

Power, Policy, and the Compensation of Top Executives ¹

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This article contributes to the quantitative analysis of international differences in executive compensation with a novel emphasis on the role of political drivers - specifically labor power, owner power, and executive power - while controlling for market factors. It leverages nested analysis, pairing a 2016 cross-sectional analysis of 179 firms in 20 countries with case studies of Finland, from 1971 to 2017, and the United States, from 1936 to 2016. The 2016 cross-sectional analysis of the world's largest firms finds that market forces are important, but that they leave a large portion of international differences in top executive compensation unexplained. Also important are labor power and executive power. Similarly, while controlling for market forces, the longitudinal case studies of large firms in the United States and Finland each find stronger labor power relative to executive power associated with lower executive pay. The theoretical framework advanced in this article helps to explain why top Chief Executive Officers' (CEO) pay - and consequent top-end income inequality - are each extreme in certain countries and periods, and modest in others.

Keywords: income distribution; inequality; power resources theory; politics; executive compensation

JEL Classifications: D31, D63, N30

Introduction

Income inequality within rich countries has grown in recent decades, and gains among nations' top one *per cent* have been the main driver of this rise (Alvaredo *et al.* 2016). Executive compensation levels are a key determinant of the top one *per cent*'s income share. In the United States, for instance, Bakija *et al.* (2012) (See also Alvaredo *et al.* 2016) report that executives, including chief executive officers (CEOs), as well as managers and supervisors, comprise about a third of the top one *per cent* earners. Similarly, Piketty and Saez (2007) found that executive compensation increases largely explain the steep rise in top income shares in the United States since 1980.

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Some studies of cross-country differences in executive compensation focus on market-driven explanations (Fernandes *et al.* 2012). Others examine political determinants. Piketty *et al.* (2011) find that higher top marginal tax rates are associated with lower CEO pay, both internationally and historically, in the United States. A few case studies in the United States have suggested political explanations for international differences in executive compensation levels. Pierson and Hacker (2010) explained high executive compensation in the United States relative to Europe through public-policy changes linked to the efforts of organized interests, particularly business lobbying groups and labor unions. Kenworthy (2017) suggested that weakened labor power in the United States relative to other countries, along with changes to corporate governance, have contributed to booming executive pay in the country. Huber *et al.* (2017) test a political framework of top one *per cent* income shares internationally over time, from 1960 to 2012. They find declining labor power, right-leaning governments, and top marginal tax rate cuts are predominantly responsible for the rising top one *per cent* income shares, and they suggest that these effects likely work in no small part through their upward impacts on executive compensation.

Whereas previous quantitative research on executive compensation has maintained at most a narrow political focus, this article provides the first systematic quantitative assessment of a broad politics-centered explanation of cross-country differences in executive compensation levels. We aim to paint a more complete picture of this key causal mechanism underlying top-end income inequality. We analyze how it is shaped both by market forces and political factors, the latter including interest-group power and corporate governance structure. We begin with a review of existing research, culminating in a theoretical framework offering hypotheses to test. Then we discuss methods, data, and operationalization. Next, we conduct a two-part nested analysis. The first part is an empirical analysis of CEO pay at 179 of the largest firms in the Organisation for Economic Co-operation and Development (OECD) in 2016. The second part analyzes the long-run development of CEO pay from 1936 to 2016 in the United States and from 1971 to 2017 in Finland. We discuss the findings and implications in a concluding section.

Literature Review

Our theoretical framework views executive compensation as the result of market factors and institutional factors - the latter capturing factors related to politics, the relative power of different social groups, policy, and corporate governance structure. Markets and institutions are not mutually

exclusive, they are interlinked. As suggested by Polanyi (1944), markets in the contemporary political economy are embedded, although the degree of embeddedness has varied over time and has become characterized by varying institutional configurations (*e.g.*, Hall and Soskice 2001). We highlight previous research on both sets of factors, as well as on how the two relate to each other.

Market Factors

An influential perspective in the literature on the factors shaping executive compensation focuses on optimal contracting (Frydman and Jenter 2010, Frydman and Saks 2010). This market-centered perspective (Holmstrom 1979) sees compensation as determined by supply and demand as well as marginal productivity (Murphy 2013). It is negotiated between managers² and boards of directors at arm's length, and efficiently designed to maximize shareholder value and minimize agency costs. Proponents of this perspective tend to view increases to executive compensation as an outcome of competitive markets rewarding executives more as globalization and technological change allows firms to operate on a larger scale, increasing their marginal productivity (Kaplan and Rauh 2013, Mankiw 2013). In a perfectly competitive market, CEOs are paid the value of their marginal product (Mankiw 2013).

Other factors that could explain pay and productivity like bargaining power, monopsony power or intellectual property rights, are assumed away. CEOs at larger firms with consequent higher marginal productivity indeed typically receive higher compensation (Fernandes *et al.* 2012, Abowd and Bognanno 1995, Frydman and Saks 2010). For instance, Gabaix and Landier (2008) found the six-fold increase in CEO pay in the United States since 1980 strongly correlated with the six-fold increase in market capitalization, a company's valuation on the stock market. Equity compensation, now commonplace around the world (Ludwig 2019), allows CEOs to increase their compensation as their firm's market capitalization increases - a point we return to below. Gabaix and Landier (2008) find that talent differences between CEOs are small but nonetheless lead to large compensation differences, given the large size of firms relative to the much smaller size of CEO compensation. Frydman (2018) found that CEO pay rose in times of high firm investment, when managerial skill in finding new productive investment opportunities is in high demand.

The extent of the impact of the market is, however, shaped and constrained by political factors mediated by institutions (Huber *et al.* 2019) that determine the market's embeddedness in society (Polanyi 1944). These factors can shape CEO pay by shaping market embeddedness. For

instance, while CEO pay in the United States has increased in lockstep with market capitalization since 1980 (Gabaix and Landier 2008), it held steady from 1936 until the 1970s despite increases in market capitalization (Frydman and Saks 2010). As we shall see, CEO pay followed a similar trend in Finland. Accounting for institutional factors related to politics can potentially help explain the decoupling of CEO pay from market factors in the earlier period.

Institutional Factors

The Role of Power Resources

Drawing from Power Resources Theory (PRT), Huber *et al.* (2019) find support for a framework of political rather than market drivers of top income shares (Korpi 1983, Stephens 1979). In PRT, different social groups use their economic or organizational power resources, mediated by institutions, to support policies that push for their preferred distributional outcomes. PRT is a class-based perspective, with union strength and left-leaning political parties representing labor power (non-executive employees) and right-leaning political parties supporting employers (including owners and management). Huber *et al.* (2019) find increasing top income shares can be explained by weakened labor power relative to employer power - represented by weaker unions, top marginal tax rate, government spending cuts, and right-leaning political party power.

Hacker and Pierson (2010) apply a similar political perspective to explain top income shares over time in the case of the United States, focusing on the power of interest groups mediated by political institutions. Similarly, Gourevitch and Shinn (2005) leverage a framework of political conflict between interest groups pushing for their preferred policies, mediated by political institutions, to explain corporate governance structure. Their framework distinguishes between three groups - owners, workers (non-executive employees), and executives - rather than PRT's two groups. These interest groups affect corporate governance through two broad sets of policies: 1) degree of coordination, *i.e.*, the rules that structure economic markets (Hall and Soskice 2001), and 2) legal protections for minority shareholders from rent extraction (La Porta *et al.* 1999). Gourevitch and Shinn (2005) group countries into two broad production regimes, or "varieties of capitalism" based on these policies: 1) a coordinated-market economy (characterized by small stock-market size, high wage coordination, high job security, and large, "blockholder" shareholders) tending to feature stronger labor and owners, and 2) a liberal-market economy which tends to feature stronger managers, and weaker labor and owners (minority, "dispersed" shareholders). More legal

protection for minority shareholders, itself a political decision, convinces potential minority shareholders to pay higher prices for shares, incentivizing blockholders to sell equity, leading to dispersed ownership.

As increased executive compensation is a central factor in explanations for increased top income shares (Huber *et al.* 2019) and executive compensation is closely related to corporate governance, these correlations, focused on the distribution of power between different groups, serve as an appropriate starting point for the institutional aspect of our theoretical framework. In the remainder of this section, we highlight factors that can be traced back to the distribution of power between different groups in society. In particular, stronger unions, higher top marginal tax rates, stronger left-leaning political parties, State ownership, a blockholder corporate governance structure, and weaker shareholder value-maximization norms represent stronger labor power relative to employer power.

Manager Power

Nominally, the board of directors is responsible for setting CEO pay. In theory, the board has sufficient power to pay the CEO whatever maximizes stakeholder value (Bebchuk and Grinstein 2005). The managerial power hypothesis, however, suggests that CEO compensation is influenced by the power CEOs have in setting their own pay (Frydman and Jenter 2010, Frydman and Saks 2010, Bebchuk *et al.* 2002, Bebchuk and Fried 2003, Bebchuk and Weisbach 2010). According to Berle and Means (1932), boards are generally beholden to and on the side of CEOs because CEOs (or their predecessors) chose the board (Means 1931). Delong and Morck (2007) and Mizruchi (2004) argued that this dependence remains today in the dispersed ownership context in the United States, as evidenced by the fact that board candidates nominated by management are nearly always approved. Bebchuk and Fried (2006) argue that an increased reliance on independent directors in the board nomination process has not remedied the situation, as boards still have ample incentive to align with CEOs, including social and psychological reasons and solidarity, the latter factor fitting with the class-based PRT, where board members and executives are aligned on the employer side. Bebchuk *et al.* (2002) speculate that differences in power explain why CEOs in the United States are paid more than their foreign counterparts, while lower-level managers are paid similarly (Abowd and Bognanno 1995). They focus on CEO power relative to boards and shareholders (to be discussed in the next section). Later on we consider CEO power relative to labor power as well.

