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# The Peter Pan syndrome for small and medium-sized enterprises: Evidence from Korean manufacturing firms

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## Abstract

This study examines whether government support for small and medium-sized enterprises (SMEs), aimed at stimulating their growth, achieves its intended goal. We argue that government subsidies create the incentive for SMEs to remain small in order to keep receiving such support and thus SMEs are reluctant to grow. We call this phenomenon the Peter Pan syndrome. Using a dataset of Korean manufacturing firms during the period of 2010–2012, we find that the Peter Pan syndrome indeed exists and that the likelihood of the Peter Pan syndrome is conditioned by factors that influence their incentive to remain as SMEs.

**JEL CODES**

L25; L53; L60

## 1 | INTRODUCTION

Small and medium-sized enterprises (SMEs) play an important role in the economy by creating the most jobs and leading innovation (Acs & Audretsch, 1990, 1993; Coad, 2007a; Harvie and Lee, 2005; Organization for Economic Cooperation and Development [OECD], 1997, 2000; Storey, 1994). Hence, supporting these firms with public funds has been an issue of contention. In fact, governments worldwide provide SMEs with various types of public support such as grants and awards, low-interest loans, credit guarantees, research and development (R&D) subsidies and tax credits, business advice, and the promotion of firm networks. (Collet, Pandit, & Saarikko, 2014; Cowling, 2010; Cowling & Mitchell, 2003; Garcia-Tabuenca & Crespo-Espert, 2010; Harvie and Lee, 2005; Humphrey & Schmitz, 1995, 1996; Lenihan & Hart, 2006; Mole, Hart, Roper, & Saal, 2009; Oh, Lee, Heshmati, & Choi, 2009; Rotger, Gørtz, & Storey, 2012; Taymaz & Ucdogruk, 2009).

Most of the member countries of the OECD generally define SMEs by stipulating size-contingent criteria for SME eligibility. For example, the Small Business Administration (SBA) of the United States uses an SME eligibility threshold in terms of the number of employees, which varies from 100 to 1,500 according to the industry (SBA, 2019). Similarly, Canada defines SMEs as firms with fewer than 500 employees (Government of Canada, 2019). According to the European Union, firms that employ fewer than 250 persons and have an annual turnover not exceeding EUR 50 million (or annual balance sheet total not exceeding EUR 43 million) are classified as SMEs (European Union, 2003). In Japan, firms are classified as SMEs if they have the number of employees or the amount of paid-in capital below the threshold levels that vary from 50 to 300 employees and from JPY 50 to 300 million, respectively (SME Support Japan, 2019). Korea also uses size-contingent criteria such as employment size, paid-in capital, and annual sales.

Given the substantial benefits that SMEs enjoy and the size-contingent criteria for SME eligibility, the problem here is that SMEs may intentionally hamper their growth in order to remain as SMEs because once they grow beyond the SME threshold, or graduate from the SME status, they lose eligibility for government support for SMEs. The substantial opportunity cost of graduating from the SME status, therefore, makes SMEs slow their growth in order to remain as SMEs. We call this phenomenon the Peter Pan syndrome, as used in the OECD (2015, 2017, and 2018). Originally, this term has been used in sociology to explain the phenomenon of grown-ups behaving like children and remaining in that state to get continuous care from parents (Kiley, 1983). SMEs desiring to maintain the status quo to receive governmental aid correspond to grown-ups longing for parental care. The OECD (2015, 2017, 2018) and The Economist (2014, May 17) reported that the Peter Pan syndrome is observed in many countries including Italy, Japan, Korea, and Mexico.

  

As SME support is intended to bolster enterprises and create employment, the existence of the Peter Pan Syndrome indicates that the government policy for SMEs fails to achieve its intended goal and causes a serious side effect. Specifically, the prevalence of SMEs reluctant to grow could trigger problems such as low productivity, deep wage inequality, a lack of efficiency, and deceleration of technological innovation (The Economist, 2014, May 17).[1] Lucas (1978) implied that these firms even result in the misallocation of resources in the national economy by distorting the firm size distribution.

Even though the existence of the Peter Pan syndrome has often been reported (OECD, 2015, 2017, 2018; The Economist, 2014, May 17), the syndrome was explained by simply showing statistics or anecdotal evidence. Furthermore, to the best of our knowledge, academic studies dealing with the Peter Pan syndrome are scant, and even the term is used in rather unconventional ways. For example, Sudhir and Talukdar (2015) used the term to describe the phenomenon in which Indian firms tend to be reluctant to adopt productivity-enhancing information technology systems because it causes difficulty in keeping their business output opaque from the formal monitoring system and thus in avoiding taxation and government regulations. Also, Dilling-Hansen (2017) used the term to refer to the phenomenon in which small firms, when they face less intense market competition, tend to show higher organizational slack or X-inefficiency (Leibenstein, 1966). It is also worth noting that there are some studies on the circumstances under which firms have incentives to refrain from growth. For example, Coad (2007a) pointed out that large firms have the incentive to dampen their growth to avoid antitrust intervention. Some studies also found that increasing firing costs make firms reluctant to grow (Garicano, Lelarge, & Van Reenen, 2016; Schivardi & Torrini, 2004). However, no study has empirically examined whether government support creates the incentive for SMEs to remain as SMEs and whether firm- or industry-specific factors influence this incentive.

Hence, this study aims to fill the lacuna in the existing literature by showing the existence of the Peter Pan syndrome through regression models. Furthermore, we examine whether the Peter Pan syndrome is more pronounced for SMEs that seem to be less likely to survive, as SMEs with a lower likelihood of survival tend to have a stronger dependence on government support. Specifically, we show that both firm- and industry-specific factors influencing firm survival such as profitability, innovative effort, the debt-to-equity (D/E) ratio, and market competition condition the likelihood of the Peter Pan syndrome. This strengthens the argument that the Peter Pan syndrome results from SMEs' incentive to hinder their growth in order not to lose their eligibility for public support.

The rest of the paper is organized as follows. Section 2 reviews the literature on the rationale for SME policies and on the determinants of firm growth. Section 3 elucidates why the Peter Pan syndrome may exist and establishes hypotheses on the existence of the Peter Pan syndrome and the conditioning role of the factors that influence firm survival. Section 4 describes the data, variables, and empirical specifications to be employed to test the hypotheses. Section 5 presents the results, and Section 6 concludes the study with some policy implications.

## 2 | LITERATURE REVIEW

### 2.1 | The rationale for small and medium-sized enterprise policies

In several developed and developing countries, most firms are SMEs, and they account for the majority of job creation and innovation (Acs & Audretsch, 1990, 1993; Coad, 2007a; Harvie and Lee, 2005; OECD, 1997, 2000; Storey, 1994). Compared with the important role of SMEs in the economy, receiving adequate investment, among several constraints, is challenging for them due to the capital market imperfections (Evans & Jovanovic, 1989; Seo, 2017; Storey, 1994). In most cases, these imperfections result from investors' reliance on incomplete information: They face information unavailability and the absence of the ability to interpret information properly (Peneder, 2008). As a result, SMEs tend to be constrained to access to finance (Audretsch & Eltson, 2002; Fazzari *et al*., 1987; Hall, 2002; Hawtrey, 1997; Lattimore, Madge, Martin, & Mills, 1998; PECC, 2003; Seo, 2017). Therefore, conventional wisdom has it that governments need to help SMEs overcome the constraint by using several tools such as grants and awards, low-interest loans, credit guarantees, R&D subsidies and tax credits, business advice, and the promotion of firm networks (Collet et al., 2014; Cowling, 2010; Cowling & Mitchell, 2003; Garcia-Tabuenca & Crespo-Espert, 2010; Harvie and Lee, 2005; Humphrey & Schmitz, 1995, 1996; Lenihan & Hart, 2006; Mole et al., 2009; Oh et al., 2009; Rotger et al., 2012; Taymaz & Ucdogruk, 2009).

Meanwhile, there are some skeptical views on the necessity and effectiveness of SME policies. For example, Davis, Haltiwanger, and Schuh (1998) argued that as jobs created by SMEs are not stable and easily disappear in a short period, their ability to create jobs might be overestimated. In addition, Haltiwanger, Jarmin, and Miranda (2013) showed that young firms, not small firms, have an important role in job creation in the whole economy. Furthermore, Hallberg (2000) and Storey (1982) pointed out that most support programs targeting SMEs do not consider the heterogeneity of firms in terms of competitiveness and thus lack effectiveness. In a similar vein, Waleczek, Zehren, and Flatten (2018) showed that providing subsidized loans to start-ups can be ineffective because it often fails to satisfy the needs of the business owners.

