

Production Complexity as Extraction Protection*

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Abstract

Do firms in developing countries use production complexity to avoid state extraction of their assets? For states, production complexity creates new, varied, and less visible asset extraction opportunities. For firms, production complexity can protect against asset extraction by making the production process less legible. The implication of this strategic interaction is that production complexity is an important determinant of likelihood of asset extraction by the state. I argue that firms use the complexity of their production processes to obfuscate them from the state and protect themselves from asset extraction. Interviews with firms, government officials, and NGOs in Vietnam suggest that firms manufacturing complex products take advantage of the state's lack of understanding of their production process to avoid fines, fees, and taxes. These findings reveal a novel way in which the changing global production landscape affects how firms in developing countries protect themselves from state asset extraction.

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1 Introduction

“The government generally doesn’t understand what we’re doing, we have to explain in-depth what the production process is... sometimes we debate intensely about the process and whether certain regulations apply.”

-Manager of foreign-owned firm, Vietnam¹

In Russia, amidst a wave of expropriations, firms with more complex products and processes have experienced a degree of safety. The Russian government has been hesitant to extract assets from firms producing high-tech products and those with complex supply chains, because it would be “hard to run”² their firms and they are concerned about “messing up”³ the businesses.

I argue that the experience of these firms is just one example of a broader phenomenon, brought on by rising global production complexity that has changed the nature of strategic interactions between states and firms. Complexity has risen in both the products made by firms and the processes by which they make them, both of which affect whether and how states extract assets. There are many strategies that firms can use to protect themselves from states and many determinants of whether and how states extract assets; I argue that production complexity has a place on both sides of this interaction. Crucially, I argue that production complexity can protect firms, if it surpasses the state’s capacity to extract assets from them.

Specifically, I argue that firms manipulate production complexity to protect themselves from state asset extraction. Production complexity protects firms by making their production processes more difficult to understand, disentangle, or transfer, which

¹Author interview, August 2023

²Weaver, Courtney, Max Seddon, and Adrienne Klasa. 2023. “Danone’s Chechen takeover: inside a Russian expropriation.” *Financial Times*, December 8, 2023.

³Seddon, Max and Anastasia Stognei. 2023. “Russia moves to seize ‘naughty’ western companies.” *Financial Times*, June 14, 2023.

increases the cost to the state of extracting their assets. This argument hinges on the concept of legibility: if production is not legible to the state, the state cannot extract assets from it. States adjust their asset extraction strategies in response to production complexity. Production complexity affects states' ability to extract assets from and regulate firms, as well as the strategy of extraction used and the universe of strategies available. The implication of this strategic interaction is that firms have incentives to maintain complexity even when it is inefficient, in order to make extraction less attractive to the state. This distortion can slow economic growth in developing countries.

In this project, I will assess whether, how, and how freely firms are able to control their production complexity—that is, how malleable production complexity is and how firms use that malleability to protect themselves from asset extraction. Further, I will assess how state extraction techniques respond to this.

I hypothesize that firms with greater threat of asset extraction will maintain or shift to more complex production processes, in order to decrease the legibility of their production and thus protect themselves from asset extraction. I also hypothesize that states respond to different levels of production complexity with different asset extraction strategies. Finally, I hypothesize that this incentive to manipulate production complexity leads to inefficient outcomes, namely lower rates of industrial upgrading.

To test these hypotheses, I will conduct interviews and firm-level survey experiments in two different product lines—one with low product complexity (knitted sweaters) and one with high (electronic integrated circuits)—in Vietnam, China, and Bangladesh. In addition to these methods, I will construct in-depth case studies of specific firms.

The three country cases were selected based on similarity in the independent variable, expropriation threat, after narrowing to my region of interest, East and Southeast Asia. Consideration was also given to the level of foreign direct investment and local production in the country, to ensure there would be a sufficient number of firms from which to select.⁴ These cases are thus “ideal-types,” cases where one would be most

⁴Data from the World Bank and the Observatory of Economic Complexity was used to this end;

likely to expect firms to engage in strategic manipulation of production complexity. This is useful for my research design, because my goal is to test my hypothesis rather than estimate a causal effect.

I am currently conducting interviews with firm managers, owners, and workers, as well as government officials and other elites and stakeholders in Vietnam. These interviews, and those planned in China and Bangladesh, will provide qualitative evidence for theory building, inform firm-level survey experiments, and help with case selection. The interviews are semi-structured, largely consisting of open-ended questions.

Survey experiments will then generate descriptive data for a greater number of respondents and will test how variation in firms' perceptions of extraction threat shape their production process choices, as well as how variation in production complexity shapes state asset extraction strategies. The goal of these survey experiments is to establish causal links between variation in perceptions of extraction threat and manipulation of production complexity, on the one hand, and between variation in production complexity and state asset extraction strategies, on the other. These surveys will include list and vignette experiments.

For the case studies, the sample of firms included will be designed to maximize variation in expropriation threat, while holding all other determinants of production process choices as constant as possible. Data from the surveys and interviews as well as administrative and archival data will inform firm selection for the case studies. The goal of these case studies is to provide evidence that firms make production process choices strategically in response to a change in extraction threat and how states adjust their strategies of asset extraction in response.

Preliminary findings from the 16 interviews that have been conducted thus far do not support the hypothesis that firms strategically manipulate production complexity to protect themselves from state asset extraction. Firms do not report making choices about production machinery based on concerns about state asset extraction. Instead,

see <https://data.worldbank.org/> and <https://oec.world/en>

firms report that they passively rely on the inherent complexity of their products to protect themselves from the state. Specifically, firms manufacturing relatively more complex products report that the government does not understand their product or process and that this lack of legibility helps them avoid asset extraction.

While the argument that manipulation of production complexity is a protective strategy does not seem to be supported, at least for technology adoption, these preliminary findings suggest that the likelihood of state asset extraction is partially determined by product complexity, much like asset specificity. Overall, production complexity has become an important determinant of firms' asset extraction risk, making it essential to our understanding of business-state relations.

