Intellectual Property Rights (IPR) and Its Effect on the Flow of Cross-Border Mergers and Acquisitions (M&As)

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Abstract: - Extant research finds effective intellectual property rights (IPR) protection encourages firms to initiate mergers and acquisitions (M&A) deals. IPR strengthening positively affects firms' research and development activities and thus their innovative ability. Consequently, acquirer firms can improve their innovation quotient by pursuing target firms in regions undertaking IPR protection and enforcement measures. The present study examines the impact of IPR protection on 20,363 inbound M&A deals engaged in 42 countries between the years 2014 to 2019. Differing from the use of conventionally employed, Ginarte and Park index available in a five-yearly interval, which evaluates only Patents, this paper proxies IPR strengthening through a more comprehensive annual intellectual property (IP) index (covering other intellectual assets like copyrights, trademarks, etc. besides patents) constructed by Global Innovation Policy Center, U.S. Chamber of Commerce. Estimates from panel regression, including country and year-fixed effects, indicate that reforms that improve IP protection in a target country are positively and, to a more considerable extent, significantly associated with an increase in inbound cross-border M&As. In addition, the impact is weakly significant when target firms belong to emerging countries. This study sheds light on whether IPR protection influences corporate decision-making. The results suggest that acquirers look forward to regions undertaking efforts to improve their IP ecosystem, either to protect their intellectual capital transmitted through technology transfer or to acquire targets high on innovative quotient.

Key-Words: - cross border mergers and acquisitions, intellectual property rights, GIPC Index, emerging market countries, target-firm country, IPR protection.

1   Introduction

Mergers and Acquisitions (M&As) are the preferred entry mode for multinational firms, [1]. When internal organic growth options prove insufficient [2] or risky [3], M&A discussions emerge at corporate tables. Once local markets are on the verge of saturation or less profitable than before, multinationals can fuel growth by transferring their proprietary assets to potential target firms in countries with possible location advantages or pursuing firms holding on to strategic assets. Cross-border M&As are ideal conduits that help acquirer firms circumvent target country entry barriers by facilitating the transfer of assets. Intellectual property (IP) is one critical proprietary asset, the export or import of which grants competitive advantages to acquirer firms. However, the potential synergy gain from ownership of IP assets is conditional upon the defensiveness of intellectual property in the target country, i.e., the nature of rights conferred to IP. The Intellectual Property Rights (IPR) measure indicates the level of local protection that foreign (target country) laws provide for IP. A weak IPR regime in the target country sways away investment, as competitors can effortlessly copy and imitate the IP [4], lowering the acquirer's benefit of owning such assets in foreign jurisdictions. Robust or at least reforming IPR regimes are thus ideal grounds for inbound investments, [5], [6]. The choice of a target by the acquirer firm hence corresponds positively to the level of IPR protection in the target country, which is why we hypothesize that strengthening IPR in

target countries increases the number of inbound cross-border M&A deals in such countries.

Intellectual property assets constitute a significant part of the target firm value and can be the driving force behind cross-border deals. Despite its tendency to influence acquirer firm choices, surprisingly, to date, very little has been researched on the effect of IPR on corporate takeover decisions. In the present study, we attempt to fill this gap by examining whether strengthening the IPRs regime at the target country level affects the inbound flow of cross-border M&As and if an asymmetry in influence exists for developed and emerging market country targets. We proxy the Global Innovation Policy Center's International Intellectual Property Index (hereinafter GIPC Index) as a measure for IPR strengthening. Our results show that better IPR protection in the target country positively impacts M&A activity. Furthermore, the effect is significant, though weak, when targets belong to emerging market countries vis-à-vis developed countries. IPR protection in emerging market countries tends to boost acquirer confidence to undertake more international M&A deals.

Our research is similar yet different to [7] work. This study is unique in the sense that it does not restrict the analysis measuring the strengthening of IPR only to one form of IP asset, viz. patents, but instead includes a more comprehensive index that reflects both judicial and enforcement aspects of other important IP assets like copyright, trademarks in addition to patents. Secondly, unlike the popularly employed, [8], patent index in academic literature, the scores of which are available in five-yearly intervals, the GIPC index allows us to examine the IPR-M&A nexus by taking annual index numbers. Finally, our study is a temporal extension to preceding studies incorporating more recent data on M&As and IPRs until 2019.

In Section 2, this paper presents available existing literature on IPR and M&A nexus to frame the present hypothesis. Following it is Section 3, where an appropriate methodology is proposed, along with data description and summary statistics. The fourth section brings out the empirical results on the effect of IPRs on inbound M&A flows, along with robustness checks. Finally, we have section five that would conclude the paper.

2 Literature Review

Intellectual property assets are critical drives of an M&A deal, [9], consequently, optimal IPR protection levels can stimulate technology transfer through M&As, [10]. Though crucial, the effect of IPRs on M&As is under-researched, both from the theoretical and empirical perspectives, [11]. This is surprising as acquirers constantly scout for targets to tap into potential growth opportunities. Cross-border M&As are attractive modes through which acquirer synergies are produced upon acquiring target firms in foreign territories, [12]. At the core of these transactions lies seeking ownership of target company assets. However, the differences in cultural and legal systems, political environment, and institutional factors, among others, elevate the risks of owning assets in foreign jurisdictions. IPR protection has proven to be a critical institutional factor, the absence of which suppresses cross-border M&A intensity, [13]. Yet, despite its importance, relatively little is known about how IPRs affect cross-border M&As, which constitute a large and significant proportion of corporate investments undertaken by multinational firms, [14].

