How Much Financial Information is in the Historical Cost and Market Valued Balance Sheets?

Jaclyn D. Kropp, Assistant Professor
Food and Resource Economics Department
University of Florida
P.O. Box 110240 1157 McCarty Hall A
Gainesville, FL 32611
jkropp@ufl.edu
Fax: 352-846-0988

Charles B. Moss, Professor
Food and Resource Economics Department
University of Florida
P.O. Box 110240 1175 McCarty Hall A
Gainesville, FL 32611
cbmoss@ufl.edu
Fax: 352-846-0988

Selected paper prepared for presentation at the Southern Agricultural Economics Association (SAEA) Annual Meeting, Orlando, Florida, 3-5 February 2013

How Much Financial Information is in the Historical Cost and Market Valued Balance Sheets?

Jaclyn D. Kropp (*University of Florida*) and Charles B. Moss (*University of Florida*)

Abstract: Financial accounting has emphasized the historical cost approach because of its objectivity. Yet in the event of bankruptcy and liquidation, assets will be liquidated at their market values. In this paper, we compare the probability of insolvency computed using market values to the probability of insolvency computed using historical costs. We find that the historical value based computation has the potential to both understand and overstate the true probability of insolvency. The disparity between the historical value based computation and the market value based computations depends on the degree of leverage and the age of the assets.

Keywords: depreciation, historical value, loan evaluation, market value, solvency

JEL Numbers: G33, Q14

Introduction

> Accounting quantifies business communications. Financial accounting, the primary dialect, allows lenders and investors to assess the amount, timing, and certainty of a corporation's future cash flows. Creditors want to know if they'll get this money back; stock investors care about whether they can expect substantial future dividends (King 2006, p.3).

Historically, the first popular accounting statement developed in the United States was the balance sheet which emerged with the popularity of bonds to finance the construction of railroads. This statement provided information on the firm's solvency or the firm's ability to pay its debts if all assets were liquidated (King 2006). The second major financial statement to emerge was the income statement that could be used to compute the earnings per share which provided information on the ability of the corporate firm to pay dividends from current income. The development of these statements is the story of the development of Generally Accepted Accounting Principles (GAAP).

In agriculture, the onset of the Farm Financial Crisis of the 1980s contributed to the creation of the Farm Financial Accounting Standards Council (FFSC) to address several controversies which arose in the financial reporting for the farm sector. Specifically, the FFCS made recommendations to improve the functioning of the credit market for agriculture (i.e., the contention was that uniform standards for financial statements would improve the lending decision). A major point of contention in their deliberations was the method for valuing long-term assets such as land, buildings, machinery, or breeding livestock. Specifically, the FFSC discussed four methods of valuation:

1. *Historical Cost/Historical Proceeds Method*. For an asset: the amount of cash, or its equivalent, paid to acquire the item, commonly adjusted for depreciation or other allocations. For a liability: the amount of cash, or its equivalent, received when the obligation was incurred – sometimes adjusted for amortization or other allocations.

2. *Current Market Value Method*. The amount of cash, or its equivalent, that could be obtained by selling an asset in an orderly liquidation.

3. *Net Realizable Value Method*. The amount of cash, or its equivalent, into which an asset is expected to be converted in the due course of business, less any direct costs necessary to make that conversion.

4. *Discounted Future Cash Flows Method*. For an asset: the present value of future cash inflows into which an asset is expected to be converted in the due course of business, less present values of cash outflows necessary to obtain those inflows. For a liability: the present value of future cash outflows expected to be required to satisfy the liability in the due course of business (FFSC, 1997, p. II-15).

Traditionally, financial accounting has emphasized the historical cost approach because of its objectivity. This historical value could be regularly adjusted by annual recognition of depreciation to allocate the cost of the purchase against income (e.g., providing for a matching of revenues and costs in the recognition of income).

