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Property Rights and Firm Scope

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The voluminous strategy research on the determinants of corporate scope is often premised on a well-established property rights regime, which contrasts with the weak property rights protection that still characterizes most countries today. We address this gap by applying property rights theory to theorize and empirically examine how the strengthening of the property rights regime affects corporate scope. Our analysis exploits the enactment of a property law that enhanced the formal protection of private properties in China as a quasi-experiment. We show that with a strengthened property rights regime, the horizontal relatedness among private firms' businesses increases, but their vertical relatedness decreases, compared with state-owned firms. Further, these effects are less prominent for politically connected firms that are afforded informal protection of property rights. Our findings shed new light on the property rights regime as a critical determinant of firms' horizontal and vertical scope.

Keywords: *property rights theory; corporate scope; horizontal scope; vertical scope; political connections*

What determines the scope of the firm is a fundamental question in strategic management (Rumelt, Schendel, & Teece, 1994). To date, scholars have examined a plethora of strategic and organizational antecedents to firm scope (Chandler, 1990; Montgomery, 1994; Penrose, 1959; Williamson, 1991). For instance, Penrose (1959) proposes that unused or underused services of resources provide an engine of growth in firm scope, and Williamson (1975) and Teece (1980) argue that the transaction costs of exchanging resources shape firms' vertical and horizontal scope (Silverman, 1999). As another example, the agency theory view

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states that managers' hubris and intention to reduce their employment risk may lead to higher levels of firm diversification (Amihud & Lev, 1981; Montgomery, 1994).

Although this body of research has significantly advanced our knowledge about the determinants of firm scope, most extant studies assume a well-developed and stable property rights regime functioning in the background, since these studies are often conducted in advanced economies, as illustrated by Chandler's (1990) seminal work of industrial enterprises in the United States, Great Britain, and Germany. Nevertheless, the development of the property rights regime varies substantially across countries, and there can also be significant changes in the regime over the history of a country such that improvements in property rights are not to be taken for granted (North, 1990). The property rights regime affects firms' value appropriation from resources (Barzel, 1997; Foss & Foss, 2005), thus altering firms' ex ante investment incentive (Besley, 1995), shaping their decisions about the scope of investment, and affecting organizational performance (Chari, Liu, Wang, & Wang, 2020). It is, therefore, critical to bring the property rights regime from the background to the front seat in studying firm strategies and decisions about firm scope (Mahoney, 2004).

In this study, we aim to address the research gap by asking the following questions: How do changes in the property rights regime affect firm scope, and how do such effects vary across different firms? To answer these questions, we use property rights theory (PRT) to explain how the protection of property rights can change firms' direction of investment and their scope of businesses. Being fundamental to any society, property rights have been highlighted in the PRT literature as a crucial determinant of firms' incentive to invest (Alchian & Demsetz, 1972; Besley, 1995; Grossman & Hart, 1986). Such impact on investment incentives is expected to shape firm scope, yet PRT has received scant attention in extant corporate strategy research (cf. Kim & Mahoney, 2002; Silverman & Ingram, 2017) compared with other theories of organizational economics (Argyres, 2011; Gibbons, 2005).

Building on PRT, we argue that the property rights regime is a critical determinant of firms' horizontal and vertical scope and that changes in the regime will influence firm scope. First, strengthened protection of property rights will rectify the distortion in firms' horizontal scope decision due to a weak regime. Current literature on firm scope mostly situates in a strong property rights regime, in which firms diversify to exploit unused productive resources while avoiding high external transaction costs of trading such resources (Penrose, 1959; Teece, 1982). Yet, we argue that in a weak property rights regime, firms would invest in unrelated businesses to lower the risk of expropriation. When the regime is strengthened, however, the value of such unrelated investment diminishes, and firms will revert to a market-based principle of conducting related diversification, thus increasing the horizontal relatedness in their business portfolio. Second, we argue that strengthened property rights protection will reduce the vertical relatedness of firms' businesses. This is because the delineation of property rights lowers the contracting costs in vertical relationships, thus decreasing the value of holding residual control rights through owning the assets in vertically related businesses. Third, we hypothesize that the proposed effects will be less salient for politically connected firms, because political connections provide an informal form of protecting property rights and can substitute for the role of a formal property rights regime in shaping firm scope (Fisman, 2001). Specifically, we expect the main effects of strengthened formal protection on horizontal and vertical relatedness to be weakened for politically connected firms, compared with nonconnected firms.

In our empirical analysis, we leverage the enactment of China's property law in 2007, a landmark in China's protection of private property, as a natural experiment to test our hypotheses. Private firms were the primary beneficiary of the law as they had long been disadvantaged by the preferential treatment state-owned enterprises (SOEs) had received from the government (Berkowitz, Lin, & Ma, 2015). This feature allows us to use private firms as the treatment group and SOEs as the control. Moreover, since the enactment of the law is beyond the control of individual (private) firms, it serves as a plausible quasi-experiment. We employ a difference-in-differences (DID) research design by comparing the scope of private firms and SOEs before and after the property law change.

Our study makes several research contributions. First, we bridge the literature on PRT and corporate strategy, shedding new light on the property rights regime as a critical, yet often neglected, antecedent of firm scope. While resource-, transaction cost–, and agency-based perspectives of firm scope mostly assume firms' secured ownership of resources (Amihud & Lev, 1999; Montgomery & Hariharan, 1991; Teece, 1980), we relax this assumption and investigate the impact of the property rights regime on firm scope. Meanwhile, while there is growing research linking institutions to firm strategy (e.g., Aguilera & Grøgaard, 2019; Hoskisson, Eden, Lau, & Wright, 2000; Khanna & Palepu, 1997; Peng, 2003), the largest point of departure of the property rights regime—and thus PRT—is the sharp focus on the role of asset ownership (Alchian & Demsetz, 1973; Grossman & Hart, 1986; Hart & Moore, 1990). Drawing from PRT, we argue that by changing the marginal return on investment, strengthened protection of privately owned assets will alter private firms' incentives to invest in both horizontally and vertically related businesses, thus shaping the directions in which they grow.

Second, this article contributes to the extant literature on PRT, one of the organizational-economics foundations of strategy (Argyres, 2011; Foss & Foss, 2022; Mahoney, 2004). As scholars have noted (Lafontaine & Slade, 2007; Whinston, 2003), a key reason why PRT is rarely empirically studied is the lack of appropriate contexts that introduce exogeneous variations to the property rights regime. By exploiting a property rights regime change in a major economy that emphasizes the protection of private property, we show empirical evidence supporting PRT's explanations for changes in firm scope. Combining "classical" PRT (Alchian & Demsetz, 1973) and "modern" PRT (Grossman & Hart, 1986; Hart & Moore, 1990), we seek to offer an integrated explanation of, and evidence on, how strengthened property rights protection will lead to changes in firms' horizontal and vertical scope. In doing so, our study adds to the empirical literature research on PRT as a theory of firm scope (see Whinston, 2001).

Third, we highlight an important boundary condition of PRT: Political connections can function as an informal mechanism shaping firm scope, especially when formal protection of property rights is not clearly defined by the institution or in the contract (Li, Meng, Wang, & Zhou, 2008). While recent PRT studies focus chiefly on the role of formal protection and delineation of property rights, informal protection, such as political connections, plays a crucial role in shaping firms' decisions as well (Foss & Foss, 2022). We join the prevailing discussion about how political connections affect corporate strategy decisions (Jia, Zhao, Zheng, & Lu, 2021) by emphasizing the substitutive relationship between political connections and formal property rights protection in determining corporate scope.

Theory and Hypotheses

Property Rights Theory and Corporate Scope

The property rights regime is fundamental to the functioning of modern society. "Classical" PRT started with reflections on the nature of asset or property ownership (Alchian, 1965; Alchian & Demsetz, 1973). With observations of the exclusivity, divisibility, and tradability of property rights, early studies have conceptualized property rights as a set of laws and rules that grant the owner exclusive rights to access, dispose, and trade the property and have emphasized the claimancy of the residual rights to income as a defining characteristic of ownership (Libecap, 1989). Secured ownership creates the incentive to acquire new resources, as the owner will be compensated by a secured right to claim the residual income from the value created by the productive use of resources (Libecap, 1989). In studying the use of resources, the strategy literature has long established that the ownership of resources provides a source of competitive advantage (Barney, 1986; Dierickx & Cool, 1989). Recent research has applied classical PRT to examine firm performance heterogeneity and attributed such heterogeneity to the uneven distribution of property rights over strategic resources across firms (Argyres, Felin, Foss, & Zenger, 2012; Bel, 2018; Gibbons, 2005; Kim & Mahoney, 2005, 2010).

