Entry into Swedish Retail- and Wholesale Trade Markets

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Abstract

This paper examines, using a zero-inflated negative binomial regression model, what determined entry into the Swedish retail and wholesale trade markets between 1990 and 1996. According to the results, high returns on equity and low sunk costs seemed to attract more entry into retail trade industries, while recent entry and higher total industry sales were associated with more entry into both retail and wholesale trade local markets.

Key words: Wholesale trade, retail trade, entry, number of firms, panel data.

JEL classification: L13, L81.

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1 Introduction

This paper examines the entry process of retail and wholesale trade firms into the Swedish market between 1990 and 1996. It is generally believed (see e.g., Geroski, 1991) that new firms produce a number of benefits. For instance, the entry, or the threat of entry, of new firms is assumed to force prices down, thereby eliminating excess profits. Moreover, high entry rates may stimulate innovation, and increase productivity and product quality.

In Sweden, as in other countries, retail and wholesale trade are constantly changing sectors, and in recent years, for example, out-of-town shopping, chain stores' market shares, and the number of international competitors have all increased (see, e.g., Bergström, 1999). Moreover, the number of firms and total employment have increased more over the last decade in the wholesale than in the retail trade sector, and a relatively larger proportion of the employees in the wholesale trade sector work in a company owned by a firm headquartered outside Sweden (see Bergström et al., 2002).

Previous empirical entry studies (see, e.g., Dunne et al., 1988; Audretsch and Fritsch, 1994; Keeble and Walker, 1994; and Love, 1996) have generally used aggregated data on firm entry or have focused on manufacturing firms. This is unfortunate because the entry process may differ between industrial sectors. For instance, Berglund and Brännäs (2001) have found that the determinants of entry differed between eight studied industrial sectors in Sweden. In addition, Troske (1996) and Pakes and Ericson (1998) presented results indicating that new non-manufacturing firms' grow to the size of the incumbents more quickly than new manufacturing firms do. Pakes and Ericson (1998) and Ilmakunnas and Topi (1999) are to our knowledge the only previous studies that have examined the entry dynamics of retail trade

firms, while we have found no study examining the entry pattern of wholesale trade firms. As the non-manufacturing sector of the economy grows, it has become increasingly important to gather information on the entry process of these firms as well.

In this paper, a zero-inflated negative binomial regression model was used to study entry behavior of retail and wholesale trade firms in Sweden between 1990 and 1996. Most previous empirical studies of entry dynamics merely control for either industrial or regional characteristics. We believe this to be a potential shortcoming since industrial characteristics may differ significantly across regions. In contrast to most previous studies, we used a data set that provided an opportunity to study industrial, regional and time specific determinants of entry into the retail and wholesale trade sector.

The results indicate that new retail trade firms enter local markets characterized by recent entry, high total sales for the specific industry, where incumbent firms have faced high returns on equity and where sunk costs were low. In addition, retail trade firms enter markets more frequently where they have access to a large stock of well-educated workers. The results indicate, on the other hand, that only recent entry and large local markets attract entry of wholesale trade firms.

The paper is organized as follows: The next section presents a basic framework describing what factors determine the number of entrants into the Swedish retail and wholesale trade sector; section three describes the data used in the study, the empirical model and the projected results; and section four presents the main conclusions from our study.

2 The Number of Entrants

We assume that firms enter a particular market with the intention of making a profit, and that potential entrants face entry costs. In addition, it is assumed that the markets studied in this paper are imperfectly competitive, and that firms enter a given market until the expected profits in each period are driven to zero: that is, until

$$E[\pi_{jmt}] = \sum_{k=1}^{K} p_{jmt}^{k}(Q_{jmt}^{k}) q_{jmt}^{k} - \sum_{k=1}^{K} C_{jmt}^{k}(q_{it}^{k}) - F_{jmt} = 0, \qquad (1)$$

where $E[\pi_{jmt}]$ denotes the expected profit of a potential entrant in industry j and municipality m in period t. In equation (1), $p_{jmt}^{k}(Q_{jmt}^{k})$ is the price of product k as a function of the total market sales in municipality m of that product, q_{jmt}^{k} is the sales of product k of the potential entrant conditional on entry, and $C_{jmt}^{k}(q_{jmt}^{k})$ is the total sales costs as a function of the sales volume of product k. Thus, $E[\pi_{jmt}]$ represents the total expected profit for a firm in the wholesale or retailing trade business selling a total of K different products.

