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Intellectual Property, Global Inequality, and Subnational Policy Variations

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INTRODUCTION

The North–South divide has been frequently invoked in the debate on intellectual property, innovation, and global inequality. While the Global North complained about the inadequate protection and enforcement of intellectual property rights in developing countries, the Global South lamented the unfair distribution of benefits within the international intellectual property regime.[1] Developing countries were also frustrated that they bore the brunt of globalization and the detrimental effects of strong intellectual property protection and enforcement.

The arrival of middle-income countries, in particular those with considerable and ever-growing strengths in the intellectual property area, has called into question the North–South debate. First, that debate is both dated and oversimplified. It overlooks the many complications raised by Brazil, China, India, and other fast-growing emerging countries. With increasing abilities to compete effectively against developed countries, these middle-income countries have now taken policy positions that do not always align with the Global South.[2] Second, by emphasizing global inequality (inequality *among* countries), the North–South debate steers policy and scholarly attention away from many important policy challenges posed by widening national inequality (inequality *within* countries). Although these challenges have received some attention from trade and development economists, they have been largely ignored in intellectual property literature.

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[1] Peter K. Yu, *TRIPs and Its Discontents*, 10 MARQ. INTELL. PROP. L. REV. 369, 379–86 (2006).

[2] Peter K. Yu, *TRIPS and Its Contents*, 60 IDEA 149, 219 (2020).

This chapter begins by revisiting the North–South debate on intellectual property, innovation, and global inequality. It explains why the arrival of middle-income countries has called into question this old binary debate. The chapter then moves from the widely studied subject of global inequality to the underexplored topic of national inequality. Focusing on the intellectual property context, the discussion highlights the considerable subnational variations in the economic and technological conditions of middle-income countries. To combat national inequality, this chapter concludes by recommending interventions in three areas: (1) international norm-setting, (2) national policymaking, and (3) academic and policy research.

3.1 INEQUALITY AMONG COUNTRIES

3.1.1 *The North*

The proponents of strong intellectual property rights often start the international law and policy debate by underscoring the need for international harmonization and effective global and national protections for creators and inventors. A strong international intellectual property regime helps ensure the adequate protection of valuable intellectual assets, most of which reside in the Global North.[3] As stated in its preamble, the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) of the World Trade Organization (WTO) lays out the "adequate standards and principles concerning the availability, scope and use of trade-related intellectual property rights."[4] This Agreement further provides "effective and appropriate means for the enforcement of trade-related intellectual property rights, taking into account differences in national legal systems."[5]

Although the TRIPS negotiators in the Global North recognized that developing countries might not receive the same distribution of benefits, they readily asserted that strong intellectual property rights would, on balance, benefit the Global South. These rights, they claimed, would help developing countries attract foreign direct investment, increase trade flows, generate jobs and tax revenues, build up human capital, and promote technology transfer and diffusion.[6] To many policymakers and commentators in developed countries, the TRIPS Agreement could be analogized to painful medicine that would provide long-term gains but short-term discomfort. As Daniel Gervais recounted, during the TRIPS negotiations, developing countries

[3] Frederick M. Abbott, *Protecting First World Assets in the Third World: Intellectual Property Negotiations in the GATT Multilateral Framework*, 22 VAND. J. TRANSNAT'L L. 689 (1989).

[4] Agreement on Trade-Related Aspects of Intellectual Property Rights pmbl., recital 2(b), Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299 [hereinafter TRIPS Agreement].

[5] *Id.* pmbl., recital 2(c).

[6] Peter K. Yu, *The Comparative Economics of International Intellectual Property Agreements*, *in* COMPARATIVE LAW AND ECONOMICS 282, 286 (Theodore Eisenberg & Giovanni B. Ramello eds., 2016).

"were told to overlook the distasteful aspects of introducing or increasing intellectual property protection and enforcement in exchange for longer-term economic health."[7]

3.1.2 *The South*

Unlike those in the Global North, policymakers and commentators in the Global South remain skeptical of the benefits provided by strong intellectual property rights, especially in the short term. In the early days of the WTO, many commentators expressed concern that the TRIPS Agreement would lead to a massive outflow of valuable resources from developing countries to their wealthier counterparts. As Jagdish Bhagwati emphatically declared, "TRIPS does not involve mutual gain; rather, it positions the WTO primarily as a collector of intellectual property–related rents on behalf of multinational corporations."[8] Likewise, World Bank economist Michael Finger estimated that the total rent transfer from the Global North to the Global South could go as high as US$60 billion per year.[9] It is, therefore, no surprise that development economist Ha-Joon Chang famously observed that developed countries sought to use the international trading and intellectual property systems to "'kick away the ladder' by which they have climbed to the top."[10]

In the area of intellectual property enforcement, for instance, higher standards will require developing countries to divert scarce resources away from other equally important, if not more important, needs – such as the provision of clean drinking water, food, shelter, electricity, schools, and basic healthcare.[11] As Keith Maskus reminded us:

> A reasonable ... estimate [based on figures the U.N. Conference on Trade and Development provided on setup and training costs in relation to TRIPS implementation] is that [the] average operating costs of an effective system might be perhaps $2.5 million per year for 10 years postreform in those countries that upgrade most rapidly and $1.5 million per year for 20 years in the others. These figures imply that, discounted at 3 percent per annum, the net present value of investment costs in effective enforcement in the developing world would be $4.1 billion over 20 years.[12]

[7] Daniel J. Gervais, *The TRIPS Agreement and the Doha Round: History and Impact on Economic Development*, in 4 Intellectual Property and Information Wealth: Issues and Practices in the Digital Age 23, 43 (Peter K. Yu ed., 2007).

[8] Jagdish Bhagwati, *What It Will Take to Get Developing Countries into a New Round of Multilateral Trade Negotiations*, *in* Department of Foreign Affairs & International Trade, Trade Policy Research 2001, at 19, 21 (2001).

[9] J. Michael Finger, *The Doha Agenda and Development: A View from the Uruguay Round* 9 (Asian Development Bank, Economics and Research Department, Working Paper No. 21, 2002).

[10] Ha-Joon Chang, Kicking away the Ladder: Development Strategy in Historical Perspective 10 (2002).

[11] Peter K. Yu, *Enforcement, Economics and Estimates*, 2 WIPO J. 1, 2 (2010).

[12] Keith E. Maskus, Private Rights and Public Problems: The Global Economics of Intellectual Property in the 21st Century 227 (2012).

Given the developing countries' continuous socio-economic plight and their admittedly more limited benefits from the international intellectual property regime, it is understandable why these countries and their supportive intergovernmental and nongovernmental organizations have been quite vocal about the detrimental effects of the TRIPS-based international intellectual property regime,[13] especially after the expiration of the transition period for developing countries on December 31, 1999. It is also unsurprising to find these countries demanding continuous systemic pro-development adjustments at the WTO, the World Intellectual Property Organization (WIPO), and other international fora.[14]

In November 2001, the Global South pushed for the establishment of the Doha Development Round of Trade Negotiations at the WTO. Although this round of negotiations is currently at a standstill, developing countries managed to amend the TRIPS Agreement to allow countries with insufficient or no manufacturing capacity to import generic versions of patented pharmaceuticals.[15] These countries also successfully secured repeated extensions of the transition period for least developed countries, which will last until July 1, 2034.

