The X Factor in Corporate Board Structure

ZhaoZhao He
Paul College of Business and Economics
University of New Hampshire, Durham, NH
Email: ZhaoZhao.He@unh.edu

Mihail K. Miletkov
Paul College of Business and Economics
University of New Hampshire, Durham, NH
Email: Mihail.Miletkov@unh.edu

Viktoriya Staneva
Paul College of Business and Economics
University of New Hampshire, Durham, NH
Email: Viktoriya.Staneva@unh.edu

Abstract

The presence of Generation X directors on U.S. corporate boards is associated with significantly better firm performance. These firms innovate more, experience higher growth in foreign sales, and invest more in Corporate Social Responsibility (CSR). The positive effect of Generation X directors on firm performance is not driven by other director attributes, such as sex, tenure, professional expertise or CEO experience, and is robust to endogeneity checks using instrumental variables. The effect is also independent from the effect of director age, which although related to director's generational identity captures something fundamentally different, and is controlled for in all of our regressions.

Keywords: Board structure, Board diversity, Generation X, Firm performance, Innovation, Foreign sales, CSR

"One generation passeth away, and another generation cometh: but the earth abideth forever."

–Ecclesiastes 1:4

1. Introduction

The role of corporate boards as being ultimately responsible for the actions of the firm has been highlighted by some of the large corporate scandals in the U.S. (Enron), Europe (Parmalat), and China (Ying Guang Xia), and the subsequent regulatory reforms. While most of the political debate and legislative actions have focused on strengthening the monitoring function of the board, the academic literature has long recognized the equally important advising function of the board. The ability of the board to provide strategic advice to company management depends, among other things, on individual director attributes, such as gender, education, experience, and ethnicity/nationality (Farrell and Hersch, 2005, Adams and Ferreira, 2009, Ferreira, 2010, Miletkov, Poulsen, and Wintoki, 2017).

In this study, we examine the effect of one of the most fundamental, yet previously overlooked, characteristic of corporate directors. Namely, the generation to which they belong. According to generational theorists, a key attribute of a generation is that its members share common beliefs and behavior.[1] Howe and Strauss (1991) go on to say that "As a social category, a

[1] According to Howe and Strauss (1991): "A GENERATION is a cohort-group whose length approximates the span of a phase of life and whose boundaries are fixed by peer personality" (p. 60).

generation probably offers a safer basis for personality generalization than such other social categories as sex, race, region, or age" (p.63). In the U.S. today there are four adult generations: Millennials (born 1982 – 2005), Generation X (born 1961 – 1981), Baby Boomers (born 1943 – 1960), and the Silent Generation (born 1925 – 1942).[2] Of these four generations, only one – the Baby Boomers – have a dominating presence in U.S. corporate boardrooms. While the Millennial and Silent generations may be too young and too old, respectively, to have a meaningful representation on corporate boards, Gen Xers (currently between the ages of 37 and 57) should be well positioned to make a valuable contribution as corporate directors providing strategic advice to company management. Indeed, some of the most successful business leaders today are Gen Xers: Elon Musk of PayPal, Tesla Motors, and SpaceX (born 1971), Jack Dorsey of Twitter and Square (born 1976), Marissa Mayer of Yahoo (born 1975), Sergey Brin and Larry Page of Google (both born in 1973), among many others.

In recent years, there has been a steady increase in the presence of Generation X directors on U.S. corporate boards, as can be seen in Figure 1. As of 2014, the end of our sample period, 65 percent of all S&P 1500 firms have at least one Gen X director, and more than 30 percent have two or more such directors. Do these directors bring any special skills and perspectives to the board? Do they affect firm performance, and what may be some of the channels

[2] The years for each generation are based on Howe and Strauss (2007).

through which such an effect is manifested? These are the questions we seek to answer in this study.

In their review of the traits and attitudes of different generations, Howe and Strauss (2007) characterize Gen Xers as practical problem solvers, innovative, pragmatic, and survivalists. These authors argue that "As business leaders, Gen Xers will be more effective at pushing efficiency and innovation than any other generation in memory" and conclude that Gen Xers "… are already the greatest entrepreneurial generation in U.S. history; their high-tech savvy and marketplace resilience have helped America prosper in the era of globalization."

Using data on all S&P 1500 firms from 1996 to 2014, we find that the percentage of Generation X directors on the board is positively and significantly related to firm performance. This effect is not driven by other director attributes, such as sex, tenure, professional expertise or CEO experience, and is robust to endogeneity checks using instrumental variables. The effect is also independent from the effect of director age, which although related to director's generational identity captures something fundamentally different, and is controlled for in all of our regressions. Howe and Strauss (2007) offer the following example illustrating this difference: "A woman of 40 today has less in common with 40-year-old women across the ages than with the rest of her generation, which is united by memories, language, habits, beliefs, and life lessons." We also document three potential channels through which

Generation X directors may be influencing firm performance; through innovation, investment in CSR activity, and more aggressive pursuit of global markets. Specifically, we find that firms with a higher percentage of Generation X directors on the board have more patents, more citations of patents, and patents that have a higher market value. Additionally, these firms report higher growth in foreign sales and engaged in more CSR activity as measured by several Environmental and Social performance indicators.

