

THESIS

A DUPONT MODEL APPROACH TO FINANCIAL MANAGEMENT: A CASE STUDY OF
VETERINARY PRACTICES

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ABSTRACT

A DUPONT MODEL APPROACH TO FINANCIAL MANAGEMENT: A CASE STUDY OF VETERINARY PRACTICES

As the veterinary industry continues to face personal debt and practice management challenges, financial analysis of veterinary practices is becoming increasingly important. Historically, veterinary practices have been managed for profitability, which when measured alone ignores the role investment and borrowing play in earning financial returns. A DuPont Model is employed to measure profitability, asset turnover, and leverage separately and then collectively through the evaluation of return on equity (ROE). Veterinary practices are divided into performance groups based on ROE and the management behavior of each performance group is evaluated and characterized. Returns for higher performing practices flow back into the business to increase productive capacity while returns for lower performing practices flow out of the business through debt repayment and owner compensation. Leverage is important where highest performers used debt to increase productive capacity and thus increase returns and the lowest performers used debt as a tool to keep their poor performing businesses in practice. This work provides a model and reference point for veterinary practice managers to measure their own financial performance.

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CHAPTER 1: INTRODUCTION

Veterinarians can no longer run a successful business by being good doctors alone. The management of veterinary practices today requires business and financial acumen that is not taught in veterinary school. Veterinary practices have historically been managed for short-term profitability. Profitability ensures the short-term success of the business so that all expenses are paid and owners have positive returns.¹ Profitability, however is only one part of the primary goal of business which is to create value from the production of goods and services. While “added-value” and “value creation” are often used as marketing buzz-words, for businesses, value is wealth. It is the tangible monetary worth of the business. In business the fundamental accounting equation must hold where assets equal the summation of owner equity and liabilities. Equity is the amount in which assets exceed liabilities, and can further be defined as the total value created. Assets are the items and tools owned by the business that are used to generate revenue. Liabilities are the debt and obligations owed on assets (Helfert 2000). The underlying question in this research is: How can veterinary practices create value captured in short-term returns and long-term wealth?

Value is created through three main business processes: operations, investment, and financing. Operations is the day-to-day activity of the business, which is quantified by profitability. Profitability is the difference between revenue earned and total cost of production. Accounting profit is used to minimize tax liability. Economic profit represents the true cash flows in and out of the business as well as any forgone opportunity costs such as unpaid labor and management. For our purposes, it is important to use economic profit. The second business

¹ Owners and shareholders will be used interchangeably throughout this report. Shareholders typically refer to private equity holders who have invested in a corporation. Most veterinary practices are incorporated in S-Corps.

process is investment defined as the purchase of assets from which all firm activity is generated. The asset turnover ratio measures investment efficiency where the value of the asset is compared to the revenue that it generates. The final business process is financing. How well does the practice borrow in order to invest and grow? Practices may obtain financing through lending or through shareholder investment. Most of the time financing occurs through some combination of financing and shareholder investment. Financing is measured through leverage defined as the extent to which a businesses' assets are paid for using debt. Debt can be a tool where outside money is used to create returns for the business. As long as the rate of return on investment of purchased assets (return on assets) exceeds the cost of borrowing (interest rate), then financing the purchase of assets will produce positive returns.

With each business process defined (operations, investment, and financing) we can evaluate each separately and collectively to determine opportunities for growth and improvement. Separate analysis of each business process in the system identifies bottlenecks and strategic areas to focus management decisions while the collective analysis determines the overall performance of the practice. This work is important as it expands practice management from focusing only on short-term profitability to management of the entire business system. Investment and financing, two components of the business system, have largely been excluded from management to this point. Both are critical to management and the long-term value of the practice.

1.1 Objective

The objective of this study is to present a whole business system financial analysis of veterinary practices and make recommendations that will increase short and long-term value and returns to the practice. These recommendations will inform veterinarians on financial analysis

and provide a tool to improve their business decision-making. Specifically, we employ a DuPont Model to make recommendations in each business area for operations, investment, and financing, and use return on equity (ROE) as a measure of whole business performance. Sensitivity analysis is performed regarding the economic adjustments made as well as the use of ROE as the chief measure of performance. We characterize the management decisions for four performance groups ranging from low performers to high performers. Finally, we draw conclusions about the effects of different management strategies and conclude that a systems approach to the management of veterinary practices produces the highest returns.

1.2. Organization of the Thesis

The following chapter will provide background and introduction to the dynamics occurring within the veterinary market. This is paired with a discussion of literature regarding agricultural and small business finance, business valuation, the DuPont Model, and risk. Chapter 3 will discuss the data used within the model. Chapter 4 will detail the methodology used in the ratio analysis of financial statements and the DuPont Model. Chapter 5 presents the results of the financial analysis. Chapter 6 is the final conclusion of the thesis and recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

The following chapter is composed of five sections. Section 2.1 details the existing veterinary market. Section 2.2 reviews the literature related to farm business management and agricultural finance. Section 2.3 describes the DuPont Model and how it has been employed in other agricultural studies. Section 2.4 discusses the transfer of businesses and how they should be valued. Finally, an accounting of the contribution to literature made by this research is presented in Section 2.5.

2.1 Veterinary Business Market

Financial and business management has long been documented as a challenge for veterinarians. Inexperience in business management, leadership, and financial training have been listed as some of the largest barriers to career success as a veterinarian (Burge 2003). One study found that the reason many veterinarians had not reached their earnings potential was a lack of financial expertise or the inability to implement business management practices (Cron et al. 2000). In a follow-up study, researchers discovered that the leading factors associated with business success in veterinary practice included business orientation, frequent financial review, employee development, negotiating skill, client loyalty, leadership, client retention, and new-client development (Volk et al. 2005). This research has prompted many veterinarians, the American Veterinary Medical Association (AVMA), and veterinary colleges alike to consider financial management education and strategies to improve financial acumen of veterinarians.

Over a decade has passed since these studies were published, and the documented lack of financial acumen in the veterinary industry remains a problem. The greatest financial incentives exist for practice owners (Cron et al. 2000). However, the rising cost of veterinary school means

that owning a practice is becoming more challenging for new veterinarians (Knippenberg et al. 2014). The most recent survey of veterinary businesses found that few associates believed they would have the management ability or financial solvency to purchase a practice (VPI 2014). Of existing practice owners, over one quarter said they planned to delay retirement because they believed their practice would sell for less than they had hoped (VPI 2014). This is despite the current market trend where investment by over thirty equity consolidation companies have largely inflated practice values (O'Neil 2017). The study also found that less than half of veterinarians were comfortable with their financial standing and that practices were burdened with large debts, including large credit card balances (VPI 2014).

As the gap between buyers and sellers of veterinary practices widen, earnings potential for new veterinarians decreases while student debt increases. A chief motivation for this study is to identify financial management trends and recommendations for veterinary practices that can increase earnings potential for practice owners in the short and long run. Secondly, this study discusses potential valuation procedures to meet the goals of buyers and sellers in veterinary practice. There has not been a single study on the economic financial performance of veterinary practices. We will evaluate the current management practices and then identify strategies to improve future business decision-making in order to improve financial success.

2.2 Agricultural Finance and Management

Section 2.2.1 Farm Business Management and Long-Term Success

There is little existing literature regarding small business finance and no existing literature of financial analysis of veterinary practices To understand the role of finance and business management, we use the farm financial literature. Veterinary practice is similar to farms in that both are typically small, privately-held businesses operated by owners who are skilled and

educated, but have little formal financial training. One national study of farms from the Agricultural Resource Management Survey (ARMS) database found that strong financial management decisions increased the net income of farms (Mirsha et al. 1999). Another study found that dairy farms who utilize an off-farm financial record service, like an accounting firm, had better financial outcomes (Gloy et al. 2002). Financial performance outcomes provide managers with the information to make decisions and future plans (Harris et al. 2012). The decisions that managers make are only as good as the information managers use in the decision-making process. Skilled managers will make better financial decisions.

Another similarity between veterinary practice and agriculture is the corporate consolidation that they have faced in recent years. Veterinary practices are being purchased by equity companies while farms are increasingly owned by corporations. Scholars have called the corporate consolidation of farms “the industrialization of agriculture” (Gloy et al. 2002, Mirsha et al. 1999). While there is not any current literature about the consolidation of practices in the veterinary industry, there is a robust literature about the consolidation of farms. The growing size of farms requires that we ask why farms are currently being consolidated. Obvious answers include economies of size, scale, and scope which can be achieved by larger farms, but several studies reviewed below have additional explanations for consolidation (Gloy et al. 2002; Purdy et al. 1997).

One study of New York dairies hypothesized that only profitable farms remain in business (Gloy et al. 2002). These profitable farms have the ability to expand and purchase less profitable farms when others exit. Researchers proposed a model to measure how profitability persists over time. The model was estimated as fixed effects, two stage least squares regression where debt was treated as endogenous to farm profitability. Researchers argue that debt was

endogenous because it could cause increased and decreased profitability. The dependent variable was a compounded return on assets (ROA) to capture the long-term effect of profitability. Production efficiency (milk per cow) was found to be the most important factors that increased long-term ROA. Financially, debt to assets had the only significant effect on ROA; as leverage increased, ROA decreased (Gloy et al. 2002). Production efficiency in this study demonstrates that the ability to convert assets into profit is important. Financial management measures demonstrate the importance how profit is employed after it is made. Many small businesses understand how to make money; the question then becomes what to do with the money to earn a higher return on investment. Long-term success will occur only if they answer how to earn and employ earned returns.

Another study also sought to measure long-term profitability of Kansas farms. Researchers explain why some farms are consistently more profitable than others, even in circumstances where profitability should be affected by exogenous variables (Ibendahl 2014). Farms with the lowest debt levels, measured as the debt-to-asset ratio, earned close to zero profit. Increased levels of debt increased and decreased profitability, which indicated that debt is a tool employed by good and bad managers, but for different reasons. Additionally, farmer age was important. The oldest farmers earned zero ROE, where younger farmers earned either more or less profit (Ibendahl 2014).

The same Kansas Farm Management data set was used in another study that attempted to explain why certain farms had been part of the Kansas Farm Management Association (KFMA) for the entire duration of the association, while others have entered and exited. Researchers found that the net income of the 55 farms that had been in the program since its inception was greater than that of the other farms. Although all of the farms had entered the program with the

same financial position, the long-term farms had grown in assets and equity faster even in periods of low profitability, such as the 1980s farm crisis. Long-term KFBMA farms also had a less variable return on equity (ROE). Researchers attributed the prolonged faster growth of the long-term farms to their reinvestment of profit back into the farm. This reinvestment increased profitability and over time the long-term farms have continued to outpace their peers with equity generation. There has been a compounding effect promoted through a positive cycle where reinvestment and profitability are exponentially increased (Ibendahl et al. 2014).

One of the hypothesized reasons for increased consolidation is specialization. A 1997 study measured the effects of specialization on farm financial performance (Purdy et al. 1997). Researchers proposed a two stage model that measured the variance of ROE and then the mean ROE with the variance as well as asset turnover, net income, specialization, and expense ratios as dependent variables. As mean ROE increased, so did its variance. This indicates that high performers perform well for different reasons. Other important indicators of financial performance were farm size and specialization where beef cattle specialists earned less, and larger farms, dairy, swine, and crop specialization earned more. Financial management was also important. Increased depreciation expense ratio decreased mean ROE. On the other hand, decreased leverage (debt to assets) decreased mean ROE and increased the variance of ROE (Purdy et al. 1997). These financial management results have important implications for businesses. First, if depreciation occurs too rapidly, profitability will be decreased. Second, debt can increase ROE, but it does carry more risk for the business.

Section 2.2.2 Management Objectives

Alternative management strategies will produce different results and decisions. Boehlje and White (1969) demonstrate that the farm manager has two choices of maximizing objectives. The first objective is to maximize disposable income available and the alternative objective is to

maximize net worth. Disposable income refers to the cash available after debt service. Net worth refers to the overall wealth in a business. In veterinary practice, profit maximization has been the goal of managers, that is maximizing available disposable income. Each strategy will cause the farm (or practice, in our case) to grow, although it will be in a different way and at different magnitudes.

Boehlje and White (1969) apply the alternative optimization strategies to a hog farm over a ten year planning horizon. They find that the decisions under the two optimization strategies are different. When disposable income is maximized, all investment activities are in depreciable assets. However, maximizing net-worth results in investment in long-term assets, such as land. Furthermore, maximizing net worth required restricted disposable income as taking on debt means that profits must repay principal and interest owed. On the other hand, maximizing disposable income meant less financial risk and loans while also producing much lower net worth. Producers are faced with a trade-off between increasing net worth and increasing disposable income, which may be used for personal consumption or reinvested into the business.

Section 2.2.3 Tax Management and Depreciation

As the results from Purdy et al. (1997) indicate, depreciation will affect financial outcomes. With this in mind, we must ask ourselves why depreciation is important. Depreciation is the diffusion of an asset's cost over its useful life and is expensed as a tax write-off (Helfert 2000). The extent to which an asset depreciates each year should be the minimum level at which reinvestment occurs. However, economic and accounting depreciation have differing goals. In practice, accounting depreciation is typically used because of its ability to lower the tax burden. Several studies have sought to quantify the results of tax policy. One study proposes a model where the marginal value product of an asset is the product of the asset's value and its rental rate where the rental rate is a function of the interest rate, investment tax credits, tax rate,

depreciation, and a ratio of tax to economic depreciation (Hanson et al. 1987). Researchers demonstrate that the repeal of the investment tax credit would decrease investment.

The finding in Hanson et al. (1987) was somewhat contrary to previous research which found that the depreciation method in U.S. tax policy did not substantially affect asset replacement age where replacement age indicates the level and timing of reinvestment (Chisolm 1974). It is important to recognize that depreciation is different from the investment tax credit, but both affect reinvestment. Finally, another study measured the effect of removing the capital gains exclusion from tax policy. Researchers concluded that the removal of this exclusion increased optimal leverage for farms, decreased expected ROE with an increased variance in ROE (Moss et al. 1989). There has been little additional research on tax policy in more recent years as changes to the tax code have been less comprehensive. Still, the discussed research on tax and depreciation is important as it highlights how investment and financial performance can be influenced by tax policy. Financial decision-makers need an understanding of this policy in order to make the best decision for their business. Tax minimization should be a goal of managers, but separate, economic financial statements following accrual accounting should be created and used to guide decisions.

2.3 Financial Performance

The farm literature demonstrates how financial performance affects the long-term success of farms. Financial decisions related to debt are important as is the reinvestment of profits. Financial performance, however, can be measured in a number of ways. Many small businesses focus on profitability. The farming literature, due to the capital nature of farming, demonstrates that asset employment is also important. Some studies, such as Gloy et al. (2002), use return on assets for that reason. The problem with ROA is that it still has not captured the effect of debt on

the business. Debt management is crucial for long-term success (Gloy et al. 2002, Ibendahl 2014, Purdy et al. 1997, Ibendahl et al. 2014, Moss et al. 1988). For this reason, return on equity (ROE) is the best measure of financial success as it represents all parts of the business process including operations, investment, and financing (Helfert 2000).

