sociological science

Competitive Exclusion versus Mimetic Isomorphism: An Identified Empirical Test

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Abstract: Why are organizations sometimes so similar, and in other cases so different? For decades this question has been central to research on organizations, and two leading theories have answered the question very differently. Neo-institutional theory points to the importance of mimetic isomorphism, where organizations imitate one another as they navigate decisions in the context of uncertainty over what is regarded as legitimate action. By contrast, ecological theory argues that competitive exclusion explains the differences we see around us, as organizations repel one another when they vie for the same resources. Decades of empirical work have tended to confirm one or the other prediction, with little acknowledgement of their opposition. Furthermore, much of the existing empirical work is limited to descriptive studies that make little or no attempt to empirically identify their findings, leaving the empirical record open to concerns over endogeneity. This article conducts an identified empirical test in a context where the two arguments make opposing predictions. In an analysis of auditor selection after the collapse of Arthur Andersen, we find evidence of competitive exclusion but no evidence of mimetic isomorphism. Implications for the continued progress of organization theory are discussed.

Keywords: mimetic isomorphism; competitive exclusion; neo-institutional theory; organizational ecology; competition; imitation

Sociological theories have long sought to explain why organizations are sometimes very similar and sometimes very different. Early theories emphasized the technical and rational forces that shape organizations, especially as they coordinate and control human behavior at large scale (Simon 1945; March and Simon 1958; Chandler 1962). Accordingly, similarities and differences among organizations were thought to be contingent on the tasks they carried out (Thompson 1967) or on the social and economic contexts giving rise to organizations (Stinchcombe 1965). More modern theories departed from these traditions by focusing instead on the interdependencies among organizations, where similarities and differences emerge as organizations transact with, compete against, and imitate one another (White 1981; Hannan and Freeman 1977; Meyer and Rowan 1977; DiMaggio and Powell 1983).

Of theories emphasizing interdependence among organizations, two leading schools of thought are notable for making opposite predictions when it comes to the question of similarities and differences. Neo-institutional theory has emphasized the importance of so-called "mimetic isomorphism," where organizations imitate one another in an effort to conform to rationalized expectations of what is thought to be legitimate behavior (Meyer and Rowan 1977; DiMaggio and Powell 1983). By contrast, ecological theory has emphasized the importance of competition, where organizations diverge through a process of "competitive exclusion" (Hannan and

Freeman 1990). The contrast between these theories is illustrated by comparing the initial questions asked in the founding articles of each, with ecological theory seeking to explain why organizations are so different and neo-institutional theory seeking to explain why they are so similar.

Decades of research within each school of thought have tended to support each of these distinct theoretical orientations. Studies published within the tradition of neo-institutional theory have tended to show results consistent with mimetic isomorphism, where organizations behave similarly to other organizations (Scott 2008). Meanwhile, studies published within the tradition of organizational ecology have typically shown evidence of competition, where organizations drive each other out by competing—at least after an initial period of legitimation (Carroll and Hannan 2000). By and large, researchers have been content to report results consistent with either school of thought, so that each has developed in parallel. Little to no effort has been made to conduct critical tests, where the theories are pitted against one another. Neither has research addressed the possibility that tests of these theories may be affected by endogeneity.

In this article, we design a critical test of the two theories in a context where organizational action is triggered by an event that was not foreseeable at the time: the unexpected and sudden demise of the auditing firm Arthur Andersen in the Enron scandal of 2001. Each of these theoretical perspectives makes a different, opposing prediction about the ensuing behavior of organizations in the wake of this event. Before laying out our empirical strategy, however, we review the essential arguments made by each of these theories regarding imitation and competition.

Imitation versus Competition

We begin by briefly stating the essential elements of both the argument for mimetic isomorphism and the argument for competitive exclusion and by observing some important shortcomings in the empirical evidence offered to date for each. Our purpose is not to delineate neat boundary conditions in a theoretical reconciliation nor to fully catalogue the literature. Instead, our purpose is to focus on the arguments made by each theory that motivate their opposing predictions regarding imitation and competition.

Mimetic Isomorphism

Beginning with mimetic isomorphism, we turn to the question "Why are organizations so similar?" Neo-institutional theories address this question by beginning with the idea that organizations seek to conform to taken-for-granted, rationalized expectations. Rather than emphasizing rational causes of organizational behavior, expectations about what is seen to be rational—so-called "rationalized myths"— guide organizational action (Meyer and Rowan 1977). When conforming to expectations, organizations often imitate one another. Collectively, we therefore see increasing similarities among organizations not so much because these similarities have rational causes but rather because of "mimetic isomorphism" among organiza-

tions seeking to behave in ways consistent with prevailing views of what is rational (DiMaggio and Powell 1983).

For decades, researchers finding evidence consistent with imitation among organizations have pointed to neo-institutional theory for an explanation. Although the details of empirical specifications vary, the general approach has been to note co-occurrences of similar behaviors among organizations and then interpret this result as evidence of imitation. For instance, Haveman (1993) interprets movement by savings and loan companies into new financial product markets when other, similar organizations have done so as evidence of mimetic isomorphism. Particularly relevant here, Han (1994), studying auditor selection by client firms, defines imitation as occurring whenever two peer firms choose the same auditor and then finds evidence of imitation so defined except among leading firms. Lounsbury (2001) finds that schools are increasingly likely to adopt recycling programs the more that socially similar schools have done so and interprets this as evidence of mimetic behavior. Looking at security analysts, Rao, Greve, and Davis (2001) find that analysts are more likely to cover a security when other analysts have recently chosen to cover it, which they interpret as evidence of "social proof" operating in the process of imitation. Looking at adoptions of board reform practices by Canadian firms, Shipilov, Greve, and Rowley (2010) find that adoptions of practices are positively affected by prior adoptions among interlocked firms, and they interpret this result as evidence of imitation. Okhmatovskiy and David (2012) find that Russian firms are more likely to adopt internal corporate governance codes if they are in industries where there are a higher proportion of firms that have adopted such codes, and they interpret this effect as evidence of imitation. We could go on, but as this partial list illustrates, the literature is replete with studies that find behaviors co-occurring among organizations and then interpret this finding as evidence that organizations imitate one another.

