Working Paper

Achieving High Growth in Policy-Dependent Industries: Differences between Startups and Corporate-Backed Ventures

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Forthcoming in *Long Range Planning*
Ross School of Business Working Paper
Working Paper No. 1324
June 2016

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June 2016

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Abstract: This research examines which firms achieve high growth in policy-dependent industries. Using the European solar photovoltaic industry as our empirical setting, we investigate the impact of policy support on the growth of independent startups and corporate-backed ventures operating across countries with diverse policy conditions. We find that producers' growth is positively linked to policy generosity, and negatively linked to policy discontinuity. Moreover, corporate-backed ventures are less affected by policy generosity compared to entrepreneurial startups, and less impacted by policy discontinuity as well. Our results underline the importance of country- and firm-level differences in analyzing firms' response to regulatory policies, and point to the need for a better understanding of the unintended consequences of policies designed to support new industries.

Acknowledgements: We thank Marie-Michelle Jobin for excellent research assistance. We also appreciate feedback from Martin Goossen and participants at the GRONEN 2014 Research Conference on earlier versions of the manuscript. This paper benefited from funding from the Strategy Research Foundation and the Society & Organizations Research Center at HEC Paris.

How can firms achieve high growth in a changing environment? Understanding high growth firms, and organizational growth more generally, has been a subject of a substantial body of research. The general tendency has been for entrepreneurship research to focus mostly on individual differences in the experience, skills or aspirations of founders, and strategy scholars to emphasize firm differences such as size, age, ownership structure or resources (Baum and Locke, 2004; Clark, Berkeley and Steuer, 2001; Eisenhardt and Schoonhoven, 1990; Mishina, Pollock and Porac, 2004; Wiklund, 2001). Dimensions of the external environment have also been investigated, with industry maturity, level of competition, dynamism, innovativeness and macro-economic conditions being among the most frequently studied factors found to explain high growth (Coad, 2007; Davidsson, Achtenhagen and Naldi, 2010; Eisenheardt and Schoonhoven, 1990; Zahra and Bogner, 2000). However, in a recent review, Wright and Stigliani (2013) suggest that the contextual dimensions that shape firm growth may be more varied than previously thought. Moreover, prior studies have tended to examine growth by entrepreneurial ventures or by established organizations separately; little research has studied how these two types of ventures differ in their growth rates after entering new industries (cf. Shrader and Simon, 1997).

This study attempts to address these limitations by examining how startups and diversifying entrants can achieve high growth in an industry where the importance of contextual dimensions, particularly public policy interventions, is paramount. After briefly discussing the role of public policy in the emergence of the clean energy sector, we develop and test hypotheses on a sample of European solar photovoltaic producers to understand the role of policy generosity and discontinuity in determining which ventures will achieve high production growth. We then examine how these two factors differently influence the growth of startups and corporate-backed ventures (Carroll, Bigelow, Seidel and Tsai, 1996; Khessina and Carroll, 2008; Sosa, 2013). Our results raise the need for a more explicit consideration of the policy environment within strategic management research (Lazzarini, 2013), and for a more nuanced understanding of the intended and unintended consequences of policy intervention designed to support the development of certain industries (Haley and Schuller, 2011; Hoppmann, Peters, Schneider and Hoffman, 2013; Marcus, Aragon-Correa and Pinkse, 2011).

The remainder of this paper is organized as follows. In the next section we focus on the impact of public policy on the clean energy sector, and particularly the setting of this study: the European solar photovoltaic (PV) industry. We hypothesize that high growth among solar PV producers is partly an outcome of policy intervention in their respective countries, and that the effect of policy characteristics depends on the ventures' organizational prehistory (Sosa, 2013). In the section that follows we provide a description of the setting and the data used to test our hypotheses, and then describe the models and results. We then outline the contributions of this study to strategic management research and to the literature on regulatory uncertainty, and discuss managerial and policy implications. Finally, we conclude by considering how some of the findings but also some limitations of our study offer opportunities for future research.

BACKGROUND AND HYPOTHESES

Policy intervention and growth of the clean energy sector

The government's role in shaping the business environment is pervasive (Lazzarini, 2013) and various aspects of government intervention have been examined by prior studies. Some scholars have emphasized institutional factors that can shape economic activity across economic sectors, such as intellectual property rights, taxation, labor market legislation, or financial and legal obstacles to business creation (see for instance Coad, 2007; Davidsson and Henrekson, 2002). Others have examined sector-specific or activity-specific government interventions, including the enactment of antitrust laws, deregulation, privatization, command-and-control or incentive-based regulation, or different forms of industrial policy (e.g. Delmas, Russo and Montes-Sancho, 2007; Dobbin and Dowd, 1997; Peters *et al.*, 2012; Russo, 1991; Rugman and Verbeke, 1998; York and Lenox, 2014).

The goal of policy intervention is, in many cases, the development of particular technologies and the promotion of specific economic sectors. The most emphatic recent example of industrial policies, policies *"promoting productive investments in a way that would not occur in market interactions free of such interventions"* (Lazzarini, 2013) can be found in the clean energy sector. In their efforts to reduce energy dependency or promote innovation and in the face of mounting sustainability concerns, governments throughout the world have established support schemes that promote the diffusion of renewable energy sources (Blok, 2006; Flamos, Georgallis, Doukas and Psarras, 2009; Peters, Schneider, Griesshaber and Hoffman 2012). According to a recent report (REN21 2012), at least 65 countries worldwide had a feed-in-tariff policy[1] in place by 2012, and a total of 109 had established some form of renewable power policy. Such incentive-based policies have been extremely successful in bringing these technologies to the market and inducing demand for renewable energy. However, despite ample evidence that public policy in general (Lund, 2009), and feed-in-tariffs in particular (Flamos *et al.*, 2009; Jacobsson and Lauber, 2006), have shaped the evolution of the clean energy sector, we know very little about how these policy schemes influence firms' investments in these industries.

[1] The Feed-in-tariff is the most widely used policy in the alternative energy sector; with this policy governments guarantee producers of clean power a fixed price (tariff) per unit of electricity that is fed into the grid, typically for a predetermined number of years (REN21, 2012).