At WIPO, developing countries, with the support of civil society organizations, managed to establish a development agenda. Adopted in September 2007, the forty-five recommendations for the WIPO Development Agenda covered a wide range of issues, including the transfer of technology, response to the digital divide, protection of genetic resources and traditional knowledge, and preservation of the public domain.[16]

Notwithstanding these pro-development efforts, developed countries' active push for new bilateral, regional, and plurilateral agreements since the early 2000s has led to the adoption of even higher international standards for intellectual property protection and enforcement. Not only do these standards go beyond what many developing countries find suitable, but they are created through nontransparent, power-driven processes with limited voice and representation for the Global South.[17] Among the more controversial negotiations were those surrounding the Anti-Counterfeiting Trade Agreement, the Trans-Pacific Partnership (TPP) – which has now become the Comprehensive and Progressive Agreement for Trans-Pacific Partnership – and the Regional Comprehensive Economic Partnership (RCEP).

[13] U.N. High Commissioner for Human Rights, *The Impact of the Agreement on Trade-Related Aspects of Intellectual Property Rights on Human Rights*, ¶¶ 24–26, U.N. Doc. E/CN.4/Sub.2/2001/13 (June 27, 2001).

[14] Peter K. Yu, *A Tale of Two Development Agendas*, 35 Ohio N.U. L. Rev. 465, 511–40 (2009).

[15] TRIPS Agreement, *supra* note 4, art. 31*bis*.

[16] Peter K. Yu, *Intellectual Property Training and Education for Development*, 28 Am. U. Int'l L. Rev. 311, 312–13 (2012).

[17] David S. Levine, *Transparency Soup: The ACTA Negotiating Process and "Black Box" Lawmaking*, 26 Am. U. Int'l L. Rev. 811 (2011); Peter K. Yu, *Six Secret (and Now Open) Fears of ACTA*, 64 SMU L. Rev. 975, 998–1019 (2011).

3.1.3 *The Middle*

Just as the Global South has become increasingly frustrated by the Global North's incessant demands for higher international intellectual property standards, a group of middle-income countries seemed to have found a formula for success. Since the beginning of the twenty-first century, these countries have selectively adapted international intellectual property standards, to the extent allowed by the TRIPS Agreement and acquiesced by the more powerful WTO members.[18] As a result, this group of emerging countries gradually obtained a greater share of the benefits provided by the TRIPS-based international intellectual property regime. As former WTO Director-General Roberto Azevêdo recalled:

> [I]n 1995, and earlier in the negotiations leading to the conclusion of TRIPS, the international [intellectual property] system was largely seen as a trade interest of the developed economies. Today, the picture differs dramatically. Some middle-income countries are among the major users of the global [intellectual property] system, and many other developing countries are increasingly engaged with it.[19]

Brazil, China, and India – together with Russia and South Africa making up the BRICS countries – are oft-cited examples. Other fast-growing emerging countries have also received similar benefits from the WTO and the TRIPS-based international intellectual property regime. In a book chapter written a decade ago, I identified the ten largest economies outside the Organisation for Economic Co-operation and Development (OECD) that had a gross national income per capita of less than US$15,000 yet some of the world's highest volumes of high-technology exports.[20] Referring to them as "middle intellectual property powers," that chapter highlighted the considerable economic and technological improvements in the world's fast-growing middle-income countries (see Tables 3.1 and 3.2). In addition to the BRICS countries, the ten surveyed economies included Argentina, Indonesia, Malaysia, the Philippines, and Thailand.

Based on the 2022 Global Innovation Index, five of the selected countries ranked within the world's top fifty: China (eleventh), Malaysia (thirty-sixth), India (fortieth),

[18] Sunil Mani & Richard R. Nelson, *Conclusion*, *in* TRIPS Compliance, National Patent Regimes and Innovation: Evidence and Experience from Developing Countries 222, 223 (Sunil Mani & Richard R. Nelson eds., 2013); Wu Handong, *One Hundred Years of Progress: The Development of the Intellectual Property System in China*, 1 WIPO J. 117, 118–19 (2009); Yu, *supra* note 2, at 207–15; Peter K. Yu, *When the Chinese Intellectual Property System Hits* 35, 8 Queen Mary J. Intell. Prop. 3, 12 (2018).

[19] Roberto Azevêdo, *Foreword to* The Making of the TRIPS Agreement: Personal Insights from the Uruguay Round Negotiations xiii, xiii (Jayashree Watal & Antony Taubman eds., 2015).

[20] Peter K. Yu, *The Middle Intellectual Property Powers*, *in* Law and Development of Middle-Income Countries: Avoiding the Middle-Income Trap 84 (Randall Peerenboom & Tom Ginsburg eds., 2014).

TABLE 3.1 *Indicators on intellectual property and related developments in 2020*

Country	Patent App., Res.	Patent App., Nonres.	TM App., Res.	TM App., Nonres.	IP Payments (US$M)	IP Receipts (US$M)	Global Innovation Index
Argentina	930	2,562	64,413	14,087	1,149	210	80
Brazil	5,280	19,058	260,774	37,159	4,062	634	62
China	1.345M	152,342	9.117M	229,248	37,871	8,583	14
India	23,141	33,630	382,294	42,289	7,241	1,254	48
Indonesia	1,309	6,851	80,545	43,242	1,530	84	85
Malaysia	989	5,839	18,414	26,872	2,388	232	33
Philippines	476	3,517	30,935	25,763	519	15	50
Russia	23,759	11,225	341,414	56,826	6,809	1,164	47
South Africa	542	6,146	22,104	14,219	1,198	126	60
Thailand	863	6,662	33,165	30,322	4,504	225	44

Note: This table draws on data provided by the World Bank and WIPO in the following areas: (1) patent applications, resident; (2) patent applications, nonresident; (3) trademark applications, direct resident; (4) trademark applications, direct nonresident; (5) charges for the use of intellectual property, payments (balance of payments, current US$); (6) charges for the use of intellectual property, receipts (balance of payments, current US$); and (7) ranking in the Global Innovation Index.

TABLE 3.2 *Other science, technology, and education indicators in 2020*

Country	High-Tech Exports (%)	High-Tech Exports (US$M)	R&D Expend. (% GDP)	Researchers in R&D (M)	Technicians in R&D (M)	S&T Journal Articles	Educ. Expend. (%)	Tertiary School (%)
Argentina	7	546	0.49†	1,211†	398†	9,730	5.0*	99
Brazil	11	5,945	1.16†	888††	970††	70,292	6.0*	55
China	31	757,459	2.14†	1,307†	N/A	669,744	3.6	58
India	11	21,583	0.65†	253†	73†	149,213	4.5	29
Indonesia	8	6,409	0.23†	216†	35†	32,554	3.5	36†
Malaysia	54	92,100	1.04†	2,185†	233†	21,885	3.9	43
Philippines	67	34,896	0.16**	106**	18**	3,072	3.7	33
Russia	9	6,525	0.98†	2,784†	438†	89,967	3.7	86*
South Africa	6	1,835	0.83‡	518‡	130‡	15,885	6.2	24
Thailand	28	45,838	1.00‡	1,350‡	297‡	13,963	3.1	43

* 2019 data; † 2018 data; ‡ 2017 data; ** 2015 data; †† 2014 data.

Note: This table draws on World Bank data in the following areas: (1) high-technology exports (% of manufactured exports); (2) high-technology exports (current US$); (3) research and development (R&D) expenditure (% of GDP); (4) researchers in R&D (per million people); (5) technicians in R&D (per million people); (6) scientific and technical journal articles; (7) government expenditure on education, total (% of GDP); and (8) school enrollment, tertiary (% gross).

Thailand (forty-third), and Russia (forty-seventh).[21] The rest were within the world's top seventy-five: Brazil (fifty-fourth), the Philippines (fifty-ninth), South Africa (sixty-first), Argentina (sixty-ninth), and Indonesia (seventy-fifth). Apart from these countries, Vietnam, a fast-growing lower-middle-income country with the world's fifteenth-largest population, also earned a top fifty spot in the index, placing at forty-eighth. Using the criteria outlined in my earlier chapter, one could certainly expand the list of "middle intellectual property powers" to include fast-growing emerging countries such as Vietnam.

