



Firm growth and efficiency in the banking industry: A new test of the efficient structure hypothesis [☆]

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ABSTRACT

In this paper we propose a new test of the *efficient structure (ES) hypothesis*, which predicts that efficient firms come out ahead in competition and grow as a result. Our test has significant advantages over existing ones, because it is more direct, and can jointly test the so-called *quiet-life hypothesis*, which predicts that in a concentrated market firms do not minimize costs. We then apply this test to large banks in Japan. Consistent with the ES hypothesis, we find that more efficient banks become larger. We also find that market concentration reduces banks' efficiency, which supports the quiet-life hypothesis. These findings imply that there is an intriguing growth–efficiency dynamic throughout banks' life cycle, although our findings also suggest that the ES hypothesis dominates the quiet-life hypothesis in terms of economic impact.

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1. Introduction

In this paper we propose a new test of the efficient structure hypothesis, and apply the test to large banks in Japan. As proposed by Demsetz (1973), the *efficient structure hypothesis* (hereafter the ES hypothesis) predicts that under the pressure of market competition, efficient firms defeat the competition and grow, so that they become larger, obtain greater market share, and earn

higher profits. Under this hypothesis, a market becomes more efficient as it becomes more concentrated, so anti-concentration measures cause unnecessary distortion in the economy. To test this hypothesis, empirical studies have examined the relation between proxies for firm efficiency and for market performance (see, for example, Weiss, 1974; Smirlock, 1985; Berger, 1995).

In contrast to this approach, the test we propose in this paper focuses on a core and more fundamental feature of the ES hypothesis; i.e., the idea that *efficient firms defeat the competition and grow*. The original hypothesis that Demsetz (1973) proposes is a composite hypothesis that predicts stages of causal relations from firm efficiency to firm growth, then to market structure, and finally to market performance. In each stage, however, the causality may or may not hold, and there might be alternative hypotheses that better explain the data. For example, although a small number of efficient firms might ultimately dominate the market, the market might become temporarily less concentrated if, for example, large inefficient firms lose market share. Thus, testing the reduced-form relation between efficiency and market performance is too rough to validate or invalidate the ES hypothesis as a whole.

Instead of testing the relation between firm efficiency and market performance, we propose to examine the causality from firm efficiency to firm growth, which is the key part of the ES hypothesis. To test this relation, we directly regress a measure of

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firm growth on a measure of firm efficiency. This is thus a more direct test of the ES hypothesis than existing tests, and this directness is one of the main contributions of this paper.

Although the efficiency–growth nexus is at the core of the ES hypothesis, our focus is necessarily limited in the sense that we do not examine the other parts of the hypothesis. However, our focus is wider than those in existing studies in another important respect. In our test, we propose also to take into account the determination of firm efficiency – the key independent variable in the growth regression – by simultaneously estimating an efficiency regression in which the efficiency measure is the dependent variable. The direct merit of this simultaneous estimation is an increase in the statistical efficiency of the estimation. However, it also allows us to test the so-called quiet-life hypothesis.

The *quiet-life hypothesis* suggests that in a concentrated market firms do not minimize costs because of insufficient managerial effort, lack of profit-maximizing behavior, wasteful expenditures to obtain and maintain monopoly power, and/or survival of inefficient managers (Berger and Hannan, 1998). To test this hypothesis, we use our efficiency regression to examine whether firms in a more concentrated market are more inefficient. Simultaneous estimation of the growth and the efficiency regressions also allows us to take into account the possibility that the effects of the ES and the quiet-life hypotheses might co-exist. Thus, our approach yields economic as well as econometric advantages. This is another main contribution of our paper.¹

Our contribution is not limited to the methodological side, however, because we actually apply our test to banks in Japan. From our empirical analysis, we find that more efficient banks have a higher likelihood of becoming larger. This finding supports the ES hypothesis. However, we also find that banks in more concentrated markets are more inefficient, which is consistent with the quiet-life hypothesis. On balance, our findings imply that efficiency allows firms to survive competition and to grow, but the resulting market concentration then erodes firm efficiency. This finding – that both the ES and the quiet-life hypotheses are both supported – is, to our knowledge, the first of its kind in the literature.

These findings raises another question: which effect is more dominant, the effect that efficient firms grow, or that the resulting concentration deteriorates firm efficiency? We find that the impact of the ES hypothesis dominates that of the quiet-life hypothesis. This implies that anti-concentration measures might increase inefficiency if they were applied to large banks in Japan.