2 Theory

In this project, I explore two questions: Do firms in developing countries strategically manipulate production complexity in response to the threat of state extraction of their assets? How do states adjust their strategies of asset extraction in response?

I argue that production complexity can protect firms, if it surpasses the state's capacity to extract assets from them. Specifically, I argue that firms manipulate production complexity to protect themselves from state asset extraction. Production complexity protects firms by making their production processes more difficult to understand, disentangle, or transfer, which increases the cost to the state of extracting their assets. This argument hinges on the concept of legibility: if production is not legible to the state, the state cannot extract assets from it. States adjust their asset extraction strategies in response to production complexity. Production complexity affects states' ability to extract assets from and regulate firms, as well as the strategy of extraction used and the universe of strategies available. The implication of this strategic interaction is that firms have incentives to maintain complexity even when it is inefficient, in order to make extraction less attractive to the state.

In the first part of this section I define my terms. In the second, I outline the behavior and incentives of both states and firms, explain my argument, and detail how the interaction of those two actors affects economic outcomes.

2.1 Definitions

2.1.1 Production Complexity

Production complexity for a specific product-line is comprised of two interrelated pieces: the inherent complexity of making the product (product complexity) and the complexity of the production process (process complexity). Semiconductors have higher product complexity than t-shirts; it is an inherent characteristic of semiconductors that they are more complex to produce than t-shirts. Product complexity is defined by the capabilities required to produce a product.⁵ Products that require a more varied and complex set of capabilities are more complex products (Felipe et al. 2011). In sum, product complexity is an inherent characteristic of a product that determines the minimum production complexity needed to produce it.

Product complexity is an inherent characteristic of a product, which determines the minimum threshold of its production complexity, but *process complexity* is malleable. Both semiconductors and t-shirts can be produced with higher process complexity than is required by the minimum threshold implied by each product's complexity. T-shirts could be produced with standard, easy to use machinery, or with a one-of-a-kind machine that requires special skills to operate. In general, a complex process is one that is difficult to understand, disentangle, or transfer (Muketha et al. 2010). A complex process is not necessarily inefficient; it is theoretically possible that making a t-shirt with a one-of-a-kind machine is the most cost-effective production process.

⁵Capabilities are: "(i) the set of human and physical capital, the legal system, institutions, etc. that are needed to produce a product (hence, they are product-specific, not just a set of amorphous factor inputs); (ii) at the firm level, they are the "know-how" or working practices held collectively by the group of individuals comprising the firm; and (iii) the organizational abilities that provide the capacity to form, manage, and operate activities that involve large numbers of people." (Felipe et al. 2011, 37).

2.1.2 Asset Extraction

Asset extraction encompasses many behaviors, such as taxation, nationalization, local content requirements, and currency transfer restrictions. Regardless of legality or the firm's ownership status, these actions all serve to transfer some portion of a firm's assets to the government or its supporters. I use this term in part in order to study a broader group of behaviors and actors than terms such as "infringement of property rights" and "expropriation" would allow. Expropriation is generally used in the literature in reference to foreign-owned firms and infringement of property rights implies illegality, but I am also interested in domestic firms and legal behavior. I also use this term to remain normatively neutral about both firm and state behavior in this area—states have incentives to regulate and extract value from firms, and firms have incentives to avoid both to maximize profits. Whether their means to meet those ends are legal or justified is not my focus in this project.

2.2 Argument

The two actors I focus on are states and firms. I limit the scope of my argument to manufacturing firms, both domestic and foreign-owned, in developing countries. Firms have an incentive to maximize profits, and must protect their assets to do so. Firms in developing countries are often concerned with protecting their assets from government expropriation, corruption, and political risk. They must make decisions with protection of their assets in mind.

States have an incentive to retain power. They use many methods to achieve this, but I focus on economic means, specifically extracting the most benefit from firms at the lowest cost. Developing countries are concerned with economic growth and supporting the state with tax revenue, but must often balance this with the conflicting goal of enriching their supporters. They must also balance the benefits of industrialization with its costs. Developing countries often lack institutional capacity and strong rule of

law, and must try to meet their goals despite these limitations.

There are many strategies that firms can use to protect themselves from states and many determinants of whether and how states extract assets; I argue that production complexity has a place on both sides of this interaction. Firms manipulate production complexity to protect themselves from state asset extraction. States adjust their asset extraction strategies in response to production complexity. The implication of this strategic interaction is that firms have incentives to maintain complexity even when it is inefficient, in order to make extraction less attractive to the state. This distortion can slow economic growth in developing countries.

The prevailing assumption in the literature is that firms make choices about production based only on what is most efficient to maximize their profits, but leaving the institutional context out overlooks the many ways firms' production processes are affected by the institutional environment. Incorporating this leads to the counterintuitive prediction that the production process itself can be manipulated as a protective strategy, and that firms are sometimes intentionally complex even when it is inefficient.

This theoretical analysis extends prior work that explores other reasons firms are intentionally inefficient, namely to retain market power and receive subsidies. Large, rent-seeking firms sometimes maintain inefficient production processes that keep production costs high, which prevents entrants from gaining a foothold in the market (Akcigit et al. 2018, Kim 2018, Hellman et al. 2003). Politically important firms sometimes take advantage of their position by maintaining inefficient production processes so they remain eligible for subsidies (Baldwin and Robert-Nicoud 2007, Fang et al. 2018, Gustafsson et al. 2019). This work broadens the scope by not only focusing on large, corrupt, or politically important firms, but arguing that the institutional environment can create perverse incentives for many types of firms.

Overall, production complexity has become an important determinant of firms' asset extraction risk, making it essential to our understanding of business-state relations. Using this framework can also help us understand a range of trends in firm behaviors,

such as the high rate of informality in developing economies (Ulyssea 2020), the puzzle of low industrial upgrading (Verhoogen 2023), and the ubiquity of fragmented supply chains (Steinberg 2023). It also contributes to the literature on informal risk-mitigating strategies of multinational corporations (see, e.g., Xu 2024). Most broadly, this theoretical analysis contributes another mechanism to the wide-ranging, long-standing literature on political determinants of economic growth.