While the intellectual property policy positions of many middle-income countries have remained close to those of other developing countries, some of these positions have begun to shift toward and align with those of their developed counterparts. Not only do the two groups of countries share similar aspirations, but some middle-income countries have also become more willing to embrace, at times reluctantly, higher intellectual property standards in international or regional negotiations.[22] Cases in point are the positions taken by Malaysia and Vietnam in the TPP negotiations and by China and the less developed members of the Association of Southeast Asian Nations (ASEAN) in the RCEP negotiations. As their economic and technological conditions continue to improve, middle-income countries will only become more active in persuading their developing country allies to support their negotiating and policy positions.

Given these rapidly changing geopolitical, economic, and policy landscapes, it is high time that we reassessed the debate on international intellectual property law and policy.[23] Although the North–South debate has been widely used in international relations and has successfully captured the tensions and conflicts between developed and developing countries in the past few decades, that debate does not fully reflect the ongoing developments in the international intellectual property regime. As middle-income countries continue to improve both economically and technologically, and as other low-income countries move up the economic ladder to become lower-middle-income countries, the gap between the Global North and the Global South will drastically reduce. Meanwhile, the challenges confronting least developed countries, which have necessitated the repeated extensions of the TRIPS transition period, will remain. In short, the debate on intellectual property,

[21] World Intellectual Property Organization, Global Innovation Index 2022: What Is the Future of Innovation-Driven Growth? 19 (Soumitra Dutta, Bruno Lanvin, Lorena Rivera León & Sacha Wunsch-Vincent eds., 2022) [hereinafter Global Innovation Index].

[22] Peter K. Yu, *TPP, RCEP and the Future of Copyright Norm-Setting in the Asian Pacific*, *in* Making Copyright Work for the Asian Pacific: Juxtaposing Harmonisation with Flexibility 19, 39–41 (Susan Corbett & Jessica C. Lai eds., 2018); Peter K. Yu, *The RCEP and Trans-Pacific Intellectual Property Norms*, 50 Vand. J. Transnat'l L. 673, 737–40 (2017).

[23] *See* Peter K. Yu, *Intellectual Property Negotiations, the BRICS Factor and the Changing North–South Debate*, *in* The BRICS-Lawyers' Guide to Global Cooperation 148, 148–49 (Rostam J. Neuwirth, Alexandr Svetlicinii & Denis De Castro Halis eds., 2017); Yu, *supra* note 2, at 216–17.

innovation, and global inequality will become more complex than a simplistic binary North–South debate.

3.2 INEQUALITY WITHIN COUNTRIES

Thus far, the debate on international intellectual property law and policy has focused primarily on global inequality. That debate has rarely gone behind territorial borders to shed light on national inequality. Since the mid-2000s, however, economists – most notably François Bourguignon, Branko Milanovic, and Thomas Piketty – have called for greater scholarly and policy attention to the ever-increasing inequalities within countries.[24] National inequality is important not only because it can be found in both the Global North and the Global South but also because it will influence how and how effectively we combat global inequality.[25]

Although inequalities within high- and low-income countries remain important and have received scholarly and policy attention, this section continues to focus on middle-income countries, for at least two reasons. First, a greater focus on inequalities within these countries will make the debate's growing complications salient. While these fast-growing middle-income countries have been slowly catching up with their developed counterparts, thereby helping to reduce global inequality, the inequalities within these countries have greatly increased. Such increase, to some extent, suggests the potential, and oft-overlooked, costs of strong intellectual property rights – the painful medicine that the Global North prescribed through the TRIPS Agreement and TRIPS-plus bilateral, regional, and plurilateral agreements.

Second, inequalities within middle-income countries will pose serious internal challenges at a point when these fast-growing countries start to align their intellectual property laws and policies more closely with those of the developed world. To respond to these challenges, policymakers may consider adjustments to strike a better domestic balance. Those adjustments not only would make the positions of these countries less coherent, but the choices and incoherences might have a significant impact on the future development of the international intellectual property regime.

For illustrative purposes, this section discusses three types of inequality within middle-income countries: geographic, sectoral, and income. While the scope and

[24] François Bourguignon, The Globalization of Inequality (Thomas Scott-Railton trans., 2017); Branko Milanovic, Global Inequality: A New Approach for the Age of Globalization (2018); Thomas Piketty, Capital and Ideology (Arthur Goldhammer trans., 2020) [hereinafter Piketty, Capital and Ideology]; Thomas Piketty, Capital in the Twenty-First Century (Arthur Goldhammer trans., 2014) [hereinafter Piketty, Capital in the Twenty-First Century]; Thomas Piketty, The Economics of Inequality (Arthur Goldhammer trans., 2015).

[25] See Chapter 11 in this volume.

length of this chapter do not allow for a greater exploration of the relationship between intellectual property protection and national inequality – and economists have yet to provide conclusive evidence on a strong causal relationship[26] – this section's observations on the three types of inequality provide useful information about the internal challenges many middle-income countries will face. Regardless of whether strong positive causality exists, those challenges will deeply affect the intellectual property policy positions taken by these countries.

3.2.1 *Geographic Inequality*

Thus far, the literature on international intellectual property law and policy has been filled with cross-country studies.[27] This nation-based focus is unsurprising, considering the need for policymakers and commentators to understand, evaluate, and appreciate the divergent policy positions adopted by the surveyed countries. Nevertheless, if policymakers and scholars are to grasp fully the internal policy challenges in each of these countries, they will have to pay greater attention to the vast subnational variations behind the countries' territorial borders.

Although subnational data remain relatively scarce, recent years have seen national intellectual property offices becoming more active in collecting these data. To highlight the deep geographical divergences within a country, there is no better dataset than the patent data collected by the China National Intellectual Property Administration (previously the State Intellectual Property Office of China).

In 2021, Guangdong, Jiangsu, and Zhejiang – the provinces with the three largest volumes of invention patent applications – had a total of 242,551, 188,241, and 129,821, respectively (see Table 3.3). Meanwhile, Yunnan, Shanxi, and Guizhou (the eighteenth to twentieth provinces) had a total of only 10,293, 10,059, and 9,869, respectively. In the same year, the total number of invention patent grants for Guangdong, Jiangsu, and Zhejiang were 102,850, 68,813, and 56,796, respectively. By contrast, the total number for Yunnan, Shanxi, and Guizhou were 3,643, 3,915, and 2,824, respectively. For both applications and grants, the figures for the more developed provinces were more than twelve times the corresponding numbers for their less developed counterparts. Had we included in the second group those provinces and autonomous regions with fewer than 5,000 patent applications and 1,200 patent

[26] See Chapter 1 in this volume.

[27] For example, Elizabeth Siew-Kuan Ng & Albert Guang-Zhou Hu, *Flexibilities in the Implementation of TRIPS: An Analysis of Their Impact on Technological Innovation and Public Health in Asia*, *in* Framing Intellectual Property Law in the 21st Century: Integrating Incentives, Trade, Development, Culture, and Human Rights 115, 118 (Rochelle Cooper Dreyfuss & Elizabeth Siew-Kuan Ng eds., 2018); U.S. Chamber of Commerce Global Innovation Policy Center, U.S. Chamber International IP Index (2018); Taylor Wessing, Global Intellectual Property Index: 5th Report (2016); Juan C. Ginarte & Walter G. Park, *Determinants of Patent Rights: A Cross-National Study*, 26 Rsch. Pol'y 283 (1997).

