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MISREADING A CANONICAL WORK: AN ANALYSIS OF MANSFIELD'S 1994 STUDY

*Paul J. Heald**

It would be hard to overestimate the influence of Edwin Mansfield's 1994 empirical study for the International Finance Corporation (an arm of the World Bank) of American business executives' attitudes toward low levels of intellectual property protection in developing nations.[1] His paper is ubiquitously cited for the proposition that if developing countries raise their level of intellectual property protection (especially patents), they will attract foreign investment and technology transfer.[2] In the spirit of the honoree of this symposium, I take a skeptical new look at a canonical work and conclude that the developing world should be very suspicious of the persistent claim that Mansfield's landmark survey of corporate decision makers supports a maximilist implementation and enforcement strategy across all areas of intellectual property.

Developing countries rightly question whether the costs of enforcing new intellectual property laws will be offset by increased foreign direct investment and technology transfer. Relying on Mansfield's research, many commentators have been willing to assert a correlation between enforcing intellectual property rights and increasing foreign direct investment and technology transfer to developing countries. For example, Peter Yu cites Mansfield for the proposition that "adopting an intellectual property regime that harmonizes with Western notions . . . [w]ill increase foreign investment, thus creating new jobs and facilitating technology transfer."[3] Similarly, "[m]ost writers [Mansfield] who have examined the role of intellectual property protection in developing countries have argued that better protection generally has positive economic effects, whether measured in terms of increased foreign direct investment or rates of modernization and development."[4] Reliance on Mansfield is predictable and persistent,[5]

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* Allen Post Professor of Law, University of Georgia. I would like to thank Chris Thomas for helping to organize this *festschrift*. My wonderful colleague Ray Patterson has long deserved this sort of honor.

[1] *See* Edwin Mansfield, *Intellectual Property Protection, Foreign Direct Investment, and Technology Transfer*, INT'L FIN. CORP. DISCUSSION PAPER No. 19 (1994).

[2] *See infra* notes 3-6 and accompanying text.

[3] Peter Yu, *Piracy, Prejudice, and Perspectives: An Attempt To Use Shakespeare to Reconfigure the U.S.-China Intellectual Property Debate*, 19 B.U. INT'L L.J. 1, 63 (2001).

[4] Horacio Teran, *Intellectual Property Protection and Offshore Software Development: An Analysis of the U.S. Software Industry*, 2 MINN. INTELL. PROP. REV. 1, 1-2 (2001).

[5] *See* Robert M. Sherwood, *Global Prospects for the Role of Intellectual Property in Technology Transfer*,

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including unquestioned citation by famous skeptics of the proposition that

42 IDEA 27, 27 (2002); Yu, *supra* note 3, at 63; Teran, *supra* note 4, at 1-2; Shanker A. Singham, *Competition Policy and the Stimulation of Innovation: Trips and the Interface Between Competition and Patent Protection in the Pharmaceutical Industry*, 26 BROOK. J. INT'L L. 363, 375-76 (2000)

> [E]dwin Mansfield's work illustrates that the intellectual property protection afforded by a country directly relates to the amount of technical development and transfer into the developing country. This factor significantly influences the composition of Foreign Direct Investment ("FDI"). Countries with strong intellectual property protection tend to experience a continuing flow of new high technology firms entering the industrial base. One World Bank study concludes that patent protection is an important ingredient in any package to support domestic R&D. The higher the intellectual property protection the greater amount of investment.