Scant literature finds a positive association between IPR strengthening and cross-border M&A intensity. One of the foremost studies in this area by, [7], finds that once a country reinforces its IPR protection, the flow of mergers increases. Their results from multinational data of 50 countries largest in terms of M&A activity show that the effect of patent protection is higher in intellectual capital-intensive industries or when patents matter most in the production process. Also, the synergy gains measured through event study methodology are more elevated in cases where the target firm country experienced an increase in their patent index scores in the preceding year. According to [15], improved IPR protection significantly increases cross-border M&A in the hi-tech sector and induces acquirers to pay higher premiums to targets from such regions. In [16], the authors use firm-level data to investigate a country's efforts in strengthening tangible property rights, as proxied by the enactment of property law, on the likelihood of M&A announcements. While confirming an increase in the probability of M&A bids in the post-legislation era, the results shed light on the two underlying economic mechanisms through which IP protection affects bid announcements: increased access to finance and product market competition. [10], evidence from 64 developing and developing countries from 1985 to 2017 shows that IPR influence gets more potent when the acquirer country holds a higher, [8], patent score than the target country. The findings point to developed countries' acquirer preference to buy targets from emerging countries. In addition, the author reports an insignificant IPR coefficient impacting inbound M&A when the International Property Rights index,

as developed by the Property Rights Alliance group, is used as an alternate proxy for IPR protection. Empirical results of [9], further reaffirm that a developing country's effort to strengthen IPR significantly increases M&As.

Few authors argue the innovation channel for growth in M&As under favorable IPR regimes. IPR protection is crucial for innovation, [17], [18] and while most M&As seem driven by innovation, [19], [20], prima facie, the causal relationship between IPR on M&As is established. Granting protection to innovation from infringement, [21], [22], IPR protection can induce acquirers to indulge in cross-border M&As for two possible motives; first, by acquiring targets with high innovation abilities, acquirers can improve their innovation quotient, [23]. Second, acquirers can export their proprietary IP assets, generated from innovation efforts, to potential target firms and improve their profitability, [24]. In both cases, IP protection measures in the target firm country lower the risk of imitation, ensuring acquirers enjoy strategic advantages over their competitors, [25].

With a limited number of published studies examining the IPR-M&A nexus, the effect of IPR can be understood from foreign direct investment (FDI) literature, the reason being that M&As are a crucial component of FDI, accounting for a significant share (80%) of total world FDI, [26]. A decade later, the growth in FDI inflows was primarily driven by cross-border M&As, while greenfield investment showed a diverging trend, [27]. The decline in greenfield investments and a corresponding uptick in cross-border M&As has continued from 2015 to 2019, [28], [29]. According to [29], the growth in global net M&As as a share of FDI inflows is 62 percent. The rising M&A numbers stress the need for thorough research on what factors, particularly IPR protection, determine the acquirer's decision to bid for a target in a foreign country. Thus, such effect approximation can be achieved using FDI literature. IPR regime in a country can potentially affect the investment climate, [6]. Since the ratification of the Trade-Related Aspects on Intellectual Property Rights (TRIPS) in 1994, countries commenced efforts to improve their IP protection or devised new systems to meet at least the minimum standards worded in the TRIPS document. Such efforts yielded fruits, and among many others, [30], [31] and [32], confirm the positive link between FDI and IPRs. Authors, [33], were among the first to explore the potential linkages between a developing country's IPR protection system and the volume and composition of FDI. Their empirical evidence indicates that a strong IPR protection regime positively affects FDI inflows. In [34], the author examined the effect of IPR on the composition of FDI for a group of transition economies in Eastern Europe and the former Soviet Union. He concludes that a weak IPR protection policy negatively affects drawing FDI into technology-intensive sectors. [35], contributes to the literature, finding a positive impact of IPR reforms on FDI inflows in developing countries.

The positive effect, however, is not always exogenous. [36], for instance, finds a negative impact of patent protection on the investment decision of developed countries, while no significant effect of IPRs for developing countries. One reason for the negative effect is that since developed countries already have in place strong IPR regulations compared to weak IPR regimes in developing nations, the marginal increase in IPR scores is more remarkable for developing countries; therefore, funds usually flow from developed to developing countries, [9]. From a foreign firm perspective, a weak IPR regime in target nations discourages FDI as domestic firms can easily imitate technologies. This effect is conditional upon the imitation ability of domestic target firms. Target country firms with higher imitation abilities can easily codify tacit information, dampening the decision to undertake FDI, [11].

Recent empirical studies are no different, reporting mixed results for IPR effects on FDI (see, for instance, [37], for a recent survey). [38], argue for stronger IPRs to entice foreign investments. For internationalization reasons, host countries with strong IPR systems attract new ventures from emerging nations, [39]. [40], further contend that safe IP territories reduce a firm's financial risk and improve access to capital as lenders offer higher sums for loans accompanied by longer maturity terms and lower spreads. [41], emphasize micro- and macro-processes that shape the evolution of institutions establishing IPR systems. Thus, these institutions become critical for multinationals seeking investment abroad. Essentially, more robust protection offers legal remedies against IP infringements. By limiting the threat of imitation, robust IPR systems incentivize investment as private returns to innovation are amplified, [42]. Also, with the strengthening of patent laws in the host nation the amplification of technology flows is greater for unaffiliated targets vis-à-vis affiliated partners, [43]. On the flip side, improvements in IPR systems in developing target countries lowers the acquirer's need to assume direct control of IP assets through M&As. In such cases, alternate modes of

undertaking foreign investment, such as licensing arrangements, turn lucrative, [44].

On the contrary, to gain access to local knowledge, few multinational firms (MNEs) choose to invest in economies with relatively weak IPRs, [45], [46]. The negative effect of strong IPR is pervasive in both emerging and developed-economy MNEs, [47]. When the motive for investment is to acquire rights of foreign IP assets in an economically advanced country, strict IPRs in foreign jurisdictions lower the incentives by limiting access to local, undisclosed information. The negative effect on M&A volumes and numbers is more pronounced when acquirers belong to regions with scarce IP assets, [48].

