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The impact of the JOBS Act and
Corporate Governance
on IPO Underpricing

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Master Thesis in Finance

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Abstract

This study investigates the effects of the Jumpstart Our Business Startups Act (JOBS Act) on information uncertainty and what attributes of corporate governance improve the asymmetry of information. The JOBS Act creates a new category of an issuer referred to as «Emerging Growth Companies (EGCs)» and allow them to be exempt from some mandatory disclosures. This research extends the study of Landsman et al. (2018) including the effect of corporate governance. We gather a dataset of 781 IPOs listed in the USA, which are separated into 682 EGCs and 99 Non-EGCs (NEGCs), for the period 2007 – 2017. Our findings suggest that an EGC firm will probably be underpriced at a higher level, after the implementation of the JOBS Act. In addition, an older CEO enhances the firm value, contributing to a lower level of IPO underpricing. Finally, it unreasonably seems that NEGCs underpriced at a higher level than EGCs after the JOBS Act implementation.

Keywords: EGC, NEGC, IPO, JOBS Act, mandatory disclosure, information uncertainty, underpricing, asymmetry of information, corporate governance.

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Β Ε Β Α Ι Ω Σ Η

Βεβαιούται ότι η μεταπτυχιακή φοιτήτρια Έλενα Χατζηττοφή (Αρ. Ταυτότητας 922693) ολοκλήρωσε με επιτυχία την προφορική υποστήριξη της διπλωματικής της μελέτης σε εξέταση που έλαβε χώραν ενώπιον διμελούς εξεταστικής επιτροπής, στις 21 Δεκεμβρίου 2020. Παρέδωσε την διπλωματική του μελέτη στις 21 Ιανουαρίου, 2021.

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1 Introduction

The Jumpstart Our Business Startups Act (JOBS Act) was signed into law in April of 2012 and created a new category of an issuer referred to as «Emerging Growth Companies (EGCs)» or startups. Among others, the provisions of the law relax and reduce mandatory disclosures for EGCs and exempts them from some burdensome Initial Public Offering (IPO) disclosures. The principal rationale is that by eliminating needless and costly disclosures, capital markets and IPOs are becoming more attractive and affordable for EGCs. Nevertheless, this law which originally aimed at encouraging the IPO process finally leads to higher information uncertainty since the IPO firms exploit the provisions of the JOBS act and eliminate their mandatory disclosures by increasing information asymmetry. Consequently, IPO markets attract investors that are relying more on their private information, as they do not have enough information for the IPO firms, affecting the pricing of firms. Specifically, this leads to a higher bid-ask spread and underpricing for the EGC IPOs and therefore the investors are compensated in this way for their risk (Barth, Landsman, and Taylor 2017). This higher underpricing is called by Chaplinsky, Hanley, and Moon (2017) as the indirect cost of issuance.

The literature also supports that the corporate governance of firms plays a crucial role in the Initial public offering market. Specifically, existing literature examined the function of corporate governance as a signaling mechanism in decreasing the level of underpricing and increasing the firm performance. It seems that specific features and attributes of corporate governance can reduce the agency problem that occurs because of the separation of ownership and management which finally increases the asymmetry of information between shareholders and managers (Zandi et al. 2019). As it is generally accepted, most of the companies face underpricing at the IPO process because of the uncertainty. Therefore, corporate governance is a device through which companies can increase their profitability and performance, and thus their uncertainty is reduced leading to lower levels of underpricing.

Considering all the above, this study examines the impact of the JOBS Act on information uncertainty and what attributes of corporate governance improve the asymmetry of information. In a nutshell, we investigate whether there is an association between the JOBS Act and the level of IPO underpricing, taking into account the impact of corporate governance on it. The provisions of the laws regarding the IPO market and the mandatory disclosures of financial statements affect the information disclosed to the various potential

investors. The degree of transparency resulting from the disclosures ultimately determines the degree of information asymmetry and, thus the uncertainty of the information. The JOBS Act, which only applies to emerging companies, was enacted in 2012, allows EGC firms to reduce some of their mandatory disclosures to save a burdensome amount of the cost of going public. Therefore, the JOBS Act aroused curiosity and motivation to investigate whether it significantly or slightly affects the underpricing of companies during the IPO process. In addition, as mentioned, corporate governance greatly affects the degree of underpricing of firms. Specifically, establishing effective corporate governance that protects minority shareholders is arguably most important at the time of an initial public offering (IPO), because the IPO represents the first time that most firms raise equity from dispersed investors. Therefore, it is essential to explore also the role of corporate governance. How did corporate governance affect the underpricing of IPOs? Is corporate governance a hedge against the effects of the JOBS Act? What are the main characteristics that corporate governance must have in order to reduce the information uncertainty and, consequently, the underpricing of firms? Consequently, these are some questions that arouse our interest in the accomplishment of this research.

A great deal of research has been made till now for the effects of the JOBS Act. A recent study by Barth, Landsman, and Taylor (2017), examines how underpricing is affected by the JOBS act, examine underpricing via two measures, the market-adjusted return, and the post-IPO volatility. They used three intervals for underpricing, the underpricing (0,0), underpricing (0,1) and underpricing (0,30), and three different measures of the volatility, the post-IPO volatility, the volatility into idiosyncratic components, and the volatility into systematic components. In respect to their results, they founded that EGCs have greater information uncertainty than NEGCS which relates to the extent to which the former firms apply the provisions of the JOBS act and they are reducing their disclosures. Our study is an extension of Barth, Landsman, and Taylor's (2017) research and contributes to the literature by also examining the effects of corporate governance in the IPO underpricing, adding some variables regarding CEO characteristics, CEO compensation, and board's composition. We also extend the Charitou, Karamanou and Loizides (2019) study by including more IPO firms and additional governance variables in our models. Lastly, we examine a higher testing period related to Barth, Landsman, and Taylor's (2017) research.

We carry out our analysis using regression analysis. We gather data for 781 IPOs listed in the USA, 682 EGCs, and 99 NEGCS, for the period between 01/2007 until 04/2017, before and after the signature JOBS act, excluding financial organizations, real estates, and

insurance companies. We also fulfilled some diagnostic tests for outliers, multicollinearity, heteroskedasticity, and normality to make sure that our model estimates are the best linear unbiased estimators (BLUE). Our major results are the following. In consistent with Barth, Landsman, and Taylor (2017), the JOBS Act increases the level of underpricing for EGCs after the signature of the JOBS Act. This is happening because EGCs publish fewer mandatory disclosures and thus the information uncertainty increases. A paradoxical result is that, not only are the NEGC IPOs affected by the JOBS Act but they are also affected more than EGCs do since their underpricing increase in a greater magnitude than EGCs. In addition, we proved that the older the CEO, the more working experience he or she has and therefore the lower the underpricing (Ernestine and Setyaningrum, 2018). Finally, regarding the other independent variables, no one is statistically significant.

The last section of this study, before the conclusions, concerns additional work that was fulfilled for the JOBS Act 2017. Following the same methodology as the case of JOBS Act 2012, we performed regression analysis by collecting data for 712 IPOs, EGCs, and NEGCs, from 08/2012 until 12/2019. Our main results illustrate that NEGCs underpriced in a greater magnitude than EGCs, after the implementation of the JOBS Act 2017. In addition, we find that the older a CEO and the lower the proportion of independent directors in a board is, the lower the IPO underpricing for firms.

The remainder of the paper is organized as follows. Section II, reports some background literature and explains the main hypotheses of the study. Section III, explains the research design, the sample, and illustrates the diagnostic tests. Section V states the descriptive statistics, major findings and empirical results of the study. Section VI illustrates the sensitivity analysis. Section VII relates additional work to the JOBS Act 2017. Section VIII provides conclusions as well as recommendations for future work¹.

2 Institutional framework and Literature review

2.1 Institutional framework

Jumpstart Our Business Start-ups Act or JOBS Act is a law that was signed into law on April 5, 2012, and is designated to support small's business funding in the U.S. by easing many securities regulations of the country. The meditation of introducing the law started

¹ I would like to thank Professor A. Charitou for giving me this research idea which is based on his current work entitled: "Charitou, A., Karamanou, I., & Loizides, G. (2019). The impact of SEC's permission of the non-public review of Draft registration statements to EGCs and non EGC IPO issuers, related to 2012 and 2017 Acts. *The International Journal of Accounting Symposium, Athens, Greece.*

following the end of the great financial crisis of 2008, aiming to push and boost the economic activity for small businesses which had largely decreased. Specifically, the JOBS Act concerns the Emerging Growth Companies (EGC) or start-up firms, which are firms with revenue less than \$1.070 billion in the most recent fiscal year and intend to encourage the IPO process.

As we know, the IPO process implies a high issue cost that companies must shoulder to get public, however, this cost is unaffordable for a large group of EGC's. Whilst the JOBS Act relies upon these companies to reduce their mandatory disclosures, is helping them to save an important amount of issue cost and at the same time make it feasible and affordable for this firm to have access and raise funds from capital markets. The law, among many other things, contains the following important provisions:

1. Relieve emerging growth companies from certain regulatory and disclosure requirements in the registration statement they originally file when they go public, and for a period of five years after that.
2. Extension for the time that certain newly public companies must begin compliance with certain requirements, including certain requirements that originated with the Sarbanes–Oxley Act, from two years to five years
3. The JOBS Act increases the number of shareholders a company may have before being required to register its common stock with the SEC and become a publicly reporting company.
4. Provide a new exemption from the requirement to register public offerings with the SEC, for certain types of small offerings, subject to several conditions.
5. Exemptions for crowdfunding.

In conclusion, the JOBS Act, mainly changed several laws and regulations, making it more manageable for companies to both go public and raise capital privately and stay private longer.

2.2 Literature review

There is an extensive Initial public offering (IPO) literature background around the phenomenon of underpricing. A couple of them assign the IPO underpricing to information uncertainty (Barth, Landsman, and Taylor 2017; Rock 1986). Firstly, Rock (1986) argues that newly listed companies are often evaluated under the price that they deserve to get value because of the information asymmetry exists in an IPO, informed and uninformed, and therefore the equilibrium offer price includes a discount which decreases the price to attract uninformed directors. The provisions of the JOBS Act of 2012 also aggravate the problem of information uncertainty and leads to higher underpricing for the EGC IPOs (Barth, Landsman, and Taylor 2017). Chaplinsky, Hanley, and Moon (2017), Charitou, Karamanou and Loizides (2019) state that underpricing is an indirect cost of issuance that, after the implementation of the Jobs act, causes the increase of the cost of capital, especially for EGCs compares to other IPOs. Moreover, Barth, Landsman, and Taylor (2017) examine the impact of the JOBS act on information uncertainty by using two different measures, the market-adjusted return, and the post-IPO volatility. In respect to their results, they found that EGCs have greater information uncertainty and as a consequence higher underpricing than NEGCS, especially 30 days after IPO, which relates to the extent to which the former firms apply the provisions of the JOBS act and they are reducing their disclosures. They finally found that the higher the proprietary costs of disclosure for EGC firms, the higher the information uncertainty because EGC firms can avoid this cost by decreasing mandatory disclosures. Westfalla and Omerb (2018) explain that EGC IPOs with lower financial statement disclosures introduce addable information asymmetry in the process of IPO for registrants and thus decrease the initial IPO valuation for EGCs. In addition, Gounopoulos, Loukopoulos, and Loukopoulos (2020) mentioned that, although the JOBS Act assesses the IPO activity to be simulated, it also undermined the credibility and trustworthiness of issuer's disclosures, as demonstrated by the higher underpricing following the JOBS Act, especially for EGCs.

A handful of studies also examines how a range of different corporate governance attributes affect both the firm's performance and pricing. Initially, as far as the board size is concerned, aspects and opinions differ. Some studies support that the board size is negatively associated with the value of the firm (Yermack 1996; Hermalin and Weisbach 2001; Dah, Abosedra, and Matar 2012). Specifically, they support that the higher the board size of the firm the lower its value. Yermack (1996) also stressed that as the board size increases, it

causes coordination and decision-making problems which reduce the performance of the firm. Therefore, the smaller the board size, the more effective is the decision-making process and thus the higher the performance and the value of the firm is. Moreover, Afza, Yousaf, and Alam (2013) found that board size is negatively related to underpricing. However, this result was not statistically significant, and they justify this by explaining that huge board results in disagreements and a lack of coordination and communication which could affect negatively the firm's value. On the other hand, Hearn (2011) found a significant positive relationship between board size and firm value which means that the higher the board's size the higher the firm value. Afzalur Rashid (2010) result in a significant positive explanatory power of the board size in influencing firm performance under both ROA and Tobin's Q performance measures. Darmadi and Gunawan (2013) study the case of Indonesia and they concluded that board magnitude is inversely related to underpricing. This is happening because investors believe that larger boards will provide better and more accurate monitoring and thus the information asymmetry will be mitigated. They also add that larger boards can better deal with the complexity of their business operations. Consistent with this, Certo, Daily, and Dalton (2001) nominate a significant negative relationship between IPO underpricing and board size. Added to these, Barnhart and Rosenstein (1998) state that firms with smaller boards tend to outperform those with large boards while an interesting survey notice that family business has lower underpricing related to non-family business (Huang, Li, and Zhang 2019). Another theory links the size of the company to the size of the board to approach the optimal number of directors in a board. This view explains that the larger and complicated a firm is, most directors are required whilst startup firms need a small size of board of directors Baker and Gompers (2003). In contrast with the above researches, the study by Irfan Ullah, Hongxing Fang, and Khalil Jebran (2019) who focuses on the emerging market of Pakistan and they provide evidence in support of a non-significance association between board size and firm value, which means that the board size does not play an important role in the firm value, in Pakistan.

Laksmmana (2008) found that board size is positively associated with directors' compensation disclosures. Specifically, he notices that the larger the board size, the more compensation details will be disclosed. The authors also detect that, when the larger proportion of CEO compensation is gained by risk income, like stock options, the fewer details will be published regarding directors' compensation. On the other hand, the proportion of CEO compensation allocated to fixed income is positively related to directors' compensation disclosures. The disclosures are direct associated with the value of the firm

since more financial statement disclosures reduce the asymmetric of information and the IPO underpricing and thus the firm value is higher (Westfall and Omer 2018). Inconsistent with this, Manders (2012) documents that the equity-based compensation, which in the research of Laksmana (2008) considered as risk income, is a governance mechanism focus to align the interests between CEO and shareholders and consequently to restrict the agency problem. The idea is to connect the compensation of the CEO with the equity, through bonuses, long-term incentives, stocks, and stock options, to have incentives to increase the performance of the company. Results show that the total equity-based executive compensation which is also higher than the fixed-wage of the CEO has a significant positive relationship with the firm's performance. Abdallah M. Dah, Salaheddine S. Abosedra, Ghida F. Matar (2012) also found a positive relation of Tobin's with CEO equity-based compensation. A different investigation (Zandi et al. 2019) examines the relationship of the firm performance and CEO compensation as the total of both fixed and risk income. Specifically, they measured CEO compensation as the total of salary, bonus, allowances, rents, fees, credit card bills, and other incentives and the firm's performance by 3 different variables, ROA, ROE, and profit margin. They found a positive relationship between CEO compensation and firm performance, for all three measures.

Extant literature deal with the relationship between CEO gender and a firm's performance. Carter, D'Souza, Simkins & Simpson (2010) found that ROA, which measures the firm's performance, is significantly positively related to the number of women directors on the board. Luckerath-Rovers (2013) who study the Dutch market agreed that one or more women directors on the board associated positively and significantly with the ROE. Adams and Ferreira (2009) also show that gender diversity in the board improves the firm's performance. In addition, the presence of a female on the board of directors and in management positions is significantly positively related to the voluntary disclosures of corporate social responsibility reports, which decrease the IPO underpricing (Valls Martínez, Cruz Rambaud, and Parra Oller 2019). Consistent with these studies, Ullah, Fang, and Jebran (2019) found that female directors on corporate boards are positively associated with the firm's value and those female CEOs can significantly enhance firm performance and value. They also point out that female directors can discipline the management, decrease the agency conflicts between managers and shareholders, and as a result improve the corporate governance which increases the firm value and that female executives in top management, such as CEOs, will produce better results since they are increasing the market value of the firm. An important research of Adams and Ferreira (2009) contributes to the literature

explaining that female directors have a significant negative association with attendance problems which means that female directors are less likely to experience attendance problems than male directors. They also note that male directors have fewer attendance problems as the board is more gender diverse. Furthermore, they document that, even after controlling directors' characteristics like age, occupation, independence, etc, women directors seem to behave in a different way than male directors do.