Id.; Thomas Lagerqvist & Mary L. Riley, *in* MARY L. RILEY, HOW TO PROTECT INTELLECTUAL PROPERTY RIGHTS IN CHINA, IN PROTECTING INTELLECTUAL PROPERTY RIGHTS IN CHINA 7, 8 (1997) (listing the loss of foreign investment and know-how as a cost of counterfeiting); Josh Martin, *Copyright Law Reforms Mean Better Business Climate*, J. COM., 1C (1996) (reporting on a "World Bank survey" that demonstrates the correlation between intellectual property rights and foreign investment); SUSAN K. SELL, POWER AND IDEAS: NORTH-SOUTH POLITICS OF INTELLECTUAL PROPERTY AND ANTITRUST 214 (1998) (arguing that an operational intellectual property regime will promote foreign investment); Edmund W. Kitch, *The Patent Policy of Developing Countries*, 13 UCLA PAC. BASIN L.J. 166, 175-76 (1994) (same); Evelyn Su, *The Winners And the Losers: The Agreement on Trade-related Aspects of Intellectual Property Rights and its Effects on Developing Countries*, 23 HOUS. J. INT'L L. 169 (2000) ("The report finds that by strengthening protection on the intellectual property rights, there may be a positive impact on developing countries through increases in local innovation, foreign direct investment, and technology transfers."); Clarisa Long, *Patents and Cumulative Innovation*, 2 WASH. U. J.L. & POL'Y 229, 238 (2000)

> Other industries, however, rely heavily on strong patent protection. One study shows that eighty percent of firms surveyed in the chemical, transportation equipment, electrical equipment, food, metals, and machinery industries indicated that the strength of intellectual property protection had a "major effect" in their willingness to invest in research and development facilities abroad.

Id.; Kenneth J. Vandevelde, *The Political Economy of a Bilateral Investment Treaty*, 92 AM. J. INT'L L. 621, 638 n.163 (1998) ("In general, strong intellectual property protection is correlated with the attraction of foreign direct investment."); Owen Lippert, *One Trip to the Dentist is Enough: Reasons to Strengthen Intellectual Property Rights Through the Free Trade Area of the Americas*, 9 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 241, 248 (1998)

> In the last twenty years, however, numerous studies have sought to measure the effect of changes in IPR standards on such items as economic growth, foreign direct investment ("FDI"), technology transfer, and consumer welfare. Special mention must go to the pioneering work of Edwin E. Mansfield of the University of Pennsylvania.

Id.; John A. Tessensohn, *Reversal of Fortune—Pharmaceutical Experimental Use and Patent Infringement in Japan*, 4 J. INT'L LEGAL STUD. 1, 21 (1998)

> The importance of providing strong protection of intellectual property rights in the ethical pharmaceutical industry can never be underestimated. The International Finance Corporation (IFC)—a World Bank affiliate—discovered that pharmaceutical companies would not be willing to invest directly in research and development facilities if there were no patent protection available for their

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intellectual property enforcement levels matter much in investment decisions.[6]

Although authoritatively establishing or disproving a causal link between strong intellectual property rights and foreign direct investment is a complex econometric exercise beyond the scope of this Article, a closer look at the famous Mansfield paper can reduce the amount of noise in the current debate and improve the quality of economic information usable by policymakers in developing countries. In 1991, Mansfield surveyed at random 100 U.S. firms in six different industries: Chemical, Transportation Equipment, Electrical Equipment, Food, Metals, and Machinery. An astonishing 94 firms responded to questions about whether the "strength or weakness of intellectual property rights protection has a strong effect on whether direct investments will be made."[7] The results were summarized as follows:[8]

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pharmaceutical products.

Id. A Google search of Mansfield and "foreign direct investment" on October 9, 2002, returned 1200 hits.

[6] *See* Keith E. Maskus, *Lessons from Studying the International Economics of Intellectual Property Rights*, 53 VAND. L. REV. 2219, 2233 (2000)

> Two recent studies find positive evidence, however. In the first, survey results were used to develop an index of perceived weakness of IPRs in destination countries on the part of U.S. firms. In the econometric model, the authors [Mansfield] found that weak patents had a significantly negative impact on the location of American FDI.

Id.; Keith E. Maskus, *Intellectual Property Rights and Economic Development*, 32 CASE W. RES. J. INT'L L. 471, 484 (2000)

> Firms with easily copied products and technologies, such as pharmaceuticals and software, would be quite concerned about the ability of the local IPRS system to deter imitation. Firms considering investing in a local R&D facility would pay particular attention to local patent and trade-secrets protection. This perspective was borne out by Mansfield (1994), who surveyed 100 U.S. firms with international operations in 1991.