### 2.2 | The determinants of firm growth

Above all, size is a major determinant that has been studied in the literature on the growth of firms. The first formulation of the relationship between size and the rate of firm growth has been suggested in

the form of Gibrat's law. This law proposes the proportionate effect of firm size, indicating that the rate of firm growth is independent of absolute firm size (Gibrat, 1931). Although Mansfield (1962) found that Gibrat's law generally holds, it is inconsistent with the findings of subsequent studies: Although some earlier studies found a positive relationship between size and the rate of firm growth (Hart, 1962; Prais, 1974; Samuels, 1965; Singh & Whittington, 1975), the majority of studies argue that small firms grow faster (e.g., Akcigit & Kerr, 2018; Arkolakis, Papageorgiou, & Timoshenko, 2018; Coad & Tamvada, 2012; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Hall, 1987; Kumar, 1985; Sutton, 1997; Yasuda, 2005). Meanwhile, there exists some evidence that Gibrat's law partially holds. For example, Mowery (1983) found that Gibrat's law holds for large firms, whereas Lotti, Santarelli, and Vivarelli (2009) and Fotopoulos and Giotopoulos (2010) found that Gibrat's law is more likely to hold for older firms. It was also found by Daunfeldt and Elert (2013) that whether Gibrat's law holds or not is largely dependent on industry-specific characteristics such as the minimum efficient scale, market concentration rate, and the number of young firms. In summary, the pattern of firm growth shows diverse and conflicting empirical support, and factors underlying the pattern of firm growth are not yet fully explored (Lee, 2010).

The growth of firms has several facets as well as complicated aspects. Possible factors determining the growth of firms could include not only size but also age, financing, R&D, management strategies, and other resources (Penrose, 1959). In the context of the relationship between firm growth and firm age, a stylized fact is that young firms usually grow faster (e.g., Arkolakis et al., 2018; Coad, Daunfeldt, & Halvarsson, 2018; Coad, Segarra, & Teruel, 2013; Coad & Tamvada, 2012; Cowling, Liu, & Zhang, 2018; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Variyam & Kraybill, 1992). With regard to the impact of financing on the growth of firms, better access to finance usually helps firms grow, whereas financial constraints generally harm growth (e.g., Eldridge, Nisa, & Torchia, 2019; Fagiolo & Luzzi, 2006; Heshmati, 2001; Honjo & Harada, 2006). Regarding the relationship between R&D and firm growth, previous studies suggest various and divergent empirical results. Some studies show that technological innovation helps firms increase the number of employees (e.g., Bogliacino, Piva, & Vivarelli, 2012; Hall, 1987; Piva & Vivarelli, 2005, 2018; Yasuda, 2005), whereas others indicate that R&D has insignificant or even negative effect on the growth of employment (e.g., Brouwer, Kleinknecht, & Reijnen, 1993; Corsino & Gabriele, 2010; Klette & Førre, 1998; Mairesse & Wu, 2019; Piva & Vivarelli, 2018; Spescha, 2019). This might be because the relationship is largely influenced by the nature of R&D—whether it is product or process R&D and whether it is labor-saving or labor-increasing (Piva & Vivarelli, 2018). Even though the factors influencing firm growth are not yet fully explored, profit-maximizing firms usually have an incentive to grow (Coad, 2007b) as growth itself leads to performance. Often, firms try to expand their size to exploit economies of scale and scope and sometimes use growth as a strategy to deter the entry of potential competitors (Dixit, 1980).

## 3 | THEORETICAL FRAMEWORK AND HYPOTHESES

In this section, we elucidate why the Peter Pan syndrome may exist and develop hypotheses on the likelihood of the Peter Pan syndrome and the factors influencing the likelihood.

As briefly discussed in Section 1, the Peter Pan syndrome can occur under two conditions. First, SMEs have the incentive to remain as SMEs, or the disincentive to graduate from the SME status, in order to maintain their eligibility for government support for SMEs. Second, the criteria for SME eligibility are size contingent. Under these conditions, the growth of SMEs beyond the SME eligibility threshold incurs the substantial opportunity cost of losing eligibility for government support for SMEs.

Given substantial government support for SMEs, SMEs generally have the incentive to remain as SMEs. However, whether firms are reluctant to grow largely depends on firm size. Specifically, very small SMEs, which are farther away from a certain SME eligibility threshold, are less likely to slow their growth because they would remain small enough regardless of their rate of growth. In contrast, as SMEs grow and approach the SME eligibility criteria, they are more likely to slow their growth in order to remain small enough. Hence, it is expected that SMEs that are closer to the SME eligibility threshold are more likely to be reluctant to grow. This leads to our first hypothesis:

**Hypothesis 1.** *SMEs closer to the SME eligibility threshold are more likely to exhibit the Peter Pan syndrome.*

Next, we examine whether the factors that influence the survival of firms condition the likelihood of the Peter Pan syndrome. It can be inferred that SMEs that are less likely to survive tend to be more dependent on government support, thereby having a stronger incentive to remain as SMEs, because losing their eligibility for public support significantly increases the hazard of their failure. First of all, we consider firm profitability. According to the literature on industrial organization, a difference in efficiency is the main factor behind the difference in firm survival rate (Ericson & Pakes, 1995; Jovanovic, 1982;). Considering that firm productivity or firm efficiency is a key determinant of firm survival (Ericson & Pakes, 1995; Jovanovic, 1982; Melitz, 2003) and that firm profitability represents firm productivity (Esteve-Perez & Manez-Catillejo, 2008), firm profitability may serve as an adequate conditioning factor. Hence, we expect that less profitable SMEs have a stronger incentive to remain as SMEs, whereas more profitable SMEs have a weaker incentive to remain as SMEs. This leads to the second hypothesis:

**Hypothesis 2.** *The Peter Pan syndrome is more (less) pronounced for less (more) profitable SMEs.*

In addition, we hypothesize that firm innovation conditions the likelihood of the Peter Pan syndrome. Because innovation plays an

important role in firm survival by enhancing firm-specific learning capacity, technological competitiveness, and adaptability to the business environment (Cefis & Marsili, 2006; Cohen & Levinthal, 1989; Eisenhardt & Martin, 2000; Fontana & Nesta, 2009; Hall, 1987; Jung, Hwang, & Kim, 2018; Wojan, Crown, & Rupasingha, 2018), we conjecture that SMEs that invest more in R&D are less dependent on government support compared with their less innovative counterparts. This brings us to Hypothesis 3:

**Hypothesis 3.** *The Peter Pan syndrome is more (less) pronounced for SMEs that conduct less (more) R&D.*

We also consider the D/E ratio, or the total liabilities divided by equity, as a factor that conditions the likelihood of the Peter Pan syndrome. The D/E ratio reflects a firm's financial leverage, and a high D/E ratio reveals its vulnerability to various business shocks. Several studies found that highly leveraged firms are less likely to survive (e.g., Bunn & Redwood, 2003; Musso & Schiavo, 2008; Zingales, 1998). Considering this, it can be inferred that the D/E ratio of a firm affects its degree of dependence on government support and thus the likelihood of the Peter Pan syndrome. This leads to the following hypothesis:

**Hypothesis 4.** *The Peter Pan syndrome is more (less) pronounced for SMEs with high (low) D/E ratios.*

Along with the firm-specific factors we considered above, we also consider an industry-specific factor that may influence firm survival. Here, we consider the degree of market competition as a conditioning variable. Market competition is an important determinant of firm profitability. For example, several studies found that market concentration has a positive effect on firm profitability (Bain, 1951, 1956; Jenny & Weber, 1976; Neumann, Böbel, & Haid, 1982; Weiss, 1974). Some studies also found that firm profitability tends to be lower for firms operating in industries with more intense competition (Hart, 1983; Scharfstein, 1988; Schmidt, 1997). Considering that firm profitability is a key determinant of firm survival, intense market competition tends to decrease the likelihood of firm survival (e.g., Audretsch, 1991; Geroski, Mata, & Portugal, 2010). The reduced likelihood of survival due to market competition increases an SME's dependence on government support and thus its incentive to remain as SMEs. This leads to Hypothesis 5:

**Hypothesis 5.** *The Peter Pan syndrome is more (less) pronounced for SMEs operating in industries characterized by low (high) market concentration.*

As a corollary to Hypothesis 5, we consider both the effects of the firm- and industry-specific characteristics that influence firm survival on the likelihood of the Peter Pan syndrome. Because efficient firms can survive even in industries characterized by intense market competition, the degree of dependence of SMEs on public support may vary depending on their firm-specific innovative effort and profitability. In particular, it seems plausible that SMEs with high profitability or intensive innovative effort have a weaker incentive to remain as SMEs than their less profitable and less innovative counterparts when they operate in competitive industries. This brings us the last hypothesis:

**Hypothesis 6.** *SMEs with high profitability or intensive innovative effort are less likely to exhibit the Peter Pan syndrome even when they operate in industries characterized by low market concentration.*

## 4 | DATA, VARIABLES, AND EMPIRICAL SPECIFICATIONS

### 4.1 | Overview: SMEs and SME support in Korea

In this study, we focus on the Peter Pan syndrome for Korean SMEs. This subsection introduces the status of Korean SMEs and SME support programs.