Studies generally examine the impact of industrial policy initiatives on an aggregate level, typically the country or the state. For instance, Sine, Haveman and Tolbert (2005) and York and Lenox (2014) found that policies increased entry rates in the independent wind power sector and the green building industry, respectively, across US states. Peters *et al.* (2012) recently studied the impact of demand-pull and technology-push policies on innovation in the solar photovoltaic sector, focusing particularly on how these types of policies foster innovative output across different countries. Students of energy policy have assessed the effectiveness of different measures used for the promotion of clean energy, with the main focus being their impact on adoption at, again, the country level (e.g. Blok, 2006; Campoccia, Dusonchet, Telaretti, and Zizzo 2008; Flamos *et al.*., 2009; Lund, 2009). Little attention has been paid to actors that may indirectly be affected by these policy schemes. For instance, while deployment policies such as feed-in-tariffs are set up to induce demand for solar energy, there is little doubt that they also have an influence on manufacturers of solar equipment. Because feed-in-tariffs are one of the most, if not the most, important driver of demand for solar cells (Flamos et al., 2009; Hoppmann et al., 2013), they offer producers the opportunity to grow to meet that demand. That is, even if the policy incentives are offered at a different stage in the value chain (see below for more details on the setting), they can have a strong impact on producers of solar PV equipment. Importantly, these producers compete internationally, yet they face substantially different policy environments in the countries where they operate. How are, then, these firms influenced by such divergent regulatory conditions?

Inarguably, high growth is one of the main strategic outcomes to be expected by firms facing policy support, as such growth is most often realized in growing markets (Eisenhardt and Schoonhoven, 1990; Gilbert McDougall and Audretsch, 2006). *But which firms achieve high* *growth when the market is induced and largely dependent on policy support*? This is the main question we ask in this paper. Our goal is not to make universal claims about firm growth. Rather, it is to uncover determinants of high growth in policy-dependent industries: industries that would not exist or would have developed to a much lesser extent absent government intervention. Policy support, we argue, creates unique challenges for managers operating in these sectors. On the one hand, increased demand calls for rapidly growing firms; on the other hand, since this demand is 'artificially' created by policy-makers and policy support varies across countries and time periods, the future viability of firms' investments is uncertain. Thus, policy support confers both opportunities and threats for firms operating in policy-dependent industries.

Policy generosity and policy discontinuity in solar PV

Perhaps the most striking example of a policy-dependent industry is the solar PV sector (cf. Haley and Schuller, 2011). Global investment in solar energy in 2012 was $140.4 billion, and the world's newly installed solar PV capacity grew in that year by 41%, reaching a cumulative capacity of more than 100 GW [2]. Until 2011, the industry was exhibiting double digit growth rates almost every year since at least the mid-90s[3]. It is indicative that in one of its worst years (2009), the PV industry grew by "only" 25% (Mehta, 2010). This rapid growth has rendered solar PV the fastest-growing renewable technology worldwide[4] and perhaps one of the fastest-growing industries of our times. Moreover, solar PV was (in 2011) the first renewable energy technology to surpass conventional energy technologies in terms of annual installed capacity in the European Union [5].

[2] http://www.photon.info/photon_news_detail_en.photon?id=79109
[3] Own analysis, based on worldwide solar cell production data reported in annual surveys of PV News.
[4] http://www.iea.org/topics/solarpvandcsp/
[5] http://www.pv-tech.org/news/solar_power_was_most_installed_power_in_europe_in_2011_says_epia

This impressive growth has not relied solely on technological developments, nor can it be attributed to naturally occurring demand. Rather, the market trends in the solar PV sector have closely followed the countries with the most generous policy support (Hoppmann *et al.*, 2013; Jobin, 2013). This dependence on policies has long been recognized in the energy policy literature, but recent research in management has also accepted this as a stylized fact, either implicitly or explicitly. In a recent study of innovation in the solar PV sector, Peters *et al.* (2012) take annual market growth as *"an adequate proxy for demand-pull policies"*, an assumption that has also been made by work on the wind energy sector (Dechezlepretre and Glachant, 2011). Overall, it is clear that deployment policies have been the single most important determinant of the development of the solar PV industry (Flamos *et al.*, 2009; Haley and Schuler, 2011; Jacobsson and Lauber, 2006).

Most new policies create opportunities but also constraints that managers need to take into account when designing business strategies (Dobbin and Dowd, 1997). For instance, when making their investment decisions, managers of photovoltaic equipment manufacturers need to consider that policy conditions are markedly different across countries. Variation in countries' policy support for PV creates an uneven playing field for firms operating in this industry, as it largely shapes the opportunities that firms face. Consistent with prior findings that policy-induced market growth induces innovation by firms (Hoppmann *et al.*, 2013), we argue here that firms' propensity to scale-up will also depend on policy support. More specifically, the growth of solar PV ventures will depend on *policy generosity*, i.e. the attractiveness of the policy support scheme in their respective countries. For instance, the amendment of the Renewable Energy Sources Act in Germany in the early 2000s granted increased feed-in-tariffs and a guaranteed tariff rate for a fixed number of years. This act made solar PV commercially attractive and increased investment security, leading to an unprecedented growth in German solar PV production (Lauber and Mez, 2004).

Our expectation is that the highest growing firms will be found in countries with more generous policies. First, the greater a country's policy generosity, the faster the market will expand, granting firms the opportunity to boost their revenues. Generous policy support attracts investment by allowing solar electricity producers a reasonable rate of return (Willman, Coen, Currie and Siner, 2003) and hence increasing the economic viability of domestic output across the value chain (Steenblik and Coroyannakis, 1995). Therefore, firms have a greater interest in growth, to take advantage of the economic opportunities that policy generosity allows. Second, the increased size of the market and the possibility of competitive entry may lead firms to expand the size of their operations in order to raise barriers to potential entrants and isolate themselves from new competition (Knudsen, Levinthal and Winter, 2013). Lastly, firms need to grow rapidly in order to keep up with the rate of change in their external environment and achieve 'environmental fit' (Pettus, 2001), which constitutes an important determinant of performance and survival (Eisenheardt and Martin, 2000; Tan and Tan, 2005; cf. Ben-Menahem, Kwee, Volberda and Van Den Bosch, 2013). Therefore. *ceteris paribus*, policy generosity should increase the likelihood that firms in the focal country will exhibit high growth:

> *Hypothesis 1: The likelihood of achieving high growth will be greater for solar PV producers operating in countries with greater policy generosity.*

As mentioned above, policy-induced growth does not come without cost. The downside is that firms can rarely be certain about the future growth of the market. Policy changes may jeopardize the viability of their investments. However, the dependence on policy suggests different levels of uncertainty for some firms versus others, as the temporal variations in policy support vary substantially across countries. While minor modifications in policy support may have little impact on investment decisions, 'sudden, dramatic discontinuities' (Haveman, Russo and Meyer, 2001: 253) in policy generosity are likely to limit the ability of firms to forecast the market for their products. Constituting a source of policy (or regulatory) uncertainty (Jobin, 2013; Marcus, 1981; Marcus et al., 2011), which manifests in firms' *''inability to predict the future state of the regulatory environment''* (Engau and Hoffmann 2011:54; Kolk and Mulder, 2011), policy discontinuities diminish firms' willingness to invest in growth initiatives.