Our paper makes several important contributions to the corporate board literature. First, we document the arrival of a new generation of board members – Gen Xers – to U.S. corporate boardrooms. Second, to the best of our knowledge, we are the first to systematically study the effect of this new generation of board members on various corporate outcomes. Finally, by documenting the importance of directors' generational identity in influencing corporate actions, our study sets the stage for future research on generational differences and their impact on corporations and their various stakeholders including shareholders, employees, customers, and suppliers.

The reminder of the paper proceeds as follows. In Section 2, we review the relevant literature and develop several testable hypotheses. In Section 3, we present the data and summary statistics. Section 4 reports the results from our main regression analysis, and Section 5 provides concluding remarks.

2. Literature Review and Hypotheses Development

The voluminous literature on corporate board structure and its effect on firm outcomes has identified a number of factors associated with directors' incentives and ability to monitor and advise company management. These factors are related to individual director characteristics as well as to the firms' external contracting and operating environments. Some of the most researched individual director attributes include gender, educational background, professional experience, and ethnicity/nationality (Carter, Simkins, and Simpson, 2003, Farrell and Hersch, 2005, Güner, Malmendier, and Tate, 2008, Adams and Ferreira, 2009, Ferreira, 2010, Ahern and Dittmar, 2012, Minton, Taillard, and Williamson, 2014, Miletkov, Poulsen, and Wintoki, 2017, Kang, Kim, and Lu, 2018).

The studies that are closest to ours include the dispersion of directors' ages along with other social and occupational director attributes in constructing an overall measure of board heterogeneity, and document that greater board diversity is associated with lower risk and better firm performance (Anderson, Reeb, Upadhyay, and Zhao, 2011, Bernile, Bhagwat, Yonkers, 2018). The main distinction and contribution of our paper is our focus on directors' generational identity, which although related to director age captures a fundamentally different construct.

According to Howe and Strauss (1991), a generation is shaped by its age-determined participation in epochal events that occur during its lifecycle, especially during the coming-of-age experiences separating youth from

adulthood. These early-life experiences help create a "peer personality" – a set of collective behavioral traits and attitudes that manifest themselves throughout a generation's lifecycle trajectory.[3] For Gen Xers, the focus of our study, these events include the disintegration of the traditional family with sharply rising divorce rates and a latchkey childhood, the spread of MTV and hip-hop culture, the fall of the Berlin Wall, and the rise of the Internet. These events helped shape a generation whose members are characterized as practical problem solvers, innovative, pragmatic, survivalists, and globally aware (Howe and Strauss, 2007).

Based on these attributes, and the work of generational theorists Howe and Strauss (1991, 2007), we propose several hypotheses related to the potential effect of Generation X directors on firm performance, and the channels through which such an effect could be manifested. As mentioned earlier, Howe and Strauss contend that "As business leaders, Gen Xers will be more effective at pushing efficiency and innovation than any other generation in memory" and call Gen Xers "…the greatest entrepreneurial generation in U.S. history…" This clearly indicates that Generation X directors can bring unique skills and perspectives to the boardroom, and provide valuable strategic advice to company management. Thus, we predict that greater representation of Generation X directors on the board will be associated with better firm performance. We formally state this hypothesis as follows:

[3] Please refer to chapter 3 in Howe and Strauss (1991) for a thorough discussion of generational theory.

Hypothesis 1*: The percentage of Generation X directors on the board is positively associated with firm performance.*

One of the key attributes ascribed to Gen Xers is "innovative", and corporate innovation has been consistently shown to predict economic growth, aggregate stock market value, and firm profitability (Hsu, 2009, Hirshleifer, Hsu, and Li, 2013, and Kogan, Papanikolaou, Seru, and Stoffman, 2017). Therefore, we postulate that one of the potential channels through which Generation X directors can influence firm performance is though promoting greater innovation. We formally state our second hypothesis as follows:

Hypothesis 2*: The percentage of Generation X directors on the board is positively associated with corporate innovation.*

Another distinguishing characteristic of Gen Xers is that they are very "globally aware" as a result of growing up in world that is highly integrated economically, politically, and culturally; this globalization is largely due to public policy changes and technological advancements over the past few decades. In the academic literature, many studies have shown that international expansion can be beneficial for companies (Garrod and Rees, 1998, Saudagaran, 2002, Lee, Kim, and Davidson, 2015). We argue that Generation X directors can positively affect company performance by promoting

the expansion of company activities into global product and service markets. Formally, our third hypothesis states that:

Hypothesis 3*: The percentage of Generation X directors on the board is positively associated with the firm's expansion into foreign markets.*

Our final hypothesis relates to the effect of Generation X directors on corporate social responsibility (CSR). Although there is no clear theoretical or empirical evidence linking generational preferences to environmental and/or social awareness, there is anecdotal evidence suggesting that Gen Xers might be especially sensitive to these issues. Specifically, a recent survey by the Corporation for National and Community Service reports that Generation X leads volunteering among generations.[4] There is, however, considerable evidence linking CSR activity to superior firm performance (Deng, Kang, and Low, 2013, Flammer, 2015, Dimson, Karakas, and Li, 2015, Lins, Servaes, and Tamayo, 2017). We empirically test the effect of Generation X directors on CSR activity using the following hypothesis:

