share of patents assigned to public and private organizations (excluding patents assigned to individuals) that are owned by the top 1 percent of all organizations. When patents are assigned to multiple entities, each entity receives an equal ownership share.

Even in a regime of strong patent rights and extreme concentration in patent ownership, knowledge economy development need not generate high degrees of income inequality if the social and political structure in which entrepreneurial firms innovate have robust mechanisms for rent sharing within the boundaries of the firm (Lazonick and Mazzucato, 2013). Here, again, the evidence is troubling. There is some positive news when it comes to rent sharing. Despite the fact that legal and contractual norms generally allow firms to acquire ownership in all the IP that their employees generate, there is some evidence that firms share the rents they generate from patents. Kline et al. (2017) find, for example, that within the population of startups applying for their first patent, workers capture on average 29 percent of the patent-induced operating surplus, though the

share is larger for named inventors and lower for others. Since the total market capitalization of much larger firms includes the economic value of each firm's patent portfolio (Kogan et al., 2017) and those same firms increasingly use stock options as a form of employee compensation, some tech firm employees who do not invent also indirectly acquire a financial stake in the value of their employer's patents. At the same time, these ownership stakes are minuscule compared to those that accrue to executives.

Much more troubling is that simultaneous shifts in business management strategy towards maximizing shareholder value have forced many IP producers (and many other firms who own non-technological IP) to vertically disintegrate, so that these rents are shared with a much smaller (and much more educated and affluent) segment of the labor force (Schwartz, 2017, 2022). This is one way in which the AKE has intersected with financialization and the "fissuring" of the workplace (Weil, 2014) to exacerbate income inequality (for more about the AKE and financialization, see Section 2.5). Similarly, though union density consistently tempers income inequality in cross-national studies of nations undergoing knowledge economy transitions (Kwon, 2016), organized labor lost significant economic and political power as the knowledge economy transition unfolded in the United States (Hacker and Pierson, 2010) and IP producers are notorious for not being unionized (Geismer, 2015; O'Mara, 2019).

In a setting where strong patent rights create large patent rents, where patent ownership is highly unequal, and where firm organization and labor market institutions do not create mechanisms for broad rent-sharing, the main way the government can temper economic inequality driven by the knowledge economy transition is through taxation and redistribution or (more promisingly) supply-side investment in under-privileged groups and regions (Unger, 2019; Barnes, 2022). But here, again, the institutional design of the AKE substantially contributes to tax avoidance and hobbles the government in its efforts to level the playing field and increase knowledge economy

participation. One of the lesser known quirks about the U.S. patent system is that companies can use patents to implement a basic tax avoidance scheme. A company like Apple can, for example, transfer ownership of its patents to a shell company incorporated in nation like Ireland and then pay "royalties" to that shell company for using those patents when making and selling consumer products. The overall effect is to shift income that would otherwise be recognized in the United States, and taxed accordingly, to a low or no tax jurisdiction.

That income cannot be repatriated without incurring a corporate tax. But some IP producers have become so powerful that they do not need the income for investment and are willing to park the money offshore until the federal government facilitates repatriation by providing a tax holiday. There have been two such tax holidays in recent history, one in the Homeland Investment Act (HIA) in 2004 during George W Bush's administration and another in the Tax Cuts and Jobs Act (TCJA) in 2017 during Donald Trump's administration. The amount of money at stake is not trivial. Shortly after the TCJA was signed, Apple announced it would repatriate $285 billion. There is evidence that, in both instances, IP producers used small amounts of the repatriated dollars for new investments or increasing employment, and that the lion's share of the income was used to pay dividends and buy back stock, which mechanically increases stock value and creates capital gains to stockholders (including executives with stock options) (Dharmapala, Foley, and Forbes, 2009; Lazonick and Mazzucato, 2013; Schwartz, 2016). The AKE therefore enables firms to use IP to avoid taxation, and even when foreign revenue is repatriated, it is utilized in ways that exacerbate economic inequality. Similarly, the "excess stock options" tax loophole, which allows companies to deduct stock options from taxable income, helps some of the world's largest IP producers to avoid paying any taxes to the federal government (Citizens for Tax Justice, 2016). In this way, the institutions of the AKE intersect with politically negotiated provisions of the tax code to magnify economic inequality and undermine post-tax efforts to soften the effects or equalize knowledge

economy participation.

The economic inequality created by the AKE has troubling implications for gender and racial inequality as well. Though the picture has improved, women remain underrepresented in engineering. The Society of Women Engineers produces annual reports documenting the obstacles that dissuade women from pursuing a degree in engineering. But even if we (falsely) assume that the substantial gender disparities in technical education reflect personal or group preferences, those women who do acquire the education and skills needed to compete for employment with IP producers still encounter deeply entrenched cultures of sexism and gender discrimination in the workplace (O'Mara, 2019; Chang, 2019). Unsurprisingly, some empirical evidence supports the view that IP producers also discriminate against women when determining compensation. Kline et al. (2017) found, for example, that while startups share on average 29 percent of patent-induced operating surplus with their employees, virtually all of that surplus accrues to male employees. Even when limiting the analysis to those firms that employ both genders, the authors found that patent allowances exacerbate existing gender earnings gaps. Bell et al. (2016) also found that only 15 percent of inventors born in the 1980s were women, and that the large gender disparity cannot be explained by differences in education or human capital. They also found substantial racial disparities in patent inventorship that cannot be explained by differences in education or human capital.

The analysis above suggests only some of the ways that the AKE produces income inequality and exacerbates gender and racial differences, but it also points to important limitations in the prevailing framework for understanding the connection between technology development and economic inequality. According to the theory of skill-biased technological change, exogenous changes in technology, like the emergence of personal computers, allowed some more skilled workers to become much more productive (those who could use computers to work more efficiently)

while it simultaneously made other less skilled workers obsolete (clerical workers whose routine tasks could now be handled by computers). This in turn caused an increasing skill premium reflected in a widening gap between the average wages earned by college graduates and the average wages earned by non-college graduates. Accordingly, technology induces higher demand for skilled labor and if educational investments do not supply higher levels of college educated workers, inequality will increase (Goldin and Katz, 2008; Autor, 2014).

The theory has its skeptics (Galbraith, 1998, Ch. 2). But the theory's biggest shortcoming, when it comes to understanding the inequality that the AKE produces, is that it misleadingly suggests that education alone is the answer. Part of the solution may lie in not only increasing the supply of college educated workers but making access to high quality education more equitable, and the analysis above suggests ways in which the structure of the AKE shackles the government when it comes to equalizing educational investment. The analysis also suggests that many other institutional and structural characteristics of the AKE inhibit equitable participation in (and benefits from) the knowledge economy, from antitrust, labor, and tax policy to theories of firm governance and organization. In this sense, it is reasonable to expect that, even if the supply of educated workers could be icnreased, the AKE will most likely continue to generate substantial inequalities so long as it puts the interests of IP producers over the interests of commodity producers in global trade agreements (see below), so long as IP ownership remains concentrated in the hands of a few elite firms and universities with no institutions providing counter-vailing power, and so long as IP is used in ways that enable tax avoidance on highly unequal forms of employee compensation.

2.4 Political Inequality

IP producers have exercised substantial influence over the legal regimes that govern international and domestic economic relations (see Chapter 1). The fact that representatives from both political

parties in the United States went to such great lengths to indulge their demands suggests several different kinds of political inequality rooted in fundamental economic cleavages. Foremost, it suggests a growing inequality between the interests of domestic commodity producers and of IP producers—in other words, an economic and political cleavage among business interests. When trade negotiators agreed to subsidize competition in commodity markets through the Generalized System of Preferences if developing nations adopted stronger patent laws, they deliberately put the interests of IP producers and their investors over the interests of domestic commodity producers (see Chapter 1). The political consensus behind this form of globalization suggests yet another form of political inequality: American consumers enjoy lower prices in commodity markets while American workers in those markets—the blue-collar workers in the "smokestack" industries that drew so much derision from New Democrats—lost their jobs. The AKE is a therefore a form of political economy that amplifies the voices of IP producers and American commodity consumers and suppresses the voices of American commodity producers and their employees.

Other political tensions within the AKE spring from the fact that, for whatever reason, IP consumers have little if any political representation. IP consumers are not just conventional customers. Rather, they include any person or organization or government that consumes IP in the legal, technical sense, including those who wish to make, sell, or import products in which IP is embedded. The unspoken and poorly represented needs of IP consumers arise in myriad debates about the AKE. Leaders of developing nations find themselves at odds with IP producers in acquiring textbooks or addressing public health emergencies. Taxpayers question why they pay once for federal research and then pay a monopoly price later when the fruit of that research becomes part of a new consumer product. Blue collar workers question why their tax dollars support so much of the innovative process, from basic research to venture financing, but the firms that acquire IP from those investments do not have to commit to manufacturing new products

in the United States. Drug consumers blanch at the power inherent in "pharma bros" who can increase the cost of essential medications by 5,000 percent overnight. The political dilemma at the root of these and many other debates in the American political economy is that with rare exceptions—generic drug makers being the most notable one—IP consumers are a broad and inchoate group that have no organized political representation.

Because patents are government sponsored tools for generating economic rents, conventional theories of political economy suggest that patent ownership should induce rent-seeking not just in the marketplace but in political arenas as well. Some case studies support this view. Lazonick and Mazzucato (2013, 1115-6) contend, for example, that the managers of IP producers lobbied heavily for two major changes in SEC regulations governing stock options in 1982 and 1991. Hacker and Pierson (2010, 190-191) similarly contend that IP producers were responsible for defeating the Financial Accounting Standards Board's first attempt to impose stricter accounting standards on stock options in 1995. O'Mara (2019, 161-71) argues that the managers of venture capital firms, organized under the auspices of the National Venture Capital Associated, played a significant role in obtaining the capital gains cut at the heart of Carter's tax reform and the abandonment of the "prudent man" rule for managing pension funds which unleashed massive sources of venture capital. And Miles (2001) shows that, in the mid to late 1990s, IP producers were deeply engaged in many areas of political combat including teacher's unions, class action lawsuits, and stock options, and that they enjoyed surprising success in some of these areas.

But the AKE's most pernicious political outcome may be the way it isolates the working class. Because of the way the AKE developed, both political parties currently support policies that require sacrifices from the working class to pursue the interests of IP producers. The Democratic Party did so because a political realignment brought affluent lawyers and knowledge economy professionals into the party coalition while marginalizing organized labor, which the former

largely viewed as corrupt. The result has been decades of political debates between one party that represents business interests and another that represents IP producers and the legal and financial service workers they rely upon. On economic issues at least, the working class seems to face a Hobbesian choice. The Republican Party categorically opposes unions and pursues economic development with deficit financed tax cuts that heavily favor the wealthy and may create jobs but will certainly disadvantage exports and favor imports. The Democratic Party nominally supports unions but mostly pursues economic development through policies that will only create jobs for a small slice of relatively affluent and educated workers. Before the election of Donald Trump, neither party gave any thought to rectifying the massive trade imbalances that leave the working class in a precarious economic position. That a Republican has chosen to attack that problem may reflect the fact that the AKE has left the working class politically adrift for more than twenty years. We can only speculate as to whether the AKE is in some ways connected to rising populism in the United States (Iversen and Soskice, 2019). But if any such connection exists, it arguably flows from the AKE's institutional form, and not from a collective failure to acquire the skills needed to participate in the AKE.

2.5 Financialization and the American Knowledge Economy

The knowledge economy transition in the United States unfolded simultaneously with increasing financialization, and it is logical to suspect that these two transformations might mutually reinforce one another or that the institutions underlying these transformations might intersect in ways that make the American political economy more unequal. Schwartz (2017, 2022) suggests one way in which this has occurred, as the institutions of the AKE have intersected with strategies of corporate governance and theories of firm organization to exacerbate income inequality. But there are other reasons to suspect that these trends are mutually constitutive. A key insight from Krippner (2005)

is that financialization emerges only when we shift our focus from changes in the occupational structure to changes in "where profits are generated" in the macro-economy. Krippner (2005) was advocating for more focus on the role of financial assets and instruments, in lieu of productive investment, in generating business profits. But the knowledge economy transition has made IP an equally (if not more) important asset class, and one that is similarly amenable to speculative behavior and rent-seeking. If we assume that financialization exacerbates inequality in the ways described in Section 2.1 (Davis and Kim, 2015), the AKE may also exacerbate inequality through the same channels by diverting resources to forms of financial rent-seeking that do not generate productive investment, like patent litigation, or by multiplying the resources that IP producers have to engage in mergers and acquisitions and other kinds of financial behavior. Simultaneously, the dramatic expansion of financial markets might also intensify the AKE's dependence on IP.

Consider, for example, the strengthening connection between IP production and equity finance. Though it is somewhat well known that the knowledge economy transition in the United States reversed a two decade long decline in per capita patent grants to domestic firms (see Chapter 1, Figure 1), it is perhaps less well known that generating IP has also become a much more valuable mechanism for publicly traded firms to raise equity capital. Figure 5 illustrates this trend. Because the U.S. Patent and Trademark Office makes public its decisions to issue domestic patents, event study techniques can be used to estimate the stock market's response to these decisions and therefore attribute an economic value, in terms of equity capital raised, associated with each firm's patents (Kogan et al., 2017). Utilizing that data, I first aggregated the stock market response to new patent announcements for each publicly traded firm in each month from 1965 to 2010, and then charted the average firm-level stock market response in each month in constant (1980) dollars. As shown, even after the opening of the NASDAQ securities market in 1971, the average publicly traded firm could expect new IP announcements to generate about $20 million in

new capitalization in 1979. Only 16 years later in 1995, with the knowledge economy transition well under way, the average publicly traded firm could expect to generate almost five times that amount, or about $100 million in new capitalization. Another 15 years later in 2010, despite the deflation of multiple IP asset bubbles, the average firm could still expect to generate about $200 million in new capitalization, a ten-fold increase since 1979. American corporations therefore face increasingly strong financial incentives to produce IP. In this way, as more resources flow through financial markets, those resources not only reward speculative non-productive investment but also IP production, and the market incentives to produce IP in many ways abet the AKE's intense reliance on IP as a primary vehicle for technological development.

On the other hand, the financialization of IP does not always benefit IP producers. For decades, many top technology firms have lamented that the fungibility of IP means that non-practicing entities, including law firms and private equity firms, can earn huge sums by buying overlooked patents and then suing prominent technology companies for patent infringement. Even if the lawsuits have little merit, many profitable firms find it cheaper to pay "nuisance settlements" to avoid the high legal costs of vindicating their claims in court. Bessen and Meurer (2008) estimate, for example, that total patent litigation costs approached $16 billion in 1999 alone. And as the Covid pandemic took root in the United States in March of 2020, one follower of patent litigation trends warned that, as the pandemic slowed global economic growth, we should "expect the chatter around [patent] litigation finance as a 'recession-proof asset class' to grow louder" as the industry was flush with new capital (Insight, 2020). In these ways, financialization imposes risks and unpredictable costs on IP production. On the other hand, many IP producers have adapted and escalated their strategic acquisitions of valuable IP to neutralize this threat (Schwartz, 2017, 201-2).

Similarly, to the extent that valuable IP generates lucrative rents and creates market power,

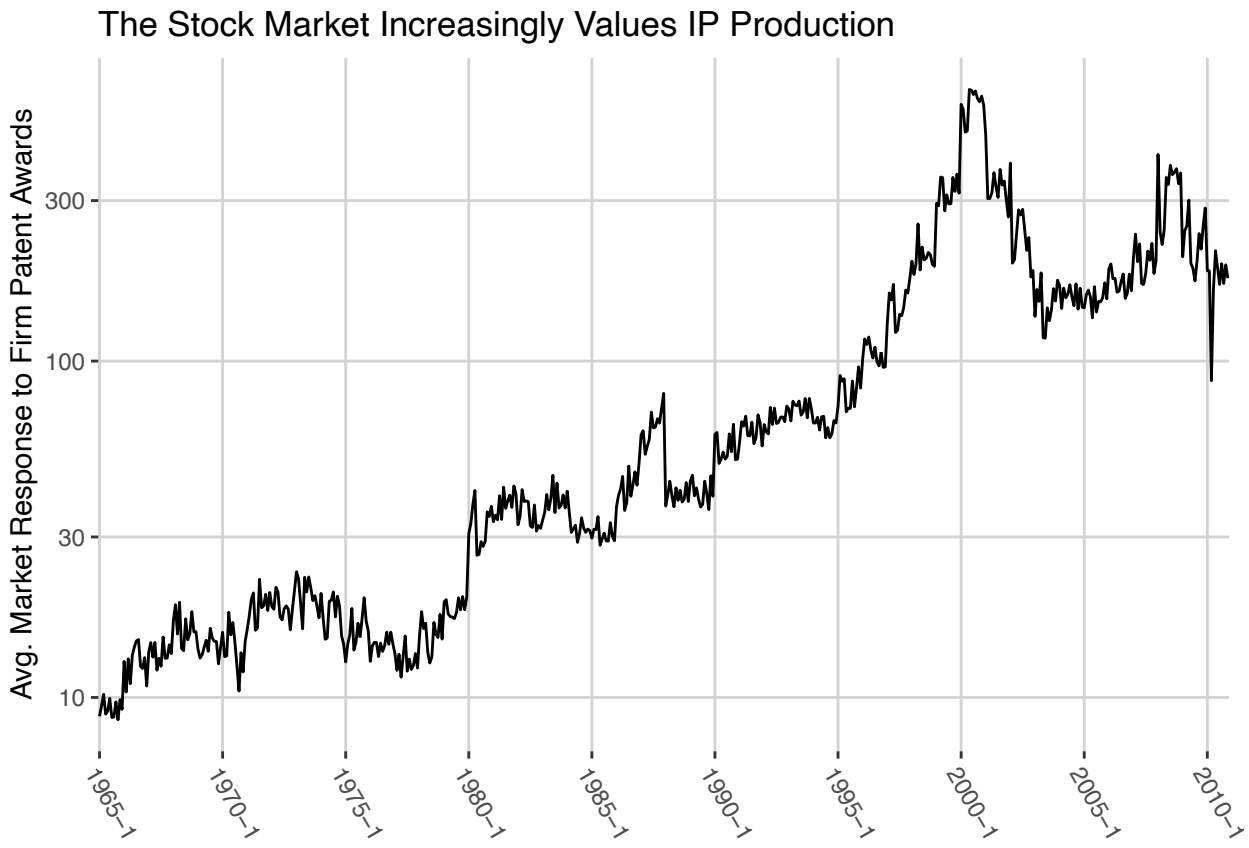

Figure 5: The average monthly stock market response to announcements, by the U.S. Patent and Trademark Office, of the decision to issue U.S. patents to publicly traded companies, in millions of 1980 dollars. Stock market response data comes from Kogan et al. (2017), which estimates individual patent values using event study techniques. Individual patent values are first aggregated (summed) at the firm level and then averaged across firms in each month.

IP producers engage in much of the same financial behavior that other firms engage in, often to even more extreme degrees, all of which exacerbates inequality through known channels. For example, the nation's largest IP producers are known to have enormous reserves of retained earnings, with Microsoft, Alphabet (Google), and Apple each holding more than $100 billion in cash reserves as of the end of 2019 (Stevens, 2019). As shown in Panel A of Figure 6, the top five IP producers among the S&P 500 firms also consistently use the highest shares of their retained earnings to buy other firms through mergers and acquisitions. The same firms are also able to generate sales revenue two to three times the cost of goods sold, which we can use as a rough measure of firm-level market power (Loecker, Eeckhout, and Unger, 2020). Similar plots (not shown) show that in recent years, pre-tax foreign income has grown to more than 15 percent of total revenue for IP producers, far more than other large firms, a fact that is consistent with studies showing that IP producers frequently use their IP to implement global tax avoidance strategies (Schwartz, 2016). In these ways, the AKE's reliance on IP fuels increasing financialization, with established concomitant effects on inequality.

2.6 Conclusion

The institutional basis of the AKE came into being between 1980 and 1994 when control over the federal government was, in most years, divided and in a setting where the two main political parties advocated for fundamentally different modes of macroeconomic management. Though Democratic Party leaders initially envisioned a major role for the state (often in partnership with businesses and universities), Republican Party leaders categorically opposed any such expansion of state power and successfully resisted most if not all such efforts. As a result, the political consensus for hastening knowledge economy development centered on market-oriented reforms, like stronger IP laws with broader global reach, that organized business interests championed but sidelined

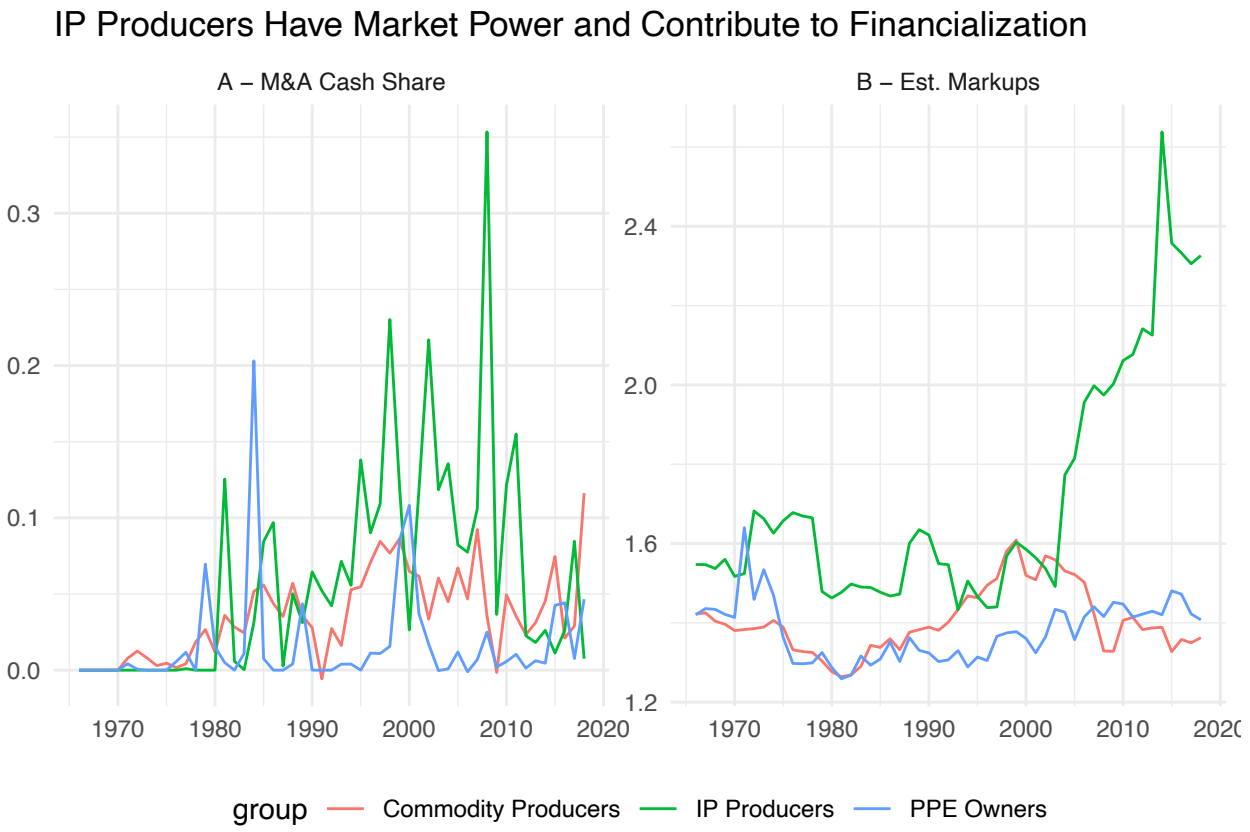

Figure 6: This figure shows (A) the amount of cash used in mergers and acquisitions as a share of retained earnings and (b) total sales as a share of cost of goods sold for three groups of firms within the S&P 500: the top five IP producers by patent portfolio value (green lines), the top five owners of conventional capital or property, plant, and equipment (blue lines), and of the reamining 490 firms, all firms who produce no IP whatsoever which I refer to as commodity producers (red lines).

reforms, like increasing investment in higher education or research or more robust industrial policy, that had broader public support (see Chapter 1).

Perhaps predictably, this form of knowledge economy development has allowed those regions with good IP infrastructure and those firms with valuable IP portfolios to play an increasingly important role in the nation's economic transformation. Other aspects of the nation's hidden developmental state have only exacerbated these trends, like the federal government's preference for matching state investments and its meritocratic system of federal awards, both of which tend to compound existing advantages; its unwillingness to increase investments in or equalize access to higher education thereby reducing capacity and making a college education more expensive; its regressive commitment to financing primary and secondary education through local property taxes in a setting of increasing economic segregation which all but guarantees access to higher education to the children of the affluent; and its unwillingness to use antitrust enforcement or other institutions to check the power of the nation's earliest winners in knowledge economy development. In these and many other ways described above, the institutions and policies of the American knowledge economy have plausibly contributed to and exacerbated the troubling socio-economic symptoms listed at the very beginning of this chapter.

3 Political Contributions by American Inventors: Evidence from 30,000 Cases

3.1 Introduction

As argued in Chapter 1, inventors, or those who produce valuable intellectual property, are central actors in the American knowledge economy and are an equally important constituency for those elected officials within the Democratic Party who have embraced the knowledge economy and have worked to hasten its development (see also Haskel and Westlake, 2018; Schwartz, 2022). But despite the importance of inventors in the American political economy, social scientists know surprisingly little about the political beliefs and behaviors of those who produce intellectual property and even less about how their behavior has changed over time. As a result, it is difficult to determine whether the Democratic Party's attempts to cultivate the knowledge economy have allowed it to reap electoral rewards.

Theory offers potentially competing answers to this question. On the one hand, because prominent Democrats have publicly championed the knowledge economy since at least 1972 (Geismer, 2015), we might expect those efforts to have motivated American inventors to express deeper levels of support for Democratic candidates over time, much in the way that the Party's positions on racial liberalism and labor legislation cultivated deeper levels of support for Democrats among minorities and the working-class (Schickler, 2016; Schlozman, 2015). On the other hand, the imperatives of divided government forced lawmakers to rely heavily on market-based reforms, like changes to U.S. patent law, to promote knowledge economy development (see Chapter 1) and, as a result, knowledge economy development to date has generally been confined to only a few regions (see Chapter 2), like California's Silicon Valley (see also Moretti, 2013). Accordingly, we might also expect that American political institutions—namely winner-take-all elections in

single-member districts—have concentrated the electoral payoffs to a few Congressional Districts or states (Rodden, 2019).