2.2.1 State Incentives and Behavior

States have incentives to get the greatest benefit from firms at the least cost. Benefits from firms include tax revenue, rents, enrichment of supporters, and economic growth. States must balance these conflicting goals between their supporters and the public in order to retain power. Excessive enrichment of supporters, for example, will decrease economic growth and may create discontent among the public. On the other side, there are a number of social, environmental, economic, and political costs of industrialization that states may choose to regulate. Pollution, for example, is a cost of manufacturing that states often regulate. States must similarly balance regulating these costs with the benefits industrialization can bring, because regulation may dampen the business environment.

States use many strategies in order to extract value from and regulate firms. The most extreme form of extraction is outright seizure and transfer of ownership of a firm's assets. States also employ less direct forms of expropriation, such as forced contract renegotiation and currency transfer restrictions (Esberg and Perlman 2022, Pelc 2017, Olynyk 2019, Knahr 2009, Graham et al. 2018). These indirect forms of expropriation may not transfer revenue to the state in the same way that nationalization would, but still enrich the state or its supporters and decrease the value of firms' assets. States may choose to use these less conspicuous forms of expropriation to lessen the economic, social, and political costs of expropriation as compared to outright nationalization (Esberg and Perlman 2022). For example, a state may force a firm to contract with

a politically connected or state-owned firm. This action does not transfer ownership, but does enrich the state’s supporters and may lessen the value of the firm’s assets.

In addition to actions that can (relatively) clearly be considered expropriation, there are many actions that blur the line between “legitimate regulation” and indirect expropriation (Olynyk 2019), such as local content or ownership requirements, forced technology transfer, taxation, and regulations for health, environmental, or social goals. From the states’ perspective, these actions are intended to develop the economy or lessen the costs of industrialization, but may decrease the value of firms’ assets or simply be considered unreasonable, confiscatory, or onerous by the firm (Olynyk 2019). Regulations to formally register a business, for example, might be intended to protect labor or collect legitimate tax revenue, but many firms find them costly and choose to remain informal (Ulyssea 2020).

I argue that production complexity affects states’ ability to extract assets from and regulate firms. As production increases in complexity, the state’s technological capacity must increase in order to extract and repurpose assets, and to successfully regulate firms.⁶ In developing countries, the state’s capacity may be too low to repurpose a firm’s assets, meaning the state lacks the capacity to run the firm itself (Opp 2012, Haber et al. 2003, Johns and Wellhausen 2016). It may also lack the capacity to use other forms of asset extraction, beyond transfer of ownership. Most developing countries lack the local capacity to produce the inputs for semiconductors, for example, so extracting value from firms producing semiconductors using local content requirements would be infeasible. Even determining the relevance of regulations can be difficult, as the opening quote to this paper suggests, if the production process is beyond the state’s technological capability or understanding. If a product or process is beyond the state’s capacity to understand, replicate, or transfer, it will be less likely to extract assets from or regulate it. Production complexity is therefore a key determinant of states’ ability

⁶This is a problem all states face, regardless of level of development. In advanced economies, however, states generally struggle to regulate new technology (e.g. artificial intelligence) rather than existing technology.

to extract from and regulate firms. Put another way, production complexity, like asset specificity (Vernon 1971, Frieden 1994), is a key determinant of whether a firm's assets will be extracted.

In addition to production complexity affecting the ability of a state to extract assets, it also affects the strategy of extraction used and the universe of strategies available. First, production complexity affects the strategy of asset extraction the state uses. States often favor production of complex products in order to move up the value chain and create economic growth. Therefore, when the product being produced is complex, the state may be more likely to use asset extraction strategies that aim to transfer technology or knowledge and shy away from heavy-handed regulation or taxation that could deter production. Also, as implied above, if production complexity makes it infeasible or too costly to use an extraction strategy, the state will shift to another strategy. States therefore adjust their asset extraction strategies in response to production complexity.

Second, rising production complexity creates new, varied, and less visible asset extraction opportunities for states. As firms change the products they make and the processes by which they make them, states similarly have a new universe of actions they can take to extract value from firms. For example, many multinational corporations rely on a system of subcontractors and subsidiaries to avoid asset extraction. Firms must follow the arms length principle in their transfer pricing between these entities, meaning that when moving assets between internal entities, they must charge the same price as they would to an outside entity (i.e. an entity "at arms length"). But there are many ways to estimate what a firm might charge an outside entity, and firms have an incentive to underestimate in order to drive down their apparent profits and avoid taxation. States therefore regulate the band of estimates that can be used. A strategy states can use to extract more value from firms is raising the floor of this band, so that firms' profits are higher and the state can collect more tax revenue from them, a policy

Vietnam instituted in 2020.⁷ In sum, firms have increased production complexity by fragmenting their supply chains and creating layered ownership structures, and states respond to this production complexity by using a new asset extraction strategy. Overall, it is clear that production complexity affects states' ability to extract assets and regulate firms, the strategy they use to do so, and the universe of strategies available to them.

2.2.2 Firm Incentives and Behavior

Firms are concerned with maximizing profits, and must protect their assets to do so. Production complexity protects firms by making their production processes more difficult to understand, disentangle, or transfer, which increases the cost to the state of extracting their assets. If a resource-constrained state must devote more resources to tax, regulate, replicate, or make use of a firm's assets, it will be less likely to do so, all else equal.

There are many actions firms can take to increase their production complexity. Firms might seek to make their assets less transferrable by relying on personal relationships in their production processes, for example by using informal contracts with workers and suppliers, or using workers rather than labor-saving machines.⁸ If the firm's ownership is forcibly changed, it is more difficult to transfer relationship-based assets than formal contracts or machines.⁹ Firms might seek to make their assets more difficult to understand or disentangle by fragmenting their supply chains, using specific inputs, creating cross-national ownership structures, creating cross-national supply-chains, or using technologically advanced processes. If the state does not understand how the process works, how the pieces of the process fit together, or who owns each

⁷Eddy Malesky and Mimi Song, "Audits on the Rise in Vietnam," June 8, 2021, in *The Fiona Show: Transfer Pricing*, produced by Andrew O'Donnell, podcast, <https://iono.fm/e/1051906>

⁸Note the difference here between process complexity and sophistication. Using labor rather than machines is complex by my definition, because it makes it more difficult to transfer assets, but is clearly the less sophisticated process.