Hypothesis 4*: The percentage of Generation X directors on the board is positively associated with the company's CSR activity as measured by several Environmental and Social performance indicators.*

[4] The 2015 "Annual Volunteering and Civic Life in America" report by the Corporation for National and Community Service (CNCS) was retrieved from: *https://www.nationalservice.gov/vcla.*

3. Data and Method

3.1 Sample

Our base sample starts with all U.S. incorporated industrial firms covered in the intersection of RiskMetrics, S&P ExecuComp, and Compustat databases from 1996 to 2014. Industrial firms are defined as companies with SIC codes outside the ranges 4900-4949 (utilities) and 6000-6999 (financials). We use data on director age from the RiskMetrics to identify Generation X directors. We also obtain information on the number of board members, fraction of independent directors, director gender and tenure from the RiskMetrics database. Data on CEO age come from S&P ExecuComp. Annual firm-level financial statement data is collected from Compustat North America Annual files.

We compute foreign sales growth based on sales revenue categorized in geographic segments using Compustat segment files. Innovation data are drawn from the patent database compiled by Kogan, Papanikolaou, Seru, and Stoffman (2017). We assess firm's engagement in CSR (Corporate Social Responsibility) based on Thomson Reuters ESG (Environmental, Social, and Governance) scores for each company. The Thomson Reuters ESG Scores represent an improvement over the existing ASSET4® scores – Thomson Reuters purchased the Swiss data provider ASSET4 in 2009 – where company size and transparency biases are minimal. The ESG scores are available for over 7,000 companies globally with time series data going back to 2002.

Firms with values of total assets or sales less than one million dollars are excluded from the sample. To mitigate the effect of outliers and incorrectly recorded data, all continuous variables are winsorized at the top one percent and, if the variable takes on negative values, bottom one percent as well. The final dataset used in the performance specification covers the period from 1996 to 2014 and consists of 16,159 firm-year observations. Table 1 reports the summary statistics for all variables used in the empirical analysis.

3.2 Model

We fit the following model to investigate the effect that having Generation X directors on the board has on a set of corporate outcomes:

$$Y_{i,\,t+1} = \alpha + \beta_1 \times GenX\ Directors\ Pct._{i,\,t} + \beta \times X_{i,\,t} + \varepsilon_{i,\,t} + \gamma_j + d_t \qquad (1)$$

where i indexes firm and t indexes years. Y stands for a set of dependent variables related to the hypotheses discussed in Section 2. In particular, we measure performance with the firm's *Market-to-Book* ratio; innovation with *ln(#patents), ln(#citations),* and *PatentValue*; foreign presence with *Foreign Sales Growth*; and CSR with *ESG_Total, Environmental, Social, Env&Social* and *Governance*. The key variable of interest is *GenX Directors Pct*, the percent of Generation X directors sitting on the board. X is a vector of CEO-, board-, and firm-level controls including *ln(CEO age), CEO GenX, ln(Median Director Age), STD(Director Age), Board Independence, ln(Board Size), Female Directors Pct., ln(Mean Director Tenure), ln(Firm Age), Size, Leverage, ROA, Tangibility, R&D, Capex, ,* and *Cash*

Flow. Equation (1) also includes industry (γ_j) and year fixed effects (d_t), where industries are defined based on Fama and French's 49 industry classification. In all specifications, standard errors are robust to heteroskedasticity and clustered at the firm level.

4. Regression Analysis

This section develops the statistical methods used to test the hypothesized effect of Generation X directors on different corporate outcomes and presents the results of the empirical analysis. In all specifications, the main independent variable of interest is the percentage of board members born between 1961 and 1981 (GenX Directors Pct.). We begin the analysis by examining the effect that greater percentage of Generation X directors on the board has on firm performance, which we proxy for with the firm's Market-to-Book ratio.

Table 2 contains the estimates of regressions of Market-to-Book on our main independent variable as well as a number of board- and firm-related characteristics. We allow for a one-year lag of the effect and estimate all regressions with lagged independent variables.

Among the board-level control variables is the average age of the firm's board members as well as the standard deviation of directors' ages. It is important to control for those variables to differentiate between the effect of director age (Gen Xers would tend to be younger than other directors and boards

with Gen Xers would tend to have higher age dispersion) and the effect of generational identity.

Furthermore, it is possible that boards with more Gen Xers are more likely to also have CEOs that belong to this generation and/or younger CEOs. If so, our variable of interest could be proxying for a CEO effect as opposed to a board of directors effect. We account for that possibility by including the age of the CEO as well as a dummy variable indicating if the CEO is a Gen Xer or not as independent variables. All our specifications also control for the size of the board, the percent of female directors, the length of director's tenure and board independence along with a comprehensive set of financial control variables that have been shown to determine firm's performance.

