

The Politics of Global Value Chains

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INTRODUCTION

Over the past 30 years of the global economy, there has been a steady expansion, consolidation, and integration of global value chains (GVCs) across the borders of states.¹ In these value chains, networks of actors are linked in the production and distribution of products and services. This trend has established a hierarchy of relationships that is dominated by a small number of firms at the top of the value chain, characterized by their ownership of patent rights, their control of branding and marketing, and their linkage with powerful retail outlets that sell (and privilege) their branded products on their store (or virtual) shelves. At the bottom of the value chain, subcontractors engage in fierce competition with each other to be able to offer the top-tier firms the lowest production and delivery costs for a component part or a finished product (Nolan et al. 2007). In between these extremes are firms that engage in more sophisticated technological design and production to meet the specifications of high-end computer and electronic production processes that have become central to the new

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system of transnational production and accumulation (Applebaum 2008; Starosta 2010). Financial networks are also becoming more prominent in connecting the different actors in the value chain with each other (Serfati 2008). Corporations at the top of the value chain look toward institutional financial actors to help establish the political and economic linkages essential to the establishment of the value chain. They also look to governments and multilateral trade and financial organizations to facilitate the terms and conditions necessary for the establishment and functioning of GVCs (Cox 2008). All of these actors form what we refer to as a transnational interest bloc (TIB) that is led by the most powerful transnational firms that secure the highest profit from the value chain, but also engage in relationships with a wide range of other actors positioned at different levels of power and influence within the value chain (Cox 2012).

The TIB includes numerous corporate, business, and political actors that are linked by this process of global production. This interest bloc is led by the structural and instrumental power of large-scale transnational corporations that occupy a hegemonic position within the bloc. The modern value chain provides the linkage between production processes that involve multiple corporate actors, whose position in the value chain is shaped by the degree of power, profit, and ownership rights distributed throughout the value chain. A production profile of the current global economy starts with the ascendancy of both the high-tech computer and information sectors and the financial sector. The integration of advanced computer networks in modern manufacturing and the incorporation of these networks in retail operations allow for a “just-in-time” delivery system for the sale of finished goods. As such, the high-tech sector occupies the most important strategic location in modern global capitalism (Harris 2008: 19–39). The high-tech firms engaged in the production of computers, operating systems, microprocessors, and information systems are central to the new economics and politics of global production. This is due to the steady expansion of the high-tech sector over the past 30 years, measured in rising corporate profits (relative to other sectors) and dispersed location of production. The electronics sector was a pioneer of producing component parts in a wide variety of locations as early as the 1960s. The high-tech sector has also been crucial for the success and expansion of other sectors of the global economy, including manufacturing and retail, giving it enhanced strategic importance for global capitalism.

The creation of a GVC involves considerable expressions of political and economic power wielded by dominant firms and their partners located at

different geostrategic and spatial positions within the value chain. The central purpose of this chapter will be to examine the power relationships embedded within TIBs, especially in the high-tech sectors of the global economy, and the political economy of the extraction of profit within the GVC. We will also address the increasing consolidation of corporate power within the value chain by examining the intersection of market power and political power with the incorporation of high-technology production methods and its impact on the global workforce.

There has been extensive scholarship over the past two decades on the economics of GVCs. But much of this literature does not fully capture the political aspects of how these supply chains came into existence. Dominant firms, or “system integrators,” have been able to secure their position at the top of GVCs by using their economic and political power within the market and within the state (Levy 2008). Firms such as Microsoft, Apple, and Intel did not simply emerge as powerful market players through their own innovation and productivity. They have been able to take advantage of considerable public financing of research and development to secure low-cost access to technological innovations that preceded their very existence as corporations (Perelman 2003). The manner in which public goods have been socialized into private profits is central to understanding the politics of corporate power and has been true in every era of capitalism.

Neoliberalism as ideology wants to strip this history from our knowledge base in order to proclaim the unfettered virtues of private accumulation, but such accumulation has long rested on a close relationship between the corporate power and the state. What has changed in recent decades is that governments are stripping away more of their public functions for private profit, especially compared to the Bretton Woods era of capitalism from 1945 to 1973. This has contributed to a corporate-driven process of accumulation that has simultaneously increased the gap between rich and poor on a global scale while delegitimizing the public functions of governments (Kotz 2015).

TIBs have emerged as a powerful political force in a wide range of locations throughout the global political economy. However, their emergence is still conditioned and mediated by the institutional, socioeconomic, and class histories of nation-states. In other words, corporate political actors have extended their influence on a global scale, but not under the circumstances of their choosing. They have had to advance their political agenda in a wide range of political and economic contexts and often compete with other corporate blocs for access to state and market power. This means that any account of TIBs cannot stop with an analysis of the

dominant firms at the top of GVCs. We must also examine the politics of how value chains are constructed at various locations within the system. This means examining which actors within the value chain control the most profitable activities, how costs are pushed downward within the value chain through advanced technology and automation, and how workers are segmented within the value chain through a geographical/spatial configuration that reinforces exploitation and extraction of profit from the bottom of the chain to the top.