⁹This is similar to the idea that firms struggling with agency issues, namely malfeasance on the part of managers, often hire family members as managers, with the assumption that family members are more likely to act in the interests of the firm (Verhoogen 2023, Cai et al. 2013, Tsoutsoura 2021). In both cases, firms respond to a threat by relying on personal relationships.

piece, it is more difficult to extract value from the process, and by extension from the firm. In other words, if a firm's production is not legible to the state, the state cannot extract assets from it. Returning to the t-shirt example, using a one-of-a-kind machine (a specific input) requires more resources for the state to understand than the standard process, making it more costly for the state to determine how to tax, regulate, replicate, or reuse that asset.¹⁰

Manipulation of production complexity is just one of many strategies firms use to protect themselves from asset extraction. If the asset extraction is illegal, the first line of defense is the legal system. But if the court system is corrupt or not independent of the state, firms may not trust that their assets will be protected. Foreign-owned firms often rely on international institutions, such as bilateral investment treaties (see Pandya 2016 for a review of this literature). Domestic firms may also rely on these treaties by forming financial relationships with foreign firms (Betz and Pond 2019). Outside of these formal institutions, there are many informal protective actions that firms take to protect themselves from asset extraction, whether that extraction is illegal or legal. These include cross-national financing structures (Henisz 2000, Chen and Xu 2023, Betz and Pond 2019), political connections (Gehlbach et al. 2010, Hellman et al. 2003, Razo 2021, Fisman 2001, Faccio 2006), bribing local officials (Pinto and Zhu 2016, Xu 2024), reliance on organized crime networks (Frye 2002, Gambetta 1993, Mehlum et al. 2002, Volkov 2016), remaining informal (Wong 2023, see Ulyssea 2020 for a review), and creating supply-chain links with other firms (Markus 2012, Johns and Wellhausen 2016).

I argue that manipulation of production complexity is another category of informal risk-mitigation strategies, and that some previously studied strategies also protect firms using this mechanism. Cross-national supply-chain links, in addition to incentivizing firms to protect one another, as Johns and Wellhausen (2016) argue, can also protect

¹⁰This is a similar idea to scholarship that focuses on how a technological gap between a firm and the government can protect a firm's property rights, because the government lacks the capacity to run the firm itself (Opp 2012, Haber et al. 2003, Johns and Wellhausen 2016).

firms by making it more difficult for the government to understand the production process, disentangle specific portions of it, or transfer those portions; in other words, by increasing production complexity (Choi and Krause 2006, Bozarth et al. 2009). Similarly, cross-national ownership structures, in addition to tying the fortunes of foreign and domestic firms together, as Henisz (2000) argues, can also protect firms by making it more complex to tax, regulate, replicate, or otherwise extract firms' assets. I also argue that informality as a whole belongs in the production complexity category, because it makes transfer of assets more difficult and decreases legibility, thus making transfer of assets more difficult. In addition to these existing strategies, I add those I discussed above: non-transferrable assets, fragmenting the supply chain, using specific inputs, and using technologically advanced processes.

There are many considerations besides protection from asset extraction that affect firms' production complexity. An increase in production complexity can happen as a side effect of meeting other ends. Firms with labor standards or environmental concerns may make production choices that increase production complexity, but do so in service of these concerns, not as a protective action. Regulatory compliance can similarly have increased production complexity as a side effect. Firms may also increase production complexity intentionally, but with a goal other than protection. Production complexity can serve a branding purpose, to differentiate a product from competitors.¹¹ Firms with market power may increase production complexity to maintain their market power, by making it more difficult for competitors to enter the market (Akcigit et al. 2018, Kim 2018, Hellman et al. 2003). Firms in key industries may intentionally slow production, sometimes by increasing production complexity, in order to remain eligible for subsidies (Baldwin and Robert-Nicoud 2007, Fang et al. 2018, Gustafsson et al. 2019). Distinguishing production complexity as a protective action from other sources of production complexity requires determining firms' intent, which I recognize has a high evidentiary bar. It must be intentional—not a side effect of some other goal—and

¹¹Consider, for example, products that are branded as using the “highest tech” processes on the market.

also have the goal of decreasing legibility, rather than profit-seeking, rent-seeking, or subsidy-trawling.

Firms may use production complexity in tandem with or in lieu of other protective actions. Manipulating production complexity is relatively low-cost and difficult to detect and prove. For some firms—particularly domestic, small firms without political connections or capital—decreasing their legibility to the state and making their assets less transferrable may be some of few options available to them. For other firms—generally larger and foreign-owned firms—it is used along with other protective actions.

2.2.3 Effects of Production Complexity

Production complexity has become an important determinant of firms' asset extraction risk, making it essential to our understanding of business-state relations. Manipulation of production complexity, as a strategy firms use and states react to, contributes to our understanding of the informal risk-mitigating strategies of multinational corporations (see, e.g., Xu 2024). But manipulating production complexity also has important implications: firms that have incentives to maintain production complexity as a protective action will maintain that complexity even when it is inefficient. This can have negative repercussions for firms' growth—and by extension for economic growth overall.

Specifically, I argue that incentives to manipulate production complexity can help us understand the puzzle of low industrial upgrading. Industrial upgrading refers to the process whereby firms in developing economies adopt advanced technologies and products from more developed economies (Verhoogen 2023). These firms are catching up to the technology frontier rather than pushing it out. Industrial upgrading is critical for economic development (Kharas and Gill 2020), but firms in developing countries often do not upgrade, even though the technology is available (Verhoogen 2023). This is a puzzle, because upgrading would help these firms grow without the need for local

innovation.¹² It is clear that there are structural impediments to industrial upgrading (Verhoogen 2023, Atkin et al. 2017b), but it is not clear what those impediments are.