While classical PRT focuses on the residual income right, "modern" PRT emphasizes residual control rights (Grossman & Hart, 1986), which should optimally be assigned to the party whose noncontractible investment contributes the most in the value creation process (Hart & Moore, 1990). Modern PRT applies to a wide range of contexts because, in a broad sense, residual control rights exist in every contractual relationship and all contracts are incomplete, yet value creation involves the collaboration of multiple parties (Hart, 1988). In particular, modern PRT has offered a precise characterization of firm incentives and become an important explanation of firm decisions on vertical relationships. Taking incomplete contracts as a central tenet and focusing on residual control rights as the core concept (Grossman & Hart, 1986; Hart & Moore, 1990), modern PRT has mathematically derived the optimal structure for asset ownership. The key insight is that misaligned asset ownership that gives parties an insufficient share of ex post value capture can lead to underinvestment ex ante, which harms the total value creation. Hence, in a vertical relationship, the party that will contribute the most to the co-creation of asset value should own the asset to maximize value creation (Grossman & Hart, 1987). On a theoretical level, this idea has been analyzed carefully and applied widely to study the occurrence and directionality of vertical integration (Whinston, 2001, 2003).

Firm scope has been a defining topic in the corporate strategy literature, and scholars have studied its determinants from transaction cost–, resource-, and knowledge-based perspectives (Henderson & Cockburn, 1996; Silverman, 1999; Teece, 1980; Williamson, 1985). Early studies argued that the possession of unused or underused resources is the source of firm growth and that the nature of such resources determines the direction of firm expansion (Kor, Mahoney, Siemsen, & Tan, 2016; Penrose, 1959). Subsequent research has discussed extensively the benefits of horizontal expansion (Chandler, 1990; Gimeno & Woo, 1999; Hill, Hitt, & Hoskisson, 1992; Teece, 1980) and the underlying mechanisms (Moatti, Ren, Anand, & Dussauge, 2015) as well as benefits of vertical integration (Afuah, 2001; Lafontaine &

Slade, 2007). In addition to these core corporate strategy considerations, a host of managerial and financial factors also influence firm scope (Beck, Demirguc-Kunt, & Maksimovic, 2005; Fisman & Svensson, 2007; Gartenberg & Pierce, 2017).

Despite the vast literature on firm scope, the property rights regime, notwithstanding its importance, has received surprisingly scant attention in corporate strategy research. Prior studies on firm scope have mostly focused on advanced economies with a well-developed, stable property rights regime, yet such a regime is often much weaker in the rest of the world and can vary significantly across countries and even within a country in different periods (Libecap, 1989; North, 1990). Such a focus thus paints an incomplete picture of the antecedents of corporate scope decisions and, more importantly, misses the point that such decisions are invariably linked to characteristics of the broader institutional environment (Kogut, Walker, & Anand, 2002), of which the property rights regime is a crucial part (Chandler, 1990; North, 1990).

Furthermore, the small number of prior studies that invoke property rights logic are often conceptual in nature (Bel, 2018; Foss et al., 2021; Foss & Foss, 2005; Schulze & Zellweger, 2021) or limited to case studies (Kim & Mahoney, 2002, 2005) or analysis of physical assets, such as land titles and agricultural investment (Besley, 1995). Firm-level, large-sample analysis based on property rights theory is particularly lacking, which leads to Whinston's (2003: 1) lament that extant empirical research "sheds little light on the relevance of property rights theory" and recommendation that researchers adopt "a natural experiment approach where we identify some variation whose effect on marginal returns to investments in various ownership structures seems very clear *a priori*" (Whinston, 2003: 20).

In the sections that follow, we apply property rights theory—both classical and modern arguments—to develop a set of hypotheses on how the strengthening of the property rights regime may affect firm scope and how an informal institution (political connections) may substitute for the role of the formal regime, followed by a discussion of how we use a quasi-experiment to test these hypotheses.

Effects of Property Rights Regime on Firm Scope

Firms can grow by expanding into horizontally and vertically related or unrelated businesses. We argue that the strengthening of the property rights regime will alter firms' growth trajectory and change the relatedness among firms' businesses. Our hypotheses start by discussing the effect on the horizontal relatedness of firms' businesses, followed by the vertical relatedness.

Horizontal relatedness. Firms expand horizontally through diversification (Montgomery, 1994). A critical consideration facing firms in their decisions on where to expand is the relatedness between new businesses and their existing ones (Anand & Singh, 1997; Silverman, 1999). A widely accepted principle, based on the assumption of an established property rights regime, is that diversification into related businesses brings benefits of scope economies (Teece, 1980, 1982; Silverman, 1999). Related diversification enables firms to use their resources and capabilities across multiple businesses at a low cost and enhances their market power (Bettis, 1981; Moatti et al., 2015; Teece, 1982). By contrast, such resource

synergies and market power diminish significantly when the new businesses are distant from the existing ones (Anand & Singh, 1997; Montgomery & Wernerfelt, 1988).

When property rights over such resources are subject to potential expropriation, however, firms' decision on what types of businesses to enter will be altered or distorted, because the benefits of relatedness can be neutralized and high relatedness may even become a liability (Wan, Hoskisson, Short, & Yiu, 2011). In countries with a weak property rights regime, the risk of expropriation is rampant and the policy environment is highly uncertain; such risk and uncertainty are also often industry specific (Kock & Guillén, 2001). If the government views an industry as particularly important or problematic, government intervention is likely to ensue (Du, Lu, & Tao, 2015). Such intervention poses a risk to firms operating in the focal and related industries, and the industries in which government invention occurs are hard to predict ex ante. Hence, firms constructing their business portfolios around highly related industries cannot effectively reduce their risk of expropriation, an important motive for firm diversification (Bettis & Mahajan, 1985; Cox, Daspit, McLaughlin, & Jones, 2012). One way firms can minimize such industry-specific risk, especially when the property rights regime is inadequate, is to proactively diversify into industries distant from or unrelated to the existing ones, reducing the horizontal relatedness between the businesses in their portfolios (Beneish, Jansen, Lewis, & Stuart, 2008). This logic is consistent with the higher level of unrelated diversification often observed in emerging economies where institutional voids are more widespread (Khanna & Palepu, 1997), although the latter literature does not focus on the critical role of asset ownership that is core to property rights theory (Alchian & Demsetz, 1973; Grossman & Hart, 1986; Hart & Moore, 1990).

Government intervention in selected industries may also prompt firms to diversify into those industries ex post, even if such industries may be less related to their core ones. Entries into those industries may not only give firms immediate benefits, such as easier access to factors of production or simply business licenses (Klapper, Laeven, & Rajan, 2006) but, more importantly, help to develop a favorable bridge with the government. Such relationships, in the absence of a strong formal property rights regime, can function as an information channel to reduce policy uncertainty (Liu, Hu, & Cheng, 2021) and an effective means to protect firms' interests (Shaffer & Hillman, 2000). These benefits notwithstanding, such diversification leads firms' growth trajectories to deviate from a market-based principle of related diversification backed by a sound property rights regime (Du et al., 2015; Kock & Guillén, 2001), hence reducing the horizontal relatedness among the businesses in firms' portfolios.

Regardless of which set of the preceding considerations is more applicable, they both impose a distortion on firms' horizontal expansion trajectory, which can be relieved by a strengthened property rights regime. With a stronger property rights regime, related diversification is more profitable than unrelated diversification due to synergies between the new and existing businesses (Helfat & Eisenhardt, 2004; Montgomery & Wernerfelt, 1988), driving profit-seeking firms' entry into related industries. In addition, firms do not need to invest in industries favored by the local government but unrelated to their core businesses in order to seek information or protection to compensate for the policy uncertainty due to a weak property rights regime (Jia & Mayer, 2017). As a result, we argue that when the property rights regime is strengthened so that the economies of scope based on related diversification

are restored, firms' horizontal expansion is likely to return to a related trajectory. We, therefore, propose the following hypothesis:

Hypothesis 1: Strengthening property rights protection has a positive effect on the horizontal relatedness of the firm's businesses.

Vertical relatedness. Besides the horizontal relatedness among a firm's businesses, strengthening property rights protection will also change the vertical relatedness of its business portfolio. While the preceding arguments revolve around classical PRT's focus on property rights securing the asset owner's residual income right, the arguments that follow concentrate on the notions of incomplete contracts and residual control rights that form the foundations of modern PRT (Grossman & Hart, 1986; Hart, 1988; Hart & Moore, 1990). Note that, regardless of which tradition, both classical and modern PRT focus on ex ante investment incentives, which contrasts with transaction cost economics' emphasis on ex post decision governance, despite a common assumption of incomplete contracts (Gibbons, 2005; Kim & Mahoney, 2005).

The ex ante assignment of residual control rights is essential in determining each party's incentives to invest in value creation in a vertical relationship (Whinston, 2003). As contracts are often incomplete, when contingencies unspecified in the contract arise, only the owner of an asset is entitled to the right to decide on the use of the asset (Lafontaine & Slade, 2007). By acquiring the asset, thus taking ownership of the asset and obtaining residual control rights, incentives for investment in value creation are unified in one single firm. In other words, if the asset in a vertically related business is critical to the focal firm's value creation, it behooves the firm to own the asset, so that it attains full control over the asset and can sufficiently exploit the asset to maximize value creation (Grossman & Hart, 1986).