To determine if either hypothesis has empirical support, I developed a unique data set containing ideology scores and information on the donation behavior for 30,603 American inventors across 18 election cycles. Specifically, I used the research data sets provided by the U.S. Patent and Trademark Office to identify U.S. residents listed as a named inventors on a U.S. patent applied for on or after January 1, 1979. I then merged the inventor data with campaign contribution data from the Database on Ideology, Money in Politics (DIME) (Bonica, 2016) to capture campaign donations and the common-factor ideology scores imputed from those donations among U.S. inventors for every election cycle from 1980 through 2014. Finally, I linked the self-reported donor employer names to organizations in the Capital IQ database to obtain unique employer identifiers and industry data (4-digit SIC codes), where available. With such data, it is possible to analyze changes in aggregate donation patterns and their geographic expression; it is also possible to determine whether American inventors are unique in their behavior after controlling for things like geography, place of work (firm), and sector. I briefly describe and motivate the construction of the data set in Section 3.2 (and more details on construction can be found in Appendix 5.1).

Analysis of the data set confirms that, while the Democratic Party has made significant inroads among American inventors in terms of garnering higher shares of donors and donations, the vast majority of those benefits have increasingly come from only a few regions and have flown to a relatively small number of candidates, as shown in Section 3.3. Similarly, though the subset of American inventors who contribute to Democratic candidates has become much more liberal over time, this development seems to be driven by changes in political geography, as shown in Section 3.4. The average ideology scores of Democratic inventors are not substantively different from those of their peers (those of the same gender who work at the same firm and live in the same

Congressional District), and the large observed decline in ideological variance among Democratic inventors has been significantly driven by similar declines in the average ideology scores across the districts in which American inventors reside. Taken together, the results suggest that American political institutions have limited the electoral payoffs for the Democratic Party, that American inventors who donate to campaigns increasingly live in liberal enclaves of similar ideological persuasion, and that knowledge economy participation motivates regional rather than individual differences in political behavior.

This study is closest in nature to Broockman, Ferenstein, and Malhotra (2019) in which the authors surveyed technology entrepreneurs[19] and found them to be as liberal or more liberal than Democratic donors on issues related to economic redistribution, globalization, and social issues but closely aligned with Republican donors on issues of government regulation. A key benefit of that study is that it sheds light on the heterogeneity of political preferences among economic elites, including technology entrepreneurs, in today's political environment. The present study sacrifices that nuance by focusing on aggregate ideological scores and donation patterns. But an important benefit of this strategy is that it allows researchers to analyze changes over time (across 18 election cycles) and across geographic space, both of which are essential to understanding the way in which American political institutions may constrain the electoral payoffs to be derived from championing a specific vision for the nation's economic future. The present study also differs in focusing more on innovators than entrepreneurs, or those who produce new and valuable IP (often for incumbent firms) rather than those who start their own businesses.[20]

By analyzing ideological changes among American inventors, this study contributes to a large and established literature on political polarization in the United States (Levendusky, 2009;

[19]Specifically, the authors randomly sampled 8,499 individuals listed as founders or CEOs of companies in Crunchbase and interviewed nearly 700 of them.

[20]Though, in the absence of inventor surveys, it is difficult to know if this distinction is salient.

Fiorina, Abrams, and Pope, 2010; Abramowitz, 2013; McCarty, Poole, and Rosenthal, 2016), especially those studies exploring the connection between polarization and the rural-urban divide in American politics (Cramer, 2016; Rodden, 2019). But it contributes much more directly to a small and growing literature on the ways in which American political institutions have shaped knowledge economy development in the United States (Soskice, 2022; Barnes, 2022; Ansell and Gingrich, 2022). A key implication is that American institutions have the potential to create a political form of "double marginalization" when it comes to promoting new models of economic growth, an effect that may cast doubt on the viability or sustainability of "third-way" or "neoliberal" economic reforms more broadly. By first constraining the economic policy choice set to those policies that exacergate geographic inequalities and then impeding the formation of cross-regional coalitions that might advocate for a more equitable geographic distribution of resources, American institutions may doom many such reforms to marginal (and highly unequal) success. I comment on this possibility and other implications in the Conclusion. Importantly, though, this study moves beyond prior work to consider the ways in which institutions plausibly influence political behavior. To do so requires disentangling the effects of inventorship—an individual characteristic—from the effects of geography when explaining aggregate changes in behavioral patterns, which is a difficult undertaking. A secondary implication, then, is that, to the extent we associate Democratic gains among inventors or rising inventor liberalism with the knowledge economy transition, these shifts appear to be rooted in regional rather than individual behaviors.

3.2 Construction of the Dataset

The process for creating the inventor-donor data set involved three main steps: (1) identify all inventors (first and last name, firm, and city and state of residence) listed on U.S. patents that were applied for on or after January 1, 1979 and who resided within the United States using research

datasets provided by the U.S. Patent and Trademark Office; (2) identify the subset of these U.S. inventors that also appear in the DIME database using fastLink (Enamorado, Field, and Imai, 2019) and acquire data on their contribution history and imputed ideology; and (3) match the self-reported employer names from the DIME database to organizations in Capital IQ to generate unique identifiers for these organizations plus other information, like SIC codes, where available. More details on each of these steps and statistics characterizing the aggregate dataset are provided in Appendix 5.1.

A primary advantage of this dataset is that it allows us to study the political behavior of the people and organizations that produce new technologies while remaining agnostic as to the boundaries of what constitutes "technology," which can bias the results of any political analysis. U.S. patent law places very few restrictions on what constitutes patent eligible subject matter,[21] and so subject to certain disclosure requirements and an examination of prior art, the Patent and Trademark Office generally issues patents for any new and non-obvious invention, broadly construed. Accordingly, the technologies that are the subject of this study are not limited to the computer and internet technologies that tend to dominate the news cycle but also include new drugs, nanotechnology, genetically modified crops, and many other lesser-known domains of invention, like the design (look and feel) of new sneakers. While this may seem over-inclusive to some, it is important to cast a broad net to avoid the bias inherent in individual judgments about what constitutes "technology."

Table 3 illustrates this point. To generate the table, I identified the primary technological domain of each inventor-donor using the classification scheme developed by the National Bureau of Economic Research, and then tabulated the total dollar amount of campaign contributions across

[21] *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) ("The Committee Reports accompanying the 1952 [Patent] Act inform us that Congress intended statutory subject matter to 'include anything under the sun that is made by man.'").

all election cycles within each domain. The table presents the top 7 results in two tranches: the top 7 technology domains with the highest share of donations going to Democratic candidates and committees ("High Dem Share") and the top 7 with the highest share of donations going to Republican candidates and committees ("High Rep Share"). The table shows that inventors in computing (computer hardware and software, computer peripherals, and semiconductor devices) and some other areas like optics and genetics give quite heavily to Democratic candidates and committees. At the same time, inventors in other technological domains, including those related to agriculture and resource extraction, donate quite heavily to Republican candidates and committees. All of these inventors are arguably working at the technological frontier within their respective industries and are therefore participating in the knowledge economy. But an exclusive focus on those who work in computer and internet technology would suggest—inappropriately in my view—that commanding majorities of knowledge economy workers have a strong partisan attachment to the Democratic Party. An analysis of all inventor-donors helps avoid this bias.

Though the lack of comparable databases makes it difficult to benchmark descriptive statistics, the database can be used to replicate prior findings in ways that provide some confidence that it is soundly constructed. For example, Rodden (2019, Fig. 3.1) reports that Democratic presidential vote share was not correlated with measures of patent output (patents per thousand people on the log scale) as recently as 1996, but the two variables have become strongly correlated since then. Data from the inventor-donor data set produces similar findings, albeit with respect to donor rather than vote shares. For each of four election cycles (1980, 1996, 2004, and 2012), Figure 7 shows the share of all patents applied for by inventors located in each Congressional District against the share of all inventor donations to Democratic candidates and committees by inventor-donors located in that same district. The blue line shows the results of regressing Democratic contribution shares on patent shares. The figure shows that, from 1980 through 1996, the patent

Table 3: **Donations by Technology Classes Show Political Bias**

NBER Subcategory	Dem Share (%)	Rep Share (%)	Total (Mil USD)
High Dem Share			
optics	66.84	29.72	3.73
computer hardware & software	63.29	31.40	57.73
computer peripherals	60.33	23.07	3.45
semiconductor devices	58.92	28.64	3.60
information storage	50.19	23.45	19.36
resins	48.91	38.93	2.98
genetics	48.23	35.25	0.91
High Rep Share			
pipes & joints	5.54	93.06	3.83
heating	7.29	89.13	4.05
misc. mechanical	14.21	81.61	16.99
gas	14.79	81.27	1.92
agriculture, husbandry, & food	11.86	79.93	14.35
earth working & wells	16.74	78.89	9.32
motors, engines, & parts	10.29	77.55	3.59

Note:
In this table, each inventor-donor is associated with a technological subcategory according to the scheme developed by the National Bureau of Economic Research. Each row captures the aggregate contributions made by inventor-donors in that technological subcategory (in millions of 2019 dollars) as well as the share of that total going to Democratic candidates and committees and the share going to Republican candidates and committees. There are 37 technology subcategories in the NBER scheme but only 14 are presented in the table, capturing the top 7 results in each of two tranches: the top 7 with the highest share going to Democratic candidates and committees and the top 7 with the highest share going to Republican candidates and committees.

share of a Congressional District was not significantly associated with the share of total donations to Democratic candidates or committees by inventor-donors. But since 1996 that relationship has grown more positive. In this way, changes in regional donation patterns from the inventor-donor dataset mirror changes in regional voting patterns reported in other studies.

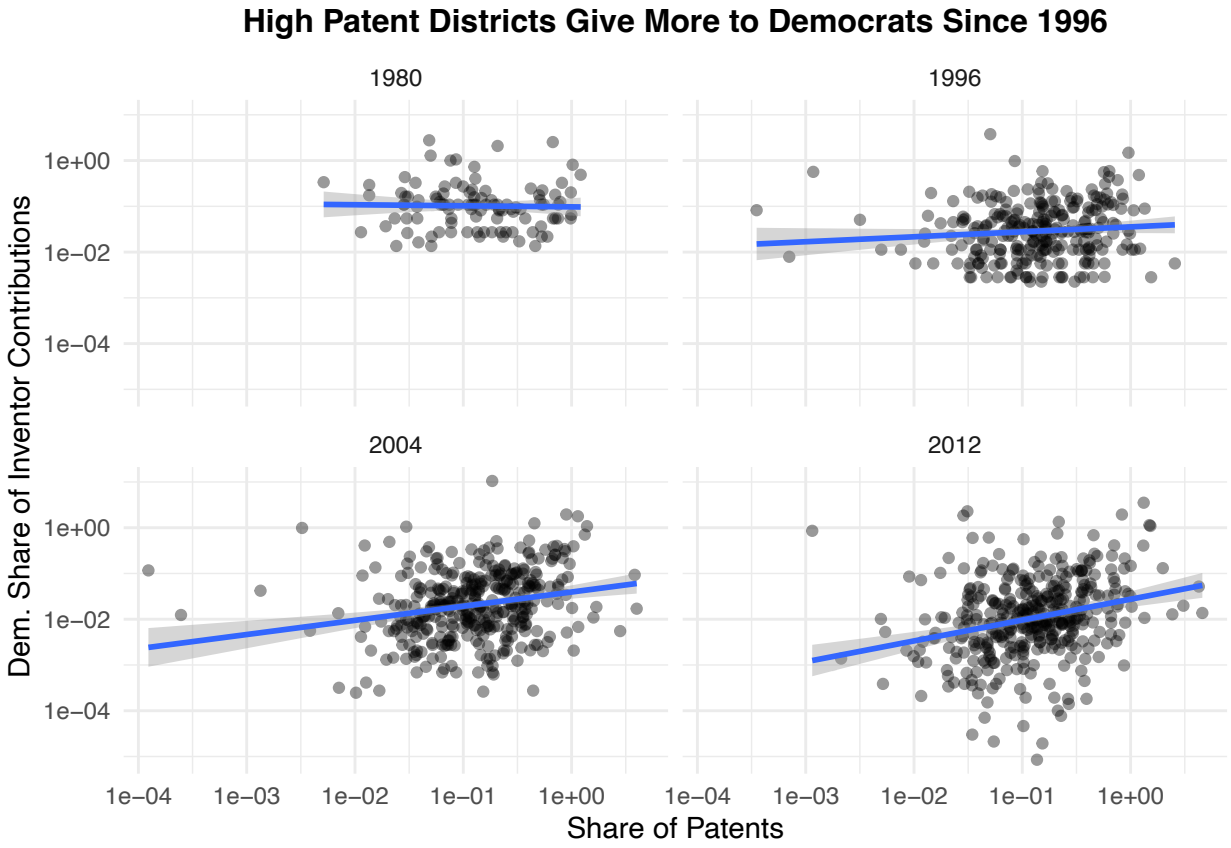

Figure 7: Each plot in this figure shows the share of all patents applied for by U.S. inventors in each Congressional District against the share of all contributions to Democratic candidates and committees from inventor-donors in the same District. Each panel shows the results from one of four presidential election cycles (1980, 1992, 2004, and 2012). Patents with more than one inventor were counted as a fractional share (1 divided by the number of inventors) accruing to each inventor. Congressional District boundaries are based on the 1990 Census and held constant across all election cycles. Districts that produced no patents or no campaign contributions are treated as missing data. The blue line shows the best linear fit given the data (i.e., a regression of contribution share on patent share).

3.3 American Political Institutions Shape Donation Patterns

If the Democratic Party's commitments to the knowledge economy have produced electoral payoffs, we would expect to observe the Democratic Party earning larger aggregate shares of either inventor donations or inventor donors, the latter of which neutralizes any potential bias from a small number of donors who contribute exceptionally high amounts to political campaigns. Figure 8 shows that this has in fact occurred. In each election cycle from 1980 to 2014, the figure shows the total amount of political contributions (in millions of 2019 dollars) that American inventors made to each of the two major parties (left panel) as well as the total number of inventors that donated to each of the two major parties (right panel). Though Republicans attracted about 73.3 percent of inventor donations in the 1980 election cycle, the parties were almost at parity in the 2008 election cycle, and though Republicans still held an advantage in the 2014 cycle, it was significantly smaller than in prior years (58.5 percent of donations in a cycle where 67.7 million dollars was raised by the two parties). Democratic gains among inventors are even more significant when considering the share of donors rather than donations: though 68.5 percent of inventors contributed to Republicans in the 1980 election cycle, 62.9 percent of inventors contributed to Democrats in the 2014 cycle. This suggests that, between 1980 and 2014, the Democratic Party's commitments to knowledge economy development effectively reversed the Republican Party's commanding advantage in the number of donors.

While Figure 8 suggests that the Democratic Party has made significant progress in courting inventors as a constituency, is amenable to multiple interpretations. Importantly, changes in aggregate donation patterns do not reveal whether inventors, as a class, have begun to favor Democratic candidates and committees by virtue of their status as producers of new technologies or whether inventors increasingly reside in metropolitan areas that have acquired strong attachments

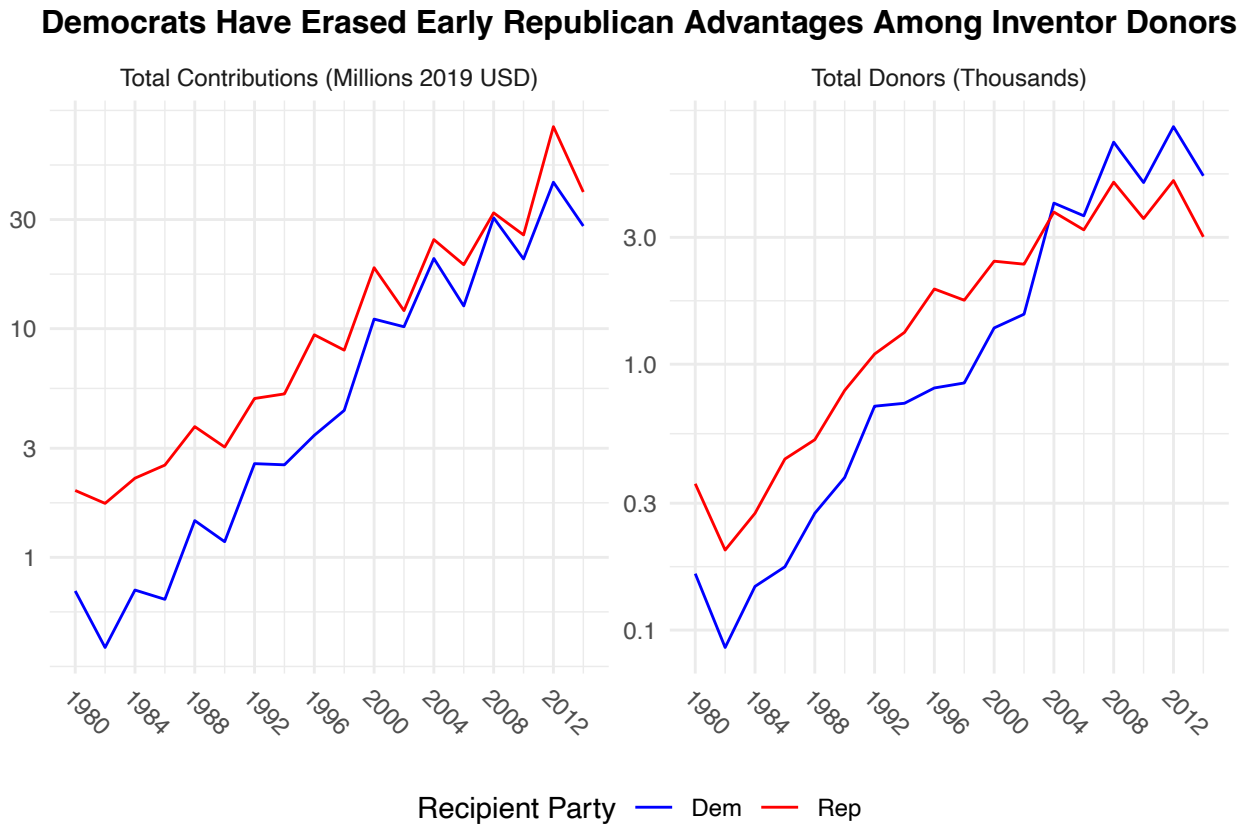

Figure 8: The left panel in this figure shows total contributions by American inventor-donors in all federal elections from 1980-2014 broken down by recipient type: Democratic candidates and PACs (blue line) and Republican candidates and PACs (red line). The contribution amounts are reported in millions of 2019 dollars. The right panel shows the total number of American inventor-donors that contributed to each recipient type for each election cycle from 1980-2014. Inventor-donors are political donors who reside in the United States and are listed as an inventor on any United States patent applied for on or after January 1, 1979. Both vertical axes are on the logarithmic scale.

to the Democratic Party over time.

To disentangle the effects of geography and the effects of inventorship, I matched inventor donors to non-inventor donors who have the same (imputed) gender, work at the same organization, and reside in the same Congressional District. For each election cycle, I then regressed a binary variable indicating whether the donor contributed to Democratic candidates or committees on another binary variable indicating whether the donor is an inventor. The over time evolution in the coefficients on the inventorship variable reveal whether inventors have developed a stronger propensity to contribute to Democrats after controlling for differences arising from gender, place of work, and place of residence. The regressions were run in matched data sets including all inventors (any donor that applied for a patent in the current election cycle or any time prior) and the subset of "switchers," which are inventors who had not applied for a patent in the prior election cycle but did in the current election cycle (i.e., donors who only became inventors in the current election cycle). The estimates from the subset of switchers are not a separate quantity of interest, but provide a robustness check to ensure that that the estimates observed among all inventors are comparable to those observed among first-time inventors and that the groups are not materially different.

The regression output is reported in Appendix 5.2, but the main result is illustrated in Figure 9, which shows the estimated coefficients on the inventorship variable in each election cycle. The solid points and confidence intervals show the results from estimating the coefficients using the full matched data set, while the crossed points (with no confidence intervals) show the point estimates from running the same regressions using the subset of switchers. As shown, from the 1980 through the 2006 election cycles, inventors were just as likely as their peers (those of the same gender, place or work, and place of residence) to donate to Democratic candidates and committees, but since the 2008 election cycle, they have become slightly *less* likely than their peers to donate to Democratic candidates and committees. These results are consistent with Broockman, Ferenstein,

and Malhotra (2019) to the extent they suggest that inventors have somewhat unique political preferences and may be more conservative than their peers in certain dimensions. But they also suggest that changes in political geography are driving Democratic gains among inventors: after controlling for geography, inventorship actually pulls in the opposite direction and would alone suggest that the Democratic Party has been losing, not gaining, ground with this constituency.

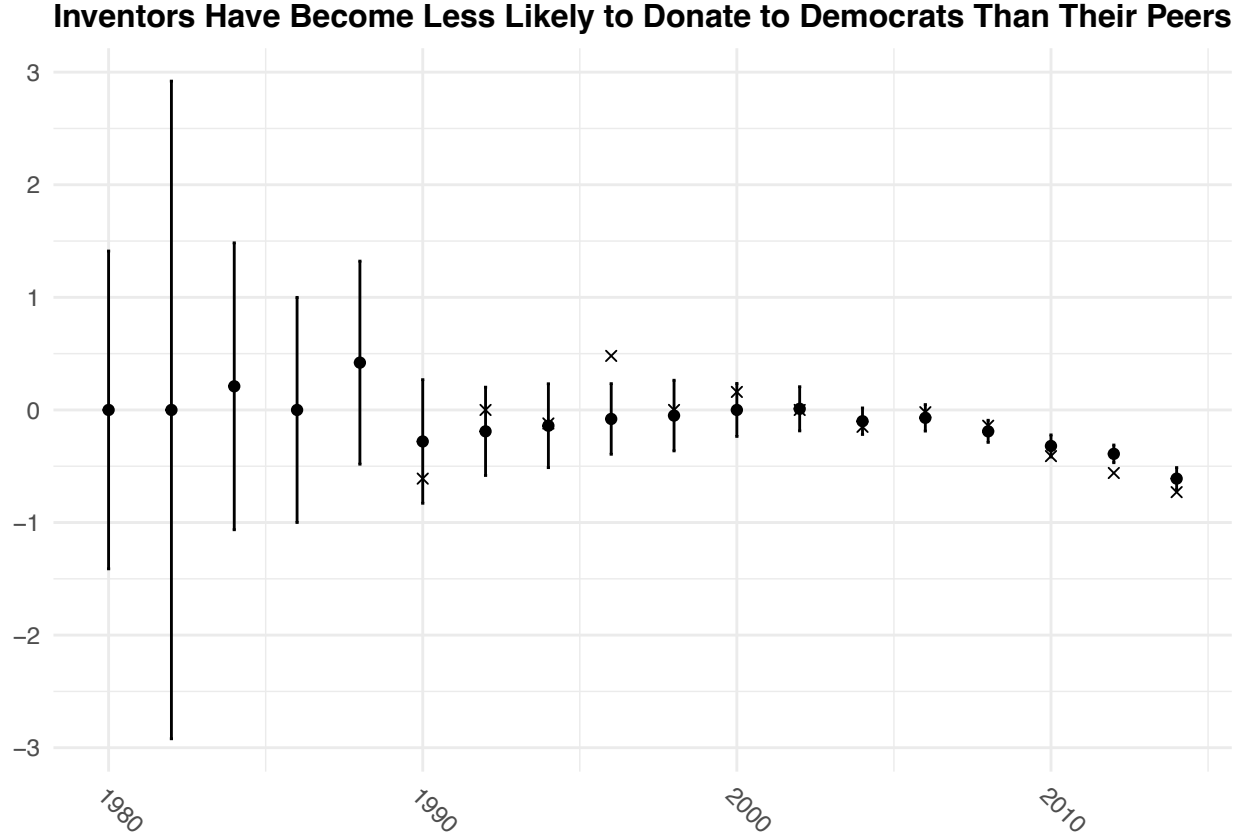

Figure 9: This figure shows the point estimates and 95 percent confidence intervals from regressing a binary variable indicating whether the donor contributed to a Democratic candidate or committee on a binary variable indicating whether the donor is an inventor, after matching inventors with non-inventors who have the same imputed gender, place of work, and place of residence. The regressions are run for each matched data set within each election cycle from 1980 through 2014. The vertical axis reflects the estimated difference in the logged odds of donating to a Democratic candidate or committee between inventors and non-inventors, with negative numbers implying less than even (50-50) odds. The solid points and confidence intervals illustrate the results from running regressions using the full matched data set where an inventor is any individual that applied for a patent in the current election cycle or any time prior. The crossed points illustrate the point estimates (with no confidence intervals) from running the same regression after confining the matched data set to switchers, or those who were not inventors in the prior election cycle but are in the current election cycle.

In a majoritarian political system with single member districts, the tendency for knowledge economy work to cluster (or agglomerate) in a handful of regions with strong pre-existing advantages might limit the electoral payoffs to be earned from supporting the knowledge economy transition (Moretti, 2013; Rodden, 2019). If this were true, we would expect to see patterns of political behavior that reflect patterns of economic behavior, with an increasing geographic concentration in innovation translating to an increasing geographic concentration in inventor donations. Table 4 indicates that this has taken place. For each of four presidential election cycles (1988, 1996, 2004, and 2012), the table shows the number of counties that participated in the knowledge economy (as evidenced by patenting) and the share of all U.S. patents flowing from the top 1 percent of those counties (the first two rows). As shown, innovation has spread modestly across geographic space from roughly 78 percent of the nation's 3,006 counties in 1988 to roughly 84 percent of all counties in 2012, but it has also become more concentrated: the top 1 percent of counties have increased their share of all patents from 30.4 to 43.6 percent.

Table 4 also shows that these economic trends are mirrored—to an even more extreme degree—in the political behavior of inventors. The next three rows show the number of zip codes from which inventors donated to political campaigns followed by the Democratic Party's share (and the Republican Party's share) of party donations flowing from the top 1 percent of those zip codes. Campaign contributions, by this measure, have become much more concentrated than inventions. The Democratic Party's share of donations flowing from the top 1 percent of zip codes has grown, for example, from about 20 percent in the 1988 election cycle to more than 60 percent in the 2012 election cycle.