Following Geroski (1995), we assume that the profit expectation of a potential entrant is given by the profits of incumbents in the previous period, i.e., $E[\pi_{jmt}] = \pi_{jmt-1}$. We realize that this is a naive form of expectations. However, a more sophisticated way of modeling profit expectations would require longer time lags, which means that observations must be dropped. When the time period is fairly short, as in our sample, this is not desirable (for a similar argument, see Ilmakunnas and Topi, 1999).

Finally, the term F_{jmt} can be interpreted as the entry cost corresponding to the zero profit condition: i.e., when additional entrants are unable to

make profits. This means that the profits of already established firms can be positive without attracting the entry of new firms. Let F_{jmt} take the following form:

$$F_{jmt} = c_0 + c_1 T + \varphi_1 N_{jmt} + \boldsymbol{\rho}^{'} \mathbf{G}_t + \boldsymbol{\eta}^{'} \mathbf{X}_{jmt} + \boldsymbol{\nu}^{'} \mathbf{Y}_{mt} + \xi_{it} \qquad (2)$$

where c is a constant term, T is a trend variable, and N_{jmt} is the number of firms entering industry j in municipality m in period t. This means that the entry cost is allowed to depend both on recent entry by other firms and the total size of the market (which is included in the vector $\mathbf{X}_{jmt}$).

Recent entry by other firms may increase the entry cost in a number of ways. For instance, more new firms means that a potential entrant must invest more in marketing, which increases the costs associated with entry. Note, however, that the opposite effect may also occur. New entrants may benefit from competitors marketing – i.e., a sort of free-riding. The entry cost also depends on a vector of general components (e.g., business cycles and institutional changes), $\mathbf{G}_t$, a vector reflecting industry specific explanatory variables including market size, $\mathbf{X}_{jmt}$, and a vector reflecting the characteristics of the municipality where the firm is planning to set up operations, $\mathbf{Y}_{mt}$. Finally, the entry cost also contains a component, ξ_{it}, not observed by the researcher. ξ_{it} is interpreted as a realization from a distribution of a stochastic variable with zero mean and constant variance.

Define $E[\pi^0_{jmt}] = \sum_{k=1}^{K} p^k_{jmt}(Q^k_{jmt}) q^k_{jmt} - \sum_{k=1}^{K} C^k_{jmt}(q^k_{jmt})$ as the profit opportunity of the potential entrant in the absence of the entry cost. Substituting equation (2) into equation (1) and solving for N_{jmt}, the number of

firms entering the market at time t, gives the following expression:

$$N_{jmt} = \alpha_0 + \alpha_1 T + \gamma \pi^0_{jmt-1} + \boldsymbol{\theta'} \mathbf{G}_t + \boldsymbol{\beta}' \mathbf{X}_{jmt} + \boldsymbol{\delta}' \mathbf{Y}_{mt} + \varepsilon_{it} \qquad (3)$$

where $\alpha_0 = -c_0/\varphi_1, \alpha_1 = -c_1/\varphi_1$, $\gamma = 1/\varphi_1, \boldsymbol{\theta'} = -(1/(\varphi_1)\boldsymbol{\rho}'$, $\boldsymbol{\beta}' = -(1/(\varphi_1)\boldsymbol{\varphi}'$ and $\boldsymbol{\delta}' = -(1/(\varphi_1)\boldsymbol{\nu}'$. The parameter α_0 is a constant term, γ measures how potential profits affect entry, $\boldsymbol{\theta'}$ captures general factors at the national level influencing firms' entry behavior, $\boldsymbol{\beta}'$ is a parameter vector corresponding to the industry-specific explanatory variables, and $\boldsymbol{\delta}'$ is a parameter vector corresponding to region-specific effects. Finally, $\varepsilon_{it} = -\xi_{it}/\varphi_1$ is a random disturbance term that, from the assumptions regarding ξ_{it}, has zero mean and constant variance. The variables used in the estimation of equation (3), and thus related to equations (1) and (2) above, will be discussed thoroughly in the empirical section.