Corporate Governance

Corporate governance structure (ownership structure) reflects the power of executives (Gourevitch and Shinn 2005), thus potentially influencing their compensation in alignment with the managerial power hypothesis. Ownership structure ranges from dispersed ownership, with a firm owned by many small shareholders, to concentrated ownership, with a firm owned by a large shareholder (“blockholder”) typically controlling at least 10 to 20 *per cent* of equity - 20 *per cent* tends to be sufficient to control the firm effectively (Porta *et al.* 1999). Blockholders can be families, small groups of individuals, widely held banks, insurance companies, other corporations or organizations, cooperatives, voting trusts, and the State. Further, the State is worth distinguishing from other blockholders as it uses the firm to pursue political objectives (Porta *et al.* 1999).

Within a concentrated corporate ownership structure, blockholders maintain enough control over the firm to provide significant oversight over CEOs through a supervisory board the blockholders dictate. By contrast, CEOs in companies with dispersed ownership structures control firms with scarce oversight from shareholders or boards of directors. Collectively, dispersed shareholders have an incentive to monitor managers, but the individual effort required to monitor management is high and gains from monitoring are widely shared, so individual incentive to monitor is weak (Roe 2006). Fernandes *et al.* (2012) found that ownership structure is the primary reason the average CEO in the United States is paid about 90 *per cent* more than the average non-American CEO. They find lower blockholder ownership is associated with higher CEO pay, and higher (widely held) institutional ownership is associated with higher CEO pay through its demands for incentive compensation justified to align CEO pay with shareholder value.

Corporate governance structure is also politically determined, a result of political conflict between interest groups, mediated by political institutions (Gourevitch and Shinn 2005). A stronger political left, *i.e.*, a more left-leaning government, enhances labor power and the likelihood of concentrated ownership (Roe 2006, Roe and Vatiero 2015, Gourevitch and Shinn 2005). Strong labor power pressures CEOs to protect the interests of workers in the form of stable wages and employment. Shareholders protect their interests by choosing to maintain firm control through concentrated ownership. Countries with more right-leaning, business-friendly, and CEO-friendly governments tend to have weaker labor power and dispersed ownership. Without fear of strong labor, shareholders are willing to give up control and sell off equity, leading to dispersed ownership (Roe 2006).

Gourevitch and Shinn (2005) highlight how political institutions aggregate interest group preferences and influence corporate governance outcomes. They distinguish between consensual and majoritarian political institutions, each tending to push countries toward different corporate governance structures. These institutions differ in their capacity “to make credible commitments among coalition partners in a bargain” (Gourevitch and Shinn 2005, p. 76). Consensual systems, like in most of Europe, are thus more likely to preserve a stable blockholder structure, where blockholder owners, managers, and workers cooperate to organize production. In majoritarian systems, like the United States, small swings in voting can exclude losing groups from the negotiating table. Interest groups are less likely to reach a credible bargain, increasing the likelihood of a predominantly dispersed ownership structure, where shareholders are given primacy.

Incentive Compensation

Various techniques have been adopted to solve the CEO monitoring problem in dispersed-ownership environments, including hostile takeovers, incentive compensation, and shareholder value-maximization norms (Roe 2006). The growing influence of shareholder value-maximization norms has justified the use of incentive compensation to align CEO interests with dispersed shareholders, allowing CEO compensation to increase as a firm’s market capitalization increases (Roe 2006). Recent evidence suggests incentive compensation, typically through stock options and grants, is now commonplace around the world, not just in dispersed ownership environments. It has been reported to comprise about half of total CEO compensation in European, Canadian, and American firms (Ludwig 2019). Further, CEO pay increases have come often in the form of incentive compensation, for instance in the United States (Murphy 2013) and Finland (Heino 2011).

As Huber *et al.* (2019) explain in the case of the United States, the shareholder value revolution, a key factor underlying increased option compensation for CEOs (Frydman and Saks 2010), was made possible only by union decline and industrial deregulation (Fligstein and Shin 2007). Similarly, Heino (2011) linked increased incentive compensation for CEOs in Finland to increased foreign ownership, where shareholder value-maximization norms were stronger - and domestic ideological change more strongly emphasized shareholder value rather than stakeholder value. Accordingly, our theoretical framework focuses on political (including

ideological) factors responsible for changes to the composition of CEO pay in favor of incentive compensation, rather than changes to the composition of CEO pay itself.

Unions, Taxation, and Political Party Power

Beyond managerial power and corporate governance structure, research has already examined the impact of other political factors on corporate governance and CEO compensation, including union strength, taxation, and political-party power. In the United States, Frydman and Molloy (2011, 2012) found that strong unions were largely responsible for the drop in CEO compensation in the 1940s, while government regulation and taxation had modest effects at most. They suggest strong unions may have kept CEO pay in check until the 1970s. Gomez and Tzioumis (2006) and Bank *et al.* (2016) also find evidence that unions limit CEO pay in the case of the United States, while Huber and *et al.* (2019) find supporting evidence internationally with regard to top income shares.

Previous research highlights how unions might constrain CEO pay. Unions are theorized to exert downward pressure on CEO pay by their very existence: CEOs and boards of directors are reluctant to increase CEO pay when unions could leverage this fact to demand increased worker pay, and unions are also likely to oppose exorbitant CEO pay relative to worker pay on solidarity grounds (Bank *et al.* 2016, Huber *et al.* 2019). Additionally, unions serve as a resource constraint, with higher pay for union workers resulting in less available financial resources for management (Huber *et al.* 2019). Finally, unions may limit the value of stock options as the market reacts negatively to union presence, although they do not necessarily negatively influence firm productivity (Huber *et al.* 2019, Gomez and Tzioumis 2006).

Levy and Temin (2007) explained, with reference to the United States, the post-1980 surge in top incomes through changing policy and institutional factors, reflecting a political shift rightward away from union strength. From 1950 to 1980, the United States featured moderately strong unions, steep progressive income tax rates, a high and rising minimum wage, and employer-labor-government cooperation. After 1980, a new consensus emphasized deregulation and privatization, weakening unions, lower tax rates, lower minimum wage, and less government intervention in the economy. Internationally, Huber *et al.* (2019) found right-leaning political-party power associated with increased top income shares.

In addition to union strength, previous research links taxation to CEO pay. Piketty *et al.* (2014) highlighted top marginal tax rates as an important factor underlying cross-country differences in executive

compensation levels, a claim buttressed by Huber *et al.* (2019). In an analysis of 14 countries in 2006, Piketty *et al.* found a strong association between higher top marginal tax rates and lower pre-tax CEO pay. They argued that at high enough marginal tax rates, small increases in after-tax pay are not worth the additional bargaining effort.

Bank and *et al.* (2016) argued, however, that the marginal tax rate hypothesis is inconsistent with historical evidence in the United States, as top marginal tax rate changes were, at best, only slightly related to pre-tax CEO pay changes (Frydman and Molloy 2011). Further, Ruf and Schmider (2018) found CEOs are paid more pre-tax to offset higher marginal tax rates in the short run. Instead of tax rates, in their explanation of increased CEO pay, Bank *et al.* (2016) emphasized changing norms around high pay, the value of “superstar” CEOs, the changing executive labor market supply and demand, and union strength, as highlighted above.

Previous research has also found that institutions that strengthen labor power, like worker councils, codetermination, and union regulations - more commonly found in coordinated-market economies and typically absent in liberal-market economies - support concentrated ownership, thereby potentially impacting CEO pay (Hall and Gingerich 2004, Höpner 2005). Worker councils are nonexecutive employee-comprised councils that are a part of corporate governance. Their powers vary depending on the country. In a few countries, they “co-determine” corporate governance through mandated seats on a supervisory board responsible for overseeing management and setting pay.

To sum up, our theoretical framework follows Huber *et al.* (2019) by focusing on a set of plausible institutional drivers of CEO pay, while also accounting for market factors. Our literature review presented evidence on stronger unions and higher top marginal tax rates limiting CEO pay. Through the lens of power-resources theory, these phenomena can both be viewed as representations of labor power. Left-leaning political-party power is an additional representation of labor power, typically supporting unions, progressive taxation, and potentially additional policies, like State ownership, that might influence CEO pay downward. Alternatively, PRT links weaker labor, top marginal tax rate cuts, and right-leaning political-party power to employer power, in opposition to labor power.

We thus expect stronger labor power relative to employer power to be associated with lower CEO pay and consider therefore four hypotheses on the relationship between labor power relative to employer power and CEO pay: stronger unions and collective bargaining are associated with lower CEO pay (H1); stronger left-leaning political-party power is associated with lower CEO pay (H2); higher top marginal tax rates are associated with lower CEO pay (H3). Additionally, deviating from PRT, Gourevitch and Shinn

(2005) distinguish between owners and CEOs, seeing them as distinct interest groups in their theoretical framework of corporate governance. Roe (2006) highlights how blockholder owners are in a stronger position to monitor CEOs than dispersed shareholders. Fernandes *et al.* (2012) find evidence in support of strong (blockholder) owners limiting CEO pay. Consequently, we hypothesize stronger owner power relative to CEO power is associated with lower CEO pay (H4). Moreover, this relationship is theorized to be still stronger if the owner is the State.