Previous literature's inconsistency in predicting the correct path of IPR effects on investments stems from two reasons. First, in their attempt to analyze the IPR effect, most authors consider the overall flow of foreign investments (e.g., [39], [46]) and neglect to differentiate between the mode of investment, viz., M&As vs. greenfield investments. Second, compared to other internationalization modes, since M&As increasingly involve exporting and importing knowledge assets, IP protection matters most in corporate takeover transactions, [49]. Thus, it seems logical that the true IPR effect can be approximated using M&A data against composite FDI, [15]. Nevertheless, little evidence also exists on the effect of IPRs on M&As. Evidence using a patent index as a proxy for IPR strengthening generally suggests a strong impact of IPRs on FDI, although disagreements persist, [50]. But though patents constitute a significant portion of intellectual property, a robust measure of IPR protection should include other forms of IP assets. Hence, there lies a gap in the literature to analyze the effect of IPR on M&A using a comprehensive index representing reforms in all primary forms of IP assets. This paper attempts to fill this gap with empirical evidence on whether country-level IPRs affect the acquirer pursuit of a target firm with the help of a robust IPR index, viz., the GIPC index.

The above discussion suggests that the acquirer's decision to undertake cross-border M&As is likely dependent upon target country specificities, including strengthening institutional environment factors, such as IPRs. These observations encourage us to frame the following hypothesis: First, since acquirers often select targets to import (export) IP assets from (to) countries with favorable IPR regimes, we conjecture that:

Hypothesis 1: IPR protection in the target firm country has a positive impact on inbound cross-border M&A

Second, in addition to IPR a host of country-specific characteristics (financial, institutional, governance, etc.) influence firms' decision to invest in foreign lands. These factors usually differ across countries with varied levels of development. Thus, the impact of IPR on M&A may be conditional upon the level of development of countries with positive effects associated with developing market economies. With emerging countries usually having lower levels of IPR protection compared to high protection in developed countries, the marginal increase in IPR scores is greater for emerging countries, [51]. Furthermore, a strict IPR already found in developed nations discourages subsequent innovation and consequently affects the flow of funds, [52]. In this case, we expect IPR reforms to matter most for M&A inflows when the target firm country has developing country status.

Hypothesis 2: IPR protection in the target firm country positively impacts inbound cross-border M&A in emerging market countries.

3 Methodology

3.1 IPR Index
Conventionally, in economic literature, the Patent Index advanced by [8], serves as a widely accepted proxy measuring the existence and strength of IPRs, [51]. As further updated by [53], the index is a sum of five country-specific national law components: the extent of coverage, membership in international agreements, provisions for loss protection, enforcement mechanisms, and period of protection. Each of these five components is assigned a binary score (0 or 1) based on the absence or presence of the element. The patent index thus takes values ranging from zero to five.

As an alternative, this study uses the International Intellectual Property Index (GIPC index) developed by the U.S. Chamber of Commerce's Global Intellectual Property Center. The index measures 30 indicators (each indicator scores values between 0 and 1) across six categories: patents, related rights, and limitations; copyrights, related rights, and limitations; trademarks, related rights, and limitations; trade secrets and market access; enforcement; and membership and ratification of international treaties. The index value ranges from 0 (weak IP

environment) to 30 (strongest IP environment). Unlike, [8], the GIPC index indicators combine using three distinct methods: binary, numerical, and mixed. For details on index categories, indicators, and methodology, refer to, [54]. On GIPC's account, this index is comprehensive, first-of-its-kind, academically rigorous, and gives an empirical assessment of the country's contribution towards improving national IP environments.

The use of this index provides many advantages compared to other IP indices. First, while strengthening patents is the foremost task of IP protection, the GIPC index extends its coverage to other IP assets like copyrights, trademarks, designs, trade secrets, etc. Second, being an annual published series, the index allows us to model high-frequency data in our estimation model, in contrast to the use of the [8] index, which changes discretely at five-year intervals. Third, unlike other indices, using binary, numeric, and mixed methods to gauge indicators in the GIPC index permits measuring the existence of relevant IP law and the actual enforcement/application. Lastly, its methodological construction is such that all mapped countries are measured through a common yardstick according to the same definitions and criteria. This allows us to compare and benchmark countries' total national IP environment similarly.

The inaugural edition of the GIPC index report was published in 2012, but continuous yearly reports have been available since 2014. It is pertinent to note that though the index benchmarked 25 countries in the 2014 edition, GIPC has constantly added new countries, taking the total country count to 50 countries in 2019. Varying country counts in the index allow us to perform sub-sample analysis.

3.2 Sample, Variable Description and Summary Statistics

To examine the effect of IPRs on aggregate M&A activity, we obtain data on merger and acquisition deals announced (domestic and cross-border) between January 1, 2014, and December 31, 2019, from the Bloomberg database. We then match values involving acquiring and target firms from the 50 largest countries in terms of M&A activity with countries covered under the GIPC IP index and obtain a final sample of 42 countries. Of these 42 countries, 18 are developed nations, 22 are emerging market countries, and the remaining are low-income countries as per the International Monetary Fund classification in 2014 (the beginning of our sample period). Analogous to existing M&A studies (e.g.,

[55]) we consider only completed majority stake purchase deals (deals with ownership sought >50%) and exclude partial equity stakes, leveraged buyouts, exchange offers, recapitalizations, spinoffs, repurchases, self-tender offers, privatizations, as well as deals where acquirer-target is a government agency. Further, we limit our sample to deals from all industries except those from the finance and utility industry. Since M&A activity is usually predominant in manufacturing and allied sectors, deals from financial and utilities represent a smaller fraction of total values. Also, IPR matters most in industries with higher intellectual asset intensity where IP is extensively used in production, [7]. In our study, between 2014 and 2019, 2,023 M&A deals were transacted in the finance and utility industry, which account for a mere 9.04 percent of total M&A deals. After imposing these filters, the final sample includes 20,363 completed cross-border inbound deals in our sample 42 countries, 19,193 (1,170) of which are private (public) target company deals.