While modern PRT generally assumes incomplete contracts, a direct implication of its main thesis is that the value of residual control rights for a firm is accentuated under a weak property right regime in which contract incompleteness or contracting costs are elevated (Johnson, McMillan, & Woodruff, 2002). From the firm's perspective, the higher the contracting costs, the more valuable the residual control rights to the firm, inducing greater vertical integration through asset ownership. Consistent with the PRT logic, research has shown that high contracting costs due to insufficient property rights protection often seen in developing countries can increase the level of vertical relatedness in a firm's business portfolio in those countries (Acemoglu, Johnson, & Mitten, 2009). Similarly, evidence also reveals that firms operating in subnational regions with weaker property rights protection witness a higher level of vertical relatedness in their business profiles (Fan, Huang, Morck, & Yeung, 2017). It is worth noting, however, that these studies focus on documenting a correlation between cross-sectional variations of property rights protection and firms' vertical relatedness rather than, as we do in this article, identifying how a change in property rights protection may cause a change in vertical relatedness.

Following this logic, when the once-weak property rights regime is strengthened, the importance of holding residual control rights is reduced. As a result, the need for vertical integration is decreased, reducing the level of vertical relatedness between the businesses in firms' portfolios, everything else constant. We thus propose the next hypothesis on firms' vertical relatedness:

Hypothesis 2: Strengthening property rights protection has a negative effect on the vertical relatedness of the firm's businesses.

Difference Between Politically Connected and Nonconnected Firms

Our preceding hypotheses focus on how formal property rights protection shapes firms' horizontal and vertical relatedness. In addition to a formal property rights regime, however, firms may also rely on informal means for protecting their property. Such informal protection can serve as a substitute for the formal regime, especially when formal protection is weak, and thus can be expected to reduce the effects of changes in the formal regime (Hall, Helmers, Rogers, & Sena, 2014; Li et al., 2008). In particular, research has theorized and shown that in countries with weak property rights regimes, political connections not only give firms resource and information access (Haveman, Jia, Shi, & Wang, 2017; Liu et al., 2021) but at a broader level function as a substitute for formal institutional support (Ijiri & Simon, 1964; Li et al., 2008; Sheng, Zhou, & Li, 2011; Xu, Yuan, Jiang, & Chan, 2015; Yan & Chang, 2018).

Following this logic, we predict that the effects of a strengthened formal property rights regime on firm scope hypothesized previously will be less salient for politically connected firms. First, politically connected firms are less susceptible to expropriation and policy uncertainty (Faccio, 2006; Jia & Mayer, 2017). In countries with inadequate property rights regimes, expropriation by others or government intervention can be rampant, yet it is difficult to predict or circumvent for outsiders (Kock & Guillén, 2001).[1] Political connections can provide a shield against such risk directly, and help to reduce the risk indirectly, because connections to politicians can gain insider information about the government's decision-making, which decreases the uncertainty surrounding potential intervention or expropriation (Du et al., 2015). Second, politically connected firms face a more friendly environment of external financing (Johnson et al., 2002). In a regime with strong property rights protection, firms can use their assets as collateral to obtain external financing to fund their growth efficiently. Such external financing will be unavailable, or obtained at a high cost, in a weak regime where the lender has legitimate reasons to doubt the security of the asset investment of the firm. Connections to politicians reduce expropriation hazards and are an endorsement of the security of firms' asset investments; thus, concerns of the lender can be relieved, reducing firms' cost of debt, a finding documented widely across many emerging markets with deficient property rights regimes (Cull & Xu, 2005; Khwaja & Mian, 2005). Third, politically connected firms are protected from market competition and enjoy an advantageous position (Fisman, 2001). When the property rights regime is strengthened, the playing field becomes more leveled. As competition increases and the value of political connections reduces (Faccio, 2010), nonconnected firms will be particularly suited for pursuing a market-based growth trajectory, compared with connected firms.

In sum, for politically connected firms that are afforded informal protection of property rights and reduced policy uncertainty, the main effects of strengthening formal protection on firms' horizontal and vertical scope will be weakened relative to nonconnected firms. In keeping with seminal research comparing politically connected and nonconnected firms (Faccio, 2010), we propose the following hypothesis focusing on the different moderating effects of the formal property rights regime across the two types of firms:

Hypothesis 3: The effects of strengthening property rights protection on horizontal relatedness and vertical relatedness will be less prominent for politically connected firms.

Data and Method

Research Context and Design

An empirical examination of PRT's predictions ideally requires a "natural experiment" that alters the marginal returns to investments for different ownership structures (Whinston, 2003). Toward that end, we exploit the enactment of China's Property Law in 2007 as a quasi-experiment to test our hypotheses grounded in PRT. The enactment of the property law is a milestone in China's protection of private property rights.

First, the law clearly defines state, collective, and private ownerships and, for the first time in the country's modern history, declares that private ownership should receive equal protection as do state and other collective ownerships and that no individuals or entities shall encroach on other's property rights (Article 4). The law specifies ownership rights, use rights, and security rights associated with each ownership type (Articles 45-56, 58-69); protects individual incomes, houses, articles, materials, investments, enterprises, and other types of properties; and prohibits illegal possession, looting, and destruction by any individuals and entities (Articles 64-66). It also requires that any expropriation or seizure of property by the state must be done in accordance with due process and must include fair compensation for the owner (Articles 42-44, 121, and 132). In addition, the law emphasizes the legal consequences of expropriation of ownership (Articles 241-245). Such strengthening of protection and prohibition of encroachment shall fundamentally increase the appropriability of fruition from firms' investments, increase the return from investments, and improve the tendency to reinvest and expand ex ante (Besley, 1995).

Second, in terms of the collateralizability of assets, the law expands the range of property that is eligible to serve as collaterals (see Articles 179-207) and pledges (see Articles 208-229) from specific properties that were allowed by law to any properties that were not prohibited by law, which greatly increased firms' ability to obtain external financing. Private firms in China have long been suffering from difficulties in obtaining financing (Li et al., 2008); such changes shall ease financers' concern regarding private firms' ability to repay loans (since unlike state-owned firms, private firms are not backed by the government) and hence ease the external financing constraint on private firms (Berkowitz et al., 2015).

Third, the law improves the delineability of contracts regarding different types of assets, including physical, intangible, and financial ones, by clarifying the transferability, pledgeability, and disposal of properties and associated interests under various scenarios (see Articles 185-190, 210-213, and 223-228). Such clarification offers relief to transacting parties and lowers the incompleteness of contracts (Foss & Foss, 2005).

Despite its economic and social significance, the law was once viewed as an antithesis to socialist principles, and hence it had undergone a prolonged process of disputations and revisions for many years before it was officially voted for and approved by the Standing Committee of the National People's Congress (China's legislature) in March 2007 and took effect the same year (see Berkowitz et al., 2015; He, Tong, & Xu, 2022). Given the vast uncertainty surrounding the disputing and revising procedures of the law, it is highly unlikely that firms (particularly private firms, which serve as our treatment group) foresaw

the *timing* of its final enactment. This feature enables us to use the enactment of the law as a quasi-experiment that is plausibly exogenous to firm decisions. In addition, Berkowitz et al. (2015) report that the enactment of the law led to a significant increase in private firms' market value, suggesting a positive future expectation about the effectiveness of this law among the public.

Though the law applies to all firms and officially declares the equal status of public and private ownerships of properties, it benefits private firms substantially more since they had traditionally been disadvantaged by the preferential treatment of their state-owned counterparts. In contrast to SOEs, which enjoy various privileges shielding them against expropriation risks and financing constraints, private enterprises often lack formal means to ensure the protection of their property rights (Li et al., 2008). The enactment of the law, therefore, significantly raised the level of property rights protection for properties of private firms. This unique setting allows us to use private firms as the treatment group and SOEs as the control group in a DID research design. As will be reported later, to validate the research design, we matched treated firms (private firms) to a set of comparable control firms (SOEs) and conduct statistical tests to check the parallel pretrends assumption. We can then isolate the impact of the law if we observe the trends of SOEs and private firms depart after the law enactment.[2]

Data and Sample

The firm-level data come from the China Stock Market and Accounting Research (CSMAR) database, available in the Wharton Research Data Services, which contains detailed information on all firms listed on the Shanghai and Shenzhen Stock Exchanges. The time window of analysis is 2003-2013, covering 5 years before (2003-2007) and six years after (2008-2013) the enactment of the property law. Following convention, we exclude firms in the finance industry due to their special accounting rules.

