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# Public policies in a regulated entrepreneurial setting

**Abstract:** The existing literature in public policy has commented mostly on mature and established businesses, leaving the relationships between entrepreneurial businesses and public policies less explored. Relying on qualitative research methods and quantitative surveys, we examine how managers in an intensively regulated entrepreneurial setting assessed the desirability of public policies. We show that managers in the regulated energy efficiency and renewable (EERE) business sector in the 1990s tended to view public policies favorably only if they lacked control over the business environment. The less control they perceived they had over the business environment, the more favorably they tended to view public policies. Our findings suggest that managers in a regulated entrepreneurial setting tend to view public policies as substitutes for their efforts to control their business environment, not as complements, as studies of mature and established companies in regulated settings commonly find. However, we also find some evidence to suggest these perceptions may evolve, as a business experiences greater success attracting customers.

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## 1 Introduction

The issue of capture has been central to the political science and economic literatures.<sup>1</sup> Stigler suggests that “regulation may be actively sought by an indus-

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<sup>1</sup> Marcus (1984).

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try or thrust upon it.”<sup>2</sup> His theory is that, as a rule, regulation is acquired by businesses or other economic interests and designed or operated primarily for their benefit. This is to be contrasted with another theory – that regulation is, as a rule, instituted primarily for the protection and benefit of the public at large or some large subclass of the public.<sup>3</sup> Bernstein’s theory, unlike Stigler’s, is cyclical.<sup>4</sup> It holds that regulatory agencies, established for public interest purposes, subsequently are captured by the industries they are supposed to control. As the enthusiasm for regulations, generated at the time of their creation, dissipates, regulatory agencies flounder, and they come to depend more and more on business for support, advice, and information.

The notion of inevitable capture, however, may not apply in all instances. Indeed, firms may face costly compliance decisions in many areas of their operations, and regulation can have adverse long term consequences in terms of declining managerial autonomy and, along with the red tape, loss of productivity. The benefits of capture may be limited to large, well-established, and mature businesses. Since entrepreneurial businesses are vital to economic growth and job creation, their relationship to the state deserves more attention. The impact of government on entrepreneurial firms may look far different than how it is portrayed in traditional capture theories.

While Mahoney and colleagues have called for the merging of research on business and public policies on the “grounds that private and public policies cannot be fully understood if they are conceived separately,” limited work has been done on the relationships between entrepreneurial businesses and regulation.<sup>5</sup> Prior research has tended to emphasize how mature and established businesses try to capture regulatory policy making bodies and exploit them for their benefit.<sup>6</sup> The relationships between entrepreneurial businesses and public policies in regulated sectors require more examination in the literature.

Using both qualitative and quantitative research methods, we explore the relationships between entrepreneurial businesses and public policies in a detailed study of the regulated energy efficiency and renewable (EERE) sector in

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<sup>2</sup> Stigler (1971: p. 3).

<sup>3</sup> Posner (1974: p. 355).

<sup>4</sup> Bernstein (1977).

<sup>5</sup> Mahoney, McGahan, and Pitelis (2009: p. 1034).

<sup>6</sup> For example, see Baron (1995); Becker (1983); Bernstein (1977); Bonardi, Hillman, and Keim (2005); Hillman and Hitt (1999); Hillman, Zardkoohi, and Bierman (1999); Mitnick (1981); Peltzman (1976); Salamon and Siegfried (1977); Stigler (1971); Schuler, Rehbein, and Cramer (2002); Shaffer and Hillman (2000); Ungson, James, and Spicer (1985); Wilson (1980).

the 1990s.<sup>7</sup> The managers of businesses in this regulated sector faced challenges typical of an entrepreneurial sector, including lack of infrastructure, inadequate development of supporting businesses, low prices for incumbents' competing products, weak demand for their products and services, and many performance uncertainties.<sup>8</sup> Studies have been done of how mature businesses in regulated sectors approach public policies, but few studies have investigated how managers of entrepreneurial businesses in a regulated sector, like the EERE sector in the 1990s, appraise them.<sup>9</sup> Our aim in this paper is to ascertain how managers in the EERE sector viewed public policies designed to stimulate demand for their products and services. In particular, we are interested in how desirable they perceived them to be.

Prior research suggests that managers in mature firms engage in political strategies to extend and protect well-established market positions. However, very few entrepreneurial businesses in the EERE sector, during the 1990s, had secure market positions to defend. Their goal was to offset their disadvantages in comparison to incumbent firms in industries like coal, gas, and oil, and to create thriving markets for new products and services. While prior research suggests that managers in mature businesses that have established products and services seek policies to reinforce market barriers and safeguard their market positions, it is unclear how managers in entrepreneurial businesses, in regulated sectors like EERE, perceive such policies.

We found that managers in the EERE sector did not, like mature businesses, view public policies as a means to defend their market advantages. Though they had the opportunity to align their competitive strategies with policies designed to aid EERE businesses, the degree to which they viewed these policies as desirable depended upon how much control they perceived they had over key actors in

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<sup>7</sup> We use the term 'entrepreneurial' to describe nascent businesses, which could be start-ups or new ventures in established firms. Some entrepreneurial EERE businesses had set out to create new markets for technologies they had developed or for service ideas they had come up with; others participated in markets for a class of products or services that was still in an early stage of its development – where demand had not quite taken off. Some EERE businesses participated in markets that were mature, but they sought to create a new segment of customer demand based on their unique positioning as the energy efficient or renewable alternative. We consider the EERE sector to be an intensively regulated sector in the sense that the viability and the vitality of these diverse businesses depends importantly upon the many public policies that affect energy costs. EERE businesses experienced direct forms of regulation as well, including energy efficiency standards, environmental regulations, and demand side management programs (Alliance to Save Energy, 2013).

<sup>8</sup> See Joskow (2001); Kammen (2006).

<sup>9</sup> For an exception, see Rubenstein et al. (1977).

the business environment. The more control they perceived they had over these actors, the less desirable they perceived public policies to be. Instead of embracing policies designed to stimulate the EERE sector, managers of entrepreneurial businesses in this sector evaluated their potential impacts skeptically and tended to view them as alternative and generally inferior routes to achieving their goals. However, managers in the EERE businesses we interviewed also suggested that if regulatory policies changed, were easier to understand and use, and more helpful in leveling the playing field between themselves and the incumbents with whom they competed, they might view these policies differently. Most doubted that policy makers could deliver the policy changes they desired, and hence, they considered the strategies they employed to influence the business environment to be a better way of enhancing their businesses than were public policies.