Another much-discussed feature of corporate governance is the independence of the members of the board. Klein (2002) results that the higher the fraction of independent directors in a board, the less fraud will take place thus the firm's performance and quality will be improved (Adams and Ferreira 2009) while the IPO underpricing will be lower (Huang, Li, and Zhang 2019). Eriksen and Aberg (2019) conclude to a weakly statistically significant positive relationship between independence and IPO underpricing. In contrast, other researchers believe that independence and firm performance are inversely related. For example, Dah, Abosedra, and Matar (2012) found a significant negative relation between Tobin's Q and the percentage of independent directors. In addition, Darmadi and Gunawan (2013) who examine the Indonesian market explain that independent directors are positively related to underpricing because they fail to mitigate asymmetry information between investors and issuers. This may be happening because managers may be preventing independent directors from increasing information dissemination due to the weaker corporate governance system of the country. Regarding the duality of CEO, Vintilă and Gherghina (2013) who also found a significant positive influence of board independence on the firm value, concluded to a statistically significant positive relationship effect of CEO duality on firm value. On the flip side, two studies that investigate the Bangladesh and Pakistan market proved that if the CEO is also the chairman of the firm, most probably the firm performance will decrease (Rashid 2010; Ullah, Fang, and Jebran 2019). Moreover, Hearn (2011) points out that a high-value firm is less likely to have a CEO as Chairman, while Afza, Yousaf, and Alam (2013) resulted that duality affects positively the underpricing of firms, therefore, if a firm aims to reduce the level of their IPO underpricing can manage to achieve it by dividing the position of CEO and chairman into two separate persons. Finally, another important characteristic of a CEO is age. On the one hand, Gounopoulos, G. Loukopoulos, and P. Loukopoulos (2020) find a negative relationship between CEO age and IPO underpricing, although this association is not statistically significant. In addition, they point out that an older CEO can raise more capital Ernestine (2018) proved that the CEO age and firm performance are positively related because an older CEO have more extensive work

experience and thus, he (or she) attracts more investors since CEO can convince them that he (or she) can lead the company better. On the other hand, Nazir (2018) showed that the older a CEO is, the lower will be the firm valuation.

2.3 Hypotheses

2.3.1 EGCs, Non-EGCs, and IPO underpricing

The primary role of the JOBS Act registration was to ease the provisions for EGC firms, to help them afford the high cost of going public, and urge them to have access to IPO markets. However, as it has been proved by a couple of studies the EGCs took the advantage of this law and decrease mandatory disclosures. The reduced disclosures which are motivated by the desire of EGCs to avoid revealing the proprietary information, increase the gap of information between investors and managers thus investors underpriced EGC IPOs to get compensation for the high risk that they bear with (Barth, Landsman, and Taylor 2017). In addition, based on Chaplinsky, Hanley, and Moon (2017), this type of underpricing is like an indirect cost of issuance which increases the cost of capital of EGC IPOs. It is also important to be noted that, it is generally accepted that most firms face underpricing during the IPO process because of the uncertainty of information (Afza, Yousaf, and Alam 2013). Therefore, the JOBS Act is anticipated to constitute another extra reason for a further increase in information asymmetry and uncertainty and eventually will lead to higher bid-ask spreads for EGCs², notably for EGCs applying more the provisions of the JOBS Act. Based on this literature, it seems that the JOBS Act affects EGCs because it refers to this group of firms, by increasing their underpricing in the IPO market. Thus, our first hypothesis is that:

H1: EGCs are more underpriced after the registration of the JOBS Act.

As discussed, underpricing is a situation faced by most companies on the IPO market to boost the demand and attract more investors that will be willing to take the risk of new companies³. Therefore, it is also expected that the phenomenon of underpricing, on the IPO market, will be also valid for most of NEGCS. Moreover, at this point, we must point out that,

² That is, the level of IPO underpricing of EGCs is anticipated to be higher than the existing (before the JOBS Act) level of IPO underpricing for EGCs because of the provisions of JOBS Act that exempt EGCs from some mandatory disclosures. (Find more information about the main provisions of the JOBS Act on the institutional framework section 2.1.).

³ Many IPOs refer to companies that are unknown to investors regarding their operations, profitability, and stability, especially if firms are startups or EGCs. Therefore, the share price decreases below its fair value to attract more investors that will be willing to bear this risk.

regarding the NEGCS, no one of the provisions of the JOBS Act of 2012 refers to those companies or exempts them from any mandatory disclosure, as the law did with EGCs. NEGCS are obligated to continue the revealing of the mandatory disclosures that EGCs are exempted from them. Thereafter, the JOBS Act 2012 does not influence the transparency and information uncertainty for NEGCS, so we expect zero or an approach of zero change on the bid-ask spread of NEGCS. Therefore, based on the above thought, it arises another hypothesis which claims that:

H2: No change in underpricing of NEGCS after the implementation of the JOBS Act

The first two hypotheses led to the conclusion that from both EGCs and NEGCS, only EGCs' underpricing will be affected by the JOBS Act, that is underpricing will be increased, while NEGCS' underpricing must be unaffected. Then, by merging the first and second hypotheses we end up with a third hypothesis which compares the change of underpricing before and after the JOBS Act between EGCs and NEGCS. Specifically, the third hypothesis states that:

H3: The difference between pre- and post-JOBS Act IPO underpricing of EGCs is higher than the difference of pre-and post-JOBS Act IPO underpricing of NEGCS

2.3.2 Corporate Governance and IPO Underpricing

Corporate governance is considered one of the most important mechanisms of a firm because it can be the cause of a firm's value creation or inversely it can destroy the firm's value. The characteristics of the firms' corporate governance are those that can determine the quality of the governance and affects the firm's performance and market value. Therefore, if a firm aims to increase its performance and market value, if the firm is public, can achieve it through qualitative corporate governance. It also seems that corporate governance plays a crucial role during the initial public offering of a firm, where most companies are even slightly underestimated. Afza, Yousaf, and Alam (2013) agree that the extent of the IPO underpricing of a firm can be decreased by signaling a better quality of the firm through the corporate governance mechanism. With the term «a good quality of governance», we mean in terms of the board size and composition, Chief executive officer's compensation and characteristics, and so on. For example, it seems that an older CEO has more experience, and it can increase the performance of a firm. In addition, it seems that female CEOs can improve corporate governance, decrease the agency problem and uncertainty, and therefore increase the transparency and firm's value (Ullah, Fang, and Jebran 2019). Moreover, Afza, Yousaf,

and Alam (2013) state that a firm can decrease its IPO underpricing if the position of CEO and chairman are held by two separate persons.

Regarding board size, studies' results are controversial since the one group of studies supports that the smaller the board size, the more effective is the decision-making process and the higher the value of the firm (Yermack 1996). On the other hand, studies show that board magnitude is inversely related to underpricing (Darmadi and Gunawan 2013). There is no obvious answer regarding the best number of board size members however we argue in favour of the theory that supports that the higher the board's size the lower the underpricing because it is much more difficult to have fraud and manipulation within the board in favor of someone, for example, CEO. Moreover, a higher board size means more opinions and more directors with different backgrounds. It is also believed by investors that a higher board's size will provide better monitoring and that a large board size can deal better with the complexity of a firm's operations (Darmadi and Gunawan 2013). Moreover, Klein (2015) found that the higher the proportion of independent directors in a board can reduce or even better eliminate fraud within the board and as a result, the firm's performance and quality will increase. Added to all these, Laksmana (Laksmana 2008) detects that, when a larger proportion of CEO compensation is gained by risk income, like stock options, the fewer details will be published regarding directors' compensation. On the other hand, the proportion of CEO compensation allocated to fixed income is positively related to directors' compensation disclosures. Furthermore, Ernestine (2018) showed that an older CEO has more extensive work experience, and thus, the CEO convinces investors that he or she leads the company better. Another important attribute of the CEO is gender. To the best of our knowledge, most of the studies, if not all of them, found that female directors can reduce the agency conflicts between managers and shareholders and thus improve corporate governance which increases firm value. In addition, females in top management, such as CEOs, can produce better results since they increase the market value of the firm (Ullah, Fang, and Jebran 2019; Adams and Ferreira 2009; Valls Martínez, Cruz Rambaud, and Parra Oller 2019). Last but not least, Afza, Yousaf, and Alam (2013) resulted that duality affects positively the underpricing of firms and that if firms divide the positions of CEO and chairman into two separate persons, they will manage to reduce the level of their IPO underpricing. Summarizing all these is resulting in the fourth hypothesis:

H4: The better the corporate governance the lower the IPO underpricing

Concluded, based on the above, better corporate governance can decrease the IPO underpricing, and with the term better corporate governance we mean a high number of members on the board, a high proportion of independent directors in the board, the CEO is old and woman, the positions of CEO and chairman are held by two different persons and the total compensation of CEO based more on a fixed income, that is salary, and lower to risk income.

3 Research design

3.1 Dataset

To illustrate the empirical part of this study, we identify an initial sample of 903 U.S. IPO's issued between January 23, 2007, and April 4, 2017. We excluded financial organizations, real estate, and insurance companies with SIC code 6091,6371, 6722, 6726, 6732, 6733, 6799. As table 1 shows, 17 IPO's are excluded because their prospectuses were not found or their offer price is missing. Moreover, 39 and 17 IPO's are not included in the sample, as their information about executive compensation and closing prices do not exist. We also reduce the sample by 1, because the opening price of this firm does not exist. Finally, there are IPO's without the firm's specific factors and independence information, so we exclude 27 and 21 IPO's, respectively. After the above reductions, we arrive with a final sample of 781 IPO's, 682 IPO's refers to EGC firms, 258 and 424 IPO's before and after JOBS Act respectively and 99 IPO's of NEGC firms split into 32 IPO's of them took place before the JOBS Act implementation and 67 of them after the JOBS Act implementation.

We hand-collected the data for the SEC codes, offer price, and corporate governance variables from SEC-filings. Corporate governance variables consist of the duality, board size, independent members in the board, age and gender of CEO, and the compensation of CEO which includes salary, bonus, option, and stock awards non-equity incentive plans, and all other compensation. Founding age of IPO's obtained by the website of Jay Ritter's IPO data and if unavailable, we hand collected them by Yahoo Finance. Data for the firm's specific factors, that are assets, revenue, net income or loss, research and development expenses, auditor, total stockholders' equity, and common shares outstanding have been gathered by Compustat. If the information for assets, revenue, and total stockholder equity were missing, we hand collected them by SEC filings. Finally, we used Central Research in Security Prices (CRSP) to obtain opening and closing prices. All the above variables, their definition, and

origin are summarised in Table 2 panel A. The data refers to the last fiscal year before the issue⁴.

3.2 Methodology

3.2.1 Regression model

To peer with the effects of the provisions of the JOBS act on the information uncertainty, as well as the implications of corporate governance, we use the following generalized linear regression model:

$$\begin{aligned} InfoUncertainty_i = & b_0 + b_1 EGCs + b_2 JA_{2012} + b_3 \sum Corporate\ Governance\ variables \\ & + b_4 \sum Firm's\ specific\ factors \end{aligned} \quad (1)$$

As regards, the left side of the model, we measure the information uncertainty by utilizing the IPO underpricing, that is the abnormal return of the bid-ask spread, to proxy for it. The subscript *i* refers to the firm *i*. With respect to the right side, it can be split into four pieces. The two dummy variables, EGCs and JA_2012, the main variables, which are seven and refer to the firm's corporate governance, and the control variables which consist of six firm's specific factors. The equation 2, shows the detailed model used to accomplish the cause of this survey.

$$\begin{aligned} InfoUncertainty_i = & b_0 + b_1 CEO_age_i + b_2 CEO_sex_i + b_3 Board_i + b_4 Independence \\ & + b_5 Duality + b_6 Fixed_income + b_7 Risk_income + b_8 ROA_i \\ & + b_9 lnAssets_i + b_{10} lnRevenue + b_{11} R\&D_i + b_{12} Auditor_i \\ & + b_{13} lnAge + b_{14} EGC + b_{15} JA_{2012} + e_i \end{aligned} \quad (2)$$

To evaluate both the short and long-term performance of IPOs, we used three intervals of IPO underpricing: Underpricing (0,0), Underpricing (0,1), and Underpricing (0,30). Moreover, equation 2 includes control variables identified as determinants of underpricing in prior research. Specifically, we introduce as control variables in the model, the profitability, firm size, revenue, research and development expenses, auditor quality, and age of the firm (Barth, Landsman, and Taylor 2017). In addition, to measure the quality of corporate

⁴ We would also like to thank Dr. George Loizides and Professor A. Charitou for supporting us with data collection and for providing us with data regarding IPOs.

governance, we import the age, gender, fixed and risk income of the CEO, the board size, the proportion of independent members of the board, and the duality, all three of them indicate board compensation.

3.2.2 Measurement of variables

Table 2, Panel B summarizes the definitions and calculations used for the dependent and independent variables. Regarding the dependent variables, we employ three intervals of IPO underpricing to estimate equation 2, as mentioned above, and each interval is measured as the market adjusted return, also called as buy and hold abnormal return, which is calculated as raw return minus the market return⁵. The raw return is the closing price minus the IPO offer price scaled by the latter. For example, the underpricing (0,0) is the raw return (0,0) minus the market return (0,0). The raw return (0,0) is calculated by the closing price on the day of the IPO (i.e., day t=0), minus the IPO offer price divided by the IPO offer price. Thinking of prior studies that information uncertainty comes from reduced disclosure leads to the delayed speed at which information is reflected in stock prices (Barth, Landsman, and Taylor 2017), there would be delayed pricing, in the case of higher information uncertainty related to the JOBS act. Consequently, we also compute the Underpricing (0,1) as the raw return (0,1) minus the market return (0,1) and Underpricing (0,30) as the raw return (0,30) minus the market return (0,30), where raw return (0,1) and return (0,30) are the closing price on the first day, i.e., day t=1, and 30 trading days, i.e., day t=30, after the IPO, respectively, minus the IPO offer price divided by the IPO offer price. The market return for each window is calculated using equation 3, below.

$$\text{Market return } (0,t) = \prod_0^t (1 + \text{daily market return } t) - 1, \text{ where } t = 0, 1, 30 \quad (3)$$

Another two components of equation 2, are EGC and JA_2012, both are dummy variables. EGC dummy variable shows the status of the IPO firm and is equal to one of the firms is an EGC firm and zero, otherwise. Based on the act, a company is considered as EGC if its revenue is less than \$1.070 billion and NEGC if its revenue is higher than \$1.070 billion. Thus, we relied on this criterion to separate if a company must be faced as an EGC or not. Moreover, JA_2012 is a dummy variable taking the value of one of the IPO that took

⁵ $BHAR(0,t)_i = [(1 + R_{i0}) * (1 + R_{i1}) * \dots * (1 + R_{it-1}) - 1] - [(1 + R_{M0}) * (1 + R_{M1}) * \dots * (1 + R_{M29}) - 1]$, where subscript i refers to the firm i.

place after the enforcement of the JOBS act and zero otherwise. The coefficient of the JA_2012 is of considerable importance since it represents the effect of the JOBS act's provisions on the IPO underpricing. Therefore, if the JOBS act increased (decreased) information uncertainty, which implies underpricing (overpricing) for the firms, then we expect a positive (negative) coefficient, $b_1 > 0$ ($b_1 < 0$).

CEO_age is the age of CEO; CEO_sex is a dummy variable that takes the value of one if the CEO is female and zero otherwise; duality is a dummy variable that takes the value of one if the position of CEO and chairman held by the same person and zero otherwise; board size is the number of directors in the board; independence is the proportion of independent directors in the Board, fixed income is the salary of CEO; risk income is the sum of bonuses, option, and stock awards, all other compensations and any non-equity incentive plan; ln_revenue is the natural logarithm of one plus revenue; ln_assets is the natural logarithm of one plus total assets, indicating firm size; ln_age is the natural logarithm of one plus number of years from the establishment until IPO of the firm; auditor quality is a dummy variable which takes the value of 1 if the auditing company of the IPO firm is ranked into the big four companies (Ernst & Young, KPMG, Deloitte and PwC) and 0 otherwise; R&D is the research and development expenses of the IPO firm; ROA is the net income scaled by total assets.

3.3 Diagnostic tests

3.3.1 Outliers

To meet with OLS regression assumptions and to test if our model estimates are the best linear unbiased estimators (BLUE), we performed some diagnostic tests. Firstly, we tested for outliers, for both dependent and independent variables. Booth (1985) defines an outlier as a data point if it is not likely to be representative of the rest of the data or if it causes problems in a standard statistical procedure. Majewska (2015) points out that the basic definition of an outlying observation is «a data point or data points that do not fit the model of the rest of the data». In addition, Hawkins (1980) defines an outlier «as an observation that deviates so much from other observations as to arouse suspicion that it was generated by a different mechanism». Following statistic research, we carry out the cook's distance test for extreme values (Gao, Ahn, and Zhu 2015) and we also illustrated the outlier observations by boxplots for each variable separately (Majewska 2015). The Cook's distance is a tool that is utilized to identify and detect influential observations (Gao, Ahn, and Zhu 2015), and box

plots are used to detect which of the variables have extreme values, that is outliers (Majewska 2015). Also, as mentioned, outliers affect our dataset and as a result, influence our results, thus this problem must be fixed. A way to approach this is by introducing the winsorization method (Chambers et al. 2000). Therefore, after we applied the Cook's distance method and box plots, we fixed the variables with outliers by winsorizing them at 1% and 99% (Chambers et al. 2000).