ORIGINS AND SCOPE OF THE GVC

Transnational firms that locate much of their research and development activities in the USA, Western Europe, and Japan have increasingly relied on GVCs from the 1980s to the present. The most extensive manifestation of this trend has occurred within firms based in the USA and Japan, with Western European firms lagging behind in the timing, pace, and quantity of reliance on GVCs. Transnational corporations with research and development activities concentrated in the USA, with different intensities depending on sectoral position, began to restructure their operations as early as the 1980s to concentrate on ownership of high-value activities that included research and design, branding and marketing, and ownership of intellectual property rights (IPR) or patents (Prechel 2000; Davis 2011). These firms then began to sell corporate divisions that were involved with the manufacturing of finished products in an effort to lower the costs of production. Instead of producing goods “in-house,” transnational firms subcontracted or outsourced production to companies in low-cost locations where production methods had to meet the specifications of the contractor. The process has grown more complex over time and often involves a range of actors that facilitate the transaction between the transnational firm that establishes the terms of production, the intermediaries that are paid to facilitate the logistics of the production operation, the often large-scale “turnkey” companies that manage the production of the product from start to finish, and the numerous small-scale producers that produce inputs needed as part of a “just-in-time” delivery system that links to the finished product. Workers at every phase of the production process are subject to rules, regulations, and restrictions on their job classification that makes it easy for contractors to maintain low wages and

poor working conditions, reinforced by the reliance on temporary work contracts and part-time classification schemes (Sealey 2010).

The politics of the GVC rests on a hierarchy of power that is made possible by the segmentation of design and manufacture, which is endemic to the value chain. The most highly profitable actors within this chain are those transnational firms, narrowly concentrated at the top of the value chain hierarchy or pyramid, that own the IPR to the design, branding, and marketing of the product. Reinforced by the politics of national and international patent law, corporations at the top of the value chain pyramid are able to leverage their ownership of high-value activities, so that costs are pushed further down the value chain, impacting the profit margins of a range of other actors who compete with each other to move up the value chain ladder, or to prevent themselves from falling off the ladder entirely (Nolan and Zhang 2010). It is a technological innovation that has made this system possible in the first place, with advanced telecommunications systems and computer hardware and software being integrated within the coordination of production activities that occurs across countries and regions of the global economy. The high-tech sector, broadly defined as including telecommunications, computer software and hardware, semiconductors, electronic component parts, and information systems, occupies a central strategic location in the creation and maintenance of GVCs. Therefore, we will focus on this high-tech sector to provide examples of the politics of GVCs as we work through the history and implications of power relationships within these chains.

At the top of the GVCs are the transnational corporations that own the rights to intellectual property that provide these firms with both economic advantage and political power relative to subordinates within the supply chain. Baruch Lev's analysis of the value of corporations on the Standard and Poor's 500 from the 1980s through the 1990s concluded that intangible assets such as IPR have become much more important than tangible assets as a percentage of a firm's value. By 1998, intangible assets accounted for 85% of a corporation's value, while tangible assets accounted for only 15%. This was a significant reversal from 1982, when tangible assets accounted for 62% of a firm's value while only 38% of that value was derived from intangible assets (Lev 2001). This shift in corporate value tracks the changes in corporate organizational structure toward a concentration of ownership of high-value activities focused around product design and a selling off of corporate divisions that produce goods. This shift in the corporate organizational structure was made possible by the high-tech

revolution, which enabled corporations to segment design from production across state borders in a more spatially compartmentalized fashion.

Concretely, this shift in corporate organizational structure has meant that corporations at the top of the GVC own the IPR that generate a disproportionate share of the revenue and the profits from the value chain. Corporations acquire ownership of IPR through a variety of mechanisms, which include research and development; purchasing patents from other inventors; mergers and acquisitions; and reliance on publicly funded research and development programs which privatize innovations at subsidized costs (Hopkins and Lazonick 2014). By concentrating their investments on research and design and the strategic acquisition of patents, corporations based in the USA, Japan, and Western Europe have been able to steadily increase their reliance on the foreign production of intermediate goods whose labor and final assembly is divided across multiple platforms across countries that the World Bank classifies as low-and-middle income (LMIC). So in assessing this shift in global production strategies, a common statistic used by researchers is the extent to which intermediate goods are becoming a more important part of the overall percentage of imports from LMICs for high-income countries. As expected, imports from LMICs have increased from 1991 to 2010 in the USA (from 20% to 50%), Japan (from 21% to 52%), France (from 10% to 21%), Germany (8% to 23%), and the UK (9% to 22%) (Milberg and Winkler 2013: 38).