These findings suggest that there is a life-cycle dimension to how managers in regulated sectors view public policies. Unless managers in entrepreneurial businesses sense they lack control of the business environment, they tend to view existing public policies negatively, while managers in mature businesses tend to view these policies positively. However, their perceptions of public policy become more favorable as they experience greater success in attracting customers. To reach these conclusions, we relied on qualitative research methods to develop grounded insights and quantitative survey methods to test the insights. In the remainder of the paper, we motivate the research with a brief introduction to the study and a literature review, describe the interviews and surveys we carried out, present our findings, and discuss the implications.

## 2 How managers in a regulated entrepreneurial sector are likely to view the desirability of public policies

Government policies have played a key role in enhancing the prospects of many emerging sectors including semiconductors, electronics, telecommunications, biotechnology, and the Internet.<sup>10</sup> To businesses in the regulated EERE sector, public policies have been and continue to be especially important.<sup>11</sup> Policy makers have enacted many supportive policies for this sector, but their backing tends to

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<sup>10</sup> Henderson and Newell (2011).

<sup>11</sup> Joskow (2001); Kammen (2006).

be intermittent and the policies they have created often have produced unanticipated consequences.<sup>12</sup>

During the post-Reagan decade, EERE managers faced a multitude of new and reconstituted regulatory policies designed to stimulate the growth of the sector; this was after such policies had been dormant during most of the Reagan administration. At the same, these managers were struggling to attract customers, grow their markets, define their competitive strategies, and create a viable business advantage.

According to the conventional wisdom in the scholarly literature, managers allocate attention and resources to public policies when they expect that the public policies yield positive net benefits to their firms.<sup>13</sup> Although this literature contends that managerial attention to public policies begins with the expectation of gain, prior work has not sufficiently established when managers understand public policies to be beneficial.<sup>14</sup> Although it would seem that nascent EERE businesses had more to gain from regulatory policies designed to promote energy efficiency and level the playing field for renewable fuels in general, their managers had less experience with public policies. Additionally, whereas the capture perspective has focused on mature businesses with stable strategies and well-established competitive advantages to protect, managers of entrepreneurial businesses are still building their markets and developing their business models. Consequently, they might assess public policies very differently. The struggle at the forefront of EERE managers' efforts was to gain footholds in markets that were dominated by powerful incumbents and to attract customers to the new markets they sought to create. As long as they had to contend with uncertain customer demand and navigate through business model changes, EERE managers would find it challenging to estimate how public policies would align with the strategies they were pursuing. Whether government policies would ultimately improve the viability of their business depended not only on how they responded to them, but also on how their customers, suppliers, competitors, and other actors in their business environment responded. It would be difficult to gauge whether public policies would ultimately benefit their business when their strategy was still taking form.

Yet, the conventional approach in the scholarly literature has emphasized how managers in mature businesses are likely to view public policies and

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<sup>12</sup> Marcus, Aragon-Correa, and Pinkse (2011).

<sup>13</sup> For example see Boddewyn and Brewer (1994); Hillman, Zardkoohi, and Bierman (1999); Henisz and Zelner (2005); Hillman and Hitt (1999); Holburn and Vanden Bergh (2008); Schuler, Rehbein, and Cramer (2002).

<sup>14</sup> Pearce, DeCastro, and Guillen (2008).

neglected managers of entrepreneurial businesses.<sup>15</sup> Managers in mature, established businesses have a history of dealing with public policies. They also have the resources and capabilities to contend with them. Their main motivation is to protect and extend market positions they have created rather than to create new markets, which tend to be smaller and have uncertain revenue potential.<sup>16</sup> These managers' understanding of public policies likely differs from the understanding that managers of entrepreneurial businesses possess. Yet, scholars have neglected to investigate these differences.

To address this gap in the literature, we interviewed managers in entrepreneurial businesses in the EERE sector, and we carried out surveys at two points, an earlier one, when the sector was very immature (1994), and a later one when it took on some characteristics of a mature sector (1998). Based on these interviews, and our reading of the relevant public policy and the management literatures, we hypothesized how managers of entrepreneurial businesses in a regulated setting like EERE would view the desirability of public policies. Our interviews, in particular, led us to expect that the degree of control a business could exert over key actors in its business environment would affect managers' views on the desirability of the public policies designed to support their sector. The more control managers perceived they had over the business environment, the less favorably they would tend to view public policies. In essence, public policies substitute for a business' capacity to affect the business environment in its favor. This contrasts with the capture literature in which mature businesses use regulatory policies to further secure their market dominance.

Our aim in doing the surveys at two points was to ascertain whether these managers would begin to change their views about public policies as the sector matured. The results of the second survey further confirmed our original hypothesis by revealing a shift in managers' perceptions: as they experienced more success in attracting customers, they became more favorably disposed toward the public policies designed to benefit the EERE sector. This suggests that managers' perspectives on public policy follow the life cycle of their businesses. In our study, managers of nascent businesses tended to view regulation as a substitute for direct control over the business environment, while managers of maturing businesses that had begun to successfully control their business environment, began to view regulation as a complement to their competitive strategies. The

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<sup>15</sup> *Ibid.*; Hart (2004); Oliver and Holzinger (2008).

<sup>16</sup> See Boddewyn and Brewer (1994); Hillman, Zardkoohi, and Bierman (1999); Henisz and Zelner (2005); Hillman and Hitt (1999); Holburn and Vanden Bergh (2008); Schuler, Rehbein, and Cramer (2002).

theory of capture only started to kick-in as the businesses began to attract a sizeable customer base.

## 3 Methodology

In order to test our hypothesis, we used interviews to inform and guide the development of two surveys, spread four years apart. The following section explains how we used the results of the interviews with managers in the EERE sector to shape the surveys, the implementation method as well as the process by which the survey data were tested against our hypothesis.