Methods, Data, and Operationalization

Methods

The research method is nested analysis, the pairing of “statistical analysis of a large sample of cases with the in-depth investigation of one or more cases contained within the large sample” (Lieberman 2005, p. 435). Large-N analysis offers a preliminary test of the validity of a theoretical model, and case analysis further assesses its validity “by plausibly linking cause to effect in the expected manner” (Lieberman 2005, p. 448). For the large-N analysis, we examine a cross-section of 179 CEOs of the largest OECD firms in 20 countries in 2016. For the small-N analysis, we conduct long-run case studies of CEO pay in the United States and Finland. These case studies are quantitative analyses rather than in-depth qualitative studies, like those already mentioned regarding Finland (*e.g.*, Heino 2011) and the United States (*e.g.*, Frydman and Saks 2010, Frydman and Molloy 2011, Pierson and Hacker 2010).

We leverage time-series analysis to take a closer look at causal chains and test for spuriousness. Unlike the large-N cross-sectional analysis, the time-series analyses account for unobserved time constant heterogeneity because they capture changes within each case over time rather than at a single point in time (Wooldridge 2015).³ We selected Finland and the United States as our case study countries for three reasons. First, we have CEO pay data dating back to the 1970s for these two countries but not others. Second, both are well-explained by our theoretical framework in the large-N analysis. Third, the United States and Finland are diverse cases, so comparing them maximizes the variance on explanatory variables (Seawright and Gerring 2008).

Both the United States and Finland seemed good choices for case analysis, which aims to examine the four hypothesized causal paths in more detail (Lieberman 2005). The United States is one of the world’s most unequal rich democracies. It is a liberal-market economy with weak labor power, mostly dispersed ownership, and a large population. Finland is one of the most equal

democracies, a coordinated-market economy with stronger labor power, more pervasive blockholding, and a small population. If our theoretical framework holds explanatory power in these two very different cases, we can be more confident in both its validity and generalizability.

Data and Operationalization

We use annual average pre-tax CEO pay as the key *dependent variable* for all analyses, following Lazonick and Hopkins (2016). CEO pay captures everything except pension compensation (because pension treatment is quite different across countries). It includes salary, bonus, stock options, stock awards, other forms of incentive compensation, and “other” miscellaneous expenses. We focus on large firms because their CEOs are the largest potential contributors to income inequality, given the tendency for CEOs at larger firms to receive higher pay.

For the large-N analysis, we collected CEO pay data from company reports (and public income tax records for Finland) for the OECD world’s largest publicly traded firms ranked by sales (Fortune 2016). Data on firms comes from Fortune magazine (2016), with market capitalization from Forbes (2016). Companies were assigned to a country based on their headquarter country, as this is typically where the CEO works (Meyer and Benito 2016).

We collected the top 58 publicly traded firms in the United States to best approximate Frydman and Saks’s (2010) historical United States time-series data. These firms were all among the world’s largest 198 firms in 2016. We also collected all other OECD firms among the top 198. On top of this, we collected OECD firms outside the top 198, in ascending order according to sales (Forbes), until we had at least five firms per OECD country. We omitted firms headquartered in some countries because of data availability: South Korea, Mexico, Turkey, Greece, and Israel. We also skipped countries with zero firms among the world’s largest 2,000 (Forbes). In all, we collected data for 179 firms across 20 OECD countries, comprising 18 *per cent* of world market capitalization in 2016 (Iskryan 2016). We excluded firms, ten in total, with CEO-founders (or CEO-owners) with a substantial equity holding (greater or equal to 10 *per cent*) as they have considerable influence in setting their own pay, often giving themselves small or zero wages as most of their earnings come from capital gains from large stock ownership. As they play a dual CEO-owner role, they fall outside the scope of our theoretical framework.

Countries do vary in their CEO pay reporting methods, a potential limitation of our study. Lazonick and Hopkins (2016) in the United States and Kotnik *et al.* (2018) in Europe show reported pay sometimes substantially understates how much CEOs actually take home, typically

because they underestimate the value of stock options and awards. Where possible, we follow Lazonick and Hopkins (2016) and capture the pay CEOs actually take home before taxes.

We conduct the small-N case studies as time-series analyses with longitudinal data on CEO pay at the largest publicly traded firms in the United States and Finland. While the data covers a small subset of all CEOs in the United States and Finland, they include a substantial share of the highest-paid CEOs and their firms comprise a substantial portion of total stock-market capitalization in each country - in 2016, approximately 40 *per cent* of total market capitalization in Finland and 30 *per cent* in the United States. Time-series inference is conditional on the observed sample (Beck 2001), but it is plausible that the insights gleaned from these influential firms may be generalizable to other publicly traded OECD firms.

For the United States, we use Frydman and Saks' (2010) dataset of CEOs in the 50 largest American firms, covering 1936 to 1991. Their panel is unbalanced, as it follows top 50 CEOs from various years, with most years capturing more than 50 CEOs because they continue to follow CEOs after their firm has dropped out of the top 50. We added CEO pay from 2014 to 2016 for the 58 largest firms in 2016 to their dataset.⁴ Our panel is also unbalanced, as we drop CEOs who worked only a partial year; Frydman and Saks (2010) also excluded CEOs with incomplete data. We drop two government-sponsored enterprises but include CEO-owners, like Frydman and Saks (2010). From 1992 to 2002, we used Frydman and Jenter's (2010) "estimated fair value" (EFV) measure of CEO pay for The Standard and Poor's 500 (S&P 500) firms to impute pay for the top 50 firms. Frydman and Saks (2010) explained S&P 500 pay is similar to top 50 pay, and 1991 and 1992 pay are comparable despite coming from different samples. Lazonick and Hopkins' (2016) work showed that in the United States, alternate measures of CEO pay are comparable until 2003; it doesn't matter which measure we use before 2002. After 2002, alternate measures of CEO pay in the United States diverge significantly. Accordingly, we use Lazonick and Hopkins (2016) data to adjust Frydman and Jenter's (2010) understated pay figures from 2003 to 2008, and to estimate pay for 2009 to 2013.

The Finland dataset tracks CEO pay from 1971 to 2008 at five firms. We chose the sample to represent different industries. It includes many of the largest companies in Finland, such as Nokia and Fortum. These data came from the work of an investigative journalist's documentary on inequality (Heino 2011, used with permission). We collected data on executive compensation from 2009 to 2017 to update this dataset to the present.⁵ Our Finland regression analyses run until 2017, the latest year in which all explanatory variables are available.

We use the following independent variables throughout the nested analysis.

Owner power is operationalized as ownership structure. Ownership structure is measured with a dummy variable, marking firms as blockholder firms if their largest shareholder owned at least 20 *per cent* of the voting rights in the firm and as dispersed-owner firms otherwise (Porta *et al.* 1999). We also distinguish firms where the blockholder with at least 20 *per cent* ownership is the State. State ownership allows governments to play a direct role in setting CEO pay. Ownership data are from company reports. We did not include ownership structure in the United States or Finland time-series analyses, though we discuss it qualitatively.

Labor power is measured through union density and collective bargaining coverage. Data are from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts database for the case studies (Visser 2019), supplemented with data from a report by Mayer (2004). For the international analysis, data are from company reports and websites (*e.g.*, WikiRate). The Global Reporting Initiative (GRI) of the United Nations (UN) requires companies to publish collective bargaining coverage rates. We collected rates as close to 2016 as possible. For companies that did not publish sufficient information on collective bargaining coverage, we took the most granular rate available from either of the following: Eurofound studies on the representativeness of European social partner organizations (Eurofound, n.d.), industry-level rates from national statistics agencies, rates from the Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts database (Visser 2019) or in a few cases, from media articles. We assign collective bargaining coverage rates based on a company's headquarter country, as this is typically where the CEO works, and global collective bargaining coverage data is less consistently available. In addition to union density and collective bargaining coverage, *labor power* is also measured by left-leaning political-party power (see below), State ownership, and top marginal tax rates - all theoretically related measures that tend to go hand in hand.

Manager power is operationalized relative to labor and owner power, with weaker labor and owner power strengthening manager power.

Political-party power potentially shapes CEO pay by impacting labor, manager, and owner power; *political-party power* is measured with government ideology scores. Kim and Fording's 2013 update (2002 - question to author: how could a 2013 update be given in 2002?) provides government ideology scores for the large-N international analysis. They classify political party statements on left-right ideology from 0 (most rightward) to 100 (most leftward). Scores for each party are then weighted by that party's share of parliament seats to construct a single score.

Previous work (Laver and Budge 1992) has found that political parties on the left and on the right in different countries tend to group together on various policy positions.

For the large-N analysis, we use an average government ideology score from 1978 to 2013, which captures a rightward political shift in many countries. Additionally, for the United States case study, we follow Kim and Fording's (2002) methodology, using the Manifesto Data Collection data (Volkens *et al.* 2017) to construct government ideology scores weighted by party control of the Senate (25 *per cent*, the presidency (50 *per cent*), and the House of Representatives (25 *per cent*). The weightings come from Ceaser and Saldin (2005). In the Finland case study, we follow Kim-Fording (2002) to update its government ideology score, weighted by party share of parliament seats, up to the present. Our scores are highly correlated (.92 in the United States, .93 in Finland) with the Kim-Fording scores.