Of course, not all co-occurring behaviors are due to imitation. This point is well established in the large literature on the diffusion of practices among organizations. In this literature, models of the timing of adoption behaviors typically make a distinction between co-occurrences that are due to simultaneous exposure to exogenous information versus those that are due to imitation (or "contagion"). This distinction goes by different names, such as "broadcast" versus "contact dependent" diffusion (Bartholomew 1982) or "exogenous" versus "endogenous" diffusion (Rossman 2014). Yet even as it has made this distinction, much of the diffusion literature has focused on co-occurring behaviors that appear to result from imitation (Strang and Soule 1998).

An important qualifier appearing in this research is that mimetic isomorphism is more likely among organizations that are more similar to one another. The specific nature of this similarity is not well established in the literature, leading to somewhat arbitrary and often very different operationalizations of similarity from study to study. In many instances, the basis of similarity for purposes of mimicry is claimed to be the same as the basis of competition, so that firms are predicted to imitate precisely those firms with which they are competing. For instance, Henisz, Zelner, and Guillén (2005) find some evidence that market-oriented reforms in certain industries by national governments are more likely when similar countries

have already adopted such reforms and then interpret this result as "competitive mimicry." That theories of competition predict the very opposite of imitation, however, is rarely if ever discussed. In this regard, the study by Still and Strang (2009) stands out, in that they look into the process through which imitation takes place in a particular organization, a large financial services firm using "benchmarking teams" to inform the organization of the practices of other firms. Interestingly, by taking this approach, they detect evidence of competitive "differentiation," where competing organizations tended not to be chosen for benchmarking.

With a large and diverse set of studies interpreting behavioral co-occurrences as evidence of imitation, the idea that organizations imitate one another has taken on a fact-like quality in much of the literature. Indeed, the institutionalization of mimetic isomorphism was noted even 20+ years ago by Mizruchi and Fein (1999). They review the uses of DiMaggio and Powell's neo-institutional theory in American organization theory articles and find a tendency for studies to interpret findings of co-occurring behaviors among organizations as evidence of imitation (rather than of the operation of shared professional norms or of coercive processes). They interpret this tendency as evidence that American academics prefer to avoid explanations that involve power and coercion. But even so, these authors also largely accept that findings of co-occurring behavior are supportive of the theory of mimetic isomorphism.

Yet clearly we should be skeptical when co-occurrences are seen as evidence of a causal process of imitation. The obvious alternative is that some other, exogenous factor is operating that has been left out of the model and that is producing co-occurring behaviors among organizations. Because these exogenous factors are especially likely to exist as similarity increases among organizations, the typical pattern found in the empirical literature on mimetic isomorphism should be treated as possibly spurious. Take, for example, Jensen's (2006) study—looking at precisely the phenomenon that we will study in this article. Jensen analyzes companies choosing to stop retaining the accounting firm Arthur Andersen after it was tainted by the Enron scandal. He finds a positive statistical association between the likelihood that an organization would drop Arthur Andersen and the incidence of other firms having done so. Jensen interprets this association as evidence of mimetic isomorphism, arguing that organizations suffered from "status anxiety" and therefore imitated one another in choosing to drop Arthur Andersen after it was tainted by scandal.

Yet the demise of Andersen left its clients with little choice but to abandon ship; the once-proud consulting firm was itself facing demise. Under these conditions, the positive association among organizations leaving Andersen arguably suffers from endogeneity. That is, the demise of Andersen was likely to have caused the leaving events to co-occur, rather than those leaving events causing one another to co-occur. But to be fair, Jensen's (2006) empirical approach has been the norm. Observed positive associations between similar events among similar organizations have long been seen as evidence of mimetic isomorphism. To be convincing, a test of mimetic isomorphism needs to offer evidence that takes endogeneity into account.

Competitive Exclusion

Meanwhile, research in organizational ecology has developed apace, emphasizing competitive interdependence among organizations as they contend for scarce resources. According to ecological theory, organizations vie for resources, and as a consequence they drive one another away through the process of "competitive exclusion" (Hannan and Freeman 1990; McPherson 1983). With the exception of the early period of an industry's formation, when increases in numbers are thought to increase the legitimacy of the form, organizations are expected to demonstrate negative interdependence indicative of competition. Decades of research in organizational ecology document situations where the existence of some organizations is associated with the departure of other, similar organizations—and this has been interpreted as evidence of competitive exclusion (Carroll and Hannan 2000).

Note that a further refinement of competition theory is needed to make it comparable to theories of mimetic isomorphism. Ecological competition can be either indirect—so-called "diffuse" competition—or it can be "direct" between particular, identifiable pairs of rivals (Hannan and Freeman 1990). Diffuse competition results as general scarcity increases with increases in numbers, collectively experienced by organizations in a niche. Direct competition, by contrast, involves specific, identifiable rivals that vie for the same resources. Competitive exclusion then occurs because one organization drives the other out or because one or both of the organizations choose to avoid competing. For instance, organizations that encounter direct competitors in multiple markets have been found to forbear from competing, especially among large organizations (Barnett 1993). In such instances, competitive exclusion results from the explicit decisions of rival organizations to avoid one another. Evidence showing competitive exclusion among direct competitors supports ecological theory and stands in direct contradiction to the imitative behavior predicted by neo-institutional theory.