These percentage increases reflect a greater reliance on GVCs by the dominant transnational corporations based in these five countries. The transnationalization of production has occurred across all sectors of the global economy, but is especially pronounced in the category of high-tech products, whose dependence on global offshoring of both sectoral materials and servicing is at the high-end compared to other sectors of global production (Milberg and Winkler 2013: 43–48). The reason is very straightforward: The new high-tech revolution has enabled a concomitant shift in corporate organizational and production strategies by making possible segmentation of production on a global scale. The high-tech products are central to such a shift, impacting not just the high-tech industry but all other industries that rely on these new high-tech platforms, from traditional manufacturing to retail services. Those firms that have IPR ownership of these high-tech sectors, therefore, have emerged as very strategically powerful, both within the marketplace and within governments, where favorable tax laws have facilitated corporate reorganization on a global scale.

IPR AND CORPORATE HEGEMONY

Transnational corporations at the top of GVCs have leveraged ownership of IPR to wield power relative to other actors in the value chain. The reliance of transnational firms on intangible assets for a majority of revenues and profit margins is part of a global corporate restructuring endemic to the current phase of global capitalism. Facing a declining or stagnating profit rate from the mid-1960s to the early 1980s, transnational corporations that comprise the Global 500 looked toward corporate reorganization to reverse this trend (Prechel 1997: 414; Cox 2012: 17). The decade of the 1980s saw the first steps toward a process of corporate reorganization that occurred unevenly depending on the country, the sector, the particular circumstances of individual firms, and the political and economic opportunities that existed to facilitate corporate reorganization. Nonetheless, we can identify the political economy of transnational corporate restructuring by examining several factors that help us understand the power dynamics of contemporary GVCs.

First, transnational corporate lobbies worked with governments in the USA, the European Union, and Japan to make protection of IPR a priority. Firms in the computer, electronics, chemical, pharmaceutical, and information technology sectors were disproportionately active in lobbying for stronger IPR protection in both domestic law and international trade agreements. Faced with mounting global competition, high costs, and declining rates of profit, firms looked toward restructuring their operations to regain their competitiveness or in some cases to fend off bankruptcy. Such restructuring involved selling off corporate divisions and concentrating on the most profitable activities centered around ownership of IPR. But for such a strategy to be successful, corporations enlisted their governments to commit to changing the domestic law to enable greater protection of IPRs. In the USA, corporate lobbying contributed to Congressional legislation strengthening the patent law, alongside additional administrative and judicial bodies created for the purpose of protecting patent rights. In the EU, the European Business Roundtable took the lead in lobbying for patent protection as part of the push for a strengthened “competition policy” in the 1990s. Transnational firms based in the USA, the EU, and Japan cooperated in pursuit of a trade-related intellectual property rights (TRIPS) agenda that would form an important part of the Uruguay Round of GATT and would be institutionalized in the creation of the World Trade Organization [WTO] (Sell 2003).

Second, the corporate lobbying for increased protection of IPR was a product of corporate restructuring on a global scale. Corporations sold off less profitable divisions that involved manufacturing or producing goods in favor of high-value activities such as ownership, consolidation, and protection of IPR. This restructuring of the corporate firm was made possible by the lucrative returns available to owners of IPR, which allowed corporations to reverse declining rates of profit by restructuring around high-value activities. The process of corporate restructuring was the product of a political relationship between corporations and states in the USA, Western Europe, and Japan, where corporations lobbied aggressively for the passage of favorable laws pertaining to taxation policy and foreign direct investment that facilitated the growth of profitable supply chains. In the USA, corporate lobbying contributed to the Congressional passage, and the Reagan Administration support, of the US Economic Recovery Act of 1986, which enabled US corporations to sell off corporate divisions and redirect the profits back into the global restructuring of the firm at low rates of taxation (Prechel 1997: 420). In Japan, the corporate lobby Keidanren succeeded in securing legislation that facilitated corporate foreign direct investment, allowing Japanese firms to begin to restructure by legalizing, encouraging, and facilitating foreign direct investment that would be crucial to establishing more flexible global supply chains that would begin to supplant the domestic supply chain relationships that long embedded Japanese firms (Yoshimatsu 1998). In Western Europe, corporate lobbies led by the European Business Roundtable lobbied successfully for the creation of a European Union that would facilitate the growth of European foreign direct investment that would lead to corporate restructuring through lower costs and greater reliance on supply networks (Belanya et al. 2003).

Third, transnational corporations have used the acquisition of patents to create quasi-monopoly power within the market. This is made possible by corporate purchase of patents just to keep competitors from accessing particular technologies or to discourage market entry by using patents to drive up the costs for start-up businesses. Corporations acquire patents not simply due to their own innovations, but more often due to the ability to purchase patents from publicly funded institutions at low costs, or the ability to use mergers and acquisitions to acquire control over patent technology held by a competitor or potential competitor. Therefore, the acquisition of patents is not primarily a process to reward corporate innovation. It is instead a political process through which corporate actors acquire patents from other entities, often public institutions, so that the costs of creating

innovative products are socialized while the profits become privatized (Perelman 2003; May and Sell 2005). This process of socializing the costs and privatizing the profits can be seen most clearly in the case of the USA, where military spending, funneled heavily through research universities during the Cold War and through private contractors in locations such as Silicon Valley as early as the 1970s, provided the technological innovations and infrastructure that was later developed and patented by dominant high-tech corporate firms (Benner 2002: 70). The computer and telecommunications sector owes much of its economic success to the ability to “tap into” publicly funded institutions such as the research university, whose ability to enter licensing arrangements with corporations was enhanced in the USA by the passage of the Bayh-Dole Act of 1980, which allowed public universities to license and patent technologies that were developed as a result of federal funding (Ward 2012).