To construct the key dependent variables, we follow an established approach in the literature (Fan et al., 2017; Fan & Lang, 2000) to calculate horizontal and vertical relatedness coefficients based on information about each firm's sales in different industries and the input-output linkages across them. To operationalize this calculation, we use the Input-Output (IO) Accounts published by the National Bureau of Statistics of China (NBSC) that record commodity flows between each pair of IO industries for the entire Chinese economy. Because detailed versions of the IO data are available only every 5 years (which is similar to the IO data of the Bureau of Economic Analysis in the United States), we use the information in the nearest year in the calculation; specifically, we use IO tables of 2002, 2007, and 2012 to calculate coefficients of firms' horizontal and vertical relatedness during the periods 2003-2004, 2005-2009, and 2010-2013, respectively (see Fan & Lang, 2000, for a similar calculation using data from the BEA of the United States).[3] Furthermore, since NBSC and CSMAR data use different industry classification systems and the classification changes across years, we manually create crosswalk tables across industry codes in different years. The harmonized IO table consists of 70 industries, with a 70-by-70 matrix of commodity-flow information.

After data cleaning, our full sample is a panel data set consisting of 2,633 listed firms, with 1,864 private firms (the treatment group) and 769 SOEs (the control group). To achieve better balance across treatment and control groups, we implement the coarsened exact matching (CEM) technique (Iacus, King, & Porro, 2012), which allows us to specify maximum imbalance

across groups for each control variable. As matching on excessive variables will run into the "curse of dimensionality" problem (Heckman, Ichimura, & Todd, 1998), we match on a subset of key covariates that may influence horizontal and vertical relatedness. Specifically, we match on firm age (number of years since the firm's founding), size (number of employees), sales, assets, and ownership concentration (measured by the Herfindahl-Hirschman index based on the proportion of market shares among top 10 shareholders) in 2007 after conditioning on industry and province. Note that we match on pre-event measures of variables to ensure that these firm characteristics were not contaminated by the enactment of the property law itself, further alleviating endogeneity concerns. This procedure yields a matched sample of 417 treated firms and 328 control firms. The CEM sample serves as our main sample for analysis.[4]

Variables

Dependent variables. We create two key dependent variables to test our hypotheses on the impact of the property law on firm scope. Specifically, we calculate two variables, horizontal relatedness and vertical relatedness, to measure the horizontal and vertical dimensions of firm scope, using data in IO tables and following the procedure in Fan and Lang (2000) and Fan et al. (2017). The IO tables report for each pair of industries, i and j, the value of i's output used to produce industry j's total output, which we denote as a_{ij}. We divide a_{ij} by the value of industry j's total output to get the value of industry i's output used to produce 1 RMB worth of industry j's output, denoted as v_{ij}. Similarly, we divide a_{ji} by the value of industry i's total output to obtain the value of industry j's output used to produce 1 RMB worth of industry i's output, denoted as v_{ji}. We use these input requirement coefficients to measure horizontal and vertical relatedness, to be detailed next.

For horizontal relatedness, we measure the degrees to which each pair of industries i and j share their inputs based on IO tables (Zhou, 2011). Specifically, we first compute for each pair of industries i and j the input requirement coefficients between each of them and every intermediate industry k ($k \neq i, j$), denoted as v_{ki} and v_{kj}. Define vectors $V_i = (v_{1i}, \ldots, v_{ni})$ and $V_j = (v_{1j}, \ldots, v_{nj})$, so that V_i and V_j contain information on industry input structures for all other industries k except for i and j. We then calculate the Pearson's correlation coefficient between V_i and V_j to measure horizontal relatedness:

$$\mathrm{HR}_{ij} = \mathrm{Corr}(V_i,\ V_j).$$

A high correlation coefficient between the two vectors suggests a significant similarity or overlap in inputs required by the industry pair i and j. Finally, we compute the firm-level horizontal relatedness (HR) coefficient as a weighted average based on the sales of the firm f (with primary industry i) across all secondary market segments j:

$$\mathrm{HR}_{ft} = \sum_{j \in S} w_{jt} \mathrm{HR}_{ij},$$

where S is the set of a firm's secondary segments, and w_{jt} is the weight of industry j and equals the ratio of the firm's sales in jth secondary segments to the total sales of all secondary segments in year t. A greater value, therefore, indicates higher relatedness between a firm's secondary segments and its primary segment.

To measure vertical relatedness, we take the average of pairwise input requirement coefficients for the pair of industries i and j,

$$\mathrm{VR}_{ij} = \frac{(v_{ij} + v_{ji})}{2}.$$

Intuitively, a high VR_{ij} can be interpreted as a high level of relatedness between the inputs and outputs of industries i and j. Finally, we compute the firm-level vertical relatedness (VR) coefficient as a weighted average of the sales of the firm f (with primary industry i) across all secondary market segments j:

$$\mathrm{VR}_{ft} = \sum_{j \in S} w_{jt} \mathrm{VR}_{ij},$$

where S is the set of a firm's secondary segments, and w_{jt} is the weight of industry j and equals the ratio of the firm's sales in jth secondary segments to the total sales of all secondary segments in year t.

Since there are gaps in the data as not all firms report their segment sales for all years, to increase statistical power we linearly extrapolate the missing values to calculate horizontal and vertical relatedness coefficients for each firm. Specifically, following prior work (Villalonga, 2004), we impute the missing values of horizontal or vertical relatedness measures by applying a linear function on the nearest 2 years with nonmissing values.[5] We show in a robustness check that our baseline results are qualitatively similar when we use the raw, nonextrapolated measures.

Explanatory variables. Using the DID technique requires us to specify treated and control groups as well as pre- and postevent periods. We define the treatment variable "private" as a binary variable that equals 1 if a firm is majority owned or ultimately controlled by private entities or individuals and 0 if it is owned by the government (at the central or local level) or its agencies, based on ownership information available in the CSMAR. Note that we excluded firms that changed ownership during the sample period to reduce any contamination of results possibly caused by some firms endogenously changing their ownership in response to the new property law. Next, we create a binary variable "post" to identify the onset of the treatment, which equals 1 for the years after the enactment of the law (2008-2013) and 0 for the years before that (2003-2007). The coefficient on the interaction term Private × Post thus captures the differential effect of the property law on private firms compared with SOEs in a DID regression framework.

Moderator variable. Our Hypothesis 3 proposes that the effects of strengthening property rights protection on firm scope vary between firms that are politically connected and those that are not. We seek to construct a variable to test this hypothesis using data on the political experience of firms' top managers or board members available from the CSMAR. We construct this measure by focusing on the data in 2008, the earliest year with detailed information available. Specifically, politically connected (PC) is a dummy variable taking the value of 1 if the firm has a top manager or board member who has been a government member at the local or national level. We do not use data in later years as firms may adjust

their decision-making regarding the formation of political connections as a result of the property law enactment; doing so reduces endogeneity concerns about political connections. Note that although 2008 was the year of law enactment, political connection data in 2008 were not likely to be contaminated by the law enactment for two reasons. First, information on managers' political links is collected for the previous year, so records in 2008 were based on information in 2007 (prior to the enactment). Second, political connections tend to be "sticky" because it is a scarce resource and hard to establish within a short time.[6]

Control variables. We include a set of firm-level and regional variables to control for their effects on firm scope. First, regarding firm-level variables, these include ownership concentration (HHI top 10 shares; measured by the Herfindahl-Hirschman index based on the proportion of market shares among top 10 shareholders). We also include cash holdings (cash; cash in log), profits (profit; profit in log), leverage (leverage; ratio of debt to total assets), a dummy variable indicating whether a firm receives government subsidies (subsidy), and research-and-development intensity (R&D intensity; measured by R&D expenditure scaled by total sales) as control variables. Large firms with cash, leverage, and intangible assets like technologies are more likely to diversify and achieve better diversification performance due to their greater resources and economies of scale, while more profitable and liquid firms may have more flexibility to undertake diversification (Beck et al., 2005; Lu & Beamish, 2004; Ramanujam & Varadarajan, 1989). Second, we further include the legal environment (legal enforcement) at the province level, measured by the ranking of the legal environment index of the province in which the firm is located, to control for possibly varying degrees of enforcement or implementation of the law across subnational regions (Berkowitz et al., 2015; Fan, Huang, & Zhu, 2013). The data come from the widely used National Economic Research Institute database created by Fan, Wang, and Zhu (2011). Finally, we include a full set of firm fixed effects to account for any time-invariant firm heterogeneity and year fixed effects to control for macroeconomic conditions that may influence firm behavior. Note that subnational region (province) fixed effects are already subsumed in firm fixed effects and cannot be included once the latter is controlled for.

Tables 1 and 2 present the variable definitions, summary statistics, and correlations of all variables. The means of horizontal and vertical relatedness coefficients are 0.048 and 0.010, respectively, with standard deviations of 0.168 and 0.026. These numbers are comparable to those reported in prior related work (Fan et al., 2017).

Table 3 presents a comparison of firm characteristics between treated and control groups before the enactment of the law. Columns 1 and 2 show firm characteristics for treated and control firms in the raw sample, respectively, and column 3 shows the difference between them. Similarly, columns 4 through 6 report this information for the CEM matched sample. Note that the overall difference in firm characteristics between treated and control firms shrinks significantly, both in magnitude and statistically, in the CEM matched sample compared with the raw sample, suggesting that the CEM matching procedure indeed improves the balance of the sample. We hence use this CEM matched sample in our main analysis.