### 3.1 Interviews

In the 1990s, the EERE sector was comprised of a wide range of businesses affected by many different types of public policies. In order to develop the surveys that would be tested against our hypothesis, we needed to understand how the entrepreneurial managers in these regulated firms appraised these policies. Therefore, we did a series of in-depth semi-structured interviews with the chief executives, founders, and business unit managers of 19 businesses, which were identified through a directory of EERE businesses, compiled by the Alliance to Save Energy in 1994, to construct a representative sample of managers to interview. We deliberately chose entrepreneurial businesses of different sizes – some that served consumers and others that served industrial customers, product manufacturers as well as service providers, and businesses focused on energy efficiency as well as renewable energy businesses. We contacted several businesses in each category and asked to interview the founder, President, CEO, or business unit manager, according to who the key decision maker was in each case. We scheduled interviews with a number of businesses in each of the aforementioned categories, so that our sample approximated the distribution of businesses in the Alliance directory (see Table 1).

At least two researchers conducted the interviews, which lasted from 1 to 3 hour. The objective of these interviews was to understand how the EERE managers assessed the public policies that affected them. We asked them to describe the nature of their industry and business, to recount how they got into the EERE business, to discuss how their focus on energy efficiency or renewable energy affected their competitive strategies, and to explain their business objectives.

The interviews were tape-recorded and subsequently transcribed in order to facilitate an analysis of the content of the transcripts, specifically to identify

**Table 1:** Types of firms in the sample.

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**Products that contribute to saving energy in residential or commercial buildings comprised 30% of our interviews and about 30% of each sample in the surveys we subsequently carried out.**

Examples are: energy efficient windows, appliances, lighting components, and insulation materials. Customers include general, mechanical, and insulating contractors, architects, builders, homeowners, building owners and managers.

**Products that contribute to saving energy in industrial processes or settings comprised 28% of our interviews and about 28% of each sample in the surveys we subsequently carried out.**

Examples are: process controls, thermostats, heat recovery systems, and ventilators. Customers include energy intensive industries (chemical, food, paper) and agricultural organizations.

**Energy efficiency services that affect energy use in commercial buildings and/or industrial processes comprised 28% our interviews and about 28% of each sample in in the surveys we subsequently carried out.**

Examples are: designing energy systems and demand side management programs, conducting energy audits, training, and developing software for energy systems. Customers include utilities, manufacturers, and non-profit organizations such as schools and hospitals.

**Producers of renewable energy or alternate fuel products comprised 14% of our interviews and about 14% of each sample in the surveys we subsequently carried out.**

These include photovoltaic products, wind power systems, and whole tree biomass systems.

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themes, following procedures similar to those outlined by Boyatzis.<sup>17</sup> We looked for overarching themes in our interviewees' responses by identifying categories of words that were semantically similar and came up repeatedly. The words "influence" and "control" and phrases pertaining to affecting, or being affected by, specific actors and the business environment in general, were predominant. One aspect of the business environment – customers – was emphasized. Whereas the managers we interviewed frequently made reference to challenges that their business environment as a whole presented, they frequently distinguished the difficulty or success they had attracting customers. Their disappointment with the role that existing public policies played in their sector was evident. The contrast between the statements that these managers made about the public policies and their business strategies was striking. While government policies were a nuisance, the business strategies pursued gave managers the control over the business environment that they sought. Public policies in general were viewed as unreliable and as having unpredictable consequences, thus were undesirable.

Public policies, according to the managers, were hard to understand and cumbersome to use. They were not sufficiently helpful in leveling the playing field

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<sup>17</sup> Boyatzis (1998).



between EERE businesses and the heavily subsidized fossil fuel industry with whom the EERE businesses competed. However, the managers also commented that if the policies changed in the future, they might find them more desirable. On the other hand, there were some countervailing opinions among these managers. The interviews suggested that managers who were less confident about their ability to control markets tended to be less critical of government policies.

In sum, our analyses of the interview transcripts indicated that public policies were less attractive to managers who perceived that they had more control over the business environment and more attractive to managers who perceived they had less control over the business environment. These findings are consistent with resource dependency theories (RDT) of organizations, which hold that a central objective of managers is to limit their dependencies on other organizations for resources.<sup>18</sup> RDT maintains that control over the business environment confers independence from external organizations that possess the resources businesses require to survive.

The managers of entrepreneurial businesses that we interviewed appeared to view public policies and competitive strategies as alternative ways to gain such autonomy, i.e., as substitutes rather than as the complements the theory of capture posits. Therefore, we hypothesized that the more control managers perceived they had over the business environment, the less favorably they would tend to view public policies. Conversely, the less control they perceived they had over the business environment, the more favorably they would tend to view public policies. These insights from the interviews informed the surveys we then conducted.

### 3.2 Surveys

After conducting, analyzing and interpreting the interview results, we developed surveys to test our hypothesis. We conducted two surveys that were 4 years apart: one in 1994, which was very early in the re-emergence of the sector after its hiatus during the Reagan administration, and one in 1998, which was during the Clinton presidency and after the sector had started to see some revitalization. When the first survey was carried out, government expenditures for policies that promoted the entrepreneurial EERE sector were low, public support weak, and commercial development nascent; but, by the second survey, there had been some progress in energy efficiency in the United States, and renewable energy programs had gradually begun to take-off globally.<sup>19</sup> Even in the later period, the sector still was

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<sup>18</sup> Pfeffer and Salancik (1978); Hillman, Withers, and Collins (2009); Davis and Cobb (2009).

<sup>19</sup> Joskow (2001); Kammen (2006).

not flourishing, especially in comparison to the established fossil fuel industry, but it had made some progress in comparison to the situation in which it found itself previously. We were interested in knowing, as the sector began to mature, whether there would be signs that the managers would view public policies as being more desirable.

To identify the appropriate managers to survey, we relied on organizations that knew the sector intimately, the Alliance to Save Energy (ASE) in the first survey and Energy Alley (EA), a state-based environmental organization, in the second. For smaller companies, we directed the surveys to owners or the CEO, and, for larger companies, to a relevant business unit manager. The surveys, like our interviews, were confined to EERE firms in a single state in order to control for state-level differences that could have confounded our results. We followed up with mailed reminders asking contacts to complete the surveys. The first survey had 66 useable responses (a 31% response rate) and, the second survey, 123 useable responses (a 35% response rate). According to EA's estimates, between the first and second survey, entries exceeded exits in this sector, which justified the second survey's larger sample. The responding businesses were distributed very similarly to the businesses in which we conducted our interviews (see Table 1). A comparison of firm size, performance, and types of business revealed no significant differences between respondents and non-respondents in the two surveys.