The result of the Bayh-Dole Act was an exponential increase in the appropriation by private corporations of federally funded research through exclusive licenses with public universities (Ward 2012: 93–94). Previously, such research was often (though not always) shared freely and widely available to the public through organizations such as the National Institutes of Health. The legislation expanded private–public partnerships that patented federal research dollars for the benefit of entrepreneurial interests who claimed that such partnerships would spur greater research and would be mutually beneficial to businesses and universities. Proponents of Bayh-Dole justified the patent system by emphasizing the monetary opportunities for universities able to effectively utilize these market relationships. However, most universities have not been able to afford the high capital outlays necessary to even enter the patent game, let alone make money from it. So, the idea that patents can somehow replace the shortfall from reductions in public finances has been patently false (pardon the pun). Instead, Bayh-Dole helped usher in a process that “began to alter the internal standards and procedures of academia” (Ward 2012: 94). The Texas A&M University System, for example, began to allow “patents and the commercialization of research” to count toward the criteria for tenure. As a former Dean of the Graduate School of the Arts and Sciences at Emory University, Donald Stein described the situation created by Bayh-Dole, “publish or perish” has been supplanted by “publish, patent or perish” (Ward 2012: 94). Since Bayh-Dole, there have been exponential increases in universities securing patents in the USA, from a relatively modest 436 university-issued patents in 1981 to more than 3500

in 2001, although patent ownership has been concentrated among a relatively small group of research universities (Montobbio 2009: 195).

In contrast to the USA, where universities license patent agreements with private firms, in many Western European countries, universities are prohibited from holding patents. Instead, professors are allowed to retain patent rights and therefore to bargain directly with private corporations or companies to commercialize their product. At the same time, unlike in the USA where federal funding filters to universities which can then license and patent the innovations that are derived from federal funding, European national agencies carry out their own research in publicly funded labs, instead of sending more of those research dollars to European universities. Furthermore, European professors in Germany, Austria, Denmark, and Sweden enjoy a “professors’ privilege” which allows them to retain property rights over their research findings (Montobbio 2009: 197). As a result, there has not been a huge increase in European universities’ patent activities from the early 1980s to the present, in contrast to the USA. However, commercial firms own most of the patents which are derived from university research in Europe, while in the USA, universities mostly retain patent ownership and license their products to private commercial businesses.

Despite the differences between the USA and European commercialization of publicly funded knowledge through patents, there has been a commonality that researchers have noted: Especially in the high-tech, biotech, and pharmaceutical sectors, publicly funded university research has been more important in creating the basis for innovation in the private sector (Montobbio 2009: 201). What this has meant is that the ability of corporations to either license with universities or to directly own the products of publicly funded innovation has grown increasingly significant for corporate research. These relationships are most robust in the developed countries, where public–private partnerships have increased the ability of a privileged stratum of high-tech firms to consolidate ownership of innovations that have been initially developed with public funding. So instead of making those innovations available to the public at lower costs, particularly in sectors that would seem to have broad public utilization needs—broadband access, healthcare and biotech innovations, etc., the public–private relationships tend to lower corporation’s cost of production (at public expense) while privatizing the benefits of public research.

This leads to our fourth point: There are clear power dynamics involved in this socialization of costs and privatization of profit that involve linkages

between privileged transnational corporations, their host governments, and their universities in the USA, Western Europe, and Japan. The embedded structure of these relationships provides leading transnational firms with strategic market power in the global market and in their dealings with developing countries. This is illustrated by the extent to which transnational firms, working closely with their home states, can leverage this market power through international trade and investment agreements and/or through global institutions such as the WTO. As the leading research on this topic has demonstrated, transnational firms in the high-tech, chemical, and pharmaceutical sectors have worked closely with their governments in the USA, the European Union, and Japan to protect and codify their ownership of IPR on a global scale in the negotiations of the Uruguay Round of GATT that led to the establishment of the WTO (Sell 2003; May and Sell 2005).