Table 1
Variable Definitions

Variable	Definition
Horizontal relatedness	Complementarity index across industry input structures based on Fan and Lang (2000); see text for details
Vertical relatedness	Vertical relatedness index based on Fan and Lang (2000); see text for details
Private	Dummy variable taking a value 1 if a firm is privately owned, 0 otherwise
Post	Dummy variable taking a value 1 after the enactment of property law (after 2008), 0 otherwise
Politically connected (PC)	Dummy variable taking a value 1 if a top manager or board member serves in local or national government, 0 otherwise
HHI top 10 shares	Herfindahl-Hirschman index based on the proportion of market shares among top 10 shareholders
Cash (log)	Total amount of cash holdings in a given year (logged)
Profit (log)	Total amount of profit in a given year (logged)
Leverage	Ratio of debt to total assets in a given year
Subsidy	Dummy variable taking a value 1 if a firm receives a positive amount of government subsidy, 0 otherwise
R&D intensity	R&D expenditure scaled by total sales in a given year (× 100)
Legal enforcement	Ranking of the legal environment index among all provinces in a given year

Note: This table shows variable definitions, where the first two rows cover the dependent variables and the next rows cover the covariates.

Econometric Model

To test the effect of strengthening property rights protection on firm scope, as proposed in Hypotheses 1 through 3, we run linear regressions to estimate the following model:

$$Y_{it} = \alpha + \beta \text{Private}_i \times \text{Post} + X_{it}'\gamma + \delta_i + \mu_t + \varepsilon_{it}, \quad (1)$$

where Y_{it} indicates dependent variables of interest, horizontal relatedness and vertical relatedness; Private_i is a dummy variable taking the value of 1 if a firm is privately owned; Post is a dummy variable taking the value of 1 if the year is after 2007, the year of the property law enactment; X_{it} is a vector of time-varying control variables; δ_i is a set of firm fixed effects; μ_t is a set of year fixed effects; and ϵ_{it} is a disturbance term. According to Hypotheses 1 to 3, β is expected to be positive for the dependent variable horizontal relatedness and negative for vertical relatedness. The identification assumption is that absent the enactment of the property law, private firms and SOEs would have evolved similarly in terms of their scope decisions; we empirically examine the plausibility of this assumption later (in Figure 1).

To test the moderating effect of political connections, as proposed in Hypothesis 3, we add a triple DID term $\text{Private} \times \text{PC}_i \times \text{Post}$ to Equation (1), where PC_i indicates whether or not firm i is politically connected as defined earlier. We expect the coefficient on the triple DID term to be negative for horizontal relatedness and positive for vertical relatedness.

Table 2
Descriptive Statistics and Correlations

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Horizontal relatedness	0.048	0.168											
2. Vertical relatedness	0.010	0.026	.065										
3. Private	0.555	0.497	−.004	−.070									
4. Post	0.543	0.498	−.008	.007	−.001								
5. Politically connected	0.479	0.500	.020	.084	−.298	−.000							
6. HHI top 10 shares	0.128	0.123	.027	.023	−.287	.182	.170						
7. Cash (log)	3.949	2.827	.024	.009	−.154	.694	.096	.220					
8. Profit (log)	3.786	1.947	.015	.041	−.312	.421	.289	.409	.660				
9. Leverage	0.510	0.548	.004	.021	−.029	−.051	.049	−.065	−.087	.005			
10. Subsidy	0.107	0.310	−.025	−.002	−.011	.244	.115	.106	.229	.138	−.028		
11. R&D intensity	3.752	4.351	.087	−.080	.250	.021	−.214	−.140	−.043	−.167	−.141	.023	
12. Legal enforcement	9.122	7.853	−.027	.046	−.093	.002	.064	−.025	−.050	−.031	.065	−.018	−.161

Note: This table shows descriptive statistics and correlations between key variables in the coarsened exact matching matched sample. Please refer to the Data and Method section for a detailed explanation.

Table 3
Comparison of Treatment and Control Groups Before Event

	Raw Sample			CEM Matched Sample		
Variable	(1) Treatment	(2) Control	(3) Difference	(4) Treatment	(5) Control	(6) Difference
Horizontal relatedness	0.048	0.054	−0.006	0.056	0.063	−0.007
	(0.195)	(0.167)	(0.008)	(0.184)	(0.175)	(0.013)
Vertical relatedness	0.009	0.013	−0.004***	0.008	0.011	−0.003*
	(0.031)	(0.029)	(0.001)	(0.025)	(0.024)	(0.002)
Politically connected	0.113	0.546	−0.433***	0.345	0.646	−0.301***
	(0.317)	(0.498)	(0.019)	(0.476)	(0.479)	(0.035)
HHI top 10 shares	0.022	0.169	−0.147***	0.058	0.142	−0.085***
	(0.070)	(0.160)	(0.006)	(0.085)	(0.094)	(0.007)
Cash (log)	1.467	5.068	−3.601***	4.049	5.610	−1.561***
	(2.150)	(2.754)	(0.107)	(1.557)	(1.554)	(0.113)
Profit (log)	1.369	4.331	−2.961***	3.745	4.656	−0.911***
	(1.937)	(2.413)	(0.095)	(1.119)	(1.527)	(0.101)
Leverage	0.707	0.530	0.177	0.577	0.539	0.038
	(4.520)	(0.228)	(0.165)	(0.701)	(0.234)	(0.036)
Subsidy	0.053	0.114	−0.060***	0.132	0.115	0.017
	(0.225)	(0.317)	(0.012)	(0.339)	(0.320)	(0.024)
R&D intensity	4.931	2.600	2.332***	4.466	2.414	2.053***
	(4.470)	(3.343)	(0.165)	(4.432)	(3.175)	(0.296)
Legal enforcement	6.992	9.404	−2.412***	8.177	9.633	−1.456**
	(6.781)	(7.737)	(0.308)	(7.378)	(8.119)	(0.569)
No. of firms	1864	769		417	328	

Note: This table reports the means and standard deviations (in parentheses) of dependent and independent variables for the treatment and control groups before the enactment of the property law (2007) using the raw sample and the coarsened exact matching (CEM) matched sample, respectively. Column 3 shows the difference between variables across treatment and control groups using the raw sample, and column 6 shows the difference using the CEM matched sample; robust standard errors are reported in parentheses. See Table 1 for variable definitions.
*$p < .10$.
**$p < .05$.
***$p < .01$ (two-tailed tests).

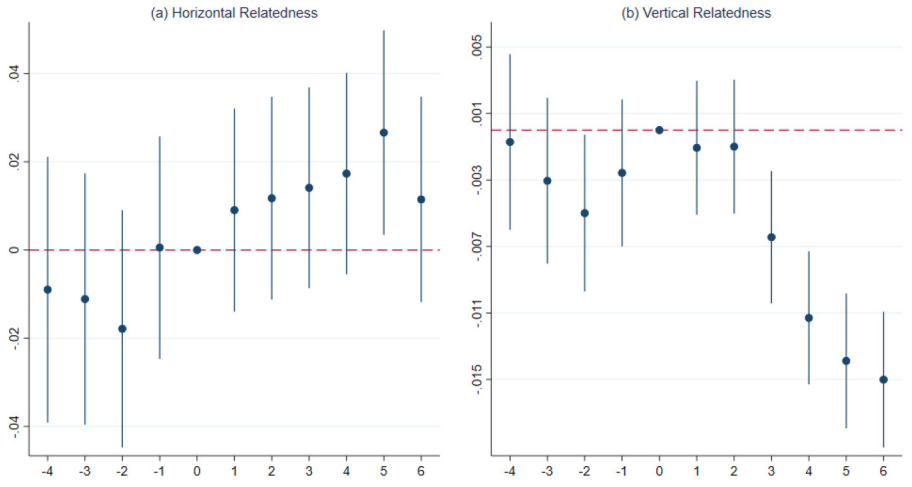
Results

Tests of Hypotheses 1 and 2

Table 4 reports the results of testing our hypotheses. In all models, we include specifications with and without control variables to check the robustness of the results and use those with control variables as preferred specifications for hypotheses testing.