Given that most campaign donations in non-presidential races goes to local candidates, we would also expect to see the growing geographic concentration in donations (shown in Table 4) to be reflected in a tendency for higher shares of donations to go to only a few candidates. Tables 5 and

Table 4: **Inventor Donations Have Become More Concentrated by Geography**

Variable	1988	1996	2004	2012
Inventions by County				
Number of Counties	2322.0	2502.0	2539.0	2514.0
Share of Patents from Top 1% of Counties	30.4	32.8	36.0	43.6
Inventor Donations by Zip Code				
Number of Zip Codes	712.0	2200.0	6204.0	14832.0
Share of Dem. Donations from Top 1% of Zip Codes	20.6	44.0	54.5	60.3
Share of Rep. Donations from Top 1% of Zip Codes	15.9	25.9	41.4	59.8

Note:
This table shows growth in the concentration of patenting (first two rows) and in inventor donations (next three rows) across four election cycles (1988, 1996, 2004, 2012). The first two rows show the number of counties in which inventors applied for US patents and the share of all patents flowing from the top 1 percent of those counties in each election cycle. The third row shows the number of zip codes in which inventors made political contributions in each election cycle. The fourth and fifth rows show the share of donations to Democrats (fourth row) and to Republicans (fifth row) flowing from the top 1 percent of those zip codes in each election cycle.

6 indicate that this has occurred for presidential and mid-term elections, respectively. Table 5 shows that, while the number of candidates who receive donations from inventors grew significantly for both parties from 1988 to 2012, the share of donations going to the top 1 percent of candidates also become more concentrated, growing from 13 to 67 percent for Democrats and from 27 to 59 percent for Republicans. Table 6 shows that, while this dramatic acceleration in concentration among recipients is driven largely by donations to presidential candidates, the trends still exist in midterm elections. Between 1990 and 2014, the share of inventor donations going to the top 1 percent of Congressional candidates grew from 12 to 20 percent for Democrats and from 14 to 20 percent for Republicans.

Closer inspection of the top recipients suggests that inventor donations remain concentrated partly because inventors (from both parties) behave like conventional donors in giving mostly to local candidates and partly because Democratic donors send much of their more expressive or strategic donations to candidates who either reside in states that are leading knowledge economy

Table 5: **Higher Shares of Donations in Presidential Races Go to a Few Candidates**

Variable	1988	1996	2004	2012
Number of Dem. Candidates	144.0	310.0	340.0	489.0
Number of Rep. Candidates	178.0	450.0	423.0	537.0
Share of Donations to Top 1% of Dem. Candidates	13.1	15.1	40.6	67.3
Share of Donations to Top 1% of Rep. Candidates	26.5	18.9	33.8	58.7

Note:
This table shows the number of Democratic and Republican candidates that received donations from inventors (rows one and two) and the share of party donations going to the top 1 percent of candidates (rows three and four) for each of four presidential election cycles (1988, 1996, 2004, and 2012).

Table 6: **Higher Shares of Donations in Midterm Races Go to a Few Candidates**

Variable	1990	1998	2006	2014
Number of Dem. Candidates	221.0	285.0	408.0	433.0
Number of Rep. Candidates	261.0	376.0	405.0	523.0
Share of Donations to Top 1% of Dem. Candidates	11.5	19.7	18.5	19.7
Share of Donations to Top 1% of Rep. Candidates	14.2	12.0	15.1	19.8

Note:
This table shows the number of Democratic and Republican candidates that received donations from inventors (rows one and two) and the share of party donations going to the top 1 percent of candidates (rows three and four) for each of four midterm election cycles (1990, 1998, 2006, and 2014).

development or who have publicly promoted the knowledge economy. On the whole, local giving among inventors has declined, but still made up a majority of donations in the 2014 election cycle (down from 71.6 percent to 51.8 percent of all inventor donations from 1982 to 2014). Among Democratic recipients, in the 2012 presidential election, three of the biggest recipients of inventor donations behind presidential candidate Barack Obama were Senate candidate Elizabeth Warren from Massachusetts, Senator Maria Cantwell of Washington, and Congresswoman Nancy Pelosi of California. Pelosi raised almost all (98.6 percent) of those donations from local donors, but Warren and Cantwell both raised higher shares from out of state donors (47.2 and 33.5 percent, respectively). Similarly, in the 2014 midterm elections, Senators Ed Markey of Massachusetts and Kay Hagan of North Carolina were two of the top four recipients and both drew significant shares of inventor donations from out of state donors (47.9 and 37.5 percent, respectively). But the top recipient in that cycle was Senator Cory Booker of New Jersey, who has taken prominent positions on the knowledge economy (Techonomy, 2015) and who received 81.8 of his donations from out of state inventors; the fourth largest recipient was Senator Gary Peters of Michigan who has sought to promote technological innovation in his home state, especially within the auto industry (Detroit Economic Club, 2018), and who received 73.1 of his donations from out of state inventors. As these examples suggest, there is some opportunity to cultivate inventor support for candidates in non-leading states, but those few have successfully capitalized on those opportunities. The dominant tendency is instead for large shares of Democratic inventor donations to flow to candidates in regions that are leading the knowledge economy transition.

To summarize, the analyses above suggest that, while the Democratic Party has made great inroads within the constituency of American inventors, they have achieved those gains not because these knowledge economy workers have become more strongly attached to the Democratic Party by virtue of their status as inventors, but because these knowledge economy workers increasingly

work and reside in regions that have developed strong preferences for Democratic candidates. And, consistent with the hypothesis that American political institutions have constrained the electoral payoffs the Democratic Party can earn from its commitments to the knowledge economy, increasing shares of inventor donations flow from only a few regions and increasing shares of those donations in turn accrue to only a few candidates. The next section looks for evidence of an alternative payoff. Has the Democratic Party's positions on the knowledge economy turned a relatively moderate group of donors and voters into more ardent and committed liberals?

3.4 Changes in Inventor Ideology Arise Primarily from Geographic Trends

The analyses in the previous section focused on changes in patterns of inventor donations, but a main advantage of the inventor donor database is that it also enables analysis of ideological changes among inventors. Figure 10 depicts how inventor ideology has changed over time. For each election cycle from 1980 through 2014, it shows the average ideology score (left panel) and the variance in ideology scores (right panel) for two sub-populations: those who contributed to Democratic candidates and committees (blue line) and those who contributed to Republican candidates and committees (red line).

As shown, the average ideology score among Republican donors remained relatively stable at about 0.75 until the 2006 election cycle, when it increased a bit. This suggests that inventors who contribute to Republicans were fairly conservative to begin with and have become slightly more conservative since 2006. In contrast, the average ideology score among Democratic donors remained constant and close to zero (at about -0.08) through 1990 but then dropped dramatically over the next twelve election cycles, reaching a low of -1.23 in the 2012 election cycle. This suggests that inventors who contribute to Democrats were a relatively moderate group to begin with but became much more liberal beginning with the election of 1992.

Similarly, the variance or spread in ideology scores for Republican donors was quite small from the beginning and appears to have slightly increased over the course of the entire time series. In contrast, inventors who gave to Democrats appeared to be relatively moderate, on average, because they were a somewhat heterogeneous bunch and had widely varying ideology scores in early election cycles. But from roughly 1992 through 2012, the variance in ideology scores for Democratic donors dropped dramatically so that in recent elections, Democratic donors have been as tightly distributed about their mean as Republican donors were in 1980 and 1982. In short, American inventors that contribute to political campaigns have become more polarized, as we observe both higher separation between average ideology scores and lower variances around those means, but that polarization arises mostly from ideological changes that took place among inventors who contribute to Democrats.

As with the aggregate donation patterns depicted in Figure 8, these aggregate ideological shifts are amenable to multiple explanations. It is possible that the Democratic Party's efforts to promote the knowledge economy have brought more inventors into the Party and made them more sympathetic to the Party's positions on issues like social welfare spending thereby causing them to become more liberal in their overall ideology. In this sense, the Party may reap electoral rewards from its knowledge economy position-taking by not only attracting more inventors but also inducing them to behave more like mainstream Democrats. The fact that the turning point for Democratic donors appears to be the 1992 election cycle, an election in which the Democratic presidential candidate successfully courted Silicon Valley entrepreneurs (Miles, 2001; O'Mara, 2019), might support this interpretation. Alternatively, the acceleration of knowledge economy development in the mid-1990s associated with the rise of the internet may have simply attracted many more inventors to metropolitan areas that have become increasingly liberal, and inventor ideologies have simply tracked these changes in political geography.

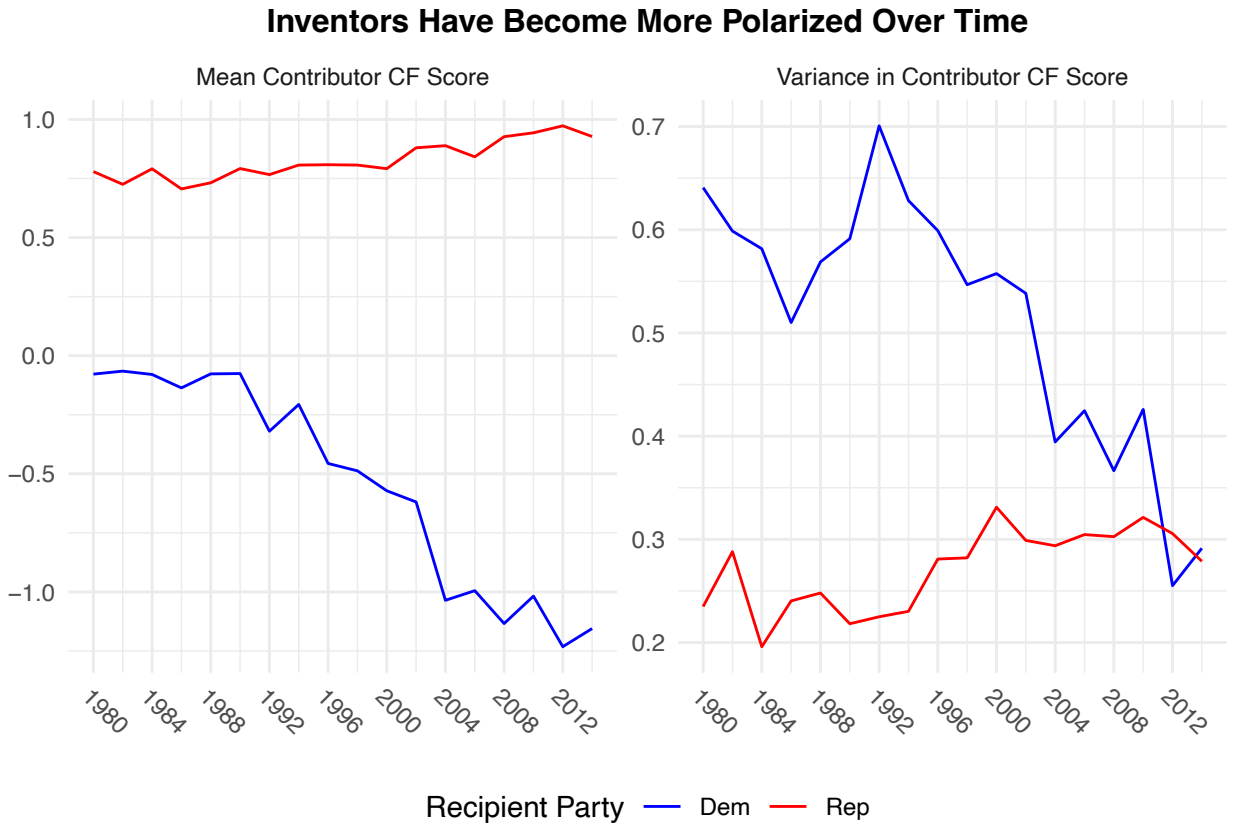

Figure 10: This figure shows the average (left panel) and variance (right panel) of the ideology scores for those inventor-donors who contributed to Democratic candidates and committees (blue line) and those who contributed to Republican candidates and committees (red line) in each election cycle from 1980 through 2014.

To disentangle the effects of geography and the effects of inventorship, I used the subset of matched inventor donors (described above in connection with Figure 9) and regressed ideology scores on a binary variable indicating whether the donor is an inventor. The over time evolution in the coefficients on the inventorship variable reveal whether inventors have become more liberal after controlling for differences arising from gender, place of work, and place of residence.

The regression output is reported in Appendix 5.2, but the main result is illustrated in Figure 11. As with Figure 9, the solid points and confidence intervals illustrate the results from estimating the results using the full matched data set, while the crossed points (with no confidence intervals) show the point estimates from running the same regressions using the subset of switchers (those who applied for their first patent in the same election cycle). The figure shows that inventors were somewhat more conservative than their peers in early election cycles and slowly became more liberal than their peers over time, though the effect is not precisely estimated and is not significantly different from zero until 2002. That trend, however, appears to have reversed around 2006 and by 2014, inventors were only slightly more liberal than their peers (differing only by -0.13 points on the common factor ideology scale in 2012).[22] Accordingly, after controlling for geography and other factors, differences between inventors and non-inventors explain only about 11 percent of the total change in average ideology scores among Democratic donors (of about -1.15 points).

Though individual characteristics, like inventorship, do not seem to explain increasing liberalism among Democratic donors, it is still possible that we are confounding geographic with firm-level or sectoral behaviors. For example, it is difficult to know whether rising liberalism among inventors who contribute to Democrats is an artifact of living in places like the Silicon Valley or Seattle, or is instead an artifact of working as a software engineer (for evidence of sectoral

[22]Note that this turning point, in the 2006 election cycle, matches the point in time when inventors began developing a lower propensity to donate to Democratic candidates and committees, shown in Figure 9.

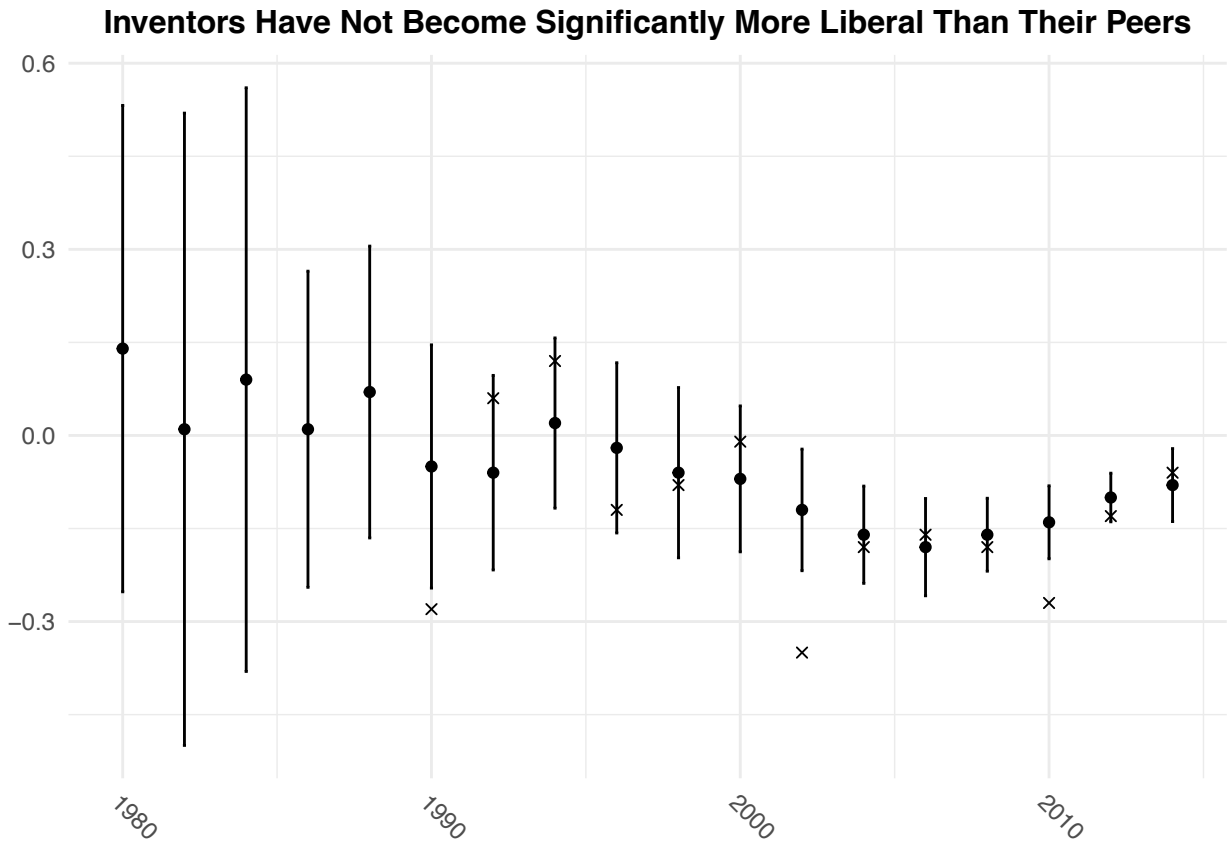

Figure 11: This figure shows the point estimates and 95 percent confidence intervals from regressing ideology scores on a binary variable indicating whether the donor is an inventor. The regressions are run for each matched data set within each election cycle from 1980 through 2014. The vertical axis reflects an estimated difference in mean ideology scores between inventors and non-inventors. The solid points and confidence intervals illustrate the results from running regressions using the full matched data set where an inventor is any individual that applied for a patent in the current election cycle or any time prior. The crossed points illustrate the point estimates (with no confidence intervals) from running the same regression after confining the matched data set to switchers, or those who were not inventors in the prior election cycle but are in the current election cycle.

patterns, refer to Table 3) or working for a firm like Google or Microsoft, which happen to have headquarters in those locations.

To explore this question, I first expanded the inventor donor database, for the 1992 and 2012 election cycles, to include campaign contribution data on all workers at firms that produce intellectual property. Specifically, as described in Appendix 5.1, I used patent data to identify all companies that produced intellectual property in the five years prior to each election cycle. I merged these firm names with the DIME database to gather contribution and ideology data on all employees for these firms (inventors and non-inventors alike) in each election cycle. I then linked new firm names (for those firms which did not have inventor donors) to Capital IQ firm identifiers and 4-digit SIC codes.

With this dataset, I performed a variance decomposition on the subsets of knowledge economy workers who contribute to Democrats and who contribute to Republicans. This analysis was predicated upon and modeled after similar analyses conducted in prominent studies of rising wage inequality (Barth et al., 2016; Song et al., 2019). In those studies, the question was whether increasing wage inequality—reflected by an increasing variance in the overall wage distribution over time—was best explained by changes between firms, with the average wages of some superior firms pulling away from the average wages of their competitors, or within firms, with executive pay (for example) pulling away from pay for administrative staff across many firms.

Here, the phenomenon to explain is not increasing variance in the wage distribution over time but decreasing variance in the ideology distribution over time among the subset of knowledge economy workers that give to Democratic candidates and committees. To determine whether geographic or firm-level shifts are driving the declining ideological variance among Democratic inventors, I implemented a Bayesian form of ANOVA decomposition for each subset of knowledge

economy workers in the 1992 and 2012 election cycles using the `runjags` library in R (Denwood, 2016a). Specifically, I fit the following non-nested hierarchical model to each data set in each election cycle:

$$y_i \sim \mathcal{N}(a_{j[i]} + b_{k[i]}, \sigma_y^2)$$

$$a_j \sim \mathcal{N}(0, \sigma_a^2)$$

$$b_j \sim \mathcal{N}(0, \sigma_b^2)$$

Here y_i represents the ideology score for donor i residing in Congressional District $j[i]$ and working at organization $k[i]$. The estimated standard deviations, σ_a, σ_b, σ_y can be interpreted as point estimates of the variation in the average ideology across districts, the average ideology across organizations, and the residual variation within districts and organizations, respectively. Following (Gelman and Hill, 2007, Ch. 22), I report finite population empirical standard deviations since there is no super-population of Congressional Districts beyond those observed in the data, though this choice does not impact the results.

A Bayesian form of ANOVA is preferable, here, because the goal is not to test whether the batches of coefficients for Congressional Districts and organizations, $a_{j[i]}$ and $b_{k[i]}$, are statistically significant sources of variation in ideology among Democratic knowledge economy workers. Both variables are highly significant in this respect in both election cycles. The goal is rather to precisely estimate (and efficiently compute) the amount of observed variation between the batch of district effects and organization effects in each period, and the residual variation within both districts and organizations, and determine which plausibly explains the overall decline in the variance of ideology scores among Democratic knowledge economy workers.

Such an analysis suggests that Democratic knowledge economy workers are becoming

more polarized primarily by virtue of the place they live rather than the place they work, though residual variation in ideology scores within districts and organizations remains an important contributor as well. Figure 12 illustrates the main results. It shows the point estimates and 95 percent confidence intervals for each of the parameters of the model when the model is fitted to data for Democratic knowledge economy workers (left panel) and Republican knowledge economy workers (right panel) in the 1992 election cycle (black points) and the 2012 election cycle (gray points). The figure reveals that, for both Democratic and Republican knowledge economy workers, the estimated variance in the average ideology scores between organizations did not materially change between 1992 and 2012. This effectively means that differences between organizations cannot explain increasing polarization among knowledge economy workers.

In contrast, for Democratic knowledge economy workers, the estimated variance in the average ideology scores between Congressional Districts plummeted by about 84 percent and, as of 2012, was close to zero (the point estimate is 0.058). In other words, Democratic knowledge economy workers have come to increasingly reside in homogeneous liberal enclaves, so that there is almost no variation left in the average ideology scores across the districts in which these workers reside. This effectively means that changes in political geography can plausibly explain increasing polarization among Democratic knowledge economy workers. A significant decline in the residual variance, by about 40 percent between 1992 and 2012, also suggests that polarization among Democratic knowledge economy workers increased within organizations and districts as well. But the amount of ideological variation remaining within organizations and districts is still relatively large (comparable in size to the variance between organizations). The most salient and surprising result is the virtual dissipation of any meaningful variation between districts.

The results are similar when the variance decomposition is run using Congressional Districts and 4-digit SIC codes instead of organizations. Whether the alternative source is hypothesized to

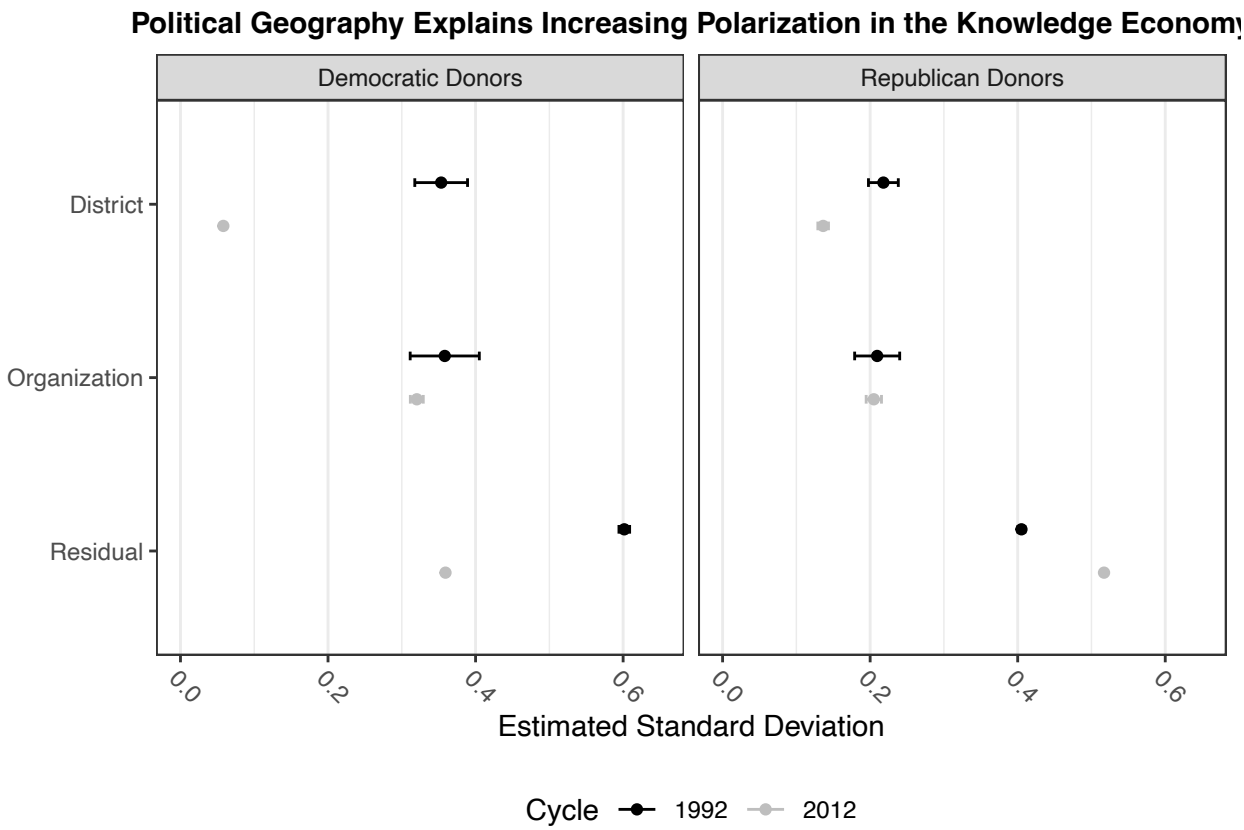

Figure 12: This figure shows the empirical standard deviation in the distribution of average ideology scores across Congressional District (top line) and across organizations (middle line) as well as the residual deviation within districts and organizations (bottom line). The estimates are produced by fitting the model described in the text. The estimates are reported for two different election cycles: 1992 (black points and 95 percent confidence intervals) and 2012 (gray points and confidence intervals). And estimates are reported from fitting the model to two different data sets: Democratic donors (left panel) and Republican donors (right panel). The estimates suggest that increasing polarization among knowledge economy workers comes predominately from changes among Democratic rather than Republican contributors and is most likely explained by increasing polarization between districts rather than between organizations.

be place of work or industrial affiliation, increasing geographic polarization emerges as the more plausible source of increasing polarization among knowledge economy workers who contribute to Democrats.

3.5 Conclusion

Inventors, or those who produce the new technologies that shape the knowledge economy, have come to favor Democratic candidates and committees when donating to political campaigns, and those who contribute to Democrats have also become more liberal since the 1992 election cycle. These aggregate findings generally support the hypothesis that the Democratic Party's rhetoric and policy commitments on knowledge economy formation have allowed it to reap electoral rewards.