According to Korea's Ministry of SMEs and Startups (MSS) and the Korea Federation of SMEs, SMEs constitute more than 99% of Korean firms and account for more than 80% of the total employment and about 50% of the added value created by Korean firms (Korea Federation of SMEs, 2018; MSS, 2019a, 2019b). Interestingly, it was reported by the OECD (2014) that only 696 among several million SMEs had graduated from the SME status between 2002 and 2012, indicating that most Korean SMEs remain as SMEs for a considerable period of time. This might be because, like most OECD countries that have public support programs primarily targeting SMEs (OECD, 1997, 2002, 2005), Korea has substantial policy packages and support programs for SMEs. For example, the Korean government supports SMEs by providing R&D subsidies and tax credits, easing regulations, purchasing their products, protecting their technologies, establishing credit guarantee foundations, and promoting their cooperation with large enterprises (MSS, 2019c). During the period of 2016–2018, annual policy funds for SMEs exceeded KRW 4 trillion (about USD 3.36 billion) and annual government purchases of SME-manufactured products amounted to more than KRW 90 trillion (about USD 76.81 billion; MSS, 2019d). In addition, the Korean government plans to provide SMEs with loan guarantees of KRW 2 trillion (about USD 1.18 billion) from 2018 to 2021 (OECD, 2019). Meanwhile, according to the Science and Technology Policy Institute, the budget for government R&D support targeting SMEs reached about KRW 3 trillion (about USD 2.52 billion) in 2015, and there were about 26,000 beneficiaries during the period of 2011–2015 (Science and Technology Policy Institute, 2017).

In Korea, the Framework Act on Small and Medium Enterprises (henceforth, SME Act) stipulates the criteria for SME eligibility. In manufacturing industries, firms with fewer than 300 employees or paid-in capital of KRW 8 billion (about USD 6.82 million) or less had been legally classified as SMEs from years 2000 to 2014. In this framework, a firm can remain as an SME and benefit from government support for SMEs by satisfying at least one of the two criteria

(i.e., employment size and paid-in capital). After the amendment of the SME Act in year 2014, the average annual sales over the previous 3 years, instead of the two criteria of employment size and paid-in capital, is used as the sole criterion for SME eligibility. It is worth noting that the SME eligibility threshold in terms of the 3-year average annual sales varies from KRW 80 to 150 billion depending on industries.[2]

## 4.2 | Data

We employ a dataset of Korean manufacturing firms during the period of 2010–2012 in which employment size and paid-in capital were used as the criteria for SME eligibility. The dataset was constructed using two sources of data. One is firm-level data from the Korea Information Service (KIS)-Value, a corporate database serviced by the National Information and Credit Evaluation Incorporation, one of the oldest and most trusted corporate credit rating institutions in Korea. The KIS-Value provides firm-level data for all manufacturing firms listed on the Korea Stock Exchange and the Korea Securities Dealers Automated Quotation, and other firms that are not listed but externally audited. The dataset includes corporate establishment dates, employment size, total sales, governmental subsidy received, paid-in capital, profitability, R&D expenditures, and the D/E ratios. The other source is the data provided by the Korea Development Institute, a government-affiliated think tank, which contains industry-level information for all manufacturing industries in Korea at the five-digit Korea Standard Industrial Classification (KSIC) level during the period of 2006–2010. Particularly, the dataset provides information on market concentration ratios in 2010. Our final dataset contains firm-level data for 7,938 firms and industry-level data for 436 five-digit KSIC industries.

## 4.3 | Variables

As explained in Section 4.1, employment size and paid-in capital were used as the criteria for SME eligibility during the sample period. Hence, we focus on firms' employment growth and use the rate of employment growth (GR_EMP) as the dependent variable. In order to reduce the volatility of firm growth, we use the following compound annual rate of employment growth:

$$\text{GR\_EMP} = \left[\left[\frac{\textit{Number of employees in } 2012}{\textit{Number of employees in } 2010}\right]^{\frac{1}{2}} - 1\right] \times 100. \quad (1)$$

Furthermore, we also employ the variable for the rate of sales growth (GR_SALES) as an alternative dependent variable in order to check that the SME eligibility criteria caused the Peter Pan syndrome. Specifically, because the criteria for SME eligibility do not include firm sales, firms do not have any incentive to slow their growth in terms of firm sales. Hence, it is expected that the Peter Pan syndrome is observed only when the growth of employment is used as the dependent variable. In order to measure the rate of sales growth, we use the compound annual rate of sales growth as follows:

$$\text{GR\_SALES} = \left[\left[\frac{\textit{Sales in } 2012}{\textit{Sales in } 2010}\right]^{\frac{1}{2}} - 1\right] \times 100. \quad (2)$$

The key explanatory variables are firm size measured as the natural logarithm of the number of employees in 2010 (EMP) and the amount of government subsidy received in 2010 (in log) by each firm (SUB).[3] As reviewed in Section 2.2, Gibrat's law indicates that the rate of firm growth is closely related to firm size. Hence, we control for the effect of firm size on the rate of firm growth. In order to evaluate the likelihood and magnitude of the Peter Pan syndrome, we examine whether the effect of government subsidy (SUB) on firm growth varies with firm size (EMP). In particular, it is expected that the effect of SUB on firm growth is more likely to be negative for larger SMEs, which are closer to the SME eligibility thresholds because they tend to slow their growth in order to remain as SMEs. Hence, the negative coefficient of the interaction term between employment size and government subsidy (EMP_SUB) indicates the Peter Pan syndrome.

Furthermore, we also construct some control variables and the variables for conditioning factors. First, we control for the effect of firm age on the rate of firm growth, which is negative as found in several studies (e.g., Arkolakis et al., 2018; Coad et al., 2013; Coad et al., 2018; Coad & Tamvada, 2012; Cowling et al., 2018; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Variyam & Kraybill, 1992). Firm age (AGE) is measured as the natural logarithm of the number of years of operation after its foundation. In order to control for the effect of R&D on firm growth, we use the natural logarithm of R&D intensity (RDINT) or the ratio of R&D expenditures to firm sales.[4] RDINT controls for the various effects of firm R&D on firm growth (Piva & Vivarelli, 2018). In order to control for the influence of external financial resources (e.g., Eldridge et al., 2019; Fagiolo & Luzzi, 2006; Heshmati, 2001; Honjo & Harada, 2006), we construct a dummy variable for publicly listed firms (LIST). A dummy variable for firms affiliated with big business groups such as Samsung and Hyundai (AFF) is also employed in order to control for the various effects of business group membership on firm growth such as sharing of intangible and financial resources and internal business transactions among member firms (e.g., Campbell & Keys, 2002; Chang & Hong, 2000; Cheong, Choo, & Lee, 2010).

As the variables conditioning the likelihood and magnitude of the Peter Pan syndrome, we created several firm- and industry-specific variables. First, we include the three-firm concentration ratio at the five-digit KSIC level (CR3) to represent the degree of market competition and industry dummy variables at the five-digit KSIC level (IND5) to control for the possibly remaining industry-specific factors influencing firm growth. We also create variables for profitability (PROFIT) and the D/E ratio (DEBT) in 2010 in order to investigate their conditioning role in the Peter Pan syndrome. Finally, we include the amount of paid-in capital in 2010 (CAP), as along with employment size, it is another criterion for the eligibility for SMEs.

**TABLE 1** Descriptions of the variables

| | |
|---|---|
| Dependent variables | |
| GR_EMP | Compound annual rate of employment growth for the period of 2010–2012 |
| GR_SALES | Compound annual rate of sales growth for the period of 2010–2012 |
| Independent variables | |
| EMP | Number of employees (in log) |
| SUB | Amount of government subsidy received (in log) |
| AGE | Firm age (elapsed years since the firm's establishment; in log) |
| RDINT | R&D intensity (R&D expenditure/firm sales; in log) |
| LIST | One if a firm is listed on the KSE or the KOSDAQ; zero, otherwise |
| AFF | One if a firm is affiliated with a business group; zero, otherwise |
| CAP | The amount of paid-in capital (billion in KRW) |
| PROFIT | Firm profitability, measured as the total operating profits divided by firm sales |
| DEBT | The debt-to-equity ratio |
| CR3 | The three-firm concentration ratio measured at the five-digit KSIC level |
| IND5 | Industry dummy variables at the five-digit KSIC level |

Table 1 describes the variables employed in this study and Tables 2 and 3 provide summary statistics including the correlation coefficients for the variables.

## 4.4 | Empirical specifications

We employ an ordinary least squares estimator for our empirical analysis after testing for the endogeneity of public support (SUB) with firm growth (GR_EMP). The baseline specification is as follows:

$$\mathrm{GR\_EMP}_{i,j} = \beta_0 + \beta_1 \mathrm{EMP}_i + \beta_2 \mathrm{SUB}_i + \beta_3 \mathrm{EMP\_SUB}_i + \beta_4 \mathbf{X}_i + \beta_5 \mathbf{Y}_j + \varepsilon_i, \quad (3)$$

where $\mathrm{GR\_EMP}_{i,j}$ is the compound annual rate of employment growth for firm $i$ operating in industry $j$ during the period of 2010–2012. $\mathrm{EMP}_i$ denotes firm size, measured as the number of employees, and $\mathrm{SUB}_i$ denotes the total amount of government subsidy in 2010. $\mathrm{EMP\_SUB}_i$ is the interaction term between $\mathrm{EMP}_i$ and $\mathrm{SUB}_i$, whose coefficient indicates the existence of the Peter Pan syndrome, as explained in Section 4.2. $\mathbf{X}_i$ denotes a set of firm-specific control variables such as firm age ($\mathrm{AGE}_i$), firm R&D intensity ($\mathrm{RDINT}_i$), and the dummy variable for publicly listed firms ($\mathrm{LIST}_i$) and for firms with business group affiliation ($\mathrm{AFF}_i$). $\mathbf{Y}_j$ denotes a set of industry-level control variables such as the variable for the three-firm concentration ratio at the five-digit KSIC level in 2010 ($\mathrm{CR3}_j$) and the dummy variables for the five-digit KSIC industries (**IND5**). $\varepsilon$ represents the idiosyncratic error.[5]