Regarding Hypothesis 1 on horizontal relatedness, columns 1 and 2 show that strengthening property rights protection has a positive effect on firms' horizontal relatedness: After the property law enactment, private firms increase their horizontal relatedness coefficient by 0.021, which represents 38% of the mean or 11% of the standard deviation of the prepolicy

Figure 1
Dynamic Effects of Property Rights Protection on Firm Scope



Note: This figure displays the dynamic effects of the property law on firms' horizontal relatedness (panel a) and vertical relatedness (panel b). Each panel summarizes results from a model specification that includes control variables, firm fixed effects, year fixed effects, and a series of interaction terms between Post and 10 annual indicators; the indicator variable for the year of the property law enactment is omitted so that that year can serve as a benchmark to illustrate the dynamics of the coefficients before and after the treatment. The coefficients and their associated confidence intervals for the 10 interaction terms are plotted. Specifically, the dots represent coefficients and the bars the 95% confidence intervals; the red dashed line represents the zero effect.

distribution of horizontal relatedness for private firms (the mean and standard deviations are 0.056 and 0.184, as shown in column 4 of Table 3).[7]

For Hypothesis 2 on vertical relatedness, columns 3 and 4 show that strengthening property rights protection has a negative effect on firms' vertical relatedness: After the enactment of the property law, private firms reduce their vertical relatedness coefficient by 0.006, which represents 75% of the mean or 24% of the standard deviation of the prepolicy distribution of vertical relatedness for private firms (the mean and standard deviations are 0.008 and 0.025, as shown in column 4 of Table 3). Note that all key coefficients are statistically significant at $p < .01$ levels, and they are robust whether or not we include control variables. These results, taken together, strongly support Hypotheses 1 and 2.

Tests of Hypothesis 3

Columns 5 through 8 report the results of testing Hypothesis 3. Again, we present results with and without control variables to assess the moderating role of political connections in the impact on horizontal and vertical relatedness. Consistent with Hypothesis 3, results in columns 5 and 6 suggest that the effect of strengthening property rights protection on horizontal relatedness is weaker for private firms with political connections. According to column 6, our preferred specification, while nonconnected private firms raise their horizontal

Table 4
DID Regression Results for Firm Scope (CEM Matched Sample)

Variable	(1) Horizontal Relatedness	(2) Horizontal Relatedness	(3) Vertical Relatedness	(4) Vertical Relatedness	(5) Horizontal Relatedness	(6) Horizontal Relatedness	(7) Vertical Relatedness	(8) Vertical Relatedness
Private × Post	0.044***	0.021***	−0.006***	−0.006***	0.087***	0.079***	−0.007***	−0.010***
	(0.005)	(0.006)	(0.001)	(0.001)	(0.010)	(0.013)	(0.002)	(0.002)
Private × Post × PC					−0.067***	−0.053***	0.003*	0.006***
					(0.010)	(0.013)	(0.002)	(0.002)
HHI top 10 shares		0.002		0.023***		−0.002		0.001
		(0.016)		(0.003)		(0.028)		(0.004)
Cash (log)		−0.001		0.000		0.001		0.000
		(0.001)		(0.000)		(0.002)		(0.000)
Profit (log)		0.001		0.000		0.005**		−0.000
		(0.002)		(0.000)		(0.002)		(0.000)
Leverage		0.002		−0.000		−0.004		0.000
		(0.004)		(0.001)		(0.005)		(0.001)
Subsidy		−0.006		−0.002**		−0.007		−0.001
		(0.006)		(0.001)		(0.007)		(0.001)
R&D intensity		0.000		0.000		0.004		−0.000
		(0.001)		(0.000)		(0.003)		(0.000)
Legal enforcement		0.001		−0.000		0.001**		0.000
		(0.001)		(0.000)		(0.001)		(0.000)

(continued)

Table 4 (continued)

Variable	(1) Horizontal Relatedness	(2) Horizontal Relatedness	(3) Vertical Relatedness	(4) Vertical Relatedness	(5) Horizontal Relatedness	(6) Horizontal Relatedness	(7) Vertical Relatedness	(8) Vertical Relatedness
Constant	0.048***	0.034***	0.011***	0.008***	0.042***	−0.005	0.014***	0.013***
	(0.002)	(0.013)	(0.000)	(0.002)	(0.002)	(0.018)	(0.000)	(0.003)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.684	0.653	0.555	0.541	0.537	0.547	0.556	0.557
No. of observations	8169	5728	8169	5728	5203	3772	5203	3772

Note: This table reports difference-in-differences regression results using the coarsened exact matching (CEM) matched sample. The unit of analysis is firm by year. See Table 1 for variable definitions. All models include year fixed effects (FE) and firm FE. Robust standard errors are reported in parentheses. PC = politically connected.
*$p < .10$.
**$p < .05$.
***$p < .01$ (two-tailed tests).

relatedness coefficient by 0.079 on average, connected ones do so to a much lesser degree (0.079 – 0.053 = 0.026).

Finally, columns 7 and 8 show that the effect of strengthening property rights protection on vertical relatedness is indeed less prominent among politically connected firms, which again jibes with our hypothesis. According to column 8, our preferred specification, while nonconnected private firms decrease their vertical relatedness coefficient by 0.010 on average, their connected counterparts do so by less than half of that magnitude (−0.010 + 0.006 = −0.004).

Dynamic Effects

To assess dynamic effects and conduct a pretrend test, we estimate a specification that allows for different coefficients in each of the pre– and post–property law periods. Specifically, we run the following regression:

$$Y_{it} = \alpha + \sum_{s=-4}^{-1} \phi_s \text{Private}_i \times \text{Pre}_s + \sum_{k=1}^{6} \beta_k \text{Private}_i \times \text{Post}_k + X_{it}'\gamma + \delta_i + \mu_t + \varepsilon_{it}, \quad (2)$$

where s and k denote the number of periods before and after 2007, the year of the property law enactment; for example, $s = -2$ means the year of observations is 2 years prior, that is, 2005, and $k = 2$ is 2 years after, that is, 2009.The terms ϕ_s and β_k estimate dynamic coefficients for each year, with 2007 as the reference year (so the coefficient for that year is set to zero). Since it may take time for firms to respond, the treatment impact on firm scope is expected to become stronger in the later years than in earlier years after the property law enactment.

Figure 1 plots the estimated coefficients along with 95% confidence intervals, with panels (a) and (b) showing the effects on horizontal relatedness and vertical relatedness, respectively. As the figure shows, the effects of the property law on horizontal (vertical) relatedness tend to have a larger (smaller) size in the post-treatment years than in the pretreatment years, as expected. Also, these effects grow in size and become more significant over time in the post-treatment years, indicating that the effects take time to materialize. In addition, the pretreatment coefficients on horizontal and vertical relatedness are mostly insignificant, suggesting that the treated and control groups do not have significantly different pretrends. Taken together, these temporal patterns are consistent with the parallel-trends assumption and indicate that the effects of the property law on firm scope appear to manifest over time as suggested by theory.

Robustness Checks, Placebo Tests, and Alternative Explanations

Robustness checks. We assess the robustness of our main results using alternative measures of relatedness and state ownership as well as a narrower time window than the baseline. First, we use raw measures of vertical and horizontal relatedness coefficients that do not include linearly extrapolated values, although doing this reduces the sample size by about 30%. As shown in columns 1 and 2 of Table 5, results based on these alternative measures remain consistent with our main findings. On average, in the 6 years following the enactment of the property law, private firms increase their horizontal relatedness by 0.026 and reduce their vertical relatedness by 0.005. Note that although they are estimated with a smaller

Table 5
Robustness Checks and Placebo Tests

Variable	(1) Horizontal Relatedness	(2) Vertical Relatedness	(3) Horizontal Relatedness	(4) Vertical Relatedness	(5) Horizontal Relatedness	(6) Vertical Relatedness	(7) Horizontal Relatedness	(8) Vertical Relatedness
Private × Post	0.026***	−0.005***	—	—	0.019***	−0.004***	—	—
	(0.007)	(0.001)			(0.006)	(0.001)		
State ownership	—	—	−0.071***	0.020***	—	—	—	—
Share × Post			(0.027)	(0.005)				
Collective × Post	—	—	—	—	—	—	0.016	0.003
							(0.022)	(0.004)
HHI top 10 shares	0.037	−0.006*	0.002	0.022***	0.006	0.014***	0.015	0.006***
	(0.025)	(0.004)	(0.016)	(0.003)	(0.016)	(0.002)	(0.013)	(0.002)
Cash (log)	−0.005**	−0.000	−0.000	0.000	0.000	0.000	0.003**	−0.000
	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Profit (log)	0.003	0.000	0.001	0.000	0.002	0.001	−0.000	−0.000
	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Leverage	−0.003	−0.000	0.002	−0.000	0.000	0.000	−0.005	0.000
	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)	(0.013)	(0.002)
Subsidy	−0.007	−0.002**	−0.005	−0.002**	−0.003	−0.000	−0.010*	0.002**
	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)
R&D intensity	0.000	0.000	0.000	0.000	−0.001	−0.001**	0.010***	0.001
	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)
Legal environment	0.000	−0.000	0.001*	−0.000	−0.001	0.001***	0.001*	0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)

(continued)

Table 5 (continued)

Variable	(1) Horizontal Relatedness	(2) Vertical Relatedness	(3) Horizontal Relatedness	(4) Vertical Relatedness	(5) Horizontal Relatedness	(6) Vertical Relatedness	(7) Horizontal Relatedness	(8) Vertical Relatedness
Constant	0.037	−0.006*	0.041***	0.005**	0.053***	0.002	0.002	0.010***
	(0.025)	(0.004)	(0.013)	(0.002)	(0.015)	(0.002)	(0.016)	(0.003)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.600	0.632	0.652	0.525	0.783	0.717	0.592	0.597
No. of observations	3950	3964	5674	5674	3894	3894	5633	5633

Note: This table reports regression results from robustness checks. Columns 1 and 2 are robustness checks using alternative measures of firm scope. Columns 3 and 4 are robustness checks using the share of state ownership as the treatment variable. Columns 5 and 6 are robustness checks using a narrower time window than the baseline, that is, 2005 to 2011. Columns 7 and 8 are placebo tests using collectively owned firms rather than privately owned firms as the "treatment" group. All models include firm fixed effects (FE) and year FE. Robust standard errors are reported in parentheses.