3 The Empirical Analysis

3.1 Data

We have access to firm- and region-specific data at the municipality level. All Swedish firms are legally bound to submit their annual reports to the Swedish patent and registration office (PRV). Data from the annual reports of firms that were tax-based in a specific municipality and active in the wholesale and retail markets between 1989 and 1996 were used in this study. This means that entry by larger establishments that were not tax-based in a specific municipality cannot be controlled for given the available data.[1]

[1] However, using data collected by the Swedish Retail Institute of Trade (HUI) for the year 1996, we can show that 88 percent of firms in the retail trade sector were tax-based in a specific municipality that year. These numbers do of course differ depending on type of

The data set was collected by Upplysningscentralen AB (UC)[2] and include, among other items, measures of profits, salaries, fixed costs, and liquidity.

The municipality-specific data were provided by Statistics Sweden. These data include measures of demographics, average income, political preferences, educational level and unemployment in each municipality. Due to the division of some municipalities into smaller units, as well as the mergers of three counties in Sweden during the studied period, a total of 56 municipalities were omitted from this study, leaving a total of 233.

The sample was restricted to firms with documented positive sales during the study period. The dependent variable in our analysis was the number of entrants in each specific five-digit retail trade, or wholesale trade, industry entering the market in municipality m in period t.[3] Before aggregating the data, our data set contained 251,584 observations for the retail trade industry, and 284,400 observations for the wholesale trade industry. Aggregating the data to the five digit SNI-code level[4] for each municipality and year left a total of 44,826 observations pertaining to the retail trade sector, and 37,923 observations pertaining to the wholesale trade sector during the study period. Table 1 reports means, standard deviations, definitions, and sources for the variables included in the analysis.

Table 1 about here.

business; branches of chains are most common in retail trade of shoes (but still 71 percent of firms are individual firms tax based in a specific municipality), and least common for florists (99 percent individual firms). Unfortunately, we have not been able to find any corresponding data for Swedish wholesale trade industries.

[2] UC is a Swedish credit information firm that collects economic information on both firms and individuals residing in Sweden.

[3] A list of all 5-digit categories and the average nnumber of firms and their average size per category, municipality and year can be found at www.hui.se, choosing research and then HUI Working Papers. The paper is listed as HUI Working Paper No 2.

[4] This means that the data consist of 69 retail and 57 wholesale trade industries. SNI refers to the Swedish standard industrial classification.

The returns on equity were on average higher for firms in the wholesale trade industry than in the retail trade industry. In addition, sunk costs and total industry size were also higher for the wholesale trade industry. This indicates that firms in the wholesale trade sector, on average, operated at a larger scale than firms in the retail trade sector. Note also that on the municipality level, wholesale trade markets were not more highly concentrated than retail trade markets.

In accordance with Bergström et al. (2002), Table 1 shows that there was more entry in the wholesale trade businesses during the years under study. In addition, wholesale trade firms entered markets with larger populations, higher population densities, and higher average income levels compared to retail trade firms. Finally, note that wholesale trade firms, on average, entered markets with a conservative government more often than retail trade firms do.

3.2 Econometric Methods

As the number of firms entering a market is a positive integer, a count data model was used. The common starting point for most count data analysis is the Poisson regression model. However, a restrictive feature of the Poisson regression model is the moment restriction $E(N_{jmt}|X_{jmt}) = var(N_{jmt}|X_{jmt}) = \mu_{jmt}$, where N_{jmt} denotes the number of entrants in industry j and municipality m at time t. Also, our dataset has an excess of observations where no entry has occurred during the period under study. Since the unconditional variance in most cases exceed the unconditional mean (overdispersion), and there is an excess of zero-entry observations in our data, it is useful to consider the zero-inflated negative binomial regres-

sion model instead. The conditional mean is specified as

$$\begin{aligned} E(N_{jmt}|X_{jmt}) &= \mu_{jmt} \qquad (4) \\ &= e^{(\alpha_0+\gamma\pi^0_{jmt-1}+\boldsymbol{\eta}'_m\mathbf{R}_m+\rho'_t\mathbf{T}_t+\boldsymbol{\theta}'_k\mathbf{G}_t+\boldsymbol{\beta}'_s\mathbf{X}_{jmt}+\boldsymbol{\delta}'_z\mathbf{Y}_{mt})} \end{aligned}$$