3.3.2 Multicollinearity

Next, we tested for Multicollinearity. Shrestha (2020) explains that multicollinearity is the occasion that the independent variables of a multiple linear regression model are correlated to each other. In addition, Shrestha (2020) discusses three techniques to catch out the multicollinearity, one of them is the variance inflation factor (VIF). Basically, the VIF measures «how much of the variance of the estimated regression coefficient is inflated if the independent variables are correlated». If the VIF equals 1 indicates that the independent variables are not correlated to each other and if the VIF is between 1 to 5 means that independent variables are moderately correlated to each other. If the VIF is between 5 to 10 indicates a high correlation among variables while a VIF higher than 10 «indicates that the regression coefficients are feebly estimated with the presence of multicollinearity» (Shrestha 2020). Therefore, we accept variables with VIF lower than 5. If the VIF is higher than 5 especially, higher than 10 must be excluded from the model because will influence our results (Shrestha 2020).

Based on the above theory, we tested for multicollinearity between the independent variable via the variance inflation factor (VIF). At this point, it must be noted that our initial model included, also, an interaction between EGC and JOBS Act, as can be viewed below.

$$\begin{aligned}
 \text{InfoUncertainty}_i = & b_0 + b_1 \text{EGCs} + b_2 \text{JA}_{2012} + b_3 \text{EGCs} * \text{JA}_{2012} \\
 & + b_4 \sum \text{Corporate Governance variables} \\
 & + b_5 \sum \text{Firm's specific factors} \quad (4)
 \end{aligned}$$

Firstly, we explored multicollinearity by regressing the above model (equation 4) and taking the VIF of the variables. However, as it can be seen in table 3, Panel A, the VIF of interaction, EGC*JA_2012, and JOBS Act variable are higher than 5. Also, the interaction was not significant since the p-value of interaction for models 1, 2, and 3 was 0.866, 0.82,

and 0.827, respectively. Shrestha (2020) showed that, if there is a correlation among independent variables, that is multicollinearity issue, this may lead to some of the significant variables that are studying, to be statistically insignificant. Therefore, to deal with this problem, we excluded the interaction from our model, and we run the regression of the adjusted model (equation 2) to test again for VIF. Table 3, Panel B demonstrates the VIF for all model variables except for the interaction, which is now less than 5, and no one independent variable has any multicollinearity problem. Moreover, the VIF for JOBS Act variables that before was 8.58 decreased to 1.08. In conclusion, we continued our analysis and diagnostic test with the model in equation 2, from which the interaction is excluded.

3.3.3 Heteroskedasticity

Following, we inquired about heteroskedasticity. Homoscedasticity is the situation that the error term is homoscedastic if the variance of the conditional distribution of the error term given the independent variables is consistent and does not depend on independent variables (Stock and Watson 2011). Thus, homoscedasticity fails whenever the variance of the unobserved factors changes across different parts of the population (Wooldridge 2013). There are two ways to test for heteroskedasticity for both categorical and continuous variables, the Breusch-Pagan test, and the White test (Klein et al. 2016). The «Breusch and Pagan test tests the null hypothesis that the residuals' variances are unrelated to a set of explanatory variables versus the alternative hypothesis that the residuals' variances are a parametric function of the predictor variables» (Klein et al. 2016). For the models with heteroscedasticity problem for which the equation is correctly specified regression and parametric heteroscedasticity is also correctly specified, have been developed methods with robust estimation to deal with heteroscedastic errors» (Klein et al. 2016). In other words, robust standard errors can be used in the case of heteroskedasticity in linear regression models. The white test is performed to test for constant variance, and it regresses the squared OLS-residuals on all distinct predictors, squares of predictors, cross products, and the intercept. The coefficient of determination of the auxiliary regression multiplied by the sample size ($n \cdot R^2$) gives us the test statistic of the White test. This test is suitable to examine if there is a heteroskedasticity problem after we use robust standardized errors.

Accordingly, we tested for heteroskedasticity using the Breusch-Pagan test (Breusch and Pagan 1979). Table 4 presents the p-values for the Breusch-Pagan test for the three dependent variables, underpricing 0, 1, and 30. All three of them are zero, which means that

the null hypothesis, which implies homoskedasticity, is rejected and there is a heteroskedasticity problem. To fix the problem, we employed robust standard errors. Next, we run again regression and we test again for heteroskedasticity, but now, by using the White test (HALBERT WHITE 1980). Table 4 demonstrates the p-value for underpricing 0,1, and 30 which are 0.6641, 0.6566, and 0.0803, respectively. The null hypothesis, which again indicates homoskedasticity, is accepted for all models at the 1% and 5% significance level and only for the first two models, underpricing 0 and 1, at the 10% significance level.

3.3.4 Normality

Finally, we tested for normality in our data. Normal distribution or Gaussian distribution is a probability distribution that is symmetric around the mean, which means that the sampling distribution of the mean is normal (Mordkoff 2016). The normality assumption is important since it claims that, if you repeat your analysis many times by changing the sample, and plot the sample means, the distribution would be normal. Mishra, Pandey, Singh, Gupta, Sahu, and Keshri (2019) point out that there are two main methods to examine for normality, graphical, and numerical. Two of the graphical methods are the Q-Q plot and histogram, and one way to numerically test for normality is the Shapiro-Wilcoxon test. The Q-Q plot presents «the proportion of the data from the original sample compared against the quantiles expected to form a normal distribution» (Miot 2017). Ideally, the points of the Q-Q plot must fall into the diagonal line (Miot 2017). Also, the histogram assists us to identify the discontinuity of the data and major asymmetries. In addition, the null hypothesis, regarding the Shapiro-Wilcoxon test is that the errors are normally distributed (Mishra et al. 2019).

According to the theory, we reviewed for normality in three ways. Firstly, we calculated the Shapiro-Wilcoxon test, which is represented in table 5, Q-Q plots, and histograms for underpricing 0, 1, and 30 which are represented in Figures 1, 2, and 3, respectively. The Shapiro-Wilcoxon test is zero, for all three models, which means that the null hypothesis of normality is rejected. We can also confirm this by looking at the Q-Q plots and histograms. As mentioned above, if the standardized residuals are normally distributed, the curve of the histogram must be bell-shaped and symmetrically distributed around zero, while the points of the Q-Q plot should fall on the diagonal line. In no one case does the above apply, since for no one does the points of the Q-Q plot fall into the diagonal line. In addition, all three histograms are not bell-shaped, neither symmetrically distributed around zero and their tails are too long from right sight. In conclusion, standardized errors are not

normally distributed, however, according to the central limit theorem, if the size of the sample is «large», as the sample of this survey, then any deviation from the assumption of error normality is not expected to create a problem in the estimator hypothesis tests (Mishra et al. 2019) since, as the number of observations increases the distribution of the sample approaches the normality (Mordkoff 2016).

4 Empirical Results

4.1 Descriptive statistics

Table 6, Panels A, B, C, and D report descriptive statistics separately for pre-EGCs, post-EGCs, pre-NEGCs, and post-NEGCs, respectively. As we were expecting, underpricing is higher for EGCs after the imposition of the JOBS act because EGCs decrease some mandatory financial statement disclosures and therefore the information uncertainty increased. Moreover, the underpricing is greater as we move away from the day of the IPO, as we also await. Specifically, the mean underpricing (0,0) for EGCs before the JOBS Act (pre-EGCs) is almost 0.15, with a minimum underpricing -0.20 and a maximum of 0.92. The mean underpricing (0,30) is 0.17 with a minimum -0.44 and a maximum of 1.19. After the resignation of the JOBS Act, the mean underpricing (0,0) for EGCs (post-EGCs) is 0.19, with -0.23 and 1.30 minimum and maximum underpricing, respectively. Regarding the mean of long-run underpricing for EGCs, the underpricing (0,30), is 0.24 begin with -0.40 minimum until 1.66 maximum underpricing. As mentioned above the JOBS Act affected the underpricing of EGCs, as we expected. In addition, it is obvious that underpricing is a situation which observed to exist both in the short and long-run period.

Regarding NEGCS before the JOBS Act (pre-NEGCS), their mean short-term underpricing, the underpricing (0,0), is 0.04 with a minimum underpricing -0.17 and a maximum of 0.30. The mean underpricing (0,30) is 0.10, with -0.36 being the minimum underpricing and 0.81 the maximum. After the JOBS Act, NEGCS (post-NEGCS) has a mean of underpricing (0,0) equal to 0.11 with -0.09 minimum and 1.22 maximum underpricing. The mean underpricing of post-NEGCS is 0.20 with -0.24 and 1.16 minimum and maximum underpricing, respectively. Descriptive statistics show that EGCs are, on average, more underpriced for both pre-and post-JOBS Act, relative to NEGCS. In addition, descriptive statistics show that post-NEGCS have a higher level of IPO underpricing relative to pre-NEGCS. This was not expected, as the JOBS Act does not exempt NEGCS from any

provision, such as EGCs, and it is therefore paradoxical that NEGC IPOs are more underpriced after the JOBS Act⁶.

4.2 Tests of means and medians

Following, we executed some tests for means and medians to have a better view of the significance regarding the difference in means and medians before and after the JOBS Act for EGC and NEGC IPOs separately. We used the t-test to test for the means' differences and the Wilcoxon test to examine the differences in medians. Table 7 Panel A is summarising the results for EGCs. Particularly in this table we report the means and medians for EGCs before and after JOBS Act, as well as the p-value for the t-test and Wilcoxon test. The means for all three dependent variables are statistically significant which means that the difference between means before and after the JOBS Act is significantly different from zero. Specifically, the underpricing (0,0) and (0,30) are statistically significant at 5% significance level and the underpricing (0,1) is significant at 10% significant level. In addition, all the independent variables, except for the independence and fixed income, are statistically significant. Nevertheless, only the median of underpricing (0,30) seems to be statistically different from zero. Regarding the independent variables are all of them significantly different than zero except for independence and risk income. The above outputs are very reasonable and anticipated since the higher information uncertainty on account of the lower disclosures, leads EGCs to be more underpriced during the IPO process. Thus, we are consistent with the first hypothesis that EGCs' underpricing is higher after the JOBS ACT registration. In addition, our results are aligned with Barth, Landsman, and Taylor (2017), who found that EGCs have greater information uncertainty that is associated with the extent to which an EGC firm applies the reduced disclosure requirements of the JOBS Act, implies that the underpricing for EGCs is higher after the implementation of the JOBS Act.

Table 7 Panel B illustrates the same information as Panel A for NEGCs, that is the means, medians, and the p-values for t-test and Wilcoxon test. Before, we noticed at table 6, Panel C and D, that in opposite to our expectations, seems that NEGCs have been affected by the JOBS Act registration. I continue to this result, we observed that not only the means of

⁶ As it has already been discussed, the underpricing is a phenomenon arising from the higher level of information uncertainty. Therefore, uninformed investors underprice the IPOs to bear with the risk. The JOBS Act affects EGCs because the less the disclosures reveal by a firm, the less informed investors are and so the higher the information uncertainty is which leads to increase further the IPO underpricing for EGCs by investors. However, NEGCs do not exempt from these mandatory disclosures that EGCs exempt from, so it is irrational for NEGCs to face a higher level of underpricing after the implementation of the JOBS Act, given that everything else is fixed.

underpricing (0,0), (0,1) and (0,30) are higher after the JOBS Act, but this increase, in underpricing, is also statistically significant, as the table 7 Panel B shows. Specifically, the underpricing (0,0) and (0,1) are statistically significant at the 5% level, and underpricing (0,30) is significant at the 10% significance level. Results also show that the difference between the means of the independent variables before and after the application of the law is not statistically significant, for no one variable. Moreover, only the median for underpricing (0,30) is significant and only the fixed income's median, from independent variables, is significant. The underpricing (0,30) is significant at the 5% level and fixed income at the 10% level. Results unreasonably illustrate that the mean underpricing of post-NEGCs is higher than the mean underpricing of pre-NEGCs, in all of the three windows of underpricing⁷. One explanation for this may be the fact that the sample for the NEGCS is only 12.7% of the total sample and perhaps such a small sample compared to the overall sample cannot produce sufficient results. In addition, we observed that NEGCS that went public in 2013, not only has the higher mean IPO underpricing, compared to each of the other years' mean IPO underpricing but also it is much above the post-NEGCs mean IPO underpricing. At the same time, we found that the USA faces a decrease of -0.41% in the annual change of GDP growth in 2013, which can be linked with the higher underpricing showing that, because of the non-favorable economic conditions, investors underpriced the NEGCS in a higher level than the normal one. In any case, we are not consistent neither with the second hypothesis that NEGCS are not affected by the JOBS Act, nor with Barth, Landsman, and Taylor (2017).

4.3 Difference – in – differences analysis

To answer hypothesis 3, we performed the difference in difference test of means, that is the difference between the change of mean underpricing of pre and post EGCs relative to the change of underpricing of pre and post-NEGCs. We also carry out this test for independent variables as well. Our initial expectation was that this difference between EGCs and NEGCS must be positive. Table 8 illustrates the results of the difference in differences test. Numbers on the second column report the change in the underpricing and independent variables between their means before and after the JOBS Act for NEGCS. Specifically, we subtracted the mean of each variable after the JOBS Act (post-NEGCs), which are presented in table 7,

⁷ Namely, underpricing (0,0), underpricing (0,1) and underpricing (0,30).

Panel B, minus the mean of each variable before the JOBS Act (pre-NEGCs)⁸. The third column presents the same information as the second column but for EGCs, that is the mean of each variable after the JOBS Act, which is presented in table 7, Panel A, minus the mean of each variable before the JOBS Act. The fourth column reports the difference of the second minus the third column, in order to be examined if the difference of pre and post EGCs underpricing is higher than the difference of pre and post NEGCS underpricing.

As it has been stated above, it is reasonable that only EGC's must be affected by the establishment of the JOBS Act, while NEGCS underpricing must generally be unchanged. Considering both these situations, it is reasonable to expect positive results in the fourth column⁹, regarding underpricing, since the difference between pre and post EGCs must be higher than this of NEGCS. Although EGCs are underpriced in a greater magnitude for both before and after the JOBS Act, in contrast to what was anticipated, NEGCS have a higher increase to their underpricing, after JOBS Act, than EGCs do. In other words, it appears that the difference of underpricing of pre and post EGCs is lower than the difference of underpricing of pre and post NEGCS and this is valid for all the three underpricing measures. Although the results are not expected, they are also not statistically significant, as the p-value shows. Therefore, we are not consistent with hypothesis three since we have exactly the opposite results, but which are not statistically significant. In addition, we are inconsistent with Barth, Landsman, and Taylor (2017). These opposite results as well as the fact that is not statistically significant may be due to the fact that only 12.7% of the sample refers to NEGCS IPOs and this may not produce accurate outputs.

4.4 Correlation analysis

Table 9 Panel A and B illustrate the correlations between all variables before and after the JOBS Act, respectively. Among the dependent and corporate governance variables before the JOBS Act, the strongest correlation is between CEO age and the short-term underpricing, that is underpricing (0,0), and the underpricing (0,1). Specifically, CEO age is negatively correlated with underpricing at the 1% significance level, which means that the older the CEO the less the underpricing. These results are as expected since an older CEO has more work experience, knowledge, and prestige and thus is preferable to a younger (Gounopoulos,

⁸ For example, the difference in mean of underpricing (0,0) between pre and post NEGCS = Mean underpricing (0,0) after the JOBS Act minus the mean underpricing (0,0) before the JOBS Act.

⁹ That is to apply that, the change in the mean between pre and post EGCs > the change in the mean between pre and post NEGCS and therefore, → The change in the mean between pre and post EGCs – the change in the mean between pre and post NEGCS > 0

Loukopoulos, and Loukopoulos 2020). This is also valid after the JOBS Act including and underpricing (0,30), which indicates that, if the CEO is older, both short-term and long-term underpricing will decrease. This post-JOBS Act correlation between CEO age and underpricing (0,0) is statistically significant at the 1% level and the correlation between CEO age and underpricing (0,1) and (0,30) are significant at the 5% level. There is also a strong negative correlation between both underpricing (0,0) and (0,1) and two corporate governance variables, CEO sex, and fixed income. All of them are statistically significant at the 5% level except for the correlation between underpricing (0,1) and fixed income which is significant at the 10%. These relations are very important and show that if the CEO is female and the CEO's salary is high, then the underpricing is lower. Although this is not valid after the implementation of the law, these pre-JOBS Act results are consistent with other literature resources which indicates that a female CEO is a better leader than a man, is less likely to face attendance problems related to a male CEO (Adams and Ferreira 2009) and they also can discipline the management and decrease the agency problem (Ullah, Fang, and Jebran 2019) . In addition, a higher proportion of fixed income into CEO compensation nominates a CEO with stable development steps looking at the long-run period and does not focus to achieve short-term goals to gain bonuses without long-run performance and profitability. Added to this a CEO with a higher proportion of fixed income is more probably to disclose directors' compensation disclosures (Laksmana 2008). Moreover, another variable that is correlated with underpricing is the proportion of independence, whose correlation is positive, which means that the higher the proportion of independent directors in a board, the higher the underpricing. Statistically, this is significant at the 5% level for underpricing (0,0) and (0,30) and at the 10% level for underpricing (0,1). This also applies after the JOBS Act only for the underpricing (0,0) at the 5% significance level. Consistent with other research, a positive relationship between the proportion of independent directors and underpricing can be attributed to the fact that independent directors fail to mitigate asymmetry information between investors and issuers. This may be happening because managers may be preventing independent directors from increasing information dissemination due to the weaker corporate governance system of the country (Darmadi and Gunawan 2013; Dah, Abosedra, and Matar 2012).