But when we examine the geographic expression of these trends, it appears that American political institutions have constrained those payoffs in ways that call into question the knowledge economy's viability as a dominant platform of economic development. Just as inventiveness has become increasingly concentrated in geographic space, so have donations from inventors become more concentrated, with roughly 60 percent of donations to each party coming from only 148 zip codes in the 2012 election cycle. And larger shares of these donations increasingly flow to presidential candidates and a small number of Congressional candidates who either live in states that are leading knowledge economy development or who have publicly supported the knowledge economy. In a majoritarian system with single-member districts, the concentration of knowledge economy development to a few regions seems to be generating larger political payoffs for some candidates but producing more muted results for many others. Of course, the campaign finance system has developed institutions for distributing money to more competitive races, but it is not yet clear whether it does so in ways that create concrete electoral incentives for the many Democratic candidates outside of known knowledge economy hubs to take up or maintain the

cause of knowledge economy development. And if as yet unobserved voting behavior among inventors follows their donation behavior, institutions for redistributing donations may offer little recourse, as inventor votes will remain concentrated nevertheless.

More broadly, these results suggest that American political institutions create at least two major perils for those who seek to mobilize the force of the government to undertake bold new programs of economic development. In a setting where the two main political parties have staked out divergent philosophies on macroeconomic management, separation of powers may tend to give neoliberal or "third-way" strategies a higher likelihood of becoming law (see Chapter 1), but the market-oriented reforms that those strategies rely upon and the unequal (and limited) response of state governments in a federalist system may also tend to exacerbate pre-existing regional inequalities (see Chapter 2). In the absence of a more robust effort by the federal government to equalize regional patterns of economic development, winner-take-all elections in single-member districts may then cause economic agglomeration (Moretti, 2013) to turn into political agglomeration (Rodden, 2019), where geographic concentration in economic gains leads to concentration in electoral payoffs and relatively few political candidates perceive a benefit from supporting the policies driving the economic transition. This in turn may impede the formation of the kinds of broader cross-regional coalitions that would be needed to overcome the imperatives of divided government and assert the federal government's hand more forcefully which will continue to make neoliberal strategies attractive for political pragmatists. Though we observe something like this happening with respect to the knowledge economy, it remains an open question whether other economic platforms, including those that depend on infrastructure investments or social welfare spending, are prone to the same dynamics.

4 Antitrust Deregulation and the Politics of the American Knowledge Economy

4.1 Introduction

After a long nascence, antitrust policy has sprung onto the public agenda. A year-long investigation into the nature of competition in digital markets has led a House antitrust subcommittee to issue a 450-page report equating the managers of today's technology firms with the oil and railroad barons of the late 19th century (Majority Staff, 2020). Members of Congress have introduced at least seven major pieces of legislation seeking to reform the nation's system of antitrust enforcement. And President Biden has appointed vocal critics of the existing system, including Jonathan Kanter, Tim Wu, and Lina Khan, to prominent positions in his administration.

Those who support the reform movement have rooted their demands in a specific narrative about the evolution of antitrust enforcement, the reasons why it has been so lax in recent decades, and what the repercussions are for the American political economy. In this perspective, the current regime arose when top antitrust officials serving under President Reagan embraced many teachings of the law and economics movement associated with the University of Chicago, and these ideological shifts in turn motivated a more relaxed posture towards potentially anti-competitive activity like mergers and acquisitions involving large companies (Khan, 2017; Stoller, 2019; Lynn, 2010). Democratic presidents after Reagan did not revert to a more aggressive antitrust posture simply because they embraced this "neoliberal" ideology (Khan and Vaheesan, 2017; Stoller, 2019). And, as with the first Gilded Age, the corporate behemoths that have emerged from this system of lax enforcement have exercised their market power in ways that disadvantage workers and consumers but increase corporate profits, thereby exacerbating economic inequality (Baker and Salop, 2015; Khan and Vaheesan, 2017).

Though mostly raised by normative scholars, some of these claims are empirical in nature, but testing has been impeded in some cases by a lack of data and in some cases by a lack of interest. First, whether antitrust officials under President Reagan dramatically reset antitrust priorities is an open question. Some contend that antitrust officials routinely respond to pressures and constraints arising from multiple political institutions including presidents, Congress, and the courts (Wood and Anderson, 1993). Others agree that that law and economics movement caused a sea change in enforcement priorities but contend that the shift began before Reagan was elected and arose from the replacement of many lawyers with economists inside the antitrust bureaucracy (Eisner and Meier, 1990). Still others have looked for patterns of change within the time period from 1980 to the present, which is the period in which good data on mergers and acquisitions exists (Macher and Mayo, 2020; Coate, 2018; Baker and Shapiro, 2008; Leary, 2002; Coate, 2000). But these studies do not allow us to compare the contemporary system of antitrust enforcement to that which prevailed before 1981.

Second, the question of whether lax antitrust enforcement has contributed to rising income inequality is mostly based on case studies (Khan and Vaheesan, 2017) and is conventionally understood as arising from the increase market power that producers have over consumers in accordance with neoclassical economic theory (Baker and Salop, 2015; Khan and Vaheesan, 2017). An alternative perspectives suggests, in contrast, that large mergers and acquisitions mechanically increase inequality by bestowing great financial rewards on the service professionals—mostly lawyers and bankers—who implement them while laying off many blue-collar workers (Short, 2022), and that the surge in this form of business activity is therefore emblematic of increasing financialization in the American political economy more broadly (Krippner, 2011). In this alternative perspective, lax antitrust enforcement has created both geographic (urban versus rural) and demographic (service professionals versus blue-collar workers) cleavages that have the potential to disrupt the status

quo. But if this is true, the relevant political question becomes: why has the Democratic Party has accommodated lax antitrust enforcement if it has been exacerbating economic inequality for more than 40 years and if intensifying antitrust enforcement would garner electoral benefits, like increasing support among blue collar workers? Existing studies which establish an empirical relationship between financialization and economic inequality, like Philippon and Reshef (2012), do not address this question.

Finally, as suggested above, reformers emphasize ideological and behavioral shifts among political elites, especially among judges and antitrust agency staff, when explaining the durability of the current antitrust system. But no work, of which I am aware, has sought to look for evidence of a broader electoral connection beneath the Democratic Party's shift on antitrust enforcement. Theory and some data suggests such a connection should exist. For starters, as suggested in Chapter 1, the technology companies that are currently under scrutiny and the service professionals on which those companies intensely rely are core target constituencies for the Democratic Party and have been since the Party first turned towards the knowledge economy in the early 1980s (Iversen and Soskice, 2019). Recent survey work also suggests that tech entrepreneurs are in fact unique in their political preferences, especially when it comes to government regulation of business behavior (Broockman, Ferenstein, and Malhotra, 2019). Similarly, if today's system of lax antitrust enforcement has been propelled by the law and economics movement, we might expect those who have been exposed to this ideology, namely lawyers, to be uniquely supportive of its tenets. And there are reasons to suspect that these differences could feed back into the political system, as legal professionals are known to donate huge sums to political campaigns (more than $320 milion in 2020) by strong Democratic margins (garnering 81 of legal professional donations in 2020) (Open Secrets, n.d.).

In this chapter, I implement a series of exploratory analyses using observational data to test

the plausibility of these three claims. First, I emulate the technique developed by Phillippon (2015) to develop a consistent time series showing merger enforcement intensity—the number of mergers and acquisitions (M&A) challenged by antitrust officials divided by the total number of large M&A deals consummated—for every year from 1955 to 2015, and then fit a Bayesian changepoint model to the data to determine if there are any critical junctures. Consistent with reformist assertions, the evidence suggests that President Reagan dramatically reset agency priorities and that subsequent Democratic presidents have done little to shift antitrust enforcement back to post-war levels. Next, I develop a model to test whether M&A mechanically influences economic inequality and whether exposure to the service economy predicts heterogeneous effects across states. Estimating this model with panel data, I find that M&A activity does exacerbate economic inequality, that the effect is confined to only a few states, and that some strongly Democratic states that are well integrated into the knowledge and service economies, including California, New York, Massachusetts, and Washington, are among those that have a uniquely strong economic interest in relaxed antitrust oversight. Given that certain demographic groups and certain regions have an economic interest in lax antitrust enforcement, I then analyze public opinion data to look for some evidence of demographic and regional differences in attitudes towards antitrust enforcement. Analysis of prior polling indicates that younger and more affluent voters are significantly less likely to support doing more to regulate M&A and, at the state level, unionization and exposure to the service economy play a more important role than presidential partisanship in explaining regional variation in attitudes towards antitrust enforcement.

These tests do not reject the reformist assertion that a certain kind of ideology, arising from the law and economics movement, partly sustains today's lax system of antitrust enforcement. They do provide some tentative evidence suggesting that this ideology may be shared more broadly than frequently assumed among the kinds of younger and more affluent professionals

that the Democratic Party has consistently courted for over forty years. Whether this remains true today requires new polling on antitrust policy preferences while controlling, at a minimum, for industry and occupation, which is a subject of ongoing work. But existing data also suggests that the Democratic Party's restraint on antitrust issues may arise from a kind of policy feedback inherent to the realignment associated with the knowledge economy transition. Though elected Democrats may have been reluctant participants in initiating the policy changes that have caused increasing financialization in the American political economy, those policies—including lax antitrust enforcement—seem to bestow great economic rewards to the service professionals that reside in several strongly Democratic states, service professionals who are known to support Democratic political campaigns by large margins. Whether those constituencies can be persuaded to set aside their own individual or regional economic interests to support the reform movement remains to be seen. To the extent they cannot, these demographic and regional cleavages may complicate the path to reform in ways not anticipated by the reformist narrative with its exclusive emphasis on the role of ideology in shaping administrative action among small groups of elite actors.

4.2 Testing Political Theories of Antitrust Policy Change

A core plank in the antitrust reform platform is that President Reagan dramatically reduced government oversight of proposed mergers and acquisitions involving large companies and that subsequent Democratic presidents failed to unwind this drastic change in administrative priorities. At least two prior studies by political scientists seem to reject this hypothesis, but each relies on interrupted time series regressions with thirty or fewer observations and seven or more predictors (Eisner and Meier, 1990; Wood and Anderson, 1993), which makes it difficult to assess the true significance of these authors' findings. Both studies also sought to explain changes either in pure counts of enforcement activity and resources (the number of cases filed, the dollar amount of budget

allocations, etc.) even though this empirical strategy has serious drawbacks. More recent studies in the legal and economic literature have therefore tended to measure antitrust enforcement intensity as a ratio of administrative action (merger challenges) relative to some measure of economic activity (the number of proposed mergers involving large companies) (Macher and Mayo, 2020; Coate, 2018; Baker and Shapiro, 2008; Leary, 2002; Coate, 2000). But these studies focus almost exclusively on the post-Reagan period and therefore say little about whether the changes observed during the Reagan administration deviated in any meaningful sense from those observed in earlier decades.

To overcome these data limitations, I first developed a unique dataset showing merger enforcement intensity—or the number of mergers challenged by the Department of Justice Antitrust Division (DOJAD) as a share of the number of proposed mergers involving large companies—for every year from 1955 to 2015. Specifically, I followed Phillippon (2015) and Baker and Wurgler (2000, 2250) in using historical time series known to be correlated with M&A activity to impute the number of large mergers consummated in each year from 1955 to 1981 and then merged these measures with comprehensive SDC Platinum data on M&A from 1982 to 2015. I then followed a similar procedure to make the historical series of DOJAD merger cases from 1955 to 1997 reported in Gallo et al. (2000) consistent with the official DOJ workload statistics reported from 1970 to 2015. I then took the ratio of DOJAD challenges relative to the number of large mergers, and normalized the resulting time series to the high point observed in 1961.

Figure 13 illustrates why it is essential to interpret regulatory activity relative to the amount of economic activity that is meant to be regulated, a quantity which is arguably endogenous to the chosen stringency of regulatory scrutiny. Panel A shows the number of cases the DOJAD filed from 1955 to 2015 challenging a merger. As shown, the numbers vary but there is no easily discernible trend and one could easily conclude that, during the Clinton presidency, antitrust enforcement intensity significantly increased. Panel B shows the number of large mergers executed in each year

over the same time frame. It shows that the amount of M&A activity exploded around 1980, most likely in anticipation of relaxed regulatory scrutiny, and continued to grow dramatically during the Clinton presidency. Panel C shows the relative enforcement rates obtained by taking the number of cases from Panel A, dividing by the number of large deals from Panel B, and normalizing the numbers so that they portray the likelihood of a challenge relative to the high enforcement rates of 1961. It provides strong evidence of a critical juncture in 1981. Assume, for example, that the average relative enforcement rates are roughly 50 percent and 1 percent before and after 1981 based on the plot. Before Reagan was elected, if the number of deals executed increased by 10 percent relative to the number of deals executed in 1961, firms could expect the number of DOJAD challenges to be about 55 percent of the number of cases filed in 1961. After Reagan was elected, firms could expect DOJAD challenges to be about 1.1 percent of the number of cases filed in 1961 for the same relative increase in M&A activity.

The analysis above supports the conventional view that antitrust policy changed dramatically in a short period of time around the early 1980s. To determine precisely when the change took place I estimated a Bayesian changepoint model (Carlin, Gelfand, and Smith, 1992) of the following form:

$$y_t = \phi y_{t-1} + a_1 x_t + b_2 z_t \text{ for t} \in (2 : k) \tag{1}$$

$$y_t = \phi y_{t-1} + a_2 x_t + b_2 z_t \text{ for t} \in (k+1 : T) \tag{2}$$

where k is a potential change point, y_t is relative enforcement rates, x_t is the DOJAD's annual budget appropriation, and z_t is presidential party affiliation. The model is first order autoregressive under the assumption that agency officials and bureaucrats will base the current year's priorities on the last year's priorities with some modifications. In terms of specifying distributional assumptions,

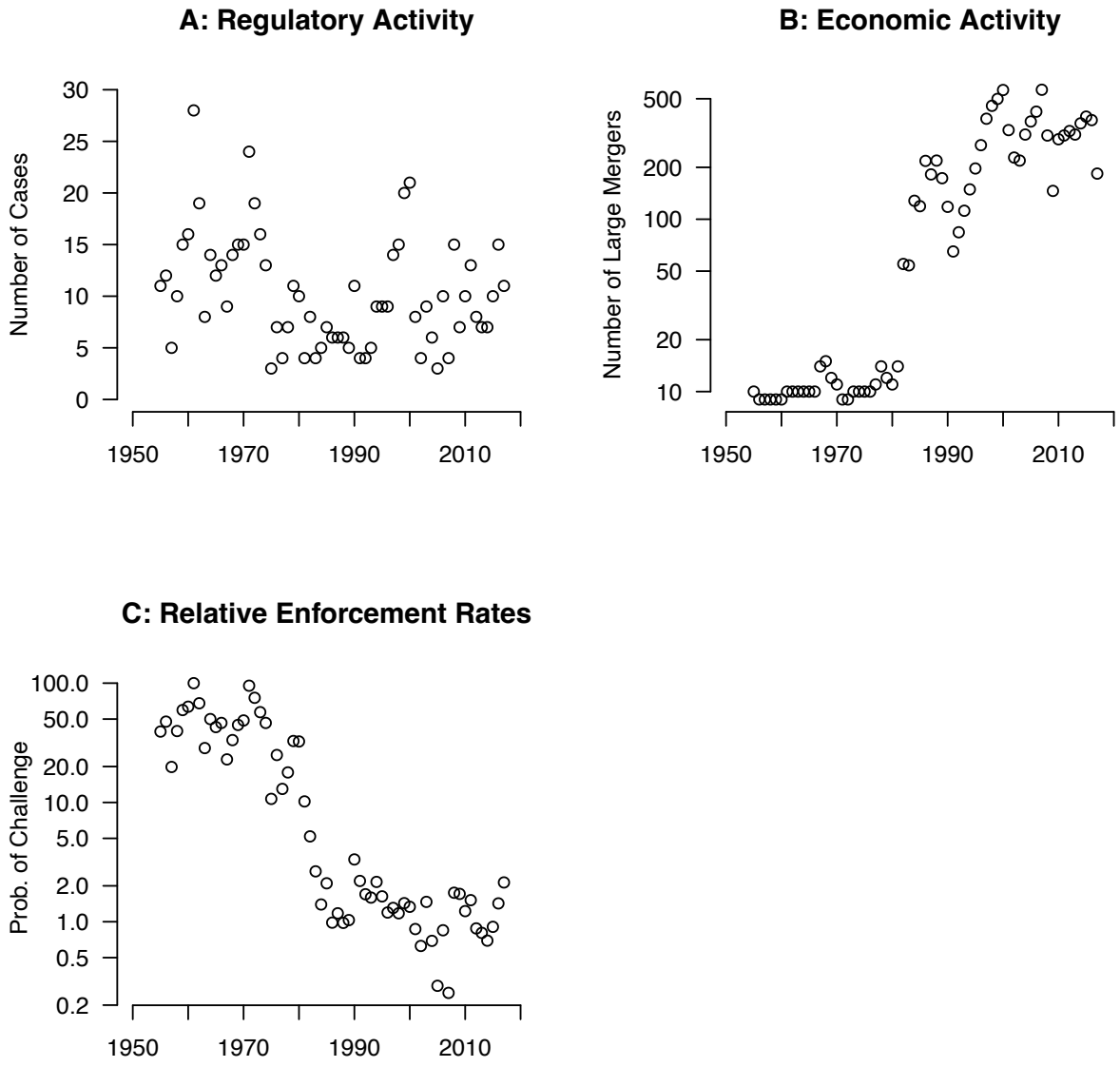

Figure 13: Panel A shows the number of DOJAD cases challenging a merger from 1955 to 2015. Panel B shows the number of large mergers in each year over the same time frame, based on imputed estimates from 1955 to 1981 as described in the text. Panel C shows the likelihood of facing a regulatory challenge, which is obtained by dividing the number of cases from Panel A by the number of mergers in Panel B, and normalizing relative to the maximum in 1961.

the change point k was drawn from a uniform distribution on the interval $(2, T)$ where T in this case is 61 (for the 61 years between 1955 and 2015), and the autoregressive coefficient, ϕ, was drawn from a uniform distribution on the interval (0,1). The remaining coefficients on budget restraints

(a_1 and a_2) and presidential party (b_1 and b_2) were given uninformative normal priors.

The results obtained by estimating equations 1-2 using the JAGS Gibbs sampler in R are shown in column (1) of Table 7. Because budget appropriations increase (almost) monotonically over the entire period, the negative coefficients a_1 and a_2 suggest that relative enforcement rates trended down before and after the change point, despite increasing budgets, though the trend is more negative after the change point. More importantly, the 95 percent confidence intervals for the coefficients measuring the effect of presidential party affiliation, b_1 and b_2, effectively surround zero. As a result, we cannot reject the null hypothesis that the partisanship of the sitting president has no bearing whatsoever on the likelihood of challenging large mergers in either period after we control for the substantial change in enforcement priorities at the change point. Because those coefficients are effectively zero, I dropped them from the model and ran a second simulation to (slightly) improve precision on the estimate of the change point, k. The results are shown in column (2) of Table 7. The 95 percent confidence interval for k is (26.0, 27.9) with a mean of 26.7. This suggests the change point is precisely estimated and took place in the 27th year, or 1981.

In sum, when we use an appropriate metric of DOJAD enforcement priorities that is consistent across several deacdes, we do see evidence of a critical juncture in antitrust enforcement priorities starting with Reagan's presidency in 1981. But we also observe that, even after Democrats regained control of the presidency in 1993 and again in 2009, they did little to return the DOJAD to its pre-1981 policy of challenging almost half of all large mergers that were proposed in each year, even though this kind of policy shift can be (and was) implemented without Congressional approval. The DOJAD did revise the merger guidelines in 1992, in 1997, and again in 2010. But the data shows that these revisions tinkered at the margins, at best. These findings support reformist contentions but also raise new questions about why Democratic presidents after Reagan chose not to reinvigorate antitrust enforcement. I explore this question in the remaining sections.

	(1)	(2)
a_1	-0.06	-0.06
	(-0.1, -0.02)	(-0.09, -0.03)
a_2	-0.21	-0.2
	(-0.29, -0.13)	(-0.27, -0.13)
b_1	-0.07	–
	(-0.48, 0.35)	–
b_2	0.15	–
	(-0.21, 0.51)	–
k	26.73	26.7
	(26, 27.98)	(26, 27.88)
ϕ	0.4	0.41
	(0.17, 0.62)	(0.19, 0.63)
N	61	61

Table 7: This table shows the mean estimated coefficients and 95 percent confidence intervals (in parentheses) obtained from estimating Equations 1-2 using the runjags library in R (Denwood, 2016b). The dependent variable in each model is DOJAD enforcement rates relative to 1961, as explained in the text. The parameter ϕ and the pairs (a_1, a_2), and (b_1, b_2) respectively capture dependence on the prior year's enforcement rates as well as budget appropriations and presidential party affiliation before and after the change point, k.

4.3 Explaining Lax Enforcement Under Democrats After Reagan

For some policy observers, the empirical results described above may come as little surprise. In a new book, Stoller (2019) argues, for example, that key political appointees to the DOJAD in Democratic administrations of the 1960s and 1970s began to embrace Chicago School "neoliberal" ideology on antitrust issues so that, by the time of Reagan's victory in 1980, liberal support for more aggressive enforcement within the bureaucracy had all but vanished. In this respect, Stoller (2019) adds descriptive heft to a similar theory articulated earlier by Eisner and Meier (1990) and Eisner (1991) and echoed by Khan (2018).

One potential drawback of these theories is that, in placing so much emphasis on ideological shifts among political elites, the authors fail to explore the possibility that some core Democratic constituencies may not want the government to regulate M&A more aggressively. In other words, existing scholarship has done little to entertain the hypothesis that there is an electoral connection

supporting the Democratic Party's shift in attitudes about antitrust enforcement. One possibility is that Democratic Party leaders embraced certain "neoliberal" policies, including a more relaxed antitrust posture, to better align themselves with a targeted constituency like the younger more affluent urban professionals who were contributing to knowledge economy development (Geismer, 2015; Iversen and Soskice, 2019). Alternatively, that constituency might be much narrower and be dominated by the leaders of high tech businesses who were known to support lax antitrust enforcement (Short, 2022). Another possibility is that, in a kind of feedback mechanism, the move towards lax antitrust enforcement shifted the economic and political terrain and thereby made it more difficult for Party leaders to revert to more robust enforcement. In this scenario, even if the initial shift to lax enforcement occurred under a Republican president, if liberal service professionals who work in knowledge economy hubs benefited from that policy, their own attitudes towards antitrust enforcement may have changed over time, and Party leaders may have shifted accordingly (Rodden, 2019). Through either mechanism—by targeting a new constituency with idiosyncratic preferences from the outset or by responding after the fact to induced changes in preferences—Democratic officials may have partly located their accommodation with lax antitrust in the demands of certain constituencies or regions.

Rigorous testing of these hypotheses is not straightforward. Archival records for business lobbyists might reveal more about the posture of business leaders towards antitrust enforcement in the 1980s and 1990s, work which is ongoing. The archives for prominent Democratic Party leaders, like Bill Clinton, might also contain evidence of intent to cater policy to new constituencies. But it is much more likely that, at least in documentary evidence, these political considerations would remain subtext while the official narrative would focus on legitimating the policy shift through ideological appeals to prove that the change is sound or justified by economic theory (Trumbull, 2012). In fact, today's antitrust reformers may over emphasize ideology simply because

it is much more likely to be observed in the historical record. Similarly, rigorous testing of whether knowledge economy and service professionals are materially different in their attitudes towards antitrust enforcement than ordinary Democratic voters would require new surveys with previously unasked questions about demographics, like occupation, targeted to heavily sample within groups, like venture capitalists or inventors, who are seldom the focus of public opinion surveys (but see Broockman, Ferenstein, and Malhotra, 2019). This work is also ongoing, but the effect of the reform movement itself, which has quite publicly signalled major challenges to the existing policy regime among progressives, will muddle the interpretation of these new surveys. To answer the historical question of whether Democratic Party leaders perceived an electoral connection in 1993 and 2009 we must therefore appeal to observational data, however imperfect.

In the sections that follow, I engaged in two such analyses. First, as described in depth in Appendix 5.4, I develop a model for testing whether cyclical shocks in M&A activity exacerbate state-level income inequality and whether state-level exposure to the service economy, as proxied by the state's share of GDP in legal services, significantly predicts heterogeneity in that relationship. When estimated separately for the pre- and post-1981 period, this model reveals whether service professionals have a concrete economic interest in lax antitrust enforcement and whether the regional expression of those interests has changed over time. In Section 4.3.1, I estimate the model in the pre- and post-1981 periods and describe the results.

Second, after finding that merger waves do exacerbate income inequality, I then test the hypothesis that the states where these economic effects are most acutely felt have historically opposed more aggressive policing of M&A at lower levels than would be expected based on aggregate measures of liberalism like two-party Democratic presidential voteshare. I test this contention by fitting a multilevel model, with both individual and regional variables, to historical polling data about antitrust enforcement and by then imputing state-level margins of support

for doing more to regulate M&A using Census data, following the technique developed by Park, Gelman, and Bafumi (2004). This analysis explores whether there once existed a plausible cleavage, demographic or geographic, among Democrats that might explains the Party's shift towards accommodating lax enforcement. In Section 4.3.2, I introduce this model and describe the results.

4.3.1 Antitrust and the Professionals Who Service the Knowledge Economy

The American public has, for some time, believed that M&A lead to concrete economic benefits for white collar professionals, like lawyers and bankers, who implement these transactions while imposing great economic costs on the blue-collar employees of the companies involved. In a 1990 survey, for example, 80 percent of respondents said that corporate mergers and takeovers help the lawyers and bankers who arrange them, while 62 percent said that the deals hurt the employees of the companies involved (Shulman, 1990). But to my knowledge, no prior work has sought to test whether there is a plausible causal relationship between M&A activity and income inequality or quantify the size of the effect or look for changes in the size of that effect over time. In fact, even those who contend that such a relationship exists tend to understand that relationship through the lens of neoclassical economic theory, which teaches that inequality generally arises somewhat diffusely, over long periods of time, from the power producers have to charge higher prices to consumers (Khan and Vaheesan, 2017). This framing overlooks an equally plausible mechanism, consistent with public opinion, in which these transactions have immediate differential impacts on white and blue collar workers (Short, 2022).