The explanatory variables are lagged 2 years behind the dependent variable in order to control for the potential endogeneity of the amount of government subsidy and the rate of firm growth. Furthermore, as a robustness check, we try an instrumental-variable approach and confirm that we can reject the possibility of the endogeneity problem in this study. Considering that firm-specific characteristics may influence the probability of receiving public funding and its size (e.g., Busom, 2000; Lichtenberg, 1984; Wallsten, 2000), one can conjecture that SMEs that grow faster are more likely to receive a higher amount of public support. Hence, in order to test for the endogeneity, we employ a dummy variable for whether a firm did R&D in 2009 as an instrumental variable, considering that whether doing R&D or not in 2009 is closely correlated with the probability of receiving public support and its size while the rate of firm growth during the period of 2010 and 2012 does not influence the likelihood of doing R&D in 2009. As expected, it is found that the correlation coefficient between the instrumental variable and SUB is statistically significant at the 1% level with a correlation coefficient of 0.11, whereas the instrumental

**TABLE 2** Summary statistics for the key variables

| Variables | *M* | *SD* | Skewness | Kurtosis | Jarque-Bera Statistics |
|---|---|---|---|---|---|
| 1. GR_EMP | 4.77 | 24.79 | 5.45 | 84.82 | $2.3 \times 10^6$ (0.00) |
| 2. GR_SALES | 11.15 | 65.88 | 39.82 | 2304.66 | $1.8 \times 10^9$ (0.00) |
| 3. EMP | 4.36 | 1.03 | 0.76 | 5.46 | 2,764 (0.00) |
| 4. SUB | 2.31 | 6.17 | 2.34 | 6.61 | $1.2 \times 10^4$ (0.00) |
| 5. AGE | 2.91 | 0.55 | −0.19 | 2.97 | 50.54 (0.00) |
| 6. RDINT | 0.01 | 0.04 | 53.87 | 3823.21 | $4.8 \times 10^9$ (0.00) |
| 7. LIST | 0.15 | 0.35 | 2.00 | 4.99 | 6,592 (0.00) |
| 8. AFF | 0.39 | 0.49 | 0.45 | 1.20 | 1,336 (0.00) |
| 9. CAP | 8.67 | 63.00 | 26.51 | 945.98 | $3.0 \times 10^8$ (0.00) |
| 10. PROFIT | 17.75 | 97.01 | −81.22 | 6973.03 | $1.6 \times 10^{10}$ (0.00) |
| 11. DEBT | 5.38 | 122.05 | 72.44 | 5743.80 | $1.1 \times 10^{10}$ (0.00) |
| 12. CR3 | 30.32 | 19.57 | 1.20 | 4.04 | 2,269 (0.00) |

*Note*. *p*-values for the Jarque–Bera test are in the parentheses.

**TABLE 3** Correlation coefficients for the key variable

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. GR_EMP | 1.00 | | | | | | | | |
| 2. GR_SALES | 0.16 (0.00) | 1.00 | | | | | | | |
| 3. EMP | −0.20 (0.00) | −0.07 (0.00) | 1.00 | | | | | | |
| 4. SUB | −0.01 (0.38) | −0.03 (0.01) | 0.09 (0.00) | 1.00 | | | | | |
| 5. AGE | −0.13 (0.00) | −0.15 (0.00) | 0.36 (0.00) | 0.00 (0.72) | 1.00 | | | | |
| 6. RDINT | 0.01 (0.48) | 0.06 (0.00) | −0.03 (0.00) | 0.06 (0.00) | −0.06 (0.00) | 1.00 | | | |
| 7. LIST | 0.01 (0.19) | −0.02 (0.05) | 0.36 (0.00) | 0.17 (0.00) | 0.23 (0.00) | 0.00 (0.46) | 1.00 | | |
| 8. AFF | −0.01 (0.24) | −0.01 (0.34) | 0.32 (0.00) | 0.02 (0.12) | 0.18 (0.00) | −0.03 (0.01) | 0.25 (0.00) | 1.00 | |
| 9. CR3 | −0.02 (0.11) | −0.01 (0.34) | 0.16 (0.00) | 0.06 (0.00) | 0.07 (0.00) | 0.03 (0.01) | 0.13 (0.00) | 0.11 (0.00) | 1.00 |

*Note.* *p*-values for the Pearson correlation test are in the parentheses.

variable has no correlation with the dependent variable (GR_EMP) with a correlation coefficient of 0.008, which is statistically insignificant at the 10% level. Using this instrument, we employ the Wu–Hausman test of endogeneity (Hausman, 1978; Wu, 1974) and find that the exogeneity of SUB and EMP_SUB cannot be rejected even at the 10% significance level.[6] In addition, we try an alternative instrumental variable, the dummy variable for whether a firm did R&D for two consecutive years (i.e., 2008 and 2009). This instrumental variable is correlated with SUB with a correlation coefficient of 0.09, which is statistically significant at the 1% level but not correlated with GR_EMP with a correlation coefficient of 0.004, which is statistically insignificant at the 10% level. We find that we cannot reject the exogeneity of SUB and EMP_SUB even at the 10% significance level.[7] Finally, we employ the robust score test of endogeneity (Wooldridge, 1995), which is robust to heteroscedasticity, and find consistent results using either of the two instrumental variables.[8]

For a robustness check for the Peter Pan syndrome, which uses sales growth (GR_SALES) as the alternative dependent variable, we use the following specification:

$$\text{GR\_SALES}_{i,j} = \beta_0 + \beta_1 \text{EMP}_i + \beta_2 \text{SUB}_{i,} + \beta_3 \text{EMP\_SUB}_i + \beta_4 \mathbf{X}_i + \beta_5 \mathbf{Y}_j + \varepsilon_i. \quad (4)$$

## 5 | EMPIRICAL RESULTS

### 5.1 | On the existence of the Peter Pan syndrome

The regression results for the existence of the Peter Pan syndrome are presented in Tables 4, 6, 8, 10. The key findings are as follows.

First, Table 4 reports the regression results for the entire sample and for the samples of non-SMEs and SMEs, respectively. The coefficient of the interaction term between employment size and government subsidy (EMP_SUB) is positive and statistically significant for the entire sample and for non-SMEs, implying that government subsidy positively moderates the size effect of employment growth. Even for SMEs, the interaction term (EMP_SUB) has a positive, even though statistically insignificant, coefficient. Table 4a presents similar results with sales growth (GR_SALES) as the dependent variable. The coefficients are largely similar to those in Table 4. In particular, the coefficient of the interaction term (EMP_SUB) is positive and statistically significant for the entire sample and is still positive (even though statistically insignificant) for non-SMEs and SMEs. These results indicate

**TABLE 4** The Peter Pan syndrome (employment growth)

| | Model (1) | Model (2) | Model (3) |
|---|---|---|---|
| GR_EMP | Entire sample | Non-SMEs | SMEs |
| EMP | −6.56 | −4.21 | −10.18 |
| | (−9.90)*** | (−2.15)** | (−11.34)*** |
| SUB | −0.60 | −1.35 | −0.50 |
| | (−2.81)*** | (−2.12)** | (−1.39) |
| EMP_SUB | 0.13 | 0.23 | 0.12 |
| | (2.92)*** | (2.25)** | (1.53) |
| AGE | −3.34 | −3.86 | −2.86 |
| | (−5.09)*** | (−2.02)** | (−3.90)*** |
| RDINT | −0.25 | −11.19 | −0.92 |
| | (−0.06) | (−0.34) | (−0.20) |
| LIST | 7.89 | 5.69 | 6.71 |
| | (6.79)*** | (1.60) | (6.44)*** |
| AFF | 2.14 | −0.63 | 0.81 |
| | (3.18)*** | (−0.36) | (1.18) |
| CR3 | −0.55 | −0.21 | −0.21 |
| | (−0.79) | (−1.44) | (−0.22) |
| IND5 | Included | Included | Included |
| Observations | 7,938 | 1,517 | 6,421 |
| R-squared | 0.125 | 0.412 | 0.152 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported.
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 4A** The Peter Pan syndrome (sales growth)

| | Model (1) | Model (2) | Model (3) |
|---|---|---|---|
| GR_SALES | Entire sample | Non-SMEs | SMEs |
| EMP | −2.14 | −2.63 | −3.12 |
| | (−1.97)** | (−2.74)*** | (−1.52) |
| SUB | −0.83 | −0.65 | −0.69 |
| | (−2.39)** | (−0.79) | (−1.20) |
| EMP_SUB | 0.12 | 0.10 | 0.09 |
| | (1.69)* | (0.82) | (0.68) |
| AGE | −19.06 | −7.79 | −22.78 |
| | (−4.57)*** | (−4.06)*** | (−3.96)*** |
| RDINT | 83.86 | 614.59 | 67.42 |
| | (5.16)*** | (1.57) | (4.66)*** |
| LIST | 5.96 | −0.67 | 6.38 |
| | (3.02)*** | (−0.39) | (2.64)*** |
| AFF | 1.40 | −0.14 | 0.23 |
| | (1.10) | (−0.08) | (0.15) |
| CR3 | 1.23 | −0.27 | 0.09 |
| | (0.52) | (−0.94) | (0.04) |
| IND5 | Included | Included | Included |
| Observations | 7,938 | 1,517 | 6,421 |
| $R^2$ | 0.048 | 0.417 | 0.050 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported.
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

that government subsidy attenuates the negative effect of firm size on the rate of growth and thus show no signs of the Peter Pan syndrome. It is worth noting that R&D intensity (RDINT) has a statistically significant positive effect on sales growth, whereas it is statistically insignificant for employment growth. A plausible explanation is that R&D often increases firm sales in a labor-saving fashion, especially when, like in Korea, the labor market is rigid (Betcherman & Islam, 2001).