Within an accounting system

$$A(t) = L(t) + E(t) \Rightarrow E(t) = A(t) - L(t) \geq 0 \tag{1}$$

where $A(t)$ is the level of assets controlled by the firm, $L(t)$ is the level of the firm's liabilities, and $E(t)$ is the level of owner's equity. The information on the balance sheet answers the question of solvency, that is whether the level of assets exceeds the level of liabilities. Depreciation is important in determining whether a firm remains solvent over time

$$\begin{gathered} A(t+1) = L(t+1) + E(t+1) \\ A(t) = L(t) + E(t) \\ A(t+1) - A(t) = \left[L(t+1) - L(t)\right] + \left[E(t+1) - E(t)\right] \\ \Delta A(t) = \Delta L(t) + \Delta E(t) \end{gathered} \tag{2}$$

where $\Delta A(t)$ is the change in the level of assets, $\Delta L(t)$ is the change in the level of liabilities, and $\Delta E(t)$ is the change in the level of equity. Intuitively, it is possible that the loss in the values of assets from normal use could contribute to the firm's insolvency. In order to further develop these concepts, we decompose the overall change in asset values as

$$\Delta A(t) = \Delta C(t) + \Delta I(t) + \Delta M(t) + \Delta L(t) \tag{3}$$

where $\Delta C(t)$ is the change in the level of cash or near cash assets held by the firm, $\Delta I(t)$ is the change in the level of inventories held for sale or work in process (i.e., corn in the granary or growing wheat), $\Delta M(t)$ is the value of depreciable assets (such as machinery and equipment), and $\Delta L(t)$ is the value of real estate (land and buildings). This change in values can be further rearranged as

$$\Delta A(t) = R(t) + W(t) + a(t) \tag{4}$$

where $R(t)$ is the firm's accounting income which is a combination of increases and decreases to cash from operations (i.e., sales and cash expenses), changes in inventory and the reduction in the values of machinery and buildings (i.e., depreciation). $W(t)$ is the change in equity and liability from owner withdrawals and principal payments. And, $a(t)$ is the change in appreciation of capital assets. For our current discussion, we are interested in the change of asset values associated with machinery and real estate ($\Delta M(t)+\Delta L(t)$).

Historically, GAAP has allowed for a one-sided recognition of these changes (e.g., GAAP allows for the systematic recognition of depreciation and/or other recognition of losses if significant evidence suggests that a loss has occurred).

Accounting versus Economic Depreciation

As discussed by Moss (2013), the primary role of depreciation in accounting is to match the cost of a long-lived asset with the revenue generated from its use. The GAAP provide for three primary methods for this matching: (1) Straight line depreciation, (2) Declining balance methods (either double declining balance or 150% declining balance), or (3) Sum of the year's digits (see Moss (2013 pp. 270-274) for a detailed discussion of these methods). These methods are loosely associated with the "single parameter geometric rate" formulation

$$\delta = \frac{K}{T} \Leftarrow V(t) = V_0 \exp[-\delta t] \qquad (5)$$

where δ is the decay parameter, K is the depreciation factor (2.0 for double declining balance or 1.5 for 150 percent declining balance), T is the useful life of the asset, and V_0 is the initial value of the asset. Hulten and Wykoff (1981) conclude that the single parameter geometric decay may be inadequate, but they support this formulation in general

> The depreciation rates produced by this study center around 1½ percent to 3½ percent per year. While the actual estimates are sensitive to the form of the retirement distribution, most of the estimates do in fact fall within this range which is below the 5 percent to 7 percent range employed in the tax treatment of assets, and the 6½ percent rate implicit in the BEA [Bureau of Economic Analysis] Capital Stock Studies (Hulten and Wykoff, 1981, p.393).