As a substitute for conducting deal-level analysis, which often limits the investigation to deals that involve public acquirers and targets, we aggregate the number of cross-border inbound deals at the target country level to measure M&A activity. Private companies in most countries are not mandated to publish financial statements unless listed. Thus, missing information on deal values and company financials limits analysis to public incorporated corporate entities, [56]. Though deal-level analysis is more apt to answer empirical questions, its disadvantage in limiting the analysis to a subsample of public firms leads to oversampling of large transactions. Besides, inferences drawn from a sample of public firm deals, which represent, on average, below 10 percent of total target deals, may be biased, [55]. Recent M&A studies by [7] and, [10] are examples of public targets representing under 0.06 proportion in total M&A deals. Aggregating 20,363 inbound M&A deals by target firm country, we construct a balanced panel of 252 observations (42 countries × 6 years). Pooling a country-level panel, we can analyze the IPR-M&A nexus by sampling all 20,263 deals, of which 94.25 percent involve private targets. Limiting the study to public targets would have restricted the sample to a mere 5.75 percent of total M&A transactions (1,170 deals). Further, we rotate the panels, taking different year and country combinations for robustness check.

Panel A of Table 1 contains information on aggregate inbound M&A deals, the GIPC index, and the average GDP per capita for our sample countries. The inception year column indexes the

year a country *i* was included in the GIPC index. Firms from Australia, China, Canada, France, India, Germany, Sweden, Italy, the United Kingdom, Spain, and the United States lie in the upper quartile regarding destinations for inbound cross-border deals. The country with the weakest IP protection (Venezuela, average GIPC index = 19.63) recorded the lowest aggregate inbound M&As (04 deals). In contrast, the United States, with the highest GIPC index average of 96.09, received the highest number of deals (5667). The correlation coefficient between inbound deals and the GIPC index is 0.498. Notably, 28 of 42 countries in the sample improved their index score between 2014 and 2019: the average increase over this period is 1.22. These observations point towards the need to strengthen IP in target countries. Another observation is that the index mirrors the country's economic wealth (GDP per capita), with wealthier countries experiencing inbound deals, although exceptions exist. India, for instance, ranks among the lowest in GDP per capita but received substantial deals as the country achieved the highest growth (31.2%) in its GIPC score from index start to end year in the sample.

Table 1. Descriptive Statistics
Panel A. The Country-level M&A activity, GIPC index scores, and averaged GDP per capita from 2014 to 2019.

Target Country	Total no. of inbound cross-border deals	GIPC index: inception year	GIPC index: start year	GIPC index: end year	Average GIPC index	Average GDP p.c (US$)
United States	5667	2014	95.07	98	96.09	58040.61
United Kingdom	2827	2014	91.97	95.73	93.23	46022.5
Canada	1596	2014	58	66.7	62.27	44186.73
Germany	1486	2015	90.93	90.97	90.93	42081.56
Australia	939	2014	80.6	83.87	82.48	57573.45
France	761	2014	90.5	90.83	90.08	37462.36
China	680	2014	38.73	47.07	42.66	8815.6
Italy	671	2016	75.63	76.93	76.73	30976.66
Spain	589	2017	76.6	79.4	78.2	26686.48
Sweden	494	2016	90.4	91.77	90.35	52067.8
India	489	2014	23.17	30.4	25.24	1735.04
Brazil	472	2014	36.1	34.73	34.98	8668.43
Switzerland	361	2015	82.53	83.07	82.91	85109.96
Singapore	352	2014	83.73	87.03	85.34	58235.63
Japan	300	2014	77.47	87.4	82.38	35441.67
Israel	283	2016	66.87	66.3	67.24	37606.56
Ireland	262	2018	88.27	89.13	88.7	65012.63
Malaysia	192	2014	47.87	49	48.82	10226.86
New Zealand	191	2014	71.07	72.33	71.34	39425.38
South Africa	174	2014	38.67	34.63	37.22	6219.41
South Korea	174	2015	77.77	84.5	81.34	29881.7
Poland	155	2016	62.5	62.6	62.16	13430.44
Turkey	127	2014	41.27	41.63	41.22	11312.34
Indonesia	124	2014	26.97	28.23	28.19	3534.1
Mexico	123	2014	47.57	49.27	47.61	9889.26
Taiwan	98	2015	48.67	56.9	53.79	24243.07
Colombia	86	2014	45.53	47.1	45.37	6271.91
Chile	77	2014	45.17	38.03	41.82	13653.92
Thailand	75	2014	24.47	27.3	25.45	6006.82
Russia	72	2014	44.27	42.3	43.36	9553.24
Vietnam	72	2014	26	27.93	27.04	2844.93
United Arab Emirates	71	2014	39.07	41.07	41.47	42512.34
Argentina	69	2014	31.5	29	29.67	13355.65
Philippines	57	2017	33.1	31.47	32.3	3211.21
Greece	45	2019	67.67	64.43	66.05	18354.3
Hungary	43	2017	69.63	73.1	71.7	13512.36
Peru	42	2015	42.27	40	41.45	6342.52
Egypt	25	2017	26.77	23.27	25.29	3506.15
Nigeria	17	2014	32.67	30.97	31.93	2578.76
Ukraine	11	2014	38.93	38.17	38.62	2277.59
Pakistan	10	2017	22.9	20.57	21.61	1355.22
Venezuela	4	2016	21.4	18.2	19.63	4150.06

Panel B. Variable description

Variable	Description [Source]
Number of inbound deals	The majority stake purchase inbound cross-border M&A deals in the target country in all industries except finance and utility in the year t. [Bloomberg]
GIPC index	GIPC International Intellectual Property index measures 30 indicators (each carries one point) across six categories: patents, related rights, and limitations; copyrights, related rights, and limitations; trademarks, related rights, and limitations; trade secrets and market access; enforcement; and membership and ratification of international treaties. The index ranges from 0 (weak IP environment) to 30 (strongest IP environment). We scale the index scores to 100 for use in our regression models. [Global Intellectual Property Center, U.S. Chamber of Commerce]
Gross domestic product (GDP)	Gross domestic product (constant 2015 US$ million) [World Bank World Development Indicator (WDI)]
GDP growth rate	GDP growth (annual decimal) [WDI]
Exchange rate	Exchange rate (Local currency unit per US$, period average) [WDI]
Stock market dev.	Market capitalization of listed domestic companies (% of GDP) [WDI]
Stock market return	Local stock market index return [WDI]
Rule of Law	Percentile rank measures the extent to which individuals demonstrate confidence in and compliance with societal norms, including the effectiveness of contract enforcement, property rights, law enforcement, and the judiciary, as well as the risk of crime and violence [World Bank Governance Database]
No. of domestic deals	A number of deals involving an acquiring and target firm in the same country in the year t. [Bloomberg]
Economic grouping	Classified as economically developed, emerging market, and low-income countries according to the 2014 International Monetary Fund (IMF) Fiscal Monitor [IMF]