### 3.3 Independent and dependent variables

Wherever possible, we used items for our variables that had been validated in previous studies.<sup>20</sup> Appendix A provides a complete variable list and shows how the variables were operationalized. The first independent variable (*Control of the Business Environment*) was the degree to which respondents were able to influence actors in the business environment. The Cronbach's alphas for this variable in the 1994 and 1998 surveys were 0.72 and 0.85, respectively. We used *Control of the Business Environment* as our main independent variable because scholars long have recognized that businesses are embedded in a broad business environment on which they depend and over which they try to exert control.<sup>21</sup> Managers' attitudes, judgments, and behaviors are shaped by the business environments in which they are rooted.<sup>22</sup> This broad environment puts pressure on businesses,

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<sup>20</sup> Bourgeois (1985); Glick et al. (1990); Chattopadhyay, Glick, and Huber (2001); Dess and Beard (1984).

<sup>21</sup> Emery and Trist (1965).

<sup>22</sup> Granovetter (1985).

makes demands, and influences the businesses' degrees of freedom.<sup>23</sup> The existence of this broad environment means that managers do not just experience external demands singly, independently, and in isolation from each other, but simultaneously, comprehensively, and in an integrated way.<sup>24</sup> Nor do they address these demands separately, but they are sensitive to uncertainty in the entire field and try to alter and re-arrange it as a whole.<sup>25</sup> The managers' concern is with losing control of the entire field of interdependent actors; a loss of control is perceived as unacceptable and threatening.<sup>26</sup>

In our case, to the degree the managers we interviewed emphasized any separate environmental component, they focused on the customers. Thus, though we treated the business environment as a whole in the main analyses, we also included a second independent variable (*Customer Control*).

The scholarly literature, as we have indicated, suggests that lack of control of the environment leads to changes in managerial perceptions, judgments, and actions.<sup>27</sup> To regain control, managers rely on initiatives with respect to markets and government.<sup>28</sup> These initiatives are interchangeable, with lack of control over one domain leading to increased attention to the other and vice versa.<sup>29</sup> The dependent variable (*Public Policy Desirability*) that we developed for the surveys captured the degree to which managers perceived that they could rely on public policies to enhance their business prospects. We asked managers to indicate the degree to which they expected four types of public policies, which were comprehensive in the mechanisms they employed to affect market demand for EERE products and services, would improve their business prospects. In both surveys, these variables were based on the average responses to the questions asked. The Cronbach's alphas for these variables were 0.88 and 0.75 in the two surveys, respectively.

### 3.4 Control variables

Many control variables were added to our analyses to rule out alternative explanations. The first set indicated how much a business stood to gain from the policies designed to foster the EERE sector. These variables were: the extent to which

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<sup>23</sup> Oliver (1991).

<sup>24</sup> Scott (2001).

<sup>25</sup> Desai (2011).

<sup>26</sup> George et al. (2006).

<sup>27</sup> Greenwood, Suddaby, and Hinings (2002).

<sup>28</sup> Ouchi (1980).

<sup>29</sup> Rivera, Oetzel, and Starik (2009).

a business *emphasizes EERE* measured as the degree to which it differentiates products/services on the basis of energy efficiency and considers this attribute important (the Cronbach's alphas were 0.73 in the first survey and 0.68 in the second survey); and business *dependence on government* contracts measured as the degree to which a business relies on government for sales (the Cronbach's alpha were 0.88 in the first survey and 0.75 in the second survey).

The second set of control variables captured the degree to which an entrepreneurial business might need government assistance. *Performance* of these businesses was measured using a 5-item scale.<sup>30</sup> Cronbach's alphas were 0.92 in the first survey and 0.72 in the second survey.

To measure the *munificence* of the business environment, i.e., the availability of resources to support growth of EERE businesses, we adapted from Bourgeois (1985) a 6-item scale. (Cronbach's alphas were 0.84 in both surveys). Environmental *instability*, which ought to positively affect managers' desire for public policy, was measured in the first survey with a 7-item scale (the Cronbach's alpha was 0.66).<sup>31</sup> The second survey matched businesses to their closest 4-digit SIC and used annual census data to compute the 5-year covariation of sales as a *market growth volatility* measure. The covariation of net worth and assets produced the same results.

The managers' appraisals of public policy also might be affected by the extent to which they believed that they could anticipate and affect the form that public policies would take. Therefore, we controlled for their perceived ability to *influence government*, which was measured with four items (the Cronbach's alpha was 0.81 in the first survey, 0.82 in the second survey), and their ability to *predict* the decisions and behaviors of *government*, which was measured with two items (the Cronbach's alpha were 0.88). In addition, we controlled for their perceived ability to predict the decisions and behaviors of key actors in their business environment. This variable, *market predictability*, had six items and the Cronbach's alphas were 0.75 in the first survey and 0.84 in the second. *Size of firm* was the number of full-time employees.

## 4 Results

Consistent with what we learned from the interviews, we found that the degree of control that these EERE managers perceived they had over the business environment significantly affected the way they evaluated public policies. In both

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<sup>30</sup> Glick et al. (1990).

<sup>31</sup> *Ibid.*

surveys, overall or general control of the business environment was negatively and significantly correlated with public policy desirability. The regression results are shown in Tables 2 and 3.

Since influencing customer decisions was the most critical element in the business environment over which the managers we interviewed wanted to gain control, we investigated this factor separately. In the first survey, we found that the relationship between customer control and the desirability of public policies was negative and insignificant, while in the second survey, this relationship was positive and significant (the second row in Table 2). The latter result was consistent with previous studies of mature businesses, in which managers tended to view public policies as favorable and as desirable because they could be used to buttress, support, and consolidate their control over the market.<sup>32</sup> We suspect that this difference in the customer control results is an indicator of the fact that the entrepreneurial businesses had made some progress during the 1990s in moving toward greater maturity. Their competitive strategies had started to succeed. They had begun to attract larger shares of existing markets or to create market spaces

**Table 2:** The impacts of control of the business environment on public policy desirability.

	Survey one 1994: (n=66)	Survey two 1998: (n=123)
Independent variables		
Control of the business environment	-1.34*	-1.51***
Customer control	-0.431	1.23**
Control variables		
EERE emphasis	0.826*	1.48***
Government dependence	-0.175	-0.032
Business performance	-0.157	0.084
Munificence	-0.196	-0.142
Instability	1.55**	
Market growth		-1.26**
Influence government	1.39**	1.23*
Predict government	0.99*	-0.033
Predict market	-0.231	2.09***
Predict customers	0.521	-1.22**
Constant	9.63 <sup>+</sup>	14***
Adjusted R <sup>2</sup>	0.3102	0.3415
Model F-stat	3.66***	3.35**

<sup>+</sup>p ≤ 0.10, \*p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

<sup>32</sup> For example, see Peltzman (1976); Stigler (1971).