To test for a plausibly causal effect between relative growth in M&A activity and income inequality according to this mechanism, I leverage the fact that in 1981, each of the fifty states plus the District of Columbia was differentially suited to take advantage of the explosion in financial activity that came with antitrust deregulation. My identification strategy is based on the

econometric model for heterogeneous treatments developed by Card (1992) and others (Rajan and Zingales, 1998; Baker, Bloom, and Davis, 2016; Angrist and Pischke, 2008) and is motivated and described in greater detail in Appendix 5.4. The main specification is:

$$Is_{it} = \alpha_i + \beta_t + \delta\xi_{i,t-1} + \gamma(\xi_{i,t-1} \times X_t) + \epsilon_t \tag{3}$$

where Is_{it} is a top income share in state i and year t, α_i and β_t are state and year fixed effects, X_t is the annual amount of large M&A activity relative to total national income, and $\xi_{i,t-1}$ represents exposure to the service economy. The coefficient on the interaction term, γ, captures the main effect of interest.

To estimate the model, I first followed a procedure similar to that used in Section 4.2 to estimate the total dollar value of global M&A completed in each year where the transaction value was more than $100 million in 1948 dollars, which is approaching $1 billion in today's dollars. I then use the time series showing M&A activity relative to total income, $X_t = log(\frac{M_t}{I_t})$, as capturing a common national shock to which each state is differentially exposed. I estimate each state's exposure to these shocks and to the service economy more generally, $\xi_{i,t-1}$, using each state's share of total GDP earned in the prior year in legal services, much in the way that Card (1992) estimated exposure to a new federal minimum wage with the share of teenage workers likely to be affected. For example, if in 1986, the total amount of income generated in legal services was $10 billion and New York generated $1 billion of the total, then its exposure to the service economy in 1987 would be 10 percent or 0.1.

Table 8 presents the results. The main finding is that growth in M&A activity relative to total income accurately predicts some fluctuations in fiscal income inequality across both periods, but the effect size for the top 0.1 percent of the income distribution has more than doubled since

1981, even after we control for the possible effect due to capital gains in the second period.[23] This strongly suggests that the income of affluent professionals at the top of the income distribution is sensitive to changes in M&A activity.

	top 0.1 percent share of fiscal income		
	1963-1980	1981-2015	1989-2015
	(1)	(2)	(3)
state share of legal services (t-1) (δ)	-9.504^{***}	-17.302	-4.030
	(2.571)	(26.463)	(21.589)
state share of legal services (t-1) $\times X_t$ (γ)	3.060^{***}	11.063^{***}	7.251^{***}
	(0.471)	(2.327)	(1.856)
capital gains			32.509^{***}
			(7.693)
state share of capital gains (t-1)			18.100^{***}
			(4.441)
state share of capital gains (t-1) $\times X_t$			38.938^{***}
			(9.660)
Constant			
N	816	1,785	1,272
R^2	0.531	0.630	0.610
Adjusted R^2	0.521	0.622	0.601
Residual Std. Error	9.771 (df = 798)	33.113 (df = 1748)	35.588 (df = 1242)
F Statistic	53.209^{***} (df = 17; 798)	82.620^{***} (df = 36; 1748)	66.918^{***} (df = 29; 1242)

*p $< .1$; **p $< .05$; ***p $< .01$

Table 8: This table shows the main results of estimating equation 3. All three models include state and year fixed effects (estimates not shown). The dependent variable in each model is the top 0.1 percent's share of fiscal income. The state's share of legal services in period $t-1$ is used as a measure of exposure to the service economy (δ in Equation 3). The main effect of interest (γ in Equation 3) is the interaction between this measure of exposure and X_t, which measures M&A activity relative to total fiscal income in year t, on the log scale (see text). Models (1) and (2) cover different time periods, 1963-1980 and 1981-2015 respectively. In model (3), I added controls for inflation adjusted capital gains at the state level plus each state's exposure to capital markets (its share of capital gains in the prior year) and that exposure interacted with X_t. It covers the time period for which this data was available (1989-2015).

One concern with the approach above is that it may not capture all of the important differences between the states in their exposure to the service economy. As an exploratory exercise, I also estimated a Bayesian equivalent of 3 (see Appendix 5.4 for more information) in which I allowed the coefficients, δ_i and γ_i, to vary by state i. This muddies the water for statistical inference, as γ_i now captures some combination of an effect and un-modeled heterogeneity in service economy exposure. But as an exploratory exercise, the results are nevertheless interesting and help identify

[23]This control is included to account for the possibility that income accruing to shareholders, rather than service professionals, are generating the results.

states that may be acutely dependent on generating economic benefits from antitrust deregulation.

Table 9 presents the results. The first key finding, shown in column (1), is that growth in M&A activity did not significantly increase fiscal income inequality from 1963-1980 anywhere except New York. This is consistent with New York being the center of legal and financial services for M&A activity before deregulation. The second key finding is that, in the period of antitrust deregulation from 1981-2015, growth in M&A activity significantly increased fiscal income inequality in only eight states plus the District of Columbia. Most of these states tend to favor Democratic presidential candidates by relatively strong margins, and at least four of them—California, Massachusetts, New York, and Washington—are considered knowledge economy leaders. In 1980, few might have predicted that antitrust deregulation would financially benefit anyone outside of a select group of professionals in New York. But the explosion in M&A activity that antitrust deregulation wrought has fundamentally altered the economic landscape so that today, groups of affluent professionals who reside in at least six consistently Democratic states plus the District of Columbia have incomes that are intensely tied to the lax antitrust regime that Reagan inaugurated.

The key takeaway, here, is that it is possible to identify specific constituencies and regions that have benefited from antitrust deregulation, and that the constituencies and regions that have benefited from this policy shift tend to favor Democratic presidential candidates by large margins (Open Secrets, n.d.). In this sense, the popular perception that M&A deregulation worked for the benefit of lawyers and bankers but to the detriment of employees has at least some basis in fact. And while it has always been true that M&A activity exacerbates income inequality, the magnitude of that effect grew substantially after deregulation and its geographic location spread well beyond New York City. In the next section, I explore the possible impact of these economic shifts on public support for having the federal government do more to regulate M&A.

state	1963-1980	1981-2015
California	3.15	15.3
	(-0.5, 6.3)	(8.28, 22.63)
Connecticut	3.37	52.66
	(-1.42, 8.68)	(9.14, 100.13)
District of Columbia	2.24	49.44
	(-3.67, 6.74)	(28.33, 70.46)
Florida	3.31	25.12
	(-1.4, 8.3)	(10.2, 39.92)
Massachusetts	3.28	56.55
	(-1.27, 8.27)	(29.5, 84.49)
Nevada	3.14	55.72
	(-1.94, 8.5)	(-0.09, 117.8)
New Jersey	3.37	27.12
	(-1.01, 8.18)	(3.39, 52.07)
New York	2.86	9.63
	(0.22, 5.32)	(4.02, 15.26)
Washington	2.99	47.75
	(-2.48, 7.88)	(14.21, 83.45)

Table 9: This table shows the main results of estimating a Bayesian form of equation 3 that allows for heterogeneity in δ_i and γ_i using the runjags library in R (Denwood, 2016b). The results for states that do not have a significant effect in any period are not shown.

4.3.2 The Political Geography of Public Support for Antitrust Re-regulation

While antitrust issues do not have a prominent place in public opinion surveys, some questions have been asked consistently enough over time to enable a basic understanding of how views on antitrust regulation have evolved in the post-Reagan period. In this section, I focus on 16 polls that asked respondents whether the federal government should make it easier or harder for companies to merge. I ignore differences in question wording and consider responses to fall into one of three categories: support for doing more, taking no position or opposed to doing more, and either refusing to answer the question or responding "I don't know."

The aggregate annual trends (where outcomes of multiple polls in the same year have been averaged) are shown in Figure 14. The results suggest that Reagan took advantage of a unique policy window in 1981 when the public was largely opposed to more federal regulation. Public attitudes quickly swung in the other direction as antitrust policy changed, with those favoring more regulation exceeding 60 percent through most of the late 1980s. Since the late 1980s, the gap between those who favor and oppose more regulation has drastically narrowed (from about 40 to about 10 percent), though overall support has been somewhat consistently between 45 and 55 percent.

For five of these sixteen polls, raw data is available for further analysis. To determine what economic and demographic cleavages have influenced public opinion towards antitrust regulation since 1981, I fit the following multilevel model using these raw data sets:

$$Pr(y_{jt} = 1) = logit^{-1}(stateyear_{i[j],t} + inc_j + educ_j + age_j + d * hisp_j + race_j + e * sex_j) \quad (4)$$

$$stateyear_{i[j],t} = state_{i[j]} + year_t + a * partisan_{i[j],t} + b * union_{i[j],t} + c * exposure_{i[j],t-1} \quad (5)$$

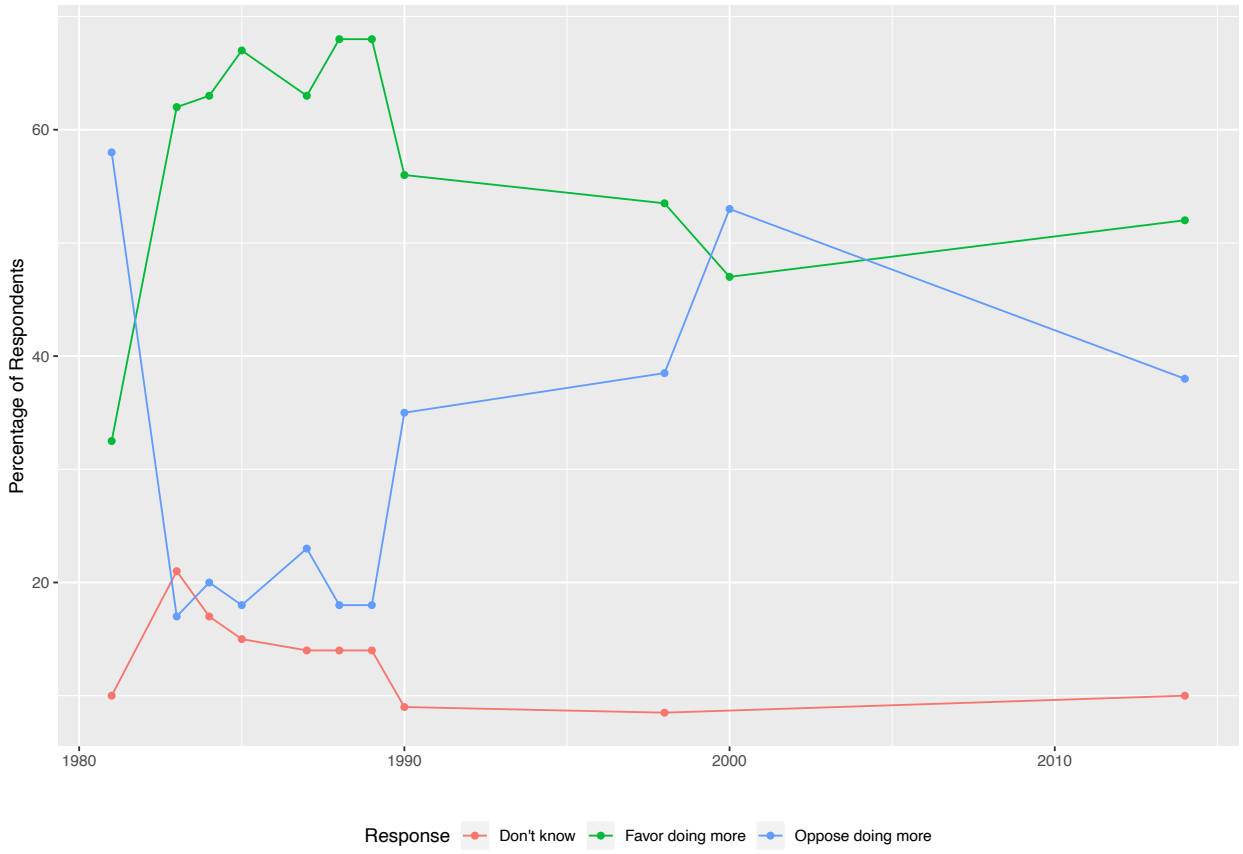

Figure 14: This figure shows the percentage of respondents who favor (green) or oppose (blue) doing more to regulate M&A, or who either refused to answer the question or did not know how to respond (red). The data includes 16 separate polls but response percentages in the same year are averaged to produce 11 annual observations since 1981. *Source*: iPOLL Databank provided by the Roper Center for Public Opinion Research.

In the regional model of Equation 5, $partisan_{i[j],t}$ in state i and year t is the average Democratic presidential vote share in the two elections prior to year t, $union_{i[j],t}$ captures the share of each state's private sector labor force that is a union member, and $exposure_{i[j],t}$ captures each state's exposure to the service economy as above (the share of total income in legal services earned by each state in the prior year). Along with time invariant aspects of each state ($state_i$) and average effects across all states in each year ($year_t$), the estimated coefficients on these three variables (a, b, and c) influence average levels of support for more regulation in the regional model. The term $i[j]$ denotes the state i that individual j belongs to. The individual model of Equation 4 includes six

basic demographic variables that were reported in each poll. Because gender and hispanic heritage are binary variables, the effects of those characteristics are modeled as simple regression coefficients (d and e) (Park, Gelman, and Bafumi, 2004, 377). The binary dependent variable y_{jt} represents whether individual j in polling year t favors more regulation of M&A. All of the regression and multilevel coefficients were given uninformative normal priors.

The results from estimating the model are shown in Figure 15. The results from the individual level model suggest that the main demographic cleavages are not race or gender. Though women are slightly more likely to support more regulation than men, and whites are slightly more opposed to more regulation than other racial groups, the differences are somewhat small compared to the other effects seen in the model, most notably age and income. Adults aged 18-34 are significantly more opposed to regulation than adults who are 65 or older for example, which suggests that one of the main cleavages in public opinion about antitrust policy is generational. Similarly, those who have a household income less than $50,000 are significantly more likely to support more regulation than those who make $100,000 per year or more.

The results from the regional model are also revealing, in that exposure to the service economy and union membership have roughly equal and substantively large opposite effects on average levels of support (though the coefficients are only marginally precise), while state partisanship plays an insignificant role in predicting aggregate antitrust attitudes. The difference in these estimated coefficients is meaningful because partisanship, unionization, and service economy exposure are weakly correlated (they have Pearson correlation coefficients ranging from 0.12-0.25). As a result, it is unlikely the effect of partisanship is being absorbed, for example, in the estimates for the other two variables. Both sets of findings (from the individual and regional models) are consistent with the view that political realignment has caused Democratic officials to base antitrust policy priorities on the preferences of younger and more affluent voters who are integrated into the

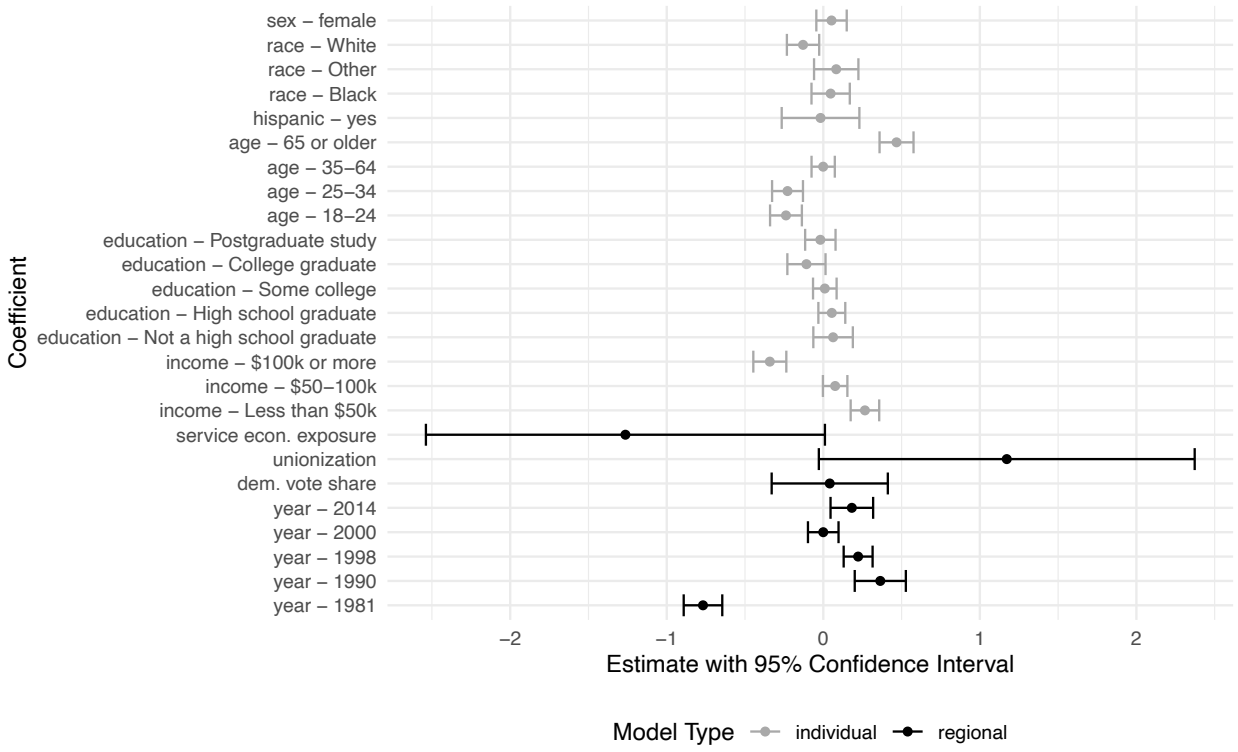

Figure 15: This figure shows the average estimated coefficient (dots) and 95 confidence intervals (bars) for both the individual characteristics (grey) and regional characteristics (black) included in the multilevel model (see Equations 4 and 5).

knowledge economy, even if those priorities are somewhat at odds with the views of older and less affluent voters in states with higher levels of union membership.

To see how these effect sizes aggregate into state-level differences in support for having the federal government do more to regulate mergers, I implemented post-stratification using IPUMS-USA census data (Ruggles et al., 2019) from the census year nearest to the polling year. In short, the multilevel model described above allows me to compute the predicted probability of support within 720 separate demographic categories (3 income levels, 5 education levels, 4 age brackets, 3 race categories, and 2 categories each for gender and hispanic heritage) for each of the fifty states plus the District of Columbia (51 state categories) for a total of 36,720 categories in each polling year. Those predicted probabilities are then effectively weighted by the share of the state's population in

each of the census categories (Park, Gelman, and Bafumi, 2004, 376) to impute average levels of support for each state and year.

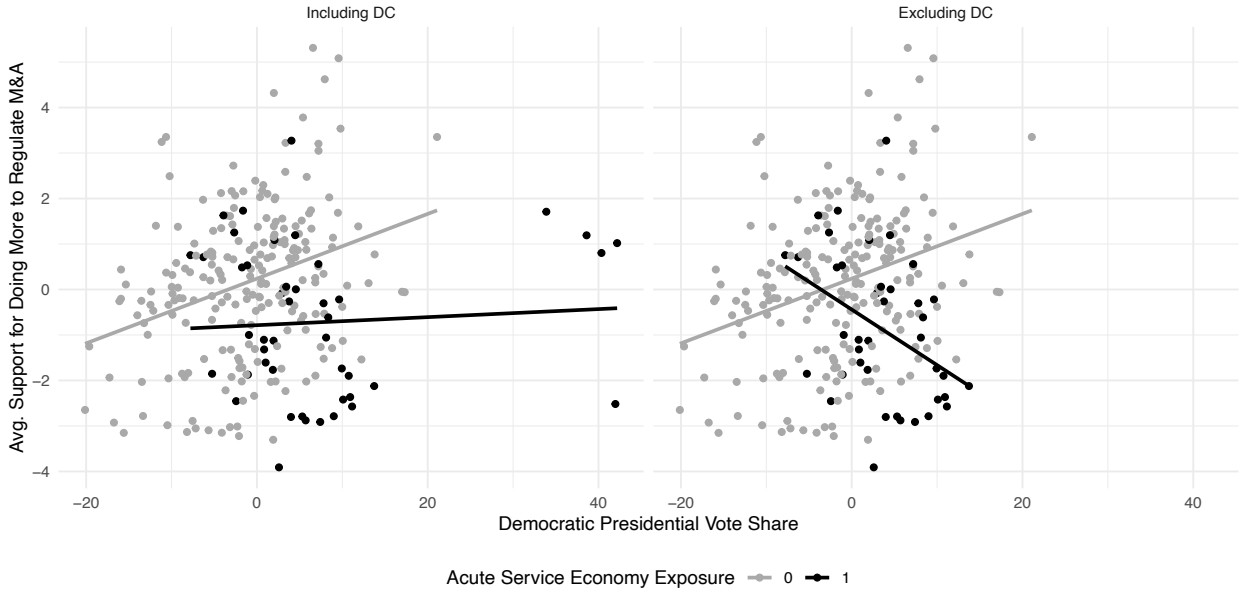

Figure 16: These figures show the predicted levels of support for having the government do more to regulate M&A at the state level as a function of average presidential vote share in the two elections prior to the polling year. In each figure, the data is pooled for all five polling years (1981, 1990, 1998, 2000, and 2014) and both variables have been de-meaned within each polling year. The figure on the left includes the District of Columbia while the figure on the right excludes it as an outlier. Each figure shows the relationship for the states with acute exposure to the service economy (black, see text) and all other states (grey). Regression lines are included as a visual aid but are not reported.

If political realignment has influenced Democratic preferences towards antitrust regulation, we would expect the states with concrete economic interests in lax regulation, by virtue of their advanced position in the service and knowledge economies, to have materially different preferences for more regulation. Figures 16 suggests that this is in fact the case. As illustrated, presidential partisanship explains some variation in attitudes towards antitrust enforcement: moving from one extreme to the other opens up a difference of about 3 percentage points in average levels of support for doing more to regulate M&A across states. But when the District of Columbia is excluded as an outlier (right), a comparable support gap exists between the service economy states

and other states who support Democratic presidential candidates at 10 percentage points above the national average. Party identification is known to be a strong and significant predictor of differences in attitudes towards regulation of big business generally and of antitrust enforcement more specifically (individual year regression results not shown), so it is no surprise that regional differences can be partly explained by partisanship. What is surprising is the drastic cleavage observed between states that tend to favor Democratic presidents, with the service economy states behaving "as if" they were extremely conservative on this issue. As illustrated, service economy states that favor Democratic presidential candidates by about 5 percentage points had about the same average levels of support for regulating M&A more aggressively as non-service economy states that favor Republican presidential candidates by 20 percentage points or more.

In sum, affluent service professionals in a few states have historically had a concrete economic interest in lax antitrust enforcement and the younger and more affluent workers who live in these regions have historically expressed much higher levels of opposition to increasing antitrust enforcement. In fact, when regional and demographic differences in attitudes towards antitrust enforcement are aggregated into state-level estimates of support for doing more, the states that are most acutely exposed to the service economy support increasing antitrust enforcement intensity at about the same average level found in states that tend to support Republican presidents by overwhelming margins. Though not definitive in establishing an electoral connection, this suggests that there was, historically, an alignment between economic interests and political preferences on antitrust policy, and that this alignment cleaved Democratic leaning states into two camps: those where increasing liberalism predictably leads to more support for antitrust intervention and those where increasing liberalism counter-intuitively leads to more *opposition* to antitrust intervention. To the extent that elected Democrats prioritized the demands of this latter group, their accommodation of lax antitrust enforcement may have been rooted in popular demands.

4.4 Conclusion

The reformers who are calling for a massive overhaul of the nation's antitrust laws have raised many important empirical claims about how and why antitrust enforcement has remained so lax in recent decades. Though data limitations and a historical lack of interest in antitrust policy among political scientists make it difficult to rigorously assess some of these claims, observational data does provide some perspective on when antitrust policy changed and why elected Democrats have historically accommodated that change. Specifically, after developing a consistent measure of merger enforcement intensity from 1955-2015, it becomes clear that President Reagan dramatically reset antitrust enforcement priorities during his first year in office and that later Democratic presidents did not materially strengthen antitrust policing of M&A. This critical juncture in antitrust policy delivered significant economic benefits to many relatively affluent service professionals, and some evidence suggests that those benefits have been confined to a handful of states that tend to favor Democratic presidential candidates, some of which are leading the knowledge economy transition. These economic changes, in turn, seem to have motivated significant differences in political behavior, as the states that have reaped the largest economic benefits from lax antitrust enforcement have historically behaved as if they are quite conservative when it comes to public support for increasing antitrust intervention.

Taken together, the results support the reformist contention that President Reagan initiated a sea change in antitrust priorities. But they also suggest that the new equilibrium in antitrust policy is not purely ideological and may have been supported, at least in part, by the idiosyncratic preferences of the service and knowledge economy professionals that have become increasingly important constituencies for the Democratic Party. The results do not rule out ideology among political elites as a strong explanatory factor. The hard constraints imposed upon antitrust officials

by Supreme Court Justices, including liberal Justices who have embraced the law and economics movement, suggest that elite ideology has played a crucial role in supporting the new equilibrium. But when representatives for organized labor appeared before Congress in the late 1980s and early 1990s to argue that large mergers and acquisitions were destroying blue collar jobs and being used to dissolve collective bargaining agreements (Fallick and Hassett, 1996), members of the Democratic Party should have theoretically perceived a political opportunity to resuscitate antitrust enforcement. That they did not suggests that Democratic Party leaders, concerned with winning elections, likely perceived any loss of blue-collar votes to be outweighed by some other electoral benefit. The data that exists, though not conclusive, suggests that Democratic Party leaders may have believed there was more to gain from aligning policy with the views of white collar professionals than there was to lose from alienating blue collar workers.

More broadly, the results suggest that policy feedback may, in some settings, interact with partisan realignment to support the status quo in federal policy-making. Iversen and Soskice (2019) contend, for example, that federal policies supporting the knowledge economy transition were driven by the public demands of middle-class voters, but as I argue in Chapter 1, in a setting of divided power, bi-cameralism effectively muted the electoral connection and led to policies that responded more intensely to the demands of organized business interests, especially high tech business interests. At the same time, it is possible that an electoral connection may still explain policy shifts that took place within the Democratic Party as the Party committed itself to knowledge economy development. This chapter suggests that such a connection may partly explain the dramatic shift within the Democratic Party on antitrust enforcement. But it also suggests that prior policy (antitrust deregulation) induced economic changes (large economic benefits for service professionals in certain regions) that made it harder for the Party to rescuscitate antitrust enforcement, as the benefits of prior policy increasingly accrued to a constituency at the center of

the Party's realignment.