I argue that incentives to manipulate production complexity are a structural impediment to industrial upgrading. If state asset extraction is a concern, firms have incentives to maintain or increase production complexity. In this context, firms will not upgrade their production process if upgrading would decrease production complexity, even if upgrading would increase efficiency. In short, the threat of state asset extraction can make upgrading costly to the firm, depressing industrial upgrading and creating inefficient outcomes.

The argument that firms make production choices based on concerns about extraction rather than efficiency can also help us understand other firm behaviors, such as the high rate of informality in developing economies (Ulyssea 2020). That firms often choose to remain informal to avoid taxation and regulation is not a new idea (see, e.g., Schneider and Enste 2000), but I argue that the framework of production complexity can elucidate the mechanism at work. Informality in general, i.e. production that is hidden from public authorities (Wong 2023), is protective because by definition it makes the firm less legible to the state. Informality is thus a form of production complexity, in the sense that it operates by obfuscating the firm’s activities from the state. Moreover, informality within production processes, such as informal contracts with workers or suppliers, protects the firm by creating a non-transferrable asset. Processes based on personal relationships are more difficult to transfer to new ownership than those that have been formalized.

Overall, incentives to make production processes difficult for the state to understand, disentangle, or transfer can lead firms to inefficient outcomes, including unnecessarily complex production processes, unwillingness to upgrade their processes, and a retreat to informality. Most broadly, this theoretical analysis contributes another mechanism to the wide-ranging, long-standing literature on institutional determinants

¹²This idea is sometimes referred to as the “advantages of backwardness” (Gerschenkron 1962).

of economic growth.

3 Method

To test these hypotheses, I will conduct interviews and firm-level survey experiments in two different product lines—one with low product complexity (knitted sweaters) and one with high (electronic integrated circuits)—in Vietnam, China, and Bangladesh. In addition to these methods, I will construct in-depth case studies of specific firms.

The three country cases were selected based on similarity in the independent variable, expropriation threat, after narrowing to my region of interest, East and Southeast Asia. All three countries rank in the bottom half of their region according to the World Justice Project’s Rule of Law Index.¹³ For example, Vietnam has, since 2015, consistently been ranked as the second or third worst country in East Asia for regulatory enforcement, the category that includes a measure for “unlawful expropriation without adequate compensation.” Consideration was also given to the level of foreign direct investment and local production in the country, to ensure there would be a sufficient number of firms from which to select.¹⁴ These cases are thus “ideal-types,” cases where one would be most likely to expect firms to engage in strategic manipulation of production complexity. This is useful for my research design, because my goal is to test my hypothesis rather than estimate a causal effect.

I am currently conducting in-country interviews with firm managers, owners, and workers, as well as government officials and other elites and stakeholders. These interviews will provide qualitative evidence for theory building, inform firm-level survey experiments, and help with case selection. Specifically, the interviews will help test how malleable production complexity is and how firms use that malleability to protect themselves from asset extraction. They will also assess firms’ beliefs about how success-

¹³<https://worldjusticeproject.org/rule-of-law-index/>

¹⁴Data from the World Bank and the Observatory of Economic Complexity was used to this end; see <https://data.worldbank.org/> and <https://oec.world/en>

ful this strategy is and their perceptions of extraction threat. Interviews with officials will assess whether they believe firms use this strategy and how their asset extraction techniques change in response. The interviews are semi-structured, largely consisting of open-ended questions. The list of questions can be found in Appendix A. Simultaneous English to Vietnamese translation is used when necessary. As with all interviews, social desirability bias is a limitation of this approach, which will be addressed using list experiments in the surveys, discussed below. Interviewees are identified through Chambers of Commerce, government websites, and professional connections. I also conduct snowball sampling from existing interviewees.

Survey experiments will then generate descriptive data for a greater number of respondents and will test how variation in firms' perceptions of extraction threat shape their production process choices, as well as how variation in production complexity shapes state asset extraction strategies. The goal of these survey experiments is to establish causal links between variation in perceptions of extraction threat and manipulation of production complexity, on the one hand, and between variation in production complexity and state asset extraction strategies, on the other. These surveys will include list and vignette experiments. The list experiments are intended to circumvent social desirability bias to test whether firms manipulate production complexity and how widespread the practice is. The vignette experiments will test whether firms manipulate production complexity in response to a change in perceptions of extraction threat, and whether the state adjusts its asset extraction strategies in response to a change in a firm's production complexity. The central concern with this method, particularly for firm-level surveys, is a low response rate. I am hopeful that leveraging the connections I make during the interviews will help address this issue.

For the case studies, the sample of firms included will be designed to maximize variation in expropriation threat, while holding all other determinants of production process choices as constant as possible. Data from the surveys and interviews as well as administrative and archival data will inform firm selection for the case studies. The goal

of these case studies is to provide evidence that firms make production process choices strategically in response to a change in extraction threat and how states adjust their strategies of asset extraction in response. A limitation of this approach is the concern that the findings are not generalizable; the survey experiments will help ameliorate this to some extent.

There are myriad alternate explanations for a firm's choice to maintain or increase production complexity that are unrelated to threat of state asset extraction. Most obviously, it could be the case that the products a firm makes simply necessitate complex production processes. To disentangle this, I focus on two specific product lines, one where the product itself is simple (knitted sweaters) and one where the product is more complex (electronic integrated circuits). The goal of this approach is to isolate product complexity from process complexity, my variable of interest. There are also many other factors that affect firms' production choices, such as environmental concerns and rent-seeking. Although a randomized control trial would be ideal to isolate causality, it is infeasible to randomly vary firms' asset extraction threat. Furthermore, the behavior I am interested in is subtle, possibly illicit, and not captured in existing datasets.¹⁵ A multi-method approach is necessary to rule out these alternate explanations and address all of these considerations. Although the survey experiments are designed to isolate manipulation of production complexity as a strategy firms pursue and that it is one of several possible strategies they might use in response to concerns about state extraction, the case studies are necessary to demonstrate that they pursue this strategy in response to a change in the threat of state asset extraction. In other words, the survey experiments isolate the behavior, but the case studies demonstrate that when that behavior is used is causally consistent.