**Table 3:** The impacts of firm size on public policy desirability.

	Survey one 1994: (n=66)	Survey two 1998: (n=123)
Control variables		
Firm size	-0.0002	-0.0004
EERE emphasis	0.758*	1.53***
Government dependence	-0.305	-0.045
Business performance	-0.336	-0.135
Munificence	-0.416	0.079
Instability	1.56**	
Market growth		-1.34*
Influence government	0.850*	1.03 <sup>+</sup>
Predict government	0.902*	0.081
Predict market	-0.375	0.881
Constant	11.22*	13.52***
Adjusted R <sup>2</sup>	0.2706	0.1761
Model F-stat	3.64***	3.35**

<sup>+</sup>p ≤ 0.10, \*p ≤ 0.05, \*\*p ≤ 0.01, \*\*\*p ≤ 0.001.

of their own. As this change occurred, the managers of EERE businesses began to see government policies in a new light – as a way of protecting and defending their newfound market advantages. Government policies were no longer viewed only as an alternative to business strategies, but, as in mature businesses, could be viewed as a complement.

In a separate analysis of the control variables, we added firm size as measured by number of employees to determine if this variable influenced the results (See Table 3). We included firm size because it has been used to indicate how much control firms have over their business environment. However, we found that, even with firm size in the models, perceived control over the business environment was significant. Firm size had no significant effect on public policy preferences.

The signs of the other control variables remained the same and were consistent with our expectations. The following control variables were significantly correlated with the perception of public policy desirability: EERE emphasis (surveys one and two), instability (survey one), weak market growth (survey two), capacity to influence government (survey one and two), and ability to predict government (survey one). The findings indicated that if the managers were in businesses that emphasized EERE, their business environments were unstable or their market growth weak, and their capacity to influence government great, then they were more likely to view government policies as desirable.

These results supported the notion that general control of the business environment was an important factor in how entrepreneurial managers assessed

public policies and the sign and significance of customer control shifted as businesses started to become more mature. To bolster confidence in our results, we subjected the OLS regressions used to estimate the models to a number of robustness checks. Each model had an average variance inflation factor below 2 and exhibited normal dispersion on residual plots. The data had constant variance ( $X^2$  for the Breusch-Pagan/Cook-Weisberg test is  $<1$  in each case). Dropping observations with the highest *df-betas* that might be exerting extraordinary influence did not change the results. Furthermore, the results were also robust to dropping the variables most highly correlated with control over the business environment, such as firm size and the ability to predict the business environment.

Using the Harmon one-factor test, we checked for the influence of common method variance. The unrotated principal component factor analysis and principal component analysis with varimax rotation both revealed not a single factor but rather, three distinct ones, with eigenvalues  $>1.0$ . These factors together accounted for 67% of total variance in the first sample and 63% in the second sample. The largest factor accounted for 28% and 33% of the variance in the unrotated factor analysis and 26.5% and 28.5% in the rotated factor analysis. In no case did it account for a majority of the variance.

Understanding that the Harmon one-factor test has been criticized, we took other steps to reduce concern that common method variance was driving the results. Different scale endpoints and formats were used for the independent and dependent variables. Items for the main predictor and the dependent variable were separated by three pages in each survey and by questions in four conceptual categories, which reduced the potential for respondents to mentally combine the items. We placed the least cognitively demanding items at the end of the survey, and we kept the survey short to avoid having respondents focus on rapid completion rather than accurate responses. When rapid completion becomes the goal, similar item formats, questioning styles, and peripheral cues are more likely to invoke previous responses, even when the content of questions differ conceptually.

To assess whether measurement error, such as common method bias, was a concern, we used instrumental variables (see Table 4). In static (cross-sectional) models, omitted variables and measurement error are likely sources of endogeneity.<sup>33</sup> We estimated instrumental variables models using *ivreg2*, as implemented in Stata 11.1, to determine whether our primary predictor (control of the business environment) was appropriately treated as endogenous. To identify the best set of instruments, several variable combinations were tested for each

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33 Antonakis et al. (2010).

**Table 4:** Instrumental variables and endogeneity tests.

Model (instruments)	$H_0$ : model underidentified, instruments irrelevant (instruments relevant if significant $\chi^2$ , can reject $H_0$ )	$H_0$ : model overidentified, instruments exogenous (instruments exogenous if $\chi^2$ is not significant, cannot reject $H_0$ )	$H_0$ : instruments exogenous and correctly excluded from 2nd stage model (instrument exogenous if $\chi^2$ is not significant, cannot reject $H_0$ )	$H_0$ : regressors exogenous (regressors are exogenous and OLS preferred if $\chi^2$ is not significant, cannot reject $H_0$ )
Sample 1: Instrumental variables (industry type, firm size, performance, low cost, differentiate)	Anderson test: $\chi^2=26.25^{***}$ Cragg-Donald test: $\chi^2=44.02^{***}$	Sargan test: $\chi^2=5.25$	Anderson-Rubin test: $\chi^2=8.36$	$\chi^2=0.048$
Coefficient on <i>Control Business Environment</i> –1.33*				
Estimates for other variables are comparable to those reported in Table 2				
Sample 2: Instrumental variables (firm performance, capital expenditure growth, demand growth)	Anderson test: $\chi^2=6.41^*$ Cragg-Donald test: $\chi^2=6.79^*$	Sargan test: $\chi^2=0.001$	Anderson-Rubin test: $\chi^2=5.64$	$\chi^2=1.487$
Coefficient on <i>Control Business Environment</i> –3.45*				
Coefficient on <i>Control customers</i> 2.35*				
Estimates for other variables are comparable to those reported in Table 2				



sample, including firm size, performance, strategy, and industry differences. Table 4 reports the variable combination that best satisfied tests of instrument validity for each sample. To check whether our instruments were relevant, we generated the Anderson canonical correlation and the Cragg-Donald Wald statistics of instrument relevance, and to test whether the instruments were exogenous, we used the Sargan test, as implemented by Stata 11.1, `ivreg2`. We also checked the Anderson-Rubin statistic, which jointly tests whether the instruments are uncorrelated with the error term and are correctly excluded from the second stage equation. This test is robust to weak instruments, and failure to reject the null increases confidence in the instruments used to specify the model. As reported in Table 4, we found instruments that satisfied these criteria, suggesting that, while imperfect, they are sufficient for our endogeneity tests.