4.5 Regression results

Table 10 depicts the regression results. Starting with EGC and JOBS Act dummy variables, we anticipated that both should increase the IPO underpricing, since the JOBS Act, which eases some provisions of the law, refers to EGC firms and allows them to avoid the publication of some mandatory disclosures, to save burdensome cost. As a result, investors are underpricing the EGC firms, after the JOBS Act to get compensated for the risk of increased information asymmetry. Consistent with our expectations, EGC, and JOBS Act variables are increasing the IPO underpricing. In addition, the EGC variable is statistically significant at the 10% level for models 1 and 2, whilst the JOBS Act is statistically significant at the 1% level for all three models. Our results are also consistent with other studies (Barth, Landsman, and Taylor 2017; Chaplinsky, Hanley, and Moon 2017). Regarding the third variable in the table, we expected that CEO age should negatively affect the IPO underpricing. Consistent with our expectations, CEO age has a negative sign and is statistically significant at the 1% and 5% for models 1 and 2, respectively. These results are also consistent with other research (Ernestine and Setyaningrum 2018; Gounopoulos, Loukopoulos, and Loukopoulos 2020) and indicate that the CEO age and IPO underpricing are inversely related because an older CEO have more extensive work experience and thus, he (or she) attracts more investors since CEO can convince them that he (or she) can lead the company better.

Regarding the other independent variables, namely CEO sex, the board size, independent, duality, fixed and risk income, no one of them is statistically significant, however, we compared our results with our expectations. Firstly, we expected that a female CEO will lead to reduce underpricing because a female CEO is considered a better leader, as mentioned above. Our results are consistent with this expectation nevertheless are not statistically significant. One reason may be the fact that only 5% of the overall sample of CEO sex variable refers to female CEOs and this cannot produce accurate and significant results however, the non-significance is in line with prior research (Eriksen and Åberg 2019). Regarding the case of board size, the results are very contradictory. As we have discussed earlier in the literature review section, there is a group of research which points out that big boards are better because there are more people with different background and more opinions are heard around an issue. In addition, it believes that larger boards will provide better and more accurate monitoring and thus the information asymmetry will be mitigated (Darmadi and Gunawan 2013). That was the way of our thinking and we have anticipated an adverse

influence of board size on underpricing, that is a large board decreases the level of IPO underpricing. Nevertheless, our results are opposite to that, showing that a large board size results in a lack of communication and coordination among members which increase the IPO underpricing while a small board size increases the effectiveness of decision-making and the performance of the firm and as a result reduce the IPO underpricing (Yermack 1996; Hermalin and Weisbach 2001). However, these results may be not significant because a smaller board cannot deal with the complexity of a larger firm's business operations and in this case, larger board size is needed. In any case, the non-significance is consistent with Ullah, Fang, and Jebran (2019).

The proportion of independent members on the board has a positive effect on underpricing, in contrast to our expectations, however, this is not statistically significant. A potential scenario of insignificant and opposite results may be that the more independent members on the board, the less fraud will take place thus the IPO underpricing should be lower (Huang, Li, and Zhang 2019). Another reason may be that plenty of the firms in our sample, if not all, have a majority of independent directors in the board of director since is a prefecture to do so, in the USA¹⁰, therefore we cannot exact conclusions on this, regarding the sample in the USA. Although it is not statistically significant, the results for a positive effect of duality into the underpricing are aligned with our expectations that IPO firms can be reduced their underpricing by better corporate governance if the positions of CEO and chairman hold by two different persons. That is why the position of CEO and chairman have conflicts of interests and therefore both positions must be separate from each other (Rashid 2010; Afza, Yousaf, and Alam 2013). In addition, we were anticipating that fixed income affects inversely the level of underpricing because a higher proportion of fixed income indicates that the CEO takes decisions to focus on the long-run period, to create value for the firm. These results are aligned with our expectations for models 1 and 3 but are not significant (Laksmana 2008). Finally, our expectations and results are different regarding the risk income variable since we were anticipating that, as higher the CEO's risk income is, the CEO may take decisions for short term performance which may have unpleasant or catastrophically long-term effects and then higher the underpricing. However, results show that the higher the CEO risk income, the lower the underpricing. This may happen because

¹⁰ On June 20,2012, USA SEC sign into the law a new rule that made mandatory for boards of public firms, with some exceptions, to be comprised by a majority of independent members. Specifically, the rule mentions that: «Independent Directors constituting a majority of the Board's Independent Directors in a vote in which only Independent Directors participate». (For more information, see SEC Release No. 33-9330, Listing Standards for Compensation Committees, June 20, 2012).

the equity-based compensation, that is the risk income, connects the compensation of the CEO with the equity creating incentives to increase the performance of the company (Manders 2012). Taking all the above into consideration, we are partially consistent with hypothesis 4 since our results only for the variables EGC, JOBS Act, and CEO age are aligned with our expectations and they are statistically significant. Although our expectations are consistent with our results for all the other variables except for independence and risk income, they are not statistically significant.

5 Sensitivity analysis

To test for the robustness of our empirical results we use another measurement of IPOs underpricing. Basically, we measure the underpricing of the IPO firms with the raw return¹¹ instead of the market-adjusted return. In addition, we regress equation 2 by changing the dependent variable of market-adjusted return with the raw return¹² of firms. Before the regression results, we execute the test of means and the difference in differences analysis to examine for the robustness of our results regarding the first three hypotheses. Results of the t-test of means, which are illustrated in Table 11 Panels A and B for EGCs and NEGCS, respectively, are consistent with our main results in table 7 Panel A for EGCs and Panel B for NEGCS. Specifically, we found that all three dependent variables of raw return, before and after the JOBS Act are statistically significant for both EGCs and NEGCS. As we can see the underpricing (raw return) of NEGCS after the JOBS Act, as measured by raw return, is still much higher than the underpricing (raw return) before the JOBS Act, which as we refer above it is not as expected. In addition, table 12 shows that consistent with our main results, the difference of underpricing (raw return) of pre and post EGCs is lower than the difference of underpricing (raw return) of pre and post NEGCS. Nevertheless, the results of the difference in differences analysis are not statistically significant, which is also consistent with our main results illustrated in table 8. Therefore, the upshot is that consistent with our main results, hypothesis one of sensitivity analysis is valid, hypothesis two is not valid since the NEGCS seem to be affected by the JOBS Act and hypothesis three is not consistent since the increase of underpricing of NEGCS is higher than this of EGCs.

¹¹ The raw return is the closing price minus the IPO offer price scaled by IPO offer price ($R_{i0} = \frac{(Price_i - Offer\ Price)}{Offer\ Price}$)

¹² The difference between the raw return and the market-adjusted return is that the first one is not adjusted on the market ($AR = R_{i0} - R_{M0}$), where AR is the abnormal return, that is the market-adjusted return and R_{M0} is the market return.

Moreover, looking at the regression results, table 13, we have almost the same results as our main analysis. The independent variables JOBS Act, EGC, and CEO_age are statistically significant and consistent with our main results. JOBS_ Act and EGCs are positively related to the underpricing (raw return) while CEO_age is negatively associated with underpricing (raw return). All other independent variables are not statistically significant, and their signaling is consistent with our main results. However, there is only one variable, the proportion of independent directors in the board which is significantly positively related to the underpricing (0,30) (raw return (0,30)) and this result is not consistent with our main results since the independence variable is not significant in any window. However, this is consistent with (Eriksen and Åberg 2019). Taking everything into consideration, we are partially consistent with hypothesis 4 since our results are aligned with our expectations and they are statistically significant only for the variables EGC, JOBS Act, and CEO age. Although our expectations are consistent with our results for all the other variables except for risk income and independence, they are not statistically significant. Finally, regarding the variable of independence for model 3, underpricing (0,30), we are not consistent with our results which indicate a significant positive relationship between the underpricing and the proportion of independent directors. Summarizing, except for the case of the significant positive impact of independence in underpricing (0,30), all other sensitivity analysis results are consistent with our main results indicating the robustness of our main analysis and results.

6 Additional work – JOBS Act 2017

6.1 Institutional framework and hypotheses

6.1.1 JOBS Act 2017

The JOBS Act 2017 announced on June 29, 2017, and took effect on July 10, 2017, is the expansion of the JOBS Act 2012, which previously benefited only the EGC firms and except NEGCS from some mandatory disclosures. Specifically, the Division of Corporate Finance which previously were accepted draft registration statement submissions only from EGCs, is now, after the registration of the JOBS Act 2017 into the law accepting this draft registration by also the NEGCS, expanding the law to all companies. Therefore, the JOBS Act provisions contained by the existing and expanding confidential submissions process aiming to benefits NEGCS firms.

6.1.2 Hypothesis and expectations

The hypothesis of this additional work is based on the same logic as the hypothesis referred above for JOBS Act 2012¹³. Firstly, we are expecting that the provisions of the new JOBS Act 2017 affect only the NEGCS since nothing new is changing for EGCs. Therefore, we expect that NEGCS will be underpriced more than before the implementation of the JOBS Act 2017, because they will disclose less information introducing higher information uncertainty, whilst EGCs will not be affected by this law since had been already affected by the provisions of the JOBS Act 2012 and the market had been adapted regarding the EGCs. Thus, our first and second hypotheses are the following:

H1: NEGCS are more underpriced after the registration of the Jobs Act 2017.

H2: No change in underpricing of EGCs after implementation of the Jobs Act 2017

Both hypotheses lead to the conclusion that only the underpricing of NEGCS will be affected by the JOBS Act 2017. Then, by merging the first and second hypotheses we end up with a third hypothesis which compares the change of underpricing before and after the JOBS Act between NEGCS and EGCs. Specifically, the third hypothesis says that:

H3: The difference of pre-and post-JOBS Act IPO underpricing of NEGCS is higher than the difference of pre-and post-JOBS Act IPO underpricing of EGCs

Finally, as had been thoroughly mentioned above the corporate governance is one of the most important mechanisms of a firm that can improve its performance and increase its value, given that corporate governance is qualitative and effective. Therefore, the fourth hypothesis says that:

H4: The better the corporate governance the lower the IPO underpricing

The term «better corporate governance» means more board members, a high proportion of independent directors in the board, the CEO is old and female, the positions of CEO and chairman are held by two different persons, and the total compensation of CEO based more on a fixed income, that is salary, and lower to risk income.

¹³ This section concerns additional work for the JOBS Act 2017 and does not explain in detail the provisions of this law. In addition, hypotheses, methodology, sources of the dataset and variables are almost the same as the main analysis of this study and it is not needed to explain them gain. Therefore, we do not go into detail on this section, except for the regression results that analysed and explained in detail.

6.2 Methodology, dataset, and diagnostic tests

To carry out the results for JOBS Act 2017, we follow the same methodology as the JOBS Act 2012. The only difference is that instead of using equation 1, we utilize equation 5 to take our results. The difference between the 2 equations is that equation 2 also contains the interaction between the two independent variables of EGC and the JOBS Act. We did not use the interaction in the analysis for JOBS Act 2012 because of the multicollinearity problem, however, in the case of the JOBS Act 2017 there is not any multicollinearity problem, so we also input the interaction in the model. Equation 6 shows the detailed model of the equation 5¹⁴. The rest of the methodology regards the calculation of the underpricing followed exactly in the same way as mentioned above in the section of methodology.

$$\begin{aligned} \text{InfoUncertainty}_i &= b_0 + b_1 \text{NEGCs} + b_2 \text{JA}_{2017} + b_3 \text{NEGCs} * \text{JA}_{2017} \\ &+ b_4 \sum \text{Corporate Governance variables} \\ &+ b_5 \sum \text{Firm's specific factors} \end{aligned} \quad (5)$$

$$\begin{aligned} \text{InfoUncertainty}_i &= b_0 + b_1 \text{CEO_age}_i + b_2 \text{CEO_sex}_i + b_3 \text{Board}_i + b_4 \text{Independence} \\ &+ b_5 \text{Duality} + b_6 \text{Fixed_income} + b_7 \text{Risk_income} + b_8 \text{ROA}_i \\ &+ b_9 \ln \text{Assets}_i + b_{10} \ln \text{Revenue} + b_{11} \text{R\&D}_i + b_{12} \text{Auditori} \\ &+ b_{13} \ln \text{Age} + b_{14} \text{NEGC} + b_{15} \text{JA}_{2017} \\ &+ b_{16} \text{NEGCs} * \text{JA}_{2017} + e_i \end{aligned} \quad (6)$$

The dataset used for the analysis was collected in the same way and from the same sources as did in the case of the JOBS Act 2012. The only difference here is that the dummy variable of NEGC takes the value 1 if the firm is NEGCs, that is its revenue is higher than \$1.070 billion and 0 otherwise. In addition, the dummy variable JOBS Act 2017 takes the value 1 if the IPO happened after the implementation of the JOBS Act and 0 otherwise. The

¹⁴ The independent variables «NEGC» is a dummy variable that takes the value 1 if the IPO is NEGC and 0 otherwise. NEGC is a firm with total revenue more than \$1.070 billion. The independent variable «JA_2017» is also a dummy variable that takes the value 1 if the IPO took place after the implementation of the JOBS Act 2017 and 0 otherwise.

rest of the variables are the same as the JOBS Act 2012 analysis and presented in Table 2 Panel A and Panel B. Furthermore, to illustrate the empirical part of this study, we identify a final sample of 712 U.S. IPO's issued between August 1, 2012, and December 12, 2019, of which is excluded financial organizations, real estate, and insurance companies with SIC code 6091,6371, 6722, 6726, 6732, 6733, 6799. Finally, to meet with OLS regression assumptions and to test if our model estimates are the best linear unbiased estimators (BLUE), we performed the diagnostic tests for outliers, multicollinearity, heteroskedasticity, and normality, which are referred to in detail above. In any case that there was any diagnostic problem, we corrected it to end up with BLUE results. Tables 14, 15, and 16 show the results for multicollinearity, heteroskedasticity, and normality, respectively.

6.3 Empirical results

6.3.1 T-test of means and difference in differences test

Table 17, Panel A, B, C, and D illustrated the basic descriptive statistics, observations, mean, minimum, maximum, and standard deviation, for both EGCs and NEGCS. Following, we executed some tests for means to have a better view of the significance regarding the difference in means before and after the JOBS Act for EGC and NEGCS IPOs separately. Table 18, Panel A and B illustrate these results. Firstly, regarding NEGCS, it seems that their underpricing increased on average after the implementation of the JOBS Act, although the t-test shows that these differences of mean underpricing before and after the JOBS Act are not statistically significant. Nevertheless, these results are consistent with our hypothesis 1 that NEGCS underpricing increased at a higher level after the JOBS Act 2017. Also, in table 18, panel B shows that the underpricing (0,0) and (0,30) of EGCs face a negligible increase after the JOBS, whilst the underpricing (0,1) face a negligible decrease. Although these results are not statistically significant shows that hypothesis 2, which says that EGCs does not affect by the JOBS Act, is valid since changes in mean underpricing before and after the JOBS Act are very close to zero. In addition, table 19 shows that the increase in underpricing of NEGCS is higher than the increase of underpricing in EGCs before and after the JOBS Act, showing that we are consistent with hypothesis 3, although these results are not statistically significant.

6.3.2 Regression results

Table 20 depicts the regression results. The only statistically significant variables are the CEO age and independence. Regarding the first one, we expected that CEO age should

negatively affect the IPO underpricing. Consistent with our expectations, CEO age has a negative sign and is statistically significant at the 1% level for model 1 and at the 5% significance level for models 2 and 3. These results are consistent with other research (Ernestine and Setyaningrum 2018; Gounopoulos, Loukopoulos, and Loukopoulos 2020) and indicate that the CEO age and IPO underpricing are inversely related because an older CEO have more extensive work experience and thus, he (or she) attracts more investors since CEO can convince them that he (or she) can lead the company better. In addition, the proportion of independent members in a board has a positive effect on underpricing, inverse to our expectations. A potential scenario maybe that independent directors fail to mitigate asymmetry information between investors and issuers. This may be happening because managers may be preventing independent directors from increasing information dissemination due to the weaker corporate governance system of the country. These results are consistent with other research (Darmadi and Gunawan 2013; Dah, Abosedra, and Matar 2012).