Section 2.3.1 The DuPont Model

One reason that studies employ different measures of financial performance is that they believe there is not a single ratio that identifies all levels of financial health. This belief is not entirely incorrect as many researchers used other measures of performance. These include profit margin and ROA (Gloy et al. 2002, Purdy et al. 1997, Ibenhdahl et al. 2014). Still, ROE is arguably the best measure because of the ability of ROE to be expanded into three other key ratios utilizing the DuPont Model (Mirsha et al. 2012). Mathematically, the DuPont Model demonstrates that the product of the operating profit margin (OPM), asset turnover ratio (ATO), and leverage multiplier is the ROE as presented in equation 2.1:

$$(2.1) \begin{array}{cccc} \text{OPM} & \text{ATO} & \text{Leverage} & \text{ROE} \\ \frac{\text{Operating Profit}}{\text{Total Revenue}} * \frac{\text{Total Revenue}}{\text{Total Assets}} * \frac{\text{Total Assets}}{\text{Equity}} = \frac{\text{Operating Profit}}{\text{Equity}} \end{array}$$

The operating profit measures profitability in its economic meaning, where revenues exceed costs, and the ratio demonstrates the degree to which revenues are converted to profit. The asset turnover measures how assets create revenue and the degree to which investment generates returns. The leverage ratio presents the level of debt that is used in the business. If returns can exceed interest payments, then debt will increase returns. Together, the product of these ratios is the ROE. Interpreted alone, it measures the business' overall financial performance. The division of the ratios allow for determining the drivers of that performance.

The study conducted by Mirsha et al. (2012) identifies the factors that drive agricultural profitability and propose that each component of the DuPont Model is influenced by different factors. Due the multiplicative nature of the DuPont Model, researchers show that the model is linear in logs and create a seemingly unrelated regression (SUR) model to demonstrate how different factors influence each ratio. Results indicated that education, farm type, specialization, and government payments drive operating profit. Specialization, vertical integration, business age, and government payments drive asset turnover. Forward contracts, farm type, specialization, and vertical integration influenced leverage (Mirsha et al. 2012).

Since the creation of the model proposed in Mirsha et al. (2012), it has been used to demonstrate factors determining profitability in more specific segments of agriculture. For beef cattle operations, region, farm size, the level of diversification, off-farm work for the operator and their spouse, and technology adoption influenced ROE (Nehring et al. 2013). Another study found that larger more diversified broiler farms with a longer housing vintage had greater ROE (Nehring et al. 2015). The DuPont Model allows for the identification of strategic management decisions and areas of focus while demonstrating the importance of managing the entire business system.

Despite the rich literature supporting ROE as the chief measure of financial performance and thus value, some believe that for businesses that offer services instead of a tangible product, financial statements are not relevant (Collins et al. 1997). Nonetheless, the employment of the DuPont Model by large corporations and its influence in extension work has been used for years (Mirsha et al. 2012). If the goal of research is to influence practice, then research should employ the methods that have been successfully used in practice. Research should also extend the use of recognized methods, like the DuPont model, to additional industries and businesses. The DuPont

Model is the most comprehensive mathematical expansion describing financial performance. Without financial statements, financial performance cannot be measured and decision-makers do not have information to make informed decisions. We argue that financial statements and financial performance are relevant to the long-term success and successful transfer of businesses.

2.4 Business Transfer and Valuation

If businesses and farms are going to succeed in the long-term, decisions must also be made for how the business transfers management and ownership. A study of farms found that financial performance, including ROE and short-term profitability, increased for farms that had a succession plan (Harris et al. 2012). Unlike large corporations, small businesses such as farms and veterinary practices rely on principal operators and agents. In order for the successful transfer of business, the measurement of financial performance, determinacy of value, and transfer of assets becomes the question that must be answered for business owners. Veterinary practices today are faced with the decision of selling to corporate buyers or associate veterinarians. The following sections review the literature regarding implications of business transfer including valuation and partnership as an alternative succession plan.

Section 2.4.1 Valuation

Like agriculture, veterinary medicine is facing corporate consolidation. For example, private equity investors are willing to pay up to 10 times earnings to purchase a practice (Sanford 2017). A practice with \$1 million in annual earnings could be worth \$10 million. However, if the same practice were sold to an associate veterinarian rather than an equity company, it would be worth less than \$10 million. This raises the question of how practices are and should be valued. Valuation can occur in several different ways with the most common small business valuations being based on book value or earnings capitalization.

Book value is the value of the assets listed on a practice's balance sheet. Book value poses several challenges as the definition can vary. Some managers² determine book value as what assets are purchased for, while others list book value as what assets can be sold for. In practice, book value ignores the intangible value that is generated by the business. Intangible value is generated by the employees, culture, organization, clients, information, branding, and other non-tangible assets created by a business. In veterinary medicine, which sells a service rather than a tangible product, many believe that book value underestimates the business' worth. For example, a practice's assets might be worth \$500 thousand. However, the same practice generates \$1 million in profit each year. The owner has no financial incentive to sell their asset for \$500 thousand when they could earn an additional \$1 million in revenue next year.

In order to quantify the intangible assets of a business then, valuation is measured through earnings capitalization of expected cash flow. Earnings are the sum of accounting profit and owner compensation, also called discretionary income or expected cash flow. The earnings are then transformed by a capitalization rate or multiplier, typically between 3 and 4 for veterinary practices (Sanford 2017). The product of the capitalization multiplier and earnings is the value of intangible assets. For example, if a practice's earnings equal \$1 million annually, a conservative estimate of capitalized earnings, which are the intangible assets, equals \$4 million.

The problem that intangible assets pose is that they cannot create returns by themselves (Kaplan 2004). An employee with the skills required to run an x-ray machine cannot generate returns without an x-ray machine as a tangible asset. While the x-ray machine needs an operator to generate additional returns, it has a tangible monetary worth separate from the returns that it generates. Because intangible assets do not have an independent monetary value, management

² Veterinary practices often use accountants to manage their book values.

requires a balanced scorecard approach to valuation. Intangible assets are made up of the human, informational, and organizational capital, which must be combined with tangible assets (Kaplan 2004). Without the strategic employment of all types of intangibles, the business cannot continue to generate the same returns that earnings capitalization predicts when the practice is sold. The problem with veterinary practices is that the intangible assets sold are often a client list and an existing infrastructure of employees. However, if the owner veterinarian who sells the practice leaves when the practice is sold, there is an exit of human capital and organizational leadership. Buyers should expect lower returns than had been occurring with this human capital in place.

Despite the weaknesses in these valuation methods, in practice there must be some way to buy and sell practices and a valuation must be completed. Often, some combination of book value and earnings capitalization is used in a method described as fair valuation. A veterinary practice is likely worth more than their book value but less than historic earnings. Business literature has attempted to define and explain how businesses should be valued for sale. In one study, researchers propose a model where fair value is function of book value and net income. Results showed higher explanatory power for book value among firms where financial health was low. This was attributed to the fact that when firms face bankruptcy, their assets will soon be liquidated and creditors value assets at book value (Barth et al. 1998). Another study compared found that the financial health of firms was a critical determinant of the valuation method. When firms had a low ratio of earnings to book value, then book value was the best valuation and when firms had a higher ratio of earnings to book value, then earnings capitalization was the most relevant valuation method (Burgstahler et al. 1997). Both studies showed consistent results where strong financial health increased overall value, which is consistent with the expectation that better firms are worth more.

Another study assessed the relevance of book and earnings valuations. Researchers found that earnings and book valuations were relevant. Book value is the best measure of bottom line earnings, which refer to earnings from extraordinary or special circumstances as well as earnings from discontinued operations (Collins et al 1997). Book value was identified as relevant for two reasons, which are not mutually exclusive. First, book value serves as a proxy for a firm's abandonment option. Abandonment options refer to the exit of a firm. Most often abandonment is due to bankruptcy but it can also refer to a firm ceasing to operate for other reasons which result in the liquidation of assets. Additionally, Collins et al. (1997) found that book value is a better proxy for future value when current earnings have transitory components. Transitory components are not permanent parts of the business. This has important implications for veterinary practices. If an owner veterinarian leaves a practice, we should expect the earnings they have generated to leave with them, at least in part, if not entirely. Practices with multiple veterinarians, where only one veterinarian leaves, have earnings that are somewhat, but not entirely, more protected. Approaches to valuation must consider that earnings, meaning intangible assets, do not occur strictly from a business being open. The assets must be employed to have any value whatsoever. When practices are bought and sold intangible assets should not only be sold solely based on earning potential. An accounting of what intangible assets are included and how they generate value for the business is essential for proper valuation. Literature review demonstrates that some combination of book and earnings valuation is appropriate for valuations. In sum, financial health and the level of permanence in intangible assets should determine value.

Literature review also leads us to conclude that the current valuation method of practices is not appropriate. While it is true that some combination of book value and earnings potential

can be used for valuation (Barth et al. 1998, Collins et al. 1997, Burgstahler et al. 1997) there is no indication that full value for earnings potential and book value should be used. In current veterinary practice valuation, sellers of practices earn returns on earnings capitalization and book value of assets. Following the book and earnings valuations described above, a practice with \$500,000 in fixed assets, and \$1 million in annual earnings would be sold for a conservative estimate of \$4 million. The assets and the expected return on those assets have been sold separately. The buyer of the practice will have to produce additional earnings to cover the cost of the fixed assets and any interest due on the loan. Sellers are in essence double dipping.

Furthermore, there is little incentive for veterinary practices to increase investment and equity positions because the practice can be sold based on capitalized earnings (Sanford 2017). Owners can withdraw all earnings out of the business each year and still receive a lump sum of expected earnings at exit. This withdrawal means no investment is increasing the productive capacity of the business. If little investment is undertaken, buyers could be purchasing assets that are at the end of their useful life, and will fail to generate expected returns. Equity companies have the advantage of large capital backings to finance these types purchases, but the rest of the veterinary industry will have to find an alternate and appropriate method of valuation that may look different for each practice.

Section 2.4.2 Equity Consolidation

Equity consolidation of veterinary practices is changing the landscape of veterinary medicine and practice ownership. There are large potential returns for retiring veterinarians and increased competition for the purchase of practices for new and associate veterinarians. With equity companies that are willing to pay up to 10 times earnings, it is difficult if not impossible, for new and associate veterinarians to compete for the purchase of practices (Sanford 2017). New veterinarians also struggle to purchase practices as they are faced with increased debt and a

declining net present value of the DVM degree (Knippenberg et al. 2014). Investors like veterinary medicine because of its growth potential with the increasing role of pets in society and its potential financial rewards as most veterinary practices have not been managed to maximize long-term returns. However, sellers of practices should understand that equity companies are not interested in purchasing all veterinary clinics, but only those that will provide some competitive advantage in terms of skill and location. Eventually, it will become more difficult for equity companies to obtain these competitive advantages and investment will cease as it did in human healthcare.

Before equity investors were interested in veterinary medicine, they began purchasing human medical practices. Advancements in technology led to less admittance and time spent by patients in hospitals. In order to diversify their portfolios and bolster lost revenues, hospitals aggressively acquired private medical practices in the 1990s (Mand 2014). During the late 1980s and 1990s, practices could be valued as much as five times revenue (Marcinko). As hospitals had acquired the most strategic practices to bolster their portfolios, acquisition of medical practices flat-lined in the early 2000s. From 2001 to 2008 there is a slight increase of solo practitioners as the healthcare market adjusted to its new landscape dominated by hospital acquisitions. The financial crisis of 2008 led to more mergers to deal with world-wide financial distress which also affected the healthcare sector. As the healthcare market began to stabilize following the Great Recession, it was shocked yet again by the Affordable Care Act (ACA) in 2012. The ACA created additional revenue pressure and changed the way that hospitals are paid (Livio 2013). These structural changes led to additional opportunity for equity consolidation and the investment cycle began again.

While there are differences between veterinary medicine and human healthcare, veterinarians looking to sell their practices should expect a pattern similar to that of healthcare up until 2008. The outstanding circumstances of the financial crisis and ACA, which led to additional equity consolidation in healthcare since 2008 will not be transferable to veterinary medicine. It is true that veterinary medicine does not face the insurance and regulatory pressure that healthcare faces, but at some point equity investment will reach a maximum at which point the excessive valuation of veterinary practices will slow, if not cease entirely. In practice, this means that investment and building real wealth should be a priority for practice owners.

Section 2.4.3 Partnership

If the private equity financing of veterinary practice can be expected to continue for a limited time, there will be a need for other financing methods to purchase veterinary practices at some point in the future. Furthermore, there is a current need to finance the transition of ownership in practices that are not purchased by equity companies. Either the equity company has already obtained a competitive advantage in that area, or the current owner is unwilling to sell to a corporate veterinary company. Owners who are not willing to sell their practices to corporations face substantially lower sale values of their practice. Even at these lower practice values, new and associate veterinarians struggle to obtain financing to purchase transitioning practices due to the declining net present value of the DVM degree (Knippenberg et al. 2014). One method that could remedy these gaps is a partnership model. Retiring veterinarians will be paid and bought out over time while associate veterinarians will have the opportunity to increase income from the practice's existing equity and will be able to save these additional returns for the eventual buyout of retiring partners.

The partnership model is not a new idea. Existing literature suggests that partnership is best suited for those industries in which production of goods and services is human capital

intensive (Morrison et al. 2003). Another study suggests professional service firms are unique in management because they are knowledge intensive and employ a professional workforce (von Nordenflycht 2010). Doctors, dentists, accountants, and lawyers have relied on the partnership model for years. Partnership helps build economies of scale and scope, increases returns on specialization, and diversifies human capital portfolios (Gilson et al. 1985). If human capital and a skilled workforce are drivers of creating returns for professionals, it makes sense why equity companies purchase veterinary practices. The owner of the practice reaps the return from expert skill; partnership may be the model, which will allow veterinarians to reap the returns from their skill rather than lining the pockets of investors.

Other reasons that partnership is well suited to professional services is that partnerships are illiquid meaning that they require a long-term relationship to the business in which mentoring can occur. Finally, partnerships allow human capital to be tied to financial capital (Morrison et al. 2003). When operations are transitory, book value is a better than intangibles for measuring value (Collins et al. 1997). Partnerships would make veterinary practices less transitory and ensure that the human capital built by the practice does not exit with the principal agent (retiring veterinarian). Human capital is instead transitioned and shared over time where senior partners mentor junior partners and associates, share client information, and cultivate a firm specific reputation and culture (Morrison et al. 2003). Ongoing partnership could also encourage additional investment back into the firm. Referring back to the farm literature, farms with a succession plan were shown to have higher financial performance (Harris et al. 2012). Partnership could be the succession plan that improves financial performance in veterinary practices.

It is possible that the reason veterinarians have not followed their other professional services peers is that they would prefer to operate as sole proprietors. This raises the question of why partnerships exist and what makes them valuable. A study regarding the partnership make up of law firms found that diversification and firm specific capital were the major reasons partners were compelled to buy-in (Gilson et al. 1985). Portfolio diversification was one reason. In different economic environments, bankruptcy and securities exchange lawyers can leverage risk so that both earn a return. The other reason was that partners of a firm have access to that firm's client information, quality assurance, and reputation that they do not have access to apart from the firm (Gilson et al. 1985). The human capital transfer of these assets is important for veterinarians. While it is true that a client list may produce some value for a buyer, an ongoing relationship with clients through the partnership will undoubtedly create additional lasting value.

Perhaps the greatest obstacle to partnership is its set-up and how owners are compensated. In a study of business model for experts, researchers point out that employing a skilled workforce has influence costs (Teece 1996). There is a delicate balance between paying senior partners for their influence and start-up costs, and compensating the most productive partners. Law firms rely on two main methods where they compensate owners based on seniority or production. Researchers have found that some combination of these methods may be the most effective (Gilson et al. 1985). Veterinary practices are ideal candidates for partnerships, but there is not existing research on the structure of partnerships specific to veterinary practices. Specific details will likely be worked out in partnership negotiations on a case by case basis. If the profession moves in this direction, a model for the transition of the business from a sole owner to partnership is needed followed by a model for the ongoing transition of the business.

2.5 Contribution

The discussed literature has provided a foundation for financial analysis of veterinary practices. Veterinary business management must expand from profitability to a systems approach that also incorporates investment and financing. To our knowledge there is not existing literature on the applied financial management of small businesses. We have learned from trends in agriculture, medicine, and professional services, the crossroads at which veterinary medicine is found. The following work will combine this knowledge in order to propose a model of financial management for veterinary practices.