The single parameter geometric decay formulation in Equation 5 is consistent with the stochastic process

$$\frac{\Delta V_t}{V_t} = -\delta_t \Leftarrow \begin{cases} \Delta V_t = V_{t-1} - V_t \\ \delta_t = \begin{cases} 1 \text{ with probability } \theta \\ 0 \text{ with probability } 1-\theta \end{cases} \end{cases} \tag{6}$$

where δ_t is the event of asset failure (either through physical failure or obsolescence) which occurs with probability θ at each increment in time.[1] However, for our purposes here, we develop the more complicated form of the stochastic process for asset values

$$V(t_0,t_1) = \int_{t_0}^{t_1} r(t)\exp(-\rho t)\,dt \Rightarrow dV(t_o,t_1) = \int_{t_0}^{t_1} \left[-\rho r(t) + r'(t)\right]\exp(-\rho t)\,dt \tag{7}$$

where t_0 is the first of the investment period, t_1 is the end of the investment period, $r(t)$ is the revenue function defined on that period, and ρ is the discount rate (Equation 7 is a continuous form of the discrete model presented in Moss, Muraro, and Boggess (1989)). Note that as long as $-\rho r(t) + r'(t) = 0 \,\forall\, t \in (t_0,t_1) \Rightarrow dV(t_0,t_1) = 0$ (or the asset value remains unchanged).

Next, consider dividing this integral into two different integrals as guaranteed by the properties of integrals

[1] Explicitly developing the linkage

$$\frac{\Delta V_t}{V_t} = -\delta_t \Leftrightarrow \frac{dV(t)}{V(t)} = -\delta$$

$$dV(t) = -\delta V(t) \Rightarrow V(t) = V_0 \exp(-\delta t)$$

$$dV\left(t_o,t_2\right)=\int_{t_0}^{t_1}\left[-\rho r\left(t\right)+r'\left(t\right)\right]\exp\left(-\rho t\right)dt+\int_{t_1}^{t_2}\left[-\rho r\left(t\right)+r'\left(t\right)\right]\exp\left(-\rho t\right)dt\,. \qquad (8)$$

In this formulation we want to consider two types of changes. In the first period, we assume that some shock has occurred which yields a return higher than the return supporting the original asset value; mathematically $r'\left(t\right) \square\, dr > \rho r\left(t\right) \Rightarrow dV\left(t_0,t_1\right) > 0$. In the second period, we will consider a change which yields an early retirement of the asset

$$r'\left(t\right) \ni: \int_{t_1}^{t_2}\left[-\rho r\left(t\right)+r'\left(t\right)\right]dt=-V\left(t_1,t_2\right). \qquad (9)$$

Putting these two parts together yields

$$\frac{dV_t}{V_t}=\xi_t+\delta_t \Leftarrow \begin{cases} \xi_t=\dfrac{\int_{t_0}^{t_1}\left[-\rho r\left(t\right)+r'\left(t\right)\right]dt}{V_t} \\ \delta_t=\dfrac{\int_{t_1}^{t_2}\left[-\rho r\left(t\right)+r'\left(t\right)\right]dt}{V_t} \end{cases} \qquad (10)$$

so that ξ_t is a variation in returns from the operation of an asset assumed to be normally distributed and δ_t is a Poisson event capturing the shock when an asset leaves production (i.e., from failure or technical obsolescence in Hulten and Wykoff (1981)).

The stochastic process formulation in Equation 10 represents a generalization of the depreciation model. It considers the effect of changes in the profitability of the use of assets as well as the probability that the asset will fail or become technologically obsolete.

Effect of Accounting and Economic Depreciation on Firm Solvency

Bringing the two parts of our analysis together, we are interested in the probability that the firm will become insolvent. Returning to Equation 4, the probability that the firm will become insolvent can be quantified as

$$P = \int_{-\infty}^{L(t)} f\left(\Delta A(t), \Omega(t)\right) dt$$
$$\text{s.t. } \Delta A(t) = R(t) + W(t) + a(t) \tag{11}$$

where P is the probability of insolvency and $f\left(\Delta A(t), \Omega(t)\right)$ (where $\Omega(t)$ is the information available at time t) is the probability density function for the change in asset values using the stochastic process formulation in Equation 10. The point of the paper is how to formulate $a(t)$? Under standard GAAP $a(t) = 0$ until the assets are sold. However, under an economic formulation $a(t) = \Delta V(t) - Dep(t)$ where $Dep(t)$ is the accounting formulation for depreciation.