TABLE 3.3 *Volume of invention patent applications and grants on mainland China in 2021*

Province	Volume of Patent Applications	Volume of Patent Grants
Guangdong	242,551	102,850
Jiangsu	188,241	68,813
Zhejiang	129,821	56,796
Shandong	82,481	36,345
Anhui	64,106	23,624
Hubei	51,690	22,376
Sichuan	45,358	19,337
Shaanxi	38,643	15,516
Hunan	36,746	16,564
Henan	34,950	13,536
Fujian	31,093	12,561
Hebei	23,923	8,621
Liaoning	23,078	10,480
Jiangxi	19,171	6,741
Heilongjiang	15,018	6,337
Guangxi	13,693	4,573
Jilin	12,680	5,730
Yunnan	10,293	3,643
Shanxi	10,059	3,915
Guizhou	9,869	2,824
Gansu	6,423	2,253
Inner Mongolia	5,998	1,651
Hainan	4,497	954
Xinjiang	4,395	1,153
Ningxia	3,054	1,103
Qinghai	1,585	454
Tibet	515	184

Note: This table focuses on only mainland China and excludes Hong Kong, Macau, and Taiwan. It also does not include the four municipalities under the central government's direct administration – namely, Beijing, Chongqing, Shanghai, and Tianjin.
Sources: *Patent Applications for Invention Originated from Home by Origin*, CHINA NAT'L INTELL. PROP. ADMIN., https://english.cnipa.gov.cn/jianbao/year2021/a/a3.html (last visited May 12, 2023); *Patent Grants for Invention Originated from Home by Origin*, CHINA NAT'L INTELL. PROP. ADMIN., https://english.cnipa.gov.cn/jianbao/year2021/b/b2.html (last visited May 12, 2023).

grants, such as Hainan, Xinjiang, Ningxia, Qinghai, and Tibet, these two groups would have even starker statistical contrasts.

While the data in this section focus on China, similar geographical disparities can be found in other emerging countries. For instance, Nobel Laureate Michael Spence referred to Brazil as a "dual economy," noting the existence of "a relatively rich one whose growth is constrained by the normal forces that constrain the growth of relatively advanced economies, and a poor one where the early-stage growth dynamics … just didn't start, owing to its separation from the modern domestic

economy and the global economy."[28] Fareed Zakaria also remarked that India "might have several Silicon Valleys, but it also has three Nigerias within it – that is, more than 300 million people living on less than a dollar a day."[29] Likewise, Ruchir Sharma described South Africa as "a developed market wrapped inside an emerging market."[30]

Since 2017, the Global Innovation Index report has included a top 100 ranking of the world's science and technology clusters. Among the ten middle-income countries listed in Tables 3.1 and 3.2, the 2022 rankings recognized the following subnational clusters: Shenzhen–Hong Kong–Guangzhou (second), Beijing (third), Shanghai–Suzhou (sixth), Nanjing (thirteenth), Hangzhou (fourteenth), Wuhan (sixteenth), Xi'an (twenty-second), Taipei–Hsinchu (twenty-sixth), Chengdu (twenty-ninth), Moscow (thirty-first), Qingdao (thirty-fourth), Tianjin (thirty-seventh), Changsha (forty-first), Chongqing (forty-ninth), Hefei (fifty-fifth), Harbin (fifty-sixth), Bengaluru (sixtieth), Jinan (sixty-first), Changchun (sixty-third), Delhi (sixty-fourth), Shenyang (sixty-eighth), São Paulo (seventy-first), Dalian (seventy-second), Zhengzhou (eighty-third), Mumbai (eighty-fourth), Xiamen (ninety-first), Chennai (ninety-seventh), and Lanzhou (hundredth).[31]

As shown by this list of science and technology clusters and the earlier discussion, middle-income countries experience considerable economic and technological variations at the subnational level, similar to the variations they encounter across nations in the North–South debate. To the extent that intellectual property reforms have contributed to improving the economic and technological conditions of middle-income countries, one cannot help but wonder whether such reforms have produced subnational winners and losers. Although the significant variations in many of these countries resemble those documented in the Global North,[32] the spatial concentration of innovative activities in a few middle-income countries, most notably China and India, has been much more uneven than what is found in Europe and the United States. As Riccardo Crescenzi and Andrés Rodríguez-Pose observed:

> Patent counts at the subnational level indicate that the five EU regions with the highest shares of patent applications together represent 35% of all EU patenting; for the US the corresponding figure is about 50%. By contrast, the five most innovative

[28] Michael Spence, The Next Convergence: The Future of Economic Growth in a Multispeed World 204 (2011).

[29] Fareed Zakaria, The Post-American World 133 (2008).

[30] Ruchir Sharma, Breakout Nations: In Pursuit of the Next Economic Miracles 173 (2012).

[31] Global Innovation Index, *supra* note 21, at 258–59. Unlike Table 3.2, which focuses on mainland China, this list covers Greater China and other parts of the world. On the concentration of innovative activities in urban hotspots and the global networks linking these hotspots, see World Intellectual Property Organization, World Intellectual Property Report 2019: The Geography of Innovation: Local Hotspots, Global Networks (2019).

[32] Annalisa Primi, *The Evolving Geography of Innovation: A Territorial Perspective*, *in* The Global Innovation Index 2013: The Local Dynamics of Innovation 69, 70 (2013).

> Indian regions cover 75% of Indian patents; in China, the five regions with the highest patent share produce almost 80% of all patent applications.[33]

Since the adoption of the TRIPS Agreement, critics have frequently and heavily criticized it for ushering in a misguided "one size fits all" – or, more precisely, "supersize fits all" – approach to intellectual property norm-setting.[34] Although "these critiques tend to end at the national border, with the trust and expectation that a sovereign government will ultimately strike the appropriate balance for its country,"[35] policymakers and scholars should not ignore the problems a "one size fits all" approach to intellectual property norm-setting would create at the subnational level.

Just as this flawed approach fails to recognize the differing needs, interests, conditions, and priorities of over 160 WTO members, especially those in the developing world, that same approach does not sit well with the wide subnational variations found within each country, even though having uniform nationwide standards does provide some important benefits. Based on the patent statistics provided earlier in Table 3.3, it is just very difficult to imagine that a Chinese province with fewer than 10,000 patent applications and 3,000 grants per year should have the same intellectual property standards as a province that has generated more than 100,000 patent applications and 50,000 patent grants annually. Likewise, uniform nationwide standards are unlikely to work very well in India, which has little patent-based innovation "outside the … innovation hubs of Mumbai, Delhi, Bangalore, Chennai, Hyderabad or Pune."[36] Thus, policymakers should begin exploring the benefits of adopting intellectual property policies that accommodate the different economic and technological conditions at the subnational level.[37]

3.2.2 *Sectoral Inequality*

The second type of inequality that warrants scholarly and policy attention concerns the uneven sectoral developments at the subnational level. Such unevenness can be attributed to a wide variety of factors, ranging from the presence of innovation clusters to the availability of human talents and foreign investors.[38]

[33] Riccardo Crescenzi & Andrés Rodríguez-Pose, *The Geography of Innovation in China and India*, 41 Int'l J. Urb. & Reg. Rsch. 1010, 1014 (2017).

[34] Peter K. Yu, *The Global Intellectual Property Order and Its Undetermined Future*, 1 WIPO J. 1, 9 (2009).

[35] Peter K. Yu, *A Spatial Critique of Intellectual Property Law and Policy*, 74 Wash. & Lee L. Rev. 2045, 2093 (2017).

[36] Crescenzi & Rodríguez-Pose, *supra* note 33, at 1016.

[37] Outside the intellectual property field, commentators have begun to explore the advantages and challenges of place-based economic development approaches. See, for example, Andrés Rodríguez-Pose & Callum Wilkie, *Revamping Local and Regional Development through Place-Based Strategies*, 19 Cityscape 151, 153–57 (2017).