The Anderson canonical correlation and the Cragg-Donald Wald tests indicated that the excluded instruments were relevant; we rejected the null hypothesis that the model was under-identified. In survey 1, the Anderson and Cragg-Donald statistics were:  $X^2=26.25^{***}$  and  $X^2=44.02^{***}$  respectively, and in survey 2 they were  $X^2=6.41^*$  and  $X^2=6.79^*$ . Because the null of instrument exogeneity could not be rejected by the Sargan test, in survey one,  $X^2=5.25$ ,  $p=0.2623$ , and in survey two:  $X^2=0.001$ ,  $p=0.9805$ , we believe that the instruments were valid. Once we had specified the 2SLS models that satisfied these criteria, we checked the endogeneity test generated by Stata's `ivreg2` procedure (using the "endog" option). This is like a Hausman test, which compares the consistency of the OLS and IV estimates. Failure to reject the null would mean that the predictors were exogenous and that OLS estimates would be more appropriate than the instrumental variable estimates. In every case, we were unable to reject the null hypothesis that our measures of control over the business environment were exogenous: in survey 1,  $X^2=0.048$ ,  $p=0.8263$ , and in survey 2:  $X^2=1.487$ ,  $p=0.4756$ . The results in the instrumented models, moreover, were consistent with the regression results.

## 5 Discussion and conclusion

It has long been recognized that regulatory policies shape the competitive landscape of industries.<sup>34</sup> Research on the relationships between public policy and business strategy has largely framed them as complements, as in the theory of

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<sup>34</sup> Hillman and Hitt (1999); Hillman, Zardkoohi, and Bierman (1999); Schuler, Rehbein, and Cramer (2002).

capture.<sup>35</sup> However, empirical work has emphasized mature businesses with established advantages and has neglected the attitudes of managers in entrepreneurial businesses.<sup>36</sup> We investigated whether managers of entrepreneurial businesses, in the regulated EERE sector, view public policies as similarly beneficial. We found that they tend to view public policies as substitutes for direct control over their business environment, suggesting that the stage of a businesses' development may be an important boundary condition on the theory of capture.

Rather than seeking to reinforce competitive advantages through public policy, our results suggest that managers of entrepreneurial businesses view public policies as undesirable unless their businesses lack control over the business environment, a pattern which differs from that found in mature sectors.<sup>37</sup> However, as the EERE sector started to mature, we found evidence of a shift in this relationship. These managers started to view public policies as a complement rather than as a substitute for actions they could take to affect their business environments.<sup>38</sup> These findings suggest that the relationships between business and public policy are likely to have a lifecycle pattern, in which the relevance and the role of public policies changes in accordance with the degree of control that managers perceive that they have over the business environment. In accord with resource dependence theory, our study suggests that perceived control over key actors in the businesses environment shapes the way managers view the potential benefits of public policies for their businesses.<sup>39</sup>

Clarifying how managers in entrepreneurial business sectors view public policies is important to developing a theory of public policy that accounts for the unique challenges in nascent sectors and the political strategies that managers apply in these settings.<sup>40</sup> Among the entrepreneurial businesses in the regulated EERE sector that we analyzed, we found considerable evidence to suggest that managers' views of the desirability of public policies depended on the degree of control that they perceived they had over the business environment. In so doing, we have introduced three new constructs that should be considered as important in research on business and government: entrepreneurial versus mature

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**35** Peltzman (1976); Schuler, Rehbein, and Cramer (2002); Shaffer and Hillman (2000); Stigler (1971).

**36** With some exceptions, see Rubenstein et al. (1977).

**37** Birnbaum (1985); Boddewyn and Brewer (1994); Bonardi, Hillman, and Keim (2005); Hillman and Hitt (1999); Salamon and Siegfried (1977); Shaffer and Hillman (2000); Mitnick (1993); Wilson (1980).

**38** Rudy (2010).

**39** Pfeffer and Salancik (1978); Hillman, Withers, and Collins (2009).

**40** Gilbert, Audretsch, and McDougall (2003); Pearce, DeCastro, and Guillen (2008).

businesses, managers' perceptions of public policy desirability, and managers' perceived control of their business environment.

While we believe this study raises new understanding of existing relationships and provokes new questions for research, it has some limitations. The EERE sector is quite diverse, and, while this enhances our ability to generalize regarding entrepreneurial managers' views of public policies, we are limited in our ability to capture fine-grained differences in these businesses' competitive strategies and in the regulatory policies that have historically affected them. It is possible that different kinds of businesses, at a particular stage in their growth, will confront challenges that could best be remedied with different kinds of public policies, and that this would influence managers' expectations of policy benefits. Although we took steps to limit measurement error in our study, some undoubtedly remains. It would be useful to develop a multi-method study in which archival data is used to trace business actions at the same time surveys are used to trace shifts in managers' attitudes over time. To truly capture the evolution of their perceptions, one would need to survey the same managers over the years that their businesses develop and to track milestones in their development. This would enable a direct test of the lifecycle pattern we can only speculate about.