Prior to the 1980s and 1990s, there were few successful or lasting attempts to expand and enforce patent rights on a global scale. But by the 1980s, sectoral pressure from corporate interests based in the USA, Western Europe, and Japan, led to a strengthening of domestic patent laws in the developed countries and a new set of policies that would be incorporated into the Uruguay Round of GATT and made enforceable under the WTO. The corporate sectors that were represented in both domestic and global lobbying efforts included biotech, chemical, pharmaceutical, entertainment, and software industries. Thus, the high-tech sectors referenced in this chapter were crucial players in the corporate coalitions that formed to lobby for IPR protections during the 1980s and 1990s. There were three outcomes of the establishment of a TRIPS that strengthened corporate power within GVCs. The first is that patents secured in developed countries were immediately given wider protection within the markets of all WTO member states. Developing countries were required to develop administrative and legal procedures necessary to meet the conditions of establishing a patent system that would guarantee some form of protection for patents that were overwhelmingly granted by governments in developed countries. Whereas countries could previously deny patent rights to corporate investors in order to spur technological innovation or to help create start-up industries, now they were required to grant patent protection across all sectors of the world economy. Second, whereas countries could previously offer patent protection for short time spans to help spur spin-off research and development and local innovation, they were now required to extend patent protection for 20-year periods in most

cases. Third, governments were now limited in how they regulate patent holders, so that there can be no requirement that patent holders share technology with domestic firms, or disseminate patented technologies for wider domestic policy or societal utilization (Shadlen 2005: 8–9).

There are exceptions that are written into these global patent rules in the areas of health and safety, but governments that seek to override patent protection requirements have to go through considerable costs and legal hurdles to justify such a move. As such, the global institutionalization of patent rights has epitomized the increasing instrumental and structural power of transnational corporations and governments in the developed world to write rules within the WTO that disproportionately privilege the profits associated with ownership of IPR. Still, the WTO does give some leeway to developing countries in the type of patent regime that they may choose to develop. Within this framework, countries are allowed what is often referred to as a “dynamic” patent regime which makes the transfer of patents acceptable under particular circumstances to help promote technology transfer and certain development objectives. Recognizing this loophole in the global patent regime, transnational corporations in high-technology industries have pushed for stronger patent and “investment” protections in bilateral or regional trade agreements. This has meant that the trade agreements being negotiated outside the boundaries of the WTO are primarily “investment” agreements, rather than trade agreements, with extensive and substantial political, legal, and enforcement protection for IPR as the centerpiece of these deals whose provisions go beyond the WTO (Shadlen 2005).

In short, international trade agreements lock in privileges for dominate transnational corporations whose political influence and market power have enabled them to secure patents by tapping into publicly funded sources of innovation or by purchasing patents from other firms or through mergers and acquisitions. The transfer of patent rights is a process that delivers a quasi-monopoly privilege to a single actor, despite the fact that high-technology innovations are often the product of what some have called “universal labor,” meaning the cumulative work of a multitude of actors, both public and private, who have been responsible for developing an “innovation,” often over a period of two decades or more. The transfer of “universal labor” to private ownership has been crucial for reversing a declining rate of profit among transnational capitalist firms. Therefore, it’s noteworthy to point out that “universal labor” represents a mechanism that was identified by Marx as both a source of potential surplus value extraction

by capitalists but also as a potential source of liberation for workers. In other words, to what extent “universal labor” is recognized in the form of compensation to all who are involved in the creation of a product versus the expropriation of “universal labor” by a narrow stratum of the capitalist class illustrates an ongoing structural contradiction of the system of capitalism. Capitalism is supposed to reward innovation with material benefits, but it appears that innovation is occurring over a lengthy period of time and, therefore, is contingent on the contributions of multiple actors, many of whom do not see adequate compensation for their labor value (Perelman 2003).

The contradictions become apparent when one understands that this privatization of “universal labor” and publicly generated knowledge comes at a significant price. First, private ownership comes with extensive privileges, including a patent system that makes wider dissemination of knowledge subject to restrictions based on patent rights that have increased in duration over the decades and are now locked in for a 20-year duration in global markets. Second, scientific advances that are dependent on the open exchange of publicly funded knowledge become subject to greater secrecy as innovators work with corporate patrons to keep the details of innovative work from being taken by rival firms or rival investors. Thus, considerable efforts are placed on legal issues that detract considerably from scientific work. Third, corporations, especially in the high-tech sector, wage patent wars that involve purchasing patents merely to prevent competitors from gaining access. These patent wars are also often accompanied by litigation, further legislation protecting patent ownership rights, and efforts to privilege secrecy and market position to satisfy the short-term profit-making interests of owners and shareholders (Perelman 2003).

TRANSNATIONAL CORPORATIONS AND CONTRACT MANUFACTURERS

As seen, the neoliberal global market rests upon many mechanisms that are necessary for the development and empowerment of TIBs. These include the strengthened IPR regime, transnational production, and closer links with governments, to name a few. Essential to this structure has been the growth of the GVC and the role of contract manufacturers. This has allowed for lead firms to offshore factories, utilize the labor of the global South, and segment and retain a higher value-added sector of production.

On the positive side, this has allowed for a greater efficiency of manufacturing, as lead firms focus on their core competency, thus reducing their overhead of expensive factories and generating greater economies of scale.

