Exploring the Impact of Female Empowerment on Country-Level IPO Underpricing*

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Abstract

From 2006 to 2021, female made significant strides in education, employment, politics, and economic independence. Despite these significant advancements, one area that remained unexplored is the impact of female's empowerment on financial activities. Our paper sought to bridge this gap by delving into the relationship between the empowerment of female and the dynamics of financial markets, particularly with a focus on the phenomenon of IPO underpricing across different countries. We hypothesized that economically and socially empowered female have unique risk preferences in their investments, often requiring higher returns to offset perceived risks, like those associated with IPOs. Empirical evidence supported this idea, showing a positive correlation between female's economic empowerment and IPO underpricing. In countries with economically empowered female, IPOs were more underpriced to attract female investors seeking higher returns. Additionally, our research highlighted the influence of influential female in politics and corporate boards, which we termed "female's leadership empowerment." Countries with more female in these roles mitigated investor concerns, resulting in reduced IPO underpricing. Notably, when considering both economic and leadership empowerment, the overall impact of female empowerment was negative and statistically significant, emphasizing the greater influence of female in leadership roles on reducing IPO underpricing. The implications of our findings are far-reaching, touching on the development of ethical policies and the broader quest for gender equality within financial markets.

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1 Introduction

Over the last decades, promoting female empowerment has become a priority for many governments, supported by extensive research demonstrating a positive correlation between female empowerment and a range of macro-level outcomes such as employment, global health, and overall economic development (see, e.g., Diebolt and Perrin, 2013; Doepke and Tertilt, 2019; Revenga and Shetty, 2012), as well as micro-level outcomes including corporate innovation and firm performance (see, e.g., Del Carmen Triana et al., 2019; Tonoyan and Boudreaux, 2023; Wu et al., 2021). During the same time, the implications of gender-based behavioral differences for financial decisions have received significant attention in the academic and practitioner arenas, with differences in risk appetite and ethical standards being the most examined traits. It is now commonly believed that on average, females possess higher ethical standards (see, e.g., Dollar et al., 2001; Schmal et al., 2023; Seebeck and Vetter, 2021; Shen and Joseph, 2021) and have a different risk appetite (see, e.g., Croson and Gneezy, 2009; Jianakoplos and Bernasek, 1998; Luo and Salterio, 2022) relative to males.[1] However, to our knowledge, the aggregate effect of these differences in personal traits on macro-level financial outcomes has largely been ignored. We aim to fill this gap.

In this paper, we are the first to conduct a cross-country examination of the effects of economy-wide changes in risk appetite and ethical standards resulting from female empowerment on global businesses. We do so by utilizing relevant and well-established measures of changes in gender-driven risk appetite (female economic empowerment), gender-driven ethical standards (female leadership empowerment), and a global business phenomenon (initial public offering (IPO) underpricing). We first present a simple model to develop our hypotheses and then test these hypotheses by using data on over 17,000 businesses from 52 countries over a 16-year period.

A pertinent question arises: Why is the focus on IPOs, and specifically on IPO under-

[1] Differences in risk-taking behavior between females and males are sometimes interpreted as females being more "risk-averse" than males. We refrain from taking this position. In line with a number of studies that examine gender and risk in contextual settings, we contend that gender plays a role in the perception and response to risks.

pricing? To adequately address the issue under consideration, we need a measure that is a.) universally observed, b.) critical for businesses, c.) closely followed by market participants, and importantly, d.) sensitive to risk appetite of the investor base and prevailing ethical and regulatory circumstances. We believe IPOs meet all these requirements. An initial public offering (IPO) represents a critical moment when a privately-owned company transitions to becoming publicly traded by offering its shares to outsiders.[2] This process necessitates transparency, integrity, and ethical considerations to ensure equitable treatment of stakeholders with varying risk preferences. IPO underpricing, commonly referred to as "money left on the table" and, measured by a large positive return on a stock's first day of trading, has been a persistent and widespread global phenomenon for several decades (see, for instance, Chen et al., 2020; Ibbotson, 1975; Loughran et al., 1994). Prior studies examining cross-country IPO underpricing predominantly focus on country-level characteristics and variations in key economic factors. However, they ignore the socio-economic equality and ethical dimensions, especially those associated with gender-based differences in risk appetite and leadership effectiveness. Our paper recognizes the importance of considering these aspects.

Drawing upon a model proposed by Stoughton and Zechner (1998), our study suggests that IPO underpricing serves as a strategic mechanism for businesses to secure commitment from block holders who actively monitor management and enhance firm value. Stoughton and Zechner's model explains that block holders incur costs in terms of sub-optimal diversification.[3] In addition, there is documented evidence that in many countries, IPO firms on average under-perform, or at least do not out-perform, non-IPO firms in the long-run (see, e.g., Gompers and Lerner, 2003; Ljungqvist, 1997; Ritter, 1991). In fact, a large number of articles in the popular press treat investing in IPOs akin to gambling.[4] Therefore, it follows

[2]Equity markets have historically played a central role in financing. Firms across the globe use IPO as a principal source of financing making a successful IPO critical for their expansion and future growth. For instance, according to PWC Global IPO Watch publication, $608bn was raised in 2,682 IPOs across the globe in 2021, the last year of our sample period. Equity markets are also the most-widely followed and traded markets in the world.

[3]For instance, while it may be optimal for an investor to allocate $5 to the current IPO for every $100 of their total investment in terms of diversification, becoming a block holder in the IPO firm would necessitate an investment of at least $15 per $100 of their wealth. The idea is that some of this additional exposure of $10 to firm-specific risk is compensated through the underpricing of IPO shares.

[4]See, for example thebowserreport.com/blog/ipos-trading-gambling or https://www.yahoo.com/

that the willingness of block holders to participate in the IPO process, which is critical for a successful IPO, is influenced by factors such as their attitudes towards different types of risky investments, their tolerance for the associated risks, and the "money left on the table". Importantly, these factors are closely intertwined with female empowerment within a particular country because such empowerment changes the investor base that constitutes block holders and consequently, the risk appetite in that country.

The existence of gender-based differences in the propensity to take risks has been examined in a variety of settings. Some scholars have long argued that females are categorically more risk-averse than males. These arguments are generally based on observations of female executive behavior and/or the lower propensity of females to engage in activities whose outcomes resemble those observed in lottery and gambling (see, e.g., Barber and Odean, 2001; Barsky et al., 1997; Charness and Gneezy, 2012; Dohmen et al., 2011; Johnson and Powell, 1994; Sunden and Surette, 1998). On the other hand, several scholars fail to find evidence that females are more risk-averse than males in other settings (see, e.g., Adams and Funk, 2012; Holt and Laury, 2002; Nelson, 2016; Schubert et al., 1999; Sila et al., 2016). In fact, there is evidence that females are more likely to engage in certain risky activities with high potential payoffs and fixed minor costs (see, e.g., Harris and Jenkins, 2006). In sum, while there is no consensus on whether females are more risk-averse than males, there seems to be an agreement that gender plays a role in the perception of risk, and that females and males have different context-specific risk appetites.

We build our first main hypothesis on the differences in risk appetite between females and males.[5] If there exists a divergence in risk appetite, and the gender with a lower inclination for investments with gambling type outcomes holds a proportionately larger portion of investible funds, it follows that the overall demand for such investments would be comparatively low in that economy. As mentioned above, both existing evidence on long-run performance and

video/investing-in-unicorn-ipos-is-gambling-money-200244092.html.

[5]Despite the ongoing challenge in the literature to separate and understand the specific distinctions between risk and gender behavior, we are fortunate that our analysis does not rely on determining whether it involves risk aversion, risk perception, or both. The underlying argument we present revolves around the disparities in overall "risk appetite" across genders.

popular opinion imply investing in IPO firms is more of a gamble compared to investing in more established firms with trading history. Given that female economic empowerment at the country level leads to relatively more investible funds at the disposal of females vis-a-vis males, it will likely impact the nature of IPO pricing. All else equal, IPO firms in that economy, which are ex-ante associated with a relatively high risk to reward structure, then have to leave more "money on the table" to entice block holders. To sum, we hypothesize that a greater degree of female economic empowerment leads to increased levels of IPO underpricing.[6]

As mentioned earlier, an economy characterized by transparency, integrity and equitable treatment of all stakeholders is a key requirement for the success of IPOs and capital markets in general. Such an economy is only possible with effective political leadership at the highest levels because a lack of it often leads to corporate self-dealing, benefiting insiders at the expense of external shareholders. One way to contain this political-corporate nexus which favors well-connected shareholders and entities is to have an increased representation of ethical leaders. Existing evidence highlights the gender discrepancy in ethical decision-making, with males prioritizing self-interest while females consider broader implications, as supported by studies such as Mason and Mudrack (1996), Nadeem (2022), and Seebeck and Vetter (2021). Females' adherence to rules and higher ethical standards make it difficult for influential shareholders to exploit outside shareholders' wealth (see e.g., Dollar et al., 2001; Nadeem, 2022; Nekhili et al., 2022). Thus, we contend that female leadership empowerment reduces apprehension among less-connected investors, increasing their confidence and willingness to participate in capital markets and to invest in risky assets.

Our second main hypothesis focuses on the distinctions in leadership styles between genders. Drawing on existing evidence, we propose that female leaders exhibit a relatively higher adherence to rules compared to their male counterparts. Additionally, considering the variations in female leadership across countries, we anticipate observing reduced instances of

[6]Although there is a robust positive feedback loop between development and female empowerment by addressing gender discrimination in education and labor markets, some empowerment policies extend beyond gender equality and prioritize resource allocation specifically for females. However, the economic consequences of these policies are not rigorously analyzed in the literature.

self-dealing and lower levels of appropriation risk in countries with a greater representation of females in leadership positions. These diminished risks can enhance the willingness of outside investors to participate in the IPO process and result in a lower demand for an extra return in the form of IPO underpricing. That is, we hypothesize a negative relationship between IPO underpricing and female leadership empowerment.

Our empirical analysis leads to several results of significant policy implications. First, we observe a positive and significant influence of female economic empowerment at the country level on IPO underpricing. These results suggest that the relatively lower risk tolerance of females, which leads to higher costs in attracting block holders, contributes to increased underpricing in IPOs. Second, our findings align with the explanation of IPO underpricing based on higher ethical standards and good governance. We discover that the politically influential females' higher ethical and moral standards help alleviate concerns among potential outside investors regarding expropriation by insiders. This increased confidence leads to higher participation rates in the IPO process, subsequently reducing underpricing. Third, we find that a composite measure of overall female empowerment at the country level, combining economic and leadership empowerment, has a negative and significant impact on IPO underpricing, indicating that on average the effect of female leadership empowerment outweighs the effect of economic empowerment.

We also document several new findings of significance that corroborate our main results. We find that IPO certification, i.e., IPOs underwritten by reputable underwriters or venture capital backed IPOs, weakens the positive effect of female economic empowerment on IPO underpricing, probably by reducing the risk aversion of potential block holders. Our results also indicate female leadership empowerment is more effective in economies characterized be weaker investor protection. Our main results remain robust to various subsets of the sample, to the use of alternative measures of female empowerment, and to different model estimations. Additionally, we provide evidence to support the argument that increased transparency and good governance associated with female leadership empowerment (see, e.g., Bekaert et al., 2005; Eichengreen, 2001; La Porta et al., 2002) further substantiates the mechanism by which

leadership empowerment at the country level reduces IPO underpricing.

We believe our study makes significant contributions to the existing literature in several areas. First, we enhance the understanding of the risk and return trade-off theory by investigating how female economic and leadership empowerment influences the risk attitudes and risk tolerance of block holders in IPOs. This novel perspective adds to the extensive studies in finance that have explored the relationship between risk and expected return, as exemplified by research conducted by Shleifer and Vishny (1997), Shefrin and Statman (2000), and Barberis and Thaler (2003). Gaining an understanding of how gender influences investment behavior and ethical considerations can offer valuable insights for policymakers, market participants, and investors.

Second, our study demonstrates the value-relevant information provided by female empowerment within the context of IPOs. While prior research has primarily focused on operational conditions and national development as determinants of IPO underpricing (e.g., Baker et al., 2021; Banerjee et al., 2011; Boulton et al., 2017), our study adds to this understanding by incorporating gender-related factors. By considering female economic and leadership empowerment, we emphasize the significance of these factors in shaping the dynamics of IPO markets. This broader perspective enriches our comprehension of the various elements that influence IPO pricing and market efficiency.

Third, our study adds to a broader literature on global access to capital and the cost of capital. For instance, Henderson et al. (2006) investigate the reasons behind firms' reliance on multiple sources of capital and the factors that influence their choices. Similarly, Kim and Weisbach (2008) provide evidence that firms globally raise capital for investment purposes. Given the substantial amount of capital raised by firms worldwide for investment, pertinent questions arise on the costs associated with raising capital on a global scale and the factors that impact these costs. Our research aims to address these crucial questions by examining the IPO perspective and offering valuable insights into the matter.[7]

[7]In a related study, Barua et al. (2010) examine the connection between the gender of CFOs and the quality of accruals in US firms. The findings indicate that companies with female CFOs demonstrate lower levels of discretionary accruals and accrual estimation errors compared to their male counterparts and thereby, reduces the costs of raising capital.

The paper is organized as follows: Section 2 presents our model and the resulting hypotheses. In Section 3, we outline the sample selection process, define the variables, and present summary statistics of the data. The results on the relationship between IPO underpricing and the key variables of interest (female economic empowerment and leadership empowerment) are presented in Section 4. Section 5 presents additional analysis incorporating moderating factors and section 6 presents the findings of robustness tests. Section 7 concludes the paper.

2 A Simple Model and Hypothesis Development

This section provides a brief overview of theories that aim to explain IPO underpricing. Subsequently, we propose specific country-level characteristics that can serve as testable factors for these theories. We also present the corresponding hypotheses.

Let's compare two countries, referred to as Country A and Country B, that are similar in all aspects except for the level of economic and leadership empowerment among females. In Country A, females are more economically empowered compared to females in Country B. Economic empowerment includes increased access to economic assets, equal participation in the workforce, and equal wages.[8] Similarly, in terms of leadership empowerment, Country A has higher female participation in political and corporate leadership positions compared to Country B.

Additionally, we assume that the size of the aggregate investible funds is the same in both countries:

$$I^A = I^B = I \tag{1}$$

Let's consider that I_w^A and I_w^B represent the total investible funds held by females in Country A and Country B, respectively. Similarly, I_m^A and I_m^B represent the total investible funds held by males in Country A and Country B, respectively. Hence,

$$I^j = I_w^j + I_m^j \qquad j = A, B \tag{2}$$

[8]We adopt the standard definition of economic empowerment for females, which includes increased access to economic assets like land and loans, equal participation in the workforce, and equal wages.

where the aggregate investible funds in each country are determined by the sum of the total investible funds held by females and males.