[38] Ashish Arora & Alfonso Gambardella, *Bridging the Gap: Conclusions*, *in* From Underdogs to Tigers: The Rise and Growth of the Software Industry in Brazil, China, India,

In many middle-income countries, it is not uncommon to find a few industrial sectors that are much more innovative and globally competitive than the others. For example, Embraer (Empresa Brasileira de Aeronautica) and Petrobras (Petroleo Brasileiro) have achieved notable success in Brazil.[39] Likewise, the pharmaceutical and information technology sectors have performed very well in India.[40] Similar observations can also be made about China. Based on WIPO statistics, all of the six Chinese firms that were among the world's top twenty Patent Cooperation Treaty applicants in 2022 came from the consumer electronics or information technology sector.[41]

More importantly, the uneven sectoral developments in middle-income countries can be traced back historically. When WIPO published its first *World Intellectual Property Report* in 2011, that report listed all the top R&D spenders among the middle-income countries in 2009.[42] Among the sectors in which the listed companies concentrated were aerospace, automotive, electrical, engineering and construction, Internet, machinery, mining, oil and gas, pharmaceuticals, semiconductors, and telecommunications. This list not only documented the historical developments in Brazil, China, and India – the only middle-income countries that had companies on the list – but also foreshadowed the similarly uneven sectoral developments in other newly emerging countries that seek to climb up the economic and technological ladder.

In view of the divergent sectoral developments identified in this section, one could certainly ask the same question we explored earlier in the previous section: Does it make sense to have the same intellectual property standards throughout the country? More specifically, should those standards apply equally to those industrial sectors that are globally competitive and those that are only beginning to take off?

Ireland, and Israel 275, 283–84 (Ashish Arora & Alfonso Gambardella eds., 2006) [hereinafter From Underdogs to Tigers]; Ashish Arora, Alfonso Gambardella & Steven Klepper, *Organizational Capabilities and the Rise of the Software Industry in the Emerging Economies: Lessons from the History of Some US Industries*, *in* From Underdogs to Tigers, *supra*, at 171, 172; Justin Yifu Lin, The Quest for Prosperity: How Developing Economies Can Take Off 172–75 (2012).

[39] Roberto Mazzoleni & Luciano Martins Costa Póvoa, *Accumulation of Technological Capabilities and Economic Development: Did Brazil's IPR Regime Matter?*, *in* Intellectual Property Rights, Development, and Catch-up: An International Comparative Study 280, 282 (Hiroyuki Odagiri, Akira Goto, Atsushi Sunami & Richard R. Nelson eds., 2010).

[40] Peter K. Yu, *Intellectual Property and Asian Values*, 16 Marq. Intell. Prop. L. Rev. 329, 358 (2012).

[41] *Annex 2: Top PCT Applicants*, World Intell. Prop. Org. (Feb. 28, 2023), www.wipo.int/export/sites/www/pressroom/en/documents/pr-2023-899-annexes.pdf. These seven firms are Huawei (first), OPPO (sixth), BOE (seventh), Vivo (eleventh), ZTE (thirteenth), and DJI (twentieth).

[42] World Intellectual Property Organization, 2011 World Intellectual Property Report: The Changing Face of Innovation 41 (2011). The list was drawn from the Global Innovation 1,000 database compiled by Booz & Company (now Strategy&).

To be sure, Article 27.1 of the TRIPS Agreement states that "patents shall be available for any inventions, whether products or processes, in all fields of technology."[43] Yet the Agreement refrains from requiring WTO members to offer the same level of protection across all areas of intellectual property rights. Incorporating by reference the Paris Convention for the Protection of Industrial Property (Paris Convention) and the Berne Convention for the Protection of Literary and Artistic Works (Berne Convention), the TRIPS Agreement recognizes the need for different forms or levels of protection in each distinct area of intellectual property right. Even within the same area, the Agreement anticipates that WTO members may need sectoral variations – or "differential treatment." As the WTO panel observed in *Canada – Patent Protection of Pharmaceutical Products*:

> The primary TRIPS provisions that deal with discrimination, such as the national treatment and most-favoured-nation provisions of Articles 3 and 4, do not use the term "discrimination". They speak in more precise terms. The ordinary meaning of the word "discriminate" is potentially broader than these more specific definitions. It certainly extends beyond the concept of differential treatment. It is a normative term, pejorative in connotation, referring to results of the unjustified imposition of differentially disadvantageous treatment.[44]

The recognition of the need for differentiation makes good economic sense. As Paul David reminded us, "economic efficiency would … call for great subtlety and differentiation in the nature and degree of intellectual property protection provided, based on differences among industries in technological and market circumstances."[45]

Indeed, among middle-income countries, for instance, it is common to find some countries performing much better in one intellectual property area than in others. In 2022, WIPO statistics ranked China (first), India (twelfth), Russia (twenty-third), Brazil (twenty-sixth), South Africa (thirty-fourth), Thailand (thirty-eighth), and Malaysia (thirty-ninth) within the world's top forty based on the volume of Patent Cooperation Treaty applications filed.[46] Of these countries, only China (third), Russia (fourteenth), India (twenty-second), Brazil (thirty-eighth), and Malaysia (fortieth) remained in the top forty when the rankings focused on international trademark applications under the Madrid Agreement Concerning the International

[43] TRIPS Agreement, *supra* note 4, art. 27.1.

[44] Panel Report, *Canada – Patent Protection of Pharmaceutical Products*, WTO Doc. WT/DS114/R, ¶ 7.94 (adopted Mar. 17, 2000).

[45] Paul A. David, *Intellectual Property Institutions and the Panda's Thumb: Patents, Copyrights, and Trade Secrets in Economic Theory and History*, *in* Global Dimensions of Intellectual Property Rights in Science and Technology 19, 43 (Mitchel B. Wallerstein, Mary Ellen Mogee & Roberta A. Schoen eds., 1993).

[46] *Annex 1: International Patent Applications by Origin (PCT System)*, World Intell. Prop. Org. (Feb. 10, 2022), www.wipo.int/export/sites/www/pressroom/en/documents/pr_2022_886_annexes.pdf.

Registration of Marks and its related protocol.[47] Thailand and South Africa were fifty-seventh and 127th, respectively.[48]

From a policy standpoint, the differing levels of intellectual property protection needed by the varying industrial sectors may raise an additional question concerning whether those middle-income countries with highly divergent sectoral developments could ultimately develop coherent nationwide intellectual property policies.[49] As I observed more than a decade ago, China may "prefer stronger protection of intellectual property rights in entertainment, software, semiconductors, and selected areas of biotechnology to increased protection in areas concerning pharmaceuticals, chemicals, fertilizers, seeds, and foodstuffs."[50] Although China has since moved up economically and technologically and has now opted for stronger protection in other areas, such as pharmaceutical and biological products,[51] its initial reluctance to strengthen protection in all fields of technologies underscores the challenge of formulating a coherent intellectual property policy that is responsive to the country's highly uneven economic and technological developments.

3.2.3 *Income Inequality*

The final type of inequality that warrants scholarly and policy attention pertains to the gap in income and wealth between the rich and the poor, which is often measured using Gini coefficients.[52] Drawing on World Bank statistics, Table 3.4 tracks the changes in income inequality in 1995 (the year the TRIPS Agreement entered into force), 2005 (the last year the TRIPS provisions on pharmaceutical patents were allowed to take effect in developing countries), and 2015 (twenty years after the TRIPS Agreement took effect). Considering that Gini coefficients alone may not reveal the full extent of income disparities,[53] this table also lists the

[47] *Annex 5: International Trademark Applications by Origin (Madrid System)*, World Intell. Prop. Org. (Feb. 10, 2022), www.wipo.int/export/sites/www/pressroom/en/documents/pr_2022_886_annexes.pdf.