While policy uncertainty may also create opportunities (Hoffmann *et al.*, 2009; Kolk and Mulder, 2011), the consensus among researchers is that it tends to have a negative impact on firms' ability to make informed decisions (Haley and Schuler, 2011). Especially, sudden policy shifts can have a severe impact as they can rarely be fully anticipated (Haveman et al., 2001). Under relatively stable regulatory regimes, firms can anticipate the future based on the past (Marcus *et al.*, 2011). However, firms' forecasting ability (Durand, 2003) is jeopardized when they are faced with sudden changes in policy support. In the solar PV sector, some countries have created persistent and stable policy regimes, with policy generosity varying only marginally from year to year. Other countries, however, faced with fiscal challenges and the increased costs of subsidizing the sector, preceded to dramatic policy changes in recent years. These changes were the main reason for the sudden collapse of certain national PV markets in Europe, starting with the Spanish PV market crash in 2009. Frequent dramatic changes in the regulatory environment can have powerful consequences for firms in this industry.

One common response for firms facing policy discontinuity or other forms of policy uncertainty is to postpone or even cancel their planned investments (Luethi, 2010; Marcus and Kaufman,1986; Marcus *et al.*, 2011; Sullivan and Blyth, 2006). In some cases, policy instability can also lead to divestment from existing businesses, as countries with unstable policy regimes place *"higher information-processing demands on organization[s]"* (Berry, 2013: 249) and increase the costs of operating in these environments. Similarly, the growth strategies of business ventures in countries where discontinuous changes in policy generosity have taken place in recent years will be impacted more. Such ventures have more difficulty assessing the future 'state of the world', as their environments are less stable. They are likely to hesitate increasing their commitment to the sector, as the disruptiveness associated with potential future changes makes it difficult for managers to anticipate demand and plan their strategies accordingly (Jobin, 2013). In contrast, firms that operate in more stable environments, those with no or limited history of sudden policy changes, will find it easier to assess the growth of the industry based on the past and will be less likely to delay or limit their investments. As a consequence, the frequency of sudden changes in policy generosity will be negatively linked with the propensity of solar PV ventures to exhibit high growth, as stated below.

> *Hypothesis 2: The likelihood of achieving high growth will be lower for solar PV producers operating in countries that have known more discontinuous policy environments in recent years.*

The role of organizational prehistory: startups vs. corporate-backed ventures

Organizational prehistory is a frequently studied attribute of new ventures. It reflects *"whether a firm has a corporate history or is starting anew"* (Sosa, 2013). Firms entering an industry can be either startups (often called *de novo* entrants) or diversifying entrants coming from other industries. A significant body of research has identified differences between startups and corporate-backed ventures in terms of performance and survival (e.g. Carroll *et al.*, 1996; Ganco and Agarwal, 2009; Mitchell, 1994; Klepper, 2002; Shrader and Simon, 1997; Thompson, 2005). However, although compelling evidence from prior research suggests that these entrants vary in their ability, and perhaps motivation, to gather resources that would allow them to grow faster than competitors, little attention has been paid to organizational prehistory in the study of firm growth. But how could organizational prehistory matter for achieving high growth in policy dependent industries?

The answer to this question is hardly straightforward, but two fundamental differences between these types of ventures can guide our attempt to answer it. First, diversifying firms enter industries with pre-existing resources, experience, and capabilities. They may benefit from better access to personnel and financial capital (Mitchell, 1994), distribution networks and R&D operations (Klepper, 2002), slack resources (Stavins, 1995), more experience with related technologies (Klepper and Simons, 2000), or even capabilities to manage growth initiatives (Lechner & Kreutzer, 2010). Independent startups, on the other hand, do not benefit from the same resources and accesses. Second, established firms coming from other industries tend to exhibit bureaucratic ossification (Coad, 2007; Fombrun and Wally, 1989) or structural inertia and rigidity (Hannan and Freeman, 1984; Haveman, 1992). Entrepreneurial startups, having less rigid organizational structures that change relatively easily (Ganco and Agarwal 2009), are more flexible and adaptable to rapidly changing circumstances.

Under conditions of greater policy generosity, firms are faced with a unique opportunity to expand their operations in order to reap the benefits of a growing, policy-induced, market. Among all firms though, new ventures are subject to liability of newness, whereby *"in the absence of growth, their survival may be significantly reduced"* (Gilbert et al, 2006: 927). Ventures established by diversifying entrants, on the other hand, are buffered from such strong survival pressures. While *"the growth of established firms is about sustaining viability, new* *venture growth is about obtaining viability"* (Gilbert et al, 2006: 927). Therefore, startups have greater motivation to grow compared to diversifying entrants.

Moreover, Khessina and colleagues suggest that the structural flexibility of *de novo* entrants allows them to innovate at a higher rate than their counterparts and bring better performing products to the market (Khessina, 2003; Khessina and Carroll, 2008). Similarly, the flexibility and dynamism associated with startups (Ganco and Agarwal, 2009; Khessina and Carroll, 2008) is likely to give them primacy over diversifying entrants in their ability to move decisively and grow at a rapid rate when environmental conditions allow it. Diversifying entrants, as structurally more complex ventures, face inertial pressures - such as the need to justify new investments to their origin firms, or existing understandings, blueprints for future action and other agreements with their corporate parents (Carroll *et al.*, 1996) - that inhibit their ability to grow at a faster rate. In addition, the difficulty of raising capital—a critical precondition for achieving high growth—for startups is less acute in countries with greater policy generosity. Firms are more likely to be accorded financing by banks or venture capitalists when the government is endorsing the sector and partly securing producers' revenues. This is likely less critical for corporate-backed ventures, because these firms' pre-existing resources allow them to rely less on external acquisition of resources, compared to start-ups.

Overall, under conditions of greater policy generosity, *de novo* firms have not only greater motivation but also greater capacity to grow; the achievement of high growth by corporate-backed ventures will be less strongly affected by policy generosity, as these firms are more rigid and inflexible and rely less on external resource acquisition, which can be affected by policy conditions.