Regarding the other independent variables, namely NEGC, JA_2017, the interaction of NEGC with JA_2017, CEO sex, the board size, independent, duality, fixed and risk income, no one of them are statistically significant, however, we compared our results with our expectations. Starting with NEGC and JOBS Act dummy variables, we anticipated that both should increase the IPO underpricing, since the JOBS Act 2017 ease some provisions of the law for NEGC firms and allow them to avoid the publication of some mandatory disclosures, which lead to higher uncertainty of information. As a result, investors are underpricing the NEGC firms, after the JOBS Act to get compensated for the risk of asymmetry of information and uncertainty information. Consistent with our expectations, the JOBS Act 2017 variable positively affects the IPO underpricing, however, it is not statistically significant. Moreover, inversely to our expectations, NEGC negatively affects the underpricing, however, this is not statistically significant, most probably because if a firm is NEGC the IPO underpricing must be increased, as other researchers explain (Barth, Landsman, and Taylor 2017; Chaplinsky, Hanley, and Moon 2017). Another possible reason for the inconsistent and non-significant results may be the fact that only 11.7% of the overall sample contained by NEGCs, and this may not produce accurate and statistically significant results for the NEGC variable. In addition, the interaction of the NEGC and JOBS Act was expected to affect positively the IPO underpricing, since the combination of NEGC and JOBS Act firms lead to a higher level of underpricing. In contrast with our expectations, the interaction term positively affects the

underpricing (0,0) and negatively affects the underpricing (0,1) and (0,30). However, no one is statistically significant.

In addition, we expected that a female CEO will lead to reduced underpricing because a female CEO considered as a better leader, as mentioned above. Our results are consistent with this expectation nevertheless are not statistically significant. One reason may be the fact that only 5% of the overall sample of CEO sex variable refers to female CEOs and this cannot produce accurate and significant results however, the non-significance is in line with prior research (Eriksen and Åberg 2019). Regarding the case of board size, the results are very contradictory. As we have discussed earlier in the section of literature review, there is a group of research which point out that big boards are better because there are more people with different background and more opinions are heard around an issue. In addition, it believes that larger boards will provide better and more accurate monitoring and thus the information asymmetry will be mitigated (Darmadi and Gunawan 2013). That was the way of our thinking and we have anticipated an adverse influence of board size, that is a large board decreases the level of IPO underpricing. Nevertheless, our results are opposite to that, showing that a large board size results in a lack of communication and coordination among members which increase the IPO underpricing while a small board size increases the effectiveness of decision-making and the performance of the firm and as a result reduce the IPO underpricing (Yermack 1996; Hermalin and Weisbach 2001). However, these results may be not significant because a smaller board cannot deal with the complexity of a larger firm's business operations and in this case, larger board size is needed. In any case, the non-significance is consistent with Ullah, Fang, and Jebran (2019).

Although it is not statistically significant, the results for a positive effect of duality into the underpricing are aligned with our expectations that IPO firms can reduce their underpricing by better corporate governance if the positions of CEO and chairman hold by two different persons. That is why the position of CEO and chairman have conflicts of interests and therefore both positions must be separate from each other. In addition, we anticipated that fixed income affects inversely the level of underpricing because a higher proportion of fixed income indicates that the CEO takes decisions to focus on the long-run period, to create value for the firm. These results are aligned with our expectations for models 1 and 3 but are not significant (Laksmana 2008). Finally, our expectations about a positive impact of risk income on underpricing are aligned with our results, although are not statistically significant. The basic idea behind this is that, if a CEO is rewarded with bonuses in the short-term period, this will incentivize CEOs to take riskier decisions that may increase

the short-term profitability of the firm but this may eventually destroy the firm's value (Laksmana 2008). In addition, if the income of the CEO is equity-based and, for example, the CEO owns some options, the CEO is more willing to take riskier decisions for the firm, because the CEO keeps the options¹⁵ that eliminate the risk for him (or her) in the case that firms value reduces in a great deal. Taking all the above into consideration, we are partially consistent with hypothesis 4. Firstly the only variable that is statistically significant and aligned with our expectations is the CEO age. Results for a statistically significant positive relationship between the proportion of independent directors and directors were not expected. Finally, although our expectations are the same as our results for all the other variables except for NEGC and the interaction term, they are not statistically significant.

7 Conclusions and Recommendations

The JOBS Act creates a new category of issuer, the EGCs, and exempts them from some mandatory financial statement disclosures. This law aimed to encourage initial public offerings and provide a kind of assistance to EGCs by saving a burdensome cost of issuance. However, instead of stopping the disclosures, only EGCs who really could not afford the cost of going public, it seems that all the EGCs took this advantage and therefore they introduce a higher level of information of uncertainty. Furthermore, studies show that corporate governance plays an important role in the mitigation of information uncertainty and ultimately in the level of underpricing. Setting effective corporate governance that protects minority shareholders is arguably most important at the time of an initial public offering because the IPO represents the first time that most firms raise equity from dispersed investors.

The purpose of this research is to examine the effects of the JOBS Act 2012 on information uncertainty and whether corporate governance influences the asymmetry of information. Using a sample of 781 USA listed EGC and NEGC firms for the period 2007-2017, we find evidence that both EGCs and NEGCs are underpriced at a higher level after the adoption of the JOBS Act. Regarding the finding for EGCs, are reasonable and consistent with both Barth, Landsman, and Taylor (2017) and our first hypothesis that EGCs' underpricing is higher after the JOBS Act. However, it was not expected to face a higher level of NEGCs underpricing because the law does not exempt NEGCs from any disclosure. As a result, we are not aligned with hypothesis two that NEGCs underpricing stay unaffected

¹⁵ Options are hedging methods to offset the risk that is related to a firm's share.

by the law. Also, we are not in line with hypothesis three since NEGCS increase in underpricing is higher than EGCs do, although this is not statistically significant. Moreover, it seems that if an IPO refers to an EGC firm or takes place after the JOBS Act, it has a higher probability to face a higher level of underpricing. In addition, we found a statistically negative relationship between CEO age and underpricing. Regarding all other variables, our expectations were consistent with our results except for independence and risk management, however, results are not statistically significant, thus our results do not provide any clear evidence about the relationship between those variables and underpricing. Therefore, we are partially consistent with hypothesis 4 that better corporate governance can reduce the IPO underpricing level.

Regarding the JOBS Act 2017, we gather data for 712 IPOs in the USA for the period 2012-2019. We showed that not only the IPO underpricing of NEGCS is affected by the JOBS Act 2017, but it is also affected in a greater magnitude than EGCs. On the other hand, EGCs face a small change in their underpricing which is close to zero. Regression results show a significant negative association between the CEO age and IPO underpricing and a significant positive relationship between the proportion of independence and the IPO underpricing. Regarding all other independent variables, our expectations are consistent with our results except for independence, NEGCS, and the interaction term, however, results are not statistically significant. Therefore, our expectations are partially aligned with our results, apart from the NEGCS variable and the interaction term of JOBS Act*NEGCS, which indicate inversely non-significant signaling than the expected one and the coefficient of the variable of the independence is negative with statistically significant association with underpricing, in contrast with our expectations. Regarding the case of the JOBS Act 2017, we are consistent with hypotheses 1, 2, and 3, although results are not statistically significant, and partially consistent with hypothesis 4.

This research has two important limitations, the small size of the sample refers to NEGCS IPOs and the small frequency of female CEOs regarding the CEO gender variable. Both limitations deprive us of the possibility of having appropriate and accurate results. Regarding future work, we would suggest to be added in the sample more observations to increase the proportion of NEGCS sample related to the total sample. In addition, it would be interesting if our model expands to examine variables for the CEO tenure and CEO education. The CEO education could be measured by dummy variables such as the business degree, that is if the CEO's studies are related to business cycle like degree in accounting, finance, economics or MBA. Some other dummy variables could be the master degree, phd

degree, or a professional qualification, like ACCA, ACA or CFA, which will take the value 1 if the CEO hold the corresponding degree. Both, CEO tenure and CEO education are variables that are difficult to find them, but if there is cooperation with global firms, like big four companies, they may provide us with these information. Another recommendation about future work that would be very interesting and could be researched by itself is to exercise how EGCS decisions about disclosure would be affected if the equity market conditions are not so favorable, and how this affects the underpricing. For example, in a great recession or a crisis, EGCs will still hide part of their mandatory disclosures or not? What is the influence of their decisions on the IPO underpricing? Added to all these, it would be very exciting and interesting if this research were applied also to other capital markets except the USA.

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8 Appendices

Table 1. Final Sample

In this table, we illustrate the initial and final datasets, and reasons for deletion and exclusion of observations.

Period: 2007 - 2017	IPOs
Initial sample	903
Less:	
Firms that do not found in SEC or with missing Offer Price	17
Firms with missing executives' compensation	39
Firms with missing information about closing prices	17
Firms without first day opening price	1
Firms without information about firms' specific factors (financial components)	27
Firms without independent information	21
Total Final Sample	781

Table 2. Variables**Table 2. Panel A. Variables, Source and Definition**

In this table, we present all raw variables collected, their definition, and the source of each variable.

Raw variables

Variable	Definition
Offer_price	IPO offer price [Source: <i>SEC</i>]
Duality	Dummy variable equals 1 if CEO and chairman is the same person and 0 otherwise [Source: <i>SEC</i>]
Board	Number of directors in the board (Board size) [Source: <i>SEC</i>]
Independence	Proportion of independent directors in the Board [Source: <i>SEC</i>]
CEO_age	Age of CEO [Source: <i>SEC</i>]
CEO_sex	Dummy variable equals to 1 if the CEO is man and 0 otherwise [Source: <i>SEC</i>]
Salary	Salary of CEO [Source: <i>SEC</i>]
Bonus	Bonus that may be earned by CEO [Source: <i>SEC</i>]
Option_awards	Any option awards of the CEO [Source: <i>SEC</i>]
NEIPC	Non-equity incentive plans compensation [Source: <i>SEC</i>]
AOC	All other compensations gained by CEO [Source: <i>SEC</i>]
Stock_awards	Any stock awards of the CEO [Source: <i>SEC</i>]
Founding date	The date of the firm's establishment [Source: <i>Jay R. Ritter</i>]
Assets	Total assets (million) [Source: <i>Compustat item «AT»</i>]
Revenue	Total revenue (million) [Source: <i>Compustat item «REVT»</i>]
Net income/loss	Net income or loss (million) [Source: <i>Compustat item «NI»</i>]
R&D_exp	Research and development expenses of the IPO firm (million) [Source: <i>Compustat item «XRD»</i>]
Audit_firm	Each number of auditors refers to an audit company [Source: <i>Compustat item «AU»</i>]
Equity	Total stockholder equity (million) [Source: <i>Compustat item «TEQ»</i>]
CSO	Common shares outstanding of the firm (million) [Source: <i>Compustat item «CSHO»</i>]
Cl. price day 0	The closing price the day of IPO [Source: <i>CRSP</i>]
Cl. price day 1	The closing price one day after the IPO [Source: <i>CRSP</i>]
Cl. price day 30	The closing price 30 days after the IPO [Source: <i>CRSP</i>]
Op. price day 0	Opening price the day of IPO [Source: <i>CRSP</i>]

Table 2. Panel B. Variables and Calculation

In this table, we present all variables used for our analysis, calculated or not variables, as well as their definition.

Calculated variables

Variable	Definition
CEO_age	Age of CEO
CEO_sex	Dummy variable equals to 1 if the CEO is man and 0 otherwise
Duality	Dummy variable equals 1 if the CEO and chairman is the same person and 0 otherwise
Board	Number of directors on the board (Board size)
Independence	Proportion of independent directors in the Board
Fixed_inc	Salary of CEO
Risk_inc	Sum of bonuses, AOC, option and stock awards, and any non-equity incentive plan
ln_assets	Natural logarithm of one plus total asset
ln_revenue	Natural logarithm of one plus revenue
ln_age	Natural logarithm of one plus age of firm (number of years from foundation until IPO of firm)
ROA	Net income scaled by total assets
R&D_exp	Research and development expenses of the IPO firm (million)
Auditor	Dummy variable which takes the value of 1 if the auditor company of the IPO firm is ranked into the big four companies (Ernst & Young, KPMG, Deloitte, and PwC) and 0 otherwise
Return(0,0)	Closing price (day 0) -offer price / offer price
Return(0,1)	Closing price (day 1) -offer price / offer price
Return(0,30)	Closing price (day 30) -offer price / offer price
Underpricing (0,0)	The market-adjusted return 0 (raw return(0,0) minus market return(0,0))
Underpricing (0,1)	The market-adjusted return 1 (raw return(0,1) minus market return(0,1))
Underpricing (0,30)	The market-adjusted return 30 (raw return(0,30) minus market return(0,30))
EGC	Dummy variable equals 1 if the firm is EGC based on the Revenue (Revenue < 1.070\$ billion) and 0 otherwise
JA_2012	Dummy variable equals 1 if the IPO happened after JA establishment and 0 otherwise

Table 3. Multicollinearity

Panel A of this Table illustrates the VIF for each variable, including the interaction EGC*JA_2012, and Panel B demonstrates the VIF for each variable, excluding the interaction EGC*JA_2012, to test for multicollinearity.

Variable	VIF
EGC_JA	10.33
JA_2012	8.58
ln_assets	4.64
ln_revenue	4.14
EGC	4.06
Fixed_inc	2.23
ln_age	1.95
ROA	1.54
Indep	1.47
Board	1.25
Risk_inc	1.23
Ceo_age	1.15
Auditor	1.12
Duality	1.1
RD	1.04
CEO_sex	1.04
Mean VIF	2.93

Table 3. Panel B. Multicollinearity test without interaction

Variable	VIF
ln_assets	4.64
ln_revenue	4.14
Fixed_inc	2.23
EGC	2.13
ln_age	1.95
ROA	1.54
Indep	1.47
Board	1.24
Risk_inc	1.23
Ceo_age	1.15
Auditor	1.12
Duality	1.1
JA_2012	1.08
RD	1.04
CEO_sex	1.04
Mean VIF	1.81

Table 4. Heteroskedasticity test

We test for heteroskedasticity using the Breusch-Pagan test. The null hypothesis indicates homoscedasticity. If the p-value is lower than 10% means that the null hypothesis is rejected and there is heteroskedasticity. If this the case, we used the robust standard errors and we test for heteroskedasticity using the White test. Again, the null hypothesis indicates homoscedasticity.

	Breusch - Pagan	Robust standardized errors White-test
Underpricing(0)	0	0.6641
Underpricing(1)	0	0.6566
Underpricing(30)	0	0.0803

Table 5. Normality

We test for normality using the Shapiro-Wilcoxon test. The null hypothesis indicates that errors are normally distributed. If p-value is lower than 10%, then the null hypothesis is rejected.

	Shapiro-Wilk test
Underpricing(0)	0
Underpricing(1)	0
Underpricing(30)	0

Figure 1. Normality – Underpricing (0,0)

These figures test for normality of the error terms. The first figure is a histogram and the figure below is a Q-Q plot. Both these figures refer to the underpricing (0,0) If the standardized residuals are normally distributed, the curve of the histogram must be bell-shaped and symmetrically distributed around zero, while the points of the Q-Q plot should fall on the diagonal line.

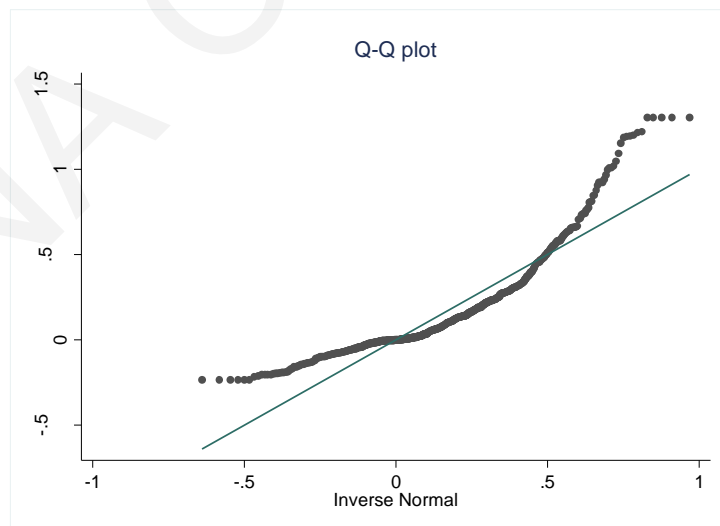
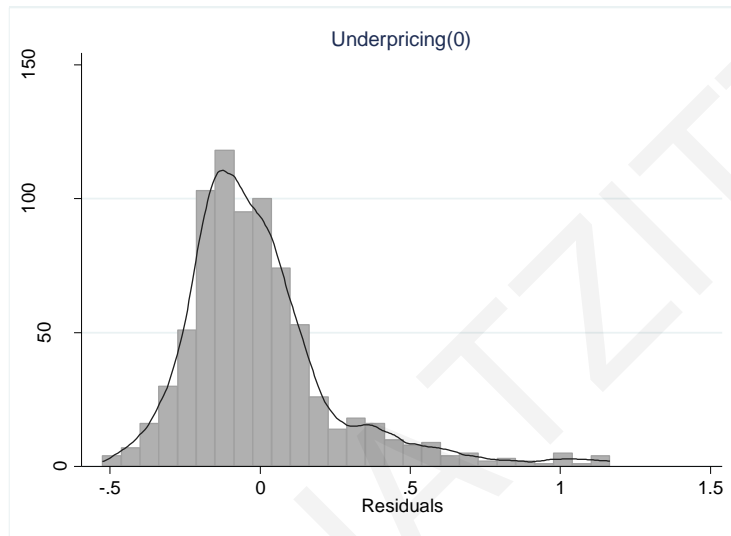


Figure 2. Normality – Underpricing (0,1)

These figures test for normality of the error terms. The first figure is a histogram and the figure below is a Q-Q plot. Both these figures refer to the underpricing (0,1) If the standardized residuals are normally distributed, the curve of the histogram must be bell-shaped and symmetrically distributed around zero, while the points of the Q-Q plot should fall on the diagonal line.