A common concern among empirical studies in corporate finance is the potential presence of an endogeneity problem in the empirical specification. In particular, it is possible that an omitted variable is determining both firm performance and the presence of Generation X directors. We address the potential omitted variable bias by using instrumental variables and estimating two stage-least squares (2SLS) regressions. A valid instrument should be correlated with the potentially endogenous explanatory variable without directly (independently) affecting the dependent variable. We argue that the number of Generation X directors in the firm's state of incorporation as well as the average number of Gen X in the firm's industry (both measured on annual basis and excluding the firm) are two valid instruments in our setting that satisfy both the

relevance and the exclusion conditions. A firm, operating in a geographical area with a higher presence of Gen Xers on corporate boards, is more likely to have board members of that generation as there will be higher supply of such directors. Geographical proximity is a factor that has been shown to affect the pool of eligible board candidates. Similar argument holds for the relevance of the industry-level instrumental variable – as Gen X directors gain expertise in a certain industry, they will be more likely to serve as board members for firms within that industry, which will increase the supply of Gen X directors. While the two instruments are likely correlated to other board characteristics as well (e.g. board age) and could affect firm's performance through those channels, it is unlikely that they will have an independent effect on performance. We also estimate the IV – 2SLS model with firm fixed-effects in order to control for any firm-level time-invariant heterogeneity.

Column 1 of Table 2 presents the estimation of the OLS regression, while Columns 2 and 3 show the results of the IV and IV with firm fixed-effects models, respectively. In all specifications, we find support for our first hypothesis in that the higher presence of Generation X directors on the board is associated with better firm performance.

Next, we empirically test for the potential channels through which Gen X directors affect firm performance. In all specifications that follow we utilize the same set of control variables used in the performance regression and add the firm's Market-to-Book ratio as an additional explanatory variable.

Our second hypothesis, as developed in Section 2, argues that Gen Xers affect performance by promoting greater innovation. We examine three different output measures of innovation – the number of patents, number of citations, and the market value of patents. It is important to note that not all firms have patents and firms that self-select as a patent holder are likely to be inherently different from those that do not. In the presence of unobservable factors that determine both the success of the firm's innovative efforts and the presence of such efforts, the coefficients from estimating equation (1) will be biased.

To address the self-selection bias we employ the Heckman selection model, where we explicitly model the propensity for each firm to be a patent holder with a set of instruments that are unrelated to the dependent variables of interest. Similar to the instrumental variables used in Tables 2 we include state- and industry-level instruments related to the propensity to innovate in the first-stage of the Heckman model. The selection equation estimates a probit regression of an indicator variable that equals 1 if the firm has a non-missing value for the *No. of patents* variable and zero otherwise. For consistency, we include the full set of control variables alongside the two instruments in the selection equation. Then, we estimate equation (1) on each of the three dependent variables with the maximum likelihood selection model. Table 3 contains the results. In support of the second hypothesis, we find a positive and statistically significant coefficient on the *GenX Directors Pct.* variable in all specifications. Firms with more Generation X directors on the board are more successful in their innovative

efforts – they have more, and more valuable, patens as well as a higher number of citations.

Another potential channel for Generation X directors to add value is by strengthening the firm's global presence. To test this third hypothesis, we examine the effect of Gen Xers on the firm's expansion into foreign markets, measured by *Foreign Sales Growth*. Similar to the patenting variables, not all firms have foreign sales and they self-select into domestic and global. This again implies selection on the dependent variable and calls for employing the Heckman selection model to avoid biased coefficients. In this case, the selection equation is a probit model, estimating the likelihood of having a global presence. The instruments included in the first stage are the number of global firms in the same industry and state, computed annually. As reported in Table 4, the instruments are both highly significant determinants of the global or domestic status of firms. More importantly, we also find support the hypothesized positive effect of the presence of Gen X directors on the firm's foreign expansion efforts.

Our final hypothesis is that Generation X directors are more concerned with the firm's Corporate Social Responsibility efforts and performance than their non-GenX colleagues. As described in Section 3, the CSR measures are derived from Thomson Reuters ESG database. While ESG data is available for approximately 30% of the sample, this is due to data availability and does not present us with a self-selection bias as in the previous two tests. Therefore, we apply the instrumental variable approach with firms fixed-effects (as in column

3 of Table 2) to the CSR data as it is the most robust to potential omitted variable issues.

The ESG Scores measure a company's relative ESG performance based on the following three pillars:

- ***Environmental***: resource use, emissions, environmental product innovation
- ***Social***: workforce, human rights, community, product responsibility
- ***Governance***: management, shareholders, CSR strategy

We begin by estimating model (1) with the combined score for all three measures as a dependent variable (*ESG_Total*). We then replace the combined score with each of the individual CSR metrics to test whether Gen Xers have a heterogeneous effect across the three components. Table 5 presents the results of the IV with firm fixed-effects model estimated on each of the dependent variables (*ESG_Total; Environmental; Social; Environmental&Social* and *Governance)*. The overall CSR metric is increasing with the percent of Generation X Directors on the board. However, the other four specifications show that the positive association is driven mainly by the Gen Xers' concern for the environmental and social aspects of CSR as we find no significant relation between Gen Xers and governance. This finding hints at the idea that Generation X directors play more of an advisory role (providing strategic advice to management) than a monitoring one.

