

## Model, Methodology and Data

### 4.1 Introduction

Prior to the performance of the empirical analyses, the following chapter specifies the applied model and estimation method. To deduct the model specifications, the following section first elaborates on crucial model issues in the ownership performance literature. Especially the endogeneity discussion in Chapter 4.2.3, gives also justification of the estimation method used, the simultaneous equations methodology, which is explained in the Section 4.3. It gives an overview over the statistical method itself as well as over important aspects of its estimation.

After Chapter 4.2 and Chapter 4.3 yielded the model and its estimation methodology, the used data set is the final part to be introduced prior to the analyses. The section starts with the introduction of the used variables, followed by the explanation of the sample selection and a presentation of the descriptive statistics of the data set.

### 4.2 Model Specifications

#### 4.2.1 Linearity and Monotonousness

One bias always present in economic literature is the model specification error. In the ownership and performance literature there are several issues to be considered to minimize the potential model specification error and subsequent bias of results. This section elaborates on the treatment of different model specification issues in literature. Based on these discussions the models analyzed in this work are deducted.

This section states and compares different alternatives for the assumed shape of the analyzed relationship. Section 4.2.2 elaborates on the timing within the relation. Chapter 4.2.3 broaches the issue of endogeneity, simultaneousness and causation, justifying the appliance of simultaneous equation

models. Finally, the section closes with a summary of the chosen model specifications.

In the ownership literature a severe model specification error may lie in the assumed shape of the relationship. From the early studies in the 1960s until today many studies have supposed a linear effect.<sup>1</sup> This surprises considering that a multitude of studies result in a nonlinear and even non-monotonous relation of ownership and performance, with the first indication given by Monsen et al. [1968].<sup>2</sup> Furthermore, the variety of contradicting effects argues also for a potential nonlinear relation. However, given the contradicting empirical evidence the exact shape is still unclear.

A frequently modelled shape of the effect of managerial ownership is given by Mørck et al. [1988].<sup>3</sup> They use a piecewise regression with two turning points of 5% and 25%, cutting the function in three parts. Many studies copy this approach and find a significantly positive relation of ownership and performance in the first range from zero to 5%.<sup>4</sup> Other adjust the range size such as Chen et al. [1993] and Cho [1998], who use a range from zero to 7%. Nevertheless, they still find evidence for a positive effect. The second part of the function is also proven significant by the majority of studies indicating a negative relation.<sup>5</sup> Chen et al. [1993] also alters the second turning point to 12% and Cho [1998] to 38%. Yet, both find a negative relation for their definition of the second piece of the function. However, for the last range of the function ending at 100% none of the studies finds significant evidence for an effect.

Figure 4.1 shows that the result is a two parted function with a maximum potentially approximating a bell-shaped relation. If so, the results would concur with Stulz [1988]'s hypothesis, that assumes a parabolic relation.<sup>6</sup> Stulz ranges the shape from zero to 50%, since the probability of a takeover vanishes at an insider ownership of theoretically 50% or higher. This high threshold may be exaggerated, since already a smaller share might guarantee the control over a firm. This holds especially under the condition of other entrenchment

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<sup>1</sup> See Demsetz/Lehn [1985], Jacquemin/De Ghellinck [1980], Kamerschen [1968], Kamerschen/Paul [1971], Larner [1966], Leech/Leahy [1991], McEachern [1975], Mehran [1995], Murali/Welch [1989], Pedersen/Thomsen [1999], Radice [1971], Round [1976], Stano [1976], Steer/Cable [1978], and Thonet/Poensgen [1979].

<sup>2</sup> See Chen et al. [1993], Cho [1998], Cleary [2000], Cui/Mak [2002], Gugler et al. [2003b], Hermlin/Weisbach [1991], Holderness et al. [1999], Hubbard/Palia [1995], Kole [1996], McConnell/Servaes [1990, 1995], Monsen et al. [1968], Mørck et al. [1988], Short/Keasey [1999], Short et al. [2002a, 1994], Stulz [1988], Welch [2003], and Wruck [1989].

<sup>3</sup> For an explanation of the assumed combined effect see Chapter 3.4.1, p. 48.

<sup>4</sup> See Holderness et al. [1999], Hubbard/Palia [1995], Kole [1996], McConnell/Servaes [1990], Mørck et al. [1988], and Wruck [1989].

<sup>5</sup> See Hubbard/Palia [1995], Mørck et al. [1988], Wruck [1989] and Holderness et al. [1999] with their 1935 sample.

<sup>6</sup> For an explanation of the assumed combined effect see Chapter 3.4.1, p. 48