Yet the theory of competitive exclusion in organizational ecology research has by and large been supported by observational research that has typically not attended to concerns over endogeneity. Empirical evidence of competition has come from estimates of the so-called "density dependent" model, where the existence of other organizations corresponds to the departure (or reduced viability) of a given, focal organization. In this model, other effects on organizational viability are assumed to be completely controlled for in the "carrying capacity," a term normally specified as a function of observable environmental characteristics. Beyond these controls, the possibility that organizations could be attracted to or repelled from a given market for other, endogenous, reasons has typically not been considered in the empirical tests.

Our aim here is to look for evidence of mimetic isomorphism and of competitive exclusion in an empirical test designed to alleviate concerns over endogeneity. In the early 2000s, the auditing firm Arthur Andersen found itself involved in a scandal so serious it would cease to exist as an auditing firm. Once the scandal was public, its client companies needed to choose a new auditor. Neo-institutional theory would predict imitative behavior in this situation, where organizations would flock to the same new auditor as their rivals. In contrast, ecological theory would predict

competitive exclusion, where rival organizations would avoid sharing the same auditor.

Asymmetries in Mimesis and Competition

Thus far we have discussed mimetic isomorphism and competitive exclusion as if all organizations contribute homogeneously to both processes and as if all organizations experience both processes similarly. Yet both theories allow for asymmetries in both cause and effect. Large, dominant organizations are seen to have a greater influence in shaping shared conceptions of behaviors that should be emulated, whereas small organizations are typically seen as suffering from status insecurity, making them more vulnerable to social pressures toward mimesis (DiMaggio and Powell 1983).

Meanwhile, theories of competition typically also allow for asymmetries, especially with regard to size. Here the predictions are more complex. Many theories assert that larger organizations are likely to be stronger competitors, owing to their considerable resources and to their political power. At the same time, however, large organizations are more vulnerable should strong competition ensue, because they have more to lose in a fight. For this reason, larger organizations are presumed to be more inclined toward avoiding competition through mutual forbearance (Barnett 1993). With regard to choosing auditors, the context we study, large organizations have the most to lose from using the same auditor as their small rivals, because by using the same auditor organizations may have a chance to gain access to similar information. For these reasons, we will allow for size-based asymmetries in our empirical tests.

Institutional Background

We delineate the Enron scandal and the collapse of Arthur Andersen based on the details provided in Benston and Hartgraves (2002), Chaney and Philipich (2002), Healy and Palepu (2003), and Jensen (2006). Founded in 1913 in Chicago and employing 85,000 people, Arthur Andersen LLP was one of the five largest accounting firms worldwide before the revelation of the Enron scandal. For 2001, Andersen reported total revenues of $9.3 billion. Andersen's first audit engagement with Enron dated back to 1985, when Enron was established through the merger of Houston Natural Gas and InterNorth. Both Enron's domestic and international businesses, as well as its reported financial performance, grew dramatically in the 1990s, impressing the market and boosting its stock price. By 2001, Enron had become one of Andersen's largest clients, and the services it received from Andersen had extended from audit to tax and other nonaudit consulting.

On October 16, 2001, Enron unexpectedly reported a nonrecurring loss of $1.01 billion after tax along with its $393 million earnings for the quarter, triggering a free fall of its stock price. The Securities and Exchange Commission started looking into Enron's affairs the next day and opened inquiries formally on October 22. On November 8, Enron further restated its financial statements for 1997 through 2000 and the first three quarters of 2001 to reflect the consolidation of entities that

were kept off the books and adjustments that were omitted previously, reducing its previously reported earnings for 1997 to 2000 by $591 million and increasing debt for 2000 by $658 million. On December 2, Enron filed for bankruptcy in New York.

Andersen's independence as Enron's external auditor was questioned after Enron's report of huge losses. As Andersen's CEO Joseph Berardino testified before Congress on December 12, Andersen received $47.5 million fees from Enron in its last fiscal year. Of this amount, $34.2 million were for auditing and tax-related work, and the remaining $13.3 million were for other services. On January 11, Andersen admitted to the Securities and Exchange Commission and the Department of Justice that its personnel involved with Enron's audit engagement had disposed of documents relating to Enron's audit. On March 14, 2002, Andersen was indicted for obstruction of justice. A federal jury convicted Andersen of a single count of obstruction of justice on June 15, 2002.[1] It was later announced that Andersen was barred from auditing public companies after August 2002.

As Jensen (2006) reports, Andersen's clients started to leave it for new auditors after Enron's announcement of its third-quarter earnings, and the majority of Andersen's clients switched to new auditors after it was indicted in March and before the final conviction in June. Barton (2005) indicates that in 2001, 76 percent of public companies were audited by the Big 5 accounting firms, representing 96 percent of public company sales. He also reports that 88 percent of Andersen's clients that dismissed Andersen switched to another Big 5 auditor (then known as the "Big 4" auditors): Deloitte, PricewaterhouseCoopers, Ernst & Young, or KPMG.

Research Design

Our identification strategy takes advantage of this sudden and unexpected collapse of Enron and Arthur Andersen. Normally firms dismiss incumbent auditors for various reasons, such as when they determine that an auditor is not diligent or lacks necessary expertise or because they are seeking a more favorable opinion. Because the true intention of management is often unobservable, studies that rely on simple associations between variables of interest and firms' auditor choices could suffer from bias because of such omitted factors. The fall of Andersen, in contrast, was an exogenous shock to Arthur Andersen's clients (referred to here as "ACs") and thereby helps to mitigate concerns over endogeneity.