> *Hypothesis 3: The positive impact of a country's policy generosity on the likelihood of high growth will be greater for startup producers than corporate-backed ventures.*

The linkages with existing businesses and their relative inertia disfavor diversifying entrants' growth in case of generous policies, but buffer them against policy discontinuity. Indeed, as we argued earlier with *H2*, when discontinuities in the regulatory environment are prominent, uncertainty regarding the future state of the market leads firms to limit their investments. But greater resources and less revision in investments (as an effect of inertia) are more likely to lead corporate-backed ventures to high growth compared to startups. Under uncertainty, *de novo* (startup) firms find it difficult to acquire capital from resource-granting agencies (Bruderl, Preisendoerfer, and Ziegler, 1992) to finance higher growth. On the contrary, corporate-backed ventures can generally rely on subsidies from their corporate parents. They are less dependent on the external environment to receive financial capital or other resources that are required to grow. Therefore, policy discontinuity can partly determine which firms achieve high growth in such industries: differences in the structure of startups and diversifying *entrants* lead to the expectation that the impact of policy discontinuity will be more severe for the former. To formalize:

> *Hypothesis 4: The negative impact of a country's policy discontinuity on the likelihood of high growth will be more acute for startup producers than for corporate-backed ventures.*

SETTING AND DATA

To test our hypotheses we focus on producers of photovoltaic equipment, and particular solar cells, in the European Union. The solar PV industry in the EU has been heavily dependent on policy support. The major market for the bulk of the last decade was Germany, a country hardly endowed with solar resources. Germany's establishment as a world leader in solar PV has been attributed to the feed-in-tariff scheme that the country established to induce demand for solar energy (Jacobsson and Lauber, 2006). This policy – considered by many as the most successful scheme for the promotion of renewable energy (Flamos *et al.*, 2009; Luethi, 2010) – allowed the industry to foster and led to Germany's dominance in terms of solar PV manufacturing, at least until recent years when fierce competition from low-cost Asian manufacturers displaced Germany from its number one position as a PV producing country. At the same time, the growth of other major European markets such as Italy and Spain has been also linked to generous feed-in-tariff schemes enacted by those countries' governments (Lauber, 2004).

Importantly, the industry is fraught with policy discontinuity (Jobin, 2013). Government support for this industry has been generous in the past. As the technology develops, some countries – naturally and expectedly –adjust their support downwards to account for technological learning and declining production costs. However, other countries have proceeded at times to abrupt and unexpected changes in feed-in-tariff schemes. These sudden changes in policy support have been attributed predominantly to two factors. First, the success of the feed-in-tariff schemes in bringing in new investments led to increased costs for governments to finance them, and second, some governments faced serious fiscal constraints after the financial crisis. Whatever the reasons for such discontinuous changes, however, it is clear that these changes severely jeopardize producers' ability to forecast the future state of the market and plan their growth strategies accordingly, rendering this industry particularly appropriate to investigate our hypotheses.

Sample and dependent variable: We focus on a sample of solar cell producers operating in EU countries from 1995-2012. Solar cell production has a significant share in the value of photovoltaic systems, and is one of the three main stages of the upstream part of the value chain. A simplified version of the PV value chain is presented in Figure 1.

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Silicon production, the first stage as shown in the figure, is considered an oligopoly, while the stages of solar cell and module manufacturing—which are sometimes intertwined depending on the PV technology—are more competitive and resemble a polypoly, i.e. a market with many buyers and sellers, none of which has enough power to set prices for the industry. As discussed above, even if the policy incentives are not directly offered to producers of solar PV equipment (e.g. feed-in-tariffs incentivize PV ownership (see Figure 1)), they are likely to have strong impact upstream because they induce demand for solar cells. Indeed, prior research has found that demand for solar PV cells is highly dependent on feed-in-tariffs (Hoppmann et al., 2013), and solar cell producers need to observe policy changes and try to adjust their expansion strategies accordingly. Finally, an important characteristic of this industry is that, while many solar cell producers started anew, several firms have also entered from other industries, allowing for our test of how organizational prehistory shapes firms' likelihood of achieving high growth in a policy-dependent industry.

Our data are taken from PV News, the longest surviving industry newsletter, and its annual surveys that report solar cell manufacturers and their production figures in the countries where they operate. While PV News was established as early as the 1980s, as our focus is on policy conditions we start our investigation from 1995 which marks the beginning of a period of rapid policy-induced growth for the industry (Peters *et al.*, 2012:1299). Our data go up to 2011 when data gathering for this project ended. After lagging the explanatory variables and excluding observations with missing data, the final sample consists of 284 observations from eight different EU countries: Belgium, Denmark, France, Germany, Italy, Netherlands, Spain, and the United

Kingdom. These correspond to 45 different ventures, 21 of which are corporate-backed ventures and 24 *de novo* startups; 27 are local and 18 are foreign firms.

To construct the dependent variable we used production data for these companies drawn from the PV News archive, specifically from the newsletters' annual lists of solar cell producers. One empirical challenge had to do with distinguishing which are the high growth firms for each year. We decided to follow previous studies of firm growth (Gul, 1999; O'Gorman, Colm and Doran, 1999; Chan, Karceski and Lakonishok, 2003; Frank and Goyal, 2003), and defined high growth ventures as those that appear in the top quartile of production growth. The variable takes the value 1 when a venture is in the top quartile for the focal year and zero otherwise. The primary expectations are that solar PV ventures are more likely to achieve high growth in countries with more generous and less discontinuous policy conditions, and that startups and corporate-backed ventures will differ in their sensitivity to policy conditions.

Independent variables: The main independent variables are policy generosity, policy discontinuity, and organizational prehistory (i.e. being an independent startup or a corporate-backed venture).

Policy generosity: Although other policy schemes have been tried out, EU countries have predominantly focused on feed-in-tariffs to promote the industry, and this policy has been found to be the most critical driver of industry growth in the EU (Flamos *et al.*, 2009; Lauber, 2004). As mentioned above, according to this policy, producers of clean power receive a fixed price (tariff) per unit of electricity that is fed into the electricity grid, typically for a predetermined number of years. The price of the tariff and its duration (number of years it is guaranteed for) define the generosity of the policy, as these two factors increase the viability of solar PV projects, enhance the likelihood of investments in the industry and, consequently, stimulate local production (Lauber and Mez, 2004). We focus on the guaranteed duration of the tariff as a measure of policy generosity, as it is more comparable between countries[6], although in additional analyses we found very similar results using tariff prices as a measure.[7]

Policy discontinuity: As suggested above, changes in policy support are natural for emerging technologies that evolve quickly because technological advancements reduce the generosity required for PV projects to break even. Thus, small adjustments to policy generosity are both expected and of little consequence to solar PV producers' strategies. Severe, discontinuous changes, on the other hand, increase policy uncertainty by rendering the future state of the policy environment unpredictable. To account for such discontinuities, we coded changes of at least twenty percent in the price or duration of the tariff for each of the countries, and we measured policy discontinuity by the number of such discontinuous changes that a country has seen in the last five years, based on information we coded mainly from the International Energy Agency's (IEA) Photovoltaic Power Systems Program (PVPS) annual reports. The five-year window was chosen because it is (a) long enough to not overestimate the impact of one single change in policy support, and (b) short enough to allow for the assumption that firms still take it into account (with many firms with low industry tenure, larger windows would be less appropriate). In addition, a five year window is consistent with prior literature on the time it takes to overcome the effects of regulatory punctuation (Haveman et al., 2001).

Corporate-backed ventures vs. startups: For each producer, we conducted a search in the whole archive of PV News to establish whether it was a start-up or a corporate-backed venture.

[6] The price of the tariff more frequently exhibits within-country variation, as some governments have set different prices for small-scale versus large-scale PV projects, industrial versus residential PV, projects in continental versus island areas, etc. The duration of the tariff is usually the same for all projects within a country, a characteristic that makes this dimension better for a between-country study such as this one.