Id.; J.H. Reichman, *From Free-Riders to Fair Followers: Global Competition Under the Trips Agreement*, 29 N.Y.U. J. INT'L L. & POL. 11 (1996) ("The availability of legal protection seems to affect all the principal methods by which developing countries obtain advanced technology they are not able to produce themselves, including foreign direct investment, joint ventures, technology transfers to subsidiaries, and licensing or franchises.").

[7] Mansfield, *supra* note 1, at 3.

[8] *Id.*

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TABLE 1 - MAJOR U.S. FIRMS IN SIX INDUSTRIES WHERE STRENGTH OR WEAKNESS OF INTELLECTUAL PROPERTY RIGHTS PROTECTION HAS STRONG EFFECT ON WHETHER DIRECT INVESTMENTS WILL BE MADE

Industry	Sales and Distribution Outlets	Rudimentary Production and Assembly Facilities	Facilities to Manufacturer Components	Facilities to Manufacturer Complete Products	Research and Development Facilities	Mean
Chemical	19	46	71	87	100	65
Trans. Equipment	17	17	33	33	80	36
Elec. Equipment	15	40	57	74	80	53
Food	29	29	25	43	60	37
Metals	20	40	50	50	80	48
Machinery	23	23	50	65	77	48
Mean	20	32	48	59	80	48

a The number of firms in the sample in each industry is chemical, 16; transportation equipment, 6; electrical equipment, 35; food, 8, metals, 5; machinery, 24.

b The chemical industry includes pharmaceuticals.

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After speculating on why the attitudes of the various industries studied varied so widely and presenting statements from interviewees, Mansfield concluded that "the strength or weakness of a country's system of intellectual property protection seems to have a substantial effect, particularly in high-technology industries, on the kinds of technology transferred by many U.S. firms to that country."[9] Although many doubt the substantiality of this link,[10] I have found no serious challenges to his research.

Although Mansfield's survey technique might be criticized,[11] the real problem is how it is interpreted by scholars and policy makers who recommend maximum recognition of patent rights or, more broadly, strong enforcement of intellectual property rights across the board. To begin, one must note that Mansfield did not ask firms about the relevance of each category of intellectual property separately. He did not question the distinct relevance of the enforcement of patents, trademarks, copyrights, trade secrets, publicity rights, or other sui generis design rights,[12] but only asked generically about "intellectual property rights" as a group.

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[9] Mansfield, *supra* note 1, at 1.

[10] *See, e.g.*, KEITH MASKUS, INTELLECTUAL PROPERTY RIGHTS IN THE GLOBAL ECONOMY 128 (2000) ("[S]trong IPRs alone do not sufficiently generate strong incentives for firms to invest in a country."); *id.* at 115 (noting that foreign direct investment in China increased ten-fold during a time of virtually no effective enforcement of intellectual property rights); Carlos A. Primo Braga & Carsten Fink, *The Relationship Between Intellectual Property Rights and Foreign Direct Investment*, 9 DUKE J. COMP. & INT'L L. 163, 164 (1998) ("[T]he available empirical evidence does not conclusively establish the relationship between IPRs and FDI decisions."); CARLOS M. CORREA, IMPLEMENTING THE TRIPS AGREEMENT: GENERAL CONTEXT AND IMPLICATIONS FOR DEVELOPING COUNTRIES 28-29 (1998)

> Thus Deardoff (1992) found that the poorest countries could not be expected to gain from the strengthening of IPRs, and that they should be exempt from any new agreement that is made to extend the patent protection under the GATT. Similarly, Subramanian, an International Monetary Fund economist, concluded that in welfare terms the individual country would be worse off, because there are no dynamic benefits (such as an appreciable effect on RD) to offset the static efficiency loses (Subramanian, 195, p. 25). A similar conclusion was reached by Scherer and Weisburst (1995)

Id.; ASSAFA ENDESHAW, INTELLECTUAL PROPERTY POLICY FOR NON-INDUSTRIALIZED COUNTRIES 104 (1996) ("The claim that the patent system encourages foreign investment in non-IC's has not been proved in practice.").