The audit market is a relevant setting for our research question. From the perspective of neo-institutional theory, choice of auditor is both public and carries with it important status implications (Jensen 2006). Mimetic behavior by organizations is expected precisely in such a situation. But auditor choice is also likely to trigger competitive concerns, where ecological theory would predict competitive exclusion. During an engagement, auditors can have access to information that is critical to the competitive position of their clients, such as information about the clients' major customers, future investments, research and development progress, and the compensation of key personnel. Leaking such information can impair their clients' competitive advantage. Serving both a client and its competitors increases the chances for an auditor to leak the client's critical information, even though different audit partners may work with different competitors. Additionally, it is not rare that

an individual auditor would work for his or her former clients after leaving the accounting firm, which is another channel for information leakage.

We assume companies that dismissed Arthur Andersen between October 15, 2001 (the day before Enron announced its third-quarter loss) and August 31, 2002 (when Andersen ceased audit work) did so because of anticipation of the fall of Andersen. In the vast majority of cases, this meant moving to one of the four other big accounting firms. We then examine whether ACs, in choosing a new auditor upon leaving Andersen, avoided auditors employed by their rivals or whether instead they were more likely to move toward the auditors of their rivals.

We use McFadden's alternative-specific conditional logit model to examine ACs' auditor choices, in which each Big 4 auditor is treated as a response category and the independence of irrelevant alternatives (IIA) assumption is imposed. In our research setting, IIA assumes that an AC's relative preference among two auditors is not affected by inclusion or exclusion of other auditors. In the audit market, the Big 4 and the non–Big 4 auditors are considered to be in two different strata and are not equal substitutes for each other. Big 4 auditors usually serve larger clients and are regarded as more conservative by the market (Teoh and Wong 1993; Lawrence, Minutt-Meza, and Zhang 2011). As indicated in Barton (2005), most ACs moved to a Big 4 auditor after the fall of Andersen, reflecting the ACs' demand for high-quality assurance service. As such, to satisfy the IIA assumption without generality, we only focus on ACs that switched to another Big 4 auditor. The regression model is specified as follows:

$$Prob\left(\sum_{j \in J} y_{ij} = 1, \ X_{ij}, \ D_i\right) = \frac{(\beta X_{ij} + \gamma D_i)}{\sum_{j \in J} (\beta X_{ij} + \gamma D_i)} \qquad (1)$$

The dependent variable *Auditor choice of ACs* (y_{ij}) is a binary variable that equals one if AC_i chooses auditor j ($j = 1, 2, 3, 4$, representing each of the Big 4 auditors) and zero otherwise. The independent variables consist of two parts: auditor-specific variables X_{ij} and AC-specific D_i.[2] Our independent variables of theoretical interest are auditor-specific binary variables indicating whether an auditor audited an AC's rivals (included in X_{ij}). Specifically, *Auditor of AC's larger (smaller) rivals* is a binary variable equal to one if an auditor audited at least one of an AC's larger (smaller) rivals in 2000 and zero otherwise. *Auditor of AC's rivals* is a binary variable equal to one if an auditor audited at least one of an AC's rivals (i.e., either larger or smaller rivals) in 2000 and zero otherwise. To define rivals, we first rank firms in the same industry by assets and then define larger (smaller) rivals of a firm as the three adjacent firms with more (fewer) assets. If a Big 4 auditor audited any of the three firms in 2000, it is considered an auditor of the firm's larger (smaller) rivals.

Control variables include both auditor-specific and AC-specific variables. The auditor-specific control variable is auditor's market share in a corresponding AC's industry, which is defined as the total assets of all firms audited by an auditor in an industry (defined by three-digit Standard Industrial Classification codes) divided by the total assets of all firms in the industry. At the AC level, we control for certain firm characteristics: AC's assets (*Assets*), the growth rate of assets (*Growth*), return on assets (*ROA*), leverage (*Leverage*), and a binary variable indicating whether an AC had a loss in the previous year (*Loss*).

Table 1: Sample selection: Main analysis

Panel A. Sample selection criteria	Number of firms	%
Firms with nonmissing assets on Compustat in 2000	11,169	
Less:		
Firms without auditor information on Compustat or Audit Analytics databases	737	
Firms with assets less than 1% of the total assets of all firms in the same industry	4,974	
Firms in industries with fewer than 10 firms	528	
Firms without a match on Audit Analytics database	1,295	
Firms that were not Andersen's clients	2,969	
Firms without necessary financial information	93	
Firms that switched to a non–Big 4 auditor	46	
Firms included in the final sample	527	
Total observations in the final sample are 2,108.		
Panel B. Successive auditors		
PricewaterhouseCoopers	86	16.32%
Ernst & Young	164	31.12%
Deloitte	140	26.57%
KPMG	137	26.00%
Total	527	100%

Main Analysis

Sample

We obtain firm information from the Compustat database and auditor dismissal data from the Audit Analytics database.[3] We start with all the firms in the Compustat data file in 2000. To better capture competitive relations among firms that would be identifiable to one another, we then exclude firms with assets less than one percent of the total assets of all firms in the same industry.[4] We also exclude industries with fewer than 10 firms to prevent these sparse observations from carrying undue weight. Because there are significant differences between firms choosing Big 4 and non–Big 4 auditors, and the vast majority of firms in our sample chose Big 4 auditors, we further restrict our sample to firms that chose Big 4 auditors. We then select all the firms that switched from Arthur Andersen to the Big 4 auditors between October 15, 2001, and August 31, 2002, and could be matched to the Compustat sample we constructed, which results in a sample of 527 firms. To apply McFadden's choice model, we generate four observations for each firm, each corresponding to a different Big 4 auditor. The final sample includes 2,108 AC–auditor pairs. Detailed statistics describing the sample selection process are reported in Table 1. Definitions of all variables are reported in Appendix A of the online supplement.