As a final complication, we consider the fact that the firm's balance sheet includes several different portfolios (i.e., land, tractors, trucks and breeding livestock)

$$\frac{\Delta V_t}{V_t} = \sum_{i=1}^{4} a_i \frac{\Delta V_{it}}{V_{it}} \tag{12}$$

where V_{it} is the value of asset i in the firm's asset portfolio at time t and a_i is the share of the firm's overall assets held in that particular asset. In order to consider the systematic component of farm assets, we will rewrite the stochastic process for individual assets as

$$\frac{\Delta V_{it}}{V_{it}} = \xi_{it} + \delta_{it} = \alpha_i \varepsilon_t + \delta_{it} + \tilde{\xi}_{it}$$
$$\text{s.t. } \mathrm{E}\left[\varepsilon_t \delta_{it}\right] = 0,\ \mathrm{E}\left[\varepsilon_t \tilde{\xi}_{it}\right] = 0,\ \mathrm{E}\left[\delta_{it} \tilde{\xi}_{it}\right] = 0 \tag{13}$$

where ε_t is the increase in return common to all agricultural assets, α_i is the degree to which asset value for asset i varies with the common return on agricultural assets, and $\tilde{\xi}_{it}$ is the idiosyncratic variation in the value of asset i. For our purposes, we impose two restrictions on the aggregation of the agricultural balance sheet. First, the agricultural asset levels have to sum up to the portfolio of agricultural assets

$$\sum_{i=1}^{4} a_i = 1, \tag{14}$$

and, second, the systematic variations have to sum up over all assets

$$\sum_{i=1}^{4} a_i \alpha_i = 1 \ . \tag{15}$$

Empirical Analysis

To analyze these differences, we numerically integrate the farm's portfolio of assets based on Equation 13. We estimate the stochastic process based on the real rate of return to farm assets for 1973 through 2000 developed by Moss, Shonkwiler, and Schmitz (2003) updated through 2011 using recent aggregate income and balance sheet data from the United States Department of Agriculture, Economic Research Service. The real farmland values for 1973 through 2000 are also taken from Moss, Shonkwiler, and Schmitz with data for 2001 through 2011 taken from various issues of the United States Department of Agriculture's *Land Values* series. The prices for Breeding Livestock, Depreciable Machinery, and Trucks are from the United States Department of Agriculture's *Agricultural Prices* series. In each case, we have used the 1910-1914 price index value for the price of each asset. The asset and returns series were then adjusted for inflation using the United States Bureau of Economic Analysis's implicit price deflator for personal consumption expenditures. These real asset values are presented in Table 1. The interest rate on ten year government bonds was then used for the opportunity cost of capital. The real change in price and excess return for agricultural assets (i.e., the rate of return on agricultural assets less the opportunity cost of capital) are presented in Table 2.

The parameters for the different stochastic processes are then estimated by regressing the change in each asset price presented in Table 2 on the excess return on agricultural assets. These results are presented in Table 3. In general, the change in farmland values and changes in the price of breeding livestock are positively related to changes in the excess return on agricultural assets. In addition, the change in the price of depreciable equipment is positively related to changes in the excess return on agricultural assets, but less directly than farmland and breeding livestock. Only the price of automobiles and trucks is negatively related to excess returns on agricultural assets. This result may be plausible in that agricultural uses probably represent a small fraction of this market. In addition to giving a magnitude for the relationship between each asset and the excess return, the results in Table 3 also suggest that the constant term is an important component of each stochastic process.