For the international analysis and the case of Finland, we measure top *marginal tax* rates using data from Piketty *et al.* (2011) as well as the OECD tax database (OECD 2018). The United States case draws data from the Tax Policy Center (2019). In the large-N analysis, we use the annual average total top marginal tax rate in each country from 1980 to 2010 - a period highlighted for substantial top marginal tax rate cuts and rising top incomes in many countries. Top tax rates capture central and local government taxes on ordinary income. For robustness, we also test a measure in the international analysis that captures payroll and consumption taxes in addition to central and local government taxes (Piketty *et al.* 2011).

Following previous research, we measure *firm size* via market capitalization and revenue, expecting each to be associated with higher executive compensation.

Findings

Large-N International Analysis

Our nested analysis begins with a quantitative analysis of CEO pay at 179 of the largest firms in OECD countries in 2016. Table 1 shows descriptive statistics for our data.

The average country pays its top CEOs \$6.2 million - \$24.7 million in the United States, \$16.1 million in Ireland, and under \$11 million in each of the other countries.⁶ The average firm pays its CEO \$10.8 million, though 80 *per cent* of firms with above average pay are firms in the United States and

Table 1
Descriptive Statistics on CEO Compensation Dataset

Country	# of firms	Compensation	Compensation standard deviation	Market capitalization	Revenue	Collective bargaining coverage	Right-left government ideology	Top marginal tax rate	Top marginal tax rate B, including consumption and payroll taxes	Percentage of firms with non-State blockholder owner (>20% voting rights)	Percentage of firms with State blockholder owner (>20% voting rights)	% voting rights for largest shareholder
Australia	5	3,624	2,342	58,764	45,335	0.76	38	50	53	0.00	0.00	0.05
Austria	5	2,021	931	6,942	14,535	0.99	49	53	53	0.60	0.20	0.35
Belgium	5	3,202	1,210	51,017	21,708	0.98	54	68	68	0.60	0.00	0.26
Canada	4	10,501	7,460	53,585	33,343	0.09	49	50	50	0.25	0.00	0.12
Denmark	5	4,251	1,656	44,899	17,892	0.81	51	63	63	0.80	0.00	0.48
Finland	5	3,870	4,211	19,774	9,589	0.93	61	58	63	0.20	0.20	0.18
France	13	5,779	5,541	36,809	83,275	0.98	58	56	71	0.23	0.23	0.32
Germany	15	6,208	3,191	52,357	94,266	0.82	51	58	63	0.27	0.13	0.17
Ireland	5	16,059	8,454	29,634	21,795	0.26	56	54	61	0.00	0.00	0.09
Italy	4	3,570	374	43,196	80,429	1.00	47	53	61	0.00	0.50	0.19
Japan	17	1,373	1,349	42,015	82,284	0.62	62	64	64	0.06	0.18	0.17
Luxembourg	3	4,412	4,486	10,597	5,351	0.53	64	50	50	0.67	0.00	0.37
Netherlands	9	6,515	3,388	57,849	70,399	0.84	53	61	67	0.24	0.12	0.20
Norway	5	1,185	158	23,768	21,711	0.89	65	49	68	0.00	1.00	0.46
Portugal	5	1,280	676	7,686	11,325	0.93	50	48	69	0.80	0.00	0.35
Spain	5	5,923	2,390	40,637	53,386	0.98	59	69	55	0.00	0.00	0.09
Sweden	4	3,664	1,862	25,552	25,153	0.86	53	64	78	1.00	0.00	0.22
Switzerland	5	8,091	3,914	145,663	85,354	0.41	50	49	55	0.20	0.13	0.13
United Kingdom	8	7,246	1,867	76,652	87,100	0.46	45	47	58	0.00	0.00	0.08
United States	53	24,062	24,773	120,257	104,488	0.12	41	45	47	0.04	0.04	0.12
Average country	20	6,172	4,012	47,383	48,439	0.71	53	54	62	0.30	0.11	0.19
Average firm	179	10,839	9,389	67,505	71,342	0.57	50	53	54	0.20	0.11	0.19
Country-level correlation with compensation	20	1.00	0.33	0.37	0.39	-0.76	-0.37	-0.36	-0.39	-0.35	-0.30	-0.47
Firm-level correlation with compensation	179	1.00	0.36	0.39	0.36	-0.47	-0.43	-0.39	-0.47	-0.19	-0.19	-0.22

Table note: all figures and in-text analysis references henceforth are in 2016 USD unless noted. Compensation in thousands. Revenue and market capitalization in millions. Right-left government ideology average from 1890-2013; 100 is left, 0 is right. N=17 countries and 166 firms for top marginal tax rate B.

compensation for every non-American CEO falls below the ~ 25 million American average. This is consistent with the well-known stylized fact that American CEOs are paid more than their foreign counterparts at firms of similar sizes. It suggests that optimal contracting theory does not come close to fully explaining international differences in top CEO pay. Country-level institutional factors are also necessary to explain pay differences between countries.

CEO pay is negatively correlated with collective bargaining coverage at both the firm (-.47) and the country level (-.76); this is aligned with hypothesis H1. Country-level government ideology (-.37) is aligned with hypothesis H2, and (country-level) top marginal tax rate including consumption and payroll taxes (-.59) are aligned with hypothesis H3.

Firms with a State blockholder controlling at least 20 *per cent* of voting rights are associated with lower CEO pay (-.19 correlation). If the firm has a non-State blockholder, the correlation drops slightly to -.15. At the country level, the correlations between non-State blockholder ownership and CEO pay (-.35) (H4), and State blockholder ownership and CEO pay (-.30) are stronger. CEOs at larger firms typically receive higher pay: country-level and firm-level market capitalization and revenue are each positively correlated with CEO pay.

Next, we turn to multivariate regressions for various models of CEO pay. The results are displayed in Table 2.

Model 1, using country-level ordinary least squares (OLS), categorizes countries with dummy variables according to their variety of capitalism, based on rules that structure its economic markets (Hall and Soskice 2001). In this model, coordinated-market economies feature stronger labor power and more blockholders relative to stronger managers and more dispersed ownership in liberal-market economies. We follow Witt *et al.* (2018), who separate out Southern Europe and Japan from other coordinated-market economies, the latter of which has a reputation for having uniquely low CEO pay because of social norms (Klein 2010). Additionally, given the well-established finding that American CEOs are paid substantially more than their foreign counterparts (*e.g.*, Fernandes *et al.* 2012, Abowd and Bognanno 1995, Ruf and Schmider 2018), we separate the United States from other liberal-market economies. We also include market capitalization in this model.

The results from Model 1 conform with theoretical expectations, with CEOs in the United States paid most, other liberal-market economy CEOs paid the second most, and Japan's CEOs paid least. If Japan is made the base country instead of the United States⁷, CEO pay is higher in every other variety of capitalism grouping at a statistically significant level. If the non-American liberal-market economy grouping is set as the base country,

Table 2
Regression Results for Logarithm of CEO Compensation

Model number:	One Country-level OLS (US is base country)	Two Country-level OLS	Three Country-level OLS	Four Country-level OLS	Five Country-level OLS	Six Country-level OLS	Seven Firm-level OLS (US is base country)	Eight Mixed effects	Nine Mixed effects
Constant	5.36*** (1.67)	5.65*** (1.77)	8.88 (5.25)	6.53 (8.24)	5.80 (6.22)	-3.38 (10.21)	5.60*** (.95)	9.18* (4.95)	10.33*** (2.86)
Revenue		-0.03 (.25)	-0.17 (.24)	-0.22 (.34)	-0.03 (.27)	-1.1 (.33)		1.2 (.09)	0.8 (.09)
Market capitalization	.41** (.14)	0.30 (.26)	0.52* (.28)	0.68* (.32)	.30 (.31)	0.32 (.33)	.37*** (.09)	.28*** (.10)	.29*** (.10)
Blockholder ownership		-.42 (.44)	-.59 (.78)	-.44 (1.13)	-.42 (.62)	-.86 (.89)		.00 (.19)	.08 (.21)
State ownership		-1.12** (.41)	-1.49** (.53)	-1.29 (.83)	-1.12** (.43)	-1.35* (.62)		-1.17*** (.32)	-1.18** (.34)
Collective bargaining coverage		-.48** (.17)			-.48 (.23)	-.56* (.30)		-.11** (.05)	-.11** (.05)
Top marginal tax rate			-0.94 (1.45)		-.04 (1.69)			-1.25 (1.21)	
Top marginal tax rate B				-.65 (2.19)		1.85 (2.54)			-1.40** (.66)
Varieties of Capitalism:									
Japan	-2.46*** (.15)						-2.73*** (.08)		
Southern Europe	-1.33*** (.27)						-1.23*** (.14)		
Other coordinated-market economy	-1.32*** (.21)						-1.16*** (.15)		
Liberal-market economy excluding US	-.76* (.38)						-.72** (.33)		
Adjusted R-squared	0.58	0.56	0.42	0.39	0.53	0.50	0.55	0.55	0.55
Number of observations (of groups in parentheses)	20	20	20	17	20	17	179	179(20)	166(17)

Standard errors are reported in parentheses
 *, **, *** indicate significance at the 90%, 95%, 99% level, respectively.
 All variables are log-transformed except dummy variables.
 Dummy variables used for State ownership, blockholder ownership, and for Varieties of Capitalism models six and one.
 Heteroscedasticity robust standard errors reported for OLS models.
 Cluster robust standard errors reported for mixed-effects models and firm-level OLS model.