    Panel B of Table 1 shows the distribution of the ACs' successive auditors. About one-third of ACs in our sample switched to Ernst & Young, and both Deloitte and KPMG took about one-fourth of sampled ACs. Only 16.32 percent of sampled ACs chose PricewaterhouseCoopers.

Table 2: Summary statistics and correlations: Main analysis

Panel A. Summary statistics

	Obs.	Mean	SD	P25	Median	P75
Auditor choice of AC	2,108	0.250	0.433	0.000	0.000	0.500
Auditor of AC's larger rivals	2,108	0.434	0.496	0.000	0.000	1.000
Auditor of AC's smaller rivals	2,108	0.420	0.494	0.000	0.000	1.000
Auditor of AC's rivals	2,108	0.660	0.474	0.000	1.000	1.000
Expertise	2,108	0.181	0.117	0.090	0.168	0.262
Assets	2,108	6.615	1.662	5.478	6.449	7.723
Growth	2,108	0.407	1.307	−0.019	0.083	0.263
ROA	2,108	0.012	0.122	−0.001	0.031	0.072
Leverage	2,108	0.309	0.234	0.109	0.296	0.467
Loss	2,108	0.256	0.437	0.000	0.000	1.000

Note: Obs., number of observations; SD, standard deviation; P25, 25th percentile; P75, 75th percentile.

Panel B. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Auditor choice of AC		−0.008	−0.036	0.005	0.030	0.000	0.000	0.000	0.000	0.000
		0.70	*0.10*	*0.81*	*0.16*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
(2) Auditor of AC's larger rivals	−0.008		0.048	0.629	0.358	−0.079	0.016	−0.013	−0.019	0.026
	0.70		*0.03*	*0.00*	*0.00*	*0.00*	*0.48*	*0.55*	*0.38*	*0.24*
(3) Auditor of AC's smaller rivals	−0.036	0.048		0.611	0.269	0.062	−0.012	0.023	−0.006	−0.002
	0.10	*0.03*		*0.00*	*0.00*	*0.01*	*0.60*	*0.29*	*0.79*	*0.94*
(4) Auditor of AC's rivals	0.005	0.629	0.611		0.390	−0.028	−0.022	0.007	−0.004	0.018
	0.81	*0.00*	*0.00*		*0.00*	*0.19*	*0.32*	*0.75*	*0.85*	*0.42*
(5) Auditors' expertise	0.023	0.344	0.266	0.372		−0.004	0.027	0.005	−0.018	−0.009
	0.30	*0.00*	*0.00*	*0.00*		*0.86*	*0.22*	*0.81*	*0.42*	*0.68*
(6) Assets	0.000	−0.077	0.066	−0.028	−0.019		0.081	−0.040	0.296	−0.120
	1.00	*0.00*	*0.00*	*0.20*	*0.38*		*0.00*	*0.07*	*0.00*	*0.00*
(7) Growth	0.000	0.029	−0.017	−0.006	0.020	0.007		0.203	−0.245	−0.158
	1.00	*0.18*	*0.42*	*0.78*	*0.37*	*0.75*		*0.00*	*0.00*	*0.00*
(8) ROA	0.000	−0.023	0.034	0.011	0.003	0.132	−0.222		−0.318	−0.756
	1.00	*0.29*	*0.12*	*0.62*	*0.91*	*0.00*	*0.00*		*0.00*	*0.00*
(9) Leverage	0.000	−0.014	−0.003	0.004	−0.015	0.224	−0.187	−0.167		0.144
	1.00	*0.53*	*0.90*	*0.89*	*0.48*	*0.00*	*0.00*	*0.00*		*0.00*
(10) Loss	0.000	0.026	−0.002	0.018	−0.003	−0.119	0.201	−0.699	0.174	
	1.00	*0.24*	*0.94*	*0.42*	*0.90*	*0.00*	*0.00*	*0.00*	*0.00*	

Table 2 reports the summary statistics and correlations between variables. Definitions of all variables are presented in Appendix A of the online supplement. As indicated in Panel A of Table 2, auditors in 43.4 percent (42.0 percent) of the AC–auditor pairs had clients that were the paired ACs' larger (smaller) rivals, and auditors in 66.0 percent of the AC–auditor pairs audited the paired ACs' larger or smaller rivals in 2000, suggesting some auditors audited both the larger and smaller rivals of ACs. Panel B of Table 2 reports the correlations. Pearson's (Spearman's rank) correlations appear in the lower (upper) triangle. The italicized *p* values are reported below the correlations. Both *Auditor of AC's larger rivals* and *Auditor of AC's smaller rivals* are negatively correlated with ACs' auditor choice, but only the correlation coefficient for *Auditor of AC's smaller rivals* is significant. Firm characteristics are generally not associated with ACs' auditor choice.

Results: Auditor Choice by Andersen's Former Client Firms

The estimation results are presented in Table 3. Panels A, B, and C report the regression results with the key independent variable being *Auditor of AC's rivals*, *Auditor of AC's larger rivals*, and *Auditor of AC's smaller rivals*, respectively. The tests are two-tailed. Standard errors are reported in parentheses. We report both the estimated coefficients and odds ratios on the key independent variables and auditor expertise. Model 1 in each panel reports the results without controlling for firm characteristics, and Model 2 reports the results with firm characteristics controlled.