5 Appendices

5.1 Constructing the Inventor-Donor Database

To implement the first step, I used the research datasets published by the PTO on the Patentsview website to build a database containing the first and last name, city and state, and organizational assignee (a firm, a university, a government agency, etc.) for all inventors who applied for a U.S. patent on or after January 1, 1979, who listed an address in the U.S. in their correspondence with the PTO (i.e., were American residents at the time of the patent application), and who assigned their patent to some organizational entity. Assignees are usually employers; by law, the inventors named on a patent must be people, but ownership of the patent routinely passes to that person's employer by virtue of the employment contract. If that does not happen, ownership passes to the inventors (there is no assignee). Because employer is an essential field for matching with DIME data, I exclude instances where ownership passes to the inventors and keep only instances where patent ownership passes to some organization.

To implement the second step, I gathered the same information (name, city and state, and employer) from the DIME database (Bonica, 2016). Using fastLink (Enamorado, Field, and Imai, 2019), I then identified those American inventors who also contributed to a political campaign at some point from 1979 through 2014 (the 1980-2014 cycles). I completed the matching in three steps. First, I stratified the patent and donor data by both election cycle and state. The algorithm would therefore only find a match if an inventor both applied for a patent and made a campaign contribution in the same election cycle (an election year and the prior year). These matches are the strongest because the invention and donation occur close in time. Second, I stratified the remaining data (after purging matches from the first step) by state and repeated the matching for inventors in all states except California, New York, and Texas. These results introduce the possibility of more

error because the acts of invention and donation are not close in time. But it captures instances where, for example, an inventor at Microsoft who lives in Washington and stays in Washington applies for a patent in, say, 1991 but does not donate to a campaign until, say, 2008. Third, and finally, for the remaining data in California, New York, and Texas, I stratified by both state and the first letter of the inventor's last name. Without this further stratification for these three large states, probabilistic matching was not computationally feasible.

The administrators of both the Patentsview and the DIME data sets have run their own disambiguation algorithms to generate unique identifiers for inventors (in Patentsview) and donors (in DIME). To ensure a higher quality of matching, I kept only those high probability matches where both datasets agreed that the match identified a unique individual. In other words, I abandoned instances where a single DIME identifier was matched to more than one Patentsview identifier and vice versa. This produced a dataset of 30,603 American inventors who contributed to a political campaign from 1979 through 2014.

Once inventor-donors are matched in this fashion, it is possible to use the unique identifiers in both data set to construct an invention record, containing data on all patents applied for by these inventor-donors from 1979-2019, and a donor record, containing data on all campaign contributions made by these inventor-donors from 1979-2014. Below, I focus exclusively on analyzing the donor record of American inventor-donors.[24] I also confine the donor record to campaign contributions made in all federal elections from the 1980 cycle through the 2014 cycle. The donor and recipient party coding in the DIME database appear to be a mix of FEC codes and legacy Voteview codes. In the analysis below, I re-coded the recipient types as Democratic candidates and committees, Republican candidates and committees, and political actions committees of unknown

[24]In Section 3.1, I appealed to the invention record to identify the technological domain (based on patent data) in which each inventor-donor predominately works.

partisan affiliation (PAC-UPAs) and ignored contributions to other partisan entities (which were not substantial in any time period). As explained in Section 3.1, PAC-UPAs are committees that either do not have a partisan designation in the underlying DIME data, do not have an ideological score or have a "middling" ideological score (greater than -0.5 and less than 0.5) which makes it difficult to impute a partisan tendency based on donation patterns, and do not have the text strings "Republican" or "Democrat" in their name.

The DIME dataset does not have disambiguated firm or organizational identifiers, and it is problematic to use those provided in the Patentsview dataset for several reasons. I therefore implemented my own name matching between the self-reported employer listed in the donation record of American inventor-donors and the organizations in Standard & Poor's Capital IQ database. To execute this third step, I first excluded instances where the DIME employer was missing or appeared to be conflated with occupation or employment status (CEO, engineer, retired, etc.). I then ranked the remaining employer names in descending order by the number of inventor donations (not the dollar amount) associated with that employer. I fed all of these names into Capital IQ's proprietary lookup algorithm to generate a suggested match and then audited the matches in two steps. First, because the top 2,212 of these names account for roughly 74.6 percent of all inventor donations across all election cycles, I manually audited the proposed matches, leading to 2,050 valid matches. For the remaining results, I implemented a relatively soft constraint on name similarity: that the DIME employer name and Capital IQ organization name had a Jaro-Winkler distance less than or equal to 0.15, which produced another 21,204 matches.[25] Together, these 23,254 self-reported employer names were linked to 14,735 unique organizations with Capital IQ identifiers.

The matching analysis utilizes the subset of inventor-donor data where the DIME employer

[25]That cutoff was chosen because, after auditing small samples, I observed that the proposed matches below this cutoff generated very few potentially false matches, while matches with a Jaro-Winkler distance between 0.15 and 0.2 had about 30 percent potentially false matches.

Table 10: **Summary of the Inventor-Donor Dataset**

Cycle	Total Donors (Thousands)	Inventor Share (%)	CIQ Linked Share (%)	Linked Inventor Share (%)	Matched Inventors	Matched Share (%)
1980	225.1	0.5	6.3	0.5	22	31.0
1982	101.4	1.9	5.6	0.9	10	20.0
1984	152.9	1.8	4.3	1.2	21	26.6
1986	155.9	2.3	6.6	1.3	42	30.9
1988	247.6	1.8	6.4	1.0	49	29.7
1990	287.8	2.0	8.1	1.4	125	38.0
1992	451.1	1.5	7.8	1.6	251	44.3
1994	428.7	1.9	9.2	1.8	275	38.9
1996	595.8	1.7	8.8	1.9	357	35.8
1998	487.2	2.4	9.6	2.2	379	36.9
2000	777.2	1.8	9.6	2.1	582	37.4
2002	894.2	1.7	11.9	1.9	1,149	56.7
2004	1,693.3	1.0	11.9	1.9	2,317	59.2
2006	1,357.0	1.4	14.2	2.1	2,338	58.8
2008	2,603.7	0.8	12.0	2.1	4,018	62.2
2010	1,689.6	1.4	13.2	2.4	3,276	60.7
2012	3,310.9	0.8	11.5	2.2	5,470	66.6
2014	2,433.0	1.1	10.9	2.3	3,852	64.2

Note:
This table presents basic summary statistics about the inventor-donor data set and the subset of that data linked to Capital IQ organizations used for the matching analysis. For each election cycle (column 1), it shows the total number of donors in the DIME data (column 2), the share of total donors that are inventors (column 3), the share of total donors and that are linked to Capital IQ organizations (column 4), and the share of donors linked to Capital IQ organizations that are also inventors (column 5). The last two columns show the number of inventor-donors matched to non-inventor donors by firm, gender, and Congressional District (column 6) and the matching success rate as a share of inventor-donors linked to Capital IQ organizations (column 7).

was linked to a Capital IQ organization through one of these 23,254 matches. Table 10 presents some summary statistics about this subset of the inventor-donor data for each election cycle. The second column shows the total number of donors in the DIME database in thousands. The third column shows the percentage of all donors that are inventor-donors, which varies over time between 0.5 and 2.4 percent of all donors. The fourth column shows the percentage of all donors that are linked to Capital IQ organizations. It reveals that the link between DIME employers and Capital IQ organizations is weakest in the 1980s, which is to be expected given that the Capital IQ database has the best coverage from the mid-1990s to the present. The fifth column shows the share of all donors that are linked to Capital IQ organizations that are inventor-donors, which essentially defines the pool of inventor-donors eligible for matching. It shows that the linking to Capital IQ organizations slightly reduces the share of inventors compared to all donors (column three) in the 1980s, that there is no relative loss in the 1990s, and that the linking slightly reduces the relative share of non-inventors from 2000 to 2014. But it does not do so dramatically in any election cycle. The sixth column shows the number of inventor-donors that were matched to non-inventor donors by organization, Congressional District, and imputed gender, and the seventh columns shows the matching success rate, which is number of matched inventor-donors as a share of inventor-donors linked to Capital IQ organizations. It shows that matching succeeds in 20-31 percent of cases in the 1980s, 35-44 percent of cases in the 1990s, and in 56-67 percent of cases from 2002 to 2014.

The ANOVA analysis is slightly different. Here, the goal is to understand whether polarization is increasing among knowledge economy workers who contribute to Democrats even if that organization's inventors do not donate. For this exercise, carried out only in the 1992 and 2012 election cycles, I supplemented the data set with data on non-inventor donors at known IP producers. Specifically, I used patent data to first identify all IP producers (any organization that was issued a patent) from 1987-1991 and from 2007-2011 (the five years prior to each relevant

Table 11: **Summary of the Knowledge Economy Worker Dataset**

Cycle	Total Donors (1,000s)	Linked Share (%)	Orgs.	Districts	Industries
1992	451.1	1.88	957	434	339
2012	3,310.9	5.99	6038	436	714

Note:
This table presents basic summary statistics about the supplemented inventor-donor data set used for the ANOVA analysis, which includes inventor-donors and non-inventor employees at firms that produce IP. For each election cycle (column 1), it shows the total number of donors in the DIME data (column 2), the share of total donors that are inventors or non-inventor donors employed by IP producers (column 4). Non-inventor donors employed by IP producers are donors that worked at organizations that were issued at least one patent from 1987-1991 (for the 1992 election cycle) or from 2007-2011 (for the 2012 election cycle), where the IP producer firm name was linked to a Capital IQ firm. The last three columns show the number of organizations (column 4), Congressional Districts (column 5), and 4-digit SIC industries (column 6) represented in the data.

election year). I then linked self-reported DIME employers to these IP producers and, for those employers not already matched above, I linked the IP producer names to Capital IQ firm names. This allowed me to link DIME employers to an additional 887 Capital IQ organizations in 1992 and an additional 7,200 Capital IQ organizations in 2012. These organizations produced IP in the years leading up to the election cycle and had employees who donated in federal elections but did not have inventor-donors who made contributions.

Table 11 characterizes the data set used in the ANOVA analysis. For each election cycle, column 2 shows the total number of donors in the DIME data and column 3 shows the share of those donors (inventors and non-inventor employees at IP producers) that are linked to Capital IQ organizations. Columns four through six show the number of organizations, Congressional Districts, and industries (4-digit SIC codes) that are represented in this data set. As shown, the data

set covers virtually all Congressional Districts in each election cycle,[26] and captures data on donors from 957 organizations in 339 industries in 1992 and 6,038 organizations in 714 industries in 2012.

[26]There is a 436th district because the at-large district for the District of Columbia is included

5.2 Regression Analysis in Inventor-Donor Dataset

Table 12: Regression Results for Ideology Model - Full Matched Dataset

	Dependent variable: Common Factor Ideology Score					
	1980	1982	1984	1986	1988	1990
inventor	0.143	0.009	0.091	0.010	0.072	−0.052
	(0.200)	(0.263)	(0.235)	(0.134)	(0.119)	(0.096)
Constant	0.531***	0.783***	0.424**	0.533***	0.606***	0.525***
	(0.127)	(0.186)	(0.162)	(0.091)	(0.082)	(0.062)
Observations	35	20	38	76	92	216
R^2	0.015	0.0001	0.004	0.0001	0.004	0.001
Adjusted R^2	−0.015	−0.055	−0.024	−0.013	−0.007	−0.003
Residual Std. Error	0.580 (df = 33)	0.587 (df = 18)	0.724 (df = 36)	0.581 (df = 74)	0.571 (df = 90)	0.695 (df = 214)
F Statistic	0.508 (df = 1; 33)	0.001 (df = 1; 18)	0.150 (df = 1; 36)	0.005 (df = 1; 74)	0.369 (df = 1; 90)	0.293 (df = 1; 214)
	1992	1994	1996	1998	2000	2002
inventor	−0.062	0.020	−0.023	−0.063	−0.074	−0.121**
	(0.080)	(0.073)	(0.070)	(0.072)	(0.062)	(0.050)
Constant	0.394***	0.441***	0.401***	0.297***	0.256***	0.298***
	(0.052)	(0.048)	(0.047)	(0.049)	(0.042)	(0.031)
Observations	433	479	656	694	1,095	1,825
R^2	0.001	0.0002	0.0002	0.001	0.001	0.003
Adjusted R^2	−0.001	−0.002	−0.001	−0.0004	0.0004	0.003
Residual Std. Error	0.817 (df = 431)	0.792 (df = 477)	0.888 (df = 654)	0.948 (df = 692)	1.017 (df = 1093)	1.037 (df = 1823)
F Statistic	0.614 (df = 1; 431)	0.076 (df = 1; 477)	0.108 (df = 1; 654)	0.751 (df = 1; 692)	1.431 (df = 1; 1093)	5.900** (df = 1; 1823)
	2004	2006	2008	2010	2012	2014
inventor	−0.161***	−0.176***	−0.157***	−0.142***	−0.097***	−0.082***
	(0.037)	(0.038)	(0.029)	(0.033)	(0.025)	(0.029)
Constant	−0.106***	−0.103***	−0.268***	−0.248***	−0.492***	−0.494***
	(0.024)	(0.024)	(0.019)	(0.021)	(0.016)	(0.018)
Observations	3,945	3,818	6,938	5,305	9,321	6,158
R^2	0.005	0.006	0.004	0.004	0.002	0.001
Adjusted R^2	0.004	0.005	0.004	0.003	0.002	0.001
Residual Std. Error	1.155 (df = 3943)	1.138 (df = 3816)	1.188 (df = 6936)	1.159 (df = 5303)	1.184 (df = 9319)	1.112 (df = 6156)
F Statistic	18.667*** (df = 1; 3943)	21.838*** (df = 1; 3816)	29.627*** (df = 1; 6936)	19.100*** (df = 1; 5303)	15.267*** (df = 1; 9319)	7.971*** (df = 1; 6156)

*p<0.1; **p<0.05; ***p<0.01

Note: This table shows the results of regressing common factor (CF) ideology scores on a binary variable indicating whether the donor is an inventor in the matched inventor data set (as described in Sections 2 and 3) for each election cycle from 1980-2014.

Table 13: Regression Output for Ideology Model - Switchers

	Dependent variable: Common Factor Ideology Score					
	1982	1984	1986	1988	1990	1992
inventor	0.277	0.147	−0.135	0.052	−0.276	0.062
	(0.269)	(0.268)	(0.234)	(0.240)	(0.234)	(0.197)
Constant	0.830**	0.607**	0.828***	0.691***	0.563***	0.271**
	(0.190)	(0.190)	(0.165)	(0.163)	(0.152)	(0.126)
Observations	6	6	8	13	38	75
R^2	0.210	0.069	0.053	0.004	0.037	0.001
Adjusted R^2	0.012	−0.163	−0.105	−0.086	0.011	−0.012
Residual Std. Error	0.329 (df = 4)	0.329 (df = 4)	0.331 (df = 6)	0.431 (df = 11)	0.712 (df = 36)	0.838 (df = 73)
F Statistic	1.060 (df = 1; 4)	0.299 (df = 1; 4)	0.333 (df = 1; 6)	0.047 (df = 1; 11)	1.398 (df = 1; 36)	0.098 (df = 1; 73)
	1994	1996	1998	2000	2002	2004
inventor	0.115	−0.118	−0.083	−0.011	−0.352**	−0.183*
	(0.212)	(0.229)	(0.177)	(0.162)	(0.151)	(0.102)
Constant	0.260*	0.353**	0.167	0.317***	0.427***	−0.197***
	(0.139)	(0.157)	(0.122)	(0.111)	(0.091)	(0.067)
Observations	65	91	130	151	214	500
R^2	0.005	0.003	0.002	0.00003	0.025	0.006
Adjusted R^2	−0.011	−0.008	−0.006	−0.007	0.020	0.004
Residual Std. Error	0.846 (df = 63)	1.089 (df = 89)	1.010 (df = 128)	0.994 (df = 149)	1.059 (df = 212)	1.133 (df = 498)
F Statistic	0.297 (df = 1; 63)	0.266 (df = 1; 89)	0.220 (df = 1; 128)	0.005 (df = 1; 149)	5.428** (df = 1; 212)	3.174* (df = 1; 498)
	2006	2008	2010	2012	2014	
inventor	−0.160	−0.177**	−0.268***	−0.127*	−0.060	
	(0.109)	(0.090)	(0.093)	(0.072)	(0.084)	
Constant	−0.146**	−0.341***	−0.235***	−0.578***	−0.640***	
	(0.069)	(0.059)	(0.057)	(0.046)	(0.052)	
Observations	429	738	670	1,071	668	
R^2	0.005	0.005	0.012	0.003	0.001	
Adjusted R^2	0.003	0.004	0.011	0.002	−0.001	
Residual Std. Error	1.109 (df = 427)	1.204 (df = 736)	1.166 (df = 668)	1.152 (df = 1069)	1.058 (df = 666)	
F Statistic	2.154 (df = 1; 427)	3.910** (df = 1; 736)	8.247*** (df = 1; 668)	3.124* (df = 1; 1069)	0.508 (df = 1; 666)	

*p<0.1; **p<0.05; ***p<0.01

Note: This table shows the results of regressing common factor (CF) ideology scores on a binary variable indicating whether the donor is an inventor among switchers (as described in Sections 2 and 3) for each election cycle from 1980-2014.

Table 14: Regression Results for Democratic Donor Model - Full Matched Dataset

	Dependent variable: Democratic Donor					
	1980	1982	1984	1986	1988	1990
inventor	0.000	0.000	0.214	0.000	0.421	−0.281
	(0.725)	(1.491)	(0.654)	(0.514)	(0.462)	(0.284)
Constant	−1.163**	−2.197**	−0.619	−1.131***	−1.240***	−0.828***
	(0.512)	(1.054)	(0.469)	(0.364)	(0.342)	(0.194)
Observations	42	20	40	82	98	250
Log Likelihood	−23.053	−6.502	−26.409	−45.554	−56.276	−146.793
Akaike Inf. Crit.	50.105	17.003	56.818	95.108	116.553	297.586
	1992	1994	1996	1998	2000	2002
inventor	−0.190	−0.137	−0.080	−0.050	−0.000	0.010
	(0.195)	(0.185)	(0.163)	(0.158)	(0.124)	(0.100)
Constant	−0.760***	−0.688***	−0.775***	−0.787***	−0.631***	−1.223***
	(0.135)	(0.129)	(0.115)	(0.112)	(0.088)	(0.071)
Observations	502	538	704	748	1,152	2,252
Log Likelihood	−305.668	−336.862	−433.918	−461.522	−743.858	−1,209.641
Akaike Inf. Crit.	615.336	677.723	871.835	927.044	1,491.716	2,423.281
	2004	2006	2008	2010	2012	2014
inventor	−0.102*	−0.067	−0.187***	−0.319***	−0.391***	−0.607***
	(0.060)	(0.062)	(0.045)	(0.051)	(0.039)	(0.047)
Constant	−0.274***	−0.578***	0.014	−0.186***	0.420***	0.283***
	(0.042)	(0.043)	(0.032)	(0.036)	(0.028)	(0.033)
Observations	4,574	4,596	7,910	6,394	10,736	7,472
Log Likelihood	−3,109.524	−2,980.247	−5,467.983	−4,319.290	−7,325.466	−5,093.655
Akaike Inf. Crit.	6,223.047	5,964.493	10,939.970	8,642.579	14,654.930	10,191.310

*p<0.1; **p<0.05; ***p<0.01

Note: This table shows the results of regressing a binary variable indicating whether the donor contributed to a Democratic candidate or committee on a binary variable indicating whether the donor is an inventor in the full matched dataset (as described in Sections 2 and 3) for each election cycle from 1980-2014.

Table 15: Regression Results for Democratic Donor Model - Switchers

	Dependent variable: Democratic Donor					
	1982	1984	1986	1988	1990	1992
inventor	0.000	1.386	0.000	0.000	−0.613	0.000
	(106,969.800)	(1.732)	(1.633)	(1.183)	(0.646)	(0.450)
Constant	−24.566	−0.693	−1.099	−0.916	−0.368	−0.659**
	(75,639.060)	(1.225)	(1.155)	(0.837)	(0.434)	(0.318)
Observations	6	6	8	14	44	88
Log Likelihood	−0.000	−3.819	−4.499	−8.376	−27.775	−56.464
Akaike Inf. Crit.	4.000	11.638	12.997	20.752	59.549	116.928
	1994	1996	1998	2000	2002	2004
inventor	−0.117	0.480	−0.000	0.161	0.000	−0.155
	(0.483)	(0.441)	(0.354)	(0.328)	(0.296)	(0.168)
Constant	−0.496	−0.990***	−0.565**	−0.619***	−1.315***	−0.119
	(0.339)	(0.325)	(0.250)	(0.234)	(0.209)	(0.118)
Observations	74	96	138	160	274	574
Log Likelihood	−48.527	−59.791	−90.354	−105.205	−141.431	−394.705
Akaike Inf. Crit.	101.054	123.582	184.708	214.410	286.863	793.409
	2006	2008	2010	2012	2014	
inventor	−0.017	−0.142	−0.411***	−0.563***	−0.727***	
	(0.185)	(0.138)	(0.142)	(0.114)	(0.142)	
Constant	−0.595***	0.047	−0.239**	0.535***	0.414***	
	(0.131)	(0.097)	(0.098)	(0.082)	(0.101)	
Observations	512	844	840	1,278	824	
Log Likelihood	−332.589	−584.424	−558.162	−863.701	−557.539	
Akaike Inf. Crit.	669.178	1,172.847	1,120.324	1,731.402	1,119.078	

*p<0.1; **p<0.05; ***p<0.01

Note: This table shows the results of regressing a binary variable indicating whether the donor contributed to a Democratic candidate or committee on a binary variable indicating whether the donor is an inventor among switchers (as described in Sections 2 and 3) for each election cycle from 1980-2014.

5.3 Estimating Historical Merger Enforcement Intensity

To develop a historical time series reflecting merger enforcement intensity before and after 1980, I first used a generalized additive model to estimate the number of large deals executed from 1955 to 2015, and then estimated the probability of a challenge in each year by dividing the number of merger cases the Department of Justice Antitrust Division (DOJAD) filed by the total number of large deals. I consider a deal to be "large" and vulnerable to regulatory change using the transaction value, or the purchase price. This is consistent with the regulatory view which has historically focused on the value of acquired assets in individual deals and in the aggregate. The FTC, for example, tracked all mergers in manufacturing and mining from 1948 to 1978 and tabulated them according to the value of assets acquired, with a "large merger" series including all deals with acquired assets worth more than $100 million in nominal (not adjusted) dollars. Here I use a lower transaction value, $50 instead of a $100 million, to get more variation in early years, but importantly, I also adjust the threshold for inflation to capture deals of comparable size across years. The model therefore estimates the number of deals in each year where the deal value exceeded $50 million in 1948 dollars, or about $400 million in today's dollars.

I describe the procedure for estimating the number of large deals in each year at length in the replication file and provide only a brief summary here. In essence, I use transaction level data on M&A in recent decades to estimate the number of large deals executed each quarter using known correlates of aggregate M&A activity, and then use the model to impute the number of large deals in prior years. The SDC Platinum database published by Thompson Reuters provides comprehensive data on mergers and acquisitions from 1982 to the present, including the transaction date and value. The Center for Research on Securities Prices (CRSP) also provides comprehensive data on publicly traded companies that have been delisted because of a merger from 1955 to 2015

including the date of delisting. I use the acquired company's stock market valuation one month prior to the delisting as a proxy for deal value. The Federal Trade Commission publishes the number of deals involving publicly traded companies in mining and manufacturing from 1955 to 1979, and that series can be extended using SDC Platinum Data with appropriate filters. Similarly, aggregate M&A activity is known to be highly correlated with other macroeconomic statistics like aggregate amounts of corporate debt (Baker and Wurgler, 2000, 2250). The Flow of Funds (FOF) database published by the Federal Reserve provides quarterly measures of corporate debt from 1955 to the present. I follow Phillippon (2015) in first fitting a model estimating quarterly counts of deals above the inflation adjusted threshold from 1982 to 2015 using SDC data as the dependent variable and CRSP data and FOF data as predictors. I then impute expected deal counts from 1955 to 1981 using the longer time span of the predictors. Last, I sum the quarterly counts to obtain annual measures.

I follow a similar procedure for estimating DOJAD enforcement activity. The official DOJ workload statistics contain the total number of merger cases filed from 1970 to 2015, but are not available for earlier years. I therefore use comparable measures published by Gallo et al. (2000) from 1955 to 1997 to estimate a linear model, and impute official measures from 1955 to 1969.

Given annual estimates of the number of merger cases filed and the number of large deals from 1955 to 2015, I calculate enforcement rates or percentages by taking the ratio. By this measure, enforcement rates reached their peak in 1961 when the DOJAD filed 28 cases but only 10 large deals were consummated. To obtain a measure resembling a likelihood of challenge, I normalize these estimates by dividing by this maximum value (2.8). The resulting metric estimates the likelihood of facing a DOJAD challenge relative to the high enforcement rates of 1961.

5.4 Inequality Model

5.4.1 Descriptive Facts About M&A and Economic Inequality

The main model reported in the chapter was born of two basic observations, shown in Figures 17 and 18 respectively. In Figure 17, the horizontal axis captures the logarithm of the ratio of total large M&A value and total fiscal income in each year from 1962 to 2015. This essentially captures the aggregate amount of large deals in each year relative to total income. The vertical axis captures the top 1 percent share of fiscal income in the same year at the federal level (nationwide). The grey points correspond to the period prior to antitrust deregulation, and we observe no significant relationship between relative M&A activity and income inequality. In contrast, after antitrust deregulation, from 1981 to 2015, there appears to be a strong positive correlation between income inequality and the amount of M&A activity.

If such a relationship is causal, it might explain why income inequality occasionally declines. Figure 18 shows the time series for the top 1 percent fiscal income share from 1975 to 2015. The fact that has garnered the most attention, of course, is the significant increase in the top 1 percent share from about 10 percent to over 20 percent since 1980. But there are also fluctuations around that trend that deserve explanation. The grey boxes represent periods since 1981 in which M&A activity grew at least 25 percent slower than total income over the prior year, periods which overlap with economic recessions. In these periods, income inequality can substantially decline. Moreover, the effect seems to be immediate. Given these observation, the challenge was to develop a theory as to how and why changes in the growth of this kind of deregulated financial activity immediately translates into changes in income inequality in the same year.