2.1 Economic Empowerment of Female and IPO Underpricing

We assume that in Country A, females are relatively more economically empowered than males, while in Country B, males are more economically empowered than females.[9] This implies that:

$$I_w^A > I_m^A \text{ and } I_w^B < I_m^B \tag{3}$$

Considering that females are more risk-averse than males, assuming everything else remaining constant, females will invest a smaller fraction of their investible funds in risky assets compared to males. Let's assume that females invest a fraction κ_w of their investible funds in risky assets in both countries, while males invest a fraction κ_m of their investible funds in risky assets in both countries. Thus,

$$\kappa_w < \kappa_m. \tag{4}$$

Given that Equation (1), (2), (3), and (4), we can deduce that the total investments in risky assets in Country A are lower than the total investments in risky assets in Country B:

$$W^A < W^B. \tag{5}$$

Let's consider that there are N risky assets in each country. If both females and males evenly distribute their investments among these N assets (naively diversify), the investment in asset k in each country is given by:

$$w_k^j = \frac{W_w^j + W_m^j}{N} = \frac{W^j}{N} \quad \forall k = 1, 2, ..., N \quad \text{and} \quad j = A, B. \tag{6}$$

[9] To isolate the individual impact of female economic empowerment on IPO Underpricing, we also assume that there is no disparity between the two countries concerning the leadership empowerment of females in this subsection.

Combining Equation (5) with Equation (6), we can conclude that $w_k^A < w_k^B$ for all k = 1, 2, ..., N. This means that the investment in asset k in Country A is lower than the investment in asset k in Country B.

Now, suppose an initial public offering (IPO) occurs in Country A, and both females and males rebalance their portfolios to include the newly issued security. In this case, Country A invests:

$$\mathbf{w}_{\text{IPO}}^A = \frac{W^A}{N+1}, \tag{7}$$

in the newly issued risky asset. And the investments in the existing risky assets decrease proportionally:

$$\mathbf{w}_k^A = \frac{W^A}{N+1} \quad \forall k = 1, 2, ..., N \tag{8}$$

It is important to note that $\mathbf{w}_{\text{IPO}}^A + \sum_{k=1}^{N} \mathbf{w}_k^A = W^A$, representing the total investment in risky assets in Country A.

If a similar initial public offering (IPO) occurs in Country B and both females and males rebalance their portfolios to include the newly issued security, the investment in Country B is as follows:

$$\mathbf{w}_{\text{IPO}}^B = \frac{W^B}{N+1}, \tag{9}$$

and

$$\mathbf{w}_k^B = \frac{W^B}{N+1} \quad \forall k = 1, 2, ..., N \tag{10}$$

It is evident that $\mathbf{w}_k^j < w_k^j$ for all $j = A, B$ and $k = 1, 2, ..., N+1$ because an increase in the number of assets decreases the dollar allocation to each security in both countries. However, utilizing Equation (5), we can argue that the total investment in the "newly issued asset" in Country A is less than the total investment in the "newly issued asset" in Country B:

$$\mathbf{w}_{\text{IPO}}^A < \mathbf{w}_{\text{IPO}}^B, \tag{11}$$

Suppose that a "block" position in the newly securitized firm requires investing $\bar{w} = \alpha V$ dollars in both countries A and B, where V represents the fair value of the IPO firm, and

α denotes the necessary holding for acting as a block holder. The cost of inducing a block holder is positively related to the additional dollar investment, which is given by $\alpha V - \mathbf{w}^A_{\text{IPO}}$ in country A and $\alpha V - \mathbf{w}^B_{\text{IPO}}$ in country B. Stoughton and Zechner (1998) propose that the underpricing of IPOs serves as compensation for the costs associated with block holding and, therefore, should be proportional to $\alpha V - \mathbf{w}^A_{\text{IPO}}$ in country A and $\alpha V - \mathbf{w}^B_{\text{IPO}}$ in country B.

Based on equation (11), the cost of inducing block holding is lower in country B compared to country A. Consequently, the dollar discounts required to attract block holders are defined as follows:

$$d_A = g(\alpha V - \mathbf{w}^A_{\text{IPO}}) > d_B = g(\alpha V - \mathbf{w}^B_{\text{IPO}}), \tag{12}$$

where, $g(\cdot)$ is a function that converts excess exposure in a stock into costs, and the conversion depends on investors' preference parameters. d_A and d_B represent the dollar discount necessary to attract block holders. Since underpricing is calculated as the ratio of the fair value minus the offered value to the offered value, and d_A is greater than d_B (given that $\alpha V - \mathbf{w}^A_{\text{IPO}}$ is greater than $\alpha V - \mathbf{w}^B_{\text{IPO}}$), we obtain:

$$U_A = \frac{V - (V - d_A)}{V - d_A} > U_B = \frac{V - (V - d_B)}{V - d_B} \tag{13}$$

Therefore, we hypothesize that IPO underpricing in country A is higher than in country B.

Hypothesis 1*: The level of female economic empowerment in any country is positively associated with IPO underpricing.*

2.2 Leadership Empowerment of Female and IPO Underpricing

In the same vein, if female participation in political and corporate leadership is higher in Country A compared to Country B, the presence of stronger ethical standards among female leaders will promote transparency and good governance. Consequently, under the assumption that all other factors remain constant, investors in Country A will exhibit a greater willingness to invest in risky assets.

Let us retain previous model setting, while assuming that there is no disparity between

the two countries concerning the economic empowerment of females:

$$I_w^A = I_w^B \text{ and } I_m^A = I_m^B. \tag{14}$$

However, we assume that due to a higher level of female leadership participation in Country A compared to Country B, there is a greater willingness among all types of investors (both females and males) to invest in risky assets in Country A relative to Country B. Specifically,

$$\kappa_w^A > \kappa_w^B \text{ and } \kappa_m^A > \kappa_m^B. \tag{15}$$

By utilizing Equations (14) and (15), it becomes evident that:

$$W^A > W^B \tag{16}$$

This implies that investors in Country A allocate a higher proportion of their funds to risky assets compared to investors in Country B.

Furthermore, employing Equations (6), (7), (8), (9), and (10) as described in the previous scenario, we can deduce that the total investment in the "newly issued asset" in Country A surpasses the total investment in the "newly issued asset" in Country B:

$$\mathbf{w}_{\text{IPO}}^A > \mathbf{w}_{\text{IPO}}^B \tag{17}$$

due to the fact that $W^A > W^B$. Moreover, assuming that a "block" position in the "newly securitized" firm entails an investment of $\bar{w} = \alpha V$ dollars in both Country A and Country B, the cost of inducing a block holder is positively associated with an additional dollar investment of $\alpha V - \mathbf{w}_{\text{IPO}}^A$ in Country A and $\alpha V - \mathbf{w}_{\text{IPO}}^B$ in Country B. Following the argument put forth by Stoughton and Zechner (1998), we can demonstrate that:

$$d_A = g(\alpha V - \mathbf{w}_{\text{IPO}}^A) < d_B = g(\alpha V - \mathbf{w}_{\text{IPO}}^B) \tag{18}$$

Hence,

$$U_A = \frac{V - (V - d_A)}{V - d_A} < U_B = \frac{V - (V - d_B)}{V - d_B} \tag{19}$$

As a result, we propose the hypothesis that IPO underpricing in Country A is lower than that in Country B.

Hypothesis 2*: There is a negative relationship between the level of female leadership empowerment at the country level and IPO underpricing.*

2.3 Composite Empowerment of Females and IPO Underpricing

Subsequently, we examine a scenario in which females in Country A possess both economic empowerment and leadership/political empowerment to a greater extent compared to Country B. Thus, $I_w^A > I_m^A$ and $I_w^B < I_m^B$;. We can rephrase the statements as follows: $\kappa_w^A < \kappa_m^A$ and $\kappa_w^B < \kappa_m^B$. However, due to transparent leadership and good governance resulting from higher ethical standards, $\kappa_w^A > \kappa_w^B$ and $\kappa_m^A > \kappa_m^B$.

Therefore, the difference in the level of investment in risky assets between the two countries is ambiguous. In other words, W^A can be either greater than, less than, or equal to W^B. This ambiguity arises because while the economic empowerment of females tends to decrease investment in risky assets, the leadership/political empowerment of females tends to increase investment in risky assets.

Hypothesis 3*: The relationship between the country-level relative leadership empowerment and economic empowerment of females and IPO underpricing is ambiguous, contingent upon which effect is stronger.*

3 Data and Summary Statistics

This section provides an overview of our sample selection process, the definition of variables used in the analysis, and presents summary statistics of the data.

3.1 Sample Selection

We gather our IPO data from the Global New Issue Database provided by Thomson Reuters (formerly SDC Platinum). Our initial sample consists of of 34,719 observations on international common stock issues spanning from January 1, 2006, to December 31, 2021. Our sample size reduces to 34,415 observations after excluding private placements as these involve selling securities directly to private investors without widespread listing. We then exclude observations with missing information on offer size and offer price resulting in a sample of 25,814 IPOs.

We calculate IPO underpricing as the percentage difference between the offer price and the closing price on the first day using data from SDC and DataStream. If the closing price on the first day is missing in SDC, we attempt to replace it with the earliest closing price within one week after the IPO issue date (i.e., the second day, third day, or first week closing price) obtained from DataStream. We then apply the following standard filters to arrive at our final sample.

1. We remove IPOs with missing values for the closing price according to the aforementioned criteria, resulting in the exclusion of 6,618 IPOs from the sample.

2. We eliminate IPOs with unusually high or low values of underpricing, specifically those exceeding 2,000% or falling below -67% resulting in an exclusion of 97 IPOs from the sample.

3. We exclude countries with fewer than ten qualified and reported IPOs during our sample period resulting in an exclusion of an additional 128 IPOs.

4. Finally, in order to ensure data completeness and reliability, we retain only those IPOs where at least one of the following country-specific variables are available: economic empowerment score, leadership empowerment score, or overall empowerment score. This results in an exclusion of a further 1,841 IPOs from the sample.

As a result, our final sample consists of 17,130 IPOs from 52 countries. In order to mitigate

the potential impact of data errors, we winsorize IPO underpricing variable at the 2.5 percent level.[10]

3.2 Variable Definition

3.2.1 Female Empowerment Data

This section provides a brief discussion on the measures of female empowerment utilized in this paper.

1. *Economic Empowerment*: To test our *Hypothesis 1*, we use the ratio of females to males in the labor force for country 'j' in year 't'. We contend that a higher ratio indicates lower economic inequality and higher female economic empowerment. This is because, assuming a fixed number of available jobs in country 'j' for year 't', a higher proportion of females in the workforce implies a proportional reduction in job opportunities for males. Our data source for this measure is the "Human Development Report" published by the United Nations. This report, launched in 1990, provides annual updates on various key indicators related to overall human development, including labor force participation rates.[11]

2. *Leadership Empowerment*: In order to test *Hypothesis 2*, we utilize the leadership empowerment index, a measure that captures the disparity between males and females at the highest level of political decision-making. This index is constructed based on the ratio of females to males in minister-level positions and parliamentary positions. Additionally, it incorporates the ratio of females to males in terms of years in executive office (prime minister or president) over the past 50 years. The leadership empowerment index ranges from 0 to 1, where a higher value indicates a higher degree of female leadership and political empowerment. These data are obtained from the "Global Gender Gap Index" published annually by the World Economic Forum since 2006.

[10] Our findings are qualitatively similar when we winsorize at the 1 percent level.

[11] We select the ratio of female to male labor force participation rates as our principal measure for female economic empowerment due to its minimal endogeneity. This ratio, grounded in labor market data, is less likely to be influenced by short-term economic policies or corporate decisions, thereby providing a more stable and reliable indicator of long-standing gender-based economic empowerment disparities.

3. *Overall Empowerment*: To examine *Hypothesis 3*, we utilize the overall empowerment index, a measure that assesses gender inequality on four dimensions: economic, political, health, and education. This index ranges from 0 to 1 and measures the extent of inequality between males and females in country 'j' for year 't'. A higher value on this index indicates reduced overall gender inequality and higher female empowerment. The Global Gender Gap report, published annually by the World Economic Forum, is the source of this index.

While we acknowledge that these indices may not encompass all dimensions of economic and leadership inequality between females and males in a given country, they do provide systematic and longitudinal insights into crucial macro-level indicators such as labor force participation rates and the representation of females in top decision-making bodies. Moreover, these measures are widely used research spanning several areas such as sociology, neonatal health, and finance (see, e.g., Abdollahpour et al., 2022; Hewa-Wellalage et al., 2022; Kosakowska-Berezecka et al., 2022). Furthermore, our analysis incorporates controls for various deal-level and market-level characteristics. Considering all these factors, we are confident in using the aforementioned indices to empirically test our model and hypotheses.

3.2.2 Control Variables

We incorporate the following deal-level and market-level control variables that have been previously documented in the literature as relevant factors influencing IPO underpricing.[12] By including these control variables, we aim to mitigate the influence of confounding factors and isolate the specific impact of female empowerment measures on IPO underpricing.

1. Deal-specific variables: We consider various deal-specific characteristics such as offer size, integer offer price indicator, book building indicator, equity carve-out indicator, venture-backed indicator, and underwriter reputation. These variables capture important aspects of the IPO deal that may affect its IPO underpricing.

[12]See Appendix A: Variable Definitions for the detailed description of the control variables.

2. Market conditions: We include variables related to market conditions during the IPO period, such as stock market return, market volatility, market size, stock turnover and IPO activity. These variables capture the general state of the market and its influence on IPO underpricing.

3. Country-specific indicators: We incorporate country-level analyst following and gender ratio, as well as the macroeconomic indicators such as GDP per capita and its growth rate. These variables reflect the overall country conditions that may influence investor sentiment and IPO underpricing.

3.3 Summary Statistics

Panel A of Table 1 provides a summary of the average and median values of IPO underpricing, as well as the number of IPOs for each country from 2006 to 2021. China and the United States account for 41% of all IPOs during this period. Conversely, Ukraine, Bulgaria and Kuwait have some of lowest number of IPOs in our sample. With regards to underpricing, IPOs from Norway are associated with the lowest underpricing of 3.03% on average, while Ukraine and France have mean values of 3.06% and 3.73% respectively. On the other hand, IPOs from Bangladesh and Kuwait are associated with the highest and second highest mean IPO underpricing in our sample.

Panel B of Table 1 presents a temporal distribution of IPOs along with average and median values of IPO underpricing. The data indicates that IPO markets were "hot" in the 2006-2007 period and subsequently cooled down as the global financial crisis hit in 2008 and 2009. From 2010 onward, the number of IPOs per year is close to the average number of IPOs in our sample (1,071). Exceptions include 2017 and 2021 with over 1,400 IPOs in each of the years. The magnitude of underpricing in our sample is 23.35% on average and ranges from a high of 31.19% in 2007 to a low of 16.43% in 2011. Given the sample median offer size of $153 million, this is an economically significant amount and further corroborates the importance of examining all relevant factors that explain IPO underpricing.