[7] Because these two are empirical proxies of the same underlying concept (policy discontinuity) they are extremely highly correlated (0.89). Thus, as we found in unreported analyses, including them in the same model leads to severe multicollinearity problems.

We completed our search with information from the International Energy Agency's PVPS annual reports and from corporate websites. All producers were finally categorized as startups (de novo organizations only operating in solar PV) or corporate-backed ventures (diversifying entrants or ventures for which a diversifying entrant had a significant stake). Using this information, a dummy variable is included in the models, taking the value of one for corporate-backed ventures and zero for startups.

Control variables: We add a number of control variables in the vector of characteristics predicting growth. As ventures' industry experience may impact their propensity to grow, we control for it using the number of years that the venture has been producing solar cells up to the focal year. We also include the size of the venture, proxied by its total production, as larger producers may be more likely to be among the highest growing ones, or may have less need to grow. Since growth can be an impetus for subsequent growth (e.g. Pettus, 2001), we also add a control for previous growth using a lagged variable. Moreover, as both access to resources and understandings of the competitive environment may be different for foreign-owned ventures (Beck, Demirgüç-Kunt and Maksimovic, 2005), we include the dummy 'foreign' to denote that a venture belongs to a firm headquartered in another country. In addition, as suggested by McKelvie and Wiklund (2010), the likelihood of growth can only be meaningfully calculated if the 'entity' under consideration remains the same. Therefore, we are careful to take into account changes in the structure of the ventures we study. Solar PV producers that are acquired are treated as a separate entity, and we further add a dummy variable to account for the effect of ownership change. Lastly, to account for the state of the overall market for PV in Europe across different time periods we add a variable that captures the total solar cell production in the EU, as a proxy by solar PV demand in the region, calculated based on PV News production data. We also add year dummies in the analysis, and our econometric specification accounts for unobserved country differences. Finally, as firms in some countries may be impacted by policy support in other jurisdictions (Fremeth and Shaver, 2014) that provide export opportunities, we control for countries' trade openness using data from the World Bank, and add a variable for the number of EU countries that had established regulation in favor of solar PV.

METHOD AND RESULTS

As is typical with binary dependent variables, we used a logit specification to understand which solar PV ventures achieve high growth. Because unobserved heterogeneity may lead to standard errors that are correlated for producers operating in the same country, we clustered the errors at the country level. As discussed above, year dummies were also included to account for time differences. Moreover, independent variables were lagged by a year to facilitate causal inference. Table 1 presents descriptive statistics and the correlation among the variables. The results of the analysis are reported in Table 2.

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Some interesting conclusions can be drawn already from the control model (Model 1). Firms' size, foreign ownership, and experience in the industry do not have a significant effect on the likelihood of high growth among the producers in our sample. Both previous growth and ownership changes appear to be positively linked to high growth. Surprisingly, we find that total EU production has a negative coefficient. Although we used this measure as a proxy for total demand in the EU, it is confounded with rivals' production, and this finding could simply mean that firms limit their investments when competition is fiercer. While the coefficient of trade openness is not significant, the coefficient of the number of countries with policy support for solar PV is marginally significant. In Model 2 we add the corporate-backed venture dummy. The coefficient suggests that corporate-backed ventures grow less, on average, than their startup counterparts, but it is not significant. Further, this effect is conditional on the policy environment as suggested by the following models.

In Model 3 the characteristics of the policy environment are added. Both policy generosity and policy discontinuity have a significant coefficient. Thus, our first two hypotheses are supported by the findings. As expected, policy generosity has a positive impact of the likelihood of high growth, while policy discontinuity limits the likelihood of high growth. In Model 4 the interaction between policy generosity and the corporate-backed dummy is significant and positive. Therefore, consistent with our third hypothesis, the influence of policy generosity on the likelihood of achieving high growth is less acute for corporate-backed ventures than it is for startups. Moreover, the interaction between policy discontinuity and the corporate-backed dummy is significant and positive. Supporting H4, it appears that startups' are less likely to exhibit high growth under conditions of policy discontinuity compared to corporate-backed ventures.

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Because the magnitude of the coefficients in logit models cannot be meaningfully interpreted, we used the margins command in Stata to calculate the average marginal effects (AME) of the variables of interest at representative values (i.e. when the corporate-backed dummy is either zero or one). These are reported in Table 3. As we can see from this table, the impact of both policy generosity and policy discontinuity varies greatly depending on the ventures' organizational prehistory. On average, a one-year increase in feed-in-tariff duration increases the tendency of firms operating in that country to exhibit high growth by 3.7 percent if they are independent startups, or by about 2 percent if they are corporate-backed ventures.

Startups are more sensitive to the (negative) impact of policy discontinuity as well. One additional discontinuous change in policy decreases the likelihood of a firm exhibiting high growth by around 29 or 9 percent for startup and corporate-backed ventures, respectively. Besides the apparent differences between these types of entrants, our results also suggest that one additional discontinuous change in policy is substantially more impactful compared to the addition of one more year of guaranteed feed-in-tariff, as the marginal effect of policy discontinuity is in absolute terms greater than the effect of policy generosity by a factor of about 7, on average. This is consistent with recent case-study evidence by Luethi (2010), who suggested that above a certain level of return, risk-related factors were more important than return-related factors for the effectiveness of PV policies.

In additional tests, we explore the sensitivity of our findings to the specification of the dependent variable. In Model 5 (Table 2) we replace the top quartile with a different cutoff point for the definition of high growth firms. In particular, for the purposes of this model we define high growth ventures as those ventures that exhibit growth greater than one standard deviation above the average of the firms present in our panel in that year. The results are consistent across both operationalizations of high growth ventures. Finally, we add another model where we use a continuous variable, the venture's growth in MW (megawatts) as the dependent variable. While the effect of policy generosity appears even stronger, potentially because this model (Model 6) exploits more variation, the effect of policy discontinuity is weaker and insignificant. We elaborate on this result in the discussion section.