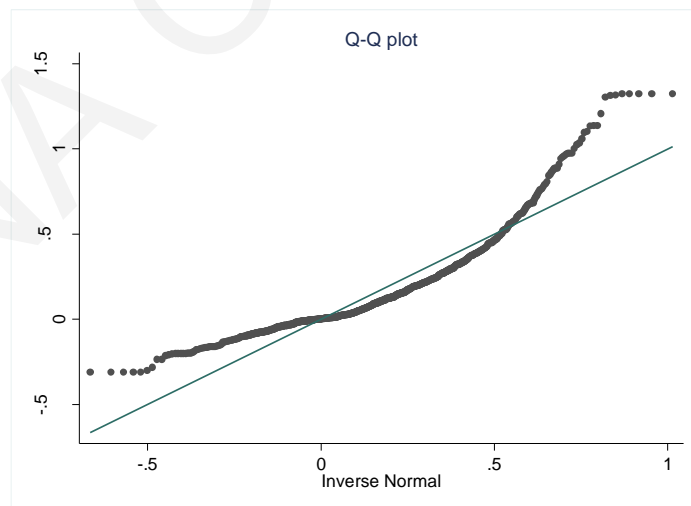
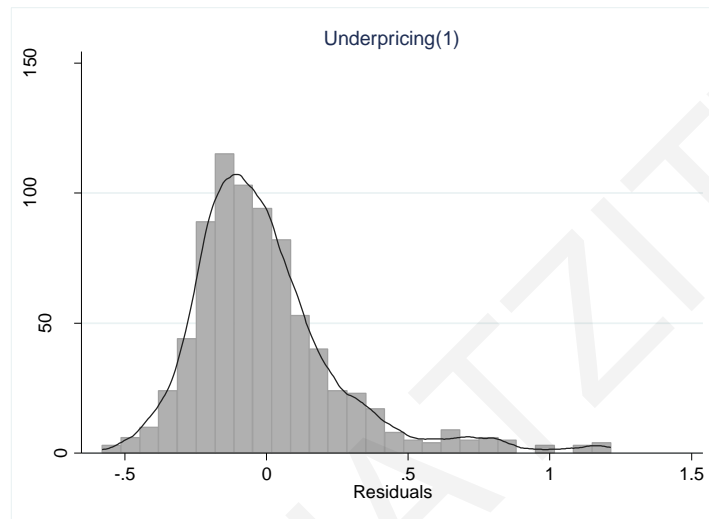


Figure 3. Normality – Underpricing (0,30)

These figures test for normality of the error terms. The first figure is a histogram and the figure below is a Q-Q plot. Both these figures refer to the underpricing (0,30) If the standardized residuals are normally distributed, the curve of the histogram must be bell-shaped and symmetrically distributed around zero, while the points of the Q-Q plot should fall on the diagonal line.

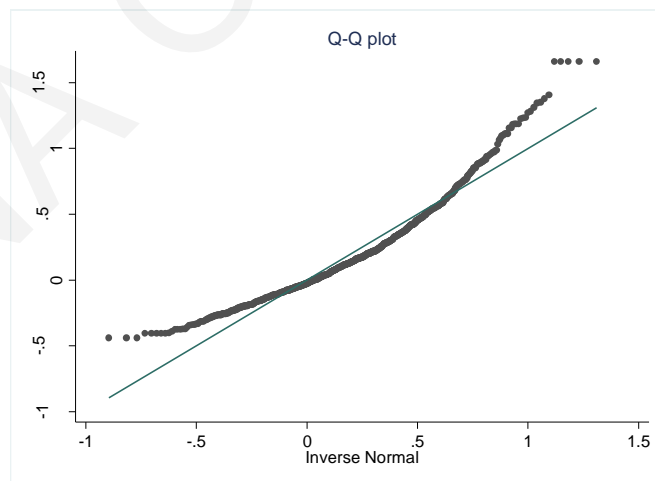
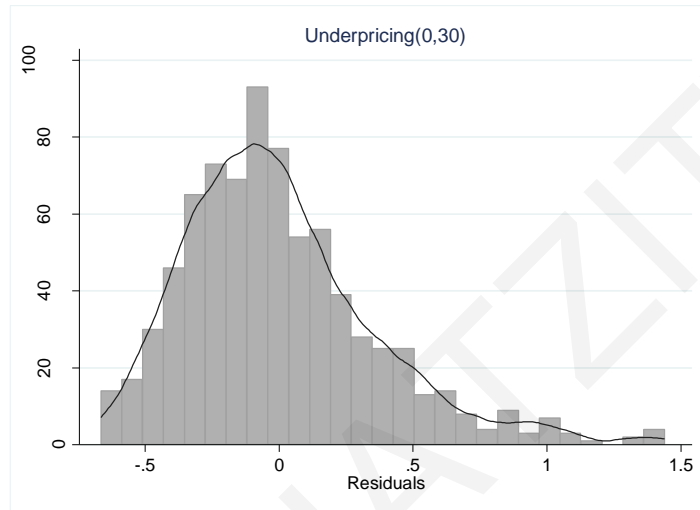


Table 6. Descriptive statistics

Table 6 refers to pre-EGCs, Panel A, post-EGCs, Panel B, pre-NEGCs, Panel C, and Post-NEGCs, Panel D, and presents descriptive statistics for variables used in our model. EGCs are firms with Revenue < 1.070\$ billion. Pre-EGC refers to EGCs that went public before the JOBS Act. Post-EGC refers to EGCs that went public after the JOBS Act. NEGCS are firms with Revenue > 1.070\$ billion. Pre-NEGC refers to NEGCS that went public before the JOBS Act. Post-NEGC refers to NEGCS that went public after the JOBS Act. The underpricing (0,0) is the raw return (0,0) minus the market return (0,0). The raw return (0,0) is calculated as the closing price on the day of the IPO (i.e., day t=0), minus the IPO offer price divided by the IPO offer price. Underpricing (0,1) is the raw return (0,1) minus the market return (0,1), where raw return (0,1) is the closing price on the first day, i.e., day t=1, minus the IPO offer price divided by the IPO offer price. Underpricing (0,30) is the raw return (0,30) minus the market return (0,30), where raw return (0,30) is the closing price 30 trading days, i.e., day t=30, after the IPO, minus the IPO offer price divided by the IPO offer price. CEO_age is the age of CEO; CEO_sex is a dummy variable equals to one if the CEO is female and zero otherwise; duality is a dummy variable equals to one if the position of CEO and chairman held by the same person and zero otherwise; board size is the number of directors in the board; independence is the proportion of independent directors in the Board, fixed income is the salary of CEO; risk income is the sum of bonuses, option, and stock awards, all other compensations and any non-equity incentive plan; ln_revenue is the natural logarithm of one plus revenue; ln_assets are the natural logarithm of one plus total assets, indicating the firm size; ln_age is the natural logarithm of one plus number of years from the establishment until IPO of the firm; auditor quality is a dummy variable which takes the value of 1 if the auditor company of the IPO firm is ranked into the big four companies (Ernst & Young, KPMG, Deloitte and PwC) and 0 otherwise; R&D is the research and development expenses of the IPO firm; ROA is the net income scaled by total assets. The sample of pre-EGCs (Panel A) consists of 270 IPO firms from January 2007 to March 2012. The sample of post-EGCs (Panel B) consists of 429 IPO firms from April 2012 to April 2017. The sample of pre-NEGCs (Panel C) consists of 35 IPO firms from January 2007 to March 2012. The sample of post-NEGCs (Panel D) consists of 68 IPO firms from April 2012 to April 2017.

Table 6. Panel A. Descriptive statistics for pre-EGCs

Variable	Obs.	Mean	Median	Q1	Q2	Min	Max	Std.Dev.
Underpricing(0)	270	0.1485	0.0985	-0.0021	0.2469	-0.2027	0.9247	0.2192
Underpricing(1)	270	0.1600	0.1079	0.0001	0.2731	-0.2001	0.9744	0.2335
Underpricing(30)	270	0.1705	0.1142	-0.0643	0.3494	-0.4371	1.1853	0.3179
CEO_sex	270	0.0333	0	0	0	0	1	0.1798
Ceo_age	270	50.2852	50	45	56	31	70	7.5906
Board	270	7.2852	7	6	8	3	12	1.6665
Indep	258	0.7143	0.6684	0.6	0.8333	0.1250	0.8889	0.1922
Duality	270	0.3963	0	0	1	0	1	0.4900
Fixed_inc	270	334.3430	304.187	256.25	400	33.28	875	136.2958
Risk_inc	270	929.3403	375.7045	154.963	909.219	0	13807.39	1871.6210
ROA	270	-0.2170	-0.0154	-0.3266	0.0666	-3.1124	0.4102	0.5569
ln_assets	270	4.7164	4.5998	3.7371	5.6031	1.9299	7.7788	1.3382
ln_revenue	270	4.0899	4.4028	3.5473	5.3950	0	6.7963	1.8619
RD	270	12.7160	8.2055	0	17.697	0	100.63	17.8918
Auditor	270	0.8222	1	1	1	0	1	0.3830
ln_age	270	2.5643	2.4849	2.1972	2.8904	0.6931	4.5747	0.6730

Table 6. Panel B. Descriptive statistics for post-EGCs

Variable	Obs.	Mean	Median	Q1	Q2	Min	Max	Std.Dev.
Underpricing(0)	429	0.1937	0.1088	-0.0006	0.2931	-0.2338	1.3045	0.3052
Underpricing(1)	429	0.1992	0.1215	-0.0042	0.3220	-0.3112	1.3214	0.3176
Underpricing(30)	429	0.2419	0.1707	-0.0547	0.4778	-0.4043	1.6610	0.4109
CEO_sex	429	0.0676	0	0	0	0	1	0.2513
Ceo_age	429	51.7343	52	47	57	35	68	7.4601
Board	429	7.0629	7	6	8	4	11	1.5628
Indep	424	0.6879	0.75	0.6	0.8333	0.1429	0.9	0.1838
Duality	429	0.3030	0	0	1	0	1	0.4601
Fixed_inc	429	343.0939	346.883	252.769	416	0	812	155.0694
Risk_inc	429	1301.239	411.539	134.688	1301.647	0	15146.25	
ROA	429	-0.6299	-0.2250	-0.6393	0.0016	-10.0785	0.5906	1.4381
ln_assets	429	4.2402	4.2009	3.2266	5.3625	0.0276	8.3316	1.6573
ln_revenue	429	3.2580	3.9998	0.6658	4.9283	0.0000	6.9754	2.2594
RD	429	13.5771	10.109	0.356	18.447	0	98.587	16.7478
Auditor	429	0.7949	1	1	1	0	1	0.4043
ln_age	429	2.4867	2.4849	2.0794	2.8332	1.0986	4.2341	0.6350

Table 6. Panel C. Descriptive statistics for pre-NEGCs

Variable	Obs.	Mean	Median	Q1	Q2	Min	Max	Std.Dev.
Underpricing(0)	35	0.0400	0.0466	-0.0020	0.0827	-0.1704	0.3009	0.0879
Underpricing(1)	35	0.0583	0.0603	-0.0093	0.1107	-0.1676	0.2692	0.0971
Underpricing(30)	35	0.0992	0.0756	-0.0230	0.2108	-0.3594	0.8128	0.2158
CEO_sex	35	0	0	0	0	0	0	0
Ceo_age	35	55.0286	55	50	59	41	69	7.2537
Board	35	9.0571	8	7	11	5	19	3.0673
Indep	32	0.3914	0.3167	0.1818	0.6	0.125	0.9167	0.2421
Duality	35	0.3429	0	0	1	0	1	0.4816
Fixed_inc	35	690.5127	599.997	466.923	875.5	308.333	1625	306.7465
Risk_inc	35	3718.378	1348.419	658.065	3066.342	0.138	36876.07	6712.058
ROA	35	0.0170	0.0130	0.0052	0.0405	-0.2467	0.2893	0.0806
ln_assets	35	7.7606	7.6626	7.1970	8.3319	5.6274	10.0797	0.9213
ln_revenue	35	7.7687	7.5861	7.3446	8.1381	7.0028	10.3315	0.6923
RD	35	31.2301	0	0	0.5	0	782	133.0269
Auditor	35	1	1	1	1	1	1	0
ln_age	35	3.5549	3.7136	2.7726	4.3567	1.9459	4.9558	0.9276

Table 6. Panel D. Descriptive statistics for post-NEGCs

Variable	Obs.	Mean	Median	Q1	Q2	Min	Max	Std.Dev.
Underpricing(0)	68	0.1132	0.0688	-0.0034	0.1575	-0.0921	1.2158	0.1917
Underpricing(1)	68	0.1304	0.0959	0.0002	0.1950	-0.1130	1.2069	0.1980
Underpricing(30)	68	0.1965	0.1691	0.0703	0.2797	-0.2367	1.1592	0.2521
CEO_sex	68	0.0441	0	0	0	0	1	0.2069
Ceo_age	68	54.6029	55	51.5	58.5	27	67	6.6560
Board	68	8.3235	8.5	7	9	4	12	1.7487
Indep	68	0.3974	0.3333	0.2222	0.5278	0.0909	0.8889	0.2369
Duality	68	0.2353	0	0	0	0	1	0.4273
Fixed_inc	68	755.7181	766.549	629.8435	915.3845	150.833	1200	224.8044
Risk_inc	68	3432.95	1680.618	818.822	4693.249	21.447	19746.92	4220.848
ROA	67	0.0120	0.0101	-0.0085	0.0339	-0.1608	0.1580	0.0534
ln_assets	68	7.9505	8.0206	7.4647	8.5591	5.3602	10.2061	0.8539
ln_revenue	68	7.9405		7.3096	8.3375	6.9772	10.5400	0.7855
RD	68	21.6213	0	0	5.4075	0	409	74.8557
Auditor	68	0.9559	1	1	1	0	1	0.2069
ln_age	68	3.7045	3.7612	3.2958	4.2767	2.1972	5.0106	0.7661

Table 7. Univariate Differences

This table illustrates the means and medians of variables used in our model for EGC, Panel A, and NEGC, Panel B, firms before and after the JOBS Act. EGCs are firms with Revenue < 1.070\$ billion. NEGC are firms with Revenue > 1.070\$ billion. We mention the two-tailed p-values to tests for the differences in means and medians using the t-test and Wilcoxon test, respectively. See table 2, Panel A and B for variable definitions. The sample of EGCs (Panel A) consists of 682 IPO firms from January 2007 to April 2017. The sample of NEGCs (Panel B) consists of 99 IPO firms from January 2007 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Table 7. Panel A. Univariate Differences for EGC firms

Variable	Before		After		P-value: test of difference in means (t-test)	P-value: test of difference in medians (Wilcoxon test)
	Mean	Median	Mean	Median		
Underpricing(0)	0.1485	0.0985	0.1937	0.1088	0.0351**	0.3432
Underpricing(1)	0.1600	0.1079	0.1992	0.1215	0.0806*	0.4928
Underpricing(30)	0.1705	0.1142	0.2419	0.1707	0.0153**	0.0825*
CEO_sex	0.0333	0	0.0676	0	0.0518*	0.0519*
Ceo_age	50.2852	50	51.7343	52	0.0132**	0.0062***
Board	7.2852	7	7.0629	7	0.0748*	0.0393**
Indep	0.7143	0.6684	0.6879	0.75	0.1855	0.1625
Duality	0.3963	0	0.3030	0	0.0112**	0.0113**
Fixed_inc	334.343	304.187	343.0939	346.883	0.4472	0.0726*
Risk_inc	929.3403	375.7045	1301.239	411.539	0.0282**	0.3780
ROA	-0.2170	-0.0154	-0.6299	-0.2250	0***	0***
ln_assets	4.7164	4.5998	4.2402	4.2009	0.0001***	0.0002***
ln_revenue	4.0899	4.4028	3.2580	3.999796	0***	0***
RD	12.7160	8.2055	13.5771	10.109	0.5194	0.0745*
Auditor	0.8222	1	0.7949	1	0.3745	0.3741
ln_age	2.5643	2.4849	2.4867	2.4849	0.1246	0.1589

Table 7. Panel B. Univariate Differences for NEG C firms

Variable	Before		After		P-value: test of difference in means (t-test)	P-value: test of difference in medians (Wilcoxon test)
	Mean	Median	Mean	Median		
Underpricing(0)	0.0400	0.0466	0.1132	0.0688	0.0346**	0.1003
Underpricing(1)	0.0583	0.0603	0.1304	0.0959	0.0449**	0.1003
Underpricing(30)	0.0992	0.0756	0.1965	0.1691	0.0546*	0.04**
CEO_sex	0	0	0.0441	0	0.2111	0.2095
Ceo_age	55.0286	55	54.6029	55	0.7662	0.9166
Board	9.0571	8	8.3235	8.5	0.125	0.5101
Indep	0.3914	0.3167	0.3974	0.3333	0.9078	0.8388
Duality	0.3429	0	0.2353	0	0.2494	0.2475
Fixed_inc	690.5127	599.997	755.7181	766.549	0.2225	0.0601*
Risk_inc	3718.378	1348.419	3432.95	1680.618	0.7922	0.554
ROA	0.0170	0.0130	0.0120	0.0101	0.7038	0.3841
ln_assets	7.7606	7.6626	7.9505	8.0206	0.3005	0.1745
ln_revenue	7.7687	7.5861	7.9405	7.7344	0.2768	0.3094
RD	31.2301	0	21.6213	0	0.6396	0.845
Auditor	1	1	0.9559	1	0.2111	0.2095
ln_age	3.5549	3.7136	3.7045	3.7612	0.3866	0.5075

Table 8. Difference in differences between EGCs and NEGCS

This table reports the differences in differences test for means of both independent and dependent variables between EGC and NEGCS firms. EGC are firms with Revenue < 1.070\$ billion and NEGCS are firms with Revenue > 1.070\$ billion. The first (and second) column illustrates the difference in the mean between pre and post EGCs (NEGCS). The third column subtracts column 2 by column 1 to find the difference between the change of underpricing before and after the JOBS Act between EGC and NEGCS IPOs. See table 2, Panel A and B for variable definitions. The sample consists of 781 IPO firms from January 2007 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, *p<0.1.