Since the number of entrants in different municipalities and industries were observed over time (longitudinal/panel data) it was possible to control for municipality, time and industry specific heterogeneity using a fixed effects model. Profit opportunities for the entrant are captured by π^0_{jmt-1}, which measures the return on equity in industry j, municipality m, at time $t-1$. The estimated equation also includes both municipality- ($\mathbf{R}_m$) and time-specific fixed effects ($\mathbf{T}_t$). General factors at the national level that influence the entry behavior of individual firms are captured by $\mathbf{G}_t$, $\mathbf{X}_{jmt}$ contain characteristics of the incumbents and the market that could be considered entry barriers by potential entrants, $\mathbf{Y}_{mt}$ is a vector of regional determinants of entry, α_0 is a constant, γ, $\boldsymbol{\eta}'_m$, $\boldsymbol{\theta}'_g$ $(g = 1, 2)$, $\boldsymbol{\beta}'_s$ $(s = 1..., 5)$, and $\boldsymbol{\delta}'_z$ $(z = 1, ..., 8)$ are parameters to be estimated.

The variable representing profit opportunities for entrants, as well as all industry-specific variables, have been lagged one period. Lagging these variables corresponds directly to the potential entrant's decision problem, since entrants only have access to other firms' annual reports with a one year time lag. Second, this setup makes it possible to alleviate a possible endogeneity problem, since the previous year's values are predetermined. Profit opportunities for entrants were measured by profits before taxes deflated by owners equity.

General determinants of entry at the national level, $\mathbf{G}_t$, include the 10

year government bond interest rate, and the 1995 decision to increase the minimum capital necessary for starting up a limited company from SEK 50,000 to SEK 100,000. The latter effect is captured by a dummy variable taking the value one for the 1995-1996 period, reflecting a regime shift in the cost of starting up new businesses. As the cost increased, this variable is expected to have a negative effect on entry.

Industry-specific factors, $\mathbf{X}_{jmt}$, include measurements of sunk costs and highly concentrated markets. Large sunk costs are believed to reflect a commitment by incumbent firms to stay in the market, as these investments cannot be recouped if a firm has to leave the market. Our proxy for the level of sunk costs is calculated in the following way: First the value of machines and equipment are subtracted from the fixed costs of the firm, leaving mainly buildings and owned premises. However, buildings could still have a substantial salvage value. To account for this, the value of buildings is divided by the population in the municipality. This is done to reflect that the investment costs in buildings and owned premises are approximately equal across Sweden, while the potential salvage value (or opportunity cost) is much higher in more populated areas of the country.

The market concentration ratio in the industry is measured by a Herfindahl index, which is equal to the sum of squares of market shares of firms in the industry. The lower limit of this market concentration ratio is zero, while it is equal to one if the entire market is supplied by one firm.

The industry specific independent variables also includes the size of the market (measured as total sales for industry j in municipality m at time t) and average size of the incumbent firms in the market. The latter was measured as the average sales per firm per year in a specific municipality. Finally, recent entry of other firms is represented by a dummy variable

equaling one if a specific industry in a specific municipality experienced entry in the previous year.

Entry is also assumed to be determined by region-specific factors, $\mathbf{Y}_{mt}$. The regional characteristics used in the estimation of equation (4) are population, population density, average per capita income, and the number of unemployed in the municipality. We also control for the presence of a university or a university college, the educational level of the population, political preferences and political stability. The availability of higher education is represented by a dummy variable assigned a value of one if a university or a university college is located in the region. Data concerning educational level within the municipality refers to the percentage of the population in the municipality that has at least enrolled in courses at a university or a university college. Political preferences are indicated by a dummy variable representing all local parliaments where non-socialist parties have the majority, while political strength is measured by another Herfindahl index.