Additional robustness tests

Finally, to rule out the possibility that our results were an artifact of coding choices, we run a series of robustness tests that all pointed towards the same conclusions. As discussed above, the choice of feed-in-tariff duration as opposed to price was based on pragmatic considerations; specifically the fact that tariff prices exhibited within-country variation for several countries. Moreover, including both tariffs and duration in the analyses would lead to substantial multicollinearity concerns due to the high correlation between the two variables and between the variables and interaction terms (indeed, including these variables in the same model led to severe multicollinearity, as indicated by variance inflation factors analyses). Thus, we designed a robustness test where we averaged the reported tariff prices of each country and used the average as an alternative measure of policy generosity; the results remained very similar to the above. Moreover, as the cutoff point for counting a policy change as discontinuous (in our case that was 20 percent-change) was merely based on our knowledge of the setting, we made sure that this choice was not driving the results. We ranged the cutoff point both below and above 20 percent. When it was set to 30 percent, for example, the results were almost identical; high growth was positively and significantly linked to policy generosity (more so for startup ventures: $p\text{-}value<0.001$) and policy discontinuity had a negative and significant effect on the likelihood of high growth (more negative among startups: $p\text{-}value<0.05$). When the cutoff point was set at 10 percent (i.e. any 10-percent-or-higher change in the price or duration of the feed-in-tariff was counted as discontinuous) the results were similar but weaker, as one would expect. In particular, the effects of discontinuity were significant for startups ($p\text{-}value<0.001$), but became insignificant in the case of corporate-backed ventures ($p\text{-}value=0.42$), although they remained directionally the same. These additional tests confirm that corporate-backed ventures are less likely to exhibit high growth as a result of policy generosity in the country where they operate, but also that they are more resilient to discontinuities inherent in policy-dependent industries.

DISCUSSION AND CONCLUSIONS

Despite the importance of regulatory environments for organizations, their impact on firm strategy has received less attention than it deserves (Russo, 1991; Doh and Pearce, 2004; Lazzarini, 2013). At the same time, the rate at which firms scale-up, and in particular the contextual dimensions in which high growth ventures compete, is a critical but understudied factor in understanding firm strategy and industry evolution (Wright and Stigliani, 2013; Knudsen *et al.*, 2013). This research contributes to a better understanding of *how* the environment matters for the achievement of high growth (cf. Clarysse *et al.*, 2011), by investigating the impact of regulation on firms operating across countries with diverse policy conditions. Our hypotheses are tested in a narrowly defined setting in order to alleviate confounding cross-industry effects and isolate the impact of the variables of theoretical interest for our study. We find that high growth is – as expected – positively linked to policy generosity, and negatively linked to policy discontinuity. We also find that corporate-backed ventures are less affected by policy generosity compared to entrepreneurial startups, and less impacted by policy discontinuity as well. Below we discuss managerial and policy implications of our findings, after outlining the contributions of our work for research on strategic management and the study of regulatory uncertainty.

Contributions

Firms' strategic decisions and consequently their growth strategies are significantly shaped by their institutional environments. Even for industries where firms compete across borders one must consider how the domestic institutional environment shapes whether firms can achieve high growth. Research has investigated national institutions' impact on growth, yet much of this work has emphasized domestic institutions as constraints that bound firms by providing the rules of the game (Peng and Heath, 1996), such as restrictions in labor market legislation, financial and legal obstacles, etc. (Coad, 2007; Davidsson and Henrekson, 2002; Davidsson *et al.*, 2010). Our study departs from this work by examining how government *support for an industry* can lead to high growth by different types of ventures, and contributes to the surprisingly scant integration between strategic management and industrial policy research (Lazzarini, 2013).

But what do our results suggest for research on strategic management? First, they underline the importance of country-level institutional conditions for firms. As performance results from the fit between firms and environmental conditions (Ganco and Agarwal, 2009), contextual dimensions that can have a significant impact on firms' strategies deserve increased attention. In policy-dependent industries, high growth is determined not only by market and technological factors, but is also triggered by policy generosity. Yet, dependence on policy support 'artificially' fosters growth, as policy generosity remains at the discretion of the government, constituting an additional source of uncertainty for firms operating in such industries. As our findings indicate, the rate of discontinuous policy changes contributes to policy uncertainty and hampers venture growth. Therefore, if we are to understand firm behavior in policy-dependent industries, a comprehensive assessment of both the opportunities and the risks that policy conditions confer on firms is required.

Second, our results suggest that diversifying entrants and startup firms differ in their growth strategies, and that this difference can be attributed to policy conditions. This finding is consistent with prior research proposing that the impact of organizational prehistory on firm performance and survival depends on characteristics of the external environment (Ganco and Agarwal, 2009; Klepper, 2002). However, extrapolating the findings of this study to performance differences should be done with extreme caution. On the one hand, growth can influence a firm's long-run competitive advantage by allowing for economies of scale (Knudsen *et al.*, fc) and spearheading future sources of revenue (Lechner and Kreutzer, 2010). On the other hand, excessive growth based on overly positive forecast estimates can produce negative performance implications, as it generates higher fixed costs and overheads (Durand, 2003). Therefore, that policy generosity facilitates high growth cannot directly translate to performance advantages, especially in the long run. In fact, strict conditions must be in place for a country's industrial policy to lead to sustainable firm-level competitive advantage (Lazzarini, 2013). In light of this divergence between growth and success (see Davidsssson *et al.*, 2010 or McKelvie and Wiklund, 2010 for a more elaborate discussion), our finding that startup ventures are more likely to achieve high growth under policy generosity is not necessarily at odds with prior empirical findings ascribing performance or survival advantages to diversifying entrants in new industries (Carroll et al.,1996; Klepper and Simmons, 2002; Mitchell, 1991).

Third, we find that independent startups firms are more sensitive to policy discontinuity than diversifying entrants. This finding is contrary to the fact that the desire for growth and propensity to take risks under uncertainty is greater for entrepreneurial ventures (Davidsson *et al.*, 2010; Mishina *et al.*, 2004). However, it is not without justification. In fact, two possible explanations can be offered to justify why the impact of policy discontinuity is less profound for corporate-backed ventures. The first was discussed above and relies on these ventures' 'parenting advantage' (Lechner and Kreutzer, 2010), especially the resources or resource slack these ventures can rely on. This resource availability buffers them from environmental change (Baum and Oliver, 1991) and allows them to grow despite policy discontinuity. This explanation would suggest that startups are unlikely to exhibit high growth under policy discontinuity because, constrained by their resources they lack the ability to do so. A second and quite different explanation would center on a deliberate decision of entrepreneurs to limit the growth of their ventures, given the uncertainty of future returns. Diversifying entrants, according to this explanation, continue to exhibit higher growth rates as inertial forces compel them to ‘stick to the plan’ despite negative environmental changes.

Although our data do not allow us to precisely reveal the underlying mechanism, they can offer at least some preliminary support for the former view. Aside from human capital, PV producers typically need to acquire primary inputs that will be used in production, and when they have to expand capacity to satisfy their production targets, they need to acquire additional manufacturing lines. The latter is substantially more costly and more likely to be required by firms that expect to grow fast (firms that expect limited growth may be more likely to reach their production targets using current capacity). The finding that the negative effect of policy discontinuity is significant for high growth ventures (Models 4 and 5) but not for overall growth (Model 6) may be explained by the fact that resource acquisition is harder when the policy environment is uncertain. Thus, these results (which were confirmed in unreported analyses where we varied the cutoff point for high growth ventures) offer some preliminary evidence in favor of the resource-explanation we discussed above. Yet, regardless of the mechanism, this finding has important implications for policy-makers, which we discuss later, but also for the literature on regulatory uncertainty (Engau and Hoffmann, 2011; Hoffmann *et al.*, 2009; Kolk and Mulder, 2011; Marcus, 1981; Marcus *et al.*, 2011).