CEO pay there is substantially higher than in Southern Europe and other coordinated-market economy groupings, as shown in Model 1. The coefficients, however, on the Southern Europe and coordinated-market economy dummy variables miss statistical significance (the coefficients and statistical significance for Japan and the United States are consistent with Model 1 as shown). Aligned with theoretical expectations, a 1 *per cent* increase in market capitalization is associated with a .41 *per cent* increase in CEO pay ($p < .05$). Each result previously mentioned in this paragraph holds when tested at the firm level as well - see Model 7. A simple model of CEO pay that includes only market capitalization and categorizes each country according to its variety of capitalism, explains over 50 *per cent* of the variation in CEO pay at both the firm and country level. Institutional differences in the rules that structure a country's economy appear to be important factors in shaping its level of CEO pay at its largest firms.

Country-level OLS Models 2 through 6 capture the association between CEO pay and revenue, market capitalization, (non-State) blockholder ownership, State blockholder ownership, and either collective bargaining coverage⁸ (Model 2), top marginal tax rate (Models 3 and 4) or both (Models 5 and 6). Across models, a 1 *per cent* increase in collective bargaining coverage decreases CEO pay from $-.48$ *per cent* to $-.56$ *per cent* ($p < .10, H1$). With collective bargaining coverage dropped from the model, the effect size on both measures of top marginal tax rate (Models 3 and 4) is substantial and negative but misses statistical significance. Top marginal tax rate is not associated with CEO pay in Models 5 or 6. In each of the country-level OLS models, revenue fails to reach significance, while market capitalization has a consistently meaningful effect size, though only reaching statistical significance in Models 3 and 4 ($p < .10$). Non-State blockholder ownership also fails to reach statistical significance across models, though the coefficient is substantial and in the hypothesized negative direction (H4). Except for Model 4, there is a statistically significant negative association between State ownership and lower CEO pay ($p < .10$), with a consistently large negative effect size (including in Model 4).

The last two columns in Table 2 present multilevel mixed-effects linear regression models of CEO pay, with random intercepts at the country level. Mixed effects allow estimation of country-level variables together with firm-level variables. This approach is regarded as generally more efficient than OLS for multilevel data and is appropriate as long as unobserved determinants of CEO pay are uncorrelated with our explanatory variables (Wooldridge 2015). It is therefore important to include all potentially relevant variables in the model (Wooldridge 2015).

The mixed-effects models capture each of the variables measured in the country-level analysis, this time at the firm-level (although top marginal tax rates vary only at the country level). The sample size is substantially larger in comparison to the country-level OLS models, so generally the standard errors of the coefficients are smaller, and statistical significance is heightened. In the first mixed-effects model, a 1 *per cent* increase in market capitalization is associated with a .28 *per cent* increase in CEO pay ($p < .01$), a 1 *per cent* increase in collective bargaining coverage is associated with a .11 *per cent* decrease in CEO pay ($p < .05$), and firms with the State controlling at least 20 *per cent* of voting rights pay 222 *per cent* less than firms without 20 *per cent* State control ($p < .01$). Like in the country-level analyses, revenue - which is highly correlated with market capitalization - has no significant association with CEO pay, nor does blockholder ownership.

In the first mixed-effects model, top marginal tax rates are not significantly associated with CEO pay, though the effect size is meaningful at the practical level and negative, with a 1 *per cent* increase in tax rate associated with a 1.25 *per cent* decrease in CEO pay. In the second mixed-effects model, a 1 *per cent* increase in top marginal tax rate B is associated with a 1.4 *per cent* decrease in CEO pay ($p < .05$). The marginal tax rate coefficients in the mixed-effects models thus align with H3 and deviate from the coefficients in Models 5 and 6, their country-level OLS counterparts, where there is no statistically significant association nor practically meaningful effect size in the hypothesized direction. These inconsistencies could potentially be explained by collinearity between labor-power variables; it is harder to disentangle their effects in the smaller sample size country-level OLS models and easier, in the mixed-effects models, where collective bargaining coverage varies at the firm level. The other variables in the second mixed-effects model, meanwhile, have similar relationships with CEO pay to those found in the first mixed-effects model.

We do not capture government ideology directly in any of the above models, as the sample size is small and theorized mechanisms for government to affect CEO pay - collective bargaining coverage, State ownership, and top marginal tax rates - are largely captured already. Across models, our findings are generally robust when government ideology is added, while the government ideology variable itself has no statistically significant association with CEO pay⁹.

Taken as a whole, the large-N international analysis lends support to this article's framework of political factors mediated by institutions, along with market factors, as important determinants of CEO pay. Firm size is associated with higher CEO pay. Stronger labor power, captured by collective bargaining, top marginal tax rates, and State ownership is associated with lower CEO pay. Collective bargaining coverage has a

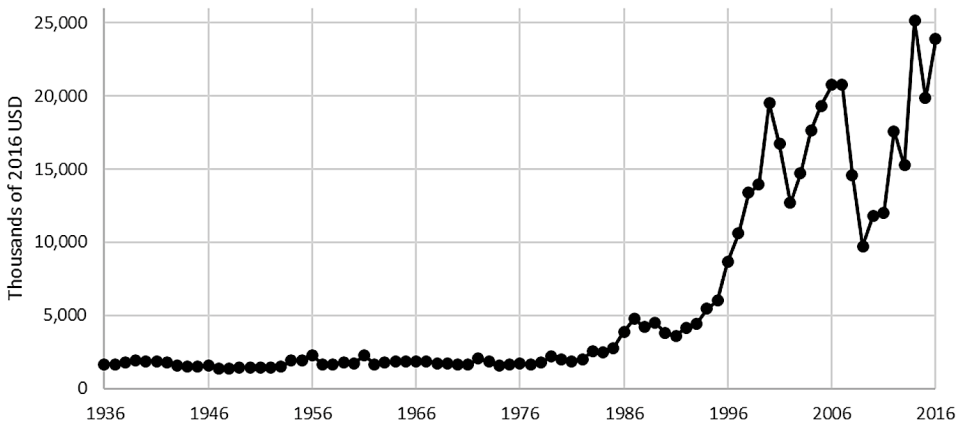
statistically significant negative association with CEO pay in every model in which it's included. State ownership is associated with lower CEO pay at a statistically significant level in six out of seven models tested, with a similar estimated effect size in the one model that misses statistical significance. In four out of six models, top marginal tax rate has a substantial negative association with CEO pay. This negative association only reaches statistical significance in the second mixed-effects model using the more comprehensive marginal tax rate though, supporting Piketty *et al.* (2011) (H3). There is no statistically significant association between non-State blockholder ownership and lower CEO pay throughout this analysis, failing to support H4.

The sample size in this analysis is only 20 countries and 179 firms. Additionally, while these results support our politics-centric theoretical framework, our left-leaning political variables are correlated with one another, so it is possible that some of the results are spurious. To further test the validity and generalizability of our theoretical framework and to take a closer look at causal paths, the next sections feature long-run quantitative case studies of CEO pay in the United States and Finland, diverse cases explained relatively well in this section by our country-level regression models (lying close to the regression line).

The Case of the United States

Figure 1 shows the average CEO pay from 1936 to 2016 at the top 50 American firms, ranked by sales. Pay for CEOs at the largest firms was stagnant from the mid-1930s through the mid-1970s. After that it rose sharply.

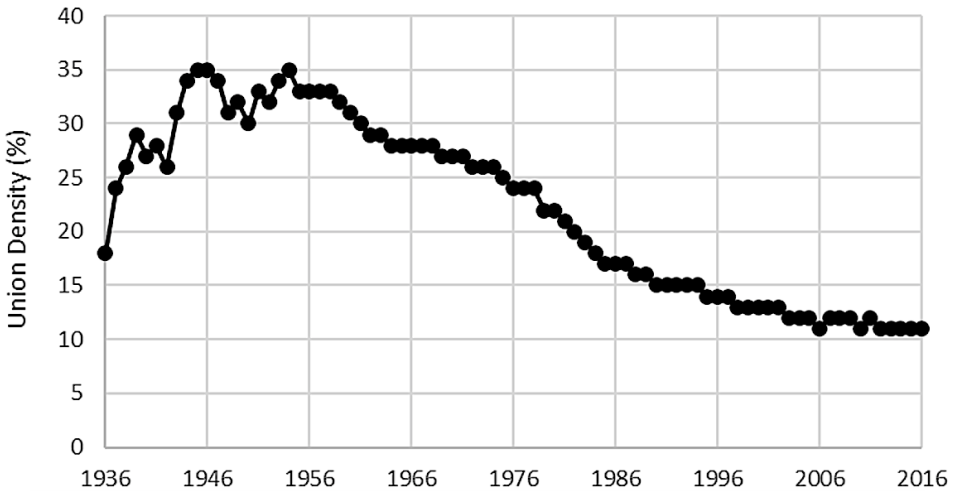
Figure 1
Top CEO Pay in the United States, 1936-2016



Our theoretical framework predicts that more dispersed ownership concentration boosts CEO pay by increasing CEO power (H4). Corporate ownership concentration levels in the United States have not significantly shifted since the early 1960s (Larner 1966), and the shift toward a dispersed ownership environment had already begun decades earlier (Means and Berle 1932). The historical trend toward increased dispersion has weakened one potential obstacle to CEO pay increases.