It is reasonable to expect the following results when estimating equation (4). From the theoretical framework, it follows that more entry should occur in industries where profit opportunities are high, while sunk costs and highly concentrated markets should prevent entry. A number of previous studies (see e.g., Audretsh and Fritsch, 1994; Davidsson et al., 1994; and Guesnier, 1994) have indicated that more entry occurs in regions where demand is high. This implies that higher population size, population density and average income in the municipality should be associated with more entry. Audretsh and Fritsch (1994) among others have also found that entry is positively influenced by the level of education in the region, possibly indicating that firms demand highly skilled labor. More entry is, therefore, expected in municipalities with established universities and/or university colleges and

where we observe a high percentage of the population that have enrolled in higher education. Entry may also be influenced by changes in the number of unemployed in the region. Davidsson et al. (1994) note, however, that this effect may be either positive or negative. More unemployed workers may attract entry because this indicates that the firm has a larger labor pool to draw from when recruiting. On the other hand, it may discourage entry because the number of unemployed serves as an indicator of regional demand.[5]

Turning to the variables concerning political preference, we expect entry to be higher in municipalities where there is strong political leadership, as measured by the Herfindahl index, because this creates a stable working environment for the firm. In addition, firms may prefer a non-socialist local government because this leadership is likely to implement more beneficial policies for the firm compared to a socialistic local government. Hence, the type of the political leadership, socialist or non-socialist, might have an effect on entry.

3.3 Estimation Results

The estimation results are presented in Table 2. Note that the municipality specific fixed effect as well as the time specific fixed effects are omitted to save space.

As can be seen from Table 2, the estimates clearly indicate that entry into retail and wholesale trade markets were mainly influenced by industry

[5] During the 1990s, the numbers of unemployed individuals in Sweden that participated in the so-called self-employment (SEMP) program increased rapidly (see e.g., Carling and Gustafson, 1999). The purpose of the SEMP-program was to reduce unemployment by providing unemployed individuals an opportunity to set up their own businesses. This can also explain why local unemployment in Swedish municipalities may have a positive impact on entry.

specific variables. The parameter estimate for returns on equity, measuring profit opportunities, was significant at the ten-percent level for retail trade businesses, indicating there was more entry into industries where the returns on equity were high. Although this is as one would expect from microeconomic theory, it has not been widely reported in previous empirical studies concerning entry (see e.g., Geroski, 1995). The results indicated that higher sunk costs decrease entry into the retail trade market, while neither profit opportunities or sunk costs had any significant effect on entry into wholesale trade markets. Moreover, the parameter estimates presented in Table 2 indicate that more entry occurred in larger markets (as measured by total sales in the industry), while higher average sales per firm per year in a specific municipality reduced entry into the retail trade industry. Finally, the results indicated that recent entry had a positive and statistically significant effect on entry.

Table 2 about here

Turning to the variables reflecting regional differences, we find that the education level of the population has a positive impact on entry into retail trade markets, but no statistically significant effect on entry into wholesale trade markets. All the other regional variables that we have tried to control for were not statistically significant at the conventional 5% level. This means that neither population size, population density, local unemployment, the proportion of the population having a university education, the presence of a university in the municipality, average income per capita in the municipality, the ideological inclination, or the political strength of local government influenced entry into the Swedish retail and wholesale trade markets during the study period.

4 Conclusions

In this paper we have made a first attempt to investigate what determine the entry process of Swedish retail and wholesale trade firms. In contrast to most previous empirical entry studies, we have been able to access industry- and region-specific data. The results indicate that primarily industry specific determinants influenced the decision to enter a new market, while a vast majority of the regional variables included in the analysis had no statistically significant impact on entry into retail and wholesale trade markets.

Industry specific effects that seemed to influence the entry decision by Swedish retail and wholesale trade firms during the study period were return on equity, the level of sunk costs, recent entry, industry size, and the average size of incumbents in the municipality. According to the results, entry was less common in retail trade industries characterized by large sunk costs, while high returns on equity seemed to attract more entry into retail trade markets. In addition, more entry occured into both retail and wholesale trade markets that were relatively large. These results are in accordance with our expectations.

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Table 1: Means (SD in parentheses), definitions, and data-sources of variables.