Second, because SMEs closer to the SME eligibility thresholds are more likely to show the Peter Pan syndrome, in Table 5 we divide SMEs into two subsamples according to the primary SME eligibility criterion of employment size (EMP). Models (1) and (2) of Table 5 report the results for the two subsamples of SMEs divided by the median of EMP (60 employees) and Models (3) and (4) for the two subsamples of SMEs divided by the third quartile of EMP (100 employees). As shown in Models (1) and (3), the coefficients of the interaction term between employment size and government subsidy (EMP_SUB) are positive and statistically significant for relatively small SMEs, whereas they are negative and statistically significant for large SMEs (i.e., Models (2) and (4)). These results show that the Peter Pan syndrome is evident for large SMEs, whose size is closer to the SME eligibility thresholds, whereas small SMEs, whose size is farther away from the thresholds show the opposite of the Peter Pan syndrome. Furthermore, as shown in Models (2) and (4) among the two subgroups of large SMEs, the absolute magnitude and statistical significance of the interaction term (EMP_SUB) is greater for the subsample of large SMEs of Model (4) than for the subsample of large SMEs of Model (2). Hence, these results altogether support Hypothesis 1. In addition, as reported in Table 5a, the results with sales growth (GR_SALES) as the dependent variable show that the coefficients of

**TABLE 5** Employment size and the Peter Pan syndrome (employment growth)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| GR_EMP | Below median EMP | Above median EMP | Below third quartile EMP | Above third quartile EMP |
| EMP | −20.28 | −3.87 | −14.72 | −6.48 |
| | (−8.82)*** | (−4.30)*** | (−9.78)*** | (−3.78)*** |
| SUB | −2.16 | 1.11 | −1.65 | 2.48 |
| | (−2.39)** | (1.74)* | (−2.90)*** | (1.79)* |
| EMP_SUB | 0.60 | −0.23 | 0.44 | −0.49 |
| | (2.48)** | (−1.71)* | (3.09)*** | (−1.81)* |
| AGE | −4.06 | −1.09 | −3.70 | 0.28 |
| | (−3.24)*** | (−1.40) | (−3.98)*** | (0.26) |
| RDINT | −4.11 | 17.20 | −1.70 | 10.83 |
| | (−0.96) | (0.80) | (−0.34) | (0.38) |
| LIST | 7.33 | 4.05 | 8.17 | 2.76 |
| | (2.61)*** | (4.13)*** | (4.96)*** | (2.18)** |
| AFF | 1.55 | −1.12 | 1.11 | −2.26 |
| | (1.19) | (−1.60) | (1.22) | (−2.33)** |

(Continues)

**TABLE 5** (Continued)

| GR_EMP | Model (1) Below median EMP | Model (2) Above median EMP | Model (3) Below third quartile EMP | Model (4) Above third quartile EMP |
|---|---|---|---|---|
| CR3 | −0.61 | 1.48 | −0.92 | 2.45 |
| | (−0.96) | (0.87) | (−2.24)** | (0.81) |
| IND5 | Included | Included | Included | Included |
| Observations | 3,274 | 3,147 | 4,824 | 1,597 |
| $R^2$ | 0.230 | 0.141 | 0.184 | 0.224 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. The median and third quartile of the number of employees are 60 and 100, respectively.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

the interaction term (EMP_SUB) are statistically insignificant even for the two subsamples of large SMEs (i.e., Models (2) and (4)). These findings confirm that only the primary SME eligibility criterion of employment size causes the Peter Pan syndrome while the syndrome does not occur in terms of sales growth.

Third, in Table 6, we divide SMEs into two subsamples according to the other, rather secondary SME eligibility criterion of paid-in capital (CAP). Models (1) and (2) of Table 6 report the results for the two subsamples of SMEs classified by the median of CAP (KRW 1.1 billion) and Models (3) and (4) for the two subsamples of SMEs classified by whether an SME's paid-in capital is below or above its SME eligibility threshold (i.e., KRW 8 billion). As shown in Models (1) and (3), the Peter Pan syndrome is not observed for SMEs with paid-in capital either below the median or below the threshold. Comparing Models (1) and (2) shows that the coefficient of the interaction term between employment size and government subsidy (EMP_SUB) is positive and

**TABLE 5A** Employment size and the Peter Pan syndrome (sales growth)

| GR_SALES | Model (1) Below median EMP | Model (2) Above median EMP | Model (3) Below third quartile EMP | Model (4) Above third quartile EMP |
|---|---|---|---|---|
| EMP | −6.21 | 2.46 | −6.18 | 3.14 |
| | (−2.06)** | (0.47) | (−2.97)*** | (0.53) |
| SUB | −0.35 | 1.23 | −1.35 | 1.77 |
| | (−0.26) | (1.09) | (−1.51) | (0.77) |
| EMP_SUB | −0.01 | −0.30 | 0.27 | −0.40 |
| | (−0.04) | (−1.25) | (1.23) | (−0.88) |
| AGE | −33.10 | −10.75 | −25.52 | −9.45 |
| | (−3.40)*** | (−2.37)** | (−3.76)*** | (−1.71)* |
| RDINT | 66.62 | 36.34 | 69.60 | −12.95 |
| | (4.73)*** | (0.94) | (5.21)*** | (−0.27) |
| LIST | 13.42 | 0.15 | 10.45 | 0.06 |
| | (1.98)** | (0.07) | (2.90)*** | (0.03) |
| AFF | −0.11 | 0.11 | −0.49 | −0.72 |
| | (−0.04) | (0.08) | (−0.26) | (−0.52) |
| CR3 | −2.25 | −2.64 | −1.99 | −0.15 |
| | (−0.78) | (−1.27) | (−0.71) | (−0.30) |
| IND5 | Included | Included | Included | Included |
| Observations | 3,274 | 3,147 | 4,824 | 1,597 |
| $R^2$ | 0.061 | 0.126 | 0.054 | 0.326 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. The median and third quartile of the number of employees are 60 and 100, respectively.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 6** Paid-in capital and the Peter Pan syndrome (employment growth)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| GR_EMP | Below median CAP | Above median CAP | Below capital threshold | Above capital threshold |
| EMP | −12.52 | −8.24 | −10.29 | −11.05 |
| | (−8.51)*** | (−6.67)*** | (−11.34)*** | (−1.01) |
| SUB | −1.45 | 0.29 | −0.98 | 6.57 |
| | (−2.69)*** | (0.55) | (−2.87)*** | (2.61)** |
| EMP_SUB | 0.36 | −0.06 | 0.24 | −1.28 |
| | (2.69)*** | (−0.52) | (3.06)*** | (−2.37)** |
| AGE | −5.29 | −0.82 | −2.69 | −10.36 |
| | (−4.43)*** | (−0.86) | (−3.66)*** | (−1.33) |
| RDINT | 31.32 | −2.48 | −0.32 | 124.25 |
| | (1.00) | (−0.64) | (−0.06) | (1.15) |
| LIST | −0.23 | 6.61 | 6.83 | 16.59 |
| | (−0.08) | (5.58)*** | (6.12)*** | (1.98)** |
| AFF | 1.31 | 0.44 | 1.12 | −16.07 |
| | (1.11) | (0.52) | (1.58) | (−1.75)* |
| CR3 | 2.56 | 0.47 | −0.60 | 1.08 |
| | (1.07) | (0.29) | (−0.66) | (1.05) |
| IND5 | Included | Included | Included | Included |
| Observations | 3,226 | 3,195 | 6,152 | 269 |
| $R^2$ | 0.228 | 0.178 | 0.157 | 0.602 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. The median of the amount of paid-in capital is KRW 1.1 billion.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 6A** Paid-in capital and the Peter Pan syndrome (sales growth)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| GR_SALES | Below median CAP | Above median CAP | Below capital threshold | Above capital threshold |
| EMP | −3.42 | −3.62 | −4.77 | 47.10 |
| | (−2.67)*** | (−0.73) | (−3.82)*** | (0.71) |
| SUB | −1.18 | −0.87 | −1.42 | 11.01 |
| | (−1.48) | (−0.69) | (−2.62)*** | (1.26) |
| EMP_SUB | 0.22 | 0.12 | 0.27 | −2.59 |
| | (1.16) | (0.44) | (2.25)** | (−1.25) |
| AGE | −19.59 | −26.02 | −19.91 | −87.35 |
| | (−5.62)*** | (−2.33)** | (−3.61)*** | (−1.05) |
| RDINT | −21.26 | 74.70 | 68.93 | −25.68 |
| | (−0.55) | (5.80)*** | (4.96)*** | (−0.07) |
| LIST | 16.32 | 5.85 | 6.36 | 14.47 |
| | (1.37) | (1.81)* | (2.68)*** | (0.65) |
| AFF | −1.39 | 1.09 | −1.04 | 47.10 |
| | (−0.72) | (0.43) | (−0.75) | (0.71) |
| CR3 | −3.00 | 0.24 | −3.28 | 11.01 |