Variable	Difference in means between pre and post NEGCS	Difference in means between pre and post EGC's	EGC's-NEGCS	P-value
Underpricing(0)	0.0451	0.0732	-0.0281	0.632
Underpricing(1)	0.0392	0.0722	-0.0330	0.59
Underpricing(30)	0.0713	0.0973	-0.0260	0.748
CEO_sex	-0.0343	-0.0441	0.0099	0.84
Ceo_age	1.4491	-0.4256	1.8747	0.256
Board	-0.2222	-0.7336	0.5114	0.177
Indep	-0.0263	0.0059	-0.0323	0.759
Duality	-0.0933	-0.1076	0.0143	0.891
Fixed_inc	8.7509	65.2054	-56.4545	0.125
Risk_inc	371.8987	-285.4280	657.3267	0.282
ROA	-0.4129	-0.0051	-0.4079	0.096*
ln_assets	-0.4762	0.1899	-0.6661	0.042**
ln_revenue	-0.8319	0.1718	-1.0037	0.024**
RD	0.8611	-9.6089	10.4700	0.221
Auditor	-0.0274	-0.0441	0.0168	0.841
ln_age	-0.0776	0.1495	-0.2272	0.13

Table 9. Correlation matrix

Table 9, Panel A presents the correlation matrix among variables before the JOBS Act. See table 2 Panel A and B for variable definitions. The sample comprises 290 IPO firms from January 2007 to March 2012. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Table 9. Panel A. Correlation between variables, before the JOBS Act

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Underpricing(0)	1.0000															
(2) Underpricing(1)	0.9583***	1.0000														
(3) Underpricing(30)	0.7439***	0.7510***	1.0000													
(4) Duality	0.0457	0.0566	0.0383	1.0000												
(5) Ceo_age	-0.1583***	-0.1643***	-0.0517	0.1744***	1.0000											
(6) CEO_sex	-0.1294**	-0.1445**	-0.0562	0.0600	-0.0644	1.0000										
(7) Board	0.0066	-0.0056	0.0426	-0.0589	0.0458	0.0535	1.0000									
(8) Indep	0.1267**	0.0987*	0.1259**	0.0265	-0.1412**	0.0130	-0.0022	1.0000								
(9) Fixed_inc	-0.1193**	-0.108*	-0.0664	0.0917	0.2921***	-0.0077	0.3341***	-0.3819***	1.0000							
(10) Risk_inc	0.0328	0.0168	-0.0020	0.0832	0.0730	-0.0074	0.3052***	-0.2118***	0.4300***	1.0000						
(11) RD	-0.0239	-0.0067	-0.0173	0.0705	0.0444	-0.0227	0.1567***	-0.0674	0.1569***	0.1021*	1.0000					
(12) ROA	0.1447**	0.1417**	0.1714***	0.1354**	0.0617	0.1008*	-0.0373	-0.2654***	0.1687***	0.0793	-0.0462	1.0000				
(13) Auditor	0.0242	0.0204	0.0302	-0.0604	-0.0307	-0.0222	0.1495***	0.0191	0.1217*	0.1023*	0.0947*	-0.1459**	1.0000			
(14) ln_assets	-0.1478***	-0.1356*	-0.0550	0.0173	0.1576***	0.0563	0.2528***	-0.4739***	0.6224***	0.3684***	0.1215**	0.4826***	0.0936	1.0000		
(15) ln_revenue	0.0735	0.0757	0.1161**	0.0739	0.12*	0.0491	0.134**	-0.4399***	0.4940***	0.2607***	0.0741	0.6392***	0.0408	0.7832***	1.0000	
(16) ln_age	-0.0843	-0.0824	0.0154	0.0299	0.2472***	0.0245	0.1186**	-0.4353***	0.4404***	0.1167*	0.0817	0.2950***	0.0227	0.4830***	0.5913***	1.0000

Table 9, Panel B presents the correlation matrix among variables after the JOBS Act. See table 2 Panel A and B for variable definitions. The sample comprises 290 IPO firms from April 2012 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Table 9. Panel B. Correlation between variables, after the JOBS Act

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Underpricing(0)	1.0000															
(2) Underpricing(1)	0.9610***	1.0000														
(3) Underpricing(30)	0.6654***	0.6888***	1.0000													
(4) Duality	0.0355	0.0314	-0.0149	1.0000												
(5) Ceo_age	-0.151***	-0.1113**	-0.1027**	0.0361	1.0000											
(6) CEO_sex	0.0648	0.0723	0.0396	0.1332***	0.0266	1.0000										
(7) Board	-0.0236	-0.0076	0.0262	-0.1783***	0.0759*	-0.0322	1.0000									
(8) Indep	0.0974**	0.0696	0.0496	0.0783*	-0.0902**	0.0450	-0.0208	1.0000								
(9) Fixed_inc	-0.0784	-0.0522	-0.0307	-0.1066**	0.1988***	-0.0082	0.2498***	-0.3926***	1.0000							
(10) Risk_inc	-0.0630	-0.0704	-0.0302	0.0592	0.0407	-0.0199	0.2178***	-0.1607***	0.2454***	1.0000						
(11) RD	0.0513	0.0392	0.0374	0.0201	-0.09**	0.0146	0.0470	0.0464	0.0308	0.0384	1.0000					
(12) ROA	0.1407***	0.1450***	0.1111**	0.0207	-0.0465	0.0751*	0.1397***	-0.1360***	0.2168***	0.1289***	0.0199	1.0000				
(13) Auditor	0.0678	0.0555	0.1043**	-0.0487	-0.0741*	-0.0182	0.2671***	0.0059	0.1743***	0.1195***	0.1505***	0.1919***	1.0000			
(14) ln_assets	0.0087	0.0255	0.0284	0.0164	-0.0027	0.0693	0.2783***	-0.4825***	0.6268***	0.3596***	0.1122**	0.5237***	0.2909***	1.0000		
(15) ln_revenue	0.0170	0.0332	-0.0049	0.0571	0.0092	0.1168***	0.2496***	-0.4414***	0.6000***	0.3091***	0.092**	0.4634***	0.2295***	0.8534***	1.0000	
(16) ln_age	-0.0564	-0.0367	-0.0303	-0.0942*	0.2091***	0.0274	0.2248***	-0.3500***	0.5998***	0.2151***	-0.0318	0.2633***	0.0633	0.5577***	0.6386***	1.0000

Table 10. IPO Underpricing Regressions Results

This table illustrates the regression summary statistic results from estimating equation (2) for three measures of IPO underpricing (as measured by market-adjusted return). Underpricing (0,0), underpricing (0,1) and underpricing (0,30). EGC is an indicator variable that equals one for EGC firms and zeroes otherwise. EGCs are firms with Revenue < 1.070\$ billion. JOBS Act is a dummy variable that equals to 1 if the IPO happened after the JOBS Act implementation. See table 2, Panel A, and B for variable definitions. Column 1 shows the expected signaling for each variable. The sample consists of 781 IPO firms from January 2007 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Variable	Expected sign	Model1 Underpricing(0)	Model2 Underpricing(1)	Model3 Underpricing(30)
EGC	+	0.0622* (0.083)	0.0652* (0.096)	0.0315 (0.545)
JA_2012	+	0.0755*** (0)	0.0716 (0)***	0.0972*** (0)
Ceo_age	-	-0.0040*** (0.007)	-0.0034** (0.034)	-0.0031 (0.117)
CEO_sex	-	-0.0164 (0.702)	-0.0193 (0.679)	-0.0207 (0.734)
Board	-/+ ?	4E-05 (0.992)	0.0015 (0.754)	0.0039 (0.592)
Indep	-	0.0780 (0.102)	0.0505 (0.339)	0.0992 (0.153)
Duality	+	0.0105 (0.621)	0.0126 (0.574)	-0.0035 (0.902)
Fixed_inc	-	-1E-05 (0.82)	5.E-06 (0.938)	-3.8E-05 (0.652)
Risk_inc	+	-2E-07 (0.952)	-2.3E-06 (0.438)	-1.7E-06 (0.707)
ROA		0.0369*** (0)	0.0382*** (0)	0.0406*** (0.001)
ln_assets		-0.0265** (0.012)	-0.0267** (0.013)	-0.0150 (0.313)
ln_revenue		0.0236*** (0.008)	0.0245*** (0.006)	0.0115 (0.348)
RD		0.0002 (0.347)	0.0002 (0.42)	9E-05 (0.722)
Auditor		0.0294 (0.249)	0.0231 (0.409)	0.0645* (0.066)
ln_age		-0.0179 (0.194)	-0.0216 (0.151)	-0.0002 (0.993)
cons		0.2899** (0.016)	0.2844** (0.024)	0.1972 (0.236)
N		781	781	781
R-Squared		0.0822	0.0688	0.0440

Table 11. Univariate Differences for Sensitivity analysis

Table 11 illustrates the means of variables used in our sensitivity analysis for EGC firms in Panel A and for NEGC firms in Panel B, before and after the JOBS Act. Raw return (0,0) is calculated as the closing price on the day of the IPO (i.e., day $t=0$), minus the IPO offer price divided by the IPO offer price. Raw return (0,1) is calculated as the closing price one day after the IPO (i.e., day $t=1$), minus the IPO offer price divided by the IPO offer price. Raw return (0,30) is calculated as the closing price 30 days after the IPO minus the IPO offer price divided by the IPO offer price. EGCs are firms with Revenue < 1.070\$ billion. NEGCs are firms with Revenue > 1.070\$ billion. We mention the two-tailed p-values to tests for the differences in means. See table 2 Panel A and B for variable definitions. The sample consists of 682 EGC IPO firms (Panel A) and 99 NEGC IPO firms (Panel B) from January 2007 to April 2017. Stars indicates the significance level, that is *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Variable	Before Mean	After Mean	P-value: test of difference in means (t-test)
Return (0)	0.1470	0.1939	0.0284**
Return (1)	0.1578	0.2000	0.0593*
Return (30)	0.1684	0.2547	0.0036***
CEO_sex	0.0333	0.0676	0.0518*
Ceo_age	50.2852	51.7343	0.0132**
Board	7.2852	7.0629	0.0748*
Indep	0.7143	0.6879	0.1855
Duality	0.3963	0.3030	0.0112**
Fixed_inc	334.3430	343.0939	0.4472
Risk_inc	929.3403	1301.239	0.0282**
ROA	-0.2170	-0.6299	0***
ln_assets	4.7164	4.2402	0.0001***
ln_revenue	4.0899	3.2580	0***
RD	12.7160	13.5771	0.5194
Auditor	0.8222	0.7949	0.3745
ln_age	2.5643	2.4867	0.1246

Table 11. Panel B. Univariate Differences for NEGC firms for Sensitivity analysis

Variable	Before Mean	After Mean	P-value: test of difference in means (t-test)
Return (0)	0.0397	0.1141	0.0319**
Return (1)	0.0616	0.1303	0.0564*
Return (30)	0.1016	0.2181	0.0281**
CEO_sex	0.0000	0.0441	0.2111
Ceo_age	55.0286	54.6029	0.7662
Board	9.0571	8.3235	0.125
Indep	0.3914	0.3974	0.9078
Duality	0.3429	0.2353	0.2494
Fixed_inc	690.5127	755.7181	0.2225
Risk_inc	3718.3780	3432.9500	0.7922
ROA	0.0170	0.0120	0.7038
ln_assets	7.7606	7.9505	0.3005
ln_revenue	7.7687	7.9405	0.2768
RD	31.2301	21.6213	0.6396
Auditor	1.0000	0.9559	0.2111
ln_age	3.5549	3.7045	0.3866

Table 12. Difference in differences between EGCs and NEGCS for Sensitivity analysis

This table reports the differences in differences test for means of both independent and dependent variables between EGC and NEGCS firms. EGC are firms with Revenue < 1.070\$ billion and NEGCS are firms with Revenue > 1.070\$ billion. The first (and second) column illustrates the difference in the mean between pre and post EGCs (NEGCS). The third column subtracts column 2 by column 1 to find the difference between the change of underpricing before and after the JOBS Act between EGC and NEGCS IPOs. See table 2 Panel A and B for variable definitions. The sample consists of 781 IPO firms from January 2007 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Variable	Difference in means between pre and post EGC's	Difference in means between pre and post NEGCS	EGC's-NEGCS	P-value
Return00	0.0469	0.0745	-0.0275	0.639
Return01	0.0421	0.0688	-0.0266	0.663
Return030	0.0863	0.1165	-0.0302	0.711
CEO_sex	-0.0343	-0.0441	0.0099	0.84
Ceo_age	1.4491	-0.4256	1.8747	0.256
Board	-0.2222	-0.7336	0.5114	0.177
Indep	-0.0263	0.0059	-0.0323	0.759
Duality	-0.0933	-0.1076	0.0143	0.891
Fixed_inc	8.7509	65.2054	-56.4545	0.125
Risk_inc	371.8987	-285.4280	657.3267	0.282
ROA	-0.4129	-0.0051	-0.4079	0.096*
ln_assets	-0.4762	0.1899	-0.6661	0.042**
ln_revenue	-0.8319	0.1718	-1.0037	0.024**
RD	0.8611	-9.6089	10.4700	0.221
Auditor	-0.0274	-0.0441	0.0168	0.841
ln_age	-0.0776	0.1495	-0.2272	0.13

Table 13. IPO Underpricing Regressions for Sensitivity analysis

This table illustrates the regression summary statistic results from estimating equation (2) for three measures of IPO underpricing. Underpricing (0,0), underpricing (0,1) and underpricing (0,30). The IPO underpricing, for the sensitivity analysis measured as the raw return of the firm. Raw return (0,1) is calculated as the closing price one day after the IPO (i.e., day t=1), minus the IPO offer price divided by the IPO offer price. Raw return (0,30) is calculated as the closing price 30 days after the IPO minus the IPO offer price divided by the IPO offer price. EGC is an indicator variable that equals one for EGC firms and zeroes otherwise. EGCs are firms with Revenue < 1.070\$ billion. JOBS Act is a dummy variable that equals to 1 if the IPO happened after the JOBS Act implementation. See table 2, Panel A, and B for variable definitions. Column 1 shows the expected signaling for each variable. The sample consists of 781 IPO firms from January 2007 to April 2017. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Variable	Expected sign	Model 1 Return (0)	Model 2 Return (1)	Model 3 Return (30)
EGC	+	0.0610* (0.09)	0.0630 (0.107)	0.0241 (0.652)
JA_2012	+	0.0769*** (0)	0.0731*** (0)	0.1107*** (0)
Ceo_age	-	-0.0039*** (0.008)	-0.0033** (0.039)	-0.0030 (0.138)
CEO_sex	-	-0.0146 (0.732)	-0.0168 (0.717)	-0.0100 (0.871)
Board	-/+ ?	3.3E-05 (0.994)	0.0013 (0.799)	0.0032 (0.657)
Indep	-	0.0780 (0.102)	0.0523 (0.321)	0.1254* (0.075)
Duality	+	0.0112 (0.596)	0.0120 (0.593)	-0.0061 (0.83)
Fixed_inc	-	-1.3E-05 (0.824)	4.9E-06 (0.937)	-3.9E-05 (0.644)
Risk_inc	+	-4.07E-07 (0.89)	-2.5E-06 (0.405)	-1.4E-06 (0.762)
ROA		0.0367*** (0)	0.0377*** (0)	0.0389*** (0.002)
ln_assets		-0.0260** (0.014)	-0.0255** (0.017)	-0.0114 (0.45)
ln_revenue		0.0231** (0.01)	0.0236*** (0.008)	0.0110 (0.373)
RD		0.0002 (0.345)	1.7E-04 (0.406)	9.9E-05 (0.701)
Auditor		0.0293 (0.25)	0.0235 (0.397)	0.0656* (0.061)
ln_age		-0.0177 (0.201)	-0.0217 (0.146)	-0.0028 (0.896)
_cons		0.2853** (0.018)	0.2791** (0.027)	0.1739 (0.302)
N		781	781	781
R-Squared		0.0811	0.0674	0.0472

Table 14. Multicollinearity test with interaction for JOBS Act 2017

This table illustrates the VIF for each variable, including the interaction NEGC*JA_2017, to test for multicollinearity. VIF must be lower than 5.