However, this important role of contract manufacturers within transnational production must be examined through the lens of TIBs and North/South divisions. With a concentration of intellectual property creation in the global North and dispersion of low-end manufacturing in the global South, the contract manufacturer plays the role of a mediator within the TIB hierarchy. Again, this means profits flow up this structure while risk and costly adjustment flow down. Lead firms, such as Intel or Apple, are thus able to expand their profits due to their relationships with their contract manufacturers, while simultaneously strengthening their relationships with Northern governments, who provide IP protection, subsidies, and subsidized research. At the bottom of the hierarchy, the low-skilled labor in the global South are placed in a precarious position as wages, hours, and job security are necessarily vulnerable to changes and adjustment.

While contract manufacturers operate in numerous industries, from textiles to automotive, we will be focusing on electronic contract manufacturers (ECMs). An analysis of ECMs will be illustrative to not only the structure of TIBs but also the larger topics of transnational production, GVCs, and North/South relations. As the name suggests, ECMs specialize in electronic components, from circuit boards and semiconductors to finished products of computers, tablets, and smartphones. As such, ECMs manufacture for the leading firms in the high-tech sector. These include large corporations such as Apple, Microsoft, and Cisco, who play a leading role in the Western TIB structure. These high-tech firms have been essential in developing the global IP regime, but have also been essential in developing the GVC and transnational production we see today.

Despite the immense size of leading ECMs, the hierarchical relationship between lead firms and contract manufacturers persists within the high-tech industry. Illustrative of this is the relationship between Apple, which has seen record profits in recent years, and its primary manufacturer, Taiwanese ECM Foxconn. By focusing on research, design, and advertisement, American lead-firm Apple has achieved monumental success, retaining as much as 30–60% of the profits from products like the iPad and iPhone (Golson 2012; Barboza 2010). By contrast, Foxconn has amassed a fraction of profits per product produced. This amounts to as little as \$8 per product (Mishkin and Palmer 2012), or even manufacturing some products for free, just to retain Apple as a client (Chan and Ngai 2010). Despite

the razor-thin profit margins, Foxconn and other ECM heavyweights, such as American firms Flextronics and Jabil Circuit, have been able to generate profits in the billions (HHPI 2015; Flex 2016; Jabil 2015). This is thanks to their participation in developing a transnational production chain that has generated transnational exploitation of labor.

As such, these manufacturers have been able to develop a truly transnational network of production. This has allowed them a leading part in developing the international division of labor with geographically dispersed factories specializing in appropriate modules along the production chain. North American ECMs have utilized this division, having the lowest value-added portion of production done by cheap labor, today heavily within China, while the bulk of high value-added portions, such as engineering or design, reside largely within the global North (Lüthje et al. 2013). While providing foreign investment, factories, and jobs into developing regions, it has also accelerated the global race to the bottom. This has large implications for possible industrial upgrading for developing states and generates a system of vulnerability and precariousness among labor.

ECM, LABOR, AND THE RACE TO THE BOTTOM

As lead firms, by definition, have retained the highest value-added portion of the supply chain, along with the largest means for growth through research and development of IP, contract manufacturers have had to find means of retaining a degree of profit. They have done this in numerous ways, from offering related services in logistics and product testing to producing for numerous lead firms. This broadening of supply chain operations and multiple manufacturing contracts allows for greater economies of scale, which in turn allows for a cheaper product and thus greater competitiveness. Despite an expansion of services, the primary cause of ECM success can be found in their exploitation of cheap labor. As mediators in transnational production, these corporations have found and developed such labor in abundance, strengthening not only their dominant position but also the structure of the GVC itself. Illustrative to this is the Chinese labor market, heavily organized by the state, and its partnership with the leading ECM, Foxconn.

Foxconn's great success is in the utilization and consolidation of sweatshops and Chinese labor. There are largely two aspects to the use of Chinese labor that will be essential for understanding how the adjustment is managed within the industry. One is the exploitation itself; the

relationship that is developed with low-paid workers who hold very little collective power. The second is the relationship to the Chinese government, which has resulted in assistance to the Taiwanese ECM in the form of subsidies, supply and pacifying labor, and participating in the race to the bottom both within China and the global labor force.

Perhaps most telling of the labor control practices Foxconn has developed is the existence of the so-called “Foxconn City.” This manufacturing compound in Shenzhen lives up to its description as a “city,” with hundreds of thousands of Chinese workers. Being primarily migrants from other areas of China, they are bused into the compound to work and live within the corporate dormitories (Chan and Ngai 2010). This movement and isolation is no accident, as it is a common strategy of developing worker control and obedience. This represents the race to the bottom for labor, whereby worker vulnerability is both found and developed to depress wages and labor power, as well as generates corporate dependence. For a company with razor-thin profits on manufacturing, this power relationship is essential.