Consistent with the correlations reported in Panel B of Table 2, firm characteristics do not have a significant impact on how firms chose among Big 4 auditors, and in fact including more firm characteristic variables decreases the likelihood that the model passes the Wald test. The other estimated coefficients are quite similar with and without controlling for firm characteristics.

As reported in Panels A and B of Table 3, if a Big 4 auditor audited an AC's rivals or larger rivals, it was less likely to be chosen by the AC after the collapse of Andersen, but the negative associations are not significant. As Panel C shows, if a Big 4 auditor audited an AC's smaller rivals, the chance it was chosen as the AC's new auditor is significantly reduced (coefficient, -0.192; $p < 0.1$). The odds of it being chosen decreased by 17.5 percent (odds ratio, 0.825), which is significant in magnitude.

We also perform several additional tests: (1) including both *Auditor of AC's larger rivals* and *Auditor of AC's smaller rivals*, (2) including both *Auditor of AC's larger rivals* and *Auditor of AC's smaller rivals* and an indicator variable for whether a Big 4 auditor audited the leaders of a corresponding AC's industry (*Auditor of AC's industry leaders*), and (3) including both *Auditor of AC's smaller rivals* and *Auditor of AC's industry leaders*. The untabulated results show that only the coefficients on *Auditor of AC's smaller rivals* are significantly negative. Taken together, these results support the prediction that ACs avoided the auditors of their smaller rivals, consistent with the idea that larger firms were in an advantageous position and smaller firms would have benefited more from information leakage.

Subsequent Analysis

A small proportion of ACs chose the auditor of their smaller rivals after leaving Andersen, a fact worth investigating in greater detail. From the neo-institutional perspective, this behavior could be seen as evidence of mimetic isomorphism. By contrast, the ecological perspective would interpret the behavior as the first move in a crowding-out process. The theory of competitive exclusion predicts a dynamic of increasing differentiation, and this can happen either by avoiding contact with a rival or by allowing contact and then driving out the rival. In this instance, if a large AC had strong enough reasons to move to its rival's auditor, such as that auditor's expertise, it might do so and then pressure the auditor to drop the AC's rival. Should this outcome occur, then the exceptional cases of moving to the same auditor would not be evidence of imitation but rather would be evidence of the crowding-out process described by competitive exclusion.

Table 3: McFadden's choice models of post-shock auditor selection

	Model 1		Model 2	
	Coefficient	Odds ratio	Coefficient	Odds ratio
Panel A. All rivals				
Auditor of AC's rivals	−0.025	0.976	−0.027	0.973
	(0.112)	(0.109)	(0.113)	(0.110)
Expertise	1.066†	2.902†	0.991†	2.695†
	(0.447)	(1.297)	(0.452)	(1.217)
Observations	2,108		2,108	
Firm characteristics	No		Yes	
χ^2	6.221		15.26	
Degrees of freedom	2		17	
Probability $> \chi^2$	0.045		0.577	
Panel B. Larger rivals				
Auditor of AC's larger rivals	−0.078	0.925	−0.079	0.924
	(0.103)	(0.095)	(0.103)	(0.095)
Expertise	1.136†	3.114†	1.059†	2.883†
	(0.437)	(1.362)	(0.442)	(1.276)
Observations	2,108		2,108	
Firm characteristics	No		Yes	
χ^2	6.755		15.770	
Degrees of freedom	2		17	
Probability $> \chi^2$	0.034		0.540	
Panel C. Smaller rivals				
Auditor of AC's smaller rivals	−0.190*	0.827*	−0.192*	0.825*
	(0.102)	(0.0843)	(0.103)	(0.0847)
Expertise	1.236†	3.442†	1.157†	3.182†
	(0.429)	(1.476)	(0.434)	(1.381)
Observations	2,108		2,108	
Firm characteristics	No		Yes	
χ^2	9.650		18.620	
Degrees of freedom	2		17	
Probability $> \chi^2$	0.008		0.351	

Notes: This table reports the results from estimation of McFadden's choice model. Model 1 includes the indicator for whether an auditor had been the auditor of the AC's (larger or smaller) rivals and the auditor's expertise. Model 2 also includes the AC's financial characteristics, such as total assets, growth of total assets, return on assets, leverage, and a binary variable indicating whether it suffered a financial loss in the previous year. ∗ and † denote statistical significance at the 10 percent and five percent levels, respectively. † $p < 0.05$; ∗ $p < 0.10$.

To adjudicate these interpretations, we further investigate how firms reacted after a rival AC chose the same auditor. Specifically, we use logit models to test whether ACs tended to switch auditors after a rival AC moved to their auditors after the collapse of Andersen. In these models, we assume the probability that the existing clients of the Big 4 auditors switched to new auditors is determined by

Table 4: Sample selection: Subsequent analysis

Sample selection criteria	Number of firms
Firms on Compustat in 2002 with nonmissing assets	10,186
Less:	
Firms without auditor information	634
Firms not included in the sample used to rank firms in the main analysis	5,391
Firms choosing non–Big 4 auditors	321
Firms without necessary financial information	767
Final sample	3,073

their characteristics (Z_{it}) and ACs' choice of auditors (A_{it}). The regression model is specified as below.

$$Prob\left(Switch_{it+1} = 1\right) = \frac{e^{a+\lambda A_{it}+\delta Z_{it}}}{1 + e^{a+\lambda A_{it}+\delta Z_{it}}} \qquad (2)$$

The dependent variable ($Switch_{it+1}$) is the termination of auditor–client relationship, which is a binary variable equal to one if a firm switched to another auditor in 2003 and zero otherwise. The key independent variables (A_{it}) are binary variables that equal one if a firm (i.e., an existing client of the Big 4 auditors) was a (larger or smaller) rival of any AC that switched from Andersen to the firm's current auditor, and zero otherwise. Note that if an AC was a larger rival of an existing client of the new Big 4 auditor, then the existing client was a smaller rival of the AC. Therefore, we denote the independent variables as *Rival arrives* (*Smaller rival arrives* or *Larger rival arrives*). As for control variables (Z_{it}), in addition to variables controlled in the main analysis, we also included two more variables in the regressions. One is an indicator variable that equals one if a firm had an M&A in 2002 (*M&A*) and zero otherwise. The other one is an indicator variable that equals one if a firm received a clean audit opinion in 2002 and zero otherwise.