Insert Table 1 here

Table 2 presents country-level averages of variables that are of primary interest for testing our hypotheses. Panel A of Table 2 focuses on the primary measures of female empowerment at the country level. The statistics presented in column 2 suggest that the Scandinavian countries of Sweden, Norway, Finland, and Denmark along with Vietnam are the countries with highest levels of female economic empowerment. On the other hand, Saudi Arabia, Pakistan, and Jordan seem to be the countries with the lowest levels of economic empowerment. The estimates presented in column 3 suggest that once again Finland, Norway, and Sweden, show the highest measures of female leadership empowerment whereas Kuwait, Saudi Arabia, and Jordan are associated with lowest levels of female leadership empowerment. When considering overall empowerment, the statistics presented in column 4 suggest that Finland emerges as the leading country with an overall score of 0.836, indicating a high level of female empowerment. In contrast, Pakistan exhibits the highest level of inequality between males and females, with an overall score of 0.552. Additionally, Panel B of Table 2, examining alternative measures of female empowerment, exhibits similar patterns to those observed in the primary measures.

While some countries that are associated with high (low) levels of female economic empowerment are also associated with high (low) levels of female leadership empowerment leading to a high overall empowerment score, the data suggests there are also countries that score highly in one aspect of empowerment and relatively poorly in the other aspect. For example, while Bangladesh is associated with one of the lowest levels of economic empowerment, it is associated with relatively high levels of leadership empowerment. Similarly, while China and Japan are associated with high levels of economic empowerment, they are associated with relatively low levels of leadership empowerment. This highlights the variations in the socio-economic conditions across different countries and provides an ideal testing ground for the ensuing empirical analysis.

Insert Table 2 here

Table 3 provides the distributional characteristics of all the variables used in this study. Specifically, the mean, 25th quartile, median, 75th quartile and the standard deviation are

presented. The mean and median values of underpricing are 23.3% and 8.0%, respectively. It is worth noting that more than half of the IPOs have integer offer prices in their home-country currencies *(Integer Offer Price)*. In 99% of IPOs, underwriters employ the book-building technique to allocate shares among investors *(Book Building)*. Additionally, approximately 60.8% of IPOs select underwriters from the top quartile *(Underwriter Reputation)* and about 21% of IPOs are equity carve-outs *(Equity Carveout)*. We observe that nearly one in five IPOs (21.2%) have received venture capital funding *(Venture Backed)* and that companies are followed by 3 analysts on average *(Analyst Following)*.

Turning to market performance measures, the statistics suggest that the three-month market return prior to the IPO issuance date stands at 3.3% on average *(Market Return)*, and that the number of IPOs issued in each year is equal to 5.8% of all the equities outstanding in the stock market that year *(IPO Activity)*. The mean and median values of the ratio of stock market capitalization to GDP *(Market Size)* is close to 1 further highlighting the economic impact of equity markets across the world. Consistent with historical and current estimates, the mean and median GDP per capita growth rates are 3.0% and 2.1% respectively. Overall, the statistics presented in Table 3 are consistent with other studies examining IPO underpricing (see, e.g., Baker et al., 2021; Boulton et al., 2011).

Insert Table 3 here

One possibility with using multiple macro-level variables is the likelihood that these variables are highly correlated with each other, clouding the inferences drawn from multivariate regressions. To address this issue, we create a correlation matrix of all variables used in the multivariate analysis and present it in Table 4. The correlation coefficient between IPO underpricing and economic empowerment is 0.034, while the correlation coefficient between IPO underpricing and leadership empowerment is -0.157. Most of the correlation coefficients between the control variables and IPO underpricing exhibit the expected signs. For instance, our findings corroborate the theory proposed by Rock (1986) that asymmetric information contributes to the observed underpricing in initial public offerings (IPOs) (see also, Busaba

and Chang, 2010), as evidenced by a correlation coefficient of -0.234 between IPO underpricing and analyst following.

As expected, GDP per capita shows a strong correlation with female economic empowerment (0.424) and overall empowerment (0.612). Along the same lines, we see a high correlation between the level *(GDP Per Capita)* and growth *(GDP Per Capita Growth)* variables measuring national wealth. To ensure the robustness of our results, we conducted regression analyses without GDP per capita as an explanatory variable, and the findings remained qualitatively similar. Similarly, we excluded other variables with a high correlation and found our main results are robust to these alternate specifications.

Insert Table 4 here

4 Multivariate Analysis

In all our regressions, we control for industry and time invariant factors by including Fama-French 48 industry dummies (see, e.g., Fama and French, 1997) and year dummies respectively, and cluster standard errors at the country-industry level (see, e.g., Baker et al., 2021; Banerjee et al., 2011; Boulton et al., 2010, 2011, 2017; Lin et al., 2013). Our primary variables of interest include economic empowerment, leadership empowerment, and overall empowerment. Additionally, we include deal-specific control variables (such as log offer size, integer offer price indicator, book building indicator, equity carve-out indicator, venture-backed indicator, and underwriter reputation) as well as market- and country-specific variables (including market return, market volatility, market size, stock turnover, IPO activity, analyst following, gender ratio, GDP per capita, and GDP per capita growth).

For the sake of completeness and comparison, we present the results of our baseline model M1 in Table 5, which includes all the control variables but does not incorporate any of the

main variables associated with our hypotheses. Specifically, we test

$$\begin{aligned} U_{ijt} = \quad & \alpha + \gamma_{Deal} * Deal\ Controls_{ijt} + \gamma_{Market} * Market\ Controls_{jt} \\ & + \gamma_{Country} * Country\ Controls_{jt} + \ \delta_{Industry} * Industry\ Indicators + \\ & + \delta_t * Year\ Indicators + \varepsilon_{ijt}, \end{aligned} \tag{20}$$

where U_{ijt} is underpricing associated with company i's IPO in country j and year t. $Deal\ Controls_{ijt}$, $Market\ Controls_{jt}$, and $Country\ Controls_{jt}$ refer to control variables specific to the deal, market, and country, respectively.

Consistent with prior literature (see, e.g., Banerjee et al., 2011; Beatty and Ritter, 1986), the results of the baseline model M1 reveals a statistically significant negative relationship between underpricing and the natural logarithm of offer size (-0.021). The idea is that smaller (IPOs) tend to be more speculative compared to larger IPOs and therefore leave "more money on the table". Sherman (2005) argues that underwriters manage information acquisition costs better by employing the book building technique and subsequently reduce IPO underpricing. In line with this argument, our analysis indicates a negative but statistically insignificant, coefficient (-0.035) for the book building indicator. Similarly, consistent with Prezas et al. (2000) and Boulton et al. (2011), we also observe a negative relationship between equity carveout and IPO underpricing, although the coefficient is non-significant. Additionally, in line with the findings of Loughran and Ritter (2004) and Baker et al. (2021), we find a positive and significant relationship between venture-backed companies and IPO underpricing. The positive coefficient of underwriter reputation is also consistent with the existing literature (Beatty and Welch, 1996; Boulton et al., 2017; Loughran and Ritter, 2004).

The coefficient for market return is positive and significant at the 1% level, indicating that IPO underpricing tends to be higher during periods of high market demand, commonly known as the "hot issue period". The positive coefficient on IPO activity variable provides further support to this idea and overall, these findings are consistent with the research by Ritter (1984), Ljungqvist et al. (2006), and Allen and Faulhaber (1989). Along the same lines, the

coefficient estimates on the two other market indicators, namely market volatility and market size, are consistent with the studies conducted by Lowry et al. (2010) and Duong et al. (2022). Specifically, market volatility has a coefficient of 2.430, while market size has a coefficient of 0.067, and both coefficients are statistically significant at the 1% level. These results suggest that higher stock market volatility and a larger market size are associated with greater IPO underpricing. The positive sign of stock turnover is also aligned with our expectation, based on the study of Lowry and Shu (2002) and Boulton et al. (2011). Additionally, our study demonstrates a negative relationship between the extent of IPO underpricing and country-level analyst following estimates, with a coefficient of -0.038, significant at the 1% level. This result is consistent with the research conducted by Bradley et al. (2003) and Cliff and Denis (2004).

To summarize, the results of our baseline model are consistent with those documented in prior literature. This reinforces the validity of our baseline model to which we add the main variables of interest to test our hypotheses.

Insert Table 5 here

4.1 Tests on Economic Empowerment Hypothesis

In this section, we examine our hypothesis on economic empowerment by testing the relationship between the relative economic empowerment of females at the country level and IPO underpricing. Specifically, we estimate the following regression specification:

$$\begin{aligned} U_{ijt} = \quad & \alpha + \beta_{EP} * Economic\ Empowerment_{jt} + \gamma_{Deal} * Deal\ Controls_{ijt} \\ & + \gamma_{Market} * Market\ Controls_{jt} + \gamma_{Country} * Country\ Controls_{jt} \\ & + \delta_{Industry} * Industry\ Dummies + \delta_t * Year\ Dummies + \varepsilon_{ijt}, \end{aligned} \tag{21}$$

The variable of primary interest, denoted as $Economic\ Empowerment_{jt}$, remains constant for each country 'j' and year 't'. Model M2 in Table 5 presents the results of our parsimonious

specification, which includes female empowerment measure, industry dummies, and year dummies. The standard errors are clustered at the country-industry level. Consistent with *Hypothesis 1*, our findings indicate that a higher level of IPO underpricing is associated with a greater female economic empowerment (the coefficient on economic empowerment is 0.120 and statistically significant at the 1% level).

We present the results of two other regression specifications in models M3 and M4, where we first incorporate only deal specific variables as additional control variables (M3) and deal specific variables along with market- and country-level variables as additional controls (M4), respectively. In both models, the coefficient on economic empowerment is positive and significant at the 1% level, further supporting *Hypothesis 1.*

4.2 Tests on Leadership Empowerment Hypothesis

In this section, we examine our hypothesis on leadership empowerment by testing the relationship between the relative leadership empowerment of females at the country level and IPO underpricing. We estimate the following regression specification:

$$\begin{aligned} U_{ijt} = \quad & \alpha + \beta_{LP} * Leadership\ Empowerment_{jt} + \gamma_{Deal} * Deal\ Controls_{ijt} \\ & + \gamma_{Market} * Market\ Controls_{jt} + \gamma_{Country} * Country\ Controls_{jt} \\ & + \delta_{Industry} * Industry\ Dummies + \delta_t * Year\ Dummies + \varepsilon_{ijt}, \end{aligned} \tag{22}$$

The variable of primary interest, denoted as $Leadership\ Empowerment_{jt}$, remains constant for each country 'j' and year 't'. Model M5 in Table 5 presents the results of our parsimonious specification, which includes the leadership empowerment of females, industry dummies, and year dummies. The standard errors are clustered at the country-industry level. Consistent with *Hypothesis 2*, our findings indicate that a lower level of IPO underpricing is associated with a higher estimate of country-level leadership empowerment (the coefficient on leadership empowerment is -0.544 and statistically significant at the 1% level).

Furthermore, Model M6 presents results using deal controls only, while Model M7 presents

results incorporating deal-, market-, and country-level controls. In both models, the coefficient on leadership empowerment is negative and statistically significant at the 1% level, further supporting *Hypothesis 2*.

4.3 Tests on Economic and Leadership Empowerment Hypothesis

Subsequently, we proceed to perform a regression analysis on the underpricing of IPOs, taking into account female economic empowerment as well as leadership empowerment.

$$\begin{aligned} U_{ijt} = \quad & \alpha + \beta_{EP} * Economic\ Empowerment_{jt} + \beta_{LP} * Leadership\ Empowerment_{jt} \\ & + \gamma_{Deal} * Deal\ Controls_{ijt} + \gamma_{Market} * Market\ Controls_{jt} \\ & + \gamma_{Country} * Country\ Controls_{jt} + \ \delta_{Industry} * Industry\ Dummies \\ & + \delta_t * Year\ Dummies + \varepsilon_{ijt}, \end{aligned} \tag{23}$$

Models M8-M10 of Table 5 present the results. In model M8, which includes both the empowerment variables, industry dummies, and year dummies, we note that the coefficient estimates for economic empowerment and leadership empowerment retain their respective signs and statistical significance. Model M9, which incorporates deal-level control variables as additional explanatory factors, yields qualitatively similar results. With all the deal-, market-, and country-level control variables, our main findings remain qualitatively similar in model M10. Overall, these findings align with previous research and our main variables of interest maintain the correct signs and levels of significance.[13]

4.4 Tests on Overall Empowerment Hypothesis

In this section, we examine our hypothesis on overall empowerment by testing the ambiguous relationship between the relative leadership empowerment and economic empowerment of females at the country level with IPO underpricing. We conduct a regression analysis where

[13]Due to the significant collinearity observed between overall empowerment and both economic empowerment (0.573) and leadership empowerment (0.673), we have refrained from including these two female empowerment measures within a single specification.

we investigate the impact of the estimate of overall empowerment on IPO underpricing.

$$\begin{aligned} U_{ijt} = \quad & \alpha + \beta_{OP} * Overall\ Empowerment_{jt} + \gamma_{Deal} * Deal\ Controls_{ijt} \\ & + \gamma_{Market} * Market\ Controls_{jt} + \gamma_{Country} * Country\ Controls_{jt} \\ & + \delta_{Industry} * Industry\ Dummies + \delta_t * Year\ Dummies + \varepsilon_{ijt}, \end{aligned} \tag{24}$$

The variable of interest, denoted as $Overall\ Empowerment_{jt}$, remains constant for each country 'j' and year 't'. Model M11 in Table 5 presents the results of our baseline specification, which includes the overall empowerment of females, industry dummies, and year dummies. The standard errors are clustered at the country-industry level. We find that the level of IPO underpricing is negatively associated with the country-level overall empowerment estimate (the coefficient on overall empowerment is -1.195 and statistically significant), indicating that the effect of leadership empowerment outweighs the effect of economic empowerment. Model M12 presents results using deal controls only, whereas model M13 presents results incorporating deal-, market-, and country-level controls. In both models, the coefficient on overall empowerment remains negative and statistically significant, further supporting the notion that the effect of female leadership empowerment outweighs the effect of female economic empowerment in the context of IPO underpricing.

5 Heterogeneity in IPO Certification and Investor Protection

5.1 Moderating Effect of IPO Certification

In this section, we extend the investigation of the influence of female economic empowerment on IPO underpricing by considering the potential moderating role of IPO certification. Certification provided either by underwriting from a high-quality underwriter or by backing from a Venture Capital (VC) firm has been well-documented as an indicator of firm quality and reliability (Carter and Manaster, 1990; Lee and Wahal, 2004; Megginson and Weiss, 1991). Following these studies, we employ two variables in this test. *Underwriter Reputation* is

denoted by a dummy variable that equals one if the investment bank underwriting the IPO is in the top quartile in the country in terms of proceeds raised, and zero otherwise; and *Venture Backed* is denoted by a dummy variable that equals one if the IPO firm is backed by VC, and zero otherwise.