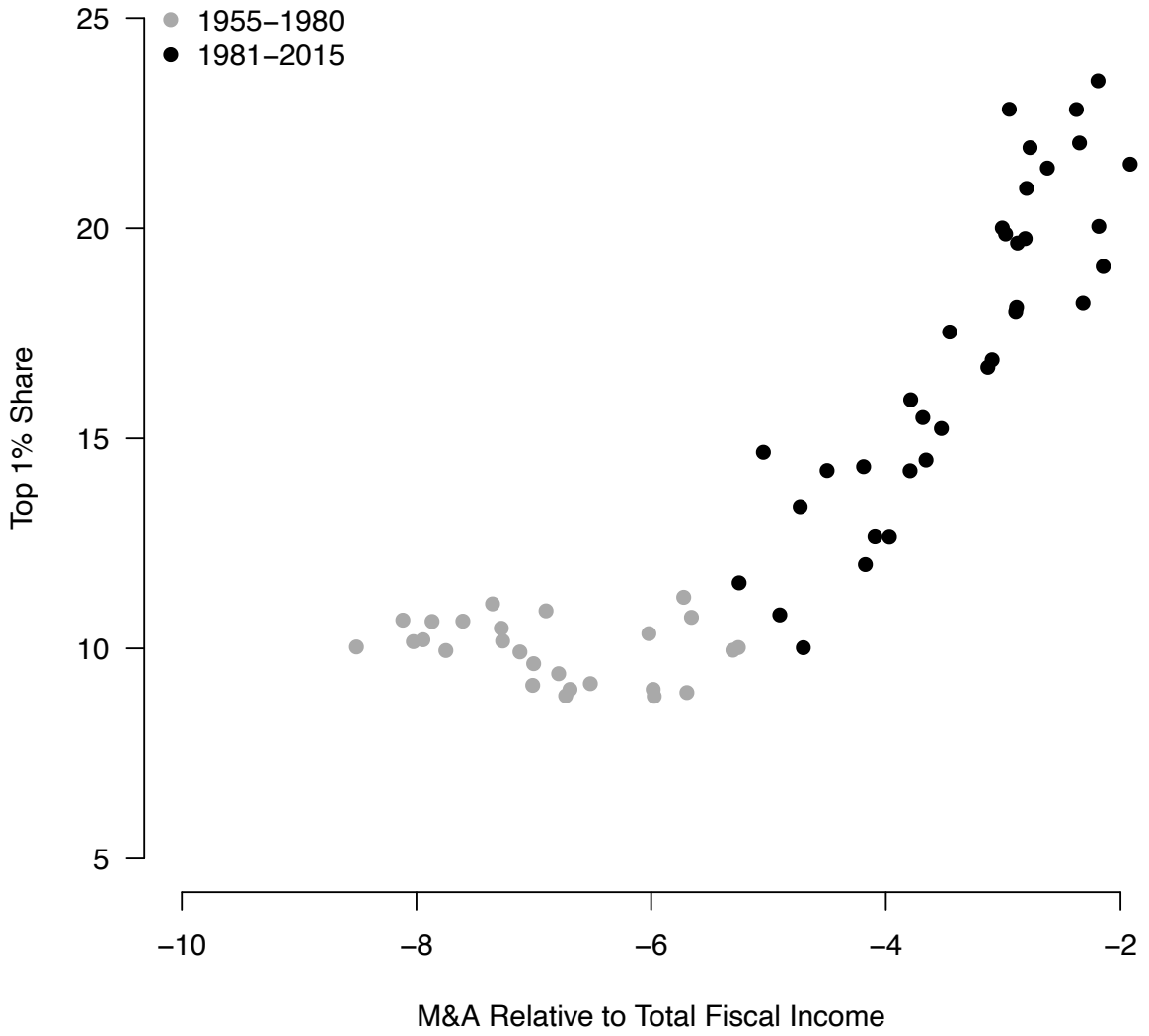

Figure 17: The horizontal axis shows $log(a_t/b_t)$ where a_t represents the total dollar value of large mergers in year t and b_t represents total fiscal income in the same year. This captures the amount of money that changes hands due to mergers and acquisitions as a share of total income on the log scale. The vertical axis shows the top 1 percent share of fiscal income. As indicated in the legend, grey points are for the period 1962-1980 while black points are for the period 1981-2015.

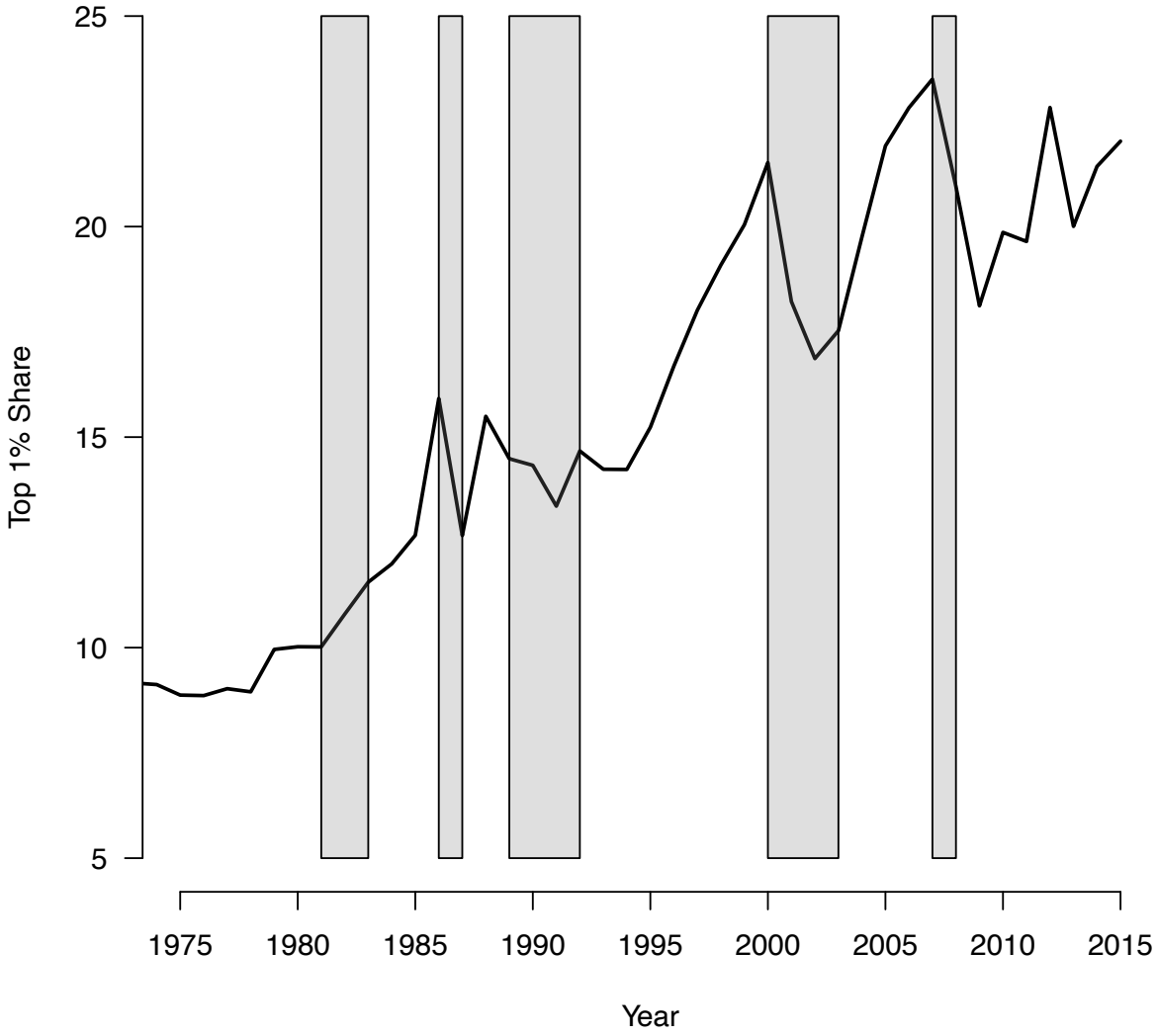

Figure 18: This figure shows the time series of top 1 percent income shares in the US from 1975-2015. The grey bands represent periods since 1981 in which M&A activity grew at least 10 percent slower than total income over the prior year. These downturns appear to be correlated with periods in which fiscal income inequality significantly declines after 1980.

5.4.2 Potential Mechanisms by Which M&A Exacerbates Inequality

Theoretically, large mergers and acquisitions create a number of opportunities for top earners to increase their share of income from labor. First, large deals are often quite complex, and the

attorneys for both corporate entities often need to perform a significant amount of due diligence. According to the data from the World Inequality Databse, the threshold income for the 99th percentile in the United States in 2014 (based on pre-tax factor income) was about $445,000 in constant 2016 dollars. Only the most senior associate attorneys would likely surpass this threshold income. A seventh-year associate at a large law firm might earn a salary of about $300,000 per year today, but it would take a fairly generous bonus (by law firm standards) for an associate at that level to make it into the top percentile of the national income distribution. Many law firm partners, however, easily fall within the top percentile. Average compensation for law firm partners was about $716,000 per year in 2014 (Lowe, 2016). Holding all else equal, if either the number of large deals or the size and complexity of a given number of deals increases, total law firm profits from M&A activity should also increase, as should per partner income.

Investment banks also profit from rising levels of M&A activity. Associate salaries for investment bankers are generally much lower than for attorneys, though bonuses often make up a much larger portion of their overall compensation. Some fourth-year associates at firms that pay above market could conceivably make it into the top percentile in years with high numbers of large transactions (Butcher, 2016). More senior directors and partners will quite often fall within the top percentile even in bad years. Investment banks are generally compensated based on a commission calculated as a percentage of the transaction size, and so as the size of mergers and acquisitions increases, compensation for both non-equity directors (with bonuses tied to performance) and equity partners (with compensation tied to firm profits) should increase.

Mergers and acquisitions are pursued for a variety of business reasons but, as suggested above, one of the primary justifications for relaxing antitrust scrutiny of mergers and acquisitions around 1981 was to create a "takeover market" to oust executives who do not meet shareholder expectations. Deals undertaken for this purpose necessarily create opportunities to renegotiate

executive compensation, and while it is possible that compensation could be adjusted downward, that outcome is not likely for two reasons. First, only large firms can reasonably finance large acquisitions and such acquisitions typically increase the merged firm's size, even if the overarching goal is divestiture. Since executive compensation appears to be correlated with firm size (Gabaix, Landier, and Sauvagnat, 2013), executives considered for new management are likely to fall within the top percentile of the income distribution and can expect increased compensation after the merger is completed. Also, executives may have simply become better at extracting firm profits for personal gain since the 1970s (Bebchuck and Fried, 2004). Changes in federal regulation of executive compensation after 1980 may have contributed to this process (Davis and Thompson, 1994; Wallace and Ferris, 2006; Hacker and Pierson, 2010; Lazonick and Mazzucato, 2013).

Each of these mechanisms is a plausible channel through which those who reside within the top of the labor income distribution in any given year might further increase their share of labor income. But mergers and acquisitions could also exacerbate capital income inequality. Many mergers are undertaken with the intent of increasing the overall market valuation of the merging companies. If mergers and acquisitions do actually increase shareholder value, and if the top percentile of the capital income distribution disproportionately benefit from that increase in stock market value, then M&A activity might also exacerbate capital income inequality. Also, many private equity and hedge fund managers charge a relatively menial management fee, which the IRS recognizes as labor income, but recognize substantial income from the profits generated by the mergers they manage, and that income is technically taxed as capital income (the "carried interest" provision). This is an additional mechanism by which M&A activity might exacerbate capital income inequality.

The following model for the relationship between aggregate income inequality and merger activity allows us to explore whether any of these mechanisms are facially plausible. First, assume

that the amount of income earned by the top 1 percent of a given income distribution (fiscal, labor, or capital) in year t, represented by i_t, depends on the nominal value of M&A activity above a given cutoff in year t, represented by M_t. If those in the top 1 percent earn a time-constant percentage of total M&A activity, β_2, this relationship could be modeled as:

$$i_t = \beta_0 + \beta_1 t + \beta_2 M_t + \mu_t \tag{6}$$

where the β_1 coefficient captures the slope of any linear exogenous time trend.

Second, since income inequality and not income levels are the primary concern, divide both variables of interest, i_t and M_t, by total income (fiscal, labor, or capital), I_t, and take the logarithm of our main predictor to allow for diminishing marginal returns.[27] Letting $X_t = log(\frac{M_t}{I_t})$, the relationship of interest then becomes:

$$Is_t = \frac{i_t}{I_t} = \beta_0 + \beta_1 t + \beta_2 X_t + \mu_t \tag{7}$$

In this specification, Is_t is the top 1 percent income share in year t and the coefficient, β_2, captures the relationship between top income shares and merger activity relative to different measures of total income (fiscal income or the pre-tax labor or capital component of national income).

As an exploratory exercise, I take the first difference of this specification to eliminate exogenous time trends and allow the difference in $log(\frac{M_t}{I_t})$ to interact with a dummy variable, D_t, representing the policy interventions associated with the start of the Reagan presidency. The specification then becomes:

[27] Investment banks are known to step down their proposed commission percentage as the final acquisition price exceeds certain thresholds. Lawyer and executive compensation may also behave similarly.

$$\Delta Is_t = \beta_1 + \beta_2 \Delta log(\frac{M_t}{I_t}) + \beta_3 D_t + \beta_4 \Delta log(\frac{M_t}{I_t}) \times D_t + \epsilon_t \tag{8}$$

where Δ indicates differencing between time periods (i.e. $\Delta Is_t = Is_t - Is_{t-1}$) and the residuals, ϵ_t, are equal to $\Delta \mu_t$. Taking the logarithm of the main predictor gives the main independent variable of interest the qualities of an elasticity in Equation 8 because:

$$log(\frac{M_t}{I_t}) - log(\frac{M_{t-1}}{I_{t-1}}) = log(\frac{M_t / M_{t-1}}{I_t / I_{t-1}}). \tag{9}$$

As a result, the model essentially captures the correlation between changes in top income shares and the extent to which the rate of growth in merger activity exceeds the rate of income growth. The model specified in Equation 8 can be estimated with OLS regression given data on annual top income shares and total income, available at the World Inequality Database, and the amount of annual merger activity. The annual amount of merger activity relative to income can be estimated following the basic procedure reported above and in Chapter 4.

Table 16 shows the results. One key finding is the statistically significant coefficient on the interaction term, $\Delta \log(M_t / I_t) \times D_t$, when the dependent variable is inequality in fiscal income (column 1). This suggests that the relationship between fiscal income inequality and the growth in M&A activity relative to fiscal income changed by an order of magnitude after 1981. Another key finding is that the immediate part of this effect operates predominately through labor income, as the coefficient on the interaction term remains significant when the dependent variable is inequality in labor income (column 2) but is not when the dependent variable is inequality in capital income (column 3). The benefit accruing to top earners in years with substantial amounts of M&A activity might snowball into higher capital income shares in later years through a delayed effect (Saez and

Zucman, 2016). But the immediate effect is observed in the labor income distribution. A third key finding is that the effect size is roughly three times larger for fiscal income inequality (column 1), which includes capital gains than for labor income inequality (column 2) which does not. This may reflect the influence of the "carried interest" provision which allows fund managers who engage in high levels of M&A to tax the substantial portion of their income as a capital gain rather than labor income (Saez and Zucman, 2016, 545), at a substantial tax savings.

	Fiscal income share	Labor income share	Capital income share
	(1)	(2)	(3)
$\Delta \log(M_t / I_t)$	0.160*	0.012	0.015
	(0.083)	(0.024)	(0.212)
D_t	0.284	0.098	0.792**
	(0.321)	(0.113)	(0.356)
$\Delta \log(M_t / I_t) \times D_t$	1.567***	0.502**	0.302
	(0.581)	(0.201)	(0.360)
Constant	−0.045	0.071*	−0.534*
	(0.136)	(0.037)	(0.311)
N	53	48	48
R^2	0.183	0.144	0.136
Adjusted R^2	0.133	0.085	0.078
Residual Std. Error	1.348 (df = 49)	0.498 (df = 44)	1.024 (df = 44)
F Statistic	3.659** (df = 3; 49)	2.457* (df = 3; 44)	2.317* (df = 3; 44)

*p < .1; **p < .05; ***p < .01

Table 16: This table shows the results of estimating Equation 8. The first term, $\Delta \log(M_t / I_t)$, captures growth in merger activity relative to growth in total income. The second term, D_t, is a dummy variable equal to 0 before 1981 and 1 after. The last term is an interaction between these two independent variables which captures a change in the relationship between merger activity and various forms of income inequality after 1981.

5.4.3 Final Model

The final model used in Chapter 4 essentially extrapolates from equation 7 to include variation at the state level and over time. Instead of interacting the measure of relative merger activity with a dummy variable representing policy intervention, separate regressions are run for the before and after time period and the difference in effect sizes is apparent from the reported coefficients. The key innovation is based on the fact that, in both periods, each of the states is differentially positioned to capture income from merger activity. I argue in Chapter 4 that this lagged exposure, $\xi_{i,t-1}$ essentially captures the extent to which each state i is integrated into (or exposed to) the

service economy in period t, and it can be explicitly modeled in a variety of ways.

The model estimated in Chapter 4 is:

$$Is_{it} = \alpha_i + \beta_t + \delta\xi_{i,t-1} + \gamma(\xi_{i,t-1} \times X_t) + \epsilon_{it} \tag{10}$$

This is effectively the panel equivalent of equation 7, except that the model now includes state and year fixed effects in lieu of a single intercept and a time trend, and the main measure of service economy exposure, $\xi_{i,t-1}$, is included as a control because it changes over time. Because X_t is co-linear with the year fixed effects, β_t, it does not enter into the model as a predictor. When using first differences to eliminate the state fixed effects and to reduce autocorrelation in the residuals (see replication file), this reduces to:

$$\Delta Is_{it} = \beta_t + \delta\Delta\xi_{i,t-1} + \gamma(\Delta(\xi_{i,t-1} \times X_t)) + \epsilon_{it} \tag{11}$$

The estimated coefficient on that control, δ, captures the extent to which changes in service economy exposure are associated with income inequality. In Chapter 4, this measure of exposure actually has a significantly negative coefficient in the first period, which suggests that, holding all else equal, as states became more exposed to the service economy from 1963-1980, they tended to see income inequality decline. The coefficient remains negative in the second period (1981-2015) but is imprecisely estimated, and so we cannot reject the null hypothesis of no relationship between service economy exposure and income inequality at conventional confidence levels.

To estimate this equation in Chapter 4, I use top top 0.1 percent fiscal income shares as the main dependent variable. Though labor income statistics might be preferable to fiscal income statistics, they are yet not available in long time series at the state level. I therefore use fiscal income

statistics but control for a possible effect through capital income by controlling for state level capital gains and the interaction between a state's exposure to capital markets (its share of capital gains in the prior year) and relative growth in M&A activity.

I use each state's share of total income in legal services in the prior year as my main measure of exposure because it is highly correlated with the share of income in securities and commodities brokerage (which covers investment banking), but is more granular[28] and is consistently reported across the shift from SIC to NAICS codes in 1997. It is also well correlated with a measure of exposure based on the advisory fees earned from reported mergers, as shown in the replication file.

I estimate equation 11 using first differencing instead of demeaning to deal with state fixed effects because the estimates are more conservative and because it substantially reduces autocorrelation in the residuals. I also use the square root of the number of tax units in state i and year t as weights to reduce the observable heteroskedasticity that is likely due to measurement error surrounding income statistics from smaller states (less than 2 million tax units) (Jayaratne and Strahan, 1996, 649). Standard errors are clustered at the state level.

The results reported in Chapter 4 are robust to variations in functional form, to the use of the top 1 percent of fiscal income as a dependent variable, to the use of a lagged average of exposure that smooths fluctuations within states, to the use of alternative measures of exposure based on M&A advisory fees or shares of income in securities and brokerage services, and to the inclusion of controls for capital gains at the state level, exposure to capital markets, and capital gains earned by way of M&A activity.

[28] In the state level GDP data published by the Bureau of Economic Analysis, the finance and insurance industry code is at the three-digit code level (523x) while the legal services code is at the four digit level (5411).

5.4.4 An Exploratory Bayesian Model with Heterogeneous Effects

It is possible that the chosen measure of exposure does not capture all of the heterogeneity among states in their ability to extract income from financial activity like M&A. For example, the dependent variable is a top income share at the state-year level, but the income threshold for achieving an income in the top 1 or 0.1 percent varies substantially by state while the salaries for the investment bankers and lawyers who work on these deals tend to be set according to national pay scales. At the same time, data on these thresholds are not as reliable as the estimated top shares, and even if accurate measures were readily available, it is not a simple matter to account for variations in these thresholds in determining a state's exposure in the model above.

As an exploratory exercise, I therefore used the also fit the following hierarchical model:

$$\Delta Is_{it} \sim \mathcal{N}(\beta_t + \delta_i \Delta\xi_{i,t-1} + \gamma_i(\Delta(\xi_{i,t-1} \times X_t)), \sigma_i^2) \tag{12}$$

$$\beta_t \sim \mathcal{N}(\mu_\beta, \sigma_{\beta^2}) \tag{13}$$

$$\delta_i \sim \mathcal{N}(\mu_\delta, \sigma_{\delta^2}) \tag{14}$$

$$\gamma_i \sim \mathcal{N}(\mu_\gamma, \sigma_{\gamma^2}). \tag{15}$$

As shown in the replication file, we can also allow for correlation between δ_i and γ_i, so that

$$\begin{pmatrix} \delta_i \\ \gamma_i \end{pmatrix} \sim N\left(\begin{pmatrix} \mu_\delta \\ \mu_\gamma \end{pmatrix}, \begin{pmatrix} \sigma_\delta^2 & \rho\sigma_\delta\sigma_\gamma \\ \rho\sigma_\delta\sigma_\gamma & \sigma_\gamma^2 \end{pmatrix}\right)$$

and $\rho \sim \mathcal{U}(-1, 1)$, but there is little evidence of any correlation and the model converges more readily if the coefficients are modeled as being independent.

References

Abramowitz, Alan I. 2013. "The Electoral Roots of America's Dysfunctional Government." *Presidential Studies Quarterly* 43 (4): 709–731.

Advisory Committee on Industrial Innovation: The Industrial Advisory Subcommittee on Patent and Information Policy. 1979. Report on Patent Policy. Technical report Department of Commerce.

Aghion, Philippe, Ufuk Akcigit, Antonin Bergeaud, and Richard Blundell. 2019. "Innovation and Top Income Inequality." *Review of Economic Studies* 86: 1–45.

Akcigit, Ufuk, and Sina T. Ates. 2019. What Happened to U.S. Business Dynamism? Technical report National Bureau of Economic Research Working Paper 25756.

Angrist, Joshua D., and Jorn-Steffen Pischke. 2008. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press.

Ansell, Ben, and Jane Gingrich. 2022. "Concentration and Commodification: The Political Economy of Postindustrialism in America and Beyond." In *The American Political Economy: Politics, Markets, and Power*, ed. Jacob S. Hacker, Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. Cambridge University Press: New York.

Appelbaum, Binyamin. 2019. *The Economists' Hour: False Prophets, Free Markets, and the Fracture of Society*. Little Brown and Company: New York.

Autor, David H. 2014. "Skills, Education, and the Rise of Earnings Inequality Among the 'Other 99 Percent'." *Science* 344 (May): 843–851.

Autor, David H. 2019. "Work of the Past, Work of the Future." *AEA Papers and Proceedings* 109: 1–32.

Baker, Jonathan B., and Carl Shapiro. 2008. "Reinvigorating Horizontal Merger Enforcement." In *How the Chicago School Overshot the Mark: the Effect of Conservative Economic Analysis on U.S. Antitrust*, ed. Robert Pitofsky. Oxford University Press: Oxford.

Baker, Jonathan B., and Steven C. Salop. 2015. "Antitrust, Competition Policy, and Inequality." *Georgetown Law Journal* 104: 1–28.

Baker, Malcolm, and Jeffrey Wurgler. 2000. "The Equity Share in New Issues and Aggregate Stock Returns." *The Journal of Finance* LV (5): 2219–2257.

Baker, Scott R., Nicholas Bloom, and Steven J. Davis. 2016. "Measuring Economic Policy Uncertainty." *Quarterly Journal of Economics* 131 (4): 1593–1636.

Barnes, Lucy. 2022. "Public Investment in the Knowledge Economy." In *The American Political Economy: Politics, Markets, and Power*, ed. Jacob S. Hacker, Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. Cambridge University Press: New York.

Barth, Erling, Alex Bryson, James C. Davis, and Richard Freeman. 2016. "It's Where You Work: Increases in the Dispersion of Earnings across Establishments and Individuals in the United States." *Journal of Labor Economics* 34 (2): S67-S97.

Baumgartner, Frank R., Jeffrey M. Berry, Marie Hojnacki, David C. Kimball, and Beth L. Leech. 2009. *Lobbying and Policy Change: Who Wins, Who Loses, and Why*. The University of Chicago Press: Chicago and London.

Bebchuck, Lucian, and Jesse Fried. 2004. *Pay Without Performance: The Unfulfilled Promise of Executive Compensation*. Cambridge: Harvard University Press.

Bell, Alex, Raj Chetty, Xavier Jaravel, Neviana Petkova, and John Van Reenen. 2016. The Lifecycle of Inventors. Technical report Working Paper.

Bell, Daniel. 1974. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. Harper Colophon Books: New York.

Berman, Elizabeth Popp. 2012. *Creating the Market University: How Academic Science Became an Economic Engine*. Princeton University Press: Princeton and Oxford.

Bessen, James, and Michael J. Meurer. 2008. *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk*. Princeton University Press: Princeton and Oxford.

Birch, David. 1979. *The Job Generation Process*. M.I.T. Program on Neighborhood and Regional Change.

Block, Fred. 2008. "Swimming Against the Current: The Rise of a Hidden Developmental State in the United States." *Politics and Society* 36 (2): 169-206.

Block, Fred. 2011. "Innovation and the Invisible Hand of Government." In *State of Innovation: The U.S. Government's Role in Technology Development*, ed. Fred Block and Matthew R. Keller. Paradigm Publishers: Boulder and London.