5. Concluding Remarks

Corporate board structure and its effect on firm value and other company outcomes is one of the most researched areas in contemporary corporate finance. In this paper, we contribute to this literature by documenting a strong generational effect in the boardroom. Specifically, we find that the new wave of Generation X directors who are slowly replacing the still dominant group of Baby Boomers on the boards are spurring an increase in firm innovation, more active expansion into global product and service markets, and increased engagement in CSR activity. These three factors are contributing to an overall improvement in firm performance for firms with larger representation of Generation X directors on the board.

To the best of our knowledge this is the first study of the generational effect in U.S. corporate boardrooms. Future studies can examine the importance of directors' generational identity in influencing other corporate actions, such as M&A activity, as well as the presence of a generational effect in the firm's dealings with other company stakeholders including employees, customers, and suppliers.

References

Adams, R., Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance, *Journal of Financial Economics* 94, 291–309.

Ahern, K., Dittmar, A., 2012. The changing of the boards: The impact on firm valuation of mandated female board representation, *Quarterly Journal of Economics* 127, 137-197.

Anderson, R., Reeb, D., Upadhyay, A., Zhao, W., 2011. The economics of director heterogeneity, *Financial Management* 40, 5–38.

Bernile, G., Bhagwat, V., Yonkers, S., 2018. Board diversity, firm risk, and corporate policies, *Journal of Financial Economics* 127, 588-612.

Carter, D., Simkins, B., Simpson, W., 2003. Corporate governance, board diversity, and firm value, *Financial Review* 38, 33–53.

Deng, X., Kang, J., Low, B., 2013. Corporate social responsibility and stakeholder value maximization: evidence from mergers, *Journal of Financial Economics* 110, 87–109.

Dimson, E., Karakas, O., Li, X., 2015. Active ownership, *Review of Financial Studies* 28, 3225–3268.

Farrell, K., Hersch, P., 2005. Additions to corporate boards: The effect of gender, *Journal of Corporate Finance* 11, 85–106.

Ferreira, D., 2010. Board diversity, In: Baker, H. K., Kolb, R. W., Anderson, R. (Eds.), Corporate governance: A synthesis of theory, research, and practice, John Wiley & Sons, Inc., Ch. 12, pp. 225–242.

Flammer, C., 2015. Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach, *Management Science* 61, 2549–2568.

Garrod, N., Rees, W., 1998. International diversification and firm value, *Journal of Business Finance and Accounting* 25, 1255-1281.

Güner, A., Malmendier, U., Tate, G., 2008. Financial expertise of directors, *Journal of Financial Economics* 88, 323–354.

Hirshleifer, D., Hsu, P., Li, D., 2013. Innovative efficiency and stock returns, *Journal of Financial Economics* 107, 632–654.

Howe, N., Strauss, W., 1991. Generations: The history of America's future, 1584 to 2069. New York: William Morrow & Company.

Howe, N., Strauss, W., 2007. The next twenty years: How customer and workforce attitudes will evolve, *Harvard Business Review*: 41–52.

Hsu, P., 2009. Technological innovations and aggregate risk premiums, *Journal of Financial Economics* 94, 264–279.

Kang, S., Kim, H., Lu, Y., 2018. Does independent directors' CEO experience matter? *Review of Finance* 22, 905-949.

Kogan, L., Papanikolaou, D., Seru, A., Stoffman, N., 2017. Technological innovation, resource allocation, and growth, *Quarterly Journal of Economics* 132, 665–712.

Lee, S., Kim, M., Davidson, W., 2015. Value relevance of multinationality: Evidence from Korean firms, *Journal of International Financial Management & Accounting* 26, 111–149.

Lins, K., Servaes, H., Tamayo, A., 2017. Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis, *Journal of Finance* 72, 1785–1824.

Miletkov, M., Poulsen, A., Wintoki, M. B., 2017. Foreign independent directors and the quality of legal institutions, *Journal of International Business Studies*, 48, 267-292.

Minton, B. , Taillard, J. , Williamson, R. , 2014. Financial expertise of the board, risk taking, and performance: Evidence from bank holding companies. *Journal of Financial and Quantitative Analysis* 49, 351–380.

Saudagaran, S., 2002. A review of the literature on the market valuation of multinational firms, *Managerial Finance* 28, 5-18.

Serfling, M., 2014. CEO age and the riskiness of corporate policies, *Journal of Corporate Finance* 25, 251–273.

Yim, S., 2013. The acquisitiveness of youth: CEO age and acquisition behavior, *Journal of Financial Economics* 108, 250–273.