[11] It is unclear from the article whether the survey was directed to the manager within the firm in charge of foreign direct investment decisions. In addition, when asked whether a firm would invest in a particular country, the question was not validated with another question testing the level of the interviewee's knowledge of the level of intellectual property protection in the country. Finally, it appears that the interviewees were not questioned about their understanding of the term "intellectual property," which could encompass patents, trademarks, copyrights, trade secrets, publicity rights, sui generis design rights, or a sub-set of this list.

[12] U.S. law, for example, provides special protection beyond traditional copyright or patent law for semi-conductors, 17 U.S.C. §§ 901-914 (2000), and boat hulls, 17 U.S.C. §§ 1301-1332 (2000).

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In order to understand why this matters, it is useful to disaggregate a theoretical firm into two divisions that investigate levels of intellectual property protection, one division concerned with where to locate manufacturing and research and development facilities, and the other concerned with where to market finished products.

Consider first the marketing division of MegaCorp. As noted earlier, owners of patented inventions, trademarks (especially prestigious marks on consumer goods) and copyrights (especially computer software) prefer to have exclusive rights to market their products. The ability to suppress some forms of competition is often beneficial to a firm's bottom line. For this reason, complaints about the costs of piracy and counterfeiting are commonplace. In fact, complaints by U.S., Japanese, and EU firms provided the main stimulus for the adoption of the TRIPS Agreement.[13] Therefore, we would expect the marketing division of MegaCorp to be concerned about the level of protection for patented, trademarked, and copyrighted products it wants to sell in a developing country.

The research and manufacturing divisions of MegaCorp, however, have a different set of concerns about the level of protection in foreign jurisdictions where it considers investing. For example, even under the TRIPS Agreement, protection for a trade secret is lost when it is revealed to the public.[14] In other words, if a developing country does not adequately protect secret processes, devices, and know-how, or provides no means to protect investments in training local employees by enforcing restrictive covenants, then some kinds of foreign direct investment may be deterred. If locating in a developing country means that valuable information or technology will be appropriated or disclosed due to poor enforcement of trade secrecy or contract law, then investment decisions may be affected. The same logic, however, does not apply to decisions to move manufacturing or research facilities to developing countries that fail to protect adequately patents, trademarks, and copyrights.

By definition, patent and trademark law only protect inventions and symbols that have been fully disclosed to the public. This is also true of the main commercial objects of copyright protection: movies, books, compact discs, and computer programs.[15] Moving a research and development facility to a country without patent, trademark, or copyright law does not increase a firm's risk of

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[13] *See* Peter Drahos, *Developing Countries and International Intellectual Property Standard-Setting*, 5 J. WORLD INTELL. PROP. L. 765 (2002).

[14] *See* TRIPS, art. 39 (1994).

[15] Copyright law does protect unpublished works like diaries and computer source code, but not from mere disclosure. *See* 17 U.S.C. §§ 106 & 107 (2000). In other words, trade secret law, not copyright law is the main vehicle for protecting valuable unpublished works from disclosure, as opposed to copying.

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damaging disclosures or increase its cost of doing business.[16] In the absence of disclosure fears, MegaCorp's research and marketing divisions should be relatively indifferent to the level of patent, trademark, and copyright protection it finds in a developing country. Its manufacturing decisions should instead be driven by "transport costs and distance from markets, low wage costs in relation to labor productivity, [access to] natural resources, and trade protection that could encourage 'tariff jumping' investments."[17] Similarly, a decision about where to locate research facilities usually depends primarily on the level of education and training of the local workforce, the condition of its financial sector,[18] the health of its legal system,[19] and the transparency of governmental procedures.[20]

If MegaCorp's primary markets are the United States, Japan, and the European Union, then its decision whether to locate its newest research or manufacturing facility in Lebanon should not turn on the state of Lebanese patent law. Lebanese patent law is irrelevant to the enforceability of MegaCorp's monopoly rights in its important markets.[21] Even after TRIPS, patent law remains local. A patent may be applied for in the United States (or any other WTO member) regardless of where invention occurs.