The Chinese government itself has been very receptive to participating in this race to the bottom and for utilizing sweatshops as a means to development. On top of facilitating an internal race to the bottom among provinces, China also assists with infrastructure, recruiting workers, such as through vocational schools, and the development of the infamous *Hukou* system, whereby a regional registration generates a vulnerable class of internal migrants (van Liemt 2016). Without the support of government programs, these laborers provide much flexibility to the ECM by accepting decreased working hours or expanding overtime, as required by fluctuations in the market (Lüthje et al. 2013).

This utilization of artificially cheap labor and state-subsidized development is not unique to Foxconn, nor is it unique to China. Indeed, there are numerous contract manufacturers that make up the transnational system, with the next largest ECMs being American firms Flextronics and Jabil Circuit. These, in turn, work with and utilize numerous locations to reach and generate the cheapest cost in production. Foxconn itself, heavily concentrated in China, has made plans to enter India and Indonesia as Chinese wages become too expensive (van Liemt 2016). This competition has allowed for the value chain hierarchy that privileges those at the top and pushes risk down.

In conjunction with the aforementioned squeeze on labor and the exploitation of the race to the bottom among states, there has been a larger

trend of ownership consolidation within this sector (Applebaum 2008). This competitive monopolization is a natural affect of capitalism as a strategy to deal with asymmetric industry power. Thus, while competition continues to exist within the industry/sector, it does so in a more oligopolistic form. Naturally, this allows for greater negotiation power, but also expands the ability to push risk farther down the value chain, to the most vulnerable and dependent actors. By expanding direct and indirect control to local factories and junior partners, ECMs are able to develop a large network of actors to participate in cost reduction (van Liemt 2016).

AUTOMATION, CHANGE, AND ADJUSTMENT

In conjunction with being by far the largest ECM, Foxconn is a useful example as it is also one of the more ambitious ECMs to adapt to the so-called “Industry 4.0.” This is seen as the fourth industrial revolution, which will call for even greater flexibility of production than we saw in the digital revolution (bmbf.de 2016). Rather than simply an expansion of robotics and production line automation, this fully incorporates labor automation, logistics, and planning by developing a global network of factories, cloud computing, and autonomous decision-making. This broad project of reshaping how production is done will reshape the industry and the broader market and society.

The expansion of automation and networks will have large implications for all actors involved in the GVC. Those benefiting most will again be lead firms with a specialization in intellectual property. ECMs will continue to have a large role in mediating the adjustment, which means labor will continue to find itself in its precarious position. It has been seen numerous times that during downturns, labor has necessarily been forced to take the largest adjustment, meaning loss of wage, hours, and employment (Lüthje et al. 2013). This makes up for the large overhead and the ability to push risk down for ECMs. This is because of the race to the bottom and can be seen in the examples of weak labor laws, weak enforcement, and lack of labor unions in host states. This weak enforcement is sometimes reserved just for export sectors, industrial parks, and transnational corporations, even if strong laws exist for domestic producers (Ibid).

While adoption of global automation and networked robotics will provide ECMs with greater leverage over labor, it is unlikely that this high-tech development will drastically change the structure of the GVC. The immediate future is unlikely to see much increase in automation, as the

abundance of cheap labor negates the high cost of such equipment. But even aspects of networked factories and autonomous decision-making will only reinforce the system as the intellectual property remains the dominant sector in production. ECMs will continue to compete for contracts as they take on the cost of technological upgrading, with much of the cost benefit being filtered to the lead firm. As a result, we will likely see greater labor vulnerability, greater costs for ECMs to compete, and cheaper manufacturing for lead firms.

Earlier in Taiwan's development, Foxconn was one of many benefactors from the state's participation and assistance in the economy's industrial upgrading (Lüthje et al. 2013). These policies of assistance, such as directing the production, organizing industry, and offering finance and subsidization, follow a more corporatist organization of the economy by the state. As such, coordination and cooperation with the government are essential for leading firms. The later push by mainland China to utilize the GVC facilitated the regional focus of Foxconn (Ibid). Not only did this allow Taiwan and China to find relative success in development, and massive growth for Foxconn, but it also developed a regional interest bloc, which not only continues to assist local corporate power but also reinforces the global structure of TIBs.

To reach or maintain a dominant position in the global market, states throughout the GVC have assisted transnational corporations and facilitated the exploitation of labor. For successful semi-peripheral states like Taiwan, this has been in relation to the more recent developmentalism of China and utilization of cheap labor there. For a state like Singapore, this is in its relations to Malaysia, and Malaysia, in turn, in its utilization of cheaper labor from Indonesia (Bormann et al. 2010). What this means, however, is that industrial upgrading and successful development requires not only the exploitation of the most vulnerable population of labor but also strong corporate-state cooperation.