Figure 1. Fraction of Firms with GenX Directors on the Board over the Sample Period

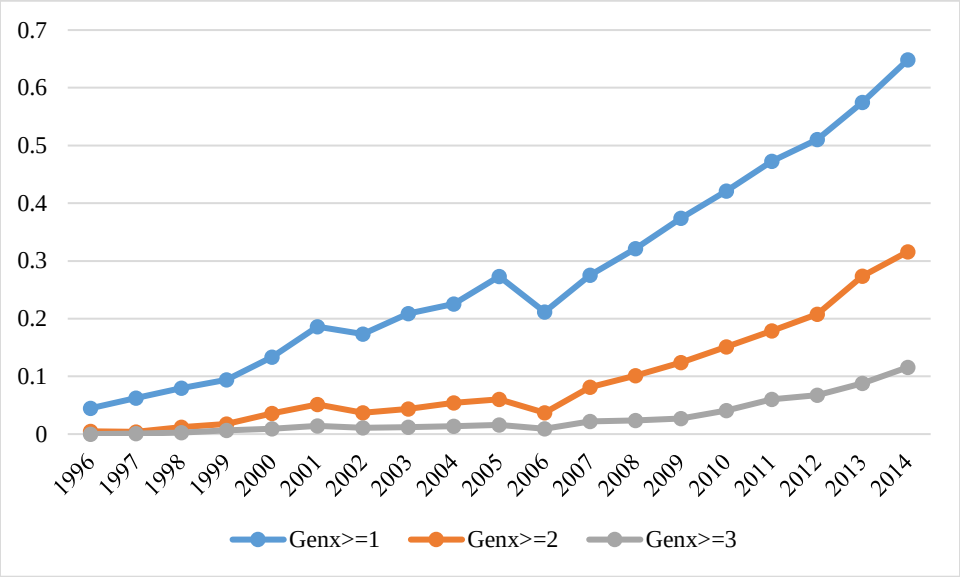

Table 1. Summary Statistics

Variable	Mean	S.D.	25th Percentile	Median	75th Percentile
Dependent Variables:					
Market-to-Book	1.96	1.22	1.20	1.58	2.27
No. of patents	61.55	225.68	3.00	9.00	34.00
Citation count	646.17	2969.66	11.00	61.00	298.00
Patent value ($mil)	1288.62	5078.90	10.34	61.87	423.80
Foreign Sales Growth	0.15	0.48	-0.03	0.08	0.22
ESG_Total	51.45	17.30	38.02	49.30	64.84
Environmental	49.38	22.13	32.10	45.11	67.00
Social	52.98	20.24	36.76	51.19	68.14
Env&Social	51.22	19.47	35.37	47.87	66.88
Governance	51.98	20.94	35.25	51.83	68.95
Key Independent Variable:					
GenX Directors Pct.	0.05	0.09	0.00	0.00	0.08
Controls:					
CEO Age	55.83	7.38	51.00	56.00	60.00
CEO GenX	0.10	0.30	0.00	0.00	0.00
ln(Median Director Age)	4.10	0.08	4.05	4.11	4.16
STD(Director Age)	7.95	2.49	6.16	7.66	9.47
Board Independence	0.70	0.17	0.60	0.73	0.83
ln(Board Size)	2.16	0.27	1.95	2.20	2.30
Female Directors Pct.	0.10	0.09	0.00	0.10	0.15
ln(Mean Director Tenure)	1.96	0.41	1.71	1.98	2.23
Firm Age	26.29	16.48	12.00	21.00	40.00
Size	6.73	1.53	5.68	6.61	7.69
Leverage	0.21	0.16	0.05	0.20	0.32
ROA	0.16	0.11	0.10	0.15	0.22
Tangibility	0.28	0.22	0.11	0.21	0.39
R&D	0.04	0.10	0.00	0.00	0.05
Capex	0.06	0.07	0.02	0.04	0.08
Cash Flow	0.10	0.08	0.07	0.10	0.14

Table 2. GenX Directors and Firm Value

The table contains coefficients of panel regressions of *Market-to-Book* on the percentage of independent directors on the board and various board characteristics and accounting control variables. The explanatory variables are lagged one year and are defined in the appendix (Table A1). Column 1 estimates the model with OLS and includes industry fixed effects based on FF49 industry classification as well as calendar year fixed effects. A 2SLS instrumental variable approach is employed in column 2 and a 2SLS, supplement by firm fixed-effect, in column 3. The sample spans the 1996-2014 period. In all specifications, the standard errors used to compute t-statistics (the latter reported in brackets) are robust to heteroskedasticity and clustering at the firm level. Coefficient estimates significantly different from zero at the 10%, 5%, and 1% level are identified with *, **, and ***, respectively.