(Continues)

**TABLE 6A** (Continued)

| GR_SALES | Model (1) Below median CAP | Model (2) Above median CAP | Model (3) Below capital threshold | Model (4) Above capital threshold |
|---|---|---|---|---|
| | (−1.43) | (0.08) | (−2.82)*** | (1.26) |
| IND5 | Included | Included | Included | Included |
| Observations | 3,226 | 3,195 | 6,152 | 269 |
| $R^2$ | 0.136 | 0.051 | 0.047 | 0.299 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. The median of the amount of paid-in capital is KRW 1.1 billion.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

statistically significant for SMEs with paid-in capital below its median, whereas it is negative, even though statistically insignificant, for SMEs with paid-in capital above its median. This result indicates, even though weakly, that SMEs whose paid-in capital is greater are more likely to exhibit the Peter Pan syndrome. It is worth noting that even though paid-in capital is a criterion for SME eligibility, it does not change much over time and is not closely correlated with firm growth. Hence, paid-in capital can be considered as a secondary criterion for SME eligibility, even though larger SMEs tend to have greater paid-in capital. On the contrary, as shown in Model (4) of Table 6, the Peter Pan syndrome is clearly observed for SMEs with paid-in capital above its SME eligibility threshold. These firms are very likely to graduate

**TABLE 7** The Peter Pan syndrome (employment growth)

| GR_EMP | Model (1) Low EMP/ low CAP SMEs | Model (2) Low EMP/ high CAP SMEs | Model (3) High EMP/low CAP SMEs | Model (4) High EMP/high CAP SMEs |
|---|---|---|---|---|
| EMP | −20.20 | −18.20 | −2.56 | −4.58 |
| | (−6.93)*** | (−4.22)*** | (−1.48) | (−3.92)*** |
| SUB | −2.56 | −1.51 | −1.47 | 1.68 |
| | (−2.43)** | (−0.83) | (−1.00) | (2.32)** |
| EMP_SUB | 0.70 | 0.42 | 0.29 | −0.34 |
| | (2.33)** | (0.88) | (0.88) | (−2.27)** |
| AGE | −4.87 | −2.06 | −2.75 | −0.10 |
| | (−2.79)*** | (−0.98) | (−1.95)* | (−0.10) |
| RDINT | 28.73 | −7.14 | 48.72 | 15.33 |
| | (0.80) | (−1.73)* | (0.92) | (0.66) |
| LIST | −0.59 | 10.42 | −3.36 | 5.02 |
| | (−0.15) | (2.54)** | (−0.69) | (4.72)*** |
| AFF | 0.44 | 2.84 | 0.12 | −1.43 |
| | (0.25) | (1.29) | (0.08) | (−1.68)* |
| CR3 | 3.20 | −0.06 | 0.05 | 2.06 |
| | (1.46) | (−0.14) | (0.95) | (0.86) |
| IND5 | Included | Included | Included | Included |
| Observations | 2,068 | 1,206 | 1,158 | 1,989 |
| $R^2$ | 0.314 | 0.292 | 0.250 | 0.209 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. SMEs with low (high) EMP and low (high) CAP are those with EMP and CAP below (above) their medians, respectively.
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 7A** The Peter Pan syndrome (sales growth)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| GR_SALES | Low EMP/low CAP SMEs | Low EMP/high CAP SMEs | High EMP/low CAP SMEs | High EMP/high CAP SMEs |
| EMP | −5.46 | −14.88 | −0.99 | 6.14 |
| | (−1.91)* | (−1.33) | (−0.51) | (0.70) |
| SUB | −1.41 | −0.36 | −0.38 | 2.57 |
| | (−0.78) | (−0.11) | (−0.25) | (1.53) |
| EMP_SUB | 0.28 | 0.01 | 0.04 | −0.57 |
| | (0.58) | (0.01) | (0.13) | (−1.62) |
| AGE | −26.58 | −43.48 | −6.73 | −12.99 |
| | (−4.90)*** | (−1.73)* | (−3.70)*** | (−1.71)* |
| RDINT | −13.85 | 70.61 | −35.03 | 76.07 |
| | (−0.28) | (4.61)*** | (−0.62) | (1.65)* |
| LIST | 23.14 | 14.15 | −0.25 | 0.56 |
| | (1.35) | (1.37) | (−0.03) | (0.24) |
| AFF | −1.02 | 3.08 | −2.32 | 1.41 |
| | (−0.33) | (0.53) | (−1.41) | (0.65) |
| CR3 | −5.85 | 3.72 | −0.07 | −3.23 |
| | (−2.07)** | (1.90)* | (−0.61) | (−1.10) |
| IND5 | Included | Included | Included | Included |
| Observations | 2,068 | 1,206 | 1,158 | 1,989 |
| $R^2$ | 0.169 | 0.076 | 0.270 | 0.133 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. SMEs with low (high) EMP and low (high) CAP are those with EMP and CAP below (above) their medians, respectively.
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 8** The likelihood of survival and the Peter Pan syndrome (1)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| GR_EMP | High PROFIT SMEs | Low PROFIT SMEs | Innovating SMEs | Non-innovating SMEs |
| EMP | −1.10 | −5.46 | −2.50 | −4.15 |
| | (−0.82) | (−4.03)*** | (−1.29) | (−3.76)*** |
| SUB | −0.34 | 2.53 | 0.53 | 1.51 |
| | (−0.57) | (2.60)*** | (0.52) | (1.79)* |
| EMP_SUB | 0.09 | −0.54 | −0.09 | −0.32 |
| | (0.71) | (−2.65)*** | (−0.41) | (−1.81)* |
| AGE | −4.08 | 1.33 | −5.68 | −0.05 |
| | (−3.85)*** | (1.06) | (−3.35)*** | (−0.05) |
| RDINT | 35.68 | −96.30 | −2.62 | – |
| | (1.81)* | (−1.66)* | (−0.09) | (–) |
| LIST | 3.41 | 1.33 | 5.60 | 4.18 |
| | (2.82)*** | (0.72) | (2.66)*** | (3.80)*** |
| AFF | 0.05 | −1.57 | −2.21 | −0.62 |
| | (0.05) | (−1.56) | (−1.41) | (−0.75) |
| CR3 | −0.52 | 3.91 | 3.15 | 2.15 |

(Continues)

**TABLE 8** (Continued)

| GR_EMP | Model (1) High PROFIT SMEs | Model (2) Low PROFIT SMEs | Model (3) Innovating SMEs | Model (4) Non-innovating SMEs |
|---|---|---|---|---|
| | (−1.54) | (1.10) | (5.78)*** | (0.92) |
| IND5 | Included | Included | Included | Included |
| Observations | 1,573 | 1,574 | 921 | 2,226 |
| $R^2$ | 0.215 | 0.222 | 0.299 | 0.176 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. High (low) PROFIT SMEs are those with firm profitability (PROFIT) above (below) its median. Innovating (non-innovating) SMEs are those that do (do not invest in) R&D. Because research and development expenditure is zero for non-innovating SMEs, the variable RDINT is dropped in Model (4).
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

**TABLE 9** The likelihood of survival and the Peter Pan syndrome (2)

| GR_EMP | Model (1) Low DEBT SMEs | Model (2) High DEBT SMEs | Model (3) High CR3 industries | Model (4) Low CR3 industries |
|---|---|---|---|---|
| EMP | −4.52 | −3.53 | −4.02 | −3.90 |
| | (−3.69)*** | (−2.45)** | (−2.65)*** | (−3.53)*** |
| SUB | 0.40 | 1.93 | 0.51 | 1.74 |
| | (0.66) | (1.67)* | (0.45) | (2.56)** |
| EMP_SUB | −0.06 | −0.42 | −0.12 | −0.35 |
| | (−0.46) | (−1.70)* | (−0.48) | (−2.47)** |
| AGE | −2.20 | −0.47 | −2.12 | −0.26 |
| | (−1.96)** | (−0.39) | (−1.69)* | (−0.26) |
| RDINT | −11.12 | 81.47 | 2.27 | 32.89 |
| | (−0.41) | (1.90)* | (0.07) | (1.19) |
| LIST | 4.49 | 2.39 | 3.77 | 4.65 |
| | (3.65)*** | (1.02) | (2.59)*** | (3.54)*** |
| AFF | −1.47 | −0.75 | −2.72 | 0.04 |
| | (−1.59) | (−0.64) | (−2.31)** | (0.05) |
| CR3 | 0.61 | 1.44 | −0.00 | −0.85 |
| | (4.21)*** | (0.70) | (−0.02) | (−0.27) |
| IND5 | Included | Included | Included | Included |
| Observations | 1,573 | 1,574 | 1,404 | 1,743 |
| $R^2$ | 0.229 | 0.193 | 0.188 | 0.105 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. Low (high) DEBT SMEs are those with the debt-to-equity ratio (DEBT) below (above) its median. High (low) CR3 industries are those with CR3 above (below) its median.
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

from the SME status because exceeding the other threshold of employment size (EMP) immediately deprives them of SME eligibility. However, as shown in Table 6a, unlike with the employment growth as the dependent variable, the interaction term between firm size and government subsidy (EMP_SUB) is either positive (Model (2)) or statistically insignificant (Model (4)) with sale growth (GR_SALES) as the dependent variable. These findings are consistent with those in Tables 5 and 5a.