We propose that IPO certification could effectively alter the risk appetite of potential block holders. This argument is rooted in the psychological and behavioral economic literature suggesting that the perception of certification and endorsement can indeed influence individuals' risk appetite (Gennaioli et al., 2015; Kahneman, 1979; Statman et al., 2008; Tversky and Kahneman, 1974). As such, when faced with an IPO that has been certified by a high-quality underwriter or a reputable VC firm, potential block holders might find it a more appealing investment. This change in behavior is not because the actual risk diminished per se, but because the certification alters block holders risk perception and consequently their risk-taking propensity. In the context of countries with higher female economic empowerment where potential block holders are less willing to participate in IPO markets *ceteris paribus*, the presence of IPO certification could change the risk appetite in such a way that they now demand less of a risk premium, i.e., underpricing, to participate in the IPO. As such, we hypothesize that the IPO certification might weaken the positive effect of female economic empowerment on IPO underpricing.

We interact the two measure of IPO certification, *Underwriter Reputation* and *Venture Backed*, with the *Economic Empowerment* and include the interaction terms in the regression specification in Equation (21), respectively. The results are presented in models M1 and M2 of Table 6. Consistent with the existing literature (Beatty and Welch, 1996; Boulton et al., 2017; Loughran and Ritter, 2004), model M1 shows that the coefficient of *Underwriter Reputation* is positive and statistically significant. Meanwhile, a higher level of IPO underpricing is still associated with a greater estimate of female economic empowerment (the coefficient on economic empowerment is 0.388 and statistically significant at the 1% level). More importantly, the coefficient of *Economic Empowerment* $\times$ *Underwriter Reputation* is negative and statistically significant, suggesting the effect of female economic empowerment on IPO

underpricing is weaker for IPOs underwritten by reputable underwriters. Our results remain quantitatively similar in model M2, when we use venture backed as the measure for IPO certification, indicating that the effect of female economic empowerment on IPO underpricing is weaker for IPOs backed by VC. Overall, our results show that the IPO certification might weaken the positive effect of female economic empowerment on IPO underpricing, probably by changing the risk appetite of potential block holders, thus further supporting *Hypothesis 1*.

Insert Table 6 here

5.2 Moderating Effect of Investor Protection

In expanding the scope of our exploration into the dynamics of IPO underpricing, we incorporate investor protection as a moderating factor in the relationship between female leadership empowerment and IPO underpricing. We are motivated to pursue this analysis because extant literature proposes that investor protection is a critical determinant of the investment environment and propensity to invest in risky assets (La Porta et al., 2002; Leuz et al., 2009; Shleifer and Wolfenzon, 2002). In countries with weaker investor protection, the interests of minority shareholders are less safeguarded, creating a less favorable investment climate. Consequently, this may reduce individuals' willingness to invest in risky assets such as IPOs. As such, under these conditions, firms might be compelled to offer more underpricing to attract investors. Recall that we use a similar argument to motivate our *Hypothesis 2*, suggesting that proxies of investor protection should have a moderating effect on the relationship between female leadership empowerment and IPO underpricing. In this framework, the idea is that ethical leadership is more (less) critical in environments with lower (greater) investor protection. In the context of our empirical analysis, this translates to the negative effect of leadership empowerment on IPO underpricing to be more (less) pronounced in in environments with lower (greater) investor protection.

We use two well-established indicators of investor protection: the rule of law index and the type of legal system - specifically, civil law countries. The rule of law index captures the

extent to which individuals have confidence in and abide by the rules of society (Chen et al., 2022a; La Porta et al., 1998). Higher values of this index indicate better investor protection. The indicator for civil law countries is a dummy variable that equals one if the IPO firm is listed in a civil law country, and zero otherwise. Literature suggests that civil law countries often provide weaker protection for minority shareholders, thereby increasing their exposure to the risk of managerial expropriation (Djankov et al., 2008; Glaeser and Shleifer, 2002).[14]

We interact the two measures of investor protection, *Rule of Law* and *Civil Law*, with the *Leadership Empowerment* and include the interaction terms in the regression specification shown in Equation (22). The results are presented in models M3 and M4 of Table 6 respectively. As expected, in model M3, the coefficient of *Rule of Law* is negative and significant and the coefficient of *Leadership Empowerment* also remains negative and statistically significant at the 1% level. We find support to the moderating effect argument in the positive and significant coefficient on *Leadership Empowerment* $\times$ *Rule of Law*. This suggests that the effect of female leadership empowerment on IPO underpricing is weaker for IPOs in countries with a higher rule of law index. It then stands to reason that female leadership empowerment should have a greater effect on IPO underpricing in countries with weaker investor protection. We test this proposition with our second measure of investor protection, *Civil Law*. Results are presented in model M4 and suggest that IPOs in civil law countries are associated with higher underpricing as indicated by a positive and significant estimate on *Civil Law*. More importantly, the interaction term, *Leadership Empowerment* $\times$ *Civil Law*, is negative and statistically significant suggesting that female leadership empowerment is more helpful in countries with weak investor protection.

6 Robustness Tests

To ensure the robustness and reliability of our results, we conduct several robustness tests. These tests aim to examine the stability and consistency of our findings under different

[14]Civil law countries include: Argentina, Austria, Belgium, Brazil, Chile China, Denmark, Finland, France, Germany, Greece, Indonesia, Italy, Japan, South Korea, Mexico, the Netherlands, Norway, the Philippines, Spain, Sweden, Switzerland, Taiwan, and Turkey.

specifications, methodologies, and data variations.

6.1 Subsample Tests

To ensure that our results are not driven by certain subsamples, we rerun our tests by excluding specific countries and time periods from our sample.

During the sample period, the combined number of IPOs from the U.S., U.K., and Canada amounts to 5,303 representing approximately 31% of all IPOs in our sample. These countries exhibit advanced institutional characteristics, including prominent investment banks, extensive analyst coverage, and robust legal frameworks, surpassing many other countries in the sample. In order to investigate whether our findings are primarily driven by these mature financial markets, we estimate regressions by excluding these countries. The results are presented in models M1 and M2 of Table 7. In model M1, we exclude U.S. IPOs and in model M2, we exclude IPOs from all three countries. Our main results remain unchanged. Subsequently, in model M3, we proceed to exclude both U.S. and Western European countries from our analysis. This was done to examine whether differences in regulations and government influence on asset pricing could account for the main results presented in our paper.[15] Agian, our findings remain robust under this alternative specification.

Small numbers of IPO events can sometimes exert disproportionate statistical impacts on price distributions without significant real economic effects. To mitigate this concern, we exclude countries with below-median numbers of IPOs during the sample period. We find that IPOs from these excluded countries account for only 4.37% of the IPOs in the full sample. Results are presented in model M4 and we find that our main results are qualitatively similar. Next, we examine whether our results were influenced by IPOs during the financial crisis years of 2007 and 2008. Model M5 presents the outcomes of the analysis after excluding data from these specific years. The coefficients associated with our measures of female economic empowerment and leadership empowerment maintain the correct signs and retain statistical significance. Lastly, we investigate whether our main findings are driven

[15]The countries in question comprise the United States, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden, and the United Kingdom.

by IPOs characterized by extremely low female empowerment. Model M6 shows the results from the sample excluding IPOs with female overall empowerment values below the 25th quartile. Encouragingly, our main findings remain robust even after excluding such IPOs.

Insert Table 7 here

6.2 Tests with Alternative Female Empowerment Measures

We redo our analysis with three alternative measures of female economic empowerment and two alternative measure of female leadership empowerment.

We first introduce the *Female Income Ratio* as an alternative measure of female economic empowerment. This metric, contrasting the average income of females with that of males within a nation, offers a direct economic perspective on gender inequality. We apply this new measure in our baseline regression analysis, as outlined in Equation (21), and present the findings in models M1 and M2 of Panel A in Table 8. The positive and statistically significant coefficient of the *Female Income Ratio* reinforces our initial hypothesis, confirming its validity even when considering different dimensions of female economic empowerment.

Our second alternative measure of female economic empowerment, *EPO Score*, is a composite measure that encompasses three key sources of economic inequality between males and females.[16] The data comes from the "Global Gender Gap Index" published by the World Economic Forum. This index assigns values ranging from 0 to 1, with higher values indicating reduced gender-based economic inequality and higher female economic empowerment. The coefficient of *EPO Score* in model M3 and M4 of Panel A in Table 8 remains positive and statistically significant, demonstrating that our first hypothesis is robust to this alternative female economic empowerment measure.[17]

[16] These sources include the participation gap, which reflects disparities in labor force participation rates; the remuneration gap, which signifies wage inequality for similar work; and the advancement gap, which captures differences in technical jobs, legislators, senior officials, and managers.

[17] While the composite measure based on the "Global Gender Gap Index" presents consistent positive coefficients, we opted not to use it as our primary measure of economic empowerment due to the presence of a leadership component in its construction. However, these positive coefficients indicate that the index is predominantly influenced by labor participation rates and wage inequality, reinforcing their significance in understanding economic empowerment.

Our third alternative measure of female economic empowerment, *WBL Score*, measures the laws and regulations that affect female economic opportunity in 190 economies. Eight indicators—structured around females' interactions with the law as they begin, progress through, and end their careers—align with the economic decisions females make at various stages of their lives.[18] The data comes from Women, Business and the Law reports published by the World Bank. Higher *WBL Score* indicates higher female economic empowerment. The results in model M5 and M6 of Panel A in Table 8 further prove the robustness of the effect of female economic empowerment on IPO underpricing.

We also employ *Females on Boards* as our first alternative measure of female leadership empowerment in our robustness checks. This metric, which quantifies the proportion of corporate board seats occupied by women at the country-year level across our sample, serving as a stable indicator of female representation in high-level corporate decision-making. A higher value in this measure reflects greater female leadership empowerment. The data for this analysis is sourced from MSCI ESG Research. The significant and negative coefficient of *Females on Boards* in model M1 and M2 of Panel B in Table 8 further substantiates our primary hypothesis.

We then use *Parliamentary Ratio*, defined as the proportion of seats held by females in national parliaments as our second alternative measure of female leadership empowerment. The data are sourced from Inter-Parliamentary Union (IPU), with higher values indicating greater female leadership empowerment. The results reported in model M3 and M4 of Panel B in Table 8 show that the coefficient of *Parliamentary Ratio* is negative and statistically significant, implying that our second hypothesis holds when we use this alternative measure of female leadership empowerment.

Finally, we extend the regression analysis by simultaneously incorporating both alternative female economic empowerment measures and female leadership empowerment measures within a single regression framework. In Panel C of Table 8, each regression includes one alternative female economic empowerment measure alongside one alternative female leader-

[18]The indicators are mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension. It identifies barriers to female economic participation and encourages reform of discriminatory laws.

ship empowerment measure. This dual inclusion allows for a more nuanced exploration of how these different dimensions of female empowerment—economic and leadership—interact and collectively influence IPO underpricing, thus further proving the robustness of our main findings.

Insert Table 8 here

6.3 Tests with Alternative Model Specifications

In our analysis so far, we control for industry and year fixed effects in all regressions following the literature (see, e.g., Baker et al., 2021; Banerjee et al., 2011; Boulton et al., 2010, 2011, 2017; Lin et al., 2013). We now include country fixed effects as an extra set of controls and present the results in models M1-M3 of Table 9. Our results remain robust to this specification. Then, we cluster standard errors at the country level and again at the year-industry level (Boulton et al., 2017; Chen et al., 2022a,b; Liu and Ritter, 2011) to ensure the statistical significance in our results is not driven by how standard errors are adjusted. For reference, standard errors are clustered at the country–industry level so far in the analysis. The results are shown in the models M4-M9 in Table 9, indicating that our main finding remain quantitatively similar.

Insert Table 9 here

6.4 Effect of Leadership Empowerment on Foreign Capital Flows and Underpricing

We contend that female leadership empowerment reduces apprehension among less-connected investors and increases their investment propensity. We now present a direct test of this conjecture. Drawing from previous research (see, e.g., Bekaert et al., 2005; Eichengreen, 2001; La Porta et al., 2002), we hypothesize that foreign investors, often considered "not-so-connected" investors, would benefit from enhanced female leadership empowerment if it actually leads to improved transparency and good governance. If this were the case, we expect

higher foreign capital flows into domestic equity markets, which, in turn, reduces the costs associated with attracting block holders. To investigate this channel, we use two measures of foreign capital flows. The first measure, *Net Capital Account*, is the natural logarithm of net capital account reported by the World Bank. Net capital account records acquisitions and disposals of non-produced non-financial assets such as land sold to embassies and sales of leases and licenses, as well as capital transfers including government debt forgiveness. The second measure, *FDI over GDP*, is a country's foreign direct investment divided by its GDP.

We first regress each of these measures of foreign capital flows on lagged female leadership empowerment, a measure of free flow of foreign capital, *Investment Freedom*, and several explanatory variables. We expect the coefficient estimate on lagged leadership empowerment measure to be positive and significant suggesting that female leadership empowerment in one period has a positive effect on inward capital flows in the subsequent period. Models M1 and M3 in Table 10 presents the results of this estimation using *Net Capital Account* and *FDI over GDP* as the measure of foreign capital flows, respectively. Results suggest a positive and statistically significant coefficient estimate on lagged female leadership empowerment at the 1% level in both cases.

Next, we use predicted values derived from the first stage regressions as the main independent variables in models M2 and M4 respectively. The dependent variable is IPO underpricing. As hypothesized, the coefficient estimate on *predicted (equity flow)* variable is negative and statistically significant at the 1% level in both models. This finding provides empirical support to the claim that female leadership empowerment, presumably through increased transparency and trust, shapes investor behavior in a way that reduces the cost of attracting block holders which, in turn, reduces underpricing.

Insert Table 10 here

7 Conclusion

Over the past two decades, our world has borne witness to remarkable advancements in the empowerment of female across a multitude of domains. From the hallowed halls of education to the bustling arenas of workforce participation, from the corridors of political power to the boardrooms of economic independence, female have been breaking through barriers, shattering glass ceilings, and carving out their rightful places in societies across the globe. These seismic shifts have ushered in a new era of inclusivity and progress, reshaping the very fabric of our societies and economies.

However, amid these remarkable strides in gender empowerment, there remained a domain cloaked in relative obscurity—the impact of female's empowerment on the intricate tapestry of financial activities. This pivotal nexus between gender empowerment and the dynamics of financial markets remained largely unexplored, prompting our research to embark on a journey to bridge this critical gap in knowledge. Our primary focus was to unravel the nuanced relationship between female's empowerment and one of the most intriguing empirical phenomena spanning the global financial landscape: IPO underpricing.