This framework also predicts that stronger unions and collective bargaining are associated with lower CEO pay (H1). We focus on union density in this part of the analysis. (Adjusted bargaining coverage and union density never stray more than 5 *per cent* from each other in years with both measures available.) Figure 2 shows union density since 1936 (Visser 2019, Mayer 2004). Union density peaked in 1954 at 35 *per cent* and then declined about 10 percentage points over the next two decades without leading to increased CEO pay. The speed of this decline accelerated in the late-1970s, the same time top CEO pay began to rise, after decades of stagnation.

Figure 2
Union Density in the United States, 1936-2016



The large-N analysis offered some evidence for a relationship between higher top marginal tax rates and lower CEO pay, which supports H3. In the United States before 1980, the top marginal tax rate remained at a 70 *per cent* minimum until the right-leaning political (Republican) party cut it to around 30 *per cent* in the 1980 s. This tax cut coincided with the rise of top CEO incomes. Movements in top marginal tax rates have not led to the hypothesized changes in CEO pay in every period. Tax rates declined by

20 percentage points in the early 1960 s, also a period of substantial union decline, without leading to a substantial change in CEO pay (Frydman and Jenter 2010). In the early 1990s, tax rates increased by 10 percentage points, and yet CEO pay rose steeply. Still, tax rates may have the hypothesized effect only after a long lag.

Hypothesis H2, explores the influence of left-leaning government power on CEO pay (by strengthening labor or owners or by weakening management). Democratic Party ideology in the past three decades is comparable to Republican Party ideology from 1956 to 1976. Republican Party ideology has since then shifted more to the right. On the basis of government ideology scores constructed from party manifesto data, there has been a strong rightward shift in the American political center of gravity in recent decades (Kim and Fording 2002).

We test the theoretical framework with a time-series regression. Table 3 shows nine models of annual average CEO pay. Models 1, 2, 5, 6, and 7 are OLS models that use Newey-West standard errors that are robust to autocorrelation and heteroscedasticity¹⁰. Models 3, 4, 8 and 9 use Prais-Winsten regression, a form of feasible generalized least squares that produces standard errors that are robust to first-order autocorrelation and heteroscedasticity¹¹. The Newey-West models are our preferred models, as they account for autocorrelation at different lags not just first-order autocorrelation, like Prais-Winsten does. Nonetheless, we present both alternatives for robustness.

We test two periods. The first four models run from 1936 to 2016 and include union density, government ideology, the top marginal tax rate at a ten-year lag, and the S&P 500 index (to capture market capitalization). Models 2, 4, and 5 add a measure of shareholder value-maximization norms. The fifth model, also covering 1936 to 2016, drops government ideology for parsimony and tests an alternate operationalization of top tax rate, using a dummy variable to distinguish a low tax rate period from 1987 to 2016, following Piketty *et al.* (2011). Historical sales data is available only at five-year intervals starting in 1955, so Models 6 through 9 also capture sales, covering 1955 to 2016.

Linear interpolation is used to fill in years with missing sales data. We include a measure of shareholder value-maximization norms because they have become important in the United States liberal market setting in recent decades (Roe 2006), potentially impacting CEO pay by strengthening managers in an alliance with dispersed owners and weakening labor. Our measure captures the frequency of books mentioning 'shareholder value' out of all 2-word Ngrams from 1936 to 2016 from Google Ngram Viewer (Michel *et al.* 2011). We assume 1965 is the origin year of the term, the first time it has been documented with its modern meaning (Heilbron *et al.* 2014).

Table 3
Regression Results for CEO Compensation

Model number:	1	2	3	4	5	6	7	8	9
	1936-2016	1936-2016	1936-2016	1936-2016	1936-2016	1955-2016	1955-2016	1955-2016	1955-2016
Constant	17.70*** (1.70)	16.62*** (.76)	14.64*** (1.23)	15.48*** (1.26)	15.23*** (.73)	21.29*** (4.19)	23.39*** (2.98)	20.54*** (4.84)	22.43*** (3.24)
Union density	-7.76*** (.26)	-5.44*** (.18)	-6.65*** (.23)	-7.74*** (.19)	-5.1*** (.17)	-1.29** (.45)	-1.43*** (.33)	-1.55*** (.50)	-1.52*** (.37)
Top marginal tax rate	-.44** (.17)	-.17* (.10)	-.03 (.09)	-.09 (.13)		-.64*** (.26)	-.44*** (.16)	-.40 (.25)	-.27 (.18)
Market Capitalization	.55*** (.14)	.28*** (.08)	.43*** (.12)	.40*** (.12)	.20** (.09)	.67*** (.11)	.40*** (.16)	.61*** (.11)	.47*** (.15)
Shareholder value orientation		0.44*** (.09)		0.34*** (.12)	0.46*** (.09)		.29*** (.10)		.27*** (.11)
Government ideology	-.52** (.21)	-.26 (.19)	-.03 (.15)	-.09 (.17)		-.24 (.23)	-.05 (.18)	-.10 (.22)	-.05 (.18)
Revenue						-.29 (.22)	-.44*** (.15)	-.25 (.30)	-.43** (.20)
Low tax period flag (1987-2016)					.34** (.15)				
Adjusted R-squared	0.92	0.96			0.96	0.96	0.97		
Number of observations	81	81	81	81	81	62	62	62	62

Standard errors are reported in parentheses

* **, *** indicate significance at the 90%, 95%, 99% level, respectively.

Top marginal tax rate with a 10-year lag.

Shareholder value orientation not logged because of zero values, standardized for ease of interpretation.

All other nonflag variables log transformed.

Lag lengths for Newey-West standard errors: ten in Model 1; two in Models 2 and 6; nine in Model 5; five in Model 7.

Like in the large-N international analysis, H1 is supported across all nine models, with a 1 *per cent* increase in union density associated with a .51 *per cent* to 1.55 *per cent* decrease in CEO pay ($p < .01$). In Models 1, 2, 6, and 7, a 1 *per cent* increase in 10-year lagged top tax rate is associated with a .17 *per cent* to .64 *per cent* decrease in CEO pay ($p < .10$) (H3). In Models 8 and 9, the coefficient on top tax rate is similar but fails to reach statistical significance. Generally, the Prais-Winsten models (Models 3, 4, 8, and 9) find a smaller, weaker association between top tax rate and CEO pay, a result of the data transformation they perform to correct for first-order autocorrelation. The Newey-West OLS models are our preferred models, as their standard errors are robust to autocorrelation at longer lags, and autocorrelation is consistently present at longer lags in our models.

Returning back to top tax rate, we tried this variable at different lags¹² and found the direction of their effect on CEO pay generally switched at shorter lags (three years or fewer), with the association varying in strength depending on the model. At longer lags, the negative effect on CEO pay generally grew larger and more statistically significant (this effect tended to peak around a 15-year lag, depending on the model), without meaningfully impacting the statistical significance or negative effect size of union density. In the fifth model, the low tax rate period flag variable is associated with higher CEO pay ($p < .05$), with a 40 *per cent* increase in CEO pay in the low tax period of 1987 to 2016 relative to the pre-1987 high tax period. Aligned with previous literature, the S&P 500 index, proxying firm size, is strongly associated with CEO pay across all nine models: a 1 *per cent* increase in the S&P 500 increases CEO pay by .20 *per cent* to .67 *per cent* ($p < .05$). Also aligned with expectations, a one standard deviation shift in shareholder value orientation is associated with a 31 *per cent* to 58 *per cent* increase in CEO pay depending on the model ($p < .05$).

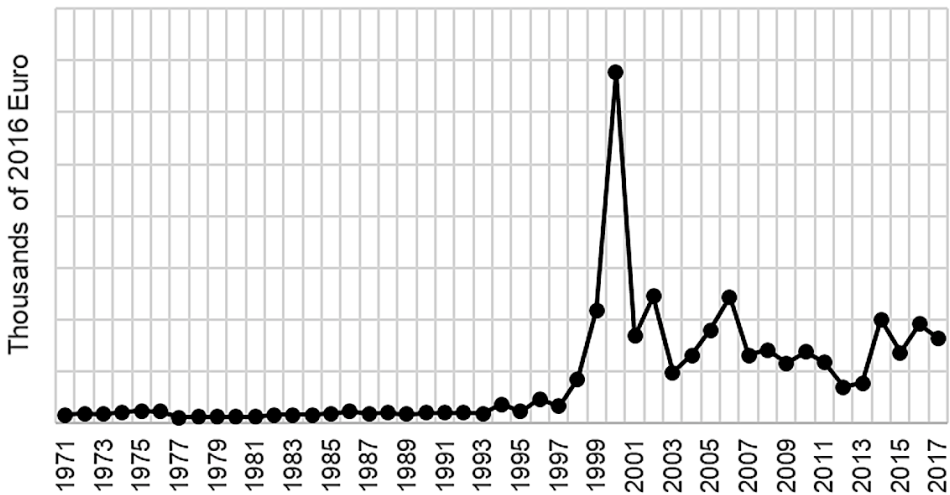
Contrary to expectations, sales have a negative association with CEO pay, where it is included, reaching statistical significance in Models 7 and 9 ($p < .05$) - potentially a result of collinearity with other variables. Government ideology has a statistically significant negative association with CEO pay in the first model ($p < .05$) (H2), with a 1 *per cent* ideological shift leftward associated with a .52 *per cent* decrease in CEO pay. The association between government ideology and CEO pay may have inconsistent strength across models because most of the effect of government ideology may be captured by union density and top marginal tax rates. It is also possible that governments have less scope to affect CEO pay in a liberal-market setting, where government intervention in the economy is less common. Another potential explanation is that this measure captures too much theoretically irrelevant information.