Variable	Retail	Wholesale	Definition and source
ENTRY	0.32	0.46	Number of entrants in a specific retail or wholesale
	(1.14)	(2.03)	trade industry in a specific municipality$m$ (m=1,...,233)
			at time period t (t=1990,...,1996). Source: UC
EQUITY RETURN	0.0319	0.0394	Profits before taxes in the industry in municipality m
	(0.098)	(0.112)	at time period *t-1*/Owners equity at time period *t-1*.
			Source: UC
INTEREST RATE	10.06	10.06	10 year government interest bond rate.
	(1.93)	(1.93)	Source: Statistics Sweden.
D-CAPITAL	0.43	0.43	Dummy variable taking the value one for the 1995-97
	(0.49)	(0.49)	period, otherwise zero.
SUNK COST	14.16	44.50	(Fixed assets-machinery and equipment)/population in
	(66.50)	(621.96)	municipality m. Source: UC and Statistics Sweden.
CONCENTRATION	0.61	0.62	Herfindahl-index: calculated as the sum of squared
	(0.39)	(0.39)	market shares of firms in the industry in municipality
			m at time period *t-1*. Source: UC
D-RECENT	0.049	0.069	Dummy variable taking the value one if entry in
	(0.22)	(0.25)	municipality m at time period *t-1*, otherwise zero.
			Source: UC
INDUSTRY SIZE	3.0E+7	9.0E+7	Total sales for the specific industry in municipality m
	(4.7E+8)	(8.8E+8)	at time period *t-1*. Source: UC.
AVERAGE SIZE	12098464	13122462	Average sales of the incumbents in the specific industry
	(2.43E+10)	(7.64E+9)	in municipality m at time period *t-1*. Source: UC
POPULATION	50852.2	52841.8	Population in municipality m. Source: Statistics Sweden.
	(86115.90)	(85054.34)	
POP. DENSITY	207.33	237.84	Population density, the ratio of population to square
	(555.36)	(582.27)	kilometers in municipality m. Source: Statistics Sweden.
INCOME	142.34	144.20	Per-capita income in municipality m (1000 SEK).
	(18.64)	(19.78)	Source: Statistics Sweden
UNEMPLOYED	1928.92	1985.15	Number of unemployed individuals in municipality m.
	(3913.16)	(3887.81)	Source: Statistics Sweden
EDUCATION	0.12	0.13	Fraction of the population in municipality m *that has*
	(0.052)	(0.054)	at least enrolled in $c$ourses at a university.
			Source: Statistics Sweden.
D-UNIVERSITY	0.19	0.20	Dummy-variable taking the value one if there is a
	(0.40)	(0.40)	university in the municipality, otherwise zero.
			Source: Statistics Sweden
D-NONSOCIALIST	0.38	0.42	Dummy-variable taking the value one if there is a
	(0.49)	(0.49)	non-socialist local government in the municipality.
			Source: Statistics Sweden
POL. STRENGTH	0.28	0.27	Herfindahl-index: calculated as the sum of squared
	(0.053)	(0.052)	representatives from the different parties in the local
			parlament. Source: Statistics Sweden
No. of obs.	44 826	37 923	

Table 2. Estimation results

	Retail		Wholesale	
Variable (parameter)	Estimate	t-value.	Estimate	t-value
Constant (α_0)	–3.52	-2.53	-4.92	-3.94
Profits (γ)	0.19	1.69	-0.11	-1.10
Interest rate (θ_1)	-0.008	-0.07	0.08	0.68
Dcapital (θ_2)	0.07	0.10	-0.56	-0.75
Sunk cost (β_1)	-2.38	-4.19	-0.02	-0.48
Market concentration (β_2)	0.04	1.29	-	-
Industry size (β_3)	0.13	13.39	0.03	7.18
Average size (β_4)	-3.84	-18.25	-0.01	-1.19
Recent entry (β_5)	0.20	6.77	0.34	12.44
Population (δ_1)	0.04	0.79	0.02	0.45
Population density (δ_2)	-0.09	-0.94	0.03	0.33
Unemployed (δ_3)	0.07	0.19	-0.01	-0.04
Education (δ_4)	3.99	2.39	0.82	0.52
Income (δ_5)	0.01	0.29	0.09	0.20
Dconservative (δ_6)	2.14	0.57	-0.53	-0.14
Political strength (δ_7)	-0.07	-0.12	0.37	0.63
Duniversity (δ_8)	3.60	1.38	1.25	0.51
Number of obs	44 826		37 923	
Log-L	-24248.84		-23790.96	

Note: Variables have been rescaled in the following way to avoid numerical problems in the estimation of the model: Industry size/1,000,000,000; Average size/100,000,000; Population/10,000; Population density/100; Unemployed/100,000; Income/10; Dcapital//100; Sunk cost/1,000; Dconservative/100.