Panel C. Summary statistics of variables used in regression models

Variable	N	Mean	Std. Dev.	25th Percentile	75th Percentile
Number of inbound deals	246	82.776	172.542	10	77
GIPC index	212	54.927	24.028	34.83	78.80
Gross domestic product (GDP)	240	1718001.5	3417186.5	310602	1560508.20
GDP growth rate	252	0.03	0.029	0.02	0.04
Exchange rate	252	1159.021	4762.441	1.33	63.04
Stock market dev.	221	73.746	60.033	31.07	102.37
Stock market return	240	2.652	21.914	-12.13	18.22
Rule of Law	252	61.073	28.501	40.38	89.42
Number of domestic deals	252	389.524	1286.578	14	197

Source: Created by the authors

3.3 Model

We use a panel regression with country and year-fixed effects to generate coefficients expressing the association between the strength of IPR protection in the target country and the intensity of inbound cross-border M&A. The baseline regression model is as follows:

$$Inbound\ deals_{i,t} = \beta_0 + \beta_1\ GIPC\ index_{i,t-1} + \beta_2\ GDP_{i,t-1} + \beta_3\ GDP\ growth\ rate_{i,t-1} + \beta_4\ Exchange\ rate_{i,t-1} + \beta_5\ Stock\ market\ development_{i,t-1} + \beta_6\ Stock\ market\ return_{i,t-1} + \beta_7\ Rule\ of\ law_{i,t-1} + \beta_8\ Domestic\ deals_{i,t-1} + \omega_i + \mu_t + \varepsilon_{i,t} \qquad (1)$$

where i indexes target country, t indexes years; ω_i and μ_t signify country and year fixed effects, respectively. All independent variables, as described in Panel B, Table 1, are lagged by one year to avoid the endogeneity problem, [57]. The dependent variable is the logarithm of (one plus) majority stake purchase inbound cross-border M&A deal in target country i. A key independent variable is the logarithm of (one plus) GIPC index measuring the country's IPR protection strength. Target country-fixed effects in the estimation model are warranted as they eliminate any permanent country-level characteristics that may correlate with cross-border M&A activity. This ensures that the estimate capturing the impact of IPR on cross-border flows (β_1) is identified from within-country variation in the GIPC index over time and not from cross-country correlations. Furthermore, including year fixed effect accounts for transitory global economy-wide influences, for example, a financial crisis. Also, the standard errors are clustered at the country level.

Previous literature advocates a series of country-level control variables that drive cross-border M&A flows. In our paper, the choice of independent

variables is drawn from the work of [55], who empirically test and document a list of first-order determinants of cross-border M&As. In our regression, we include variables that exhibit time-series variation, as country-fixed effects absorb permanent or slow-changing country-level factors (culture, legal origin, for instance). We have annual GDP (logarithmic terms) and yearly GDP growth rate to control the country's economic development and growth, respectively, [58], [59]. The market capitalization of all listed firms, scaled by GDP (Stock market development), indicates the size of the financial market, and holds for the effect of the country's equity market development, [60]. The valuation effect in M&A flows is administered by stock market return and forex exchange rate, [55], [61]. The Rule of law variable controls the overall legal environment in the target country, while the number of domestic deals indicates an open and flourishing M&A market, [7], [9]. All independent variables used in the study are described in Table 1, Panel B. Table 1, Panel C presents the summary statistics for variables used in the panel regressions. The average number of deals a country receives is 82.7, with a mean-to-standard deviation ratio of 0.48. This indicates the asymmetry in the inbound deals received by each country. Sampling countries of different economic groups (advanced, emerging, and low-income) with varied GDP levels is one possible explanation for this phenomenon. However,

since IPR strengthening is associated positively with economic development level, the deal variation may result from a strong and improving IPR environment. The average GIPC index score is 54.92, with a 24.02 standard deviation from the mean. Notably, top (bottom) quartile countries possess a GIPC score of over 78.8 (34.83). Corroborating these numbers with Panel A, Table 1 shows that developed countries with high standards for IPR attract significant inbound cross-border deals.

4 Results

4.1 Testing the Relevance of Fixed Effects

To test the relevance of including fixed effects in our panel regressions, we estimate and present the results of Pooled ordinary least squares (OLS), panel fixed effects model, and random effects model in Table 2. Among the three models, the GIPC index coefficient is positive but weakly significant at a 10 percent significance level in the fixed effects model, signifying the association between inbound flows and the GIPC index. Besides, the null of the Hausman test is rejected (*p<0.00*) at a 1% significance level, confirming the correlation between the error term and regressors. These results thus support the inclusion of fixed effects in our panel regression model.