The DuPont Model will be employed to identify management recommendations and strategies where return on equity (ROE) is the primary measure of value and each component of ROE is evaluated to understand the entire business system, while jointly studying the operating, investment, and financing processes within that system on an individual level. We will demonstrate the relevance of financial statements for veterinary practice owners and managers. From our analysis of ROE performance, we will characterize the management strategies that are indicated by existing financial statements. Recommendations will be made to guide future data collection and research regarding practice management. Finally, we will interpret results in the context of management decision-making to provide insight on how financial statements should be created and used for decision-making in veterinary practice.

CHAPTER 3: DATA

Financial statements were compiled from practice management rotations conducted by the University of Georgia College of Veterinary Medicine and used in cooperation with the AVMA. Forty-five companion animal practices that had balance sheets and income statements for 3 consecutive years were analyzed. Each practice had three years of financial statements in the time period 2011-2016³. Ratios were compiled for each year, and then three-year averages of the ratios for each practice were calculated and reported.

We use annual balance sheets and income statements. The balance sheet presents the business' assets, liabilities, and equity at a point of time. A balance sheet changes continuously as these account balances change. In this report, we utilize year-end balance sheets. The income statement is a report of revenues and costs generated from operations across the time period captured in the balance sheets. An example balance sheet and income statement can be found in Appendix A and B, respectively. Below important components of the financial statements are defined.

3.1 Description of Financial Statements

For the DuPont Analysis we utilize annual balance sheets and income statements. The balance sheet presents the business' assets, liabilities, and equity at a point of time. A balance sheet changes continuously as these account balances change. We utilize year-end balance sheets. The income statement is a report of revenues and costs generated from operations across the time period captured in the balance sheets.

³ Each practice had a varying 3-year period of financial statements. For example, one practice might be from 2011-2013 while another is 2012-2015.

Table 3.1. Financial equations and relationships defined for DuPont Analysis.

Defined Financial Equations		
Measure	Calculation	Performance
Equity	=Total Assets – Total Liabilities	Value
Total Assets	=Current Assets + Fixed Assets	Efficiency
Total Liabilities	=Current Liabilities + Long-Term Liabilities	Leverage
Gross Margin	=Total Revenue- Cost of Goods Sold	Profitability
Profit Margin (Net Income)	=Total Revenue – Total Cost	Profitability
Total Cost	=Cost of Goods Sold + Operating Expenses + Depreciation + Amortization ⁸	Profitability
Operating Profit	=Total Revenue – Total Cost + Depreciation + Amortization ⁴	Profitability

Current assets are assets that can turn over within a time period of less than a year while current liabilities are debt obligations that must be paid during the upcoming year. Fixed assets are assets with a life greater than one year and long-term liabilities are obligations with a loan term longer than one year. Total assets and total liabilities are the sum of fixed and current assets and liabilities, respectively.⁵

Operating profit, total revenue, and depreciation have been defined with the ratios reported in Table 1. Cost of goods sold refers to the cost of inventory that has been paid to vendors. Operating expenses refer to the variable costs of running the business. Please see Appendix B for an example income statement and an accounting of various operating expenses.

3.2 Financial Statement Summary Statistics

Three-year averages of practice's financial statements were taken. These results are presented separately for the balance sheet and income statement. Table 3.2 describes the summary statistics of the average balance sheets over the practices.

⁴ See sample balance sheet in Appendix A. Amortization refers to the depreciation tax write-off of purchased intangible assets that occurs over the 15-year period allowed by the IRS.

⁵ See Appendix A for an example balance sheet where these terms are used.

Table 3.2 Three-Year Average Balance Sheet, Summary Statistics

Measure	n	Mean	Median	Minimum	Maximum	Std. Dev.
Current Assets	45	\$177,221	\$116,879	\$229	\$1,388,766	\$225,005
Fixed Assets	45	\$85,392	\$43,783	\$24	\$779,161	\$126,532
Intangible Assets	45	\$34,560	\$0	\$0	\$887,612	\$188,610
Other Assets	45	\$7,232	\$0	\$0	\$177,613	\$28,017
Total Assets	45	\$334,405	\$222,440	\$25,678	\$1,489,161	\$369,118
Current Liabilities	45	\$62,244	\$46,115	\$0	\$236,399	\$55,563
Long-Term Liabilities	45	\$146,759	\$54,519	\$0	\$1,250,116	\$251,713
Total Liabilities	45	\$209,903	\$118,865	\$0	\$1,403,228	\$284,189
Equity	45	\$125,402	\$67,368	-\$399,480	\$1,404,087	\$272,373

All summary statistics reflect the reported tax-based financial statements. Fixed Assets refer to net fixed assets, which equal the sum of purchase prices minus depreciation. Intangible assets refer to the amount for which a practice has been purchased in excess of their real or fixed assets. This refers to the earnings capitalization or expected goodwill at practice purchase. All other components are defined in the previous section of the data description. Table 3.3 reports the summary statistics on the average income statements of a practice.

Table 3.3. Three-Year Average Income Statement, Summary Statistics

Measure	n	Mean	Median	Minimum	Maximum	Std. Dev.
Revenue	45	\$1,641,690	\$1,686,593	\$239,617	\$4,078,401	\$874,688
COGS	45	\$442,140	\$447,601	\$60,010	\$994,216	\$207,122
Labor Expense	45	\$595,324	\$495,068	\$41,001	\$1,768,757	\$408,645
Owner Withdrawal	45	\$133,181	\$105,571	\$0	\$433,011	\$102,475
Other Expenses	45	\$282,462	\$276,763	\$39,139	\$665,472	\$142,298
Total Cost	45	\$1,463,052	\$1,528,530	\$238,134	\$3,236,307	\$755,957

COGS represents the cost of goods sold, as described above. All other costs listed here are each a portion of operating expenses as defined in Section 3.1. Labor expense refers to all salaries, taxes, and payroll costs. Owner withdrawal is the salary paid to the owner veterinarian

each year. Other expenses refer to overall overhead costs such as rent, utilities, advertising, etc.⁶

Any calculated profit from this table refers to income from operations. Interest expense and depreciation are not included in this measure as they are not operating costs. In economic financial statements, interest and depreciation should be included. All financial statement are reported on a cash-basis when the transfer of cash occurs.

⁶ A full list of these costs is found in Appendix B.

CHAPTER 4: METHODOLOGY

Financial statements of veterinary practices will be analyzed to characterize financial management of high and low performing practices. The objective of the methodology is to describe the current financial performance of veterinary practices and provide a context in which recommendations can be made to improve performance. Performance is measured based on return on equity (ROE) which is calculated through the use of the DuPont Model described in section 4.1. The adjustment of financial statements for use in the model is detailed in section 4.2.. Section 4.3 characterizes performance groups based on the ROE calculated through the DuPont Model. Finally, an in depth analysis of the balance sheet prompted by drivers of ROE performance is detailed in Section 4.4.

4.1 The DuPont Model

Business owner's make decisions to maximize profit. Using strategic management, they identify short and long-term goals. In veterinary practices, the day-to-day management and reaching short-term profitability goals have been the focus. A secondary focus has been minimizing the income tax burden through depreciation write-offs and owner withdrawals (Sanford, personal communication 2017). Profitability management is essential to business success, but examined alone ignores the long-term usefulness of assets and liabilities in a business. Management strategy should also incorporate the investment and financing business processes. Therefore, we define return on equity (ROE) which demonstrates the ratio of earnings to equity, or the rate at which equity (value) is being created as the chief financial goal. Because we are particularly interested not only in creating earnings, but what is generating these earnings, we employ a DuPont Analysis.

The DuPont Analysis divides ROE into three ratios that characterize the performance of operations, investment, and financing (Moss et al. 2012). From the data provided on these statements, the information in Table 3.1 is needed to generate the ratios for the DuPont Analysis reported in Table 4.1. Table 4.1 displays each of the ratios where the components in the ratios are defined as the following: Operating profit is the difference between revenue and cash expenses. All financial statements in the analysis are reported on a cash basis. Depreciation is added back because it is a non-cash expense. Depreciation (which is diffusion of the asset's cost over its useful life) is expensed as a tax write-off, but this money does not flow out of the business each year. We recognize the value of the asset as decreasing, but the transfer of cash has already occurred and is thus not realized again. As earlier defined in the fundamental accounting equation, equity is the difference between assets and liabilities. Total Revenue is all of the cash generated from the sale of goods and services. Total Assets are all of the purchased investments of monetary value that produce revenue (Helfert 2000).

Table 4.1. DuPont Analysis Ratios

Financial Ratio	Calculation	Performance indicator
Return on Equity (ROE)	$= \frac{\text{Operating Profit}}{\text{Equity}}$	Value
Operating Profit Margin (OPM)	$= \frac{\text{Operating Profit} + \text{Interest}}{\text{Total Revenue}}$	Profitability (Operations)
Asset Turnover (ATO)	$= \frac{\text{Total Revenue}}{\text{Total Assets}}$	Efficiency (Investment)
Return on Assets (ROA)	$= \frac{\text{Operating Profit}}{\text{Total Assets}}$	Efficiency & Profitability
Leverage Multiplier	$= \frac{\text{Total Assets}}{\text{Equity}}$	Leverage (Financing)

Mathematically, the DuPont Model demonstrates that the product of the OPM, ATO, and Leverage Multiplier is the ROE as presented in equation 4.1:

$$4.1 \quad \begin{array}{cccc} \text{OPM} & & \text{ATO} & & \text{Leverage} & & \text{ROE} \\ \frac{\text{Operating Profit}}{\text{Total Revenue}} * & \frac{\text{Total Revenue}}{\text{Total Assets}} * & \frac{\text{Total Assets}}{\text{Equity}} = & \frac{\text{Operating Profit}}{\text{Equity}} \end{array}$$

When empirically calculating operating profit in the OPM analysis, interest expense is added back to the operating profit to analyze operations separately. Interest expense is the cost of debt that is influenced by financing decisions. The performance related to debt is captured in the leverage multiplier and interest expense is not included in profitability analysis. In practice, interest expense certainly affects the profitability of a business. Therefore, in the final calculation of ROE, interest expense is subtracted from the operating profit. By separating each analysis, and then combining for ROE we can analyze each business process separately and then collectively.

4.2 Adjustments to Financial Statements

On the reported financial statements, accounting profit is determined to maximize profit while minimizing tax liability. Veterinary practices rely on these financial statements. While accounting profit is quite useful for minimizing tax liability, it is less useful for making financial management decisions especially as they relate to the balance sheet as well as investment and financing business processes. The second portion of the analysis employs several economic adjustments and assumptions that will allow for sensitivity analysis to be performed on the overall ROE performance. We will evaluate how sensitive the overall analysis is to the base parameters which will help guide future data collection and promote good financial decision-making for investment and the long-term value of the practice. These adjustments are useful

because they bring relevance to the balance sheet and help to capture the true value of what assets and tools are being employed to generate revenue.

The following sections describe and provide justification for the adjustments that are made and is followed by an updated calculation and analysis of the DuPont Analysis ratios.

Section 4.2.1 Depreciation

Most veterinary practices are managed from a tax minimizing perspective. In an attempt to minimize taxes, depreciation occurs rapidly. The use of MACRS depreciation as defined by the IRS has the half year election which allows for large expense write-offs when calculating taxable income which is the accounting profit (IRS 2016b). Fixed assets include anything that generates value for the clinic for longer than one year. When purchased, these assets are reported on the balance sheet at the “book” value or what was paid for them. Over time the asset depreciates which is listed on the balance sheet as a “contra asset”⁷ which is a negative value and thus we get net fixed assets. However, it is likely that the asset is actual depreciation is less than what is reported on the balance sheet due to the tax depreciation allows for MACRS depreciation methods. Thus, the asset value listed on the balance sheet is much lower than its economic or market value. To adjust, we will assume that economic depreciation is 20% and that the collective fixed assets are worth 80% of their original value. Sensitivity analysis on the initial specification was performed using depreciation rates of 50% and 10%. This analysis did not produce substantially different results in terms of ROE performance. Twenty percent depreciation assumes a five-year life of an asset with zero salvage value. This assumption is further an appropriate measure as assets that there is likely some combination of new and old

⁷ See sample balance sheet in Appendix A for example.

assets where the value of the new outweighs the old so that the average depreciation is lower than fifty percent.

Section 4.2.2 Building Rental

Because the initial ATO was so high across all performance levels, we assumed that assets were missing from the balance sheet. Upon further investigation, it came to our attention that in order to minimize tax liability, the building in which the practice operates is held in another business entity and not reflected on the practice balance sheet. This is because principal payments on debt cannot be written off as an expense, but rent payments can be under current tax policy. Rental payments are used to pay debts or as a different form of owner compensation. Holding the building in a separate entity protects the practice from potential legal liabilities as well.

Due to this finding, we will make two adjustments. First, one year's rental expense will be added to the balance sheet as a current liability to reflect the lease payment due in the next 12 months. Second, fixed assets will be adjusted to include the building's value because it is used in revenue creation. We have assumed that the value is eight times the rental expense. Discussion with accounting experts indicated that building value is typically between 7.5 to 8.5 times rental expense (O'Neil 2017). In initial discussion, we assumed that building value would be closer to 15 times rental expense. This assumption was made considering many practice building loans have a term of fifteen to twenty years. If a loan lasts twenty years, about fifteen years will be principal and another five will be interest payments. Sensitivity analysis was conducted. In the final model, we use the expert experience and assumed 8 times rent was closer to the building value. Ratio analysis results from the higher assumed building value of 15 times rent is included in Appendix D. Note that there were no differences between performance levels of the practice as each practice was adjusted in the same way. However, ATO and ROE are slightly higher for

final model. This model was also chosen as ATO was closer to expectations. Furthermore, in the final model and sensitivity analysis we have assumed that the building's value does not depreciate.

Section 4.2.3 Intangible Assets

When veterinary clinics are purchased, a valuation is completed. The value of the clinic is the sum of the fixed assets and the discretionary income, which is then transformed by a multiplier based on a capitalization or rental rate. The capitalization rate is the expected rate of return that an investment is expected to generate. When the clinic is purchased, the capitalized discretionary income goes on the balance sheet as an intangible asset, often called goodwill. Goodwill for a veterinary practice is the expected return from the client list. This asset is amortized over a fifteen-year period, following IRS guidelines, in which the amortization of goodwill can be listed as depreciation expense on the tax return (IRS 2016a).

There are a few problems that intangible assets create. First, if the asset fails to provide the expected return, it becomes a dead asset in which the debt used to purchase the asset is greater than the actual value, which results in negative equity. The IRS defines how intangible assets are amortized. They have a fifteen-year life that is not tied with the actual value of the client list over that time period. Due to this, we have a discounting mismatch on our balance sheet. It is unlikely that a client list from fifteen years ago is still producing a return today. Most pets do not live fifteen years, although owners may replace pets, and the calculated expected return further assumes that all of the clients from the purchased clinic remain clients after the sale. From a financial standpoint, the ideal amortization of intangible assets would be equal to the current portion of the long-term debt used to finance the purchase of the practice. However, due to inflated practice values, this form of amortization is also likely to create a discounting mismatch.

The greatest problem created by intangible assets is that they are not a true asset. They cannot be sold if the practice were to resell or default, although the practice debt has financed them. The practice has been purchased based on expected cash flow and thus its debt exceeds the true value of its assets. To address the problems created by intangible assets on the reported financial statements, we will include intangible assets in the ATO because owners are expecting to generate a return on them. However, intangible assets are removed from the practice's equity position. In this report, value creation is based on the increased value and accumulation of tangible assets.⁸

Section 4.2.4 Debt-Equity Structure Assumption

Moving forward, we have already discussed adjustments that will be made concerning buildings and intangible assets. Although we have assumed and normalized the building's asset value, we do not have the information to transform this on the liability and equity side of the balance sheet as we do not know how long the practice has been in business or the loan rate and term. This is a recognized limitation. Therefore, we assume that following the current liability adjustment upward (and equity downward) to include lease expense and removal of intangible assets from total assets, the practice's leverage position for its building is not different from its leverage position on its fixed assets. In our adjusted analysis, we will conduct sensitivity analysis and evaluate return on assets (ROA) as an alternative measure of value creation as ROA is not affected by this assumption. We will also compare the total equity of each performance group as management decisions are a function of existing wealth.