Together the goal of these methods is to demonstrate that production complexity is malleable, that firms manipulate it, that they do so in response to the threat of state asset extraction, and that it is a barrier to asset extraction. To do so requires

¹⁵The one exception I am aware of is the World Bank's Enterprise Surveys, which has a section on innovation in manufacturing processes, but coverage across both countries and years is low.

four foundational pieces of evidence: 1) there is variation in government understanding of production processes, 2) firms perceive this (lack of) understanding as useful, 3) firms find it useful specifically to avoid state asset extraction, and 4) firms manipulate production process to decrease legibility to the government.

4 Preliminary Findings

As of May 2024, I have conducted 16 interviews in Vietnam, six with firm managers and directors (2 textiles, 4 electronics), one with a government official, five with NGOs, one with an investor, and two with academics.

Recall that my goal is to demonstrate that production complexity is malleable, that firms manipulate it, that they do so in response to the threat of state asset extraction, and that it is a barrier to asset extraction. To do so requires interview evidence of four things: 1) there is variation in government understanding of production processes, 2) firms perceive this (lack of) understanding as useful, 3) firms find it useful specifically to avoid state asset extraction, and 4) firms manipulate production process to decrease legibility to the government.

Beginning with 1 (there is variation in government understanding of production processes), the interviews I have conducted thus far confirm that there is variation in government understanding of production processes and that it varies by product. Interviewees manufacturing electronics report that the government does not understand their firms' products or production processes. Interviewees manufacturing knitted textiles, the less complex product, have given mixed responses. Of two interviews with textiles firms, one reports that "the government generally doesn't understand what we're doing, we have to explain in-depth what the production process is... sometimes we debate intensely about the process and whether certain regulations apply."¹⁶ The other reported that the government does understand both their firm's products and

¹⁶Manager of foreign-owned firm, textile industry, Vietnam, author interview, August 2023

process, because the textile industry in general has been long-standing in Vietnam.¹⁷ On balance, these findings seem to support the hypothesis that there is variation in government understanding of production processes and that it varies by product complexity.

Next, 2 and 3: is this (lack of) understanding useful for the firm? Why? Interviewees in the electronics industry admit that the government’s lack of understanding is helpful for them in avoiding regulations and taxation, largely because the government is less likely to catch discrepancies in paperwork if they don’t understand the product and process. Several anecdotes were shared, including a case where an employee in a partially government owned company has been embezzling from the company by reporting a lower price to auditors for the products sold, while charging buyers a higher price, and pocketing the difference. The interviewee asserted that the auditors have not caught the embezzler “because they don’t understand the differences in the products”, so the fact that the reported price does not match the product sold is not obvious to the government auditors.¹⁸ Several other interviewees report that they are able to misreport on their environmental reports, in such a way that the firm’s costs are lowered, thanks to the lack of understanding.¹⁹ By contrast, both interviewees in the textile industry asserted that they follow on the regulations. However, in both cases they asserted that this was due to foreign influence in the company as opposed to concern about being punished by the local government. In one case the company is US owned, and in the other the main client is a US based brand. Both implied that any unlawful behavior on their part would lead to bad outcomes for the company.²⁰

Finally, 4: do firms make decisions about technology adoption based on the institutional environment? Specifically, do concerns about state asset extraction prevent technology adoption? While some interviewees agree that technology adoption is held back by the institutional environment, none have thought this is because of concerns

¹⁷ Author interview, April 2024

¹⁸ Author interview, April 2024

¹⁹ Author interviews, April 2024

²⁰ Author interviews, August 2023 and April 2024

about state asset extraction, in some cases stating that lack of investment is in part because of the uncertain regulatory environment. However, some firms have noted that production machinery must be imported and that there are institutional barriers to importing this machinery (specifically there is a high incidence of rent-seeking by customs officials), which can slow their production.

5 Discussion

Recall that my definition of production complexity for a specific product-line is comprised of two interrelated pieces: the inherent complexity of making the product (*product* complexity) and the complexity of the production process (*process* complexity). Overall, my hypothesis that *process* complexity is malleable and firms manipulate it to protect their assets seems to be unsupported. Firms do not report making choices about their production machinery based on concerns about state asset extraction. However, firms do report that *product* complexity is protective; specifically, firms manufacturing more complex products (electronics) report that the government does not understand their product or process and that this lack of understanding helps them avoid asset extraction. These preliminary findings suggest that the likelihood of state asset extraction is partially determined by the product complexity, much like asset specificity. But the argument that manipulation of production complexity is a protective strategy does not seem to be supported, at least for technology adoption.

Despite the absence of evidence for the hypothesis that firms strategically manipulate process complexity, it is not evidence of absence. As mentioned in the findings section, firms have reported that there are institutional barriers to importing machinery. This is a recent finding that I have not yet had the opportunity to follow up on, but I intend to focus on this issue in future interviews. It may be the case that concerns about state extraction during machinery imports lead firms to alter their production process to decrease their legibility to the state. Moreover, thus far I have focused my

interview questions about process complexity on technology adoption, specifically production machinery. However, there are many other areas where firms might manipulate process complexity, for example by decreasing their capital to labor ratio. Determining what other kinds of process complexity firms are most likely to manipulate is a key next step in the project.

In addition to conducting interviews, I have collected several data sources during my fieldwork that I hope to include in the project. I have access to a dataset that includes, among other things, product level information for all firms, foreign and domestic, within industrial parks in one province. It is possible that this data, combined with some other data source showing variation in my independent variable (threat of state asset extraction), could be a viable path forward. I have also learned that firms joining industrial parks in that province are required to report their process of manufacturing and a description of technology used, another piece of data that has promise. Another possible path forward is to rely on a recent, largely exogenous, increase in the corporate tax rate. This shock to state asset extraction could have different effects on firms depending on their level of production complexity.