IPO underpricing, an enigmatic phenomenon witnessed worldwide over the past several decades, encapsulates a pivotal moment in the life of a company—the transition from private to public ownership. It entails the practice of offering shares to the public at a price lower than their actual market value on the day of the IPO. This strategic move is designed to entice investors, generate enthusiasm for the newly issued stocks, and ensure a successful debut in the stock market. However, the extent of underpricing varies significantly from one country to another, leading us to inquire into the factors that contribute to these cross-country variations, with a particular emphasis on gender-related dynamics.

Our research utilizes a vast array of data, encompassing a staggering 17,130 IPOs conducted across 52 diverse countries, spanning the years from 2006 to 2021. Within this treasure trove of information, we unearthed compelling evidence that lent substance to our inquiries. We discovered that countries boasting higher levels of economic empowerment among their female populace tended to exhibit a corresponding increase in IPO underpricing. In essence,

in societies where female were economically empowered, IPOs were more likely to be underpriced to a greater degree. This observation hints at the notion that female investors, in such environments, might demand higher returns as compensation for the perceived risks associated with investing in IPOs, thereby driving up the levels of underpricing.

Conversely, an intriguing pattern emerged when we examined the influence of leadership empowerment among female. In countries where female held more prominent leadership roles, particularly in the realms of politics and corporate governance, there was a distinct reduction in IPO underpricing. This finding illuminated the influential role that female in positions of power played in instilling confidence within the market, effectively mitigating investor concerns. In such environments, companies found themselves less compelled to resort to excessively generous IPO pricing strategies to attract investors.

In essence, our research serves as a beacon, guiding us through the labyrinthine landscape of factors that contribute to the variations in IPO underpricing observed across the diverse nations of our world. Moreover, it casts a spotlight on the profound implications of gender-based economic and leadership equality on the cost of taking a company public. These findings are not merely academic in nature; they hold the power to influence real-world decisions made by policymakers, investors, and corporate leaders. By underscoring the importance of fostering gender equality, not only as a matter of ethics but as a catalyst for more efficient and equitable financial markets, our research carries the promise of catalyzing meaningful progress toward gender equality within finance and society at large.

As we continue our journey through the ever-evolving global financial landscape, understanding these dynamics provides us with a compass, guiding us toward a future where gender empowerment is not just a headline but an integral component of prosperous and inclusive economies worldwide.

Appendix A: Variable Definitions

Following is the list of the variable descriptions.

IPO Underpricing	IPO underpricing is the percentage return from the offer price to the first closing price. We utilize Thomson Financial Securities Data Company (SDC) Platinum and DataStream databases for this calculation. The IPO issue date and offer price are obtained from the SDC Platinum database, and we identify the earliest closing price within one week after the IPO issue date in either the SDC or DataStream databases.
Economic Empowerment	Economic Empowerment is the ratio of female to male labor force participation rates. This variable is held constant at the country-year level in our sample period and a higher value indicates less economic inequality. The source of this index are the annual Human Development Reports published by the United Nations.
Leadership (or Political) Empowerment	Leadership Empowerment is an index that measures inequality between males and females at the highest level of political decision-making, ranging from 0 to 1. It quantifies the ratio of females to males in minister-level positions, parliamentary positions, and years in executive office (prime minister or president) over the past 50 years. Throughout our sample period, this variable remains constant at the country-year level. A higher value on the index signifies reduced gender inequality in political representation. The Global Gender Gap report, published annually by the World Economic Forum, is the source of this index.
Overall Empowerment	Overall Empowerment is an index that assesses gender inequality on four dimensions: economic empowerment, leadership empowerment, health empowerment, and education empowerment. Ranging from 0 to 1, this index measures the extent of inequality between males and females. Throughout our sample period, the value of this variable remains constant at the country-year level. A higher value on the index indicates reduced overall gender inequality. The Global Gender Gap report, published annually by the World Economic Forum, is the source of this index.
Log Offer Size	Log Offer Size is the logarithm value of IPO offer size in millions of dollars adjusted by CPI index, estimated based on SDC Platinum database (see, e.g., Beatty and Ritter, 1986; Smart and Zutter, 2003).
Integer Offer Price	Integer Offer Price is a indicator variable, which indicates one when the offer price is integer in home-country currency, estimated based on SDC Platinum database (see, e.g., Bradley et al., 2004).
Book Building	Book Building is a indicator variable, which indicates one when the underwriter chooses book-building as pricing technique, reported in SDC Platinum database (see, e.g., Sherman, 2005).
Equity Carve-Out	Equity Carve-Out is a indicator variable, which indicates one when the issue is a carve-out deal, reported in SDC Platinum database (see, e.g., Prezas et al., 2000).

Appendix A: Variable Definitions (Continued)

Venture Backed	Venture Backed is an indicator variable for IPOs that received venture capital funding, and zero otherwise, reported in SDC Platinum database (see, e.g., Barry et al., 1990; Loughran and Ritter, 2004).
Underwriter Reputation	Underwriter Reputation is a indicator variable equal to one if the investment bank underwriting the IPO is in the top quartile based on combined IPO proceeds, and zero otherwise, estimated based on SDC Platinum database (see, e.g., Beatty and Welch, 1996; Duong et al., 2022; Loughran and Ritter, 2004; Megginson and Weiss, 1991).
Market Return	Market Return is the cumulative local market return over last three month before the IPO issue date based on DataStream market index for each country (see, e.g., Ljungqvist et al., 2006; Ritter, 1984).
Market Volatility	Market Volatility is the standard deviation of stock market index returns for for each year and each country, estimated based on DataStream market index for each country (see, e.g., Lowry et al., 2010).
Market Size	Country-specific total market capitalization of stocks traded divided by GDP in the year of the IPO listing, estimated based on World Bank annual reports (see, e.g., Duong et al., 2021, 2022).
Stock Turnover	Stock Turnover is the ratio of total value of shares traded over stock market capitalization for each year and each country, estimated based on World Bank annual reports (see, e.g., Beck et al., 2000; Lowry and Shu, 2002).
IPO Activity	The ratio of the total number of IPOs in the issue year divided by the number of listed equities for the country and year of listing, estimated based on SDC Platinum database and World Bank annual reports (see, e.g., Baker et al., 2021; Ritter, 1984).
Analyst Following	Analyst Following is the median value of firm-year analyst following estimates in one country during the sample period from 2006 to 2021, based on I/B/E/S Summary Statistics database (see, e.g., Hope, 2003). Firm-year analyst following estimate is the number of analysts who follow one firm by issuing one-year-ahead EPS forecasts. This variable is held constant at the country-year level in our sample period.
Gender Ratio	Gender Ratio is calculated as the female population over total population for each country and each year, based on the World Bank annual reports.
GDP Per Capita	Gross domestic product per capita, reported by World Bank.
GDP Per Capita Growth	Annual growth in GDP per capita, reported by World Bank.

Appendix A: Variable Definitions (Continued)

Rule of Law	Country-specific index for the extent to which agents have confidence in and abide by the rules of society. The data source is La Porta et al. (1998).
Civil Law	A dummy variable equal to one if the IPO firm is listed in a civil law country, and zero otherwise. The data source is La Porta et al. (1998).
Female Income Ratio	The Female Income Ratio is a proxy for how much command women have over a country's economic resources. For each country, it is computed using female and male shares of the economically active population, the ratio of the female to male wages (both indicators are sourced from the ILO), gross domestic product valued at constant 2017 international dollars (IMF), and female and male shares of population (World Bank). The methodology used to compute this indicator is adapted from the methodology developed by the United Nations Development Programme's Human Development Report Office for computing the Gender Development Index (UNDP, 2020, pages 6-7). This variable remains constant at the country-year level throughout our sample period, with a higher value indicating higher female economic empowerment.
EPO Score	EPO score is an index ranging from 0 to 1 that captures economic inequality between males and females. It considers differences in labor force participation rates, remuneration gaps for similar work, and disparities in representation within technical jobs, legislators, senior officials, and managers. This variable remains constant at the country-year level throughout our sample period, with a higher value indicating reduced economic inequality. The Global Gender Gap report, published annually by the World Economic Forum, is the source of this index.
WBL Score	By measuring the laws and regulations that affect female economic opportunity in 190 economies and identifying barriers to female economic participation and encourages reform of discriminatory laws, WBL Score reflects state of female economic opportunities based on eight indicators: mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension. This variable remains constant at the country-year level throughout our sample period, with a higher value indicating higher female economic empowerment. The source of this score is the Women, Business and the Law Reports published by the World Bank.
Females on Boards	Females on Boards represents the percentage of board seats held by women. This variable remains constant at the country-year level throughout our sample period, with a higher value indicating higher female economic empowerment. The data source is MSCI ESG Research.

Appendix A: Variable Definitions (Continued)

Parliamentary Ratio	Parliamentary Ratio is the proportion of seats held by females in national parliaments, estimated based on World Bank annual reports. This variable is held constant at the country-year level in our sample period and a higher value indicates greater female leadership empowerment.
Investment Freedom	An index ranging from 0 to 100 that measures the ease of free flow of capital, especially foreign capital. The data source is the Index of Economic Freedom report published by the Heritage Foundation on an annual basis.
Net Capital Account	Net capital account reported by the World Bank records acquisitions and disposals of non-produced non-financial assets, such as land sold to embassies and sales of leases and licenses, as well as capital transfers, including government debt forgiveness. We use this measure as a proxy for foreign investments in a given country.
FDI Over GDP	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. FDI Over GDP shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors divided by its GDP.

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Table 1: Summary Statistics of IPO Underpricing by Country and Year

This table presents the summary statistics of IPO underpricing in two different aspects. Panel A details the mean and median values of IPO underpricing, along with the number of IPOs for each country in the full sample comprising 17,130 IPOs from 2006 to 2021. Panel B provides similar statistics but breaks down the data by year, offering insights into the annual trends in IPO underpricing. In both panels, IPO underpricing is defined as the percentage return from the offer price to the first closing price.

Panel A: Summary Statistics of IPO Underpricing by Country

	UnderPricingMean	UnderPricingMedian	No of IPOs
Argentina	35.77%	13.56%	14
Australia	19.09%	7.50%	881
Austria	5.64%	1.33%	19
Bangladesh	110.41%	142.00%	31
Belgium	4.05%	2.12%	67
Brazil	8.05%	1.10%	196
Bulgaria	21.23%	6.67%	12
Canada	29.71%	9.00%	1,003
Chile	4.14%	2.06%	20
China	38.87%	43.96%	3,690
Cyprus	8.88%	4.87%	14
Denmark	16.86%	3.24%	72
Egypt	12.27%	7.77%	18
Finland	6.10%	4.78%	66
France	3.73%	0.26%	360
Germany	8.06%	1.11%	223
Greece	8.27%	-0.38%	25
India	13.63%	3.50%	934
Indonesia	32.88%	34.49%	366
Ireland	9.58%	7.45%	46
Israel	25.02%	4.67%	94
Italy	9.50%	1.95%	206
Japan	35.56%	20.83%	1,027
Jordan	46.56%	32.00%	27
Kuwait	84.81%	59.22%	11
Luxembourg	7.77%	2.40%	38
Malaysia	19.39%	10.00%	325
Mexico	28.48%	2.34%	46
Morocco	5.42%	1.54%	13
Netherlands	3.97%	0.64%	67
New Zealand	6.22%	5.00%	51
Norway	3.03%	0.80%	148
Pakistan	6.85%	0.18%	24
Philippines	9.76%	3.23%	64
Poland	30.68%	11.11%	177
Russia	8.24%	0.32%	53
Saudi Arabia	60.90%	26.00%	55
Singapore	21.32%	6.63%	337
South Africa	20.71%	7.39%	60
South Korea	28.72%	12.14%	960
Spain	4.90%	2.22%	66
Sri Lanka	30.42%	9.95%	20
Sweden	13.63%	4.98%	246
Switzerland	11.58%	5.76%	78
Thailand	32.97%	13.04%	345
Tunisia	18.91%	7.78%	14
Turkey	12.86%	4.98%	148
Ukraine	3.06%	2.96%	10
United Kingdom	13.96%	6.82%	962
United States	12.04%	1.80%	3,338
Utd Arab Em	19.57%	4.62%	21
Vietnam	16.51%	-0.08%	42
Overall	23.25%	8.00%	17,130

Panel B: Summary Statistics of IPO Underpricing by Year

	No of IPOs	UnderPricingMean	UnderPricingMedian
2006	1,424	22.80%	8.06%
2007	1,539	31.19%	9.38%
2008	615	24.33%	4.50%
2009	540	31.11%	11.56%
2010	1,224	24.15%	9.19%
2011	1,065	16.43%	4.68%
2012	844	20.13%	6.90%
2013	737	17.15%	4.69%
2014	983	18.29%	5.62%
2015	1,064	20.71%	9.35%
2016	868	24.11%	15.72%
2017	1,427	27.16%	20.00%
2018	1,118	20.91%	6.00%
2019	1,030	27.76%	13.38%
2020	1,212	27.54%	6.80%
2021	1,440	16.89%	3.64%
Overall	17,130	23.25%	8.00%

Table 2: Country-Level Variables of Main Interests

This table presents country-level variables related to female empowerment in a full sample of 17,130 IPOs from 2006 to 2021. Panel A focuses on main measures: Economic Empowerment (ratio of female to male labor force participation), Leadership Empowerment (an index of inequality in political decision-making), and Overall Empowerment (an index across four dimensions including economic and leadership empowerment). Panel B introduces alternative measures: Economic Empowerment is assessed through Female Income Ratio, EPO Score, and WBL Score, capturing income equality and economic opportunities, while Leadership Empowerment is evaluated using Females on Boards and Parliamentary Ratio, highlighting women's representation in corporate and political spheres. Detailed variable definitions are presented in Appendix A.