Table 4 presents the balance sheet components for each asset. The first column represents a commercial grain farm while the second column represents a diversified farm with some commercial livestock (possibly a cow-calf producer in the Great Plains). The systematic variations are computed using the results from Table 3; however, instead of -0.4922 for the systematic relationship for trucks we used 0.0500. Table 5 then presents the market and historical based values for each asset where the economic values are based on 3,000 draws. Table 6 presents the average excess of market value over historically based asset values and the probability that the market value will exceed the historically based valuation.

Table 7 presents the probability of insolvency computed using historical values and the probability of insolvency computed using market values for various initial capital structures for the two balance sheets presented in table 4. For these computations, it is assumed that the real interest rate is 1.8 percent, owner withdraws are 7.5 percent, and principal repayment is 10.0 percent each period. As shown in table 7, rarely are the two probability calculations the same thus suggesting that the use of historical values have the potential to both understand and overstate the true probability of insolvency. The degree to which historical based computations understate or overstates the true risk of bankruptcy depends on the degree of leverage and the age of the assets.

Implications

The simulations reveal some interesting findings worthy of discussion. Unsurprisingly, the probability of insolvency increases with the percentage of total assets financed using debt (percentage debt). Also as expected, the historical cost values tend to understand asset values relative to market values. Thus, it follows that we would expect the probability of insolvency based on historical values to exceed the probability of insolvency based on market values. Interestingly, however, the results indicate that at low levels of debt the use of historical values understate the probability of insolvency, assuming that the market values calculations provide a more accurate picture of the true risk of bankruptcy. Furthermore, at higher levels of debt (60 or 70 percent), the probability of insolvency based on market values exceeds the probability of insolvency based on historical values early in the life of the assets. The findings that the probability of insolvency is greater when market values are used are driven by the possibility of asset failure obsolesces captured in the market value calculation but ignored in the historical value calculation. As the assets age, the probability of insolvency based on the historical values becomes larger than the probability of insolvency based on the market values; the crossover is driven by appreciation of land. The time period in which the crossover occurs is inversely related to the degree of leverage; for more highly leveraged farms the crossover will occur earlier in the life of the assets. Moreover, the difference between the market value based probability of insolvency and the historical value based probability of insolvency declines as leverage increases.

The findings have clear implications for loan evaluation. The results suggest that the use of historical values have the potential to both overstate and understate the true probability of bankruptcy. If a borrower has low levels of debt or relatively new assets with higher levels of debt, use of historical values may actually understate the true probability of insolvency because the historical values do not account for likelihood of asset failures or obsolesces. Conversely, if the borrower has higher levels of debt and older assets, the use of historical values may overstate the probability of bankruptcy. Thus, when lenders are considering the financial riskiness of a potential borrower the lender must consider not only the borrower's capital structure but also the age of the borrower's depreciable assets.

References

Farm Financial Standards Council (FFSC). 1997. Financial Guidelines for Agricultural Producers.

Hulten, C.R. and Wykoff, F.C. 1981. The Estimation of Economic Depreciation Using Vintage Asset Prices. *Journal of Econometrics*, 15, 367-396.

King, T.A. 2006. *More Than a Numbers Game: A Brief History of Accounting*. Kindle edition. John Wiley & Sons.

Moss, C.B. 2013. *Agricultural Finance*. Taylor-Francis.

Moss, C.B., R.P. Muraro, and W.G. Boggess. 1989. Distortionary Impacts of the 1982 and 1986 U.S. Tax Code on Capital Investments: A Case Study of Investments in Orange Groves. *Southern Journal of Agricultural Economics*, 21(2), 107-16.

Moss, Charles B. J.S. Shonkwiler, and Andrew Schmitz. 2003. The Certainty Equivalence of Farmland Values: 1910 to 2000. In *Government Policy and Farmland Markets: The Maintenance of Farmer Wealth* edited by C.B. Moss and A. Schmitz, pp. 209–222. Ames, Iowa: Iowa State University Press.