Finally, if the hypothesis about *process* complexity manipulation is ultimately unsupported, the finding about *product* complexity is still a contribution. Demonstrating that this finding is robust will require considerable further research, most obviously by providing evidence that product complexity is distinct from asset specificity.

References

- Akcigit, Ufuk, Salome Baslandze, and Francesca Lotti. 2020. “Connecting To Power: Political Connections, Innovation, And Firm Dynamics.” NBER Working Paper No. 25136.
- Atkin, David, Azam Chaudhry, Shamyla Chaudry, Amit K. Khandelwal, and Eric Verhoogen. 2017. “Organizational Barriers to Technology Adoption: Evidence from Soccer-Ball Producers in Pakistan.” *The Quarterly Journal of Economics* 132 (3): 1101–64.
- Baldwin, Richard, and Frederic Robert-Nicoud. 2007. “Entry and Asymmetric Lobbying: Why Governments Pick Losers.” *Journal of the European Economic Association* 5 (5): 1064–93.
- Betz, Tim, and Amy Pond. 2019. “Foreign Financing and the International Sources of Property Rights.” *World Politics* 71 (3): 503–41.
- Bozarth, Cecil C., Donald P. Warsing, Barbara B. Flynn, and E. James Flynn. 2009. “The Impact of Supply Chain Complexity on Manufacturing Plant Performance.” *Journal of Operations Management* 27 (1): 78–93.
- Cai, Hongbin, Hongbin Li, Albert Park, and Li-An Zhou. 2013. “Family Ties and Organizational Design: Evidence from Chinese Private Firms.” *Review of Economics and Statistics* 95 (3): 850–67.
- Chen, Frederick R., and Jian Xu. 2023. “Partners with Benefits: When Multinational Corporations Succeed in Authoritarian Courts.” *International Organization* 77 (1): 144–78.
- Choi, Thomas Y., and Daniel R. Krause. 2006. “The Supply Base and Its Complexity: Implications for Transaction Costs, Risks, Responsiveness, and Innovation.” *Journal of Operations Management* 24 (5): 637–52.
- Esberg, Jane, and Rebecca Perlman. 2023. “Covert Confiscation: How Governments

Differ in Their Strategies of Expropriation.” *Comparative Political Studies* 56 (1): 3–35.

Faccio, Mara. 2006. “Politically Connected Firms.” *The American Economic Review* 96 (1): 369–86.

Fang, Lily, Josh Lerner, Chaopeng Wu, and Qi Zhang. 2018. “Corruption, Government Subsidies, And Innovation: Evidence From China.” NBER Working Paper No. 25098.

Felipe, Jesus, Utsav Kumar, Arnelyn Abdon, and Marife Bacate. 2012. “Product Complexity and Economic Development.” *Structural Change and Economic Dynamics* 23 (1): 36–68.

Fisman, Raymond. 2001. “Estimating the Value of Political Connections.” *American Economic Review* 91 (4): 1095–1102.

Frieden, Jeffrey. 1994. “International Investment and Colonial Control: A New Interpretation.” *International Organization* 48 (4): 559–93.

Frye, Timothy. 2002. “Private Protection in Russia and Poland.” *American Journal of Political Science* 46 (3): 572.

Gambetta, Diego. 1993. *The Sicilian Mafia: The Business of Private Protection*. Cambridge, MA: Harvard University Press.

Gehlbach, Scott, Konstantin Sonin, and Ekaterina Zhuravskaya. 2010. “Businessman Candidates.” *American Journal of Political Science* 54 (3): 718–36.

Gerschenkron, Alexander. 1962. *Economic Backwardness in Historical Perspective: A Book of Essays*. United Kingdom: Belknap Press of Harvard University Press.

Graham, Benjamin A. T., Noel P. Johnston, and Allison F. Kingsley. 2018. “Even Constrained Governments Take: The Domestic Politics of Transfer and Expropriation Risks.” *Journal of Conflict Resolution* 62 (8): 1784–1813.

Gustafsson, Anders, Patrik Gustavsson Tingvall, and Daniel Halvarsson. 2020. “Subsidy Entrepreneurs: An Inquiry into Firms Seeking Public Grants.” *Journal of Industry,*

Competition and Trade 20 (3): 439–78.

Haber, Stephen, Noel Maurer, and Armando Razo. 2003. “When the Law Does Not Matter: The Rise and Decline of the Mexican Oil Industry.” *The Journal of Economic History* 63 (1): 1–32.

Hellman, Joel S, Geraint Jones, and Daniel Kaufmann. 2003. “Seize the State, Seize the Day: State Capture and Influence in Transition Economies.” *Journal of Comparative Economics* 31 (4): 751–73.

Henisz, W. 2000. “The Institutional Environment for Multinational Investment.” *Journal of Law, Economics, and Organization* 16 (2): 334–64.

Johns, Leslie, and Rachel Wellhausen. 2016. “Under One Roof: Supply Chains and the Protection of Foreign Investment.” *American Political Science Review* 110 (1): 31–51.

Kharas, Homi, and Indermit Gill. 2020. “Growth Strategies to Avoid the Middle-Income Trap.” In *Trapped in the Middle?*, by Homi Kharas and Indermit Gill, 24–47. Oxford University Press.

Kim, Tae. 2017. “Does a Firm’s Political Capital Affect Its Investment and Innovation?” *SSRN Electronic Journal*.

Knahr, Christina. 2010. “Indirect Expropriation in Recent Investment Arbitration.” *Austrian Review of International and European Law Online* 12 (1): 83–102.

Markus, Stanislav. 2012. “Secure Property As A Bottom-Up Process: Firms, Stakeholders, and Predators in Weak States.” *World Politics* 64 (2): 242–77.

Mehlum, Halvor, Karl Ove Moene, and Ragnar Torvik. 2002. “Plunder & Protection Inc.” *Journal of Peace Research* 39 (4): 447–59.

Muketha, G.M., A.A.A. Ghani, M.H. Selamat, and R. Atan. 2010. “A Survey of Business Process Complexity Metrics.” *Information Technology Journal* 9 (7): 1336–44.