**TABLE 10** The likelihood of survival and the Peter Pan syndrome (3)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| | High CR3 industries | | Low CR3 industries | |
| GR_EMP | High PROFIT SMEs | Low PROFIT SMEs | High PROFIT SMEs | Low PROFIT SMEs |
| EMP | 0.00 | −7.51 | −2.95 | −4.38 |
| | (0.00) | (−3.06)*** | (−1.75)* | (−2.84)*** |
| SUB | −0.77 | 1.51 | 0.61 | 2.94 |
| | (−0.91) | (0.91) | (0.75) | (2.46)** |
| EMP_SUB | 0.18 | −0.33 | −0.10 | −0.64 |
| | (0.97) | (−0.95) | (−0.59) | (−2.56)** |
| AGE | −5.53 | 1.55 | −2.70 | 1.39 |
| | (−3.55)*** | (0.70) | (−1.98)** | (0.89) |
| RDINT | 40.03 | −118.10 | 18.55 | 45.45 |
| | (1.57) | (−1.70)* | (0.64) | (0.40)/ |
| LIST | 4.44 | 0.04 | 2.56 | 5.30 |
| | (2.36)** | (0.02) | (1.63) | (1.94)* |
| AFF | −0.75 | −4.35 | −0.04 | 1.24 |
| | (−0.44) | (−2.46)** | (−0.03) | (0.99) |
| CR3 | −0.09 | 0.01 | 3.35 | −6.24 |
| | (−0.40) | (0.06) | (4.81)*** | (−0.99) |
| IND5 | Included | Included | Included | Included |
| Observations | 702 | 702 | 871 | 872 |
| $R^2$ | 0.314 | 0.307 | 0.156 | 0.173 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. High (low) CR3 industries are those with CR3 above (below) its median. High (low) PROFIT SMEs are those with firm profitability (PROFIT) above its median.

Abbreviation: SMEs, small and medium-sized enterprises.

***statistical significance at 1% level (on two-tailed test).

**statistical significance at 5% level (on two-tailed test).

*statistical significance at 10% level (on two-tailed test).

Fourth, in Table 7, we divide SMEs into four samples according to the two SME eligibility criteria of employment size and paid-in capital. As expected, the coefficients of the interaction term between employment size and government subsidy (EMP_SUB) are positive and statistically significant for SMEs that are farther away from the SME graduation threshold in terms of both size and paid-in capital (Model (1) of Table 7). Furthermore, for SMEs who are farther away from either of the two thresholds (Models (2) and (3)), the interaction term (EMP_SUB) has a positive, even though statistically insignificant, coefficient. On the contrary, the Peter Pan syndrome is clearly observed for SMEs as they approach the thresholds in terms of both employment size and paid-in capital (Model (4) of Table 7). It is worth noting that the Peter Pan syndrome is not observed with sales growth (GR_SALES) as the dependent variable. Specifically, Table 7a shows that the coefficient of the interaction term (EMP_SUB) is negative but statistically insignificant for SMEs that are closest to both of the thresholds and is even positive, even though statistically insignificant for the other subsamples of SMEs that are father away at least in terms of one criterion. These results further support Hypothesis 1.

## 5.2 | Conditioning factors for the Peter Pan syndrome

Tables 12–15 report the regression results for some factors that may condition the Peter Pan syndrome. In particular, we use the sample of large SMEs with employment size (EMP) above its median, which are more likely to exhibit the Peter Pan syndrome, and examine whether certain firm- and industry-specific characteristics influencing firm survival condition the likelihood and magnitude of the Peter Pan syndrome. The results of Tables 12–15 support our Hypotheses (i.e., Hypotheses 2 through 6) that SMEs with low survivability are more likely to exhibit the Peter Pan syndrome.[9]

First, Models (1) and (2) of Table 8 report regression results for the two subsamples divided by the median of profitability (PROFIT), and Models (3) and (4) report regression results for the two subsamples divided by whether an SME is innovating or not. As shown in Models (2) and (4), the interaction term between employment size and government subsidy (EMP_SUB) has a negative and statistically significant coefficient only for SMEs with low profitability and for noninnovating SMEs. On the contrary, the Peter Pan syndrome is

**TABLE 11** The likelihood of survival and the Peter Pan syndrome (4)

| | Model (1) | Model (2) | Model (3) | Model (4) |
|---|---|---|---|---|
| | High CR3 industries | | Low CR3 industries | |
| GR_EMP | Innovating SMEs | Non-innovating SMEs | Innovating SMEs | Non-innovating SMEs |
| EMP | −3.05 | −3.91 | −2.37 | −4.38 |
| | (−0.77) | (−2.08)** | (−1.12) | (−3.24)*** |
| SUB | −1.38 | 1.21 | 1.72 | 1.84 |
| | (−0.74) | (0.83) | (1.46) | (2.03)** |
| EMP_SUB | 0.31 | −0.27 | −0.33 | −0.39 |
| | (0.77) | (−0.86) | (−1.34) | (−2.04)** |
| AGE | −10.05 | −0.35 | −10.05 | −0.35 |
| | (−3.12)*** | (−0.24) | (−3.12)*** | (−0.24) |
| RDINT | −25.80 | – | 16.49 | – |
| | (−0.59) | (–) | (0.48) | (–) |
| LIST | 6.85 | 3.04 | 4.93 | 5.47 |
| | (1.99)** | (1.80)* | (1.94)* | (3.78)*** |
| AFF | −2.33 | −1.97 | −1.92 | 0.33 |
| | (−0.67) | (−1.47) | (−1.24) | (0.32) |
| CR3 | 0.67 | −0.11 | 3.13 | −3.17 |
| | (0.89) | (−0.79) | (6.55)*** | (−0.76) |
| IND5 | Included | Included | Included | Included |
| Observations | 422 | 982 | 499 | 1,244 |
| $R^2$ | 0.338 | 0.244 | 0.275 | 0.129 |

*Note*. Huber-White heteroscedasticity-consistent *t* statistics are in the parentheses. The constant and the coefficients of the industry dummies are not reported. High CR3 industries are those with CR3 above its median. Innovating (non-innovating) SMEs are those that do (do not invest in) research and development. Because research and development expenditure is zero for non-innovating SMEs, the variable RDINT is dropped in Models (2) and (4).
Abbreviation: SMEs, small and medium-sized enterprises.
***statistical significance at 1% level (on two-tailed test).
**statistical significance at 5% level (on two-tailed test).
*statistical significance at 10% level (on two-tailed test).

not observed even for large SMEs with high profitability and for large innovating SMEs. Furthermore, the absolute magnitude and statistical significance of the interaction term are greater in Models (2) and (4) of Table 8 than in the benchmark of Model (2) of Table 5, which uses the same subsample of large SMEs (i.e., above the median of EMP). These results confirm that less profitable SMEs and noninnovating SMEs are more likely to show the Peter Pan syndrome, which is consistent with Hypothesis 2 and Hypothesis 3. It is worth mentioning that government subsidy (SUB) has a positive and statistically significant stand-alone effect on employment growth only for large SMEs with low profitability and for non-innovating large SMEs, implying that they are more dependent on government subsidy.

Second, Table 9 reports regression results for the subsamples of large SMEs divided by either the median of the D/E ratio (DEBT) or the median of the degree of market concentration (CR3). The interaction term between employment size and government subsidy (EMP_SUB) has negative coefficients throughout the models of Table 9, hinting at the existence of the Peter Pan syndrome. However, the coefficient is statistically significant only for large SMEs with high D/E ratios, as shown in Model (2), and for large SMEs operating in low concentration (i.e., competitive) industries, as shown in Model (4). Furthermore, the magnitude and statistical significance of the interaction term are greater in these models of Table 9 than in the benchmark of Model (2) of Table 5. However, SMEs with low D/E ratios or SMEs operating in concentrated industries do not exhibit the Peter Pan syndrome, even though they are large SMEs. These results altogether support Hypothesis 4 and Hypothesis 5. Meanwhile, the stand-alone effect of government subsidy (SUB) on employment growth is positive and statistically significant only for large SMEs with high D/E ratios and large SMEs operating in competitive industries, indicating that government subsidy is critical for SMEs with a low likelihood of survival.