[48] *Id.*

[49] Yu, *supra* note 35, at 2096.

[50] Peter K. Yu, *International Enclosure, the Regime Complex, and Intellectual Property Schizophrenia*, 2007 Mich. St. L. Rev. 1, 25.

[51] Peter K. Yu, *From Struggle to Surge: China's TRIPS Experience and Its Lessons for Access to Medicines*, *in* Intellectual Property Law and Access to Medicines: TRIPS Agreement, Health, and Pharmaceuticals 172 (Srividhya Ragavan & Amaka Vanni eds., 2021); Peter K. Yu, *China's Innovative Turn and the Changing Pharmaceutical Landscape*, 51 U. Pac. L. Rev. 593, 602–08 (2020) [hereinafter Yu, *China's Innovative Turn*].

[52] The Gini Index provided by the World Bank "measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution." *Metadata Glossary*, World Bank, https://databank.worldbank.org/metadataglossary/gender-statistics/series/SI.POV.GINI (last visited May 24, 2021).

[53] Piketty, Capital and Ideology, *supra* note 24, at 26; Piketty, Capital in the Twenty-First Century, *supra* note 24, at 266–67.

TABLE 3.4 *Changes in income inequality from 1995 to 2015*

Country	1995 Gini	2005 Gini	2015 Gini	1995 Top 10%	2005 Top 10%	2015 Top 10%	1995 Bottom 10%	2005 Bottom 10%	2015 Bottom 10%
Argentina	48.9	47.7	41.6*	37.0	34.9	29.9*	1.1	1.3	1.8*
Brazil	59.6	56.3	51.9	47.5	44.6	40.9	0.8	1.0	1.2
China	35.2**	40.9	38.6	27.3**	30.9	29.4	3.1**	2.4	2.6
India	31.7‡‡	34.4‡	35.7†	26.7‡‡	29.2‡	30.1†	3.8‡‡	3.7‡	3.5†
Indonesia	32.0‡‡	33.0	39.7	27.0‡‡	27.4	32.4	3.9‡‡	3.6	3.0
Malaysia	48.5	46.4§	41.1	37.9	35.1§	31.3	1.8	1.8§	2.3
Philippines	N/A	46.6§	44.6	N/A	36.6§	34.9	N/A	2.1§	2.3
Russia	N/A	N/A	36.6	N/A	N/A	26.8	N/A	N/A	2.2
South Africa	59.3‡‡	64.8	63.0*	46.7‡‡	54.2	50.5*	1.3‡‡	1.0	0.9*
Thailand	43.5††	42.5‡	36.0	34.9††	33.8‡	28.4	2.5††	2.5‡	3.2

* 2014 data; † 2011 data; ‡ 2004 data; § 2003 data; ** 1996 data; †† 1994 data; ‡‡ 1993 data.
Note: This table draws on World Bank data in the following areas: (1) Gini index, (2) income share held by highest 10%, and (3) income share held by lowest 10%.

respective figures for the income share of both the top and bottom deciles in each country.

Although the Gini coefficients of countries such as China, India, and South Africa have increased from 1995 to 2005, with the top decile getting a larger share of income, similar figures for other middle-income countries have remained stagnant or fallen. The lack of conclusive evidence on correlation in this area is understandable. While stronger intellectual property protection generated by the TRIPS Agreement reduced affordable access to intellectual property–based goods and services, thereby widening the gap between the rich and the poor, the positive benefits provided by the WTO, trade liberalization, and the entry of foreign investors reduced income inequality.

A considerable increase in income inequality following the adoption of the TRIPS Agreement would certainly be alarming. Such an increase would suggest the adverse impacts of inappropriate WTO rules in intellectual property or other areas. Even a slight increase or a limited decline can still raise questions about why the change did not correspond to the more significantly reduced economic and technological gaps between the Global North and middle-income countries. Based on these developments, one may wonder whether national inequality will become a bigger issue for the latter in the near future, considering the fast-closing gap between these two groups of countries. As Branko Milanovic reminded us:

> With the increases of mean incomes in Asian countries, the gaps between countries have actually been narrowing. If this trend of economic convergence continues, not only will it lead to shrinking global inequality but it will, indirectly, also give

> relatively greater salience to inequalities within nations. In fifty years or so, we might return to the situation that existed in the early nineteenth century, when most of global inequality was due to income differences between rich and poor Britons, rich and poor Russians, or rich and poor Chinese, and not so much to the fact that mean incomes in the West were greater than mean incomes in Asia.[54]

Likewise, François Bourguignon observed:

> [A]s the rise in national inequality ... seems to coincide with the recent acceleration of globalization, we have a tendency to conclude that the latter was responsible for the former, even if, paradoxically, globalization has *also contributed* to a drop in international inequalities. However, once we have looked at it through both national and international lenses, the relationship between globalization and inequality turns out to be more complex than it first appears.[55]

In the intellectual property field, the growing attention on national inequality has raised questions about whether the imbalance in the existing international intellectual property regime could exacerbate inequality in income and wealth – the subject of fast-expanding scholarly inquiry.[56] Moreover, because an intellectual property system would inevitably affect one's ability to use new technology – which has a demonstrated impact on income inequality[57] – problems in the intellectual property system could create a vicious cycle that would further widen the gap between the rich and the poor within a country. Thus, when policymakers adjust intellectual property laws and policies – for example, to align them more closely with developed country standards – they will have to think deeper about the distributive effects of those adjustments as well as the preemptive or corrective measures that could be introduced to prevent further increasing income inequality.

3.3 RECOMMENDATIONS FOR INTERVENTIONS

Using middle-income countries as illustrations, the previous section calls for greater scholarly and policy attention to national inequality in the intellectual property

[54] MILANOVIC, *supra* note 24, at 5.

[55] BOURGUIGNON, *supra* note 24, at 2–3.

[56] Included in this fast-growing literature are Samuel Adams, *Globalization and Income Inequality: Implications for Intellectual Property Rights*, 30 J. POL'Y MODELING 725 (2008); Philippe Aghion, Ufuk Akcigit, Antonin Bergeaud, Richard Blundell & David Hemous, *Innovation and Top Income Inequality*, 86 REV. ECON. STUD. 1 (2019); Sourav Bhattacharya, Pavel Chakraborty & Chirantan Chatterjee, *Intellectual Property Regimes and Wage Inequality*, 154 J. DEV. ECON. 102709 (2022); Angus C. Chu, *Effects of Patent Policy on Income and Consumption Inequality in a R&D Growth Model*, 77 S. ECON. J. 336 (2010); Christian Kiedaisch, *Growth and Welfare Effects of Intellectual Property Rights When Consumers Differ in Income*, 72 ECON. THEORY 1121 (2021); Swati Saini & Meeta Keswani Mehra, *Impact of Strengthening Intellectual Property Rights Regime on Income Inequality: An Econometric Analysis*, 38 ECON. BULL. 1703 (2018). Thanks to Keith Maskus for suggesting these sources in Chapter 1 in this volume.

[57] BOURGUIGNON, *supra* note 24, at 85–87.

context, which has been largely underexplored when compared with global inequality. To help combat national inequality, this section recommends interventions in three areas: (1) international norm-setting, (2) national policymaking, and (3) academic and policy research. Although these interventions were developed with middle-income countries in mind, many of them will be equally relevant to high- and low-income countries.