Table 2. Pooled OLS, panel fixed and random effects model results: Effect of GIPC index on inbound M&As

Variable(s)	Pooled OLS	Fixed Effects	Random Effects
Log GIPC index	0.024	0.052*	-0.021
	(0.038)	(0.030)	(0.029)
Log GDP	0.710***	-2.971***	0.635***
	(0.056)	(0.579)	(0.120)
GDP growth rate	3.136*	0.792	0.950
	(1.724)	(1.397)	(1.492)
Log Exchange rate	-0.079***	0.103	-0.108**
	(0.022)	(0.200)	(0.045)
Stock market dev.	0.004***	-0.005*	0.002
	(0.001)	(0.003)	(0.002)
Stock market return	-0.003	-0.002	-0.003**
	(0.002)	(0.001)	(0.001)
Rule of Law	0.551***	0.145	0.466***
	(0.090)	(0.255)	(0.162)
No. of domestic deals	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Constant	-8.601***	42.805***	-6.804***
	(0.858)	(7.749)	(1.782)
Observations	186	186	186
R-squared	0.762	0.212	0.744
F-test	70.816***	4.717***	98.605***
Hausman test	53.098***		

Note: Regression results on the effect of the GIPC index on inbound cross-border M&A deals in sample countries during the period 2014-2019 in all industries except finance and utility. The dependent variable is the logarithm of (one plus) majority stake purchase inbound deals in the target country in all industries except finance and utility in the year t. All independent variables lagged by one year.
*** p<0.01, ** p<0.05, * p<0.1*
Source: Created by the authors

4.2 Panel Fixed Effects Regression Results

Table 3, Table 4 and Table 5 in Appendix reports the panel regression results, including country and year fixed effects, with ten different specifications under each of the three country samples grouped according to their economic category. We refer to the International Monetary Fund's year 2014 (the beginning period of our sample) classification of 'developed', 'emerging market', and 'low-income' economies. Column 1 reports all country-year results, while columns 2-6 results are obtained by dropping years as mentioned in the Table 3 (Appendix). Likewise, since the number of countries added to the GIPC index increased sequentially over the sample period, columns 7-10 present panel regression results for a set number of countries and years; for instance, since five more countries were added to the GIPC index in 2015, taking the total country count to 30 (the index covered 25 countries in 2014), column 8 panel contains 30 countries whose IP index score is available from 2015 to 2019. The standard errors are calculated in all regressions by adjusting the clusters observed at the country level.

Regression estimates of Table 3 (Appendix) cover all economic group countries (i.e., developed, emerging, and low-income group countries). The estimated log GIPC index coefficient in model 1 (0.044) shows that strengthening IPRs significantly increases the number of inbound M&As. Interestingly, by including year-fixed effects, which account for economy-wide global factors besides country-fixed effects, we note that the significance level for the GIPC coefficient now increases to 1 percent in model 1 Table 3 (Appendix) from 10 percent as found in Table 2 country fixed effects results. Also, by clustering standard errors at the country level, our regression addresses heterogeneity concerns, thus reporting robust standard errors. The positive effect holds in models 2-6 despite altering the dataset by dropping one specified year observation. By rotating panels country-wise, we get a positive yet insignificant impact of IPRs on inbound M&A. This is because, as we turn panels, the dataset is usually limited to more developed countries as information on most control variables is limited to such countries.

[7] and [62], urgings on multinational firms' preference to place an M&A bid to target firms in reforming developing market countries vis-à-vis those from other countries motivate us to examine further whether the effect of changes in IPR strengthening on M&A activity varies across the level of economic development of target country. We test this relationship and report the panel results

for a sample of emerging and developed market countries separately in Table 4 (Appendix) and Table 5 (Appendix), respectively. Though weak, our results indicate possible differences in inbound M&A intensity by the country of origin of target firms.

The coefficient of the log GIPC index enters the regression positively in almost all equations in Table 4 (Appendix) and Table 5 (Appendix), except for columns 8 and 10 in Table 5 (Appendix). The coefficient is statistically significant in four out of 10 regression specifications in Table 4 (Appendix), while none in Table 5 (Appendix). However, it is essential to note that the GIPC coefficient is only weakly significant in all emerging country samples (Column 1, Table 4 in Appendix). Insignificant coefficients of the GIPC index in Table 5 (Appendix) conform with that of [7], who find that M&As flow from developed to developing countries and not vice versa. Also, the negative GIPC index coefficient in columns 8 and 10 of Table 5 (Appendix) may suggest that a stronger IPR discourages investment and limits the scope for growth. Again, the result may seem analogous to the inverted-U relationship between intellectual property protection and innovation, where strict IPR regimes discourage innovation and, thus, M&A intensity, [63]. But, though this differential finding, to some extent, hints that strengthening of IPR may lead to an increase in inbound M&As when targets belong to developing countries vis-à-vis those in developed countries, we advise caution in interpreting such inference. The reason is that the significance of the GIPC coefficient in column 1, Table 4 (Appendix), is only weakly significant at the 10 percent level, while it turns insignificant in Table 5 (Appendix).

Regarding control variables, the flow of M&As is consistently positive to the number of domestic deals within the target country across Table 3 (Appendix), Table 4 (Appendix) and Table 5 (Appendix) results; this indicates an open and conducive market for M&As. Although the rule of law variable is positive in Table 3 (Appendix), the effect becomes significant in the emerging country sample (Table 4, Appendix). At the same time, it turns negative in models 1 to 7 in the developed country sample (Table 5, Appendix). Since developed countries post higher rule of law scores with slight variation over time, the effect seems positive and significant in Table 4 (Appendix) results as emerging countries can cause substantial variation in their governance. Improvement in the legal environment in emerging market countries boosts acquirer confidence to undertake greater

M&As in such countries. Unlike, [7], our results show an insignificant effect of a country's GDP on inbound M&A flows across all regressions. Interestingly, our exchange rate coefficient is negative, though insignificant, in most regressions, pointing to the relevance of the valuation effect consistent with, [55]; depreciated target currency makes such country firms cheaper for foreign acquirers. The negative exchange rate coefficient in model 1, Table 3 (Appendix), points towards 0.14 elasticity of cross-border deals with currency rate changes.

Our coefficients of market return and stock market development variables take the same signs as those of, [7], and, [10], empirical results. Furthermore, the F-test statistic is consistently significant at a 1 percent level of significance across all models in Table 3, Table 4 and Table 5 in Appendix. Such statistical significance of the F-statistic suggests that the regression model, as specified in equation (1), is a better fit to the data than a model without any controls.