Results: The Termination of Existing Auditor–Client Relationship

Details of the sample selection process are reported in Table 4. We start with all firms on Compustat in 2002 with nonmissing assets. We then exclude firms without auditor information or that are not included in the sample we use to rank firms in the main analysis. Firms that chose non–Big 4 auditors or that lacked necessary financial information are also excluded from the sample. The final sample includes 3,073 firms. Summary statistics and correlations among all variables are presented in Table 5. As reported, about five percent of the firms switched to new auditors in 2003, and about seven percent (6.6 percent) of the firms witnessed auditors accepting their larger (smaller) rivals.

The estimation results are reported in Table 6. Model 1 reports the results of the regression with the key independent variable being *Rival arrives*. As the results show, if a firm's auditor accepted its rivals as clients, the firm was likely to switch to other auditors. Model 2 (Model 3) reports the results of the regression with the key independent variable being *Smaller rival arrives* (*Larger rival arrives*). As reported, the

Table 5: Summary statistics and correlations: Subsequent analysis

Panel A. Summary statistics

	Obs.	Mean	SD	P25	Median	P75
Switch	3,073	0.048	0.213	0.000	0.000	0.000
AC's larger rivals	3,073	0.070	0.255	0.000	0.000	0.000
AC's smaller rivals	3,073	0.066	0.248	0.000	0.000	0.000
AC's rivals	3,073	0.128	0.334	0.000	0.000	0.000
Expertise	3,073	0.258	0.114	0.175	0.246	0.324
Assets	3,073	6.856	1.901	5.477	6.712	8.055
Growth	3,073	0.052	0.290	−0.069	0.023	0.129
ROA	3,073	−0.035	0.223	−0.036	0.022	0.057
Loss	3,073	0.346	0.476	0.000	0.000	1.000
Leverage	3,073	0.279	0.231	0.081	0.253	0.414
M&A	3,073	0.177	0.381	0.000	0.000	0.000
Clean	3,073	0.437	0.496	0.000	0.000	1.000

Note: Obs., number of observations; SD, standard deviation; P25, 25th percentile; P75, 75th percentile.

coefficient on *Smaller rival arrives* is positive but not significant (coefficient, 0.359). The p value for the coefficient is 0.30 for two-sided tests. The coefficient on *Larger rival arrives* is positive and significant (coefficient, 0.477; $p < 0.1$). The results show that if a firm's auditor accepted its larger rivals, its odds of leaving the auditor increased by 61.1 percent, which is very significant in magnitude. This finding is consistent with the argument that when rival firms did share an auditor, smaller firms were pushed out by their larger rivals. More generally, the results support the theory of competitive exclusion.

Discussion and Conclusion

Do the patterns we see among organizations result from mimetic isomorphism or competitive exclusion? Our identified empirical test finds evidence that competitive exclusion operated among the organizations in our data, whereas it does not find evidence of mimetic isomorphism. In the wake of the (exogenous) collapse of Arthur Andersen, firms apparently did not follow their rivals when choosing a new auditor, as would be predicted by the mimetic isomorphism argument of neo-institutional theory. Rather, firms avoided going to the auditors of their rivals, the pattern predicted by the competitive exclusion argument of organizational ecology. But this competitive pattern was asymmetrical: Larger rivals with more to lose from competition were significantly less likely to go to an auditor if there was already a smaller rival there. Smaller firms, those with more to gain from sharing an auditor with a larger rival, did not show such reticence. But neither did we find evidence that these firms sought out a common auditor with their rivals.

Further analyses of the subsequent responses following the experimental period showed additional evidence of competitive exclusion. Faced with a rival who had chosen to share auditors, organizations were likely to then leave that auditor—

Table 5 continued

Panel B. Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Switch												
(2) AC's larger rivals	0.017											
	0.36											
(3) AC's smaller rivals	0.033	0.051										
	0.06	*0.01*										
(4) AC's rivals	0.038	0.716	0.693									
	0.04	*0.00*	*0.00*									
(5) Expertise	-0.040	0.045	0.008	0.040								
	0.03	*0.01*	*0.65*	*0.03*								
(6) Assets	-0.059	0.029	-0.019	0.005	0.202							
	0.00	*0.12*	*0.30*	*0.78*	*0.00*							
(7) Growth	-0.028	0.010	0.012	0.014	0.021	0.131						
	0.12	*0.57*	*0.50*	*0.45*	*0.25*	*0.00*						
(8) ROA	-0.052	0.009	-0.012	-0.002	0.064	0.183	0.525					
	0.00	*0.63*	*0.51*	*0.91*	*0.00*	*0.00*	*0.00*					
(9) Loss	0.027	-0.025	-0.016	-0.031	-0.038	-0.159	-0.511	-0.824				
	0.13	*0.16*	*0.37*	*0.09*	*0.03*	*0.00*	*0.00*	*0.00*				
(10) Leverage	0.039	-0.005	0.039	0.026	0.018	0.142	-0.044	-0.059	0.044			
	0.03	*0.78*	*0.03*	*0.15*	*0.32*	*0.00*	*0.02*	*0.00*	*0.01*			
(11) M&A	0.001	0.040	-0.006	0.022	-0.004	0.085	0.289	0.038	-0.052	-0.068		
	0.96	*0.03*	*0.75*	*0.23*	*0.83*	*0.00*	*0.00*	*0.04*	*0.00*	*0.00*		
(12) Clean	-0.009	-0.007	-0.017	-0.009	-0.029	-0.120	0.066	0.038	-0.062	-0.097	-0.054	
	0.64	*0.68*	*0.36*	*0.62*	*0.10*	*0.00*	*0.00*	*0.03*	*0.00*	*0.00*	*0.00*	