Table 1. Price Indices for Agricultural Assets

Year	Livestock & Poultry	Autos & Trucks	Machinery	Land
1973	3196.83	3076.20	2994.34	1086.39
1974	2224.14	3094.29	3184.04	1113.20
1975	1861.83	3385.14	3565.21	1206.36
1976	2027.78	3560.56	3761.97	1372.07
1977	1958.66	3689.72	3862.82	1450.82
1978	2555.41	3648.87	3939.46	1612.26
1979	3106.77	3695.65	4034.12	1748.15
1980	2693.61	3521.08	4075.20	1755.72
1981	2290.16	3763.71	4176.58	1625.80
1982	2165.99	3964.50	4284.43	1480.41
1983	1950.22	4055.87	4352.24	1422.47
1984	1879.12	4187.57	4351.32	1202.42
1985	1804.11	4290.79	4141.90	1028.53
1986	2063.19	4290.60	3956.49	927.26
1987	3038.32	4359.73	3823.88	928.91
1988	2075.36	4333.02	3812.42	922.16
1989	2182.13	4312.19	3897.26	924.77
1990	2096.39	4274.71	3914.87	922.25
1991	1911.63	4353.49	3939.54	899.54
1992	2006.11	4474.58	3964.02	903.64
1993	1955.65	4175.09	3962.87	930.71
1994	1742.85	4271.20	4105.15	939.89
1995	1479.10	4312.99	4250.83	973.76
1996	1330.08	4322.07	4324.83	993.12
1997	1628.67	4290.20	4364.84	1026.62
1998	1509.80	4237.65	4454.11	1063.56
1999	1610.22	4188.96	4489.31	1108.05
2000	1811.23	4079.45	4526.13	1132.72
2001	1797.62	3979.08	4563.08	1192.62
2002	1632.21	3851.82	4629.18	1237.96
2003	1707.59	3628.32	4641.36	1273.54
2004	1959.18	3607.94	4849.59	1329.21
2005	2039.60	3514.51	5019.56	1528.25
2006	1925.70	3376.19	5142.74	1691.03
2007	1836.57	3241.19	5236.02	1808.49
2008	1689.10	3067.42	5567.54	1890.72
2009	1565.83	3102.93	5930.35	1837.42
2010	1772.36	3123.03	6014.34	1879.87
2011	2010.49	3132.41	6227.11	1993.71