The Case of Finland

Figure 3 shows the evolution of average CEO pay at five of the largest firms in Finland since 1971. As in the United States, CEO pay in Finland remained stable for decades. In the mid-1990s, it began its rise to new heights.

Although Finland remains one of the more equalising advanced economies according to the Gini Index, it has become significantly more unequal since the mid-1980s (Søgaard *et al.* 2018), while the CEO-to-median-disposable-income (Tilastokeskus) ratio has taken off since 1990. In the 1990s, 85 *per cent* of firms in Finland had at least one controlling owner with 10 *per cent* equity or more (Porta *et al.* 1999). Corporate governance research suggests ownership dispersion has increased slightly since the 1970s (Jakobsson and Korkeamäki 2014, 2015). Corporate governance also changed qualitatively: it went from a bank-led to an equity-financed system after the banking crisis of the early 1990s (Jakobsson and Korkeamäki 2014). State intervention in the economy was reduced in the late 1980s, when it stopped rationing credit and setting interest rates to ensure sufficient banking profits (Tainio *et al.* 1997). Although ownership concentration has remained relatively stable in general, Jakobsson and Korkeamäki (2014) argue the reduced role of large shareholders in corporate governance created a “power vacuum” for CEOs to fill (Jakobsson and Korkeamäki 2014). Mäkinen (2008) also provides quantitative evidence of large shareholders associated with lower CEO pay in Finland (H4).

Figure 3
Top CEO Pay in Finland, 1971-2017



On the observation of the State as a blockholder, one of the sample firms has been majority State-owned throughout its history, allowing the government to influence pay directly. More generally, the Finnish State owned about 10 *per cent* of the stock market capitalization on the Nasdaq Helsinki in 2013, about the same percentage it owned in 1993 (Jakobsson and Korkeamäki 2014) - around the time CEO pay nonetheless began to increase.

Figure 4 shows union density and collective bargaining coverage from 1971 to 2017. Starting in 1971, union density increased steadily and peaked at 81 *per cent* from 1993 to 1997. After 1997, it steadily decreased to 62 *per cent* in 2017 (Visser 2019). CEO pay more than doubled between 1993 and 1996 and more than quadrupled from 1996 to 1999. Though it took place two decades later in Finland, this is a similar sequence of events to those observed in the case of the United States: decades of stagnation in CEO pay were followed by a sudden, rapid increase.

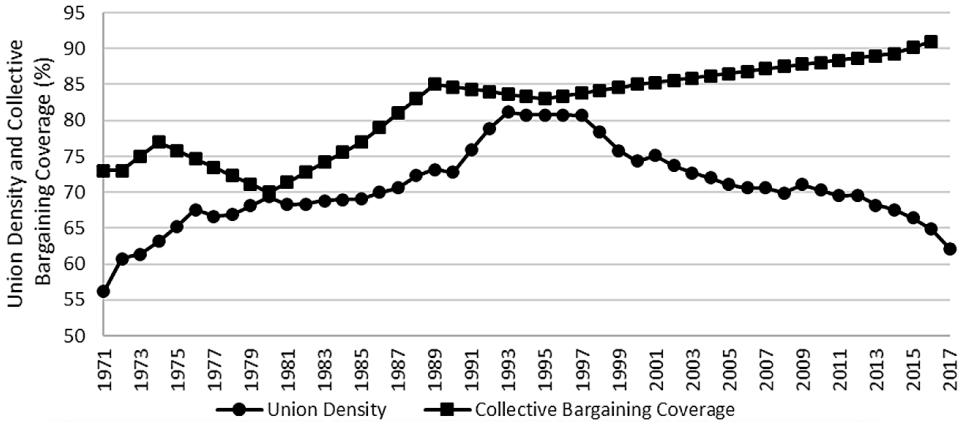
The internationalization of the workforce has also fragmented and likely weakened labor power. In the mid-to-late 1990s, the average sample firm employed 50 *per cent* of its workforce in Finland; in 2018 this figure had dropped to 21 *per cent* (figures collected from company annual reports).

While other measures of labor power (government ideology, top marginal tax rate, and union density) have decreased since 1990, collective bargaining coverage has steadily decreased over the period analyzed, reaching 91 *per cent* in 2016 (Visser 2019). Unlike in the case of the United States, it diverges from union density significantly. We try both operationalizations in the upcoming regressions, though unions may be a better indicator of labor power in the case of Finland. They play a powerful role in tripartite negotiations over wage agreements. As of 2006, no major labor market reform had been passed without their consent (Böckerman and Uusitalo 2006).

Over time, Finland's top marginal tax rate, including mandatory subnational tax rate, has decreased from 68 *per cent* in 1974 to 51 *per cent* in 2017. CEO pay and top marginal tax rate each remained relatively stable from 1974 to 1988. Since 1989, top tax rates have continued to decrease, while CEO pay has risen.

Although more left-leaning governments have remained typical in Finland, the political center of gravity has shifted rightward since 1990. From 1958 to 1987, its ideology score averaged 69; since the 1991 government, it averaged 57 (Kim and Fording 2002). Also, the secular right-leaning National Coalition Party is Finland's most market-oriented party (Döring and Manow 2019). From 1966 to 1986, it was excluded from the governing coalition entirely; since 1987, it has been a part of the coalition every year in the analysis period outside 2003 to 2006. Secular right-leaning political parties have been tied in other research to increased

Figure 4
Union Density and Collective Bargaining Coverage in Finland,
1971-2017



top incomes by weakening labor and strengthening managers (Huber *et al.* 2019). This rightward shift has likely played a role in increased CEO pay levels (H2).

A few further events likely played a role in the increase of CEO pay. Finland joined the European Union in 1995, and the Union of Soviet Socialist Republics (USSR) collapsed in 1991. Concurrently, neoliberal ideas were growing more influential in the Nordic countries (Egholt Sogaard *et al.* 2018, Nygård 2006). The end of the Communist era nearby in Russia opened up opportunities for European Union membership but also for an embrace of right-leaning and market-oriented ideas, which may have brought new upward international pressures on pay. Indeed, Heino (2011) highlights international pressures from increased foreign ownership, along with ideological changes, to explain the adoption of incentive compensation and subsequent boom in CEO pay in Finland.

Table 4 shows time-series results. The models span 1975 to 2016 and operationalize firm size as either sales or market capitalization or both. Sales data is collected from Finland's largest companies' yearbooks (Yritystieto Oy 1976, 1978, 1982, 1992). Market capitalization is operationalized with a general stock index, available from annual statistical yearbooks and from public information sources after 2000. Sales data is available dating back to only 1975 with several data gaps. We establish missing sales data with linear interpolation, by estimating equal fixed growth between years. Modern data is collected from public databases. As in the analysis of the United States, the models include union density and top marginal tax rate. Given the divergence between union density and collective bargaining coverage in Finland, we also test models with collective bargaining coverage instead of

Table 4
Regression Results for CEO Compensation .

Model number:	1	2	3	4	5	6	7	8	9	10
	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016	1975-2016
Constant	35.99*** (11.75)	37.78*** (10.02)	13.32 (9.02)	15.05* (8.10)	26.42* (14.80)	31.97** (13.39)	33.88** (13.41)	47.37*** (15.97)	47.19*** (15.54)	48.53*** (20.58)
Union density	-6.45*** (1.29)	-6.25*** (1.54)			-3.48 (2.24)	-4.59* (2.39)	-5.41*** (1.55)			
Government ideology	-1.69*** (.62)	-1.37*** (.57)	-1.10* (.56)	-94* (.54)	-1.49** (.68)	-1.32*** (.59)		-80*** (.29)	-87*** (.37)	
Market capitalization	.44** (.20)	.56** (.21)	0.39 (.23)	.50** (.24)	.41* (.22)	.52** (.23)	.51* (.28)	.78*** (.27)	.79*** (.26)	.95*** (.31)
Revenue	0.41 (.39)	.19 (.38)	-0.01 (.40)	-0.14 (.39)	.18 (.34)	.10 (.35)	-0.06 (.63)	-0.08 (.28)	-0.09 (.29)	-0.14 (.63)
Top marginal tax rate			-4.78*** (.91)	-4.11*** (1.13)	-2.67 (1.64)	-1.62 (1.91)		-5.11*** (.64)	-5.04*** (.72)	
Low tax period flag (1991-2016)							.79* (.46)			.54 (.59)
Collective bargaining coverage								-8.25*** (2.69)	-8.21*** (2.63)	-8.84** (3.60)
Adjusted R-squared	0.86		0.86		0.87		0.84			0.81
Number of observations	42	42	42	42	42	42	42	42	42	42

Standard errors are reported in parentheses

*, **, *** indicate significance at the 90%, 95%, 99% level, respectively.

Top marginal tax rate with a 10-year lag.

All non-flag variables log transformed.