Finally, in Tables 10 and 11, we further investigate the magnitude and likelihood of the Peter Pan syndrome for subsamples divided by both firm- and industry-level factors. Table 10 reports

regression results for the four subsamples of large SMEs divided by the medians of both firm-specific profitability (PROFIT) and industry-specific market concentration (CR3). Similarly, Table 11 reports regression results for the four subsamples divided by whether an SME is innovating or not and the median of market concentration (CR3). First, as shown in Models (1) and (2) of Table 10, large SMEs operating in concentrated industries do not exhibit the Peter Pan syndrome, regardless of firm profitability, which is largely consistent with Model (3) of Table 9. Second, however, the Peter Pan syndrome is observed only for large SMEs with low profitability, as shown in Model (4) of Table 10. That is, large SMEs with high profitability do not exhibit the Peter Pan syndrome even when they operate in competitive industries. In line with previous results, the Peter Pan syndrome is not observed for large SMEs operating in concentrated industries, regardless of whether they are innovating SMEs or not. On the contrary, in competitive industries, the coefficient of the interaction term between employment size and government subsidy (EMP_SUB) is negative for both innovating and noninnovating large SMEs, which hints at the existence of the Peter Pan syndrome. However, the negative coefficient is statistically significant only for noninnovating large SMEs operating in competitive industries, as shown in Model (4) of Table 11. It is worth noting that the stand-alone effect of government subsidy (SUB) on employment growth is positive and statistically significant only for large SMEs that operate in competitive industries when they have low profitability, as shown in Model (4) of Table 10, or when they are noninnovating SMEs, as shown in Model (4) of Table 11.

## 5.3 | Notes on the stand-alone effects of the explanatory variables

In this subsection, we present explanations for the stand-alone effects of the key explanatory variables (firm size and the amount of government subsidy) and control variables.

First, in most models throughout this study, the stand-alone effect of firm size (EMP) on the rate of employment growth is negative, which is largely consistent with previous studies (e.g., Coad & Tamvada, 2012; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Hall, 1987; Kumar, 1985; Sutton, 1997; Yasuda, 2005). It is worth noting that the coefficient of firm size can even be positive, though statistically insignificant, in models using sales growth as the dependent variable (e.g., Models (2) and (4) of Table 5a and Model (4) of Tables 6a and 7a). This finding implies that though both the number of employees and firm sales are widely used as measures of firm size, they are not completely identical characteristics.

Second, the amount of government subsidy (SUB) has a positive stand-alone effect on the rate of firm growth for the subsamples in which the Peter Pan syndrome is observed (e.g., Models (2) and (4) of Tables 5, 8, and 9 and Model (4) of Tables 6, 7, 10, and 11). A plausible interpretation is that the stand-alone effect of government subsidy (SUB) is more likely to be positive for SMEs that are more dependent on government support, which are more likely to exhibit the Peter Pan syndrome. In contrast, in most of the other subsamples of firms, which are less likely to exhibit the Peter Pan syndrome, the stand-alone effect of SUB is negative. This finding is consistent with the argument that government subsidy can exacerbate firm performance by giving rise to allocative inefficiencies in firm resources, organizational slack, and subsidy-seeking behavior (Bergström, 2000; Kornai, 1986; Martin & Page, 1983) and implies that these negative effects of government subsidy are more pronounced for firms that are less dependent on government support.

Third, the coefficients of the firm-level control variables, in general, have the expected signs. firm age (AGE) is negatively correlated with firm growth, which is consistent with the literature on firm growth (e.g., Coad et al., 2013; Coad & Tamvada, 2012; Dunne & Hughes, 1994; Evans, 1987a, 1987b; Variyam & Kraybill, 1992). As briefly discussed in Section 2.1, the effect of R&D intensity (RDINT) on firm growth varies depending on either the sample or the dependent variable, which would largely be influenced by the nature of R&D (e.g., labor-saving or labor-increasing and product or process R&D) as Piva and Vivarelli (2018) argued. Whether a firm is publicly listed or not (LIST) has in general a positive and statistically significant effect on firm growth, which implies the positive effect of the availability of external finance on firm growth, even though it is statistically insignificant for some large firms particularly with sales growth (GR_SALES) as the dependent variable. Contrary to the existing wisdom that affiliation with a business group may help firm growth, its effect on the growth of SMEs is largely insignificant. In particular, business group affiliation (AFF) even has a negative and statistically significant effect on employment growth for large SMEs (Model (4) of Tables 6, 8, 10) and especially for those operating in high concentration industries (Model (3) of Table 9 and Model (2) of Table 10). These results are in line with the finding that relatively small firms are more likely to benefit from being affiliated with a business group (e.g., Bamiatzi, Cavusgil, Jabbour, & Sinkovics, 2014), whereas business group affiliation may incur some costs to large affiliates, such as tunneling and cross-subsidization within business groups (e.g., Chang & Hong, 2000), especially when they operate in high concentration industries in which they enjoy high profitability and market power.

Finally, it is also worth noting that the coefficient of the variable for market concentration (CR3) has the expected signs. First, it has a positive and statistically significant effect on employment growth for innovating SMEs (Model (3) of Tables 8 and 11) and SMEs with a low D/E ratio (Model (1) of Table 9). One plausible explanation is that market concentration may increase the appropriability of innovation (e.g., Angelmar, 1985; Lee, 2005) and the potential returns to investment by less financially constrained SMEs. Second, market concentration has a negative and statistically significant effect on the rate of growth for relatively small SMEs in terms of employment size (Model (3) of Table 5) or paid-in capital (Model (3) of Table 6a and Model (1) of Table 7a). These results are plausible considering that small

SMEs face more severe disadvantages in industries dominated by a few large competitors.

## 6 | CONCLUDING REMARKS

Despite much attention paid to the Peter Pan syndrome for SMEs, academic studies dealing with the phenomenon are scant. Hence, in this study, we aim to investigate the existence of the Peter Pan syndrome and to identify conditioning factors for the syndrome, thereby extending the understanding of the Peter Pan syndrome. Using a dataset of Korean manufacturing firms, which includes rich firm- and industry-level information, we find the following. First, SMEs closer to the primary SME eligibility criterion (i.e., employment size) are more likely to show the Peter Pan syndrome. Second, the result is largely consistent with paid-in capital as a secondary SME eligibility criterion. Third, however, the Peter Pan syndrome is not observed for SMEs that are farther away from at least one of the thresholds. Fourth, the Peter Pan syndrome is not observed when we consider the rate of firm growth in terms of firm sales, which is not included in the two SME eligibility criteria. Finally, the Peter Pan syndrome is more pronounced for SMEs seemingly facing low odds of survival such as less profitable SMEs, noninnovating SMEs, highly leveraged SMEs, and SMEs operating in competitive industries. Interestingly, it is observed that profitable SMEs and innovating SMEs are less likely to exhibit the Peter Pan syndrome even when they operate in competitive industries.

Some policy implications are in order. First, this study suggests that government policies aiming to foster the growth of SMEs fail to achieve their intended goal due to the existence of the Peter Pan syndrome. This finding suggests that a new design of public support for SMEs, in terms of, for example, the eligibility of public support, is necessary in order to mitigate the Peter Pan syndrome. Second, gradually reducing the opportunity cost of graduating from the SME status seems to be helpful for alleviating the syndrome. This idea is in line with the argument that providing a small amount of public support for a large number of small firms is more efficient than offering large funding to a few medium-sized firms (Howell, 2017). Finally, the inclusion of the rate of growth as either an SME eligibility criterion or an evaluation criterion for projects with public support can be considered.

There are some limitations in our study due to limited data availability. First, public support, which also works as the opportunity cost of graduation from the SME status, is measured as the total amount of government subsidy received by SMEs. Hence, the subsidy measure includes various types of subsidy, and more importantly, distinguishing subsidies available only for SMEs from those available for both SMEs and non-SMEs is impossible in this study. Second, there are many types of opportunity costs for SMEs that are not reflected in government subsidy. For example, governments often provide SMEs with various tax credits, technical assistance, and support for marketing activities. Finally, this study can be improved by using a panel dataset covering a considerable period of time, which allows us to control for unobserved firm-specific characteristics that may influence firm growth and the likelihood of receiving public support.

## Data sharing availability statement

Research data are not shared for a legal reason that access to one of the data sources (KIS-Value) is available only for paid memberships.

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## ENDNOTES

[1] Regarding the productivity issue of the problem, it might be worth reading The Economist (2012, March 3).

[2] For example, the threshold level of the 3-year average annual sales for furniture manufacturers is KRW 150 billion, whereas the threshold level for medicine manufacturers is KRW 80 billion.

[3] We take logs after adding one to the amount of government subsidy in order to avoid losing observations with zero values of government subsidy.

[4] We take logs after adding one to R&D intensity in order to avoid losing observations with zero values of R&D intensity.

[5] We use the Huber-White robust standard errors to control for the potential heteroscedasticity of the error term (White, 1980).

[6] The test statistic is 0.40 with a *p*-value of 0.67.

[7] The test statistic is 0.46 with a *p*-value of 0.63.

[8] All of the results are available from the authors upon request.

[9] For a robustness check, we also use the entire sample of SMEs to see whether the same firm- and industry-specific characteristics condition the Peter Pan syndrome and find that the Peter Pan syndrome becomes more statistically significant for SMEs with a low likelihood of survival as they approach the SME eligibility thresholds. The results are largely consistent with those reported in Tables 10, 12–14. They are available from the authors upon request.

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