Table 2. Rate of Change in Asset Prices and Excess Return on Agricultural Assets

Year	Livestock & Poultry	Autos & Trucks	Machinery	Land	Excess Returns on Ag Assets
1974	-0.3628	0.0059	0.0614	0.0244	-0.0096
1975	-0.1778	0.0898	0.1131	0.0804	-0.0286
1976	0.0854	0.0505	0.0537	0.1287	-0.0474
1977	-0.0347	0.0356	0.0265	0.0558	-0.0500
1978	0.2660	-0.0111	0.0196	0.1055	-0.0511
1979	0.1954	0.0127	0.0237	0.0809	-0.0591
1980	-0.1427	-0.0484	0.0101	0.0043	-0.0919
1981	-0.1623	0.0666	0.0246	-0.0769	-0.1016
1982	-0.0557	0.0520	0.0255	-0.0937	-0.0922
1983	-0.1049	0.0228	0.0157	-0.0399	-0.0869
1984	-0.0371	0.0320	-0.0002	-0.1681	-0.0726
1985	-0.0407	0.0244	-0.0493	-0.1562	-0.0474
1986	0.1342	0.0000	-0.0458	-0.1037	-0.0301
1987	0.3871	0.0160	-0.0341	0.0018	-0.0215
1988	-0.3812	-0.0061	-0.0030	-0.0073	-0.0301
1989	0.0502	-0.0048	0.0220	0.0028	-0.0192
1990	-0.0401	-0.0087	0.0045	-0.0027	-0.0268
1991	-0.0923	0.0183	0.0063	-0.0249	-0.0339
1992	0.0482	0.0274	0.0062	0.0045	-0.0123
1993	-0.0255	-0.0693	-0.0003	0.0295	-0.0136
1994	-0.1152	0.0228	0.0353	0.0098	-0.0177
1995	-0.1641	0.0097	0.0349	0.0354	-0.0344
1996	-0.1062	0.0021	0.0173	0.0197	-0.0080
1997	0.2025	-0.0074	0.0092	0.0332	-0.0238
1998	-0.0758	-0.0123	0.0202	0.0354	-0.0204
1999	0.0644	-0.0116	0.0079	0.0410	-0.0323
2000	0.1176	-0.0265	0.0082	0.0220	0.0008
2001	-0.0075	-0.0249	0.0081	0.0515	0.0106
2002	-0.0965	-0.0325	0.0144	0.0373	0.0050
2003	0.0451	-0.0598	0.0026	0.0283	0.0203
2004	0.1374	-0.0056	0.0439	0.0428	0.0172
2005	0.0402	-0.0262	0.0344	0.1395	0.0134
2006	-0.0575	-0.0402	0.0242	0.1012	-0.0043
2007	-0.0474	-0.0408	0.0180	0.0672	-0.0008
2008	-0.0837	-0.0551	0.0614	0.0445	0.0151
2009	-0.0758	0.0115	0.0631	-0.0286	0.0115
2010	0.1239	0.0065	0.0141	0.0228	0.0198
2011	0.1261	0.0030	0.0348	0.0588	0.0344

Table 3. Estimates of Stochastic Processes

	With Constant			Without Constant	
Asset	α_0	α_1	σ	α_1	σ
Livestock & Poultry	0.0057	0.7386	0.1529	0.6590	0.1509
	(0.0305)[a]	(0.7351)		(0.5895)	
Autos & Trucks	-0.0114	-0.4922	0.0306	-0.3317	0.0316
	(0.0061)	(0.1472)		(0.1236)	
Machinery	0.0225	0.1339	0.0293	-0.1820	0.0344
	(0.0059)	(0.1410)		(0.1342)	
Land	0.0371	0.8736	0.0617	0.3526	0.0681
	(0.0123)	(0.2965)		(0.2660)	

[a] Numbers in parenthesis denote standard errors.

Table 4. Communality and Variance of Asset Stochastic Processes

	Balance Sheet Share		Systematic Proportion		Depreciable	Idiosyncratic
	1	2	1	2	Life	Variance
Land	80.0	75.0	1.184	1.173		0.0617
Tractors	10.0	10.0	0.181	0.180	7	0.0293
Trucks	7.0	5.0	0.068	0.067	3	0.0306
Breeding Livestock	3.0	10.0	1.001	0.991	10	0.1529

Table 5. Market and Historical Cost Values of Assets

		Tractors		Trucks		Breeding Livestock	
Period	Land	Market	Historical	Market	Historical	Market	Historical
1	101.063	88.022	78.571	78.248	70.000	89.522	85.000
2	102.227	77.575	61.735	62.472	49.000	80.377	72.250
3	103.223	69.020	48.506	49.255	32.667	71.172	61.413
4	104.465	60.656	36.379	38.544	16.333	63.839	52.639
5	105.931	53.268	24.253	30.517	0.000	57.682	43.866
6	106.915	46.081	12.126	23.902	0.000	51.885	35.093
7	108.056	40.508	0.000	18.875	0.000	46.277	26.320
8	109.506	35.925	0.000	14.705	0.000	41.621	17.546
9	110.740	31.423	0.000	11.481	0.000	37.270	8.773
10	112.021	27.553	0.000	9.244	0.000	33.181	0.000