⁸ Tangible assets are real assets and equal the sum of fixed and current assets. See Appendix A for example.

Section 4.2.5 Summary of Adjustments

Table 4.2 summarizes the differences between the reported and adjusted financial statements. Appendix C reports the reported and adjusted DuPont Model ratios for the example financial statements in Appendix A&B.

Table 4.2. Summary of Financial Statement Adjustments

Category	Financial Statements	
	Reported	Adjusted
Depreciation	MACRS	Assume 20% of purchase price annually
Current Liability	No lease payment.	Add rental expense as lease payment due.
Long-Term Asset	Building value held in separate entity.	Adjust total assets to include building assumed to be 8x rental expense.
Intangible Assets	Represent practice goodwill, included as an asset and equity.	Allow to be included in asset calculations, but removed from equity position.
Debt to Equity	$\frac{=Total\ Liabilities}{Total\ Equity}^9$	$\frac{=Total\ Liabilities + Lease\ Expense}{Total\ Equity}^{10}$

Note that in calculation of the adjusted ROE, ROE is calculated as the product of the ratios, which have been adjusted according to Table 4.2. This distinction is important to understand for those who may attempt to recreate this work. ROE can also be calculated as the ratio of profit to equity reported in Table 3.1. However, due to data constraints, we cannot know the actual level of equity. The assumed asset level is higher than that reported due to adjusted building value and depreciation rate. However, as the debt to equity ratio must be assumed due to the lack of information on liabilities with regard to the building, we do not effectively know what the true level of equity is. Therefore, we are still able to arrive at an adjusted ROE by applying our adjustments and assumptions to the ratios in the DuPont Model and using the properties of

⁹ As reported. See example balance sheet in Appendix A.

¹⁰ With fixed assets equal to 80% of their reported value to reflect assumed depreciation rate.

equation. More perfect data would make these assumptions unnecessary in which case the quotient of the ROE ratio would be equal to the product of the ratios in the DuPont Model.

4.3 Calculation and Division of Performance Groups

Three-year averages of the DuPont ratios in Table 4.1 were calculated for each practice. First, we calculated ratios based on the reported financial statements for each year and practice, and then three-year practice averages were taken for each ratio¹¹. Then, practices were divided into groups based on their ROE performance. After evaluation of the statements and calculated ratios, economic adjustments to the financial statements were identified, the ratios were recalculated, and practices were again separated into performance groups based on their ROE. Performance groups were divided by natural breaks in ROE. There were four groups in each analysis. The division of performance groups is defined in Table 4.3.

Table 4.3. Defined performance groups based on calculated ROE.

ROE Performance	Division of ROE Performance Groups	
	Reported ROE	Adjusted ROE
Low	ROE < 0	ROE < 0
Low-Mid	0 < ROE < 1	0 < ROE < 0.2
Mid-High	1 < ROE < 3	0.2 < ROE < 0.4
High	ROE > 3	ROE > 0.4

Section 4.3.1 Sensitivity Analysis regarding ROE Performance

Much of the literature has supported alternate measures of performance when defining success (Gloy et al. 2002, Purdy et al. 1997, Ibendahl et al. 2014). These include profitability and

¹¹ Some practices that had averages other than three years. One practice only had one year of financial statements, two utilized two years of financial statements, and four practices had four years of financial statements from which averages were generated.

ROA. One reason that the DuPont Model was chosen was that it mathematically encompasses both of these measures as well as leverage.

4.4 Further Analysis of the Equity Position

The DuPont Analysis revealed that the highest performing practices made prudent financing and investment decisions which increased the long-term value of their practice and also increase short-term returns through increased profitability. If profitability is managed alone, practices pay no attention to their balance sheets¹² and thus have no tool to analyze their investment and financing decisions. This additional analysis demonstrates the relevance of the balance sheet to veterinary practice management. We will separate practices based on their ROE performance as defined by the DuPont Model, and then describe liquidity and solvency positions of practices by performance group to make recommendations that will improve asset and liability management.

Table 4.4 summarizes and defines the discussed relationships (Helfert 2000).

Table 4.4. Balance Sheet Definitions

Definition of Balance Sheet Relationships	
Measure	Calculation
Equity	=Total Assets – Total Liabilities
Total Assets	=Current Assets + Fixed Assets
Total Liabilities	=Current Liabilities + Long-Term Liabilities

Table 4.4 does not report any equations related to profit or the income statement. One of the major differences between a balance sheet and income statement is time. A balance sheet is a snapshot in time describing the business’ value. An income statement is a summary of transactions over a period of time that result in a profit or loss. Any profits retained between balance sheet reports are reflected on the newest balance sheet. Profit is captured often through

¹² The Balance Statement describes the assets, liability, and equity of a business. Please see Appendix A for an example Balance Sheet and Income Statement.

additions of cash to the balance sheet or utilized in the purchase of new assets. Rather than describing practice performance based on profit alone, it is important to capture the whole business system and thus we will use return on equity (ROE). It determines how much value is created in the business each year. As value creation is increased this will help reach the two-part goal of increasing returns for owner's today and improving the long-term financial position of the practice.

Using the adjusted balance sheets, the practices were divided by ROE performance group as discussed in Section 4.3. Then, in order to determine the liquidity and solvency positions of practices, the ratios defined and reported in Table 4.5 are calculated (Helfert 2000). Three-year practice averages are taken for each ratio, and then summary statistics for each ROE performance group are presented in the following results section.

Table 4.5. Liquidity and Solvency Ratios

Liquidity and Solvency Ratios		
Ratio	Calculation	Performance
Current Ratio	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Liquidity
Debt Coverage Ratio (DCR)	$\frac{\text{Operating Profit}^{13}}{\text{Debt Service}^{14}}$	Liquidity
Debt/Assets (D/A)	$\frac{\text{Total Liabilities}}{\text{Total Assets}}$	Solvency
Debt/Equity (D/E)	$\frac{\text{Total Liabilities}}{\text{Equity}}$	Leverage

¹³ Operating Profit = Total Revenue- Total Cost + Depreciation Expenses

¹⁴ Debt Service = Principal + Interest + Lease Payments Due

CHAPTER 5: RESULTS AND DISCUSSION

The previous discussion presented to this point in the thesis has provided a background for the results that follow here. Section 5.0 provides an overview of ratio analysis and comparison of performance. Then, we start with an initial discussion of the DuPont Model's financial ratios calculated from the reported financial statements in Section 5.1. Summary statistics are discussed for each performance group. This is followed by a discussion of changes to performance groups following the economic financial statement adjustments in Section 5.2. Section 5.3 reports summary statistics for the adjusted DuPont Analysis by performance group. Section 5.4 employs the adjusted financial statements in a report of financial ratios related to the liquidity and solvency of each ROE performance group. Section 5.5 details contingency tables of alternative measures of performance and correlations between the DuPont model, its components, and factors that may affect certain performance measures.

5.0 Overview of Results

Ratio analysis objectively indicates how a business performs financially. The DuPont Model employs ratio analysis to determine the overall financial performance of the business, measured by ROE. Furthermore, the DuPont Model allows us to separate ROE into the OPM, ATO, and leverage multiplier to measure the performance of each component of the business system, including operations, investment, and financing, respectively. Therefore, if we allow ROE to be our overall measure of performance, then we can separate practices into groups based on their ROE as was described in our methods section. After this grouping, we can compare performance within and between groups. This comparison allows us to understand what drives low and high performance and indicates factors that contribute to strong returns in terms of ROE.

The following sections interpret individual ratios, detail results by performance group, compare differences between groups, and analyze contributions that each business system component makes to ROE based on their defined performance level.

5.1 DuPont Analysis Ratios as Reported

Section 5.1.1 Operating Profit Margin

As defined by the DuPont Model, operating performance is measured through the operating profit margin (OPM). The ratio compares operating profit (plus interest expense) to total revenue. OPM can be interpreted as the proportion of every dollar of revenue that results in a profit or the proportion of every dollar of revenue that is not devoted to costs. OPM for each performance tier is reported in Table 5.1. Mean and median of each group is included because the mean may be skewed by relatively high or low performers. Also included are minimum and maximum values as well as the standard deviation.

Table 5.1. 3-Year Average Operating Profit Margin by ROE Performance Group, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	10	0.0711	0.0658	-0.0406	0.1920	0.0774
Low-Mid	11	0.0797	0.0740	1.6893	0.2044	0.0570
Mid-High	12	0.1250	0.1302	0.0639	0.1952	0.0391
High	12	0.1599	0.1439	0.0216	0.3477	0.1058
Total	45	0.1112	0.1028	-0.0406	0.3477	0.0804

Two practices earned a negative profit and both were in the lowest performing group. Additionally, in the lowest performing group the standard deviation of profitability is much greater due to a larger range of performance. This suggests greater volatility among the poorest performing group. In the Low-Mid performance group, only 8% of revenue became profit indicating that profits are very close to zero. This is a concern because interest expense has been

added back to remove financing effects on profit. If interest were considered these practices could have earned a negative profit as well. Only the two highest performing groups earned a mean profit, which was close to expectations. We would expect a healthy practice to have an OPM around 0.15 with 0.2 being the target OPM. Finally, in initial analysis, owner compensation occurred even when profit was negative or very low. This is an indication of improper allocation of owner withdrawals, which we will revisit and discuss further when we discuss the performance groups after economic adjustment.

Section 5.1.2 Asset Turnover Ratio

As defined by the DuPont Model, investment performance is measured through the asset turnover ratio (ATO). The ratio compares total revenue to total assets. ATO can be interpreted as the revenue earned per dollar of assets. It answers the question of how efficiently assets are being converted into production. ATO for each performance level is reported in Table 5.2.

Table 5.2. 3-Year Average Asset Turnover Ratio by ROE Performance Group, Summary

Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	10	15.7049	8.0862	2.5723	73.8370	21.9465
Low-Mid	11	4.9893	4.0954	1.6893	10.5471	2.9891
Mid-High	12	7.9709	8.5245	1.4500	13.3404	3.1898
High	12	10.6985	9.7794	2.0411	26.9600	7.8329
Total	45	9.6881	7.5714	1.4500	73.8370	11.5439

Similar to the OPM, we observe a large range and standard deviation in the lowest performing group. Besides indicating volatility, this suggests the opportunity for additional study in the lowest performing groups. One troubling discovery is that the lowest performing practices in terms of ROE have a much higher average (15.70) and median (8.09) ATO than all of the higher performing groups. One explanation is that they may have fewer assets or have under-

reported their assets compared to their peers. It may also be that the higher performing practices have treated depreciation more appropriately and are reinvesting in new assets as old assets depreciate fully. Furthermore, for mean and median ATO, the calculated value is much greater than expected in all groups. We expect that a strong ATO would be somewhere around 2 where each dollar of asset generates \$2 of revenue. Because depreciation occurs rapidly under MACRS depreciation, the reported financials generate an ATO that is higher than the true ATO. We expect that an economic rate of depreciation will adjust the ATO to within our expectations

Section 5.1.3 Leverage Multiplier

As defined by the DuPont Model, leverage is measured using an equity multiplier. The multiplier compares total assets to total equity. It describes the extent to which a practice relies on equity to finance its assets. Therefore, the leverage ratio demonstrates the extent to which assets are owned free and clear of debt. For example, if a practice purchases a mobile x-ray machine, and have paid down half of the principal of the loan for the x-ray machine, the leverage ratio for this particular machine is 2.¹⁵ Half of the asset is financed by equity and half is financed by debt. A higher ratio indicates that the practice relies more on debt than equity to finance its investments. The equity multiplier for each performance tier is reported in Table 5.3.

Table 5.3. 3-Year Average Leverage Ratio by ROE Performance Group, Summary

Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	10	-11.2487	-3.0500	-73.0980	2.6504	23.0162
Low-Mid	11	1.8475	1.7153	0.6877	4.8306	1.1359
Mid-High	12	3.0414	2.1190	1.0097	15.7565	4.0445
High	12	66.5056	17.6091	1.0000	311.7779	103.0545
Total	45	16.4977	1.7532	-73.0980	311.7779	61.0560

¹⁵ X-Ray Cost (Asset Value) = \$5,000, Paid Cash (Equity) = \$2,500, Loan= \$2,500; \$5,000/\$2,500 =2

The low performing group has practices with a negative leverage ratio. A negative ratio indicates that total liabilities (debt) exceeds total assets. Potential explanations for this include that assets are depreciated rapidly using MACRS depreciation defined by the tax code so that depreciation exceeds principal repayment or that the practice has operated at a loss for an extended period of time. Notice that propensity for debt first decreases from the Low performing group to the Low-Mid group and then increases with performance. The highest performing practices utilize more debt compared to equity. This indicates that they are seeking to promote growth and debt is one of the tools through which growth is achieved. Finally, while the highest performers use a large proportion of debt and are thus reaping rewards, their leverage position and risk exposure is high which begs the question of what optimal leverage may be. We also expect that an assumed rate of depreciation will significantly lower these leverage ratios as we suspect the assets are worth more than reported on the existing balance sheet.

Section 5.1.4 Return on Equity

As defined by the DuPont Model, the practice's overall performance and chief measure of value creation is the return on equity (ROE). The ratio compares operating profit to equity. ROE can be interpreted as the return generated per dollar invested in equity. ROE for each performance tier is reported in Table 5.4.

Table 5.4. 3-Year Average Return on Equity by ROE Performance Group, Summary

Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	10	-6.2435	-1.0267	-27.4804	-0.0954	10.1846
Low-Mid	11	0.5210	0.5924	0.0777	0.8979	0.2654
Mid-High	12	1.7495	1.7511	1.0335	2.7414	0.5588
High	12	48.9959	11.3004	3.2948	307.2548	89.9058
Total	45	12.2720	1.1672	-27.4804	307.2548	50.5225

In the case of the lowest performing group, money is being lost per dollar of investment which is quite concerning although not surprising considering the performance of the business processes discussed so far. The standard deviation is much lower than when compared to the other groups, but that is because only so much can be lost compared to that which others are gaining. The highest performing group has a very large ROE and range. This suggests there may be star performers within this group, which perform even higher than their high performing peers. The median practice in the highest performing group has a 1,130% return on equity. Even the Mid-High performers earn on average a 175% return. Still, ROE in the two highest performing groups is much higher than expected likely due to the combined high ATO and equity multipliers. One concern with using ROE as the chief measure of value creation is that it may overstate the position of practices with very little equity. Per dollar of equity, their return may be higher but this could pale in comparison to overall performance. For this reason, in our adjusted analysis, we will also report their net equity to recognize that ratios allow comparison across different sizes of practices, ultimately size and scale are important as well.

Section 5.1.5 Summary of Reported Analysis

The reported analysis has helped us to understand the problems in financial reporting that if fixed could improve financial decision-making. OPM followed expectations where low OPM also translated to low ROE. ATO became more problematic as the absence of the building as part of the asset base and accelerated depreciation led to our hypothesis that true ATO is much lower than reported on tax-based financial statements. The leverage multiplier leads us to conclude that debt is the tool of the lowest and highest performers, but this ratio is also hypothesized to be overestimated as a result of the intangible assets and accelerated depreciation of fixed assets. Finally, the product of these ratios represent an ROE that is expected to fall after adjustments to financial statements are made in order to correct for the inflated ratios seen throughout this

section of our results. The following section details how the adjustments to financial statement change both performance levels and groups.