5 Conclusion

Previous studies have suggested the need to strengthen IPR systems and the role harmonization of IPRs plays in attracting FDI. However, very little is spoken about how IPR regimes can influence an acquirer's decision to engage in overseas mergers and acquisitions. Also, the scant literature examines IPR-M&A nexus proxying patent scores as a proxy for IPRs strengthening. This paper intends to fill the academic literature gap by exploring whether reforms in country-level IPRs affect the intensity of inbound cross-border mergers and acquisitions in target countries using a comprehensive IPR index. Specifically, we engage the Global Innovation Policy Center's International Intellectual Property Index (GIPC Index) to proxy for IPR strengthening. While access to IP assets is vital for corporates to engage in M&As, IPR systems shielding IP assets from imitation motivate acquirers to pursue a target abroad. In line with this way of thinking, we find that reforms in intellectual property rights are imperative for increased cross-border M&A flows. Also, we find weak evidence that the increase in cross-border M&A derived from strengthening IPRs is strong for the developing countries' sample. The results are robust to controlling other determinants of M&As in the model and country and year-fixed effects. Our inconsistent and insignificant findings across developed and developing country sub-samples contradict, [9],

who find that a developing country's struggle in strengthening IPRs leads to a considerable increase of M&As vis-à-vis a developed country's effort.

Our results suggest stronger IPRs providing domestic benefits for countries through increased inbound M&A flows. As investors are very aware of IPR systems and inclined towards reforming governments favorably, these results urge policymakers to strengthen their IPR regimes to attract global capital flows, of which M&As form an integral part necessary to fund their development objective. Our study is limited to analyzing the IPR-M&A nexus at the country level, ignoring industry-specific effects. Further, we exclude finance and utility deals in our estimations. Knowledge intensity varies across industries, as does the need for intellectual properties. Thus, the evaluation of industry-specific effects of IPR, primarily employing the GIPC index, would serve as an exciting extension to the present study. Again, though deals from the finance and utility industry are low compared to all other industry deals, the study can be extended to uncover if deals from these industries display a differential effect of IPRs on M&As. As many M&A deals announced are never complete, one could evaluate how strengthening IPRs impacts deal cancellations. Finally, future research may explore how ownership of IP assets and protection granted to them affects M&A performance and value creation for participating firms.

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APPENDIX

Table 3. Panel country-level analysis and Robustness tests on the effect of the GIPC index on inbound M&A deals in all sample economic group countries

| Variable(s) | All sample | Excluding year | | | | | Number of Countries [Years] | | | |
| | | 2015 | 2016 | 2017 | 2018 | 2019 | 25 [2014-19] | 30 [2015-19] | 35 [2016-19] | 40 [2017-19] |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log GIPC index	0.044***	0.047**	0.025	0.043**	0.057***	0.039**	1.331*	1.299	0.818	-0.195
	(0.015)	(0.021)	(0.019)	(0.018)	(0.016)	(0.018)	(0.762)	(0.795)	(0.837)	(1.438)
Log GDP	-1.634*	-0.825	-1.922*	-1.807*	-1.490	-1.721	-1.496**	-1.174	-0.68	-1.602
	(0.952)	(0.948)	(1.076)	(0.947)	(0.969)	(1.194)	(0.699)	(0.869)	(1.701)	(4.093)
GDP growth rate	-0.324	0.132	-0.210	-0.085	-0.714	-0.332	-0.116	0.552	1.402	5.635
	(0.933)	(1.092)	(0.913)	(1.391)	(0.677)	(1.038)	(1.065)	(1.574)	(1.915)	(3.831)
Log Exchange rate	-0.147	0.126	-0.433	-0.180	-0.099	-0.189	0.092	0.240	-0.004	-0.226
	(0.185)	(0.179)	(0.283)	(0.175)	(0.187)	(0.288)	(0.217)	(0.271)	(0.226)	(0.762)
Stock market dev.	-0.004***	-0.004***	-0.003	-0.006***	-0.001	-0.007***	-0.003*	-0.004***	-0.002	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)
Stock market return	0.001	0.000	0.002	0.002	0.002	0.001	0.000	-0.001	0.000	-0.004
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)
Rule of Law	0.299	0.362	0.359	0.305	0.307	0.187	0.565**	0.330	0.834**	0.446
	(0.201)	(0.240)	(0.224)	(0.218)	(0.202)	(0.210)	(0.236)	(0.240)	(0.402)	(0.520)
No. of domestic deals	0.000*	0.000**	0.000	0.000**	0.000	0.000	0.000**	0.000***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	24.644*	13.346	28.953*	27.128**	22.335	26.511	16.426	13.290	6.348	24.772
	(13.374)	(13.084)	(15.151)	(13.266)	(13.542)	(16.839)	(10.257)	(12.364)	(23.524)	(59.401)
Observations	186	148	149	149	149	149	125	116	93	70
R-squared	0.598	0.722	0.184	0.629	0.630	0.632	0.734	0.775	0.220	0.195
F-test	30.034***	37.695***	2.763*	30.055***	30.904***	30.713***	31.836***	45.039***	1.852*	3.274***

Note: Panel regression results on the effect of the GIPC index on inbound cross-border M&A deals in sample countries during the period 2014-2019. The dependent variable is the logarithm of (one plus) majority stake purchase inbound deals in the target country in all industries except finance and utility in the year t. All independent variables lagged by one year. Country and year-fixed effects are included in all regressions. Robust standard errors in parentheses, clustered at country level. *** p<0.01, ** p<0.05, * p<0.1
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Table 4. Panel country-level analysis and Robustness tests on the effect of the GIPC index on inbound M&A deals in sample emerging market countries