3.3.1 *International Norm-Setting*

From the inception of the Paris and Berne Conventions, the international intellectual property regime has focused primarily on developments across nations. Although countries at that time were eager to develop international standards for protecting literary, artistic, and industrial property, the original conventions ended with a modest set of international minimum standards and a provision recognizing the principle of national treatment, which prohibits the discrimination against foreign authors and inventors.[58]

This nation-based focus on international norm-setting continues even today despite the adoption of much higher intellectual property standards, such as those enshrined in the TRIPS Agreement and TRIPS-plus bilateral, regional, and plurilateral agreements. Notwithstanding this continuous focus, the specific and detailed standards laid down in these agreements have greatly eroded the policy space that countries have traditionally retained to design intellectual property laws and policies.[59] As a result, policymakers, especially those in developing countries, have great difficulty optimizing the intellectual property system based on local conditions. Should inequalities within the country arise or grow, these policymakers will have less policy space and a tougher time harnessing the intellectual property system to combat those inequalities.

Given the significant inequalities within developing countries that have been documented in this chapter – whether at the geographic, sectoral, or income level – it is high time that policymakers explored more actively the feasibility of putting in place a system that would allow for greater subnational policy variations than what is now found in the Global North. Consider, for instance, the law and policies needed to address geographic inequality within a country. While Article 27.1 of the TRIPS Agreement states that WTO members cannot discriminate "as to the place of invention, the field of technology and whether products are imported or locally produced,"[60] the WTO panel in *Canada – Patent Protection of Pharmaceutical*

[58] Berne Convention for the Protection of Literary and Artistic Works art. 5(1), Sept. 9, 1886, 1161 U.N.T.S. 3 (revised at Paris July 24, 1971); Paris Convention for the Protection of Industrial Property art. 2(1), Mar. 20, 1883, 828 U.N.T.S. 305 (revised at Stockholm July 14, 1967).

[59] Peter K. Yu, *The International Enclosure Movement*, 82 Ind. L.J. 827, 858–70 (2007).

[60] TRIPS Agreement, *supra* note 4, art. 27.1.

Products made clear that "differentiation" does not always amount to "discrimination."[61]

Moreover, although countries tend to have nationwide intellectual property standards, a scrutiny of the actual protection on the ground shows subnational variations, which widen even more when one takes judicial enforcement into consideration. Such subnational variations are common in not only the Global South but also the Global North. In the United States, for example, appellate courts continue to disagree over the protection of intellectual property rights, generating what commentators generally refer to as "circuit splits."[62] A case in point is the protection offered by national trademark and unfair competition laws. Although the legal standards may be the same on paper – that is, based on the federal Lanham Act – they differ at times in practice, not to mention the differing levels of protection offered by state unfair competition laws.[63]

Finally, there is a growing trend for developing countries to establish "free trade zones," "customs free zones," or "export processing free zones" to attract foreign investors.[64] These free zones tend to offer "relaxed regulations, limited taxes[,] ... reduced oversight ... [and] softened Customs control" – features that differ significantly from those in other parts of the country.[65] Thus, even though subnational policy variations seem suspect under WTO rules at first glance, the question on the permissibility of these variations is not as straightforward when one goes deeper into how trade and intellectual property laws currently operate in practice. Indeed, the existence of free trade zones or their equivalents within the WTO framework strongly suggests the possibility for greater subnational policy variations or differentiation.

3.3.2 *National Policymaking*

Even if the WTO and the TRIPS-based international intellectual property regime do not prohibit subnational policy variations per se, countries may decline to adopt laws that would support such variations. For national unity, legislative convenience, practical considerations, and other reasons, countries may embrace uniform nationwide standards even when those standards do not provide benefits to every

[61] Panel Report, *supra* note 44, ¶ 7.94.

[62] Graeme B. Dinwoodie, *International Intellectual Property Litigation: A Vehicle for Resurgent Comparativist Thought*, 49 Am. J. Comp. L. 429, 430 (2001).

[63] Peter S. Menell, *Regulating "Spyware": The Limitations of State "Laboratories" and the Case for Federal Preemption of State Unfair Competition Laws*, 20 Berkeley Tech. L.J. 1363, 1380–95 (2005).

[64] Susan Tiefenbrun, *U.S. Foreign Trade Zones, Tax-Free Trade Zones of the World, and Their Impact on the U.S. Economy*, 12 J. Int'l Bus. & L. 149, 167–80 (2013).

[65] Business Action to Stop Counterfeiting & Piracy, International Chamber of Commerce, Controlling the Zone: Balancing Facilitation and Control to Combat Illicit Trade in the World's Free Trade Zones 1 (2013).

geographic region or industrial sector. Indeed, compromises in national policymaking are both common and inevitable.

Nevertheless, policymakers pushing for higher intellectual property standards should pay greater attention to mechanisms that could help strike a more appropriate balance in the domestic intellectual property system. Among the balancing mechanisms that have received wide support in the developing world are limitations and exceptions in copyright law for educational and research purposes; limitations and exceptions in patent law for research, early working, and the development of diagnostics; restrictions on patent protection for microorganisms and diagnostic, therapeutic, and surgical methods; compulsory licensing of vaccines, pharmaceuticals, and medical technologies; support for parallel importation of copyrighted, patented, and trademarked products; limits to injunctive relief; significantly reduced penalties for noncommercial infringement; and measures to prevent abuse of intellectual property rights and other anticompetitive practices.

At the institutional level, policymakers could consider adjustments to make the intellectual property system more supportive of individual creators and inventors and small and medium-sized enterprises. In Chapter 5 in this volume, Daniel Benoliel and Rochelle Dreyfuss proposed adjustments to the patent system that would promote creation and invention in the Global South.[66] Commentators have also highlighted the pro-development potential of utility models, geographical indications, the protection of traditional knowledge and cultural expressions, and other forms of intellectual property rights.[67] As if these proposals were not enough, a growing volume of literature now showcases the positive economic and development benefits of open innovation models as well as alternative incentive frameworks, such as grants, prizes, and advance market commitments.[68] Some commentators have also advanced "new concepts such as 'frugal', 'reverse' or 'trickle-up' innovation," which are attractive to not only developing countries but also the disadvantaged populations in developed countries.[69]

While adjustments to intellectual property laws and policies often provide the first line of reform, policymakers should also consider alternative or supplemental adjustments outside the intellectual property system. For instance, they could

[66] See Chapter 5 in this volume.

[67] Geographical Indications at the Crossroads of Trade, Development, and Culture: Focus on Asia-Pacific 259–435 (Irene Calboli & Ng-Loy Wee Loon eds., 2017); Innovation without Patents: Harnessing the Creative Spirit in a Diverse World (Uma Suthersanen, Graham Dutfield & Chow Kit Boey eds., 2007); Poor People's Knowledge: Promoting Intellectual Property in Developing Countries (J. Michael Finger & Philip Schuler eds., 2004).

[68] Gene Patents and Collaborative Licensing Models: Patent Pools, Clearinghouses, Open Source Models and Liability Regimes 169–244 (Geertrui Van Overwalle ed., 2009); Amy Kapczynski, *Order without Intellectual Property Law: Open Science in Influenza*, 102 Cornell L. Rev. 1539 (2017).