5.2 Changes to Performance Groups following Adjustments

After making the financial statement adjustments summarized in Table 4.2, practices were regrouped into performance groups based on their adjusted ROE. It is important to conduct sensitivity analysis to determine how the financial adjustments affect performance results. Twenty of the 45 practices changed performance group. Table 5.5 is a contingency table reporting the performance groups of practices before and after financial statement adjustments were made.

Table 5.5 Contingency Table of Performance Group Assignment

		Reported Financials				
Performance Group		1	2	3	4	Total
	1	4	1	1	2	8
Adjusted Financials	2	3	7	1	2	13
	3	0	2	8	2	12
	4	3	1	2	6	12
	Total	10	11	12	12	45

There is some variation in performance groups. Some can be attributed to changes in the total practices in each group or relatively small changes. There were very few changes in which the lowest performing became the highest and vice versa. Additionally, Group 3 had the most consistent grouping. Appendix E summarizes the performance group assignments and the changes in group level. The remainder of this section discusses what caused the changes in the performance groups. The adjustments increased the performance of 11 practices while decreasing the performance of 9 practices. In discussion, practices will not be discussed uniquely, but will be analyzed by the direction and magnitude of their performance change. It is

useful to explain why the practices changed performance group as these changes are critical to understanding the interpretation of real performance.

Eleven of the practices had a one-unit change in performance group. In each of these cases, the practice was “on the bubble” in their group. They only switched from being among the lowest in a higher group to being the highest in a lower group. This was due to subtle differences in their debt and asset structure that changed their performance group. The subtleness of the changes in performance groups for these practices are not particularly concerning to the consistency of results. However, 9 of the practices changed performance groups by a large magnitude. Five of these practices moved from high performing to low performing. Four of the practices moved from low performing to high performing. It turns out that there are important reasons for the directions and magnitude of these changes. Decreases in performance are caused by intangible assets reducing equity. Increases in performance are due to the economic depreciation level. In the reported analysis, assets had been depreciated more rapidly than principal owed had been paid resulting in a false negative equity. Adjusting for economic value of the assets demonstrated a hidden high performance level.

Five practices moved from high to low performance. The reason for this was because they had a large percentage of assets designated as intangible assets. Removing these intangible assets from equity caused equity to be negative despite strong OPM and ATO. This means that their ROE is negative due to a negative equity position. This provides us with two unique learning opportunities. First, it is possible that in the case of these practices, the intangible assets or client list has produced the expected return. Future research should more closely examine the structure and composition of these intangible assets to confirm this result. It could provide a model for the future purchase of intangible assets. Second, practices in the lowest performing

group are in that group for numerous different reasons. For example, some practices have a negative return because their equity is negative after the removal of intangible assets. Other practices earn negative returns because they have earned a negative profit.

Four practices moved from low performing to higher performing due to their depreciation and asset structure. The assets had been rapidly depreciated. Adjusting assets to their assumed economic value increased their performance. They had greater assets and greater equity as a result of the adjustment. This highlights the importance of considering the economic value of assets and the effects of using accounting profit for tax purposes. While taxes may be lessened, eventually depreciation cannot continue and capital gains tax must be paid on the additional return. For long-term success, it is increasingly important to manage not only to minimize taxes but also to increase value and equity over time.

One practice in particular warrants additional commentary. Practice #40 listed in Appendix E moved from the lowest to the highest performance group. Like the other practices who increased performance, their tangible assets had been greatly depreciated and economic adjustment increased performance. However, when compared to their higher performing peers, this practice has a much higher level of intangible assets at nearly 20% on average over the three year period. The removal of intangible assets from equity did not decrease the performance of this particular practice. Upon analysis, we learn that this practice had a relatively low level of initial intangible assets. When purchased, the tangible assets were, and continue to be, worth more than the intangible assets. This practice highlights that intangible assets do in fact have some value, but only when paired with the tangible assets in a practice. Although small sample size does not allow us to draw further conclusions, this practice could reveal a better valuation model in which so long as tangible assets exceed intangible then expected returns could be better

generated. This finding is likely not unique and future research and valuations should consider this possibility.

While the intangible asset structure and depreciation affected the groups that practices were defined in, the rental expense adjustments for current liabilities and building value did not qualitatively affect performance level of practices. One reason for this is that all of the practices were affected by these adjustments in the same way. In contrast with intangible assets where some practices have them and others do not, all buildings and rental expense are managed in the same way. The building adjustments do not affect overall performance level as much as they adjust the DuPont Analysis ratios to our expectations. Moving forward, compiling consolidated balance sheets including building value would be useful to reduce the limitations of this assumption.¹⁶ With an understanding of how the adjustments have affected performance, we will now analyze and discuss the adjusted practice performance as defined by the DuPont Analysis.

5.3 DuPont Analysis Ratios with Economic Adjustments

Section 5.3.1 Adjusted Operating Profit Margin

Again, we use OPM to measure profitability as defined by the DuPont Analysis. Results are reported in Table 5.6 and are interpreted as the proportion of profit earned by each additional dollar of revenue. The financial statement adjustments did not affect the OPM as the income statement was not adjusted. Therefore, the calculated OPM for each practice is not different than what is reported in Table 5.1, however the mean, median, minimum, and maximum vary since the adjustments made affected the assigned performance group of practices.

¹⁶ Consolidation in this case refers to combining all business entities that have been separated for tax purposes into one balance sheet to perform analysis on the entire business.

Table 5.6. 3-Year Average Calculated Operating Profit Margin by ROE Performance**Group with adjustments, Summary Statistics**

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	0.1177	0.1124	-0.0406	0.2800	0.1061
Low-Mid	13	0.0448	0.0494	-0.0112	0.0872	0.0313
Mid-High	12	0.1294	0.1235	0.0639	0.2044	0.0421
High	12	0.1611	0.1414	0.0430	0.3477	0.0867
Total	45	0.1114	0.1028	-0.0406	0.3477	0.0804

Here, we see the same trends as discussed in the reported section. The lowest groups have some earners who have a negative profit and the largest standard deviation. One difference seen here is that on average, the lowest ROE performers have higher profits than the Low-Mid group. The lowest group has the highest standard deviation in profit as well. They perform poorly for different reasons. Some earn a negative profit while others have a negative ROE due to negative equity but are still able to earn a profit on an annual basis. In the Low-Mid group, there is one practice that has a negative average profit over the three-year period. While average profit was negative, its ATO and equity multipliers offset this as performance improved over the time period so that its overall average ROE was positive. Only the highest performing group earns profits that meet expectations where OPM is greater than 0.15. Notice that profitability increases at each ROE performance level which follows expectations as profitability is essential to earning returns. Large owner withdrawals occur regardless of performance category. Table 5.7 reports mean OPM compared to mean OPM without owner withdrawals and the average percent of revenue taken as a withdrawal.

Table 5.7. 3-Year Average Mean OPM Before and After Owner Withdrawal by ROE

Performance Group

ROE Performance	n	OPM Before	OPM After	% Revenue
Low	8	0.1801	0.1177	6.2326%
Low-Mid	13	0.1737	0.0448	12.8927%
Mid-High	12	0.2219	0.1294	9.2465%
High	12	0.2309	0.1611	6.9746%
Total	45	0.2029	0.1114	9.1582%

OPM before owner withdrawal in the two lowest performing groups is very similar. However, the Low-Mid group takes nearly double the owner withdrawal. One reason is that the lowest group has negative equity and must use a larger proportion to repay debts. OPM before owner withdrawal is not very different among the two top performance levels with the highest performers just slightly above the middle group. The main difference in these top performance groups and the Low-Mid group is that it takes nearly double the average owner withdrawal suggesting that this group is removing most of the value from their business while high performers are reinvesting nearly double. The highest performing group earns slightly more profit than the Mid-High group, 23% compared to 22%, they reinvest 3% more which likely earns more profit at a diminishing rate. We learn two things from this comparison. First, it is important to manage beyond short-term profitability and reinvest to increase long-term returns. Second, investment should not occur only for the sake of investment, but what practices invest in matters, and will affect their returns. Investment will also follow the law of diminishing marginal returns so that at a certain level of investment, practices will cease to reap additional returns from that investment.

Section 5.3.2 Adjusted Asset Turnover Ratio

Investment performance and efficiency is again measured by the ATO. ATO can be interpreted as the revenue produced by each additional dollar of asset investment. The ratios reported in Table 5.8 reflect the adjustment of increasing total assets by the normalized building value, which was assumed to be 8 times the annual rental expense. Furthermore, economic value of the fixed assets was assumed to be eighty percent (twenty percent depreciation). Intangible assets are not yet removed as owners expect these to generate a return and there is a liability that has financed them.

Table 5.8. 3-Year Average Calculated Asset Turnover Ratio by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	1.0702	0.9951	0.8728	1.5061	0.2127
Low-Mid	13	1.0380	0.8720	0.5697	1.7119	0.3336
Mid-High	12	1.6951	1.6564	0.8190	2.9008	0.6216
High	12	1.8522	1.6082	1.2405	3.2302	0.6733
Total	45	1.4361	1.2767	0.5697	3.2302	0.6198

The adjusted ATO is now much closer to expectations, albeit lower than the expected optimal ATO of \$2 of revenue created per dollar of asset, which may indicate we could assume a higher rate of depreciation or that the building is worth less than we have assumed. Nonetheless, this is not particularly problematic as different assumptions will affect the ratios in the same way with only the scale differing. Interestingly, the Low performing group has a higher average and median ATO when compared to the Low-Mid group. We have already discussed the low investment that the Low-Mid group is engaged in. Investment increases the productive capacity of the business and will therefore increase returns. Perhaps as a consequence of low investment, this group has a lower ratio. The Mid-High and High performing groups each earn on average \$1.70-\$1.85 per dollar of assets with the highest group earning slightly more. This further

supports our discussion of owner withdrawal, which indicated that while these groups invested similarly, the highest group makes better investments, which lead to higher returns. Another possible contributor to lower than expected ATO is the included intangible assets. If they fail to create the expected return, the practices may have been overvalued at purchase. Table 5.9 reports the average percentage of total assets that are intangible assets by performance group.

Table 5.9. 3-Year Average, Average Intangible Assets as a % of Total Assets by ROE

Performance Group

ROE Performance	n	% Intangible
Low	8	32.1833%
Low-Mid	13	1.6906%
Mid-High	12	0.4354%
High	12	1.5556%
Total	45	6.7408%

Intangible assets bring down the ATO of the lowest performing group, but do not significantly affect the other groups. If the liability associated with these assets were not included on the balance sheet, returns for the lowest group would likely equal or exceed all of their higher performing peers. The top performing groups each have less than 2% of intangible assets on average. This calls for comparison between the low and high performing groups. The high performing groups have a higher asset turnover because they have invested better, namely that they are not paying for intangible assets, or are earning additional revenue as a result of their assets. Intangible assets cause a problem here because instead of investing in new assets, debts on intangible assets must be paid which lowers their asset turnover because debt repayment obligations lower the funds available for asset replacement as well as new investment.

Section 5.3.3 Adjusted Leverage Multiplier

A firm's debt exposure is measured using the leverage multiplier which divides total assets by total equity in the DuPont Analysis. The ratio compares how many assets a practice has

for each dollar of equity. Assets have been adjusted to reflect economic depreciation assumed to be twenty percent. Intangible assets have been removed from the analysis on the asset and equity side as we do not consider them to be real assets and they do not have any resale value justifying their removal from equity. Equity has also been adjusted downward to include the rental expense current liability. Due to the discussed limitation on adjusting total assets for the building, but lacking information to adjust liabilities and equity accordingly, we do not adjust for building value. Instead, we have assumed that the debt structure for the building is not different from the debt structure currently reflected on the balance sheet and thus the ratio will hold. The final calculated leverage multiplier is reported in Table 5.10.

Table 5.10. 3-Year Average Calculated Leverage Multiplier by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	-108.5515	-3.5549	-828.4764	-0.4643	290.9723
Low-Mid	13	2.6522	2.4051	1.4195	5.8957	1.2290
Mid-High	12	1.5458	1.4918	1.0383	2.2834	0.3943
High	12	4.4638	2.0292	1.0218	14.0271	4.5305
Total	45	-16.9293	1.6297	-828.4764	14.0271	123.8244

In the lowest performing group, the equity multipliers are all negative, and some have large negative values. These practices are highly leveraged because they have purchased intangible assets causing debt to exceed assets. Removal of intangible assets makes equity negative meaning that the practice was purchased at, and owes liabilities greater than its assets. The two middle performing groups have relatively low leverage, although the Low-Mid group uses more debt than the Mid-High group. The highest performing group utilizes much more debt, although their leverage ratio is much lower and carries less risk than that reported in section 5.1. On average, the highest group has a leverage ratio 2-3 times higher than the two middle groups.

They take on additional risk and receive a higher reward for prudent financing and investment. Lower performing groups could improve ROE by responsibly financing of asset purchases.

Section 5.3.4 Adjusted Return on Equity

Return on Equity is the primary measure of shareholder value creation in the DuPont Analysis. It can be interpreted as the profit per dollar of shareholder investment, which is equity for this analysis. It is the product of the OPM, ATO, and Equity Multiplier. In calculation of this ratio, ATO has been adjusted for depreciation and building value. The equity multiplier is adjusted for intangible assets, depreciation, and the current liability for rental expense. Table 5.11 reports the final results.

Table 5.11. 3-Year Average Calculated Return on Equity by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	-0.9673	-0.5542	-3.8082	-0.0237	1.2721
Low-Mid	13	0.0985	0.0935	0.0313	0.1832	0.0503
Mid-High	12	0.2897	0.2714	0.2103	0.4023	0.0627
High	12	0.7771	0.7254	0.4441	1.2430	0.2684
Total	45	0.1410	0.2164	-3.8082	1.2430	0.7857

From this final calculation of created value, we learn a lot about the overall performance and management of each practice group. The lowest performing group on average has negative returns to equity. This occurs for two reasons. Either the practice earns a negative cash profit or the practice has intangible assets on their reported balance sheet. Purchase of intangible assets results in negative equity. Until the intangible assets are fully amortized or the loan is paid off, ROE will be negative. On average, low performing practices are highly leveraged with debt exceeding assets. In the Low-Mid group ROE is close to zero. Profits are also close to zero and there is a low level of reinvestment as returns leave the practice through owner withdrawal. Their

relatively higher leverage multiplier should increase returns, but the Low-Mid group has the lowest ATO and OPM due to high owner withdrawal and subsequent low investment. In the Mid-High group, profit and ATO is near that of the highest performing group. The highest performing group is set apart by their high profits, ATO, and leverage multiplier. In order to reach this level of performance the Mid-High group should focus on prudent investments that are well financed. In the highest group, ROE is much larger than their peers due to a compounding effect where they have higher performance in every business process which leads to a much greater overall return. The High group is evidence that proper management of the entire business system lends well to improving the business' overall performance. Beyond the short-term profitability goal of increasing returns today, investment and utilizing financing further increase returns today and in the future when the practice is sold.

Another take-away observed throughout the analysis is that the middle performing groups have the most in-group stability. For nearly every ratio including ROE, they have the lowest standard deviation. On the other hand, the lowest performing practices tend to have the largest standard deviation and the highest performers fall somewhere in between. The differences in performance volatility within groups indicate practice age and management style and ability. Although practice age is unknown in our sample and this hypothesis cannot be confirmed, it is performing practices, particularly the Low-Mid group appear to be mature practices where owners are content with their current position and therefore have low levels of investment. The highest and lowest practices are hypothesized to be newer practices that are seeking to grow to different degrees of success.

Section 5.3.5 Sensitivity Analysis of Performance Results

One potential problem of using ROE as the chief measure of value creation is that ROE can be influenced by practices with small levels of equity reaping much higher relative returns.

Decisions on investment and financing will be functions of existing wealth. The level of equity is the denominator in ROE, it will affect the overall ratio of returns. Because the ratio hides effects of size, mean equity by performance group is reported in Table 5.12.