Table 6: Logit models to test for termination of auditor-client relationship

	Model 1		Model 2		Model 3	
	Coef.	OR	Coef.	OR	Coef.	OR
Rival arrives	0.484†	1.622†				
	(0.222)	(0.361)				
Smaller rival arrives			0.359	1.432		
			(0.302)	(0.433)		
Larger rival arrives					0.477*	1.611*
					(0.285)	(0.460)
Expertise	−1.314	0.269	−1.265	0.282	−1.253	0.286
	(0.815)	(0.219)	(0.810)	(0.229)	(0.811)	(0.232)
Assets	−0.145†	0.865†	−0.145†	0.865†	−0.142†	0.868†
	(0.051)	(0.044)	(0.051)	(0.044)	(0.051)	(0.044)
Growth	−0.146	0.865	−0.140	0.869	−0.149	0.861
	(0.354)	(0.306)	(0.353)	(0.307)	(0.353)	(0.304)
ROA	−0.465	0.628	−0.488	0.614	−0.469	0.625
	(0.379)	(0.238)	(0.378)	(0.232)	(0.379)	(0.237)
Loss	−0.048	0.953	−0.061	0.941	−0.056	0.946
	(0.216)	(0.206)	(0.216)	(0.203)	(0.216)	(0.204)
Leverage	0.805†	2.238†	0.823†	2.276†	0.796†	2.217†
	(0.336)	(0.752)	(0.335)	(0.762)	(0.336)	(0.745)
M&A	0.142	1.152	0.143	1.154	0.152	1.164
	(0.236)	(0.272)	(0.236)	(0.273)	(0.236)	(0.275)
Clean	−0.098	0.907	−0.098	0.906	−0.094	0.910
	(0.176)	(0.160)	(0.176)	(0.160)	(0.176)	(0.160)
Constant	−2.015†	0.133†	−1.979†	0.138†	−2.013†	0.134†
	(0.393)	(0.052)	(0.391)	(0.054)	(0.392)	(0.052)
Observations	3,073		3,073		3,073	
Pseudo R^2	0.024		0.021		0.022	
χ^2	27.820		24.790		26.010	
Degrees of freedom	9		9		9	
Probability $> \chi^2$	0.001		0.003		0.002	

Notes: Coef, coefficient; OR, odds ratio. ∗ and † denote statistical significance at the 10 percent and five percent levels, respectively. † $p < 0.05$; ∗ $p < 0.10$.

although again the observed pattern is asymmetric and depends on organizational size. In this case, however, it was the larger firms that stayed and the smaller firms that fled, possibly evidence that larger firms had more power to retain the auditor of their choosing. In any case, the subsequent behavior of these organizations after the experimental period again shows evidence of competitive exclusion, not mimetic isomorphism.

We noted at the outset the parallel development of neo-institutional and ecological theory over time. Clearly, each of these theoretical perspectives has contributed greatly to our knowledge about organizations, and no particular empirical test is sufficient to invalidate (or validate) an entire theoretical perspective. Yet it remains true that these two perspectives have thrived with little attention paid to where

they make contradictory predictions. Instead, we seem to be content to invoke each theory selectively or at most to agree to boundary conditions where one theory or the other will prevail. Our view is that we have much to gain as a discipline by seeking out and analyzing precisely those contexts where these perspectives make contradictory predictions (Stinchcombe 1968). By doing this, we are able to advance knowledge, in that we are able to see where empirical evidence lines up in favor of one theoretical perspective over another.

It is worth asking whether we have been fair in our portrayal and test of the mimetic isomorphism idea, given that we do not find evidence in favor of that theory's prediction. Empirically, perhaps our research setting and operationalization are not appropriate for a test of the theory's prediction. To that challenge, we note that those arguing for mimetic isomorphism from a neo-institutional perspective have already chosen precisely our setting, the collapse of Arthur Andersen, as a context for demonstrating mimetic isomorphism among organizations. The difference is that we carry out the test in a way that deals with endogeneity, and by paying attention to the identification problem we conclude that there is no evidence of mimesis in that setting.

To conclude, we note that recent years have seen a revolution in the standards for empirical proof in social science research. Much of what we know about organizations is founded on studies of descriptive patterns that may be worth revisiting. Our analyses illustrate that much can be gained by revisiting questions with an eye for empirical identification. Such efforts should help to make clear where our theories have predictive power.

Notes

1 Ultimately, Andersen's conviction was overturned by the Supreme Court on May 31, 2005.

2 The Big 4 auditors are the alternatives, and auditor-specific variables can vary with both ACs and auditors.

3 We match firm information from the two data sets primarily by Central Index Key (CIK). For firms without a CIK on Compustat, we match observations by firm name, ticker, sales, and assets. In addition to auditor dismissal dates, we also use auditor information from the Audit Analytics database if the information is missing on Compustat.

4 Industry is defined by three-digit Standard Industrial Commission code.

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