Recent research has started to suggest that the uncertainty stemming from governmental actions does not always lead firms to postpone their investment decisions. Rather, different motivations exist for firms to continue with their investments despite such sources of uncertainty (Hoffmann *et al.*, 2009). Our study confirms this idea, but only partly, as we find that policy discontinuity, one aspect of policy uncertainty that is important in solar PV, does lead firms to limit their growth but not in the same way for all firms. Organizational prehistory strongly shapes the impact of policy discontinuity on firms. This finding contributes to the broader research stream on regulatory uncertainty by offering a novel moderator of the relationship between policy uncertainty and firm strategy. Importantly, as discussed by Hoppmann *et al.* (2013) firms need not be the direct target of policies to be affected. Contrary to production policies, feed-in-tariffs are usually set up by governments with the goal of stimulating demand. The impact on solar PV producers that we find so strong in our study and the differential impact on some producers over others are very likely unintended consequences of political intervention in this industry.

Managerial and policy implications

A few insights from our study can be useful to policy-makers. First, before designing or implementing industrial policy initiatives, regulators must not only consider the intended effects of policy intervention for their targets (e.g. consumers, firms in a certain position in the value chain, or the sector on aggregate) but also attempt to predict potential unintended consequences of their policies for other actors. In particular, discontinuous changes in policy support can have dire consequences for the competitiveness of local producers. Our results show that even after accounting for the impact of reduced policy generosity, firms are hesitant to continue their investments when there is a recent history of discontinuous policy changes in their country. Second, while firm growth has been linked to welfare benefits such as job creation, increased tax collection or more broadly economic development (McKelvie and Wiklund, 2010), deployment policies promote or hamper growth in different ways for startups and diversifying entrants, and regulators must be clear of their motives when designing such instruments. The growth of entrepreneurial entrants is on the one hand viewed as key for generating employment opportunities but, on the other hand, the jobs created by startups can disappear soon afterwards (Coad,2007; Vivarelli, 2007) given *de novo* firms' liability of newness (Freeman, Carroll and Hannan, 1983). We cannot offer normative prescriptions as to whether growth by entrepreneurial or corporate-backed ventures should be promoted by national governments, but policy-makers should clearly formulate their goals and ensure that they consider the differences in how these firms react to policy intervention. Third, both entry and growth have been the targets of policy making, but recent research suggests that policy support has different effects on these two important outcomes. York and Lenox (2014) find evidence that state-policy incentives in the US green building industry exert greater influence on entry by diversifying incumbents compared to entry by startups. Our findings show the opposite pattern for firm growth, as policy generosity contributes more to startups' growth than to that of corporate-backed producers. Insofar as these differences are not context-specific, they suggest that the incentives for entry in policy-dependent industries may be different than those for expansion.

Firms can also gain critical insights by inspecting the policy conditions in their sectors. Industry environments are today more dynamic than ever. For firms to survive over time, they need to keep up with the rate of change of their industry environment (Ben-Menahem *et al.,* 2013). Skilled managers are well aware of the dangers of firm-environmental misalignment, yet the difficulty of forecasting external changes and biases in decision-making often lead firms to over- or under-invest (Durand, 2003). Market, technological, and competitive effects can shape the landscape in which firms operate and influence their opportunities to achieve high growth. In policy-dependent industries though, managers are faced with additional, and perhaps unique, challenges (Doh and Pearce, 2004). Country environments vary in terms of policy conditions, and these conditions can manifest into opportunities as well as threats to future growth. Policy generosity can be a source of munificence that allows firms to grow faster than competitors. But managers should be careful to assess not only the short-term policy environment, but also the long-term implications that policy-dependence brings about. They must continuously scan the regulatory environment to design their growth strategies or adjust their reliance on the local market, and accordingly protect their companies from unexpected policy shifts. They can also use this study as a roadmap to better predict the potential impact of policy conditions on their competitors' growth strategies.

Lastly, it is the responsibility of managers to remain cognizant of the discontinuities inherent in policy-dependent industries, but also to communicate their concerns to regulators who are often inattentive to, or even unaware of, the unintended effects of policy instability. Firms facing unstable institutional environments need to integrate such communication in their nonmarket strategies (Den Hond, Rehbein, de Bakker and van Lankveld, 2014). Moreover, even though nonmarket strategy can be seen as a zero-sum game where firms compete with peers for political influence (Henisz and Zelner, 2012), the need to maintain a stable policy environment is arguably beneficial to most firms operating in a country, and thus collective action to influence policy makers though industry associations is also warranted.

Limitations and future research directions

Our study provides several insights in the direction of understanding the role that policy intervention plays in certain sectors. It advances recent work on the solar PV industry (Peters *et al.*, 2012) by using a more precise measure of deployment policies. By focusing on the most widespread policy scheme for solar PV, we provide evidence of the notoriously sizeable impact of policy support on firms in this industry, and answer the call of Peters and colleagues for research on the effects of specific policy instruments and their design features. However, we align with their additional suggestion that future research should also examine combinations of different policy instruments and how they impact firms and industry development.

As discussed above, the empirical setting was chosen to isolate alternative effects and allow for a more contextualized theory of how policy generosity and policy discontinuity shape firm behavior. Certainly, generalization of our findings to other industries should be attempted with care and future research is needed to determine the precise boundaries of our theory. We suspect, however, that in other sectors that rely on government support firms will exhibit similar patterns of behavior. At the very least, the shift of focus from the industry to the firm-level of analysis (Hoppmann *et al.*, 2013) provides additional insights as to the side-effects of policy support. It also exposes the need for a more refined understanding of how the uncertainties associated with political intervention influence firm behavior, and particularly how *different firms* may be influenced in different ways by the same policy conditions.

Other research directions that we deem important relate to the organizational decision-making practices that shape firm growth, as well as the consequences of high growth in policy-dependent industries for long-term competitiveness. Our finding that policy generosity is more likely to spawn high growth among startups is consistent with the common view that entrepreneurs are risk-averse or even overconfident. But this latter view is not consistent with our other result, that in the face of policy discontinuity startup firms grow less than diversifying entrants. The results could be attributed to fundamental differences in managerial or organizational decision-making processes among these types of firms, or are simply a question of ability to raise capital and other resources in order to expand. Our additional analyses are suggestive of the latter view, but future research is needed to illuminate the precise mechanisms.

Moreover, favorable policy conditions confer opportunities for firms but may also lead to escalation of commitment and hinder performance (Durand, 2003). Therefore future research is required to identify whether, in policy-dependent industries, the differences in growth among startups and corporate-backed ventures translate into long-term performance and survival differentials.