Table 5.12. 3-Year Average, Average Equity by ROE Performance Group

ROE Performance	n	Average Equity (\$)
Low	8	-66,172
Low-Mid	13	402,401
Mid-High	12	567,474
High	12	427,377
Total	45	369,779

The lowest performing group has negative equity as expected. The top three performing groups have somewhat similar average equity levels. While there is similar financial standing between these groups, their management styles appear to create subtle differences in the equity level. The Mid-High group has a higher level of reinvestment and earns higher profits. These are likely mature practices that continue to reinvest well, albeit at a lower rate than their higher performing peers because they have already experienced the diminishing marginal returns of investment. The Low-Mid group employs more debt and withdraws more from the business. Their equity is slightly lower because of long-term higher owner withdrawal. The highest performing group has a lower average equity than the middle groups indicating that they may be younger practices that are growing rapidly. Despite these differences in overall equity, the highest performing practices still earn a much greater return per dollar of equity.

Finally, we must address our limiting assumption for the equity multiplier, which affects ROE. Recall that in our adjusted analysis, we adjusted assets to reflect the estimated building value but had no information on the buildings' debt structure and therefore assumed that the debt structure for the building was not different from the debt structure for the rest of the practice and its assets. To observe the effect of this assumption, we removed the assumed leverage multiplier

from the analysis and report return on assets (ROA) in Table 5.13. ROA can be interpreted as the profit earned for each dollar of asset and is also the product of the OPM and ATO. It is a better measure than considering only profitability because it also considers investment and asset efficiency. ATO in this calculation has been adjusted for economic depreciation and building value. Intangible assets remain part of the ATO and thus ROA while they were removed from ROE.

Table 5.13. 3-Year Average Calculated Return on Assets by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	0.0964	0.1040	-0.0739	0.2565	0.1040
Low-Mid	13	0.0417	0.0421	-0.0106	0.1119	0.0330
Mid-High	12	0.2002	0.1920	0.1218	0.3496	0.0676
High	12	0.3155	0.2605	0.0559	0.6836	0.2199
Total	45	0.1667	0.1304	-0.0739	0.6836	0.1647

ROA follows the same trends and patterns as ROE, except in the case of the two lowest performing groups. Lowest performers actually have on average nearly double ROA of the Low-Mid group. Their intangible assets apparently contribute to the creation of some return, although the return on these assets is almost one-third to half that of the two highest performing groups. This indicates that the Low groups, returns go to paying down debt rather than investment. Although debt repayment and investment increase equity, only investment increases productive capacity. The ROA for the Low-Mid group is close to zero, and then ROA increases with performance level. While the highest performers still perform much better than their peers, they do not perform as well as they do in the ROE calculation. In the ROE calculation, their performance was strengthened because borrowing is used to further increase returns.

The ability of some practices to have strong ROA but a negative ROE deserves additional commentary. Recall that there were five practices in the reported analysis that were higher performers until their intangible assets were removed from their equity position. They have a strong ROA, but negative equity. It is possible that the intangible assets in these practices are generating strong returns. These practices have a negative ROE because their equity is negative due the removal of intangible assets. After looking further into their high profits, it was revealed that in each of these practices, there was an owner veterinarian who was earning much higher than their peers. A larger sample is needed to draw definite conclusions, but it appears that the human capital whether from skill or work ethic was driving these returns. Buyers of practices are cautioned that these practices are the exception not the norm and most of the time expected return sellers receive is higher than that of the buyer. Future research should be conducted to determine the make-up of practices who earn greater than their expected return and what about them allows for the generation of expected return post-sale.

Our sensitivity analysis using ROA in contrast to ROE only changed results from the standpoint of the two lowest performing groups. The debt that intangible assets create for the lowest performing group is important for the ROE calculation, but does not affect ROA. Removal of the intangible assets in ROE did not qualitatively change results other than to further separate the highest and lowest performers. This evidence indicates that intangible assets create some value although fail to create the expected value, defined as the capitalized profit and discretionary income, that the practice was purchased for and the debt that must be repaid on this purchase decreases performance. This raises question of what the value of a practice really is and what it should be bought and sold for. Borrowing costs and discounting should certainly be considered when a practice is purchased. The consistency of these results indicate the assumed

debt and equity structure has not qualitatively affected the overall outcome of performance, especially dividing the lower and higher performers. These results, compared with ROE, also demonstrate the importance and ability of debt to either help or hurt practices.

Section 5.3.6 Summary of Adjusted DuPont Model

This adjusted analysis shows that profitability does not adequately measure total financial performance. Some of the lowest performers in terms of ROE, have greater profitability than some higher ROE performers. Removal of returns in terms of owner compensation resulted in lower returns. Asset and liability management influence ROE the most as it is productive capacity of the assets employed in the generation of services that are driving returns. This is seen in our analysis of both ATO and the leverage multiplier. Borrowing allows the highest performers to increase their asset base and pay later. However, borrowing can also result in the removal of returns from the business system through debt repayment, which is the case of our lowest performers and the debt burden related to their intangible assets. Sensitivity analysis showed that our adjustments and assumptions have not substantially changed results, and measuring performance based on ROE, rather than ROA, only further separated the highest and lowest performers.

5.4 Asset and Liability Ratios by Adjusted ROE Performance Groups

The analysis of the DuPont model results lead us to conclude a couple of important observations. Returns have three primary uses. They may be withdrawn for owner compensation, used to pay debt obligations, and/or invested to increase the productive capacity. Primarily, low financial performance is the result of low or diminished production capacity where reinvestment has not occurred or is the result of high debt obligations, which also cause lower investment rates. On the other hand, prudent investment and borrowing for the purchase of assets leads to

the highest returns. These conclusions deal primarily in the management of assets and liabilities and prompts us to look further at the analysis of the balance sheet to draw conclusions about the liquidity and solvency of veterinary practices.

Section 5.4.1 Current Ratio

Liquidity determines whether the practice can meet its short-term obligations. To measure liquidity, the current ratio by performance group is reported in Table 5.14. The current ratio is the number of current assets that the practice has for each dollar of current liability.

Table 5.14. 3-Year Average Calculated Current Ratio by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	0.9969	1.0116	0.0010	2.1978	0.7595
Low-Mid	13	0.8717	0.7933	0.2751	1.7995	0.4612
Mid-High	12	2.9091	1.5264	0.1959	19.3282	5.2531
High	12	2.2287	0.8341	0.0129	10.6708	3.1750
Total	45	1.7991	0.8497	0.0010	19.3283	3.2134

In order to be considered liquid, the current ratio must be greater than one. On average, only the two highest performing groups are considered liquid with a mean current ratio greater than 1. A strong current ratio should be greater than 1.25, which means upcoming bills in the next 12 months can be paid with some reserves that can be used to absorb unforeseen circumstances. Even in the highest performing group, the median current ratio is close to 1, but still far too low. Each performance group contains practices with a current ratio that is less than 1. Practices with a current ratio below 1 are illiquid and cannot pay their debts. Because each performance group contains practices of this type, it is helpful to analyze median values as strong liquidity practices greatly influence the mean. The Low performing group has a higher average current ratio than the Low-Mid group, likely due to the high owner withdrawal in the Low-Mid

group. There are practices within every performance group that are illiquid. In order to pay bills as they become due, additional revenue will need to be generated across the veterinary industry.

Because of the poor liquidity position of practices, it is helpful to discuss potential causes and remedies for this position. One explanation for low liquidity is the under-reporting and/or over-purchasing of inventory. All inventory reported as current assets was estimated because quality records have not been kept. Improvement of these records could improve the current ratio. Beyond improving financial records, some inventory is sensitive to time; vaccinations and pet food can expire if not sold in a timely fashion and can result in a financial loss.

Responsible record keeping and reporting can also improve current liability records. Nearly half of the practices did not have a current portion¹⁷ of their loans due listed on the balance despite reporting a long-term loan. If the current portion of a loan is not reflected in current liabilities, the current ratio will be inflated. If the current portion were included in our analysis, it would make an already poor industry liquidity position even worse. Besides improved record keeping, an understanding of time horizons in asset and liability management could also improve liquidity. It is possible that the current low liquidity occurs because current liabilities are being used to finance the purchase of capital (fixed or long-term) assets. While financing capital assets with current liabilities is contrary to sound financial management there are several explanations for what could be driving this behavior. Practices may not be able to obtain a long-term loan, practices may be debt averse and use equity to finance purchases which places stress on the business and results in short-term loans, or owners/managers need further clarification on the differences between capital and current purchases and debt. Additional research should consider all of the outlined explanations and educational material should include

¹⁷ The current portion refers to the principal and interest due on long-term loans in the coming year.

record keeping, differentiation of current and capital purchases, and how to obtain proper financing.

Section 5.4.2 Debt Coverage Ratio

In order to improve liquidity, additional revenue must be generated to pay down expenses. As discussed in our introduction of balance sheets and their relationship to profit and the income statement, residual profits are added as cash to the balance sheet and can be used to service debts. Debt service is the sum of accounts payable, rental expense, interest expense, and principal due. The ability to repay these debts is measured by the debt coverage ratio (DCR) which compares operating profit to debt service. A ratio greater than one indicates that the practice generates enough profit to repay its debt during the year. The DCR is important to profitability because principal payments on loans are not considered an expense, but result in cash leaving the business. In calculation of operating profit, rental expense and interest expense are added back to operating profit as these are expenses that have already been paid from revenue. Table 5.15 reports summary statistics of the DCR by ROE performance group.

Table 5.15. 3-Year Average Calculated Debt Coverage Ratio by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	1.2956	1.0396	0.0335	2.4213	0.7100
Low-Mid	13	1.0396	0.9641	0.5562	1.7528	0.3602
Mid-High	12	3.3442	2.3032	1.2572	11.4586	2.8504
High	12	6.6207	2.7917	1.0495	38.1637	10.4882
Total	45	3.1880	1.6381	0.0335	38.1637	5.9061

This metric is more encouraging than the current ratio, with each group on average having a DCR greater than 1. Most of the practices are effectively generating enough revenue to pay their debts, although as indicated by the minimum values the two lowest performing groups

have practices with a DCR less than 1. In the highest performing group, on average the practices generate nearly \$7 of profit for every \$1 of debt. Although the Mid-High group does not perform as well, on average their debts are more than adequately covered as their average DCR is greater than \$3. The lowest groups have a mean DCR slightly above one. Better management of debt and owner withdrawals could easily improve their debt coverage ability. Table 5.16 reports the mean percentage of revenue and mean owner withdrawal by performance group.

Table 5.16. 3-Year Average Calculated Mean Owner Withdrawal by ROE Performance Group

Average Owner Withdrawal, 3-year average			
ROE Performance	n	% Revenue	Owner Withdrawal
Low	8	6.2326%	\$103,505
Low-Mid	13	12.8927%	\$201,364
Mid-High	12	9.2465%	\$165,162
High	12	6.9746%	\$102,874
Total	45	9.1582%	\$148,049

Despite the lowest performing groups facing the lowest and inadequate debt coverage ability, owner withdrawal still occurs.¹⁸ The Low-Mid group’s owner compensation is nearly double that of the other groups. The highest performers take the most conservative withdrawals and as evidenced by Table 5.15, their debt coverage is strong as a result. To determine the state of liquidity without owner withdrawal, Table 5.17 reports summary statistics by ROE performance group for an adjusted DCR with owner compensation added back to profit to determine the practice’s ability to repay if they did not remove these funds.

¹⁸ Owner withdrawal and compensation are used interchangeably.

Table 5.17. 3-Year Average Calculated Debt Coverage Ratio plus owner compensation by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	1.7402	1.8815	0.2840	2.9435	0.7440
Low-Mid	13	2.1867	1.8912	0.8869	4.3503	0.9895
Mid-High	12	5.0023	4.1627	1.4981	11.9448	3.1163
High	12	7.9873	4.8438	1.5659	38.1637	10.4988
All	45	4.4050	2.1200	0.2840	38.1637	6.0565

The absence of owner withdrawal improves debt coverage ability in every performance group. We do not recommend eliminating owner compensation, especially when the business generates adequate returns. Table 5.17 indicates that on average, improved management of owner compensation in the two lowest performing groups could effectively allow for the servicing of all debts, which would lower the practice’s financial stress. Other strategies for improving debt coverage include cost management, increasing revenue through increased patients seen or raising prices and the refinancing of debt.

We must also address a financial reporting problem in this sample where roughly half of the practices do not report a current portion of principal due on their long-term liabilities. Due to this limitation, their principal is not included in the debt service calculation, which leads to overestimation of debt coverage ability. To address this weakness, the DCR is calculated with depreciation expense subtracted from operating profit with summary statistics reported in Table 5.18. Our assumption is that economic depreciation expense is often near or equal to the principal payment due on capital assets. While the assumption is imperfect, it allows us to determine whether principal is being considered by managers as an expense before owner withdrawal occurs.

Table 5.18. 3-Year Average Calculated Debt Coverage Ratio minus depreciation by ROE Performance Group with adjustments, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	0.8666	0.9361	-0.1016	1.8948	0.6608
Low-Mid	13	0.9373	0.8705	0.5562	1.6805	0.3557
Mid-High	12	3.3442	2.3032	1.2572	11.4586	2.8504
High	12	6.3450	2.7251	1.0401	36.1869	9.9886
Total	45	2.9556	1.4432	-0.1016	36.1869	5.6755

Results are not qualitatively different from the initial report of the DCR in Table 5.14. On average, the bottom two performance groups are unable to service their debts. Only the two highest performing groups have an average DCR greater than one. The consistency of these results is encouraging as the under-reporting of the current portion has not substantially affected our results. In the sample, total debt is relatively low which translates to a relatively low current portion. The lowest performing practices need better management of debt and owner withdrawal to improve their liquidity. The other lesson learned is that the lowering performing practices make owner withdrawals before considering principal due and reinvestment in new assets.

Section 5.4.3 Debt to Assets

Whereas liquidity represents a practice’s ability to meet its short-term obligations, solvency represents a practice’s ability to meet its total obligations. A practice is solvent if their total assets exceed their total liabilities. Solvency is measured by the debt to assets (D/A) ratio. A ratio greater than one means that debts exceed assets and the practice is insolvent. This ratio is affected by our outlined financial statement adjustments and assumptions reported in Table 3.3. Economic depreciation is assumed to be 20%, rental expense is added to current liabilities and subtracted from equity, the total building value cannot be added and the debt-equity structure is assumed to be the same as reported. We will report the D/A ratio with and without intangible

assets. Table 5.19 reports summary statistics for debt to assets without intangible assets considered in total assets.

Table 5.19. 3-Year Average Calculated Debt to Assets without Intangible Assets by ROE

Performance Group, Summary Statistics

ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	1.4903	1.3216	0.7725	3.1748	0.7257
Low-Mid	13	0.5897	0.5571	0.2914	1.1883	0.2406
Mid-High	13	0.3072	0.3233	0.0366	0.5346	0.1612
High	12	0.5442	0.4888	0.0213	1.0018	0.2965
Total	45	0.6623	0.5344	0.0213	3.1748	0.5408

Although veterinary practices have relatively poor liquidity positions, most are solvent. Only the lowest performing group is insolvent on average. The lowest practices have a large proportion of their assets made up of intangible assets. The removal of assets from the asset and equity positions demonstrate that these practices have outstanding loan balances greater than the net worth of their real assets. Despite the highest performing group's utilization of debt, their assets exceed liabilities and thus debt is a tool for growth that has not placed extensive stress on the business. The debt acquired by the lowest performing practice does place stress on the business; to test the sensitivity of practices to the removal of intangible assets, the debt to asset ratio with intangible assets added back is reported in Table 5.20.