The rest of the paper proceeds as follows. In the next section, we review related literature and explain our contribution. Section 3 explains our methodology. We apply the methodology to banks in Japan in Section 4. The final section concludes.

2. Literature

2.1. Empirical studies on the efficient structure hypothesis

Earlier studies consider the ES hypothesis as an alternative to the classical structure-conduct-performance (hereafter SCP) hypothesis. The SCP hypothesis predicts that a concentrated market engenders a low degree of competition, leading to market inefficiency, e.g., monopolistic pricing and excess (monopoly) profits. Similar to the ES hypothesis, the SCP hypothesis predicts a positive relation between concentration and profits, but the underlying mechanisms are completely different. Although the SCP hypothesis implies the need for anti-concentration measures, such measures are highly distortionary under the ES hypothesis.

Because the policy implications of these two hypotheses are contrary, earlier studies such as Weiss (1974) and Smirlock (1985) test the ES and the SCP hypotheses simultaneously by extending the traditional IO framework. The traditional framework examines the effect of market concentration (proxied by market Herfindahl, for example) on market performance (e.g., firm profit). To this framework, the earlier ES studies add market share as an additional independent variable, arguing that market share is a proxy for the relative efficiency of the firms. They then claim that the ES hypothesis is supported if the share has a positive effect on profit, but the SCP hypothesis is supported if market concentration has a positive effect.²

However, this approach suffers from serious drawbacks. First of all, it is unclear whether such findings indeed support the two hypotheses as the authors claim. Market shares, the squared sum of which is the Herfindahl index, also reflects market power of the firm, and so it might support the SCP hypothesis if market share has a positive impact on profit (Shepherd, 1986).³ Second, this approach suffers from an identification problem that is well-known for the classical test of the SCP hypothesis; i.e., we cannot identify a causal relationship by regressing a market performance variable on market structure variables (see e.g., Tirole, 1988, p.1–2). Third, although these studies implicitly assume that the ES and the SCP hypotheses are alternatives, they might be compatible, at least in the short-run. Finally, as explained in the Introduction, examining the relation between market structure and market performance is too rough a test of the ES hypothesis.

The test that we propose in this paper does not suffer from these drawbacks. We directly test the effect of firm efficiency on firm growth, the core relationship of the ES hypothesis. In this test, we explicitly take into account the endogeneity of the variables, and allow for mutual compatibility of the ES hypothesis and the quiet-life hypothesis (which is closely related to the SCP hypothesis).

To overcome some of the problems of the earlier studies, Berger and Hannan (1989) propose an alternative test, which investigates the price–concentration relationship. Berger and Hannan (1989) argue that although both the ES and the SCP hypothesis predict a positive relation between profits and market concentration, their implications are different with respect to the price–concentration nexus. The SCP hypothesis predicts that firms have more monopoly power in a concentrated market and set higher prices, while the ES hypothesis predicts that in a more concentrated market where efficient firms dominate, the market price is lower. Using data on US deposit markets, Berger and Hannan (1989) find a lower interest rate (i.e., a higher price) in a more concentrated market – a finding, they argue, which is consistent with the SCP hypothesis.

However, this test also suffers from serious drawbacks. First, the prediction of the ES hypothesis with respect to the price–concentration relationship is unclear. Although efficient firms might set a lower price in order to compete with their rivals, if superior competitive performance is unique to the efficient firms and unobtainable to others, efficient firms might set a *higher* price and enjoy more monopoly profits, at least in the short-run. Second, Berger

² More recent studies along these lines include Evanoff and Fortier (1988), who take into account entry barriers; Tregenna (2009), who uses panel data from the pre-crisis period in the US; Hsieh and Lee (2010), who allow the effect of market concentration to vary depending on the factors such as foreign or government bank ownership, law and regulation, corporate governance, economic development, and intra-industry competition; and Goddard et al. (*forthcoming*) the main focus of which is profit convergence.

³ Smirlock et al. (1984) disagree with the idea that market shares reflect market power, but this is mere speculation on their part. Smirlock (1985) additionally uses an interaction term between market concentration and market shares to separately identify the two hypotheses, but the reasoning behind this identification is again unclear.

¹ As explained below, our test has some other advantages over existing studies, e.g., a consideration for endogeneity.

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