We see a number of compelling avenues for research to build upon our study. We believe that perceptions of control are likely to play a role in the cognitive shortcuts that managers use to evaluate public policies. Classification is a type of cognitive shortcut that managers use.<sup>41</sup> Perceptions of control are likely to affect whether entrepreneurial managers classify policies as representing a threat to or an opportunity for their business.<sup>42</sup> Further, it would be useful to explore whether, through such classification, the business actions that entrepreneurial managers take in regard to public policies are directed inwardly toward organizational practices or are directed outwardly toward other market actors.<sup>43</sup>

Perceptions of control also are likely to figure into entrepreneurial managers' estimation of the gains and losses from public policies, and beliefs regarding strategic actions they should take. Entrepreneurial managers who believe that their businesses have substantial control over the environment are likely to frame public policies in terms of the potential losses, whereas those who perceive that they have little control are likely to frame public policies in terms of the potential gain. According to prospect theory, perceived gains and losses are evaluated asymmetrically, with potential losses' being given more weight than are potential gains.<sup>44</sup> If public policies are framed in this way, entrepreneurial managers with

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41 Gigerenzer (2008); Gary and Wood (2011); Kahneman (2011).

42 Dutton and Jackson (1987).

43 Chattopadhyay, Glick, and Huber (2001).

perceptions of low control over the business environment are likely to be predisposed to encourage the development of public policies that are in their interest despite the risks.<sup>45</sup> The findings of Rudy and Johnson (2013) are largely consistent with this type of argument.

Additionally, research could explore the relationships between entrepreneurial managers' appraisals of public policy and their attention to the public policy domain. Cognitive shortcuts tend to be invoked unconsciously, but they can produce conclusions that approximate informed judgments.<sup>46</sup> Accurate assessments are less likely, however, if entrepreneurial managers systematically ignore the relevant information.<sup>47</sup> Investigations of the relationships between policy appraisals and attention to the policy domain could reveal when managers' decisions regarding aligning their business strategies with public policy are informed by accurate judgments.<sup>48</sup> If entrepreneurial managers keep abreast of developments in the public policy domain primarily when they perceive public policies to be desirable, they are likely to be biased toward information that confirms their positive expectations. If these managers ignore the policy domain when they perceive public policies to be undesirable, they are likely to systematically neglect opportunities to align their strategies to these policies.

In conclusion, we believe that the relationships between entrepreneurial managers' perceptions of public policy and business engagement with public policies deserve additional study, as the social and economic value of aligning policy makers with emerging businesses appears to be high.<sup>49</sup> However, the paths through which managers' perceptions affect their businesses' actions are complex.<sup>50</sup> Additional research is needed to extend what we know about when entrepreneurial businesses align their strategies with regulatory policies, how managerial perceptions influence the degree of alignment, and when such alignment ultimately furthers the goals of both the businesses and the policy makers.

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44 Kahneman, Slovic, and Tversky, (1982); Plambeck and Weber (2010).

45 Chattopadhyay, Glick, and Huber (2001).

46 Gigerenzer (2008); Kahneman (2011).

47 Daft, Sormunen, and Parks (1988); Sutcliffe (1994).

48 Crilly and Sloan (2012); Ocasio (1997).

49 Mahoney, McGahan, and Pitelis (2009); Oliver and Holzinger (2008).

50 Chattopadhyay, Glick, and Huber (2001); Daft, Sormunen, and Parks (1988); Plambeck and Weber (2010); Thomas, Clark, and Gioia (1993).

# Appendix A: Survey items

## The First Survey

### Independent and dependent variables

#### Control of the Business Environment

*To what extent is your firm able to influence the decisions and behavior of each of the following? {1=minimal influence; 4=moderate influence; 7=tremendous influence}*

1. Competitors
2. Suppliers
3. Distributors
4. Research institutes/consortia
5. Trade/professional associations

#### Customer control

*To what extent is your firm able to influence the decisions and behavior of the following? {1=minimal influence; 4=moderate influence; 7=tremendous influence}*

1. Customers

#### Policy desirability

*To what extent do you think each of the following policy types could facilitate the growth of your business in energy efficiency products/services and/or renewable fuels? {1=not at all; 4=to a moderate degree; 7=to a great extent}*

1. Subsidies (e.g., customer rebates, business tax credits, research grants).
2. Taxes (e.g., on energy inefficiency/waste or fuel taxes).
3. Provision of a public good (such as education, dissemination of information, raising awareness).
4. Regulation (e.g., energy efficiency standards, product performance standards, certification).

## Control variables

### EERE emphasis

*How strongly do you agree or disagree with the following statements? {1=very strongly disagree; 4=neither agree nor disagree; 7=very strongly agree}*

1. We differentiate our products/services from those of our competitors on the basis of energy efficiency.
2. Energy efficiency is an important feature of our major products and/or services.

### Government dependence

*To what extent do these groups have the ability to influence your firm either directly (through specific demands or requests) or indirectly (as when internal decisions are constrained by your knowledge of these group's preferences or goals)? {1=minimal influence; 4=moderate influence; 7=tremendous influence}*

1. Federal government
2. State and local government

### Business performance

*Compared to the other firms in your principal industry, over the past two years, the... {1=very low; 4=average; 7=very high}*

1. after tax return on your firm's total assets was
2. overall performance and success of you firm was
3. sales volume for your firm was
4. cash flow in your firm was
5. market share for your firm was

### Munificence

*How accurate are the following statements? {1=not very accurate; 4=somewhat accurate; 7=very accurate}*

1. Demand for the products/services of your principal industry has been growing and will continue to grow.
2. The investment or marketing opportunities for firms in your principal industries are very favorable at the present time.

3. The opportunities for firms in your principal industry to expand the scope of their existing products/markets is extremely limited.
4. In your industry, sales have been growing and are likely to grow.
5. The total value of assets for firms within your industry have been declining and will continue to decline.
6. Capital expenditures in your firm's principal industry have been growing and will continue to grow.

### **Instability**

*How strongly do you agree with each of the following statements? {1=very strongly disagree; 4=neither agree nor disagree; 7=very strongly agree}*

1. Customer demand and preferences are relatively stable in your industry.
2. Your firm must frequently change the way it produces goods or services in order to be competitive.
3. The total value of assets for the firms in your industry varies a lot from year to year.
4. The actions of your major suppliers (including materials, equipment, or labor suppliers) change little from one year to the next.
5. Public/political attitudes toward your industry and its products/services are relatively stable.
6. The volume of sales for firms in your industry fluctuates very little from year to year.
7. Your firm frequently changes its technology to keep up with competitors.