*$p < .10$.

**$p < .05$.

***$p < .01$ (two-tailed tests).

sample size, the coefficients on the DID term for the two dependent variables (horizontal relatedness and vertical relatedness) are highly similar in magnitude to those based on the full sample in columns 2 and 4 of Table 4.

Second, instead of a dichotomous treatment definition of a firm being private versus state owned, we use a continuous measure of state ownership (i.e., share of the firm owned by the state). Results in columns 3 and 4 of Table 5 show that firms that have a lower state ownership (that is, more private) increase their horizontal relatedness and decrease vertical relatedness after the enactment of the property law, in line with our baseline results. Third, we use a narrower time window than the baseline, that is, 3 years before and after the enactment of the law, that is, 2005 to 2011. Results are shown in columns 5 and 6 of Table 5: The estimated key coefficients remain highly similar both economically and statistically. Taken together, our results are not sensitive to these alternative firm scope and treatment measures or alternative time spans of analysis.

In addition, to avoid the potential issue of comparing the incomparables, we have conducted additional analyses using only private firms. Using this subsample of only private firms, we find that private firms' horizontal relatedness significantly increased while vertical relatedness decreased after the law enactment, which is consistent with our hypotheses.[8]

Placebo tests. To further validate our results, we conduct a placebo test where we use collectively owned firms, rather than privately owned firms, as the "treatment" group (the control group remains SOEs). In China, collectively owned firms are those whose means of production are owned collectively, including rural and urban enterprises invested by collective units (Lu, Tao, & Yang, 2010). Since theoretically the property law does not affect collectively owned firms, we should not expect these firms to change their scope decisions after the law enactment. Columns 7 and 8 of Table 5 report the estimation results for the two key dependent variables. As expected, none of the coefficients on the DID term (Collective × Post) is statistically distinguishable from zero. This test indicates that the observed effects of the property law in our main results are indeed specific to private firms rather than collectively owned firms.

Seemingly unrelated regressions. One may argue that a firm's decisions on the vertical and horizontal scope are interconnected. For example, when a firm expands in scope through either horizontal or vertical investment, for instance, by expanding into new businesses, it may consider the horizontal and vertical dimensions of such expansion jointly. To account for potential interdependencies between the two dimensions of relatedness (Brahm, Parmigiani, & Tarziján, 2021; Zhou & Wan, 2017), we allow the error terms in the two regression equations to be correlated by estimating a seemingly unrelated regression (SUR) as a robustness test. Table 6 presents the estimation results for two SUR models, one with the control variables (columns 1 and 2) and one without (columns 3 and 4). Two observations are in order. First, the DID coefficients of interest on firms' horizontal relatedness and vertical relatedness across regression models are similar in magnitude to our baseline estimates in Table 4 earlier. A joint test of the DID coefficients being zero is soundly rejected (the first row in the bottom panel). Second, although a Breusch-Pagan test for error independence across equations is rejected in the model with control variables, the pairwise residual correlation between equations is quite low (the last two rows in the bottom panel). This

Table 6
Seemingly Unrelated Regression Results for Firm Scope

	Model 1: Without Controls		Model 2: With Controls	
Variable	(1) Horizontal Relatedness	(2) Vertical Relatedness	(3) Horizontal Relatedness	(4) Vertical Relatedness
Private × Post	0.044***	−0.006***	0.023***	−0.007***
	(0.005)	(0.001)	(0.005)	(0.001)
HHI top 10 shares			−0.012	0.025***
			(0.015)	(0.003)
Cash (log)			−0.000	0.000
			(0.001)	(0.000)
Profit (log)			−0.003*	0.000
			(0.002)	(0.000)
Leverage			−0.001	−0.000
			(0.004)	(0.001)
Positive subsidy			−0.002	−0.003***
			(0.006)	(0.001)
R&D intensity			−0.000	0.000
			(0.001)	(0.000)
Legal enforcement			0.001**	−0.000**
			(0.001)	(0.000)
Constant	0.014***	−0.002	−0.023***	−0.003**
	(0.004)	(0.001)	(0.009)	(0.002)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
No. of observations	7249	7249	5729	5729
Joint test of residual correlation	$\chi^2 = 148.92$, $p = .000$		$\chi^2 = 74.12$, $p = .000$	
	$\rho_{12} = 0.0087$		$\rho_{12} = -0.0002$	
Breusch-Pagan test	$\chi^2 = 0.620$, $p = .4312$		$\chi^2 = 0.000$, $p = .9878$	

Note: This table reports seemingly unrelated regression results using the coarsened exact matching (CEM) matched sample. The unit of analysis is firm by year. To check robustness, Model 1 in columns 1 and 2 does not include control variables, and Model 2 in columns 3 and 4 includes control variables. All models include year fixed effects (FE) and firm FE. The bottom panel presents statistics for (a) a joint test of the key coefficients of interest to be zero, (b) pairwise correlation in the residuals across equations, and (c) a Breusch-Pagan test for error independence across equations. Standard errors are reported in parentheses.
*$p < .10$.
**$p < .05$.
***$p < .01$ (two-tailed tests).

low correlation further alleviates concerns that the potential intercorrelation between a firm's scope decisions may lead to estimation bias.

Alternative Explanations

We also consider alternative explanations that may result from events contemporaneous with the property law enactment. One such event was the outbreak of the global financial

crisis in 2008. The crisis had a big negative impact on firm investments in many countries, although much less so in China (Kahle & Stulz, 2013). With regard to our findings specific to private firms' horizontal and vertical relatedness, we do not believe the crisis would drive the results. First, while the financial crisis was a shock to firm investments generally, in China, private firms—rather than SOEs—should be the ones more exposed to the shock because they generally receive little support from state-owned banks and other financial organizations, nor are they backed by the government. Since a predominant share of the RMB four trillion stimulus package following the crisis created by the government went to SOEs and infrastructure projects mainly contracted to SOEs, had the crisis or the stimulus package played a role, we would expect private firms to invest in more unrelated businesses (e.g., infrastructure projects) in an effort to obtain government funding, which would then reduce their horizontal relatedness rather than increase horizontal relatedness as shown in our empirical analysis. Second, following the crisis, firms would experience higher stress and face greater hazards in contractual relationships, suggesting that they should increase control over the upstream and downstream businesses rather than decrease asset ownership in vertically related businesses. This reasoning is, again, opposite to our empirical finding that private firms actually reduce their vertical relatedness after the law change. Third, to further alleviate concerns about the crisis, we examine potentially differential effects on firms in the real estate industry, which is generally believed to have played a crucial role in causing or amplifying the global financial crisis (Mian & Sufi, 2014). Columns 1 and 2 of Table A1 show that the impact on horizontal and vertical relatedness is not significantly different between firms in real estate and other sectors.

Another concurrent event is the passage of China's antimonopoly law in 2007, which would have lowered uncertainty by more clearly defining market dominance and prohibiting government entities from abusing their administrative powers to favor connected firms or to restrict competition. To ameliorate the worry about this confounding factor, we investigate potentially differential effects on firms in monopoly industries. To identify monopoly industries, we refer to several policy documents, including the Protocol on the Accession of the People's Republic of China to the WTO, the Catalogue for the Guidance of Foreign-Invested Industries, and the Thirty-Six Guidelines on Encouraging and Supporting the Development of Non-Public Sector. We define monopoly industries as those having entry barriers erected against foreign firms as well as against domestic privately owned firms. As shown in columns 3 and 4 of Table A1, the coefficient on the triple DID term is economically and statistically insignificant. This result suggests that the effect of the property law on horizontal relatedness or vertical relatedness is indistinguishable between firms operating in monopoly industries and those operating in nonmonopoly industries.

To offer further evidence that the adoption of the property rights law is the key driver behind our results, we perform subsample analyses by estimating the effects on firm scope separately for firms that have high versus low tangible-asset ratios (defined as the ratio of fixed assets over total assets) and that are located in coastal versus inland areas. We would expect that the impact will be more pronounced for firms with high tangible-asset ratios or located in inland regions. Indeed, this conjecture is verified by results in Table A2, which show that the effects on horizontal and vertical relatedness are more significant both economically and statistically for firms with high tangible-asset ratios (columns 1 through 4) and firms in inland locations (columns 5 through 8).