Table 5.20. 3-Year Average Calculated Debt to Assets with Intangible Assets by ROE

Performance Group, Summary Statistics

Debt/ Assets with Intangible Assets calculated with adjustments, 3-year average						
ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.
Low	8	0.9651	0.9370	0.5286	1.5327	0.3061
Low-Mid	13	0.5789	0.5544	0.2908	1.1883	0.2366
Mid-High	13	0.3044	0.3230	0.0366	0.5010	0.1571
High	12	0.5286	0.4888	0.0213	0.9820	0.2745
Total	45	0.5609	0.5010	0.0213	1.5327	0.3213

The three highest performing groups have not substantially changed because they have a relatively low proportion of intangible assets. The results are also consistent across groups with the Mid-High group being the most solvent, followed by the High and Low-Mid groups. The focus of our discussion is on the lowest performing group. On average, their assets exceed liabilities. However, there are some practices who still have debt exceeding their assets and on average, the remaining practices have nearly a one for one trade-off between debt and assets. They are barely solvent and their debt is much, much higher than any of the other performance groups. We hypothesize that the debt owed on intangible assets has created financial stress, which requires additional debt to be used for real assets. Without a doubt, the debt burden on intangible has created financial stress for other parts of the business. Future research should be undertaken to determine what veterinary practices are truly worth so that the responsible buying, selling, and financing of practices can occur.

Section 5.4.4 Debt to Equity

Finally, our discussion of solvency is not complete without measuring the degree to which the practices are leveraged. Ultimately, we want to compare the degree of risk exposure for each performance group as well as the extent to which they utilize debt when compared to equity. We computed the Debt/Equity (D/E) ratio for which summary statistics by performance group are reported in Table 5.21. D/E is interpreted as the amount of debt used to finance purchases per dollar of equity. It is affected by our assumptions where intangible assets are removed, decreasing equity, and debt is increased by the rental expense added to current liabilities. Again, we cannot consider the building value and loan in this calculation due to a lack of reported information.

Table 5.21. 3-Year Average Calculated Debt to Equity Reported by ROE Performance Group, Summary Statistics

Debt/Equity calculated with Adjustments, 3-year average							
ROE Performance	n	Mean	Median	Minimum	Maximum	Std. Dev.	
Low	8	-109.5515	-4.5549	-829.4764	-1.4643	290.9723	
Low-Mid	13	1.6522	1.4051	0.4195	4.8957	1.2290	
Mid-High	12	0.5458	0.4918	0.0383	1.2834	0.3943	
High	12	3.4638	1.0292	0.0218	13.0271	4.5305	
Total	45	-17.9293	0.6297	-829.4764	13.0271	123.8244	

The lowest performing group has negative D/E because equity is negative due to the removal of intangible assets. In this case, debt must be used to finance because equity does not exist and the practice is highly leveraged. The mean should be interpreted with caution as it is affected by a few influential practices. The Low-Mid group has only slightly more debt than equity while the Mid-High group has more equity than debt. The highest performing practices utilize more debt than the middle performers and less than the lowest performing group. The take home message is that some level of debt is very helpful and healthy but if debt levels become too high their repayment can put stress on the business. Debt is the tool used by the lowest and highest performers. In the case of the lowest performing practices, where intangible assets are putting a strain on the business, these are loans that perhaps should not have been made because they have made the practices insolvent before business can even be conducted.

Section 5.4.5 Summary of Balance Sheet Analysis

Evaluation of the current ratio and DCR demonstrate that liquidity is an industry wide issue. Liquidity may be improved by better financial reporting or debt education. The DCR measure reports slightly better than the current ratio indicating that even without cash reserves on the balance sheet, the business can cash flow. Despite the poor liquidity position across the industry, solvency is only an issue for the lowest performers. The solvency challenges are caused

by the intangible assets that result in debts exceeding real assets and resulting in negative earned equity. Even when intangible assets are considered real assets, the lowest performing practices still have debt to assets that approach one. This demonstrates the financial stress that debt related to intangible assets has caused. These findings are consistent with the findings of the DuPont Model where improving our asset and liability management represent the greatest opportunities to increase financial returns.

5.5 Contingency Rankings and Correlations of Performance Measures

As demonstrated in our ratio analysis, ROE in the DuPont Model is useful for measuring performance as it measures overall performance but can also be divided into the OPM, ATO, and leverage multiplier. This allows us to understand what contributes to and drives overall financial returns. However, results may be sensitive to assignment of performance group. To test this outcome, ROE performance groups were also created using K-Median Clustering. Mean DuPont Model results were not different and the contingency table of groups and the average resulting DuPont Model can be found in Appendix F. Furthermore, many studies have used alternate measures of performance, often some measure of profitability, leverage, and ROA (Gloy et al. 2002, Purdy et al. 1997, Ibendahl et al. 2014). Depending on the business objective, it is appropriate to measure performance in a variety of ways. ROE measures how much wealth is being gained within the business system. Other measures seek to measure the overall level of return or the performance of a single part of the business system. For that reason, the following section reports and discusses contingency tables of performance designation if practices had been ranked by profitability, asset efficiency, or leverage. This is followed by correlation tables, which relate management decisions, especially how profit is employed, to the measures of performance found in the DuPont Model.

Section 5.5.1 Contingency Tables

Contingency tables were constructed comparing the ROE performance designation to the assignment of performance group for OPM, ATO, and the leverage multiplier. These alternative measures of performance were chosen because of their relevance and relation the DuPont Model. OPM measures profitability, which is the historical business objective in current veterinary practice. ATO and the leverage multiplier were chosen because they measure production efficiency and leverage, respectively, which are supported in the literature as being important to long-term business success (Gloy et al. 2002, Ibendal et al. 2014). Similar to ROE, performance groups were defined by natural breaks. Appendix G reports the thresholds of those performance levels. The resulting contingency results are found in Tables 5.22, 5.23, and 5.24, respectively.

Table 5.22. Contingency Table of ROE vs. OPM Performance Group Assignment

		OPM Groups				
Performance Group		1	2	3	4	Total
	1	2	2	1	3	8
ROE	2	7	6	0	0	13
Groups	3	0	2	8	2	12
	4	1	2	4	5	12
	Total	10	12	13	10	45

Table 5.23. Contingency Table of ROE vs. ATO Performance Group Assignment

		ATO Groups				
Performance Group		1	2	3	4	Total
	1	1	5	2	0	8
ROE	2	7	4	1	1	13
Groups	3	1	2	4	5	12
	4	0	1	6	6	12
	Total	9	12	12	12	45

Table 5.24. Contingency Table of ROE vs. Leverage Performance Group Assignment

		Leverage Groups				
Performance Group		1	2	3	4	Total
	1	8	0	0	0	8
ROE	2	0	2	3	8	13
Groups	3	0	7	5	0	12
	4	0	3	4	5	12
	Total	8	12	12	13	45

The results of these tables teach us a few important things. In each of the tables, we do not see many practices who change by more than one group unit. The top two performing groups tend to stay together and the bottom two performance groups also tend to stay together. Furthermore, the middle high performance group, group 3 in our contingency tables, is the most consistent in its performance group assignment. ATO and Leverage performance maps the most closely to ROE, especially for the lowest performance group where leverage is able to predict each of the lowest performers in terms of ROE performance. The other take home message seen here is that there is not a silver bullet for determining overall performance. Some practices perform better in terms of investment efficiency while others perform better in terms of leverage or profitability. There are certainly different strategies that drive increased returns. This demonstrates the usefulness of a full system analysis and implementation for producing returns. There is opportunity for all practices to increase performance regardless of performance group.

Section 5.5.2 Correlations Measuring Performance Level

Ratio analysis is useful to understand overall performance of the business system and each component of that system. However, it is an outcome of a management decision or strategy, which means it does not necessarily capture the complete relationships. Essentially, the ratios are dependent variables that are affected by a variety of factors and management of the business. To account for this, we report the correlation between our computed ratios and known factors that

are indicated, but not explicit in ratio analysis. This is done for each DuPont Model component including OPM, ATO, and leverage.

Ratio analysis shows that operating profit is related to revenue, costs, and owner compensation. The OPM accounts for revenue, but does not reflect the relationship of certain costs. Therefore, Table 5.25 reports the correlation between OPM and labor, owner compensation, overhead, and cost of goods sold (COGS) as ratios of total cost.

Table 5.25 Correlation of OPM and Cost Ratios

	OPM	Labor	Owner	COGS	Overhead
OPM	1.0000				
Labor	-0.1072	1.0000			
Owner	-0.3655	-0.4717	1.0000		
COGS	0.4891	-0.5227	-0.2640	1.0000	
Overhead	0.1143	-0.3810	-0.3359	0.1102	1.0000

Comparing OPM to the main costs in the business, we see that labor costs for both staff and owner compensation have a negative relationship with OPM. Owner withdrawal has the most negative relationship, which is to be expected where withdrawing any money from the business will directly decrease profit. This was apparent in the Low-Mid performance group during our ratio analysis of OPM and owner withdrawal. COGS and overhead have positive relationships with OPM. We must interpret this carefully. It is likely that additional production of services result in increased COGS as these are input or variable costs. It is obviously important for managers to reduce their input costs as much as possible, but increased production will invariably increase these costs, which is reflected in this correlation. It is also worth noting that the two costs associated with labor, including both labor and ownership are negatively correlated with the other costs. Here we see a trade-off between labor and capital use. As labor increases, capital decreases and as capital increases, labor decreases. There is also a negative correlation

between labor and owner compensation where practices that pay owners more will pay less for labor. In service-based businesses, like veterinary medicine, human capital becomes very important. These results indicate that management of costs associated with labor affect profit the most and that there is a trade-off between labor and capital consistent with economic theory.

Because of the lessons learned from the correlation between OPM and costs, we also wanted to determine the extent to which the way profits are employed would affect ATO and leverage. Due to lack of variables in the data regarding investment and debt, we rely on the choices managers have to employ profits as some profits will be allocated to debt and investment decisions that are not seen on the income statement. Profits may be used for owner compensation, debt repayment, and reinvestment. It is expected that owner compensation and debt repayment would have a negative relationship with ATO, as less money will be available to reinvest. Correlations are reported in Table 5.26. Owner compensation is used in correlation is computed as a percent of total revenue. Debt to assets (D/A) measures the level of debt outstanding that must be paid.

Table 5.26 Correlation of ATO, Owner Withdrawal, and Debt

	ATO	Withdrawal	D/A
ATO	1.0000		
Withdrawal	0.1050	1.0000	
D/A	-0.3635	-0.0853	1.0000

Contrary to expectation, owner compensation had a positive relationship to ATO. This was a surprising result, although the 10% correlation is rather negligible. This indicates that something else is going on. We expect that the level of investment is not as important as the productivity of assets that are purchased. Additional information regarding production is needed to understand the factors that drive ATO. There was a negative relationship between leverage,

represented by D/A, and ATO. For the most part, increased leverage decreased asset efficiency. This followed our expectation that increased debt repayment would leave less money for reinvestment and result in less productive assets.

Similarly, we wanted to understand what affected the leverage position. Again, we must rely on how profits are employed to determine what might be affecting debt. This relationship is less intuitive than with investment. Debt servicing leaves less funds to compensate owners and less funds to reinvest. However, borrowing itself also provides funds for investing which may cancel out the effect of less funds to reinvest. Still, high levels of debt related to intangible assets for the lowest performers in ratio analysis also meant little reinvestment and thus we expect the level of intangible assets, which indicate date, will have a negative relationship with the leverage multiplier. Correlations for owner compensation computed as a percent of total revenue and the percent of intangible assets are reported in Table 5.27.

Table 5.27 Correlation of Leverage, Owner Withdrawal, and Intangible Assets

	Leverage	Withdrawal	% Intangible
Leverage	1.0000		
Withdrawal	-0.0956	1.0000	
% Intangible	0.0482	-0.2317	1.0000

The debt correlations add little explanatory power. Owner withdrawal does have a slightly negative relationship with leverage as expected, but the affect is rather negligible. The level of intangible assets, which in our ratio analysis meant much higher debt levels have virtually zero relationship. This is likely because this problem only affects the lowest performance group in ratio analysis. Like with the ATO correlations, we have few independent variables to understand what is driving increased or decreased leverage in practices. In future

work, data regarding productive efficiency and the reasons debt is used will be useful to employ in regression analysis. Furthermore, adjusting for practice age and location is needed.

The caveat to the DuPont Model is that although the OPM, ATO, and leverage ratios are essentially dependent variables on factors outside of the model, they are also independent variables for determining ROE in overall performance. This helps us to narrow down not the specific factor driving returns, but certainly what that factor is related to in the business system. Here, we are also able to tie discrete performance levels described in the previous section to the continuous performance variables themselves. In order to further understand these relationships, correlations between ROE performance group assignments, represented as a categorical variable from 1-4, and the performance levels of ROE, OPM, ATO, and leverage were computed. Table 5.28 reports these correlations.

Table 5.28 Correlation of ROE Performance Group Assignment and DuPont Measures

	Group	ROE	OPM	ATO	Leverage
Group	1.0000				
ROE	0.6993	1.0000			
OPM	0.3584	-0.0353	1.0000		
ATO	0.5480	0.3453	0.2986	1.0000	
Leverage	0.2513	0.2169	0.1923	0.1279	1.0000

It follows that determining performance group by ROE would mean a high positive correlation between ROE and performance level. OPM, ATO, and Leverage are also each positively correlated to the performance group. Of the DuPont business system components, ATO has the highest correlation to ROE. The second row of Table 5.25 measures the correlation of ROE with the DuPont Model components. Following our expectations developed in column 1, ATO has the highest positive correlation with ROE. This consistent finding indicates that ATO is the main driver of ROE. Recall that ATO measures investment efficiency. Efficient assets allow for increased production of services, which should lead to higher returns. Leverage also has a

positive relationship with ROE, although the correlation is only about 20%. To this degree, leverage tends to positively increase returns when ROE is positive and decrease returns when ROE is negative as is the case in the lowest performance group. Finally, ROE and OPM have virtually zero correlation. This demonstrates that managing profitability does not adequately measure financial performance and is consistent with the conclusions drawn from our ratio analysis. Profitability does not translate to wealth and it is necessary to manage the whole business system.

It is worth mentioning that there are slight positive correlations between OPM and ATO, OPM and leverage, and ATO and leverage. These measures have a weakly positive relationship. Most notably, OPM and ATO are roughly 30% correlated. Increased production efficiency should drive higher returns in terms of profitability. The same is true of leverage, although to a lesser extent due to the cost of borrowing. This is perhaps why the relationship is only 20%. Borrowing should increase the productive asset base from which returns are generated, however this does come at a cost. The relationship between these factors is worth mentioning, but the affect is small.

Both high and low correlations are useful to our analysis as they show what is and is not important. From our ratio analysis, we know that many performance ratios take opposite directions, meaning that the lowest performers have negative equity and ROE while the highest performers have positive ROE and equity. This trend is especially apparent for ROE and debt. Ratio analysis helped us to understand that the lowest performers removed funds from the business while the highest performers have more funds flowing in than out. To remove these cancelling effects, correlations for the DuPont model were computed for only the practices in the top two performance groups. The results are reported in Table 5.29.

Table 5.29 Correlation DuPont Measures for Top 2 Performance Groups

	ROE	OPM	ATO	Leverage
ROE	1.0000			
OPM	0.0975	1.0000		
ATO	0.1039	0.1300	1.0000	
Leverage	0.6748	-0.4797	-0.3330	1.0000

In comparison with Table 5.28, the glaring difference between the top half of the performers and the entire sample is that increased leverage has the greatest positive relationship with ROE. This finding is consistent with the ratio analysis of the previous sections where the highest performers were separated by their increased debt use. It is worth noting that the middle performers may choose to use less debt as the equity in their ROE denominator is on average about \$100,000 higher than the highest performing group and decreasing returns on debt and investment may be seen. The Mid-High performance group could consider debt to increase the rate of return, but they may also be content to invest earned equity as well. Both of which reflect good management and the wealth building history of the business.