Olynyk, Stephen. 2012. “A Balanced Approach to Distinguishing between Legitimate Regulation and Indirect Expropriation in Investor-State Arbitration.” *International*

- Trade and Business Law Review* 15: 254–96.
- Opp, Marcus M. 2012. “Expropriation Risk and Technology.” *Journal of Financial Economics* 103 (1): 113–29.
- Pandya, Sonal S. 2016. “Political Economy of Foreign Direct Investment: Globalized Production in the Twenty-First Century.” *Annual Review of Political Science* 19 (1): 455–75.
- Pelc, Krzysztof J. 2017. “What Explains the Low Success Rate of Investor-State Disputes?” *International Organization* 71 (3): 559–83.
- Pinto, Pablo M., and Boliang Zhu. 2016. “Fortune or Evil? The Effect of Inward Foreign Direct Investment on Corruption.” *International Studies Quarterly* 60 (4): 693–705.
- Razo, Armando. 2021. “Network Structure and Performance of Crony Capitalism Systems Credible Commitments without Democratic Institutions.” *Public Choice* 189 (1–2): 115–37.
- Schneider, Friedrich, and Dominik H Enste. 2000. “Shadow Economies: Size, Causes, and Consequences.” *Journal of Economic Literature* 38 (1): 77–114.
- Sell, Susan K., and Aseem Prakash. 2004. “Using Ideas Strategically: The Contest Between Business and NGO Networks in Intellectual Property Rights.” *International Studies Quarterly* 48 (1): 143–75.
- Steinberg, Jessica. 2023. “Structure and Context: A Multi-Level Approach to Supply Chain Governance.” *Annual Review of Political Science* 26 (1): 411–29.
- Streeck, Wolfgang, Jurgen Grote, Volker Schneider, and Jelle Visser, eds. 2005. *Governing Interests: Business Associations Facing Internationalism*. London: Routledge.
- Tsoutsoura, Margarita. 2021. “Family Firms and Management Practices.” *Oxford Review of Economic Policy* 37 (2): 323–34.
- Ulyssea, Gabriel. 2020. “Informality: Causes and Consequences for Development.”

Annual Review of Economics 12 (1): 525–46.

Verhoogen, Eric. 2023. “Firm-Level Upgrading in Developing Countries.” *Journal of Economic Literature* 61 (4): 1410–64.

Vernon, Raymond. 1971. *Sovereignty at Bay: The Multinational Spread of U.S. Enterprises*. New York, NY: Basic Books.

Volkov, Vadim. 2016. *Violent Entrepreneurs: The Use of Force in the Making of Russian Capitalism*. Ithaca: Cornell University Press.

Wong, Mathew Y H. 2023. “Economic Development, Corruption, and Income Inequality: The Role of the Informal Sector.” *Politics*, January, 026339572211489.

Xu, Jian. 2024. “Double Jeopardy: FCPA Enforcement and MNC Risk-Mitigation Strategies.” *Asian Review of Political Economy* 3 (1): 1.

Appendix A

Questions for firms:

- What is your firm's legal form? (e.g. joint-stock, limited liability, sole proprietorship, etc.)
 - Follow up: if joint venture, why?
- What are your main products? How did you decide what to produce?
- What is the production process?
 - Follow up: why?
- Please tell me how your firm is organized. How many managers are there per worker?
 - Follow up: ask about personal connections
 - Follow up: who knows the most in your company about the production process?
- Please tell me about your suppliers and buyers. Do you prefer to contract with domestic or foreign firms? How do you choose which firms to contract with?
 - Follow up: some firms find that working with foreign firms helps their relationship with the government. Have you found that to be true?
 - Follow up: are your contracts with suppliers formalized?
 - Follow up: is it helpful to have a personal connection with suppliers? Why?
- Please tell me about your workers. How do you choose who to hire?
 - Follow up: do you hire foreigners? Why?

- Follow up: does having foreign workers affect your relationship with the government?
- Follow up: are these contracts formalized?
- When making investment decisions, what factors do you consider?
 - Follow up: what non-economic considerations are there?
 - Follow up: if a new method or machine were introduced that would make your products better or your firm more efficient, what would you need to consider before using it?
- What prevents your firm from upgrading its technology?
- What is the most effective way to have a good relationship with the government?
 - Follow up: what factors affect enterprises' relationship with the government?
 - Follow up: does the type of products an enterprise makes (i.e. economic sector) affect its relationship with the government?
 - Follow up: there have been cases where enterprises have their licenses revoked, and then an identical state-owned firm opens. What factors do you think make this more or less likely? (e.g. contracts with suppliers and buyers are informal contracts with suppliers, foreign employees, connections with government, production is too complicated to be replicated)
 - Follow up: what regulations do you find most onerous?
 - Follow up: firms sometimes make changes to their production process to avoid fees, fines, or taxes (e.g. under-reporting salaries to avoid social insurance payments or using specific materials to avoid customs duties). Have you heard of this happening?
 - Follow up: how often do inspections occur?
 - Follow up: which ministries do you interact with the most?

- What information does the government collect about your firm? For example, do they collect information about your firm's production process? How does the government use the information they collect about your firm?
 - Follow up: are there strategies other firms use to make it easier or more difficult for the government to collect this information?
 - Follow up: do you think that government officials understand your firm's production process? Would it be helpful if they did? Why?
- I've heard that fire safety regulations have recently become a big issue. How have you dealt with this? Do you know how other firms have addressed this?
- Can you please tell me about your experience with environmental protection regulations?
 - Follow up: what information did the government collect from you for the environmental protection profile?
 - Follow up: when new regulations come out, do you take the opportunity to comment on them?
 - Follow up: in general, if you need to make the government aware of a concern, how do you do that?
- Can you please tell me about your experience with quality and other technical standards?
 - Follow up: have these regulations impacted your production decisions?
- How have the US-China tariffs during the Trade War impacted the supply chain of your enterprise?
 - Follow up: ask about fragmentation
- What are the main risks you perceive to your business?

- Follow up: how do you protect yourself from those risks?
- Follow up: how do other firms like yours protect themselves?