[69] World Intellectual Property Organization, *supra* note 42, at 40.

develop a well-functioning transfer mechanism that would allow the anticipated winners from intellectual property reforms to share benefits with the potential losers. As Frederick Abbott reminded us about the adverse public health implications of bilateral and regional trade agreements:

> The problem with . . . using net economic gains or losses as the developing country benchmark is that gains for a developing country's textile or agricultural producers do not directly translate into higher public or private health expenditures. Salaries for part of the workforce may increase and government tax revenues may rise, and this may indirectly help to offset pharmaceutical price increases. However, in order for the health sector not to be adversely affected, there must be some type of transfer payment, whether in the form of increased public health expenditures on pharmaceuticals, by providing health insurance benefits, or other affirmative acts. In a world of economic scarcity, the prospect that governments will act to offset increases in medicines prices with increased public health expenditures is uncertain.[70]

To prevent intellectual property reforms from increasing national inequality, policymakers could undertake two general types of complementary reforms to help redistribute benefits: ex ante and ex post.[71] Ex ante redistribution could include changes in education and healthcare policies. For example, commentators have called for expanded access to education and reduced educational inequalities.[72] By transferring technology and know-how, education will help create a more level playing field for disadvantaged populations. Indeed, knowledge transfer is so important that commentators have proposed intellectual property reforms to improve the educational environment.[73]

Another ex ante mechanism for redistributing the benefits of intellectual property reforms is in the healthcare area. Healthcare reform, including efforts to make pharmaceuticals and other health products more affordable, will increase the productivity and life expectancy of disadvantaged populations and thereby enable them to amass greater wealth. In relation to China, for instance, I have advocated reform to increase public access to healthcare products and services in anticipation of the country's active push for the development of national champions in the pharmaceutical sector.[74]

[70] Frederick M. Abbott, *The Cycle of Action and Reaction: Developments and Trends in Intellectual Property and Health*, *in* Negotiating Health: Intellectual Property and Access to Medicines 27, 33 (Pedro Roffe, Geoff Tansey & David Vivas-Eugui eds., 2006).

[71] Bourguignon, *supra* note 24, at 167.

[72] *Id.* at 167–70; Milanovic, *supra* note 24, at 221–22.

[73] See, for example, Susan Isiko Strba, International Copyright Law and Access to Education in Developing Countries: Exploring Multilateral Legal and Quasi-Legal Solutions (2012); Margaret Chon, *Copyright and Capability for Education: An Approach "from Below,"* *in* Intellectual Property and Human Development: Current Trends and Future Scenarios 218 (Wong Tzen & Graham Dutfield eds., 2010).

[74] Yu, *China's Innovative Turn*, *supra* note 50, at 613–14.

Like ex ante redistribution, ex post redistribution – through tax-and-transfer mechanisms, perhaps – could be equally effective.[75] While the provision of subsidies, grants, or tax credits to local creators and inventors[76] could raise questions about national treatment under the TRIPS Agreement if those benefits would affect the availability, acquisition, or maintenance of intellectual property rights,[77] such provision would be deemed more acceptable if they were available to all creators and inventors – foreign and local alike. Because foreign creators and inventors in the developing world tend to be of a considerable size, the introduction of qualification thresholds in subsidies, grants, and tax credits could help ensure the careful tailoring of benefits to those in need, including local creators and inventors. Meanwhile, by offering identical benefits to similarly situated creators and inventors regardless of their country of origin, these incentive measures would arguably provide "effective equality of opportunities" – a criterion that WTO panels have used to evaluate treaty compliance.[78]

Thus far, economists have widely debated whether ex ante or ex post redistribution would be more efficient. The outcome of this analysis will likely depend on the specific conditions of the country involved. Given these diverging conditions, there may also be an additional question concerning what development goals the redistribution policies should prioritize. Fortunately, the U.N. General Assembly provided some helpful guidance when it adopted seventeen Sustainable Development Goals in December 2015 to replace the 2000 Millennium Development Goals. Sustainable Development Goal 10 specifically calls for reducing "inequality within and among countries" – the two types of inequality explored in this chapter. The goals' supportive plan of action, *Transforming Our World: The 2030 Agenda for Sustainable Development*, further identified "poverty eradication, health, education and food security and nutrition" as continuing development priorities.[79]

3.3.3 *Academic and Policy Research*

The last set of recommended interventions concerns academic and policy research. Emanating from this chapter's focus is a line of inquiry targeting the growing inequalities within countries and the benefits and drawbacks of greater subnational policy variations. As noted earlier, because cross-country comparisons have

[75] Bourguignon, *supra* note 24, at 158–67.

[76] Economic Impacts of Intellectual Property–Conditioned Government Incentives (Dan Prud'homme & Song Hefa eds., 2016).

[77] TRIPS Agreement, *supra* note 4, art. 3.

[78] Appellate Body Report, *United States – Section 211 Omnibus Appropriations Act of 1998*, ¶ 258, WTO Doc. WT/DS176/AB/R (adopted Jan. 2, 2002).

[79] G.A. Res. 70/1, Transforming Our World: The 2030 Agenda for Sustainable Development, ¶ 17 (Oct. 21, 2015).

dominated the literature on international intellectual property law and policy, limited research has been devoted to the wide disparities within each country. Academic and policy researchers should therefore devote greater attention to inequality within countries than among countries.

A second, and related, line of inquiry pertains to the linkage between intellectual property and non–intellectual property policies, such as those relating to education, healthcare, tax, and subsidies. A greater exploration and deeper understanding of this linkage will improve our ability to use these policies to redistribute the benefits of intellectual property reforms, including the new knowledge generated from stronger intellectual property protection, from the beneficiaries in the country to the disadvantaged parts. Whether ex ante or ex post, such redistribution will help minimize national inequality.

A third line of inquiry targets specific intellectual property developments in middle-income countries. Although a fast-growing literature has covered such developments in BRICS countries,[80] with additional country-based studies conducted on Indonesia, Malaysia, Thailand, Vietnam, and other emerging countries, there remains a dearth of scholarship on intellectual property developments across middle-income countries. Academic and policy researchers should therefore undertake more extensive research in this area.

A better understanding of developments within and across middle-income countries will likely challenge our prevailing understanding of international intellectual property law and policy, especially in relation to the North–South debate. Studying these countries may also help identify new problems and challenges in the intellectual property area. For example, many middle-income countries continue to face significant piracy and counterfeiting problems even though they have become quite innovative and now experience ever-growing intellectual property activities.[81] A case in point is China, which leads the world in not only international patent applications and intellectual property litigation[82] but also in the volume of pirated and counterfeit goods. Thus far, we do not have sufficient theoretical and empirical accounts to explain how countries could cope with intellectual property developments that proceed simultaneously in two diametrically opposed directions.[83] Greater research on this topic, or other unique issues found in middle-income countries, could therefore help improve our ability to address problems in the international intellectual property regime.

[80] For this literature, see sources collected in Peter K. Yu, *A Half-Century of Scholarship on the Chinese Intellectual Property System*, 67 Am. U. L. Rev. 1045, 1115 n.303 (2018).

[81] Yu, *supra* note 20, at 99–100.

[82] China National Intellectual Property Administration, The Status of Intellectual Property Protection in China in 2020, at 4 (2020); Peter K. Yu, *The Rise and Decline of the Intellectual Property Powers*, 34 Campbell L. Rev. 525, 544–49 (2012).

[83] Peter K. Yu, *Intellectual Property, Asian Philosophy and the Yin-Yang School*, 7 WIPO J. 1, 12–13 (2015).

CONCLUSION

The arrival of middle-income countries has raised intriguing questions about intellectual property, innovation, and global inequality. The success of these countries, especially those with considerable and ever-growing strengths in the intellectual property area, has shown the oversimplification of the binary North–South debate on intellectual property law and policy and its inability to capture the ongoing developments in the intellectual property field. The wide geographic, sectoral, and income inequalities within these countries have also called for greater scholarly and policy attention to subnational developments.

Focusing on the intellectual property developments within and across a group of fast-growing middle-income countries, this chapter not only documents the considerable inequalities among and within countries but also highlights the feasibility and benefits of using subnational policy variations to combat national inequality. Specifically, this chapter recommends interventions in three areas: international norm-setting, national policymaking, and academic and policy research. It is my hope that intellectual property policymakers and scholars will start paying greater attention to inequality within countries, just as they studied inequality among countries more than two decades ago.