Variable	VIF
ln_assets	4.07
ln_revenue	3.75
NEGC	2.47
Fixed_inc	2.21
ln_age	2.19
JA_2017_negc	1.46
Indep	1.44
RD	1.33
Risk_inc	1.29
Board	1.28
ROA	1.27
Auditor	1.2
JA_2017	1.19
Ceo_age	1.17
Duality	1.12
CEO_sex	1.04
Mean VIF	1.78

Table 15. Heteroskedasticity test for JOBS Act 2017

We test for heteroskedasticity using the Breusch-Pagan test. The null hypothesis indicates homoscedasticity. If the p-value is lower than 10% means that the null hypothesis is rejected and there is heteroskedasticity. If this the case, we used the robust standard errors and we test for heteroskedasticity using the White test. Again, the null hypothesis indicates homoscedasticity.

	Breusch - Pagan	Robust standardized errors White-test
Underpricing(0)	0.0008	0.9988
Underpricing(1)	0.0037	1
Underpricing(30)	0	1

Table 16. Normality test for JOBS Act 2017

We test for normality using the Shapiro-Wilcoxon test. The null hypothesis indicates that errors are normally distributed. If p-value is lower than 10%, then the null hypothesis is rejected

	Shapiro-Wilk test
Underpricing(0)	0
Underpricing(1)	0
Underpricing(30)	0

Table 17. Descriptive statistics for JOBS Act 2017

Table 17 refer to pre-NEGCs, Panel A, post-NEGCs, Panel B, pre-EGCs, Panel C, and Post-EGCs, Panel D, and presents descriptive statistics for variables used in our model. NEGCs are firms with Revenue > 1.070\$ billion. Pre-NEGC refers to NEGCs that went public before the JOBS Act 2017. Post-NEGC refers to NEGCs that went public after the JOBS Act 2017. EGCs are firms with Revenue < 1.070\$ billion. Pre-EGC refers to EGCs that went public before the JOBS Act 2017. Post-EGC refers to EGCs that went public after the JOBS Act 2017. The underpricing (0,0) is the raw return (0,0) minus the market return (0,0). The raw return (0,0) is calculated as the closing price on the day of the IPO (i.e., day t=0), minus the IPO offer price divided by the IPO offer price. Underpricing (0,1) is the raw return (0,1) minus the market return (0,1), where raw return (0,1) is the closing price on the first day, i.e., day t=1, minus the IPO offer price divided by the IPO offer price. Underpricing (0,30) is the raw return (0,30) minus the market return (0,30), where raw return (0,30) is the closing price 30 trading days, i.e., day t=30, after the IPO, minus the IPO offer price divided by the IPO offer price. CEO_age is the age of CEO; CEO_sex is a dummy variable equals to one if the CEO is female and zero otherwise; duality is a dummy variable equals to one if the position of CEO and chairman held by the same person and zero otherwise; board size is the number of directors in the board; independence is the proportion of independent directors in the Board, fixed income is the salary of CEO; risk income is the sum of bonuses, option, and stock awards, all other compensations and any non-equity incentive plan; ln_revenue is the natural logarithm of one plus revenue; ln_assets are the natural logarithm of one plus total assets, indicating the firm size; ln_age is the natural logarithm of one plus number of years from the establishment until IPO of the firm; auditor quality is a dummy variable which takes the value of 1 if the auditor company of the IPO firm is ranked into the big four companies (Ernst & Young, KPMG, Deloitte and PwC) and 0 otherwise; R&D is the research and development expenses of the IPO firm; ROA is the net income scaled by total assets. The sample of pre-NEGCs (Panel A) consists of 67 IPO firms from August 2012 to June 2017. The sample of post-NEGCs (Panel B) consists of 16 IPO firms from July 2017 to December 2019. The sample of pre-EGCs (Panel C) consists of 413 IPO firms from August 2012 to June 2017. The sample of post-EGCs (Panel D) consists of 216 IPO firms from July 2017 to December 2019.

Table 17. Panel A. Descriptive statistics for pre-NEGCs for JOBS Act 2017

Variable	Obs.	Mean	Std. Dev.	Min	Max
Underprice0	68	0.1140	0.1915	-0.0921	1.2158
Underprice1	68	0.1348	0.1954	-0.0864	1.2069
Underprice30	68	0.2010	0.2470	-0.2123	1.1592
Duality	68	0.2206	0.4177	0	1
Ceo_age	68	54.7794	5.9396	29	67
CEO_sex	68	0.0441	0.2069	0	1
Board	68	8.2353	1.7114	4	11
Indep	68	0.3878	0.2305	0.0909	0.8889
Fixed_inc	68	751.0973	231.5556	150.833	1200
Risk_inc	68	3498.891	4279.120	21.447	19746.92
ln_age	67	3.7102	0.7543	2.1972	5.0106
RD	68	15.9154	59.7814	0	409
ROA	68	0.0093	0.0505	-0.1608	0.1573
Auditor	68	0.9412	0.2370	0	1
ln_assets	68	7.9740	0.9034	5.3602	10.5044
ln_revenue	68	7.9276	0.7937	6.9772	10.5400

Table 17. Panel B. Descriptive statistics for post-NEGCs for JOBS Act

Variable	Obs.	Mean	Std. Dev.	Min	Max
Underprice0	16	0.1761	0.1604	-0.0799	0.4922
Underprice1	16	0.1735	0.1780	-0.1551	0.4444
Underprice30	16	0.2112	0.2738	-0.3300	0.7595
Duality	16	0.1875	0.4031	0	1
Ceo_age	16	49.8125	7.2958	35	61
CEO_sex	16	0	0	0	0
Board	16	8.5	1.7889	5	12
Indep	16	0.5674	0.2526	0.2	0.9091
Fixed_inc	16	760.8004	287.8459	349.89	1426.346
Risk_inc	16	12469.2800	28105.9400	519.985	109832.5000
ln_age	16	3.5054	1.0516	1.7918	5.1240
RD	16	159.4646	379.6809	0	1505
ROA	16	0.0196	0.1095	-0.2424	0.2415
Auditor	16	0.9375	0.2500	0	1
ln_assets	16	7.9661	0.9629	6.7238	10.0854
ln_revenue	16	7.8862	0.7822	7.0101	9.4537

Table 17. Panel C. Descriptive statistics for pre-EGCs for JOBS Act

Variable	Obs.	Mean	Std. Dev.	Min	Max
Underprice0	413	0.1947	0.3250	-0.3734	2.0554
Underprice1	413	0.2001	0.3325	-0.3689	1.7741
Underprice30	413	0.2416	0.4186	-0.4883	1.9464
Duality	413	0.3123	0.4640	0	1
Ceo_age	413	51.6344	7.6141	35	68
CEO_sex	413	0.0751	0.2638	0	1
Board	413	7.0581	1.5475	4	11
Indep	413	0.6887	0.1830	0.1111	0.9091
Fixed_inc	413	338.9364	154.2507	0	800
Risk_inc	413	1323.4980	2376.7590	0	15146.2500
ln_age	413	2.4792	0.6318	1.0986	4.2341
RD	413	14.1167	17.2847	0	98.5870
ROA	413	-0.7071	1.6833	-12.119	0.4627
Auditor	413	0.7942	0.4048	0	1
ln_assets	413	4.2063	1.6637	0.0276	8.3316
ln_revenue	413	3.1785	2.2668	0	6.9754

Table 17. Panel D. Descriptive statistics for post-EGCs for JOBS Act

Variable	Obs.	Mean	Std. Dev.	Min	Max
Underprice0	216	0.1971	0.3007	-0.4110	1.6321
Underprice1	216	0.1929	0.3083	-0.4200	1.6641
Underprice30	216	0.2502	0.5807	-0.5378	5.0718
Duality	216	0.2176	0.4136	0	1
Ceo_age	216	51.8380	7.7054	33	73
CEO_sex	216	0.0926	0.2905	0	1
Board	216	7.1343	1.5598	3	11
Indep	216	0.7190	0.1638	0.25	0.9091
Fixed_inc	216	366.5179	137.2147	23.75	750
Risk_inc	216	2038.785	5941.799	0	44535.79
ln_age	216	2.3212	0.5773	1.0986	3.5553
RD	216	24.7480	29.5958	0	160.947
ROA	216	-2.9985	10.0744	-71.2568	0.3484
Auditor	216	0.8241	0.3816	0	1
ln_assets	216	3.9193	1.8170	0.0344	8.5807
ln_revenue	216	2.5762	2.4521	0	6.9709

Table 18. Univariate Differences for JOBS Act 2017

This table illustrates the means of variables used in our model for NEGCs, in Panel A and for EGCs in Panel B, before and after the JOBS Act 2017. NEGC are firms with Revenue > 1.070\$ billion. EGC are firms with Revenue < 1.070\$ billion. We mention the two-tailed p-values to tests for the differences in means using the t-test. See table 2 Panel A and B for variable definitions. The sample consists of 83 NEGC IPO firms and 629 EGC IPO firms from August 2012 to December 2019. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

Table 18. Panel A. Univariate Differences for NEGC firms for JOBS Act 2017			
Variable	Before Mean	After Mean	P-value: test of difference in means (t-test)
Underpricing(0)	0.1140	0.1761	0.2342
Underpricing(1)	0.1348	0.1735	0.4707
Underpricing(30)	0.2010	0.2112	0.8838
CEO_sex	0.0441	0.0000	0.3983
Ceo_age	54.77941	49.8125	0.0051***
Board	8.235294	8.5000	0.5824
Indep	0.3878	0.5674	0.0072***
Duality	0.2206	0.1875	0.7749
Fixed_inc	751.0973	760.8004	0.886
Risk_inc	3498.891	12469.28	0.0124**
ROA	0.0093	0.0196	0.574
ln_assets	7.9740	7.9661	0.9753
ln_revenue	7.927586	7.8862	0.8512
RD	15.91541	159.4646	0.0034
Auditor	0.941177	0.9375	0.9561
ln_age	3.7102	3.5054	0.3705

Table 18. Panel B. Univariate Differences for EGC firms for JOBS Act 2017

Variable	Before Mean	After Mean	P-value: test of difference in means (t-test)
Underpricing(0)	0.1947	0.1971	0.9274
Underpricing(1)	0.2001	0.1929	0.7922
Underpricing(30)	0.2416	0.2502	0.8306
CEO_sex	0.0751	0.0926	0.4451
Ceo_age	51.6344	51.8380	0.7513
Board	7.0581	7.1343	0.5592
Indep	0.6887	0.7190	0.0414**
Duality	0.312349	0.2176	0.0119**
Fixed_inc	338.9364	366.5179	0.0275**
Risk_inc	1323.498	2038.785	0.0326**
ROA	-0.7071	-2.9985	0***
ln_assets	4.2063	3.9193	0.0471**
ln_revenue	3.1785	2.5762	0.0022***
RD	14.11669	24.7480	0***
Auditor	0.7942	0.8241	0.3703
ln_age	2.4792	2.3212	0.0023***

Table 19. Difference in differences between EGCs and NEGCS for JOBS Act 2017

This table reports the differences in differences test for means of both independent and dependent variables between EGC and NEGCS firms. EGC are firms with Revenue < 1.070\$ billion and NEGCS are firms with Revenue > 1.070\$ billion. The first (and second) column illustrates the difference in the mean between pre and post NEGCS (EGCs). The third column subtracts column 2 by column 1 to find the difference between the change of underpricing before and after the JOBS Act 2017 between NEGCS and EGC IPOs. See table 2 Panel A and B for variable definitions. The sample consists of 712 IPO firms from August 2012 to December 2019. Stars indicates the significance level, that is *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Variable	Difference in means between pre and post NEGCS	Difference in means between pre and post EGC's	NEGCS's- EGC's	P-value
Underpricing(0)	0.0620222	0.0024248	0.0595974	0.501
Underpricing(1)	0.0387325	-0.0071785	0.045911	0.612
Underpricing(30)	0.0102657	0.0086345	0.0016312	0.99
CEO_sex	-0.0441176	0.0175321	-0.0616497	0.423
Ceo_age	-4.96691	0.20358	-5.17049	0.018**
Board	8.4558824	0.076148	8.3797344	0.68
Indep	0.1796781	0.0303219	0.1493562	0.005***
Duality	-0.0330882	-0.0947561	0.0616679	0.632
Fixed_inc	9.7031	27.5815	-17.8784	0.705
Risk_inc	8970.389	715.287	8255.102	0***
ROA	0.0102547	-2.291395	2.3016497	0.164
ln_assets	-0.007897	-0.286994	0.279097	0.559
ln_revenue	-0.041385	-0.602282	0.560897	0.382
RD	143.54919	10.63131	132.91788	0***
Auditor	-0.0036765	0.0298852	-0.0335617	0.762
ln_age	-0.204843	-0.157993	-0.04685	0.801

Table 20. IPO Underpricing Regressions for JOBS Act 2017

This table illustrates the regression summary statistic results from estimating equation (5) for three measures of IPO underpricing (as measured by market-adjusted return). Underpricing (0,0), underpricing (0,1) and underpricing (0,30). NEGC is an indicator variable that equals one for NEGC firms and zeroes otherwise. NEGCs are firms with Revenue > 1.070\$ billion. JOBS Act is a dummy variable that equals to 1 if the IPO happened after the JOBS Act implementation. See table 2, Panel A, and B for variable definitions. Column 1 shows the expected signaling for each variable. The sample consists of 712 IPO firms from August 2012 to December 2019. Stars indicates the significance level, that is ***p<0.01, **p<0.05, * p<0.1.

	Expected sign	Model1 Underpricing(0)	Model2 Underpricing(1)	Model3 Underpricing(30)
NEGC	+	-0.0668 (0.166)	-0.0747 (0.152)	-0.0613 (0.36)
JA_2017	+	0.0170 (0.527)	0.0116 (0.67)	0.0175 (0.709)
JA_2017_negc	+	0.0019 (0.973)	-0.0080 (0.888)	-0.0513 (0.574)
Ceo_age	-	-0.0047*** (0.007)	-0.0041** (0.025)	-0.0052** (0.03)
CEO_sex	-	-0.0385 (0.325)	-0.0583 (0.111)	-0.0232 (0.712)
Board	-/+ ?	0.0064 (0.361)	0.0076 (0.296)	0.0105 (0.442)
Indep	-	0.1420 (0.016)	0.1173 (0.074)	0.1127 (0.212)
Duality	+	0.0256 (0.357)	0.0251 (0.377)	0.0054 (0.886)
Fixed_inc	-	-0.00012 (0.104)	-9.7E-05 (0.194)	-9.5E-05 (0.375)
Risk_inc	+	6E-07 (0.739)	8.08E-07 (0.69)	3.33E-06 (0.299)
ROA		0.0015 (0.386)	0.0028 (0.049)	0.0018 (0.47)
ln_assets		0.0032 (0.773)	0.0015 (0.882)	0.0118 (0.422)
ln_revenue		0.0122 (0.188)	0.0150 (0.082)	0.0016 (0.902)
RD		-9.8E-05 (0.469)	-1.3E-04 (0.396)	-2.4E-04 (0.136)
Auditor		0.0466 (0.119)	0.0505 (0.116)	0.1113 (0.007)
ln_age		0.0080 (0.665)	0.0040 (0.839)	0.0206 (0.484)
_cons		0.2217** (0.048)	0.2071* (0.066)	0.1961 (0.193)
N		712	712	712
R-Squared		0.0526	0.0517	0.0325

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