Lag lengths for Newey-West standard errors: two in Models 1, 3, and 5, three in Models 7 and 8; four in Model 10.

union density. Models 1, 3, 5, 7, 8, and 10 use OLS with Newey-West standard errors that are robust to autocorrelation and heteroscedasticity. Models 2, 4, 6, and 9 use the Prais-Winsten regression to produce standard errors that are robust to first-order autocorrelation and heteroscedasticity. Except for Models 7 and 10, all models capture top marginal tax rate with a ten-year lag. Models 7 and 10 capture the top marginal tax rate with a

flag variable that distinguishes a high tax rate period (pre-1991) from a low tax rate period (1991 to 2016), similar to the analysis of the United States. These models also drop government ideology for parsimony.

Union density and collective bargaining coverage each have a sizable negative association with CEO pay in each model (H1). The effect of a 1 *per cent* increase in union density decreases CEO pay by a range of 3.48 *per cent* to 6.45 *per cent* across models, reaching statistical significance in four of five models ($p < .10$). Model 5 tests tax rate together with union density. Although the coefficient on union density fails to reach statistical significance in this model, it is consistent in magnitude and direction with the coefficients on union density in the other models. In the models with collective bargaining coverage instead of union density, a 1 *per cent* increase in collective bargaining coverage is associated with a decrease in CEO pay ranging from 8.21 *per cent* to 8.84 *per cent* ($p < .01$).

Tax rates with a 10-year lag have a strong negative association with CEO pay in Models 3 and 4, with a 1 *per cent* increase decreasing CEO pay by 4.11 *per cent* to 4.78 *per cent* ($p < .01$). Models 3 and 4 do not capture union density or collective bargaining coverage. When union density is tested together with tax rate in Models 5 and 6, only union density reaches statistical significance ($p < .10$), in Model 6. Nonetheless, the coefficient sizes on tax rate (and union density) are large and in the hypothesized direction in Models 5 and 6 - broadly consistent with the findings of the other models. In the collective bargaining coverage models, a 1 *per cent* increase in top marginal tax rate is associated with a 5.04 *per cent* to 5.11 *per cent* decrease in CEO pay ($p < .01$) (H3).

In Model 7, the low tax period flag variable is in the hypothesized direction with a substantial effect size ($p < .10$). Changing from the high tax (pre-1991) period to the low tax (1991 to 2016) period is associated with a 120 *per cent* increase in CEO pay. The low tax period flag effect is substantial and in the same direction in Model 10, but it is smaller and not statistically significant. Left-leaning government ideology is associated with decreased CEO pay ($p < .10$) in all eight models where it is included (H2). A one *per cent* leftward increase in government ideology reduces CEO pay by .87 *per cent* to 1.69 *per cent*.

Turning to market variables, across models, a 1 *per cent* increase in market capitalization is associated with a .39 *per cent* to .95 *per cent* increase in CEO pay, reaching statistical significance ($p < .10$) in nine of ten models, with a consistent effect size in the model that fails to reach statistical significance. Sales are not associated with CEO pay at a statistically significant level across models.

Conclusions

This article analyzed a politics-centered explanation of variation in executive compensation at the OECD world's largest firms in 2016 and in a long-run time-series analysis of a subset of the largest firms in Finland and the United States. Across both time and space, market factors are important, but they leave a large portion of variation in top executive compensation unexplained. Also important are political factors, such as labor, owner, and CEO power. Our findings are summarized in Table 5.

The international analysis of CEO pay at 179 of the OECD world's largest firms finds collective bargaining coverage and State ownership each associated with lower CEO pay, as well some support for an association between higher top marginal tax rate and lower CEO pay. These findings each support the hypothesis that stronger labor power relative to CEO power results in lower CEO pay. We also find larger firm size is associated with higher CEO pay. No association is found between non-State blockholder ownership and CEO pay.

Time-series analyses of the cases of the United States and Finland also support the labor-power hypotheses. We find a strong negative association between union density and CEO pay in the United States and Finland as well as a strong negative association between collective bargaining coverage and CEO pay in Finland. The time-series analyses offer support for a substantial negative association between top marginal tax rate and CEO pay as well. Market factors are found to exert upward influence on CEO pay in the United States and Finland. Despite many differences between the countries, there are similarities. In both countries, CEO pay remained stable for decades. It then experienced unprecedented growth, starting in the 1980s in the United States and in the 1990s in Finland. At the same time, labor power was declining considerably in both countries.

The negative association between left-leaning government ideology and CEO pay was found to be more robust in Finland than in the United States (H2). Relative to the United States' liberal-market economy, Finland's coordinated-market economy may allow for more of a role for government intervention in shaping CEO pay - especially through State ownership and also through government involvement in tripartite

negotiations. In the United States, there is a negative association between left-leaning government ideology and CEO pay in the first series models (1936 to 2016) but not in any of the 1955 to 2016 models - perhaps due to the fact that government intervention in the economy has diminished over time, especially relative to the World War II period.

The case studies of the United States and Finland mostly support the top marginal tax rate hypothesis, while the international analysis findings are more mixed (H3). The international analysis indeed finds a substantial negative association with CEO pay in a majority of models - notable especially because sample sizes are small and collinearity is high - but the coefficient is only statistically significant in one of the models. The case study of the United States finds more evidence of a positive short run association between top tax rate and CEO pay than a negative one, aligned with Ruf and Schmider (2018). In contrast, with a ten-year lag, the case of the United States finds a negative association between top marginal tax rate and CEO pay, as does the case of Finland. Similarly, if we test a low frequency model of tax rate, splitting the time-series into a low tax and high tax period, as did Piketty *et al.* (2011), both country cases offer evidence of top marginal tax rates' downward influence on CEO pay (H3), aligned with the findings of Piketty *et al.* (2011).

Table 5
Summary of Hypotheses Tested and Findings.

Hypothesis	International findings	US findings	Finland findings
H1: union and collective bargaining strength CEO pay ↓	Supported	Supported	Supported
H2: left political party power ↑ CEO pay ↓	Not supported	Partial support	Supported
H3: top marginal tax rate ↑ CEO pay ↓	Partial support	Supported	Supported
H4: owner power ↑ CEO pay ↓	Only supported for state owners	Not tested	Not tested

While much past research has found pronounced international differences in executive compensation (*e.g.*, Fernandes *et al.* 2012, Abowd and Bognanno 1995, Ruf and Schmider 2018, Piketty *et al.* 2011), past studies have tended to focus on market variables while excluding political and institutional variables other than tax rates (Piketty *et al.* 2011) and ownership structure (Fernandes *et al.* 2012). Our analysis adds some support to the findings of Piketty *et al.* (2011) on the negative influence of top marginal tax rates on CEO pay, as well as some support for the power of blockholder owners to check CEO pay - provided the blockholder is the State. Fernandes *et al.* (2012) find that non-institutional blockholders (including State and non-State blockholders) are associated with lower CEO pay; our findings suggest this effect may mostly be driven by State rather than non-State blockholders (and perhaps also by the CEO-owners included in their sample, themselves blockholders who tend to receive lower CEO pay). Relative to previous research, our explanation of executive

compensation maintains a broader political perspective, painting a more complete picture. On top of tax rate and ownership structure, we capture the impact of additional measures of power - like union density, collective bargaining coverage, and government ideology. Our findings demonstrate that these political factors are important pieces of the CEO pay puzzle.

Future research could aim to elaborate on the theoretical framework tested in this analysis with case studies of additional countries and also qualitative process tracing to pinpoint more clearly exactly how labor, owner, and CEO power shape CEO pay (for example, by closely observing pay negotiations). Though the link between stronger labor power and lower CEO pay is robust throughout our analysis, we cannot identify precisely how this relationship works - for instance, how much of union impact on CEO pay is because of unions claiming a higher share of the revenue pie for themselves or threatening to demand higher wages in collective bargaining negotiations, and how much of union impact on CEO pay is through their promoting or proxying egalitarianism and solidarity (and related policies) in society. Further, given collinearity between our power variables, in-depth qualitative process tracing - linking cause and effect in detail - could be a particularly effective strategy for strengthening validity.

The theoretical framework advanced in this article helps explain why top CEO pay and top-end income inequality are extreme in certain countries and periods, and modest in others. Huber *et al.* (2019) concluded that, around the world, income concentration among the top 1 *per cent* of a nation's richest citizens is predominantly a political phenomenon. Our findings reinforce theirs. We conclude that executive compensation at large firms, a key source of top-end income inequality, is to a significant extent driven by political factors.

Appendix

The case study of the United States excludes 'other' forms of compensation from 2014 to 2016.

CEO pay in Finland includes earnings from capital collected from public tax records. Earnings from capital comprise less than 10 *per cent* of annual average CEO pay across the five-firm sample.

Notes

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² CEO, manager, and executive are used interchangeably in the literature and throughout this article.

³ The nested analysis approach is exemplified by Lieberman's (2003) case study of income tax rates.

⁴ The case study of the United States excludes 'other' forms of compensation from 2014 to 2016.

⁵ CEO pay in Finland includes earnings from capital collected from public tax records. Earnings from capital comprise less than 10 *per cent* of annual average CEO pay across the five-firm sample.

⁶ An alternate, understated estimated fair value measure of US CEO pay is also above the other countries at \$16.6 million.

⁷ Only the United States base model is shown here.

⁸ Table 2 : 0% collective bargaining coverage transformed to 1% before log transformation in Models 8 and 9. Firms with 0% average \$32 million CEO pay, well above sample average.

⁹ The analyses are not shown here but could be provided.

¹⁰ This approach is exemplified by Piketty *et al.* (2011).

¹¹ This approach is exemplified by Kiser and Linton (2001).

¹² These models are not shown here but could be provided.

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