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TABLES AND FIGURES

Table 1. Correlation Matrix[a] and Descriptive Statistics

	Variable	1	2	3	4	5	6	7	8	9	10	11	12
1	High Growth	1.00											
2	Experience	-0.10	1.00										
3	Size	0.17	-0.08	1.00									
4	Previous growth	0.20	-0.11	0.55	1.00								
5	Foreign	-0.11	-0.06	-0.11	-0.06	1.00							
6	Ownership change	0.12	-0.22	0.02	0.08	0.09	1.00						
7	Total EU production	0.00	0.01	0.58	0.28	0.06	0.02	1.00					
8	Trade Openness	-0.02	-0.46	0.25	0.16	0.12	0.16	0.39	1.00				
9	EU countries with regul.	-0.01	-0.06	0.46	0.24	0.11	0.06	0.82	0.43	1.00			
10	Corporate-backed	-0.14	0.32	-0.26	-0.15	0.42	-0.05	-0.17	-0.08	-0.19	1.00		
11	Policy generosity	0.16	-0.01	0.31	0.17	-0.08	0.03	0.42	-0.06	0.60	-0.14	1.00	
12	Policy discontinuity	-0.06	0.10	0.01	-0.08	0.03	0.07	0.06	-0.06	0.03	0.02	0.27	1.00
	Mean	0.25	12.04	44.35	9.38	0.36	0.14	793.28	75.47	16.98	0.50	12.80	0.21
	St. Deviation	0.43	8.56	84.29	30.29	0.48	0.34	869.57	29.6	8.54	0.50	9.58	0.53

[a] Absolute values above 0.15 are significant at the 1 percent level.

Table 2. Likelihood of achieving high growth [a]

	Main models				Robustness tests [b]	
VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Experience	-0.032	-0.025	0.009	0.028	0.045*	0.003
	(0.020)	(0.025)	(0.020)	(0.020)	(0.021)	(0.282)
Size	0.003	0.003	0.001	0.001	0.001	-0.049
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.031)
Previous growth	0.015***	0.016***	0.017***	0.016**	0.037***	0.679***
	(0.003)	(0.003)	(0.005)	(0.006)	(0.008)	(0.183)
Foreign firm	-0.414	-0.294	0.154	0.208	0.717+	6.072
	(0.279)	(0.287)	(0.212)	(0.207)	(0.378)	(5.061)
Ownership change	0.751***	0.755***	0.922***	0.901***	1.048**	8.593
	(0.185)	(0.190)	(0.243)	(0.234)	(0.321)	(5.293)
Total EU production	-0.001***	-0.001***	-0.002**	-0.003***	-0.004***	-0.190+
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.114)
Trade openness	-0.009	-0.008	0.014	0.021	0.030+	0.006
	(0.010)	(0.009)	(0.012)	(0.014)	(0.016)	(0.043)
EU countries with regul.	1.046+	1.051+	1.147	1.037	0.896*	17.086+
	(0.578)	(0.588)	(1.035)	(1.270)	(0.431)	(10.359)
Corporate-backed venture		-0.269	-0.550*	0.549	1.448	-2.047
		(0.322)	(0.280)	(0.684)	(0.898)	(2.295)
Policy generosity			0.180***	0.249***	0.355***	0.938**
			(0.048)	(0.072)	(0.093)	(0.311)
Policy discontinuity			-1.182**	-1.772***	-1.742***	-0.901
			(0.391)	(0.229)	(0.292)	(4.170)
Policy gener. X Corp.-backed				-0.100**	-0.187**	-0.821***
				(0.035)	(0.061)	(0.147)
Policy discont. X Corp.-backed				1.028**	0.926***	0.400
				(0.352)	(0.142)	(4.982)
Year dummies	Included	Included	Included	Included	Included	Included
Intercept	-25.759+	-25.930+	-30.970	-29.274	-26.115**	0.000
	(14.912)	(15.188)	(26.203)	(31.730)	(9.545)	(0.000)
Num. of observations	284	284	284	284	284	284
Num. of ventures	45	45	45	45	45	45
Num. of countries	8	8	8	8	8	8
Pseudo R-sq. [c]	0.083	0.085	0.160	0.183	0.325	0.336

Robust standard errors in parentheses: *** p<0.001, ** p<0.01, * p<0.05, + p<0.1

[a] Logit estimation for Models 1-5. GLS estimation for Model 6

[b] Model 5 is similar to Model 4 with a different operationalization of High Growth. In Model 5 we use a continuous variable to capture producers' growth.

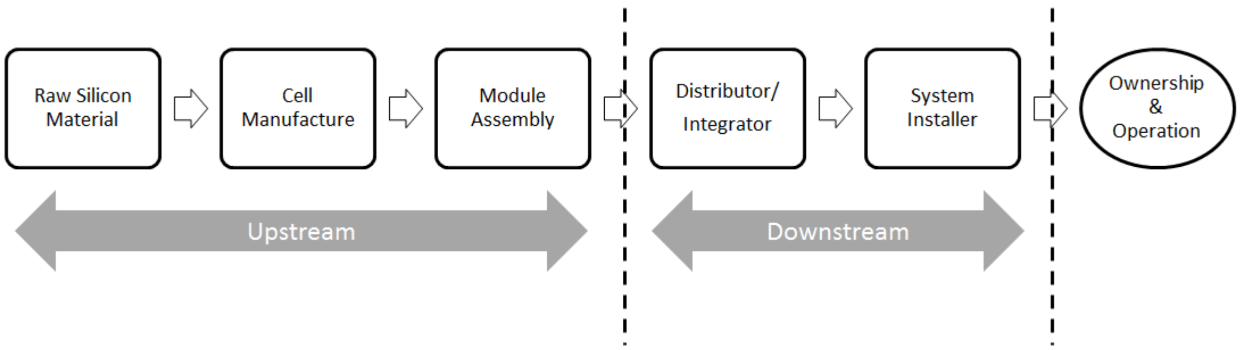
[c] R-sq. for Model 6

Table 3. Average Marginal Effects of interaction terms *

Variables		*AME*	*z-score*
Policy generosity	Startups	.038	5.61
	Corporate-backed ventures	.019	2.83
Policy discontinuity	Startups	-.29	-5.94
	Corporate-backed ventures	-.091	-1.36

* The table depicts the average marginal effects (AME) of the policy variables on the dependent variable, for the two possible values of the interaction term (corporate-backed dummy). AMEs indicate the predicted change in the likelihood of high growth for each one-unit increase in the independent variable.

Figure 1. Basic structure of the PV supply chain *



* The figure is adapted from a report of the U.S. National Renewable Energy Laboratory by Frantzis, Graham, Katofsky, and Sawyer (2008) and offers a snapshot of the basic components of the PV industry's supply chain.