The proper interpretation of Mansfield's findings require an understanding of key differences between trade secrecy and patent law. Only trade secrecy law (hand-in-hand with contract law) can protect proprietary information from disclosure. On the other hand, the full specifications of a patented invention are available to any pirate who can afford a computer and internet access to the world's public patent office databases. Locating a research facility or a manufacturing plant in a developing country that underprotects patents, trademarks, and copyrights should not significantly increase the likelihood that piracy will occur there. Under this logic, the respondents to Mansfield's survey who expressed

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[16] In fact, to the extent that licenses need not be obtained from other intellectual property owners, the cost of doing business may be reduced.

[17] Keith E. Maskus, *The Role of Intellectual Property Rights in Encouraging Foreign Direct Investment and Technology Transfer*, 9 DUKE J. COMP. & INT'L L. 109, 123 (1998).

[18] *See* Robert G. King & Ross Levine, *Finance, Entrepreneurship, and Growth: Theory and Evidence*, 32 J. MONETARY ECON. 513 (1993) (growth in gross domestic product is strongly correlated to the stability and health of a country's financial sector).

[19] *See* Ross Levine, *Law, Finance, and Economic Growth*, 8 J. FIN. INTERMEDIATION 8 (1999) (correlating strength of legal system with economic growth); Ross Levine, *The Legal Environment, Banks and Long-Run Economic Growth*, 30 J. MONEY, CREDIT, & BANKING 596 (1998) (same).

[20] *See* MASKUS, *supra* note 10, at 123; *see also* Reichman & Lange, *infra* note 32, at 96 (noting "the Daimler Benz decision to develop software in India, where the human resources are comparably cheap but skillful"); ENDESHAW, *supra* note 10, at 104 (listing non-intellectual property factors critical to the decision to invest in a developing country).

[21] Both American and European law reward foreign inventive activity without regard to the state of the law where the invention was made. *See* 15 U.S.C. § 102(a), (b), & (g).

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concerns over levels of "intellectual property protection" in developing countries were most likely articulating a fear that information disclosure might occur due to a lack of enforcement of trade secrecy law (or perhaps from a desire by their marketing departments to suppress competitors' sales). In other words, concerns over "intellectual property" enforcement cannot logically be read to stand for the proposition that strong patent, trademark, or copyright laws affect foreign direct investment (as opposed to marketing decisions).

Support for this limited reading can be found in the paper itself. Mansfield includes many quoted comments from interviewees which indicate that disclosure concerns are paramount. He offers the comments of a chemical executive who explains, "[o]ur concern still resides in being able to procure a quick injunction against a confidant who is in a position to disclose confidential information."[22] A computer executive adds that "we have not implemented manufacturing operations there that use our highest level of technology due to uncertainty over trade secret protection."[23] One firm's chief patents counsels complains that there are "no effective means to prevent a Korean employee who develops a knowledge of the equipment, from using that information in a subsequent employment."[24] Another patent counsel reveals that "[t]he technology advantage that we enjoy over our competitors often results from catalyst compositions and . . . know-how . . . [which] need not be transferred to licensees or subsidiaries. We typically minimize [our] risk . . . by not disclosing critical catalyst or process know-how information to the licensee."[25] These comments support the logical inference that disclosure fears—driven by inadequate trade secret or contract law–affect decisions to invest in manufacturing facilities or to transfer technology to the developing world.[26] There is little support, on the other hand, for the proposition that levels of patent, copyright, and trademark are relevant in foreign direct investment decisions.

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[22] Mansfield, *supra* note 1, at 14.

[23] *Id.* at 27.

[24] *Id.* at 31.

[25] *Id.* at 30.