	(1)	(2)	(3)
Dependent Variable:	**Market-to-Book**	**Market-to-Book**	**Market-to-Book**
Model:	**OLS**	**IV 2SLS**	**IV 2SLS with Firm Fixed Effect**
GenX Directors Pct.	0.538**	2.413***	2.272***
	[2.34]	[2.92]	[3.97]
CEO Age	-0.0838	-0.183	0.230*
	[-0.72]	[-1.37]	[1.78]
CEO GenX	0.0622	-0.154	-0.154**
	[1.05]	[-1.43]	[-2.11]
Median Dir. Age	-0.3	0.294	-0.524**
	[-1.34]	[0.85]	[-2.12]
STD(Director Age)	-0.00664	-0.0276***	-0.0368***
	[-1.13]	[-2.60]	[-4.04]
Board Ind	0.0759	0.0411	-0.134
	[0.80]	[0.43]	[-1.44]
Board Size	0.00483	0.0577	-0.0458
	[0.07]	[0.87]	[-0.70]
Female Dir. Pct.	0.21	0.530***	-0.239
	[1.34]	[3.46]	[-1.39]
Mean Dir. Tenure	0.148***	0.190***	0.192***
	[3.76]	[4.46]	[4.54]
Firm Age	-0.0693***	-0.0731***	-0.155*
	[-2.78]	[-2.87]	[-1.66]
Size	0.0195	0.0103	-0.414***
	[1.49]	[0.78]	[-10.97]
Leverage	-0.957***	-0.927***	-0.789***
	[-10.32]	[-9.83]	[-7.24]
ROA	5.451***	5.703***	2.999***
	[17.88]	[18.09]	[12.05]
Tangibility	-0.396***	-0.326***	0.258
	[-3.55]	[-4.42]	[1.44]
R&D	2.693***	3.615***	0.59
	[8.52]	[12.22]	[1.29]
R&D Dummy	0.0816**	0.0677**	0.0558
	[2.24]	[1.97]	[1.15]

Capex	-0.827***	-1.235***	-0.699***
	[-3.18]	[-4.87]	[-3.35]
Cash Flow	-0.123	0.0588	-0.0761
	[-0.31]	[0.14]	[-0.27]
N	16159	16159	16159
Adjusted R^2	0.409	0.37	

Table 3. GenX Directors and Innovation - Heckman Selection Model

The table contains coefficients of estimating the Heckman Selection model on three different measures of innovation– number of patents, number of citations and market value of patents (columns 1, 2, and 3, respectively). The main independent variable of interest is the percentage of independent directors on the board and all specifications include various board characteristics and accounting control variables. The explanatory variables are lagged one year and are defined in the appendix (Table A1). The table also reports the estimated coefficients for the two instrumental variables used in the first-stage (selection) equation.
All specifications include industry fixed effects based on FF49 industry classification as well as calendar year fixed effects. The sample spans the 1996-2010 period. In all specifications, the standard errors used to compute z-statistics (the latter reported in brackets) are robust to heteroskedasticity and clustering at the firm level. Coefficient estimates significantly different from zero at the 10%, 5%, and 1% level are identified with *, **, and ***, respectively.

	(1)	(2)	(3)
Dependent Variable:	**ln(patents)**	**ln(citations)**	**ln(patent value)**
Model:	**Heckman OLS**	**Heckman OLS**	**Heckman OLS**
GenX Directors Pct.	1.123**	1.616**	1.813***
	[2.01]	[2.07]	[3.01]
ln(CEO Age)	0.0677	-0.0573	-0.0955
	[0.25]	[-0.16]	[-0.34]
CEO GenX	0.203	0.204	0.0682
	[1.23]	[0.95]	[0.41]
ln(Median Director Age)	0.456	0.0683	0.242
	[0.87]	[0.10]	[0.45]
STD(Director Age)	-0.0143	-0.0164	-0.0218
	[-0.88]	[-0.73]	[-1.33]
Board Independence	0.293	0.313	-0.0568
	[1.41]	[1.08]	[-0.25]
ln(Board Size)	-0.363**	-0.511**	-0.273*
	[-2.27]	[-2.41]	[-1.67]
Female Directors Pct.	1.166**	1.410**	0.511
	[2.47]	[2.28]	[1.14]
ln(Mean Director Tenure)	0.0856	0.131	0.134
	[1.02]	[1.16]	[1.54]
Firm Age	-0.064	-0.221**	-0.162**
	[-0.91]	[-2.31]	[-2.21]
Size	0.590***	0.648***	1.203***
	[13.81]	[12.56]	[31.71]
MB	0.0355	0.112***	0.406***
	[1.29]	[2.79]	[13.07]
Leverage	-0.720***	-0.848***	-0.734***
	[-2.92]	[-2.78]	[-3.08]
ROA	-2.167***	-2.783***	-1.174**
	[-4.77]	[-4.25]	[-2.46]

Tangibility	-0.457	-1.455***	-0.660**
	[-1.36]	[-3.22]	[-2.06]
R&D	1.730***	1.534***	2.659***
	[3.90]	[2.74]	[5.20]
R&D Dummy	0.132	0.131	-0.0409
	[0.95]	[0.71]	[-0.32]
Capex	1.698**	3.297***	2.359***
	[2.47]	[3.36]	[3.35]
Cash Flow	1.464**	1.367	-0.417
	[2.32]	[1.52]	[-0.61]
Selection Equation IVs			
Patent_Industry	0.00659***	0.00641***	0.00627***
	[8.24]	[7.72]	[7.74]
Patent_State			
	0.00185***	0.00142**	0.000967*
	[3.15]	[2.51]	[1.80]
Observations	12810	12810	12810
Uncensored Observations	5079	5012	5012

Table 4. GenX Directors and Foreign Sales Growth - Heckman Selection Model

The table contains coefficients of estimating the Heckman Selection model on the firm's foreign sales growth. The main independent variable of interest is the percentage of independent directors on the board and all specifications include various board characteristics and accounting control variables. The explanatory variables are lagged one year and are defined in the appendix (Table A1). The table also reports the estimated coefficients for the two instrumental variables used in the first-stage (selection) equation.
The model includes industry fixed effects based on FF49 industry classification as well as calendar year fixed effects. The sample spans the 1996-2014 period. In all specifications, the standard errors used to compute z-statistics (the latter reported in brackets) are robust to heteroskedasticity and clustering at the firm level. Coefficient estimates significantly different from zero at the 10%, 5%, and 1% level are identified with *, **, and ***, respectively.