### **Influence government**

*To what extent is your firm able to influence the decisions and behavior of each of the following? {1=minimal influence; 4=moderate influence; 7=tremendous influence}*

1. Federal government
2. State and local government

*How accurate are the following statements? {1=not very accurate; 4=somewhat accurate; 7=very accurate}*

3. By collaborating with other firms within our industry, we can have a great deal of influence over the development of public policy related to energy efficiency.
4. By collaborating with other firms from other industries, we can have a great deal of influence over the development of public policy related to energy efficiency.

### **Predict government**

*To what extent are you able to predict the decisions and behavior of each of the following? {1=never predict; 4=sometimes predict; 7=always predict}*

1. Federal government
2. State and local government

### **Predict market**

*To what extent are you able to predict the decisions and behavior of each of the following? {1=never predict; 4=sometimes predict; 7=always predict}*

1. Competitors
2. Suppliers
3. Distributors
4. Customers
5. Research institutes/consortia
6. Trade/professional associations

## **The Second Survey**

### **Independent and dependent variables**

#### **Control of the business environment**

*To what extent is your business able to influence each of the following groups, either directly or indirectly {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}*

1. Suppliers
2. Distributors
3. Wholesalers
4. Retailers

#### **Customer control**

*To what extent is your business able to influence each of the following groups, either directly or indirectly {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}*

1. Customers



## Policy desirability

*How beneficial are following types of public policies to your business?*

{1=very harmful, 2=somewhat harmful, 3=neither harmful nor beneficial, 4=somewhat beneficial, 5=very beneficial}

1. Increasing the penalties to firms using energy inefficient products (e.g., through energy taxes).
2. Passing more rigorous codes and standards that discourage energy inefficient products and services.
3. Having the government provide consumer information (such as home energy rating programs and technical assistance to businesses).

*Government policies are valuable when they result in...*

{1=strongly disagree, 2=somewhat disagree, 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree}

1. Awareness by customers
2. Subsidies to renewable fuels
3. Regulations to encourage the use of more energy efficient products
4. Increasing energy costs directly with higher energy taxes

## Control variables

### EERE emphasis

*How strongly do you agree or disagree with the following statements? {1=strongly disagree, 2=somewhat disagree; 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree}*

1. We differentiate our products/services from those of our competitors on the basis of energy efficiency.
2. Energy efficiency is an important feature of our business' major products and/or services.

*Commitment to EERE business*

1. To what extent do you consider your business to be in an energy efficiency or renewable energy industry? {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}
2. To what extent is energy efficiency or renewable energy a major part of your business' long-term plan for growth? {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}

3. Do you believe that energy efficiency and renewable energy products and services are a growing, shrinking, or stable part of your business? {1=*shrinking*, 2=*shrinking slightly*, 3=*stable*, 4=*growing slightly*, 5=*growing*}
4. In the next 3 years, how likely is it that your business will remain in the business of energy efficient and renewable energy products and services? {1=*very unlikely*, 2=*somewhat unlikely*, 3=*neither likely nor unlikely*, 4=*somewhat likely*, 5=*very likely*}

#### *Best in EERE class*

{1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}

1. To what extent is your product or service the most energy efficient in its class?
2. To what extent is your product or service the most advanced renewable energy product or service of its type?

#### **Government dependence**

*How strongly do you agree or disagree with the following statements?* {1=strongly disagree, 2=somewhat disagree; 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree}

1. Our sales depend to a large extent upon government contracts or procurement policies.
2. The government is one of our largest customers.

*How strongly do you agree or disagree with the following statements?* {1=strongly disagree, 2=somewhat disagree; 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree}

1. Energy related policies significantly influence whether our business is able to compete with established products and services  
Our sales depend, to a large extent, on the following state or federal energy related policies:
  - a) ...utility sponsored energy efficiency programs (demand-side management)
  - b) ...federal and state tax benefits for renewable energy
  - c) ...federal, state, or local building and energy codes that affect energy use
  - d) ...federal appliance efficiency standards

#### **Business performance**

*Compared to the other businesses in your principal industry, over the past two years, the...* {1=very low; 2=somewhat low; 3=average; 4=somewhat high; 5=very high}

1. Overall performance and success of your business was (also ran with just this)
2. Sales volume for your business was
3. Cost of producing your business' products and services was (reverse code)
4. Cash flow in your business was
5. Market share for your business was

### **Munificence**

*How strongly do you agree or disagree with the following statements? {1=strongly disagree, 2=somewhat disagree; 3=neither agree nor disagree, 4=somewhat agree, 5=strongly agree}*

1. Demand for the products/services of your principal industry has been growing and will continue to grow.
2. The investment or marketing opportunities for firms in your principal industries are very favorable at the present time.
3. The opportunities for firms in your principal industry to expand the scope of their existing products/markets are extremely limited. (reverse coded)
4. Resources for growth and expansion are easily accessible in your industry
5. In your industry, sales have been growing and are likely to grow.
6. The total value of assets for firms within your industry has been declining and will continue to decline. (reverse coded)
7. Capital expenditures in your businesses' principal industry have been growing and will continue to grow.

### **Instability**

We used secondary data for this measure rather than a survey item. Specifically, we matched businesses to their closest 4 digit SIC (24 of our respondents provided one but we checked their business descriptions of all businesses in our sample to match them). We used the Annual Census data for these SICs to compute the co-variation of sales, assets, and net worth in their closest 4 digit SIC match. This is the standard deviation of reported sales, assets, net worth over the period 1995 – 1998, divided by the mean value for the same period. This measure corresponds to some of the items in the Instability survey scale.

### **Market growth**

Compared to other industries, we expect the growth of our industry in the next 5 years will be 1=very low, 2=somewhat low, 3=average, 4=somewhat high, 5=very high.

### Influence government

*To what extent is your business able to influence each of the following groups, either directly or indirectly {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}*

1. Federal government
2. Local government
3. State government

### Predict government

*To what extent are you able to predict the actions of each of the following? {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}*

1. Federal government
2. Local government
3. State government

### Predict market

*To what extent are you able to predict the actions of each of the following? {1=not at all, 2=to a limited extent, 3=to some extent, 4=to a considerable extent, 5=to a great extent}*

1. Customers
2. Suppliers
3. Distributors
4. Wholesalers
5. Retailers

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