Panel A: Country-Level Main Measures of Female Empowerment

	Economic Empowerment	Leadership Empowerment	Overall Empowerment
Argentina	0.673	0.300	0.718
Australia	0.825	0.183	0.724
Austria	0.809	0.274	0.706
Bangladesh	0.461	0.461	0.703
Belgium	0.797	0.278	0.734
Brazil	0.722	0.098	0.678
Bulgaria	0.818	0.192	0.712
Canada	0.870	0.223	0.740
Chile	0.638	0.218	0.683
China	0.821	0.149	0.680
Cyprus	0.806	0.083	0.662
Denmark	0.882	0.369	0.771
Egypt	0.310	0.073	0.606
Finland	0.891	0.579	0.836
France	0.837	0.245	0.717
Germany	0.815	0.392	0.766
Greece	0.690	0.094	0.671
India	0.301	0.356	0.648
Indonesia	0.625	0.156	0.677
Ireland	0.784	0.407	0.772
Israel	0.846	0.195	0.709
Italy	0.676	0.224	0.692
Japan	0.705	0.072	0.653
Jordan	0.280	0.055	0.619
Kuwait	0.540	0.026	0.638
Luxembourg	0.791	0.185	0.715
Malaysia	0.608	0.062	0.657
Mexico	0.549	0.213	0.677
Morocco	0.334	0.080	0.585
Netherlands	0.825	0.352	0.751
New Zealand	0.843	0.390	0.780
Norway	0.900	0.565	0.833
Pakistan	0.269	0.141	0.552
Philippines	0.635	0.339	0.774
Poland	0.759	0.172	0.702
Russia	0.823	0.070	0.694
Saudi Arabia	0.268	0.035	0.578
Singapore	0.755	0.112	0.691
South Africa	0.768	0.387	0.749
South Korea	0.706	0.104	0.643
Spain	0.786	0.381	0.746
Sri Lanka	0.453	0.295	0.705
Sweden	0.901	0.501	0.818
Switzerland	0.839	0.325	0.754
Thailand	0.794	0.074	0.697
Tunisia	0.354	0.140	0.631
Turkey	0.412	0.095	0.610
Ukraine	0.791	0.058	0.685
United Kingdom	0.825	0.331	0.751
United States	0.822	0.186	0.734
Utd Arab Em	0.500	0.140	0.640
Vietnam	0.892	0.124	0.698
Overall	0.758	0.197	0.703

Panel B: Country-Level Alternative Measures of Female Empowerment

	Alternative Economic Empowerment			Alternative Leadership Empowerment	
	Female Income Ratio	EPO Score	WBL Score	Females on Boards	Parliamentary Ratio
Argentina	0.480	0.598	0.722	0.111	0.376
Australia	0.727	0.741	0.862	0.223	0.264
Austria	0.456	0.589	0.880	0.187	0.327
Bangladesh	0.478	0.450	0.488		0.202
Belgium	0.634	0.682	0.914	0.247	0.372
Brazil	0.564	0.648	0.818	0.118	0.115
Bulgaria	0.659	0.687	0.913		0.220
Canada	0.716	0.762	0.978	0.205	0.246
Chile	0.451	0.540	0.746	0.049	0.153
China	0.638	0.667	0.732	0.098	0.229
Cyprus	0.557	0.606	0.876	0.275	0.131
Denmark	0.758	0.742	0.978	0.274	0.385
Egypt	0.277	0.434	0.433	0.069	0.139
Finland	0.746	0.787	0.971	0.324	0.425
France	0.668	0.643	0.964	0.313	0.231
Germany	0.660	0.707	0.911	0.220	0.328
Greece	0.522	0.620	0.810	0.083	0.159
India	0.255	0.388	0.678	0.126	0.118
Indonesia	0.474	0.612	0.644	0.067	0.183
Ireland	0.629	0.709	0.956	0.175	0.165
Israel	0.602	0.676	0.790	0.208	0.234
Italy	0.530	0.577	0.932	0.320	0.296
Japan	0.518	0.576	0.779	0.058	0.095
Jordan	0.295	0.469	0.273		0.070
Kuwait	0.434	0.583	0.265		0.037
Luxembourg	0.799	0.706	0.965	0.199	0.262
Malaysia	0.495	0.605	0.484	0.164	0.113
Mexico	0.442	0.526	0.809	0.067	0.348
Morocco	0.281	0.412	0.731		0.148
Netherlands	0.632	0.689	0.948	0.238	0.377
New Zealand	0.654	0.759	0.922	0.238	0.341
Norway	0.832	0.795	0.963	0.400	0.406
Pakistan	0.213	0.328	0.461	0.076	0.210
Philippines	0.630	0.778	0.757	0.109	0.245
Poland	0.602	0.656	0.779	0.136	0.229
Russian	0.620	0.730	0.731	0.070	0.137
Saudi Arabia	0.221	0.330	0.356	0.019	0.094
Singapore	0.762	0.738	0.747	0.114	0.240
South Africa	0.539	0.646	0.830	0.192	0.409
South Korea	0.473	0.530	0.836	0.031	0.160
Spain	0.582	0.635	0.968	0.173	0.387
Sri Lanka	0.404	0.564	0.656		0.055
Sweden	0.829	0.802	0.993	0.355	0.452
Switzerland	0.783	0.733	0.850	0.192	0.322
Thailand	0.710	0.747	0.739	0.120	0.110
Tunisia	0.296	0.456	0.563		0.271
Turkey	0.344	0.434	0.808	0.140	0.142
Ukraine	0.573	0.711	0.746		0.082
United Kingdom	0.628	0.704	0.943	0.234	0.256
United States	0.756	0.779	0.864	0.216	0.214
Utd Arab Em	0.376	0.466	0.312	0.039	0.232
Vietnam	0.747	0.740	0.738		0.262
Overall	0.628	0.672	0.812	0.158	0.215

Table 3: Summary Statistics of Variables

This table presents the mean, quartiles, and standard deviation of the variables in the full sample with 17,130 IPOs from 2006 to 2021. IPO Underpricing is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Overall Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females along four dimensions - economic empowerment, leadership empowerment, health empowerment and education empowerment. Log offer size is the logarithm value of IPO offer size. Integer offer price indicates one when offer price is integer in home-country currency. Book building indicates one when the underwriter chooses book-building as pricing technique. Equity carve-out indicates one when the issue is a carve-out deal. Venture backed is an indicator variable for IPOs that received venture capital funding, and zero otherwise. Underwriter reputation is a dummy variable equal to one if the investment bank underwriting the IPO is in the top quartile based on combined IPO proceeds, and zero otherwise. Market return is the cumulative local market return over last three month before the IPO issue date. Market volatility is the standard deviation of stock market index returns for for each year and each country. Market size is country-specific total market capitalization of stocks traded divided by GDP in the year of the IPO listing. Stock turnover is the ratio of total value of shares traded over stock market capitalization for each year and each country. IPO activity is the ratio of the total number of IPOs in the issue year divided by the number of listed equities for the country and year of listing. Analyst following is the median value of firm-year analyst following estimates. Gender ratio is calculated as the female population over total population for each country and each year. GDP per capita is gross domestic product per capita for each year and each country. GDP per capita growth is annual growth in GDP per capita for each year and each country.

Variable	Mean	Q1	Median	Q3	Std	N
IPO Underpricing	0.233	0.004	0.080	0.400	0.393	17,130
Economic Empowerment	0.758	0.724	0.815	0.825	0.145	14,478
Leadership Empowerment	0.197	0.122	0.160	0.256	0.116	16,100
Overall Empowerment	0.703	0.673	0.700	0.738	0.047	16,100
5 Alternative Measures						
Female Income Ratio	0.628	0.562	0.640	0.680	0.165	16,091
EPO Score	0.672	0.624	0.693	0.754	0.112	16,100
WBL Score	0.812	0.756	0.819	0.913	0.119	17,130
Females on Boards	0.158	0.085	0.126	0.234	0.098	12,010
Parliamentary Ratio	0.215	0.168	0.213	0.249	0.079	17,127
Deal Characteristics						
Log Offer Size	3.280	1.931	3.549	4.825	2.142	17,130
Integer Offer Price	0.602	0.000	1.000	1.000	0.489	17,130
Book Building	0.991	1.000	1.000	1.000	0.095	17,130
Equity Carveout	0.209	0.000	0.000	0.000	0.406	17,130
Venture Backed	0.212	0.000	0.000	0.000	0.409	17,130
Underwriter Reputation	0.608	0.000	1.000	1.000	0.488	17,130
Market Characteristics						
Market Return	0.033	-0.013	0.033	0.074	0.090	17,130
Market Volatility	0.045	0.028	0.038	0.055	0.023	17,130
Market Size	0.996	0.662	0.954	1.328	0.464	15,690
Stock Turnover	1.303	0.660	1.161	1.956	0.858	15,690
IPO Activity	0.058	0.027	0.042	0.078	0.047	15,690
Country Characteristics						
Analyst Following	3.120	2.000	2.500	4.000	1.871	17,130
Gender Ratio	0.456	0.486	0.500	0.506	0.139	17,130
GDP Per Capita (US$)	30,452	8,016	35,992	48,383	22,241	15,690
GDP Per Capita Growth	0.030	0.011	0.021	0.057	0.037	15,690

Table 4: Correlation Coefficients of Variables

This table presents the correlation coefficients of the variables in the full sample with 17,130 IPOs from 2006 to 2021. IPO Underpricing is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Overall Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females along four dimensions - economic empowerment, leadership empowerment, health empowerment and education empowerment. Other variable definitions are presented in Appendix A.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
(1) IPO Underpricing	1.000									
(2) Economic Empowerment	0.034	1.000								
(3) Leadership Empowerment	-0.157	-0.112	1.000							
(4) Overall Empowerment	-0.168	0.573	0.673	1.000						
(5) Log Offer Size	-0.156	0.238	-0.021	0.175	1.000					
(6) Integer Offer Price	-0.146	-0.231	0.122	0.039	0.189	1.000				
(7) Book Building	-0.014	0.005	0.010	0.010	0.026	-0.006	1.000			
(8) Equity Carveout	0.005	-0.038	-0.029	-0.054	-0.048	-0.033	0.043	1.000		
(9) Venture Backed	0.130	0.103	-0.171	-0.125	0.085	0.023	0.006	-0.005	1.000	
(10) Underwriter Reputation	0.005	0.191	-0.124	-0.013	0.401	0.117	0.006	-0.020	0.197	1.000
(11) Market Return	0.121	-0.012	0.004	-0.026	0.100	-0.008	0.006	-0.006	0.016	0.045
(12) Market Volatility	0.173	-0.026	-0.138	-0.259	0.033	-0.127	0.015	0.002	0.054	0.079
(13) Market Size	-0.033	0.135	-0.050	0.246	0.078	0.121	0.000	-0.035	-0.053	-0.006
(14) Stock Turnover	0.091	0.268	-0.233	-0.145	0.158	-0.164	0.035	-0.007	0.250	0.243
(15) IPO Activity	0.130	0.271	-0.136	-0.051	0.141	-0.250	0.016	-0.004	0.149	0.182
(16) Analyst Following	-0.234	0.049	0.044	0.133	0.296	0.136	0.027	-0.023	-0.014	0.026
(17) Gender Ratio	0.038	0.338	-0.269	-0.206	-0.133	-0.112	-0.015	0.040	0.048	-0.053
(18) GDP Per Capita	-0.178	0.424	0.160	0.612	0.135	0.216	-0.008	-0.040	-0.043	0.000
(19) GDP Per Capita Growth	0.169	-0.069	-0.142	-0.344	0.020	-0.239	0.008	0.009	0.110	0.088

	(11)	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**	**(19)**
(11) Market Return	1.000								
(12) Market Volatility	0.150	1.000							
(13) Market Size	0.131	-0.232	1.000						
(14) Stock Turnover	0.112	0.399	-0.243	1.000					
(15) IPO Activity	0.108	0.229	-0.136	0.394	1.000				
(16) Analyst Following	-0.039	-0.043	0.080	0.000	-0.023	1.000			
(17) Gender Ratio	-0.120	0.126	0.127	-0.134	-0.251	-0.052	1.000		
(18) GDP Per Capita	-0.066	-0.353	0.555	-0.191	-0.279	0.150	0.433	1.000	
(19) GDP Per Capita Growth	0.123	0.197	-0.351	0.250	0.517	-0.067	-0.396	-0.610	1.000

Table 5: Female Empowerment and IPO Underpricing

This table presents the baseline regression results of the association between female empowerment and IPO underpricing in the full sample with 17,130 IPOs from 2006 to 2021. The dependent variable is IPO underpricing, which is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Overall Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females along four dimensions - economic empowerment, leadership empowerment, health empowerment and education empowerment. Log offer size is the logarithm value of IPO offer size. Integer offer price indicates one when offer price is integer in home-country currency. Book building indicates one when the underwriter chooses book-building as pricing technique. Equity carve-out indicates one when the issue is a carve-out deal. Venture backed is an indicator variable for IPOs that received venture capital funding, and zero otherwise. Underwriter reputation is a dummy variable equal to one if the investment bank underwriting the IPO is in the top quartile based on combined IPO proceeds, and zero otherwise. Market return is the cumulative local market return over last three month before the IPO issue date. Market volatility is the standard deviation of stock market index returns for for each year and each country. Market size is country-specific total market capitalization of stocks traded divided by GDP in the year of the IPO listing. Stock turnover is the ratio of total value of shares traded over stock market capitalization for each year and each country. IPO activity is the ratio of the total number of IPOs in the issue year divided by the number of listed equities for the country and year of listing. Analyst following is the median value of firm-year analyst following estimates. Gender ratio is calculated as the female population over total population for each country and each year. GDP per capita is gross domestic product per capita for each year and each country. GDP per capita growth is annual growth in GDP per capita for each year and each country. t-values are reported in parentheses. ***, ** and * stand for statistical significance based on a two-sided t test at the 1%, 5% and 10% level, respectively. Standard errors are clustered at the country-industry level. All regressions control for year fixed effects and industry fixed effects.