Bonica, Adam. 2016. "Database on Ideology, Money in Politics, and Elections: Public version 2.0 [Computer file]." Stanford, CA: Stanford University Libraries.

Broockman, David E., Gregory Ferenstein, and Neil Malhotra. 2019. "Predisposition and the Political Behavior of American Economic Elites: Evidence from Technology Entrepreneurs." *American Journal of Political Science* 63 (1): 212-233.

Butcher, Dan. 2016. "The battle for investment banking associates drives up pay on Wall Street." *Efinancial Careers* (February).

Campbell, Andrea Louise. 2003. *How Policies Make Citizens: Senior Political Activism and the American Welfare State*. Princeton University Press: Princeton and Oxford.

Card, David. 1992. "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage." *Industrial and Labor Relations Review* 46 (1): 22–37.

Carlin, Bradley P., Alan E. Gelfand, and Adrian F.M. Smith. 1992. "Hierarchical Bayesian Analysis of Changepoint Problems." *Journal of the Royal Statistical Society Series C* 41 (2): 389–405.

Carpenter, Daniel and David A. Moss, eds. 2014. *Preventing Regulatory Capture: Special Interest Influence and How to Limit It*. Cambridge University Press: New York.

Chang, Emily. 2019. *Brotopia: Breaking Up the Boys' Club of Silicon Valley*. Portfolio.

Chetty, Raj, David Grusky, Maximilian Hell, Nathaniel Hendren, Robert Manduca, and Jimmy Narang. 2017. "The Fading American Dream: Trends in Absolute Income Mobility Since 1940." *Science* 356: 398–406.

Chetty, Raj, Nathaniel Hendren, Maggie R. Jones, and Sonya R. Porter. 2020. "Race and Economic Opportunity in the United States: An Intergenerational Perspective." *Quarterly Journal of Economics* 135 (2): 711–83.

Chetty, Raj, Nathaniel Hendren, Patrick Kline, and Emmanuel Saez. 2014. "Where Is the Land of Opportunity? The Geography of Intergenerational Mobility in the United States." *Quarterly Journal of Economics* 129 (4): 1553–1623.

Christophers, Brett. 2016. *The Great Leveler: Capitalism and Competition in the Court of Law*. Harvard University Press: Cambridge and London.

Citizens for Tax Justice. 2016. "Fortune 500 Corporations Used Stock Options Loophole to Avoid $64.6 Billion in Taxes Over the Last Five Years." *ctj.org*.

Coate, Malcolm B. 2000. "Merger Enforcement at the Federal Trade Commission." *Antitrust Bulletin* 45: 323–47.

Coate, Malcolm B. 2018. "The Merger Review Process at the Federal Trade Commissionn from 1989 to 2016." Working Paper. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2955987.

Cohen, Lizabeth. 2003. *A Consumer's Republic: The Politics of Mass Consumption in Postwar America*. Vintage Books: New York.

Corak, Miles. 2013. "Income Inequality, Equality of Opportunity, and Intergenerational Mobility." *Journal of Economic Perspectives* 27 (3): 79–102.

Coriat, Benjamin, and Olivier Weinstein. 2012. "Patent Regimes, Firms and the Commodification of Knowledge." *Socio-Economic Review* 10: 267–92.

Cowan, Edward. May 30, 1983. "Washington Watch; A Democratic Rift." *The New York Times*: Section 1, Page 36.

Cowan, Edward. Sept. 19, 1982. "Democrats Offer New Policy to Sustain National Growth." *The New York Times*: Section 1, Page 28.

Cramer, Katherine J. 2016. *The Politics of Resentment: Rural Consciousness in Wisconsin and the Rise of Scott Walker*. The University of Chicago Press: Chicago & London.

Dahl, Robert A. 2005. *Who Governs? Democracy and Power in an American City*. Yale University Press: New Haven and London.

Davis, Gerald F., and Suntae Kim. 2015. "Financialization of the Economy." *Annual Review of Sociology* 41: 203–21.

Davis, Gerald F., and Tracy A. Thompson. 1994. "A Social Movement Perspective on Corporate Control." *Administrative Science Quarterly* 39 (1): 141–173.

Denwood, Matthew J. 2016a. "runjags: An R Package Providing Interface Utilities, Model Templates, Parallel Computing Methods and Additional Distributions for MCMC Models in JAGS." *Journal of Statistical Software* 71 (9): 1–25.

Denwood, Matthew J. 2016b. "runjags: An R Package Providing Interface Utilities, Model Templates, Parallel Computing Methods and Additional Distributions for MCMC Models in JAGS." *Journal of Statistical Science* 71 (9): 1–25.

Detroit Economic Club. 2018. "Michigan Should Lead the Next Frontier of Innovation." Recorded interview. https://www.econclub.org/meeting/senator-peters/.

Dharmapala, Dhammika, C. Fritz Foley, and Kristin J. Forbes. 2009. Watch What I Do, Not What I Say: The Unintended Consequences of the Homeland Investment Act. Technical report National Bureau of Economic Research Working Paper 15023.

Drahos, Peter, and John Braithwaite. 2003. *Information Feudalism: Who Owns the Knowledge Economy?* The New Press: New York.

Eisinger, Peter K. 1988. *The Rise of the Entrepreneurial State: State and Local Development Policy in the United States*. The University of Wisconsin Press: Madison.

Eisner, Marc Allen. 1991. *Antitrust and the Triump of Economics: Institutions, Expertise, and Policy Change*. The University of North Carolina Press: Chapel Hill and London.

Eisner, Marc Allen, and Kenneth J. Meier. 1990. "Presidential Control versus Bureaucratic Power: Explaining the Reagan Revolution in Antitrust." *American Journal of Political Science* 34 (1): 269–287.

Enamorado, Ted, Benjamin Field, and Kosuke Imai. 2019. "Using a Probablistic Model to Assist Merging Large-Scale Administrative Records." *The American Political Science Review* 113 (2): 353–371.

Executive Advisory Council. 1982. Winning Technologies: A New Industrial Strategy for California and the Nation. Technical report California Commission on Industrial Innovation.

Fallick, Bruce C., and Kevin A. Hassett. 1996. "Unionization and Acquisitions." *The Journal of Business* 69 (Jan.): 51-73.

Feldman, Maryann P., Alessandra Colaianni, and Connie Kang Liu. 2007. "Lessons from the Commercialization of the Cohen-Boyer Patents: The Stanford University Licensing Program." In *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices*. Centre for the Management of Intellectual Property in Health Research and Development: Oxford. http://www.iphandbook.org/handbook/chPDFs/ch17/ipHandbook-Ch

Feldman, Robin C. 2003. "The Insufficiency of Antitrust Analysis for Patent Misuse." *Hastings Law Journal* 55: 399.

Fiorina, Morris P., Samuel J. Abrams, and Jeremy C. Pope. 2010. *Culture War? The Myth of a Polarized America*. Longman: London.

Gabaix, Xavier, Augustin Landier, and Julien Sauvagnat. 2013. "CEO Pay and Firm Size: An Update After the Crisis." *The Economic Journal* 124 (574): F40-F59.

Galbraith, James K. 1998. *Created Unequal*. The University of Chicago Press: Chicago.

Galbraith, James K. 2012a. *Inequality and Instability: A Study of the World Economy Just Before the Great Crisis*. Oxford University Press: Oxford.

Galbraith, John Kenneth. 2012b. *American Capitalism: The Concept of Countervailing Power*. Martino Fine Books: Eastford.

Gallo, Joseph C., Kenneth Dau-Schmidt, Joseph L. Craycraft, and Charles J. Parker. 2000. "Department of Justice Antitrust Enforcement, 1955-1997: An Empirical Study." *Review of Industrial Organization* 17: 75–133.

Geismer, Lily. 2015. *Don't Blame Us: Suburban Liberals and the Transformation of the Democratic Party*. Princeton University Press: Princeton.

Gelman, Andrew, and Jennifer Hill. 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press: New York.

Goldin, Claudia, and Lawrence F. Katz. 2008. *The Race Between Education and Technology*. The Belknap Press of Harvard University Press: Cambridge and London.

Graham, Otis L. 1992. *Losing Time: The Industrial Policy Debate*. Harvard University Press: Cambridge and London.

Greenspan, Alan. 1986. "Antitrust." In *Capitalism: The Unknown Ideal*. Penguin Publishing Group: New York.

Grullon, Gustavo, Yelena Larkin, and Roni Michaely. 2017. Are US Industries Becoming More Concentrated? Technical report Working Paper.

Hacker, Jacob S., Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. 2022. "Introduction: The American Political Economy: A Framework and Agenda for Research." In *The American Political Economy: Politics, Markets, and Power*, ed. Jacob S. Hacker, Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. Cambridge University Press: New York.

Hacker, Jacob S., and Paul Pierson. 2010. *Winner-Take-All Politics: How Washington Made the Rich Richer–And Turned Its Back on the Middle Class*. Simon and Schuster: New York.

Hall, Peter A. 2019. "From Keynesianism to the Knowledge Economy: The Rise and Fall of Growth Regimes." *Business Economics* (54): 122—26.

Hall, Peter A., and David Soskice. 2001. "An Introduction to Varieties of Capitalism." In *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, ed. Peter A. Hall and David Soskice. Oxford University Press: Oxford.

Hart, David M. 1998. *Forged Consensus: Science, Technology, and Economic Policy in the United States, 1921-1953*. Princeton University Press: Princeton.

Hart, David M. 2001. "Antitrust and Technological Innovation in the US: Ideas, Institutions, Decisions, and Impacts, 1890-2000." *Research Policy* 30: 923-936.

Haskel, Jonathan, and Stian Westlake. 2018. *Capitalism Without Capital: The Rise of the Intangible Economy*. Princeton University Press: Princeton and Oxford.

Helpman, Elhanan. 2004. *The Mystery of Economic Growth*. The Belknap Press of Harvard University Press: Cambridge and London.

Hope, David, and Angelo Martelli. 2019. "The Transition to the Knowledge Economy, Labor Market Institutions, and Income Inequality in Advanced Democracies." *World Politics* 71 (2): 236–88.

Horwitz, Morton J. 1977. *The Transformation of American Law 1780-1860*. Harvard University Press: Cambridge and London.

Hurt, Shelley L. 2011. "The Military's Hidden Hand: Examining the Dual-Use Origins of Biotechnology in the American Context, 1969-1972." In *State of Innovation: The U.S. Government's Role in Technology Development*, ed. Fred Block and Matthew R. Keller. Paradigm Publishers: Boulder and London.

Insight, RPX. 2020. "Private Equity's Interest in Patent Litigation Remains High, Possibly Increasing Amid Signs of an Economic Downturn.".

Iversen, Torben, and David Soskice. 2019. *Democracy and Prosperity: Reinventing Capitalism Through a Turbulent Century*. Princeton University Press: Princeton and Oxford.

Jaffe, Adam B., and Manuel Trajtenberg. 2002. *Patents, Citations, and Innovations: A Window on the Knowledge Economy*. The MIT Press: Cambridge and London.

Jayaratne, Jith, and Philip E. Strahan. 1996. "The Finance-Growth Nexus: Evidence from Bank Branch Deregulation." *The Quarterly Journal of Economics* 111 (3): 639–670.

Johnson, Chalmers A. 1982. *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975*. Stanford University Press: Redwood City.

Khan, Lina. 2018. "The Ideological Roots of America's Market Power Problem." *The Yale Law Journal Forum* 127: 960–979.

Khan, Lina M. 2017. "Amazon's Antitrust Paradox." *The Yale Law Journal* 126 (3): 710-805.

Khan, Lina M., and Sandeep Vaheesan. 2017. "Market Power and Inequality: The Antitrust Counterrevolution and Its Discontents." *Harvard Law and Policy Review* 11: 235–294.

Kleinman, Daniel Lee. 1995. *Politics on the Endless Frontier: Postwar Research Policy in the United States*. Duke University Press: Durham and London.

Kline, Patrick, Neviana Petkova, Heidi Williams, and Owen Zidar. 2017. Who Profits from Patents? Rent-Sharing at Innovative Firms. Technical report Working Paper.

Kogan, Leonid, Dimitris Papanikolau, Amit Seru, and Noah Stoffman. 2017. "Technological Innovation, Resources Allocation, and Growth." *Quarterly Journal of Economics*: 665-712.

Koh, Dongya, Raul Santaeulalia-Llopis, and Yu Zheng. 2015. Labor Share Decline and the Capitalization of Intellectual Property Products. Technical report Working Paper.

Krippner, Greta R. 2005. "The Financialization of the American Economy." *Socio-Economic Review* 3: 173–208.

Krippner, Greta R. 2011. *Capitalizing on Crisis: The Political Origins of the Rise of Finance*. Harvard University Press: Cambridge and London.

Kristol, Irving. 1975. "On Corporate Capitalism in America." *The Public Interest* 41: 124–41.

Kwon, Roy. 2016. "A New Kuznetsian Dynamic: The Knowledge Economy and Income Inequality in the United States, 1917-2008." *The Sociological Quarterly* 57 (1): 174–204.

Lampe, David. 1988. "Introduction." In *The Massachusetts Miracle: High Technology and Economic Revitalization*, ed. David Lampe. The MIT Press: Cambridge and London.

Landes, William M., and Richard A. Posner. 2004. "An Empirical Analysis of the Patent Court." *University of Chicago Law Review* 71: 111-128.

Lazonick, William, and Mariana Mazzucato. 2013. "The Risk-Reward Nexus in the Innovation-Inequality Relationship: Who Takes the Risks? Who Gets the Rewards?" *Industrial and Corporate Change* 22 (4): 1093-1128.

Leary, Thomas B. 2002. "The Essential Stability of Merger Policy in the United States." *Antitrust Law Journal* 70: 105–42.

Lerner, Josh. 1999. "The Government as Venture Capitalist: The Long-Run Impact of the SBIR Program." *Journal of Business* 72 (3): 285–318.

Lerner, Josh. 2009. "The Empirical Impact of Intellectual Property Rights on Innovation: Puzzles and Clues." *American Economic Review* 99 (2): 343–48.

Levendusky, Matthew. 2009. *The Partisan Sort: How Liberals Became Democrats and Conservatives Became Republicans*. University of Chicago Press.

Loecker, Jan De, Jan Eeckhout, and Gabriel Unger. 2020. "The Rise of Market Power and the Macroeconomic Implications." *Quarterly Journal of Economics* 135 (2): 561-644.

Lowe, Jeffrey A. 2016. Major, Lindsey & Africa 2018 Partner Compensation Survey. Technical report Major, Lindsey & Africa. https://www.mlaglobal.com/en/knowledge-library/research/compensation-survey-2016 (last accessed Dec. 1, 2019).

Lynn, Barry C. 2010. *Cornered: The New Monopoly Capitalism and the Economics of Destruction*. John Wiley & Sons, Inc.

Macher, Jeffrey T., and John W. Mayo. 2020. "The Evolution of Merger Enforcement Intensity: What Do the Data Show?" Working Paper. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3651485.

Majority Staff. 2020. "Investigation of Competition in Digital Markets.". https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519.

McCarty, Nolan, Keith T. Poole, and Howard Rosenthal. 2016. *Polarized America: The Dance of Ideology and Unequal Riches*. The MIT Press: Cambridge.

Meador, Daniel J. 1992. "Origin of the Federal Circuit: A Personal Account." *American University Law Review* 41: 581-620.

Miles, Sara. 2001. *The Democrats and Silicon Valley: How to Hack a Party Line*. Farrar, Straus & Giroux: New York.

Moretti, Enrico. 2013. *The New Geography of Jobs*. Mariner Books of Houghton Mifflin Harcourt: Boston and New York.

Murray, Charles. 2012. *Coming Apart*. Random House: New York.

Negoita, Marian. 2011. "To Hide or Not to Hide? The Advanced Technology Program and Future of U.S. Civilian Technology Policy." In *State of Innovation: The U.S. Government's Role in Technology Development*, ed. Fred Block and Matthew R. Keller. Paradigm Publishers: Boulder and London.

Newfield, Christopher. 2008. *Unmaking the Public University: The Forty-Year Assault on the Middle Class*. Harvard University Press: Cambridge and London.

Newman, Pauline. 2002. "Origins of the Federal Circuit: The Role of Industry." *Federal Circuit Bar Journal* 11: 541-43.

O'Mara, Margaret. 2019. *The Code: Silicon Valley and the Remaking of America*. Penguin Books.

Open Secrets. N.d. "Campaign Contributions and Lobbying Totals, Lawyers and Law Firms." Database. https://www.opensecrets.org/industries/totals.php?cycle=2022&ind=K01.

Orren, Karen, and Stephen Skowronek. 2004. *The Search for American Political Development*. Cambridge University Press: New York.

Park, David K., Andrew Gelman, and Joseph Bafumi. 2004. "Bayesian Multilevel Estimation with Poststratification: State Level Estimates from National Polls." *Political Analysis* 12 (4): 375-385.

Peters, Gerhard, and John T. Woolley. 1964. "One Nation, One People (The 1964 Democratic Party Platform Online)." *The American Presidency Project*.

Peters, Gerhard, and John T. Woolley. 1968. "The Terms of Our Duty (The 1968 Democratic Party Platform Online)." *The American Presidency Project*.

Peters, Gerhard, and John T. Woolley. 1972. "New Directions: 1972-76 (The 1972 Democratic Party Platform Online)." *The American Presidency Project*.

Peters, Gerhard, and John T. Woolley. 1976. "No Title (The 1976 Democratic Party Platform Online)." *The American Presidency Project*.

Philippon, Thomas, and Ariell Reshef. 2012. "Wages and Human Capital in the U.S. Finance Industry: 1909-2006." *Quarterly Journal of Economics* 127 (4): 1551–1609.

Phillippon, Thomas. 2015. "Has the US Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation." *American Economic Review* 105 (4): 1408–1438.

Piketty, Thomas. 2014. *Capital in the Twenty-First Century*. The Belknap Press of Harvard University Press: Cambridge and London.

Rai, Arti, and Bhaven Sampat. 2012. "Accountability in Patenting of Federally Funded Research." *Nature Biotechnology* 30 (10): 953-956.

Rajan, Raghuram G., and Luigi Zingales. 1998. "Financial Dependence and Growth." *The American Economic Review* 88 (3): 559–586.

Reardon, Sean F. 2011. "The Widening Academic Achievement Gap Between the Rich and the Poor: New Evidence and Possible Explanations." In *Whither Opportunity? Rising Inequality, Schools, and Children's Life Chances*, ed. Greg J. Duncan and Richard J. Murnane. Russel Sage Foundation.

Reardon, Sean F., and Kendra Bischoff. 2011. Growth in Residential Segregation of Families by Income, 1970-2009. Technical report US2010 Project.

Rodden, Jonathan. 2019. *Why Cities Lose: The Deep Roots of the Urban-Rural Political Divide*. Basic Books.

Rothenberg, Randall. 1984. *The Neoliberals: Creating the New American Politics*. Simon and Schuster: New York.

Ruggles, Steven, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas, and Matthew Sobek. 2019. "IPUMS USA: Version 9.0 [dataset]. Minneapolis, MN: IPUMS, 2019." Database.

Rugh, Jacob S., and Douglas S. Massey. 2010. "Racial Segregation and the American Foreclosure Crisis." *American Sociological Review* 75 (5): 629–51.

Ryan, Michael P. 1998. *Knowledge Diplomacy: Global Competition and the Politics of Intellectual Property*. Brookings Institution Press: Washington D.C.

Sachs, Rachel. 2013. "The New Model of Interest Group Representation in Patent Law." *Yale Journal of Law and Technology* 16: 344.

Saez, Emmanuel, and Gabriel Zucman. 2016. "Wealth Inequality in the United States Since 1913: Evidence from Capitalized Income Tax Data." *Quarterly Journal of Economics* 131 (2): 519–578.

Salant, Walter S. 1989. "The Spread of Keynesian Doctrines and Practices in the United States." In *The Political Power of Economic Ideas: Keynesianism Across Nations*, ed. Peter A. Hall. Princeton University Press: Princeton.

Scherer, F.M. 2009. "The Political Economy of Patent Policy Reform in the United States." *Journal on Telecommunications and High Technology Law* 7: 167.

Schickler, Eric. 2016. *Racial Realignment: The Transformation of American Liberalism, 1932-1965*. Princeton University Press: Princeton & Oxford.

Schlozman, Daniel. 2015. *When Movements Anchor Parties: Electoral Realignments in American History*. Princeton University Press: Princeton & Oxford.

Schow, Ashe. 2012. "President Obama's Taxpayer-Backed Green Energy Failures." *The Daily Signal*.

Schulman, Bruce J. 1994. *From Cotton Belt to Sunbelt: Federal Policy, Economic Development, and the Transformation of the South, 1938-1980*. Duke University Press: Durham and London.

Schumpeter, Joseph A. 2012. *The Theory of Economic Development*. 16 ed. Transaction Publishers: New Brunswick and London.

Schwartz, Herman Mark. 2016. "Wealth and Secular Stagnation: The Role of Industrial Organization and Intellectual Property Rights." *The Russel Sage Foundation Journal of the Social Sciences: New York* 2 (6): 226-249.

Schwartz, Herman Mark. 2017. "Club Goods, Intellectual Property Rights, and Profitability in the Information Economy." *Business and Politics* 19 (2): 191–214.

Schwartz, Herman Mark. 2020. "Corporate Profit Strategies and U.S. Economic Stagnation." *American Affairs* IV (3).

Schwartz, Herman Mark. 2022. "Mo' Patents Mo' Problems: Corporate Strategy, Structure, and Profitability in America's Political Economy." In *The American Political Economy: Politics, Markets, and Power*, ed. Jacob S. Hacker, Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. Cambridge University Press: New York.

Scotchmer, Suzanne. 2004. *Innovation and Incentives*. The MIT Press: Cambridge and London.

Sell, Susan K. 2003. *Private Power, Public Law: The Globalization of Intellectual Property Rights*. Cambridge University Press: New York.

Short, Nicholas. 2016. "The Political Economy of the Research Exemption in American Patent Law." *Fordham Intellectual Property, Media, and Entertainment Law Journal* 26: 573.

Short, Nicholas. 2022. "Antitrust Reform in Political Perspective: A Constructive Critique for the Neo-Brandeisians." Working Paper. https://scholar.harvard.edu/nickshort/publications/antitrust-reform-political-perspective-constructive-critique-neo-brandeisians.

Shulman, Yankelovich Clancy. 1990. "Time/CNN/Yankelovich Clancy Shulman Poll USYANKCS.022690.R11D." Cornell University, Ithaca, NY: Roper Center for Public Opinion Research, iPOLL, accessed Nov-22-2019.

Silk, Leonard, and David Vogel. 1976. *Ethics and Profits: The Crisis of Confidence in American Business*. Simon and Schuster: New York.

Skowronek, Stephen. 1982. *Building a New American State: The Expansion of National Administrative Capabilities*. Cambridge University Press: New York.

Song, Jae, David J. Price, Fatih Guvenen, Nicholas Bloom, and Till von Wachter. 2019. "Firming Up Inequality." *The Quarterly Journal of Economics* 134 (1): 1–50.

Soskice, David. 2022. "The United States as Radical Innovation Driver: The Politics of Declining Dominance?" In *The American Political Economy: Politics, Markets, and Power*, ed. Jacob S. Hacker, Alexander Hertel-Fernandez, Paul Pierson, and Kathleen Thelen. Cambridge University Press: New York.

Soss, Joe, Richard C. Fording, and Sanford F. Schram. 2008. "The Color of Devolution: Race, Federalism, and the Politics of Social Control." *American Journal of Political Science* 52 (3): 536–53.

Stein, Judith. 2010. *Pivotal Decade: How the United States Traded Factories for Finance in the Seventies*. Yale University Press: New Haven and London.

Stephens, Joe, and Carol D. Leonnig. 2011. "Solyndra: Politics Infused Obama Energy Programs." *The Washington Post*.

Stevens, Pippa. 2019. "Here Are the 10 Companies With the Most Cash on Hand." *CNBC*.

Stiglitz, Joseph E. 2013. *The Price of Inequality: How Today's Divided Society Endangers Our Future*. W.W. Norton and Company: New York and London.

Stoller, Matt. 2019. *Goliath: The 100-Year War Between Monopoly Power and Democracy*. Simon and Schuster: New York.

Techonomy. 2015. "Booker, Fischer, and Parker: Technollgy, Innovation and American Progress." Videotaped interview. https://techonomy.com/video/booker-fischer-parker-technology-innovation-and-american-progress/.

Tesler, Michael. 2012. "The Spillover of Racialization into Health Care: How President Obama Polarized Public Opinion by Racial Attitudes and Race." *American Journal of Political Science* 56 (3): 690–704.

Thelen, Kathleen. 2021. "American Business in Comparative Perspective: Historical Legacies and the Long Shadow of the Law." Forthcoming.

Thurow, Lester. 1980. *The Zero-Sum Society: Distribution and the Possibilities for Change*. Basic Books: New York.

Trumbull, Gunnar. 2012. *Strength in Numbers: The Political Power of Weak Interests*. Harvard University Press: Cambridge and London.

Turner, James. 2006. "The Next Innovation Revolution: Laying the Groundwork for the United States." *Innovations: Technology, Governance, and Globalization*.

Unger, Roberto Mangabeira. 2019. *The Knowledge Economy*. Verso: London and New York.

United States Census Bureau. 1985. Statistical Abstract of the United States. Technical report The United States Government.

U.S. Congress, House, Committee on the Judiciary. N.d. "Court of Appeals for the Federal Circuit Act Of." 1981 WL 404308.

Vogel, David. 1989. *Fluctuating Fortunes: The Political Power of Business in America*. Basic Books, Inc., Publishers: New York.

Wallace, James S., and Kenneth R. Ferris. 2006. "IRC Section 162(m) and the Law of Unintended Consequences.".

Waterhouse, Benjamin C. 2014. *Lobbying America: The Politics of Business from Nixon to NAFTA*. Princeton University Press: Princeton and Oxford.

Weil, David. 2014. *The Fissured Workplace*. Harvard University Press: Cambridge and London.

Weiss, Linda. 2014. *America Inc.? Innovation and Enterprise in the National Security State*. Cornell University Press: Ithaca and London.

Wood, B. Dan, and James E. Anderson. 1993. "The Politics of Antitrust Regulation." *American Journal of Political Science* 37 (1): 1–39.