Variable(s)	All sample	Excluding year					Number of Countries (Years)			
		2015	2016	2017	2018	2019	25 (2014-19)	30 (2015-19)	35 (2016-19)	40 (2017-19)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log GIPC index	0.062*	0.081***	0.023	0.052	0.095***	0.049	1.526	1.822*	1.346	0.379
	(0.032)	(0.026)	(0.035)	(0.041)	(0.031)	(0.038)	(1.039)	(0.989)	(1.095)	(1.547)
Log GDP	-0.735	0.627	-0.975	-0.794	-0.923	-0.913	-0.707	-1.157	-0.677	0.566
	(0.967)	(1.004)	(1.124)	(1.064)	(0.867)	(1.376)	(1.167)	(1.341)	(1.771)	(4.737)
GDP growth rate	-0.373	-0.098	-0.110	-0.593	-0.636	-0.477	-0.494	-0.516	-0.052	3.381
	(2.071)	(2.053)	(1.520)	(3.060)	(1.752)	(2.227)	(1.348)	(1.529)	(1.548)	(4.894)
Log Exchange rate	-0.092	-0.030	-0.301	-0.135	0.003	-0.119	0.079	-0.044	-0.047	0.681
	(0.230)	(0.228)	(0.325)	(0.222)	(0.220)	(0.383)	(0.302)	(0.352)	(0.262)	(1.302)
Stock market dev.	-0.006***	-0.005***	-0.004**	-0.009***	-0.001	-0.008***	-0.006***	-0.006***	-0.004**	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
Stock market return	0.001	-0.001	0.002	0.003	0.000	0.002	0.001	0.001	0.000	0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.004)
Rule of Law	0.589**	0.851*	0.594***	0.623**	0.423	0.571**	0.629**	0.688	0.806	1.569**
	(0.211)	(0.411)	(0.179)	(0.229)	(0.275)	(0.228)	(0.243)	(0.425)	(0.876)	(0.669)
No. of domestic deals	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Constant	10.775	-8.063	14.559	11.773	13.194	13.468	4.743	10.176	4.407	-14.357
	(13.337)	(13.926)	(15.510)	(14.442)	(11.854)	(18.888)	(15.313)	(17.166)	(22.478)	(67.248)
Observations	100	80	80	80	80	80	75	64	51	40
R-squared	0.642	0.756	0.397	0.698	0.685	0.604	0.764	0.796	0.424	0.468
F-test	42.259***	27.354***	10.490***	40.432***	15.047***	26.060***	34.194***	65.758***	8.057***	8.089***

Note: Panel regression results on the effect of the GIPC index on inbound cross-border M&A deals in sample countries during the period 2014-2019. The dependent variable is the logarithm of (one plus) majority stake purchase inbound deals in the target country in all industries except finance and utility in the year t. *All independent variables lagged by one year. Country and year-fixed effects are included in all regressions. Robust standard errors in parentheses, clustered at country level. *** p<0.01, ** p<0.05, * p<0.1*
Source: Created by the authors

Table 5. Panel country-level analysis and Robustness tests on the effect of the GIPC index on inbound M&A deals in sample developed market countries

Variable(s)	All sample	Excluding year					Number of Countries (Years)			
		2015	2016	2017	2018	2019	25 (2014-19)	30 (2015-19)	35 (2016-19)	40 (2017-19)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log GIPC index	0.009 (0.023)	0.017 (0.019)	0.015 (0.028)	0.009 (0.030)	0.012 (0.025)	0.005 (0.023)	0.497 (0.568)	-0.423 (1.017)	0.012 (1.328)	-0.166 (0.696)
Log GDP	-1.780 (1.736)	-3.184 (1.932)	-1.761 (1.605)	-1.741 (1.681)	-1.597 (1.804)	-1.694 (1.706)	-1.821 (1.010)	-5.066* (2.394)	-3.895* (2.124)	8.178*** (2.300)
GDP growth rate	-0.356 (0.861)	-0.529 (0.622)	1.794 (4.248)	0.406 (1.199)	-0.900 (0.974)	-0.923 (0.646)	2.066 (2.638)	7.675*** (2.315)	5.725** (2.453)	8.009** (2.897)
Log Exchange rate	-0.573 (0.686)	-1.032 (0.889)	-0.854 (0.941)	-0.924 (0.675)	-0.796 (0.791)	0.137 (0.897)	-0.170 (0.465)	0.085 (0.394)	0.424 (1.087)	-4.353*** (0.570)
Stock market dev.	-0.001 (0.004)	0.000 (0.002)	-0.002 (0.005)	0.000 (0.004)	0.000 (0.006)	-0.002 (0.005)	0.003** (0.001)	-0.001 (0.003)	-0.008*** (0.002)	0.001 (0.001)
Stock market return	0.003 (0.003)	0.000 (0.002)	0.005 (0.005)	0.003 (0.004)	0.007* (0.004)	0.004 (0.003)	-0.001 (0.001)	-0.001 (0.004)	0.008*** (0.002)	0.001 (0.002)
Rule of Law	-0.339 (0.296)	-0.021 (0.134)	-0.522 (0.440)	-0.472 (0.326)	-0.259 (0.283)	-0.436 (0.304)	-0.560 (1.259)	0.222** (0.096)	1.531*** (0.182)	0.778*** (0.149)
No. of domestic deals	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000 (0.000)
Constant	30.960 (24.891)	50.309* (27.460)	31.697 (23.398)	31.178 (24.167)	28.229 (25.958)	29.752 (24.164)	30.857 (17.424)	78.482* (36.235)	53.453 (32.815)	-109.991*** (31.281)
Observations	76	60	61	61	61	61	40	44	36	26
R-squared	0.736	0.871	0.277	0.750	0.753	0.823	0.962	0.956	0.514	0.899
F-test	201.89***	353.04***	12.652***	59.848***	78.78***	56.58***	-	-	128.06***	9307.70***

Note: Panel regression results on the effect of the GIPC index on inbound cross-border M&A deals in sample countries during the period 2014-2019. The dependent variable is the logarithm of (one plus) majority stake purchase inbound deals in the target country in all industries except finance and utility in the year t. All independent variables lagged by one year. Country and year-fixed effects are included in all regressions. Robust standard errors in parentheses, clustered at country level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
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