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13
Economic Empowerment		0.120***	0.088***	0.328***				0.076***	0.080***	0.288***			
		(5.28)	(3.64)	(4.33)				(3.26)	(3.20)	(4.92)			
Leadership Empowerment					-0.544***	-0.468***	-0.401***	-0.542***	-0.469***	-0.399***			
					(-6.24)	(-6.72)	(-4.92)	(-17.03)	(-14.51)	(-5.00)			
Overall Empowerment											-1.195***	-0.990***	-0.452*
											(-5.22)	(-5.00)	(-1.79)
Log Offer Size	-0.021***		-0.031***	-0.025***		-0.027***	-0.021***		-0.031***	-0.026***		-0.023***	-0.019***
	(-3.75)		(-18.22)	(-4.94)		(-5.23)	(-4.14)		(-17.76)	(-5.17)		(-3.96)	(-3.64)
Integer Offer Price	-0.038		-0.084***	-0.008		-0.072**	-0.032		-0.073***	-0.004		-0.088***	-0.044**
	(-1.62)		(-12.10)	(-0.44)		(-2.37)	(-1.48)		(-10.16)	(-0.20)		(-2.95)	(-1.99)
Book Building	-0.035		-0.043	-0.038		-0.013	-0.009		-0.019	-0.012		-0.017	-0.017
	(-1.15)		(-1.38)	(-1.16)		(-0.38)	(-0.26)		(-0.55)	(-0.39)		(-0.53)	(-0.51)
Equity Carveout	-0.006		-0.010	-0.006		-0.011	-0.007		-0.014*	-0.009		-0.013	-0.007
	(-0.85)		(-1.27)	(-0.88)		(-1.19)	(-0.94)		(-1.73)	(-1.08)		(-1.38)	(-0.94)
Venture Backed	0.085***		0.080***	0.072***		0.068***	0.063***		0.052***	0.050***		0.079***	0.073***
	(4.76)		(9.80)	(4.09)		(3.74)	(3.67)		(6.14)	(2.92)		(3.86)	(3.81)
Underwriter Reputation	0.029		0.062***	0.024		0.042**	0.019		0.047***	0.015		0.048**	0.025
	(1.45)		(8.67)	(1.15)		(2.22)	(1.15)		(6.27)	(0.87)		(2.37)	(1.44)
Market Return	0.003***			0.003***			0.003***			0.003***			0.003***
	(3.04)			(2.95)			(3.77)			(3.68)			(3.65)
Market Volatility	2.430***			3.285***			2.481***			3.276***			2.258***
	(6.57)			(6.28)			(6.78)			(6.67)			(6.35)
Market Size	0.067***			0.069***			0.044***			0.049***			0.066***
	(4.35)			(4.51)			(2.78)			(3.17)			(4.14)
Stock Turnover	0.001			-0.019*			-0.009			-0.027***			0.001
	(0.07)			(-1.86)			(-0.94)			(-2.63)			(0.10)
IPO Activity	0.075			0.017			0.078			0.060			0.159
	(0.34)			(0.11)			(0.38)			(0.38)			(0.72)
Analyst Following	-0.038***			-0.036***			-0.038***			-0.037***			-0.039***
	(-4.68)			(-4.62)			(-5.22)			(-5.24)			(-5.11)
Gender Ratio	0.397			-0.618			0.160			-0.650			0.646
	(0.56)			(-0.96)			(0.26)			(-1.07)			(0.88)
GDP Per Capita	-0.000			-0.000***			0.000			-0.000*			-0.000
	(-1.06)			(-3.48)			(0.09)			(-1.74)			(-0.10)
GDP Per Capita Growth	0.014**			0.007			0.015**			0.009*			0.015**
	(2.24)			(1.46)			(2.29)			(1.83)			(2.17)
Constant	0.026	0.145***	0.305***	0.327	0.337***	0.430***	0.211	0.275***	0.382***	0.425	1.070***	1.030***	0.191
	(0.07)	(8.29)	(8.36)	(0.98)	(10.17)	(10.31)	(0.67)	(14.15)	(9.47)	(1.33)	(6.24)	(7.53)	(0.53)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,687	14,476	14,476	14,476	16,098	16,098	14,657	13,446	13,446	13,446	16,098	16,098	14,657
Adjusted R-squared	0.164	0.046	0.087	0.172	0.078	0.106	0.176	0.065	0.100	0.185	0.073	0.102	0.168

Table 6: Cross-sectional Analysis

This table presents the cross-sectional analysis of the association between female empowerment and IPO underpricing from 2006 to 2021. M1 and M2 present the effect of IPO certification on the relation between female economic empowerment and IPO underpricing. M3 and M4 present the effect of country institutions on the relation between female leadership empowerment and IPO underpricing. The dependent variable is IPO underpricing, which is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Underwriter Reputation is a dummy variable equal to one if the investment bank underwriting the IPO is in the top quartile based on combined IPO proceeds, and zero otherwise. Venture Backed is an indicator variable for IPOs that received venture capital funding, and zero otherwise. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Rule of Law is a country-specific index for the extent to which agents have confidence in and abide by the rules of society. Civil Law is a dummy variable equal to one if the IPO firm is listed in a civil law country, and zero otherwise. Other variable definitions are presented in Appendix A. t-values are reported in parentheses. ***, ** and * stand for statistical significance based on a two-sided t test at the 1%, 5% and 10% level, respectively. Standard errors are clustered at the country-industry level. All regressions control for year fixed effects and industry fixed effects.

	IPO Certification		Investor Protection	
	M1	M2	M3	M4
Economic Empowerment	0.388***	0.367***		
	(9.11)	(5.09)		
Economic Empowerment×Underwriter Reputation	-0.171**			
	(-2.11)			
Underwriter Reputation	0.162**			
	(2.48)			
Economic Empowerment×Venture Backed		-0.365**		
		(-1.99)		
Venture Backed		0.361**		
		(2.45)		
Leadership Empowerment			-0.976***	-0.268***
			(-8.78)	(-5.80)
Leadership Empowerment×Rule of Law			0.081***	
			(5.94)	
Rule of Law			-0.015***	
			(-3.25)	
Leadership Empowerment×Civil Law				-0.227***
				(-3.64)
Civil Law				0.091***
				(6.04)
Deal-related Controls	Yes	Yes	Yes	Yes
Market-related Controls	Yes	Yes	Yes	Yes
Country-related Controls	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	14,476	14,476	10,903	14,657
Adjusted R-squared	0.168	0.173	0.147	0.158

Table 7: Subsample Robustness

This table presents the subsample robustness tests of of the association between female empowerment and IPO underpricing from 2006 to 2021. M1 presents the results in the sample excluding U.S. IPOs. M2 presents the results in the sample excluding U.S., U.K., and Canadian IPOs. M3 presents the results in the sample excluding U.S. and western European nations. These countries include United States, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Spain, Sweden and United Kingdom. M4 presents the results in the sample excluding countries with below median number of IPOs . M5 presents the results in the sample excluding IPOs from the year 2007 and 2008. M6 presents the results in the sample excluding IPOs with below 25th quartile value of female overall empowerment. The dependent variable is IPO underpricing, which is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Other variable definitions are presented in Appendix A. t-values are reported in parentheses. ***, ** and * stand for statistical significance based on a two-sided t test at the 1%, 5% and 10% level, respectively. Standard errors are clustered at the country-industry level. All regressions control for year fixed effects and industry fixed effects.

	M1	M2	M3	M4	M5	M6
Economic Empowerment	0.296***	0.229***	0.311***	0.355***	0.285***	0.155*
	(4.92)	(3.89)	(4.46)	(5.58)	(5.35)	(1.70)
Leadership Empowerment	-0.411***	-0.442***	-0.444***	-0.307***	-0.403***	-0.166**
	(-4.56)	(-5.12)	(-3.75)	(-3.70)	(-5.03)	(-2.48)
Log Offer Size	-0.029***	-0.021***	-0.038***	-0.027***	-0.028***	-0.024***
	(-5.90)	(-5.49)	(-7.46)	(-5.34)	(-5.46)	(-3.53)
Integer Offer Price	-0.004	0.021	-0.012	-0.007	0.008	-0.026
	(-0.22)	(0.93)	(-0.56)	(-0.34)	(0.50)	(-1.64)
Book Building	-0.011	-0.013	-0.015	-0.011	-0.011	-0.048
	(-0.34)	(-0.39)	(-0.41)	(-0.30)	(-0.34)	(-1.46)
Equity Carveout	-0.009	-0.008	-0.012	-0.006	-0.007	-0.020**
	(-0.99)	(-0.90)	(-1.17)	(-0.67)	(-0.88)	(-2.73)
Venture Backed	0.034**	0.029**	0.042**	0.048***	0.049***	0.047*
	(2.28)	(2.10)	(2.50)	(2.80)	(2.86)	(1.98)
Underwriter Reputation	0.038**	0.044**	0.044**	0.021	0.006	-0.005
	(2.30)	(2.39)	(2.36)	(1.15)	(0.43)	(-0.68)
Market Return	0.003***	0.003***	0.003***	0.002***	0.002***	0.002**
	(3.24)	(2.95)	(3.10)	(3.34)	(3.21)	(2.07)
Market Volatility	3.702***	3.891***	4.061***	2.284***	1.952***	1.774**
	(7.19)	(6.96)	(6.98)	(4.51)	(3.75)	(2.55)
Market Size	0.039***	0.042***	0.006	0.100***	0.026*	0.090***
	(2.59)	(2.87)	(0.42)	(4.96)	(1.69)	(6.39)
Stock Turnover	-0.036***	-0.037***	-0.059***	-0.009	-0.012	-0.006
	(-2.97)	(-2.90)	(-5.30)	(-0.99)	(-1.32)	(-0.69)
IPO Activity	0.015	0.264*	0.221	-0.157	0.162	0.215
	(0.09)	(1.72)	(1.10)	(-0.96)	(1.11)	(1.20)
Analyst Following	-0.052***	-0.050***	-0.061***	-0.036***	-0.032***	-0.026***
	(-7.73)	(-7.33)	(-5.92)	(-5.03)	(-4.74)	(-4.16)
Gender Ratio	-0.654	-0.444	-0.461	3.461**	-0.022	0.966**
	(-1.09)	(-0.78)	(-0.79)	(2.53)	(-0.04)	(2.10)
GDP Per Capita	-0.000	-0.000*	-0.000	-0.000***	-0.000***	-0.000***
	(-1.32)	(-1.80)	(-0.57)	(-2.84)	(-2.97)	(-4.77)
GDP Per Capita Growth	0.009*	0.008	0.008*	0.023***	0.003	0.011***
	(1.94)	(1.51)	(1.76)	(3.94)	(0.81)	(3.97)
Constant	0.467	0.355	0.445	-1.735**	0.198	-0.277
	(1.48)	(1.19)	(1.41)	(-2.48)	(0.71)	(-1.12)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,304	9,655	9,301	12,787	11,292	9,650
Adjusted R-squared	0.199	0.198	0.202	0.193	0.155	0.165

Table 8: Alternative Female Empowerment Measures

This table presents regression results from 2006 to 2021 on the relationship between female empowerment and IPO underpricing, segmented into three panels for robustness tests using alternative female empowerment measures. Panel A examines the impact using alternative female economic empowerment measures, including Female Income Ratio (the average income of females with that of males within a nation), EPO Score (a measure of economic inequality between males and females), and WBL Score (reflects state of female economic opportunities based on eight indicators: mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension). Panel B explores the effects through alternative female leadership empowerment measures, namely Females on Boards (quantifies the proportion of corporate board seats occupied by women at the country-year level) and Parliamentary Ratio (the proportion of seats held by females in national parliaments). Panel C combines analyses from Panels A and B, integrating one alternative female economic empowerment measure (such as Female Income Ratio, EPO Score, or WBL Score) and one female leadership empowerment measure (such as Females on Boards or Parliamentary Ratio) in the same regression. The dependent variable across all panels is IPO underpricing, defined as the percentage return from the offer price to the first closing price. Detailed definitions of all variables are available in Appendix A. t-values are reported in parentheses, and significance levels are indicated as ***, **, and * for 1%, 5%, and 10% levels, respectively.

Panel A: Alternative Female Economic Empowerment Measures

	Female Income Ratio		EPO Score		WBL Score	
	M1	M2	M3	M4	M5	M6
Female Income Ratio	0.223***	0.227***				
	(2.90)	(3.33)				
EPO Score			0.254**	0.279***		
			(2.03)	(2.66)		
WBL Score					0.142***	0.129***
					(3.38)	(2.65)
Leadership Empowerment		-0.404***		-0.410***		-0.403***
		(-5.08)		(-5.13)		(-11.30)
Log Offer Size	-0.023***	-0.023***	-0.023***	-0.024***	-0.019***	-0.019***
	(-4.27)	(-4.70)	(-4.35)	(-4.75)	(-11.38)	(-11.06)
Integer Offer Price	-0.022	-0.015	-0.025	-0.016	-0.046***	-0.036***
	(-1.12)	(-0.76)	(-1.23)	(-0.81)	(-6.90)	(-5.10)
Book Building	-0.021	-0.010	-0.020	-0.009	-0.033	-0.011
	(-0.66)	(-0.31)	(-0.63)	(-0.29)	(-1.08)	(-0.32)
Equity Carveout	-0.005	-0.006	-0.003	-0.004	-0.009	-0.009
	(-0.61)	(-0.81)	(-0.45)	(-0.62)	(-1.22)	(-1.26)
Venture Backed	0.077***	0.063***	0.077***	0.063***	0.083***	0.064***
	(3.74)	(3.54)	(3.85)	(3.65)	(10.54)	(7.80)
Underwriter Reputation	0.028	0.019	0.028	0.019	0.033***	0.022***
	(1.54)	(1.17)	(1.54)	(1.17)	(4.88)	(3.09)
Market Return	0.003***	0.003***	0.003***	0.003***	0.004***	0.005***
	(4.07)	(4.11)	(3.94)	(4.01)	(12.38)	(13.06)
Market Volatility	2.418***	2.616***	2.437***	2.651***	2.433***	2.569***
	(6.88)	(7.46)	(6.90)	(7.45)	(7.11)	(7.08)
Market Size	0.064***	0.037**	0.063***	0.035**	0.061***	0.052***
	(4.17)	(2.41)	(4.08)	(2.33)	(6.77)	(5.70)
Stock Turnover	0.001	-0.012	0.002	-0.011	0.014***	0.002
	(0.12)	(-1.35)	(0.22)	(-1.24)	(3.11)	(0.39)
IPO Activity	-0.128	-0.127	-0.084	-0.095	0.565***	0.560***
	(-0.57)	(-0.56)	(-0.39)	(-0.43)	(6.93)	(6.88)
Analyst Following	-0.039***	-0.038***	-0.039***	-0.038***	-0.038***	-0.038***
	(-5.08)	(-5.24)	(-5.08)	(-5.24)	(-22.32)	(-22.03)
Gender Ratio	-0.058	-0.305	-0.076	-0.367	0.132	-0.952***
	(-0.09)	(-0.50)	(-0.11)	(-0.59)	(0.47)	(-3.17)
GDP Per Capita	-0.000***	-0.000*	-0.000**	-0.000	-0.000***	-0.000***
	(-3.12)	(-1.77)	(-2.36)	(-1.22)	(-7.17)	(-8.71)
GDP Per Capita Growth	0.012**	0.013**	0.013**	0.013**	0.012**	0.013**
	(2.13)	(2.28)	(2.06)	(2.20)	(2.18)	(2.31)
Constant	0.151	0.353	0.116	0.329	0.415***	0.830***
	(0.43)	(1.14)	(0.33)	(1.05)	(3.17)	(5.96)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,648	14,648	14,657	14,657	15,687	14,657
Adjusted R-squared	0.170	0.179	0.169	0.178	0.150	0.160