Discussion

The history goes back for decades for both the corporate strategy literature of firm scope and the organizational-economics literature of property rights. Given the role property rights play in firms' value appropriation and investment, it is crucial to understand how property rights matter for firms' corporate strategy, such as scope decisions (Mahoney, 2004). However, relative to the fast growth in resource-, transaction cost–, and agency-based explanations of determinants of firm scope, the property rights–based perspective has received much less attention, despite vertical integration being one of the core questions PRT seeks to address (Grossman & Hart, 1986). Leveraging a quasi-experiment in a large economy where the property rights regime was altered, we have theorized and tested how a strengthened property rights regime—hence offering stronger protection of private property—may affect private firms' scope. First, we showed that because a strengthened property rights regime can help firms reap benefits from scope economies based on related diversification, it increases the horizontal relatedness in firms' business portfolios. Second, a strengthened regime reduces the importance of holding residual control rights in vertical relationships through owning vertically related assets, thus decreasing the vertical relatedness in firms' business portfolios. Third, we found that these effects on horizontal and vertical relatedness are less prominent for politically connected firms that are afforded informal protection of property rights.

Situated in the corporate strategy literature, our study deepens extant knowledge of the interrelationship among the property rights regime, resource investment (He, Tong, & Xu, 2022; Kim & Mahoney, 2002), and corporate scope (Silverman & Ingram, 2017). While a large stream of research explores how institutions affect firm strategy generally (Hoskisson et al., 2000; Peng, 2003), few studies have zoomed in on the role of asset ownership by applying property rights theory to theorize and empirically examine the direction of corporate investment that alters firm scope.

Furthermore, our article joins the prevailing discussion in strategic management on how the security and allocation of property rights matter for firm strategies and competitive advantage (Bel, 2018; Silverman & Ingram, 2017). Given the resource-based view's assumption of the security of resources (Foss & Foss, 2005), it is important to ask what would happen to firm behavior if secured property rights of resources cannot be taken for granted. We show that while a weak property rights regime would distort firm decisions on corporate scope, strengthening property rights helps to alleviate such distortions and restore firms' incentives to grow as prescribed by the resource-based logic. This finding, in our view, reinforces the notion that a careful resource-based analysis of firms' competitive advantage must account for the nature of the ownership of the underlying resources—a notion that demands increasing attention as emphasized in recent research on ownership competence (Foss et al., 2021).

In addition, we add value to the empirical literature on property rights. Despite its apt explanation on the logic behind firm investment and scope, PRT's predictions about firm scope is still understudied empirically at the firm level, often due to a lack of appropriate contexts and research designs (Lafontaine & Slade, 2007; Whinston, 2003). By exploiting the enactment of the property law of China that strengthened the protection of private properties, we present evidence supporting PRT's rationale for changes in firm scope. In addition, the modern PRT literature has predominantly focused on asset investment in vertical

relationships (Grossman & Hart, 1986); and extant studies on the interdependencies between horizontal scope and vertical scope have primarily examined firm- and industry-level determinants (Brahm et al., 2021; Tanriverdi˙ & Lee, 2008; Zhou & Wan, 2017). Our article thus adds to the literature by providing an account of how a strengthened property rights regime—an institutional-level determinant—affects both the horizontal and vertical relatedness among firms' businesses.

We also contribute to the literature by analyzing the role of political connections as an informal institution in moderating the effect of the formal property rights regime on corporate strategy. Specifically, our focus on how political connections function as a mechanism for the informal protection of private property and moderate the horizontal and vertical relatedness of the firm adds to recent scholarship on the general role of firms' political connections in shaping strategic choices (Jia et al., 2021). At a broader level, our study joins seminal research on the differences between politically connected and nonconnected firms (Faccio, 2010) by arguing and showing that the differences in corporate scope between the two types of firms will narrow, as the strengthening of the formal property rights regime benefits nonconnected firms more substantially.

Contributions aside, we would like to note several limitations in this study that point to fruitful future research directions. First, although we have leveraged the enactment of China's property law as an exogenous change to the formal property rights regime, it is yet to be examined whether our findings are generalizable to other contexts with stronger property rights regimes. Second, we have focused our analysis on the horizontal and vertical relatedness between a firm's businesses, and ample opportunities exist in studying the specific directions or industries that a firm seeks to expand into or exit from. Third, we believe that changes in the property rights regime may also affect the means by which firms expand, such as greenfield investments or acquisitions, or firms' decisions for obtaining and allocating resources, which may change their leverage of financial resources and expenditure in areas such as R&D. Fourth, though we use a balanced matched sample of private firms and SOEs as the treated group and control group, an ideal context would be to find exogenous variation in property rights protection among firms of the same ownership type. As property rights are a cornerstone of the governance of modern society (Acemoglu & Robinson, 2012), theoretical and empirical research applying property rights theory to further our knowledge about firm boundary decisions and their performance implications is well positioned to make significant contributions to the field of strategic management.

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Notes

1. Voluminous case studies across developing countries have been documented in De Soto (2000) and Acemoglu and Robinson (2012).

2. We also conduct a placebo test using collectively owned firms (Lu, Tao, & Yang, 2010), rather than privately owned firms, as a "treatment" group.

3. Although input-output tables are updated every 5 years, as is the standard practice (since commodity-flow coefficients across industries do not change frequently), firms' sales in each industry vary each year, so there is still substantial variation in the horizontal and vertical relatedness measures over time for each firm.

4. We ensure that all firms survived the whole sample period to eliminate confounding effects due to firm exits and entries into the sample.

5. The missing values of horizontal or vertical relatedness are imputed by applying a linear function on the nearest 2 years with nonmissing values, (t_1, y_1) and (t_2, y_2), as: $y_t = ((t - t_1)/(t_2 - t_1))(y_2 - y_1) + y_1$, where t denotes the year with missing values and y_1 denotes the imputed value of horizontal or vertical relatedness.

6. For example, Li and Cheng (2020) show that after a sudden loss of a politically connected director, rarely are private firms able to hire a replacement even within 3 years.

7. Theoretically, firms can increase their horizontal relatedness by expanding into related industries or divesting unrelated ones. Upon analyzing firms' industry entry and exit data, we find that while firms are doing both, the increase in horizontal relatedness is driven more by expanding into related businesses. Specifically, during the sample period, private firms on average entered 0.70 new industries, resulting in an increase of 0.019 units in the horizontal relatedness coefficient, and exited 0.17 old industries, resulting in a decrease of 0.005 units in the horizontal relatedness coefficient.

8. Detailed results are available upon request.

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Appendix

Table A1
Additional Robustness Checks

Variable	(1) Horizontal Relatedness	(2) Vertical Relatedness	(3) Horizontal Relatedness	(4) Vertical Relatedness
Private × Post	0.021***	−0.006***	0.021***	−0.006***
	(0.006)	(0.001)	(0.006)	(0.001)
Private × Post × Real Estate	−0.031	0.002	—	—
	(0.039)	(0.007)		
Private × Post × Monopoly	—	—	−0.006	−0.001
			(0.010)	(0.002)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.653	0.541	0.653	0.541
No. of observations	5728	5728	5728	5728

Note: This table reports regression results from additional robustness checks. Columns 1 and 2 examine potentially differential effects for the real estate sector. Columns 3 and 4 examine potentially differential effects for monopoly sectors. Monopoly industries are defined as those having entry barriers erected against foreign firms as well as against domestic privately owned firms. All models include control variables, firm fixed effects (FE), and year FE. Coefficients for control variables are suppressed for brevity. Robust standard errors are reported in parentheses.
*$p < .10$.
**$p < .05$.
***$p < .01$ (two-tailed tests).

Table A2
Subsample Regression Results for Firm Scope

Variable	(1) Horizontal Relatedness	(2) Horizontal Relatedness	(3) Vertical Relatedness	(4) Vertical Relatedness	(5) Horizontal Relatedness	(6) Horizontal Relatedness	(7) Vertical Relatedness	(8) Vertical Relatedness
Private × Post	0.021***	0.008	−0.004***	−0.002	0.014*	0.023**	−0.001	−0.011***
	(0.008)	(0.009)	(0.001)	(0.001)	(0.007)	(0.011)	(0.001)	(0.002)
Subsample	Tangible-asset ratio		Tangible-asset ratio		Location		Location	
	High	Low	High	Low	Coastal	Inland	Coastal	Inland
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.779	0.626	0.769	0.627	0.572	0.702	0.565	0.540
No. of observations	2402	3249	2402	3249	3482	2246	3482	2246

Note: This table reports difference-in-differences regression results using various subsamples. The unit of analysis is firm by year. Columns 1 to 4 split the samples into those with a tangible-asset ratio (ratio of fixed assets over total assets) above and below the median value. Columns 5 to 8 split the samples into those located in coastal and inland provinces. All models include control variables, firm fixed effects (FE), and year FE. Coefficients for control variables are suppressed for brevity. Robust standard errors are reported in parentheses.

*$p < .10$.

**$p < .05$.

***$p < .01$ (two-tailed tests).