Japan is one of the better-known states in providing extensive subsidies to its corporations, both to promote research and development and to foster greater competitiveness in the global market. Through a lengthy history starting most prominently with the Ministry of International Trade and Industry (MITI), Japan has organized and supported its leading corporations to become dominant actors within the global market (Johnson 1982). As the name suggests, MITI has used this as a trade (and investment) strategy, which has helped Japan become a world leader within the

high-tech industry, but also enriched specific actors. The automation company FANUC received great benefit from this intervention, as standardization of machine tools was developed around their products (Kende 1991). But the old national developmentalism in Japan has long since given way to a Japanese state that is linked to transnational firms that have greatly expanded their relationships with foreign TIBs. In the process, the growth of transnationalized production, in Japan and elsewhere, has lessened the identification of corporations with their “home” territory in favor of a transnational identity focused on maximizing global profits. As documented by a wide range of scholarly works, the role of transnational corporations in Japan has pushed the Japanese state toward the adoption of neoliberal policies that have steadily eroded the basis for the old “developmentalism.” This has meant considerable Japanese government support for foreign direct investment and trade agreements that have promoted the linkages of transnational firms in Japan to GVCs (Lechevalier 2014), and away from previously entrenched domestic supply networks.

Like Japan, the US state has actively supported leading transnational corporations to become dominant globally (Block 2008). Outside of the better-known assistance, such as direct subsidies and infrastructure, the USA has provided both major political support and high-tech research to a wide range of transnational firms. This includes strong corporate leadership in the development of the TRIPS regime within the WTO (Sell 2003) and the inclusion of “investment” provisions in US-led bilateral and regional trade agreements, which have locked in privileges for transnational corporate investment that go beyond those mandated in the WTO. Investment agreements, often mistakenly referred to as “trade” agreements, lock in privileges for transnational capital that make traditional “developmentalist” approaches more difficult for states. Instead, states have more incentives to subsidize trade and investment networks that contribute to the growth of GVCs, while organizing their population into cheap labor for transnational corporations. In research, the USA has acted as a mediator to unite universities and corporations in partnership. Known as the “triple-helix model” (Etzkowitz 2003), this has made the US economy the world leader in high-tech products, but at the cost of hidden research subsidization and a corporatization of the University system (Giroux 2009). In summary, a transnational corporate lobby has had considerable success expanding its influence in US foreign economic policymaking during the neoliberal era, further providing incentives for an expansion of GVCs within US tax and investment legislation (Dreiling and Darves 2011).

China's ascendancy has been closely linked to GVC networks that transcend nation-states, with the USA, the EU, and China promoting policies that have helped to establish the conditions and the growth of transnational production networks. These networks involve considerable cooperation between transnational firms based in the West and the Chinese state, despite ongoing geopolitical and economic tensions between the West and China. China has seen spectacular growth due to its inclusion in transnational production, while actively assisting and subsidizing the growth and consolidation of transnational ECMs. This is especially true for the stellar success of Foxconn, as China's globalization has allowed Taiwanese corporations access to abundant cheap labor and cemented Taiwan's position as a middle-income state. While this has brought much into the coffers of the Chinese government, its own subsidization of high-tech IP has been on seemingly contradictory paths. Some factions within the Chinese government want to provide further assistance to Chinese-owned high-tech businesses that can compete effectively with TIBs dominated by Western transnational corporations. At the same time, highly profitable Chinese firms are linked to a TIB that includes Western corporations like Apple. Thus, the Chinese state is divided into competing corporate factions, with each using its political influence within the Chinese Communist Party to steer government policy in its preferred direction (Hung 2009).

CONCLUSION

As the previous cases illustrate, in this age of the GVC, TIBs often exert power across a range of states, including states with seemingly distinct political cultures and institutions. TIBs exert both structural and instrumental power relative to states, ECMs, and labor within an increasingly global production system. These interest blocs are often able to use their extensive political and economic ties to leverage their power in a wide range of circumstances. Many of the most important future battles over the distribution of profits, wages, and resources will be fought within the context of a transnational production system that has disproportionately privileged dominant transnational firms.

Within this TIB, the role of labor could become increasingly important as a potential vehicle for transformative battles over allocation of profits, wages, and resources. The rapidly expanding architecture of the modern GVC has required the increasing centralization and consolidation of

workers within what some researchers have called “logistical” nodes of coordination and distribution (Sealy 2010). This has meant an increasing concentration of workers whose activities in facilitating transportation and delivery of products connected to GVCs are crucial to a functioning system. There are now huge concentrations of workers in warehouses that have become indispensable “clusters” facilitating the coordination of rail, truck, air, and water transportation. In just three of these clusters in the USA, there are concentrations of over 100,000 workers that provide a crucial logistics function for GVC networks. To the extent that these workers can be mobilized politically, they represent a potential challenge to the current skewed distribution of profits at the top of GVCs, a political and economic system that has thus far been dominated by the preferences of the lead transnational firms that control TIBs (Brooks and Moody 2016).

NOTE

1. There is a vast literature on global supply chains and “value” chains. For one of the best recent summaries, complete with a good bibliography and several timely articles in the same journal issue, see Jeffrey Nielson, Bill Pritchard, and Henry Wai-chung Yeung, “Global Value Chains and Global Production Networks in the Changing International Political Economy: An Introduction,” *Review of International Political Economy*, 21:1, 1–8.

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