Panel B: Alternative Female Leadership Empowerment Measures

	Females on Boards		Parliamentary Ratio	
	M1	M2	M3	M4
Females on Boards	-0.731***	-0.758***		
	(-6.20)	(-5.52)		
Parliamentary Ratio			-0.277**	-0.551***
			(-2.27)	(-4.29)
Economic Parity		0.381***		0.465***
		(6.13)		(6.38)
Log Offer Size	-0.019***	-0.026***	-0.019***	-0.024***
	(-3.64)	(-4.83)	(-3.68)	(-4.90)
Integer Offer Price	-0.058***	-0.021*	-0.048**	-0.017
	(-3.78)	(-1.69)	(-2.20)	(-0.95)
Book Building	-0.009	-0.017	-0.028	-0.024
	(-0.24)	(-0.47)	(-0.94)	(-0.77)
Equity Carveout	-0.008	-0.011	-0.005	-0.005
	(-1.09)	(-1.54)	(-0.79)	(-0.71)
Venture Backed	0.077***	0.061***	0.080***	0.061***
	(5.05)	(4.16)	(4.78)	(4.01)
Underwriter Reputation	0.008	-0.002	0.026	0.014
	(0.49)	(-0.09)	(1.33)	(0.74)
Market Return	0.002	0.002	0.003***	0.003***
	(1.40)	(1.49)	(3.02)	(3.00)
Market Volatility	-0.187	0.982**	2.467***	3.399***
	(-0.42)	(1.98)	(6.62)	(6.68)
Market Size	0.056***	0.052***	0.055***	0.049***
	(3.01)	(2.79)	(3.55)	(3.24)
Stock Turnover	0.015	-0.009	-0.001	-0.026***
	(1.05)	(-0.83)	(-0.10)	(-2.61)
IPO Activity	0.880***	0.671***	0.190	0.130
	(3.71)	(3.75)	(0.85)	(0.76)
Analyst Following	-0.029***	-0.026***	-0.038***	-0.036***
	(-4.16)	(-3.76)	(-4.74)	(-4.74)
Gender Ratio	2.984***	1.388	0.388	-1.026*
	(3.22)	(1.38)	(0.56)	(-1.74)
GDP Per Capita	-0.000	-0.000***	-0.000	-0.000**
	(-0.82)	(-3.14)	(-0.00)	(-2.40)
GDP Per Capita Growth	-0.002	-0.007*	0.015**	0.007
	(-0.46)	(-1.79)	(2.34)	(1.51)
Constant	-1.082**	-0.520	0.073	0.535*
	(-2.34)	(-1.07)	(0.21)	(1.74)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	10,575	9,370	15,684	14,473
Adjusted R-squared	0.160	0.167	0.166	0.179

Panel C: Alternative Female Economic and Leadership Empowerment Measures						
	M1	M2	M3	M4	M5	M6
Female Income Ratio	0.148**	0.268***				
	(2.24)	(3.48)				
EPO Score			0.376***	0.365***		
			(3.66)	(3.01)		
WBL Score					0.169***	0.296**
					(3.25)	(2.35)
Females on Boards	-0.751***		-0.816***		-0.783***	
	(-6.28)		(-6.94)		(-13.55)	
Parliamentary Ratio		-0.384***		-0.418***		-0.579***
		(-3.07)		(-3.44)		(-4.31)
Log Offer Size	-0.021***	-0.021***	-0.023***	-0.022***	-0.018***	-0.025***
	(-3.84)	(-4.18)	(-4.16)	(-4.30)	(-9.50)	(-13.89)
Integer Offer Price	-0.046***	-0.033*	-0.037***	-0.034*	-0.052***	-0.071***
	(-3.01)	(-1.69)	(-2.65)	(-1.70)	(-6.86)	(-8.46)
Book Building	-0.004	-0.017	-0.004	-0.016	-0.021	-0.000
	(-0.08)	(-0.52)	(-0.08)	(-0.49)	(-0.61)	(-0.01)
Equity Carveout	-0.008	-0.004	-0.007	-0.002	-0.008	-0.006
	(-0.99)	(-0.54)	(-0.85)	(-0.27)	(-0.97)	(-0.85)
Venture Backed	0.063***	0.069***	0.063***	0.070***	0.081***	0.089***
	(3.30)	(3.63)	(3.39)	(3.78)	(9.38)	(11.61)
Underwriter Reputation	0.004	0.024	0.003	0.023	0.006	-0.004
	(0.30)	(1.39)	(0.24)	(1.37)	(0.75)	(-0.58)
Market Return	0.002**	0.003***	0.002**	0.003***	0.002***	0.003***
	(2.25)	(4.09)	(2.18)	(4.01)	(3.95)	(7.30)
Market Volatility	-0.084	2.503***	-0.015	2.563***	-0.385	2.486***
	(-0.17)	(7.04)	(-0.03)	(7.07)	(-1.43)	(11.19)
Market Size	0.059***	0.047***	0.051***	0.043***	0.047***	0.172***
	(3.33)	(3.04)	(2.86)	(2.76)	(4.30)	(9.36)
Stock Turnover	0.014	-0.002	0.014	-0.002	0.015***	-0.028***
	(1.01)	(-0.24)	(1.07)	(-0.18)	(2.74)	(-4.12)
IPO Activity	0.740***	-0.006	0.590**	0.023	0.901***	-0.076
	(3.00)	(-0.03)	(2.46)	(0.10)	(8.61)	(-0.68)
Analyst Following	-0.030***	-0.039***	-0.030***	-0.039***	-0.029***	-0.033***
	(-4.81)	(-5.19)	(-4.80)	(-5.19)	(-15.87)	(-19.89)
Gender Ratio	3.403***	-0.147	2.898***	-0.282		2.513
	(4.49)	(-0.23)	(3.79)	(-0.43)		(1.14)
GDP Per Capita	-0.000**	-0.000*	-0.000***	-0.000	-0.000*	-0.000***
	(-2.26)	(-1.92)	(-2.81)	(-1.36)	(-1.75)	(-3.55)
GDP Per Capita Growth	-0.001	0.013**	-0.001	0.013**	-0.008***	0.013***
	(-0.30)	(2.24)	(-0.32)	(2.16)	(-3.76)	(6.23)
Constant	-1.364***	0.240	-1.242***	0.229	0.315***	-1.132
	(-3.57)	(0.72)	(-3.31)	(0.69)	(5.71)	(-1.02)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,555	14,645	9,555	14,654	10,575	15,687
Adjusted R-squared	0.167	0.174	0.170	0.172	0.156	0.202

Table 9: Alternative Model Estimations

This table presents the robustness tests of of the association between female empowerment and IPO underpricing from 2006 to 2021 using alternative model estimations. M1-M3 represent regression results that include country, year, and industry fixed effects. M4-M6 represent regression results with standard error clustered at the year–industry level, and M7-M9 represent regression results with standard error clustered at the country level. The dependent variable is IPO underpricing, which is the percentage return from the offer price to the first closing price. Economic Empowerment is the ratio of female to male labor force participation rate. Leadership Empowerment is an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making. Other variable definitions are presented in Appendix A. t-values are reported in parentheses. ***, ** and * stand for statistical significance based on a two-sided t test at the 1%, 5% and 10% level, respectively.

	With Country Fixed Effects			Cluster Standard Errors at the Year-Industry Level			Cluster Standard Errors at the Country Level		
	M1	M2	M3	M4	M5	M6	M7	M8	M9
Economic Empowerment	1.187***		1.198***	0.328***		0.288***	0.328**		0.288***
	(5.47)		(5.62)	(6.41)		(5.83)	(2.41)		(3.36)
Leadership Empowerment		-0.432**	-0.350**		-0.401***	-0.399***		-0.401***	-0.399***
		(-2.27)	(-2.05)		(-9.12)	(-8.54)		(-3.29)	(-4.10)
Log Offer Size	-0.026***	-0.021***	-0.026***	-0.025***	-0.021***	-0.026***	-0.025***	-0.021**	-0.026***
	(-6.48)	(-5.28)	(-6.39)	(-9.04)	(-6.90)	(-8.68)	(-3.00)	(-2.55)	(-3.25)
Integer Offer Price	-0.059***	-0.059***	-0.059***	-0.008	-0.032**	-0.004	-0.008	-0.032	-0.004
	(-4.26)	(-3.74)	(-4.21)	(-0.67)	(-2.27)	(-0.28)	(-0.29)	(-1.03)	(-0.14)
Book Building	0.004	0.002	0.007	-0.038	-0.009	-0.012	-0.038	-0.009	-0.012
	(0.13)	(0.07)	(0.20)	(-1.21)	(-0.27)	(-0.37)	(-1.30)	(-0.29)	(-0.43)
Equity Carveout	-0.006	-0.006	-0.007	-0.006	-0.007	-0.009	-0.006	-0.007	-0.009
	(-0.98)	(-1.04)	(-1.05)	(-0.79)	(-0.87)	(-1.05)	(-0.92)	(-1.06)	(-1.08)
Venture Backed	0.047***	0.058***	0.048***	0.072***	0.063***	0.050***	0.072***	0.063***	0.050**
	(3.46)	(3.89)	(3.47)	(5.16)	(4.70)	(4.16)	(3.48)	(3.13)	(2.61)
Underwriter Reputation	0.006	0.003	0.006	0.024***	0.019**	0.015	0.024	0.019	0.015
	(0.33)	(0.16)	(0.30)	(2.72)	(2.10)	(1.58)	(0.72)	(0.73)	(0.55)
Market Return	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003**	0.003***	0.003***
	(2.85)	(3.12)	(2.85)	(4.14)	(4.64)	(4.76)	(2.42)	(2.83)	(3.02)
Market Volatility	2.596***	2.497***	2.624***	3.285***	2.481***	3.276***	3.285***	2.481***	3.276***
	(6.58)	(7.42)	(6.65)	(5.34)	(3.56)	(5.55)	(4.60)	(4.84)	(5.07)
Market Size	0.202***	0.180***	0.199***	0.069***	0.044***	0.049***	0.069**	0.044	0.049*
	(5.73)	(5.07)	(5.67)	(4.51)	(2.83)	(3.25)	(2.40)	(1.52)	(1.73)
Stock Turnover	-0.037***	-0.027***	-0.036***	-0.019**	-0.009	-0.027***	-0.019	-0.009	-0.027
	(-3.54)	(-2.79)	(-3.45)	(-2.04)	(-0.85)	(-2.93)	(-0.97)	(-0.51)	(-1.40)
IPO Activity	0.145	-0.116	0.130	0.017	0.078	0.060	0.017	0.078	0.060
	(0.78)	(-0.43)	(0.71)	(0.12)	(0.42)	(0.41)	(0.08)	(0.32)	(0.28)
Analyst Following	-0.032***	-0.034***	-0.032***	-0.036***	-0.038***	-0.037***	-0.036**	-0.038***	-0.037***
	(-4.55)	(-4.54)	(-4.55)	(-9.32)	(-10.09)	(-9.15)	(-2.61)	(-2.98)	(-2.94)
Gender Ratio	6.120*	2.577	5.295	-0.618	0.160	-0.650	-0.618	0.160	-0.650
	(1.70)	(0.74)	(1.48)	(-1.34)	(0.36)	(-1.45)	(-0.62)	(0.17)	(-0.73)
GDP Per Capita	-0.000*	-0.000	-0.000**	-0.000***	0.000	-0.000**	-0.000**	0.000	-0.000
	(-1.72)	(-1.41)	(-2.10)	(-4.23)	(0.14)	(-2.24)	(-2.07)	(0.05)	(-1.15)
GDP Per Capita Growth	0.008**	0.012**	0.009**	0.007*	0.015***	0.009**	0.007	0.015**	0.009
	(2.29)	(2.43)	(2.42)	(1.96)	(3.69)	(2.40)	(1.14)	(2.04)	(1.49)
Constant	-3.771**	-1.006	-3.289*	0.327	0.211	0.425*	0.327	0.211	0.425
	(-2.04)	(-0.58)	(-1.80)	(1.36)	(0.88)	(1.83)	(0.63)	(0.46)	(0.91)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	No	No	No	No	No	No
Standard Error Clustered at Country–Industry Level	Yes	Yes	Yes	No	No	No	No	No	No
Standard Error Clustered at Year–Industry Level	No	No	No	Yes	Yes	Yes	No	No	No
Standard Error Clustered at Country Level	No	No	No	No	No	No	Yes	Yes	Yes
Observations	14,476	14,657	13,446	14,476	14,657	13,446	14,476	14,657	13,446
Adjusted R-squared	0.226	0.216	0.226	0.172	0.176	0.185	0.172	0.176	0.185

Table 10: Channel Test of Female Leadership Empowerment on IPO Underpricing

This table presents the regression results of the mediating effect of foreign capital flows on the association between female leadership empowerment and IPO underpricing. The dependent variable in M1 and M3 is the foreign capital flows into that country, measured by the natural logarithm of net capital account and foreign direct investment over GDP, respectively. The dependent variable in M2 and M4 is IPO underpricing. Net Capital Account is a proxy for foreign investments in a given country, which records acquisitions and disposals of non-produced non-financial assets, as well as capital transfers. FDI Over GDP shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors divided by its GDP. IPO underpricing is the percentage return from the offer price to the first closing price. Predicted (Equity Flow) is the predicted value of the dependent variable from model M1. Lagged Leadership Empowerment an index ranging from 0 to 1 and reflects inequality between males and females at the highest level of political decision-making in the previous year. Investment freedom is an index ranging from 0 to 100. This index measures the ease of free flow of capital, especially foreign capital. Other variable definitions are presented in Appendix A. t-values are reported in parentheses. ***, ** and * stand for statistical significance based on a two-sided t test at the 1%, 5% and 10% level, respectively. Standard errors are clustered at the country-industry level. All regressions control for year fixed effects and industry fixed effects.

	Net Capital Account		FDI Over GDP	
	M1	M2	M3	M4
Predicted (Equity Flow)		-0.025***		-0.224***
		(-4.64)		(-2.84)
Log Offer Size		-0.023***		-0.022***
		(-4.59)		(-4.17)
Integer Offer Price		-0.024		-0.028
		(-1.19)		(-1.33)
Book Building		-0.025		-0.039
		(-0.78)		(-1.22)
Equity Carveout		-0.010		-0.009
		(-1.43)		(-1.33)
Venture Backed		0.060***		0.065***
		(3.99)		(4.10)
Underwriter Reputation		0.022		0.027
		(1.20)		(1.38)
Lagged Leadership Empowerment	15.626***		0.333***	
	(3.29)		(6.77)	
Investment Freedom	0.012		0.008***	
	(0.16)		(16.96)	
Market Return	0.119***	0.006***	-0.001**	0.002**
	(5.30)	(5.27)	(-1.98)	(2.49)
Market Volatility	209.071***	8.629***	-1.669***	2.898***
	(5.66)	(6.44)	(-4.54)	(5.47)
Market Size	-3.314**	-0.041	0.305***	0.135***
	(-2.28)	(-1.49)	(21.36)	(4.83)
Stock Turnover	-5.795***	-0.169***	-0.160***	-0.053***
	(-9.42)	(-4.80)	(-21.61)	(-2.64)
IPO Activity	64.811***	1.939***	3.256***	0.942***
	(5.44)	(4.86)	(22.56)	(3.17)
Analyst Following	0.649***	-0.020***	0.000	-0.037***
	(6.59)	(-2.74)	(0.08)	(-4.75)
Gender Ratio	88.712**	2.567***	-7.708***	-0.839
	(2.23)	(3.06)	(-18.72)	(-1.14)
GDP Per Capita	-0.000***	-0.000***	-0.000**	0.000
	(-5.17)	(-4.97)	(-2.06)	(0.82)
GDP Per Capita Growth	0.364	0.021***	0.071***	0.025***
	(1.01)	(3.75)	(25.12)	(3.45)
Constant	-49.782***	-1.137***	4.059***	0.770*
	(-2.61)	(-2.64)	(19.79)	(1.91)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	14,476	14,476	14,476	14,476
Adjusted R-squared	0.369	0.176	0.300	0.169