Dependent Variable:	**Foreign Sales Growth**
Model:	**Heckman OLS**
GenX Directors Pct.	0.208**
	[1.99]
ln(CEO Age)	0.0174
	[0.34]
CEO GenX	-0.0023
	[-0.10]
ln(Median Director Age)	0.137
	[1.48]
STD(Director Age)	-0.00750***
	[-2.67]
Board Independence	-0.000888
	[-0.02]
ln(Board Size)	-0.0195
	[-0.69]
Female Directors Pct.	-0.179***
	[-3.00]
ln(Mean Director Tenure)	0.00849
	[0.52]
Firm Age	-0.0282***
	[-2.83]
Size	-0.00216
	[-0.44]
MB	0.0178**
	[2.56]
Leverage	-0.0613
	[-1.45]
ROA	0.965***

	[5.77]
Tangibility	-0.047
	[-0.89]
R&D	0.0413
	[0.46]
R&D Dummy	0.00171
	[0.11]
Capex	0.296
	[1.49]
Cash Flow	-1.360***
	[-5.69]
Selection Equation IVs	
Foreign_Industry	0.0150***
	[9.41]
Foreign_State	0.00301***
	[4.15]
Observations	16209
Uncensored Observations	6896

Table 5. GenX Directors and Corporate Social Responsibility

Dep Variable:	(1) CSR_Total	(2) Environmental	(3) Social	(4) Env&Social	(5) Governance
Model:	**IV with Firm FE**	**IV with Firm FE**	**IV with Firm FE**	**IV with Firm FE**	**IV with Firm FE**
GenX Dir. Pct.	78.90***	148.0***	80.69***	113.6***	-0.214
	[3.86]	[4.96]	[3.22]	[4.72]	[-0.01]
CEO Age	-4.879	-4.149	-4.796	-4.48	-5.793
	[-1.19]	[-0.72]	[-0.87]	[-0.94]	[-1.05]
CEO GenX	-3.871*	-7.123**	-6.233**	-6.668**	2.504
	[-1.76]	[-2.22]	[-2.07]	[-2.47]	[0.93]
Median Dir. Age	33.67***	54.07***	45.13***	49.51***	-2.399
	[4.23]	[4.57]	[4.35]	[5.08]	[-0.23]
STD(Director Age)	-1.260***	-2.200***	-1.049**	-1.612***	-0.457
	[-3.71]	[-4.64]	[-2.57]	[-4.15]	[-0.98]
Board Ind	11.68***	7.221	6.829*	7.020*	22.31***
	[3.61]	[1.62]	[1.76]	[1.92]	[4.62]
Board Size	-1.46	3.631	-2.663	0.416	-5.736**
	[-0.66]	[1.18]	[-0.93]	[0.15]	[-2.12]
Female Dir. Pct.	8.998*	-3.845	5.877	1.121	26.96***
	[1.85]	[-0.57]	[0.91]	[0.19]	[4.00]
Mean Dir. Tenure	1.95	3.643**	0.345	1.959	1.929
	[1.46]	[2.00]	[0.21]	[1.30]	[1.09]
Firm Age	7.347**	-1.173	13.27***	6.204	9.951**
	[2.13]	[-0.21]	[2.87]	[1.40]	[2.07]
Size	2.757***	5.503***	1.347	3.380***	1.337
	[2.74]	[3.56]	[1.03]	[2.62]	[1.04]
MB	-0.552*	-0.844*	0.094	-0.365	-0.979**
	[-1.73]	[-1.89]	[0.21]	[-0.96]	[-1.98]
Leverage	-5.519	-3.796	-10.90**	-7.424*	-1.173
	[-1.54]	[-0.74]	[-2.46]	[-1.73]	[-0.26]
ROA	9.844**	8.421	16.45***	12.52**	3.741
	[2.07]	[1.27]	[2.68]	[2.20]	[0.55]
Tangibility	-10.71*	-16.12*	-9.638	-12.81*	-5.924
	[-1.67]	[-1.88]	[-1.20]	[-1.72]	[-0.69]
R&D	-4.519	2.008	-11.09***	-4.68	-4.15
	[-1.45]	[0.46]	[-2.61]	[-1.33]	[-0.68]
R&D Dummy	3.067	4.07	4.171*	4.122*	0.666
	[1.56]	[1.34]	[1.73]	[1.75]	[0.32]
Capex	-3.772	-8.551	1.032	-3.656	-4.033
	[-0.50]	[-0.77]	[0.11]	[-0.42]	[-0.40]

Cash Flow	-8.437	-7.567	-11.93*	-9.794	-5.338
	[-1.55]	[-0.96]	[-1.67]	[-1.50]	[-0.60]
N	4528	4528	4528	4528	4528