Section 5.5.3 Summary of Contingency and Correlation Analysis

We have demonstrated the usefulness of separating practices into performance groups as in many cases the mean cancels out many of the important management findings, especially related to debt as we saw in the ratio analysis. The correlation analysis has allowed us to confirm many of our conclusions gained from ratio analysis where Table 5.26 has shown that investment efficiency (ATO) and production does the most to drive returns, followed by debt. Furthermore, the correlation analysis has demonstrated that profitability has a rather negligible relationship with returns and building wealth. This finding was suspected but unconfirmed in the ratio analysis. Consistent with the ratio analysis in the previous sections, asset and liability management provide the greatest opportunities to increase returns. We know that there are

underlying factors that drive these outcomes, specifically related to production and management decision-making, but more data is needed. Nonetheless, the outcomes found here provide a guide for future data collection and further inform our interpretation of the DuPont Model in ratio analysis.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Historically, veterinary practices have managed their financial statements and business to maximize profitability and minimize taxes. While these are important management activities, they focus only on the operations component of the business system. By employing the DuPont Model to capture performance of each business process, we are able to analyze each business process separately as well as capture the overall performance of the business. The DuPont Model employs ROE as the chief measure of value creation. From our employment of this model, we are able to characterize and analyze differences in performance in our sample of veterinary practices from which several recommendations arise. The following chapter summarizes those recommendations. Section 6.1 describes the current management decisions of the performance groups. Section 6.3 discusses how this work informs manager decision-making. Section 6.3 details recommendations for financial record keeping. An overview of intangible assets and the transfer of veterinary practices is discussed in Section 6.4. Section 6.5 concludes with a summary of what we have learned and the goals of management.

6.1 Management by ROE Performance Group

The importance of a full system approach to financial management cannot be understated. The DuPont Analysis revealed that it was not operations and profit that led to high or low performance. Instead, managers must ask themselves what drives profit. It was decision-making with regards to equity or net worth, including investment and financing which determined the true differences between performance in practices. Consistent with the farm literature, the objective to build wealth should result in increased investment and borrowing while maximizing short-term profitability will not guide the business to the same decisions

(Boehlje and White 1969). In sum, we find that low performing practices have returns that flow out of the business while high performing practices have returns that flow back into the business. Two primary trends, with regard to assets and liabilities, emerge.

The first major trend that separates high and low performers is their use and purpose of debt. Debt is a tool used by the lowest and highest performers. This was consistent with the farm literature (Ibendahl et al. 2014). The lowest performance group is able to create some returns, but ROE is negative because debt exceeds real asset value. Here returns must pay down debt before compensating owners and reinvesting in the business. On the other hand, the highest performance group also has a high debt obligation, but they are able to use debt as a tool to purchase new assets that are employed to generate additional returns in excess of the cost of borrowing. The leverage ratio is the best measure of how debt is used. The highest performers used debt to increase productive capacity and thus increase returns. The lowest performers use debt as a tool to keep their poor performing businesses in practice. It should be noted that middle performers have low debt burdens. Debt neither harms nor hurts these practices. Practices in the middle groups could use debt as a tool to increase performance if they are willing to take on additional risk associated with debt

We caution that debt should not be taken because it may increase performance, which gives way to the second important trend. Prudent investment produces higher returns. Investment is the purchase of assets, which are employed to conduct business. Assets may be purchased with existing equity or by borrowing funds. Just as debt should not be taken on for the reason that debt could increase returns, investment should not occur because it could increase returns. The reason that returns are increased in both cases is important. Prudent investment results in the purchase of assets that increase the productive capacity of the business. Similar to farms,

production efficiency is critical to long-term financial success (Gloy et al. 2002, Purdy et al. 1997). Although some savings are necessary and good, cash does little good sitting in a savings account when it could be used to add additional assets such as exam rooms or equipment. ATO demonstrates how productive or efficient a practice's assets are. The highest performing practices reinvest their returns, which leads to an increased productive capacity and higher subsequent returns. Furthermore, the higher performers experienced a compounding effect where long-term investment in productive capacity allowed them to continue to separate from their lower performing peers. This compounding effect also occurred in the farm literature where the most productive farms remained successful even in periods of low prices (Ibendahl et al. 2014). The lowest performing practices use returns to either pay debts on old assets or withdraw returns from the business. Removal of returns leads to stagnant or diminished productive capacity and lower subsequent returns.

It is important to notice that there are profitability differences between performance groups and it is true that profitability does impact returns. Sensitivity analysis surrounding the measurement of performance demonstrated that profitability does not adequately measure financial performance. The inclusion of investment and financing performance measures in ROE further separated the highest and lowest performers. Some practices that earned the highest profitability failed to earn wealth, but the practices that earned wealth all also were very profitable. When we think about the drivers of the business system, this makes sense. To begin production, an influx of capital is needed through borrowing and or investment. The purchase of productive assets allows for the production of veterinary services from which profit can be generated.

Profit does not exist without the employment of assets in production. The direction of causality is important. Profitability exists because assets have been employed in the production to services, which in turn produce returns. Therefore, the productive capacity of the assets that are used will determine the level of return. The highest performing practices have higher profits because they have invested in productive capacity. Furthermore, debt is used as a tool by the highest performers to purchase assets that increase this capacity and lead to even higher returns in the business. This asset and liability management is what sets the highest performers apart and is a clear demonstration of the usefulness and relevance of the balance sheet, which tracks assets and liabilities. With this understanding, the remainder of our conclusions deal with the measurement and management of certain assets and liabilities.

6.2 Management Decision-Making: Owner-Withdrawal, Investment, and Debt

Because practice management to this point has focused on management of revenues and costs, most owners and managers have been able to produce a profit. This daily management produces the short-run return for the veterinary practice. In the long-run, managers must decide how profits should be employed to increase future profits and wealth. Options include debt repayment, owner compensation, and reinvestment in assets or some combination thereof. Once these decisions have been made, they will affect the future performance of the business. This is why we recommend a holistic systems approach to these decisions with the understanding that they are related to each other.

One trend from the balance sheet analysis in section 5.4 demonstrated that practices across performance groups have low liquidity. Part of the reason for this position is that owner compensation occurs before the measurement of performance. Owners are compensated regardless of the return that the business produces. While owners must have some level of

compensation to sustain their standard of living, the majority of owner compensation should occur after debts have been serviced and replacement of depreciated assets has occurred. It is worth mentioning that high levels of personal and student debt could be causing large owner withdrawals. If this is the case, such student debt has major implications as it greatly reduces the wealth that a practice owner can purchase. Simultaneous with the decision on the level of owner compensation, managers should also decide what level of returns to reinvest into the business. These decisions must be made simultaneously as there is a trade-off between the two; increased investment will decrease the returns available for the compensation of owners and vice versa. This decision will depend on the owner's preference for short-term returns or long-term wealth. Future research should seek to identify the optimal level of reinvestment and consumption. This optimal level will depend on the target practice value upon liquidation of wealth. Thus, future research should also measure what the final value of a practice should be. It is expected from our DuPont Analysis results that at some level there will be diminishing returns on investment and equity.

If owners and managers choose to reinvest, there is a follow up decision of what to invest in. Future research should seek to collect information about assets with purchase price, date, and useful life in order to calculate return on investment (ROI) to indicate which assets hold the greatest returns for veterinary practices. Depreciation schedules may be the most efficient method to collect this information. Investment highlights the importance of true value creation by increasing equity. Equity should not be increased for the sake of increasing equity but rather the sake of improving long-term returns on the business. As discussed in our analysis of performance levels, reinvestment will increase returns and the assets invested in matter. Assets must increase productive capacity. For example, acquiring cash to sit on a balance sheet has little

value but investing cash in assets that create additional return will improve short- and long-term value of the practice. Collecting data on asset and depreciation schedules will be useful to determine which assets create the most value and guide future research and recommendations.

It is further worth noting that investment in veterinary practice may look different than the type of investment that occurs in farms. Farming is a goods based business that requires many capital inputs while veterinary practice is primarily a service-based business. This does not mean that investment should not occur in veterinary practice, but there is an added challenge of investing in less tangible or capital assets. This non-capital investment may look like investing in advertising or human capital, through either hiring new staff or training existing employees. Any capital investments will primarily rely on technology. For example, large animal veterinarians could look at purchasing ultrasound technology. Their clients pay not for the service of “preg-checking” but for the result of that service. They need a pregnancy confirmation to decide whether or not to keep a cow. Ultrasound will allow for any earlier decision regarding the cow, and saves the client money. This value allows the veterinary to charge more for this sort of service. The take home message is that veterinarians should look to invest in productive assets, which may be tangible, but may also be in human capital and other less measurable assets.

Once a decision to invest has been made, managers must decide to finance it with equity, debt, or some other combination thereof. As long as the return on investment exceeds the interest rate, the practice will earn money by financing investments with debt. Another trend from the balance sheet analysis in section 5.4 determined that besides high owner withdrawals, another potential factor affecting the poor liquidity position is that capital (fixed) assets may currently be financed by current liabilities. Many practices are not liquid, but most are solvent, suggesting that fixed assets have been financed with current liabilities. Managers should understand that if

an asset has a life of longer than one year, it should be financed by a long-term loan. Credit cards and lines of credit should not be used for the purchase of capital assets. One constraint that practices may face is that due to their already poor liquidity position, obtaining a long-term loan may be difficult which causes them to employ more short-term debt, such as credit cards. Additional short-term debt on capital assets exacerbates the problem and creates a cycle of business stress that can ultimately lead to bankruptcy. Education on the types of assets, and how to obtain proper financing would help to improve liquidity.

6.3 Record Keeping and Financial Statements as a Decision Tool

Financial management decisions are only as good as the information that they are based on. The conclusions detailed up to this point, have made the case for the relevance of the balance sheet in increasing financial returns. Therefore, the first order of business for practice owners and managers is to improve financial reporting in order to create balance sheets from which decisions can be made. Current liabilities should reflect the current portion due on long-term loans and rental expense due in the upcoming period. Current assets should reflect an accurate inventory level. Future work should also seek to utilize consolidated balance sheets, which reflect the building value and liabilities. In veterinary practice, real estate and buildings are often held in a separate entity for tax and liability reasons. This however, leads to overestimation of asset turnover. An accounting of all assets and liabilities is important. There is a need to consolidate all business entities included in the practice so that the true state of the business is analyzed. We have included assumed adjustments for building value and the current lease payment due. Future data collection and research should seek to collect and use accrual-based consolidated financial statements and which will reduce the limitations of these assumptions in future analysis. Proper financial management and reporting lend to the best analysis and recommendations.

It must also be recognized that there is a difference in estimated ratios between an economic and accounting budget. The way in which we account for assets and liabilities matters. From an economic perspective, it is important to know the real or true worth of assets and liabilities. Therefore, we make economic adjustments that do not reflect depreciation expense and other tax-write offs. Depreciation is not only a tool to reduce accounting profit, but also demonstrates an asset's value over its life and serves as an indication of the level at which practices should reinvest. The veterinary industry currently employs MACRS depreciation so that depreciation can be expensed more rapidly and reduce tax liability. This leads to over-representing returns when calculating ATO and could mean capital gains tax on future returns. We cannot disagree that using MACRS depreciation results in tax benefits. Managers should seek to minimize taxes. Our conclusion is that financial accounting for taxes alone is not sufficient in order to make prudent management decisions. Financial statements should also reflect the actual asset value over its useful life using economic depreciation in order to provide information, and be used as a decision-making tool for managers.

One reason that having financial statements that reflect true economic value is that depreciation can be used as a tool to allocate the proper amount of reinvestment that should occur in a practice annually. Practices should budget for principal repayment and reinvestment. One method to budget is through the utilization of a capital asset replacement fund. Annual capital asset replacement (CAR) can be easily measured in two ways. One way is the difference between the value of new assets purchased and the amount of the long-term loan for the asset. For example, a car is purchased for \$25,000 with \$5,000 down and \$20,000 in loans, then the capital asset replacement cost is \$5,000 for the first year. Another option, is to budget taking the difference between economic depreciation and the term principal due for all assets. Let's say the

depreciation for all fixed assets is \$30,000 and the principal owed on the loans for these assets is \$20,000. Then, the capital asset replacement cost is \$10,000 that should be reinvested or at the very least saved for a future investment. CAR can be added to the income statement as a non-cash expense, like depreciation. Although it is not a taxable expense considered in accounting profit, CAR expense deductions report a true profit that can help guide managers to make withdrawal decisions that ensure principal and depreciation (asset replacement) are accounted for.

6.4 Business Transfer

The above recommendations highlight the importance of asset and liability management for veterinary practices. They further seek to demonstrate the role that true economic value plays in decision-making and why more thought for management's financial statements is required than simply tax accounting. This focus on real value is important because at business transfer, there must be some value assigned to the assets that are employed. This finding is contrary to current valuation practices and the following sections point out the problems with the current valuation method and propose possible alternatives.

Section 6.4.1 Critique of Current Valuation

While the veterinary industry faces liquidity constraints, the majority of the practices were solvent with total assets exceeding total liabilities. The practices that were not solvent had a large proportion of intangible assets on their balance sheets. This is characterized as the goodwill, client list, expected return, or combination thereof at purchase. From our analysis, it appears that practices do not produce a high enough return to justify this inflated purchase price. The lowest performing practices have debt that exceeds the value of their real assets and the servicing of these debts result in less ability to reinvest in productive capacity and compensate

owners. Furthermore, these “fake” assets cannot be resold and thus put unnecessary strain on the financial position of the practice. It is not prudent to pay for the expected return on an investment as that leaves no return. These liabilities create additional stress on the business and thus lead to the liquidity and solvency problems.

The current practice management of veterinary practices focuses on profitability and tax minimization. When practices are currently bought and sold, they include intangible assets, which are based on profit plus discretionary income inflated by a multiplier, often three to four times earnings¹⁹. Earnings capitalization reflects the opportunity cost of selling a profitable practice. For example, if a practice earns its owner \$1 million a year, then the owner has no reason to sell because after five years, the practice would have earned the owner an additional \$5 million. The earnings multiplier incentivizes the owner to sell because they can earn their expected return on keeping the practice today.

This current method of valuation has several problems. First, earnings capitalization ignores discounting. The current owner is willing to sell their practice for \$4 million because they no longer have to work for the next four years to earn the same expected return. This however, ignores that a dollar today is worth more than a dollar tomorrow and the return should be worth less than the original \$4 million. Another problem here is that oftentimes when practices are sold, there is a large transitory component. Suppose that the owner veterinarian who sells the practice retires along with the practice sale. Clients who were coming to that clinic because they liked their veterinarian are now incentivized to look elsewhere to take care of their pets. Some clients may stay and some may leave, but if the human capital generating expected

¹⁹ Earnings in this case refer to profit plus owner’s compensation.

returns exits at the sale, the expected return included in the selling owners' opportunity cost is different than the return that can be expected for a new owner veterinarian.

The other problem of earnings capitalization as a valuation method occurs on the buyer's side. Going back to the example of the practice that earns \$1 million each year and is valued by an earnings capitalization at \$4 million. Suppose that an associate veterinarian used a Small Business Administration (SBA) loan, as is common for veterinary practice, to finance the purchase. It is common for veterinary practices to be purchased with an SBA loan with 100% of the value being financed. The loan term is 15 years and has a 6.25% interest rate with monthly payments. By the time the loan is repaid, the practice will have cost nearly \$6.2 million. The \$4 million practice purchased will also end up paying \$2.2 million in interest expense. Buyers must consider the cost of debt when purchasing the practice. The buyer will automatically have profits reduced by \$150,000 annually in interest expense alone.

Buyers should also consider that if the practice is purchased separately from its assets, this does not include the building and equipment cost in the needed return. Some will argue that practices can be purchased without purchasing a building. This may be true, however, the long-term lease value can also serve as a proxy for a building value. The practice