[26] A chemical executive states that we "will not expose technology of any significant value in countries where it is not safe." *Id.* at 29. Other comments included expressions of concern by one executive over the "theft of our technology" as opposed to infringement, *id.* at 24, and by another over the need for "assurance . . . that technology will remain proprietary." *See* Mansfield, *supra* note 1, at 24. One director stated that "we are reluctant to do any straight transfer of technology deals unless the information is coded or the technology is older technology." *Id.* at 29. A chemical executive states that "you tend to use your older technology [where pirates] have the capital and technical capability to duplicate your technology if they get their hands on it." *Id.* at 30. Another states, "[t]he technology embodied in new, but copiable products, like highly successful agrichemicals, are withheld." *Id.*

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Also significant to a proper interpretation of Mansfield's results is recognizing the extent to which executives expressing concern over levels of intellectual property protection were influenced by the desire to access markets for their goods, as opposed to factors related to where to make direct investments in facilities. Quoted comments provided by Mansfield indicate that the desire to suppress piracy was primarily a marketing worry, as opposed to an investment concern. A chief patent attorney recognized, "[i]nadequate or ineffective protection of intellectual property works against introduction of the product into such country."[27] A chemical executive commented that the level of intellectual property protection determines "when a weak IP country gets the product."[28] Another expressed the concern that when drugs are "introduced to the market and the business built up to an interesting level . . . a patent pirate will come into the market with an infringing product."[29] Mansfield also quotes a pharmaceutical executive concerned that "those developing countries that comprise major pharmaceutical markets, such as Taiwan, India, and Brazil, have not made any significant improvements."[30] It is easy to understand why rights holders care about levels of enforcement in the countries where they market their products. This concern may have influenced the attitudes of those surveyed on the very different question of whether foreign direct investment decisions are influenced by levels of intellectual property protection.

Mansfield did not restrict his survey to those executives primarily in charge of making direct investment decisions–in fact, at least two respondents are described as international marketing directors. Some are described as CEO's or patent attorneys. Given the comments included in Mansfield's paper, disaggregating the concerns of a firm's marketing division from the concerns of a firm's manufacturing and R&D divisions seems to have been imperfectly accomplished, if it was accomplished at all. This further taints Mansfield's correlation between enforcement of intellectual property laws and direct investment decisions. Finally, he is often unclear what the word "investment" means when used by the firm executives interviewed.[31] Sometimes its seems to be used loosely to refer to the decision to market a product as opposed to open a manufacturing plant or R&D facility. Mansfield's paper reveals no attempt to define "direct investment" for the respondents, and some of the overt marketing concerns expressed may be

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[27] *Id.* at 24.

[28] Mansfield, *supra* note 1, at 31.

[29] *Id.* at 14. Another executive stated, "[p]rior to the new Taiwan patent law, Taiwan manufacturers copied and exported our proprietary agrichemicals." *Id.* at 13.

[30] *Id.* at 13, 14.

[31] *Id.* at Appendix I.

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driven by the understanding that selling a product in a country, especially through a wholly owned subsidiary, constitutes a sort of direct investment.

All in all, a close look at Mansfield's research provides support for the proposition that American firms with significant disclosure worries are influenced by the level of enforcement of trade secrecy and contract law in making foreign direct investment decisions. Its current status as canonical evidence that maximum enforcement of all sorts intellectual property law–and especially patent law—will stimulate investment should not remain unchallenged. Instead of blindly relying on Mansfield's research, a more rational strategy for developing countries would take into account the costs and benefits of protection in the context of their unique economic situation.[32] Depending on the category of intellectual property subject to the TRIPS Agreement, developing countries should seriously consider minimal compliance. Under no circumstances should a developing country accept the confident assertions made by some commentators that adopting a maximalist posture towards all protection will stimulate foreign investment. A law-by-law analysis is always necessary.

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[32] *See* J.H. Reichman & David Lange, *Bargaining Around the TRIPS Agreement: The Case for Ongoing Public-Private Initiatives to Facilitate Worldwide Intellectual Property Transactions*, 9 DUKE J. INT'L & COMP. L. 11, 50 (1998) (the "chronic problem for policymakers even in the most developed countries is that the one-size-fits-all paradigms [are indequate] in developing countries, where different players at different stages of development demand different and contradictory approaches").

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