Table 6. Comparison of Market and Historical Value

Period	Excess of Hist. Value	Probability Market > Hist.
1	2.509	0.634
2	4.553	0.663
3	6.083	0.663
4	7.891	0.685
5	10.197	0.716
6	11.105	0.714
7	12.416	0.727
8	12.949	0.716
9	13.393	0.707
10	14.015	0.696

Table 7. Probability of Insolvency

Year	40 Percent		50 Percent		60 Percent		70 Percent	
	Hist.	Mkt.	Hist.	Mkt.	Hist.	Mkt.	Hist.	Mkt.
Balance Sheet Shares 1								
1	0.00	0.00	0.00	0.02	0.00	0.32	0.00	3.02
2	0.00	0.82	0.00	4.18	0.00	12.76	0.00	27.12
3	0.00	7.32	0.00	18.14	0.00	31.54	0.00	47.18
4	0.00	18.96	0.00	31.76	0.00	44.90	0.06	57.50
5	0.00	30.00	0.00	41.98	0.00	53.48	0.86	64.06
6	0.00	37.94	0.00	48.80	0.00	58.72	7.08	67.64
7	0.00	43.82	0.00	54.16	0.14	62.26	23.06	69.62
8	0.00	48.08	0.00	57.64	0.84	64.40	46.48	71.10
9	0.00	52.04	0.00	59.94	4.42	66.00	71.04	71.38
10	0.00	54.48	0.02	61.68	11.88	66.76	87.18	71.50
11	0.00	56.34	0.04	62.38	24.98	67.30	94.64	71.68
12	0.00	57.90	0.30	62.68	41.64	67.42	97.98	72.06
13	0.00	58.46	0.84	63.24	57.10	67.72	99.42	72.28
14	0.00	58.78	2.76	63.52	72.42	67.98	99.88	71.80
15	0.00	59.42	5.96	63.84	83.38	67.80	100.00	71.64
16	0.00	59.88	10.80	64.20	90.58	67.74	100.00	71.12
17	0.02	60.24	18.98	64.22	94.84	67.64	100.00	71.02
18	0.08	60.32	28.10	64.08	97.42	67.42	100.00	70.84
19	0.12	60.26	39.56	63.92	98.72	67.22	100.00	70.46
Balance Sheet Shares 2								
1	0.00	0.00	0.00	0.04	0.00	0.36	0.00	3.70
2	0.00	1.24	0.00	5.26	0.00	14.50	0.00	30.10
3	0.00	9.24	0.00	20.44	0.00	35.06	0.00	50.22
4	0.00	21.88	0.00	35.24	0.00	48.58	0.02	60.72
5	0.00	33.32	0.00	45.98	0.00	57.24	0.40	67.42
6	0.00	41.92	0.00	53.12	0.00	63.10	3.34	70.90
7	0.00	48.68	0.00	58.54	0.00	65.92	13.54	72.94
8	0.00	53.10	0.00	61.82	0.24	68.50	31.64	74.18
9	0.00	56.56	0.00	64.26	1.54	70.54	55.88	75.22
10	0.00	59.46	0.00	66.12	6.04	71.34	76.58	75.84
11	0.00	61.18	0.02	67.14	15.00	72.20	90.12	76.28
12	0.00	62.58	0.06	68.04	28.92	72.64	95.86	76.68
13	0.00	63.62	0.36	68.50	45.38	73.18	98.44	76.74
14	0.00	64.28	1.34	68.98	60.68	73.38	99.54	76.98
15	0.00	64.64	3.06	69.50	74.82	73.48	99.80	76.60
16	0.00	65.36	6.62	69.76	85.08	73.22	99.94	76.16
17	0.02	65.86	12.32	69.88	90.96	73.34	100.00	75.96
18	0.04	66.08	19.54	69.96	95.00	73.08	100.00	75.80
19	0.06	66.40	28.64	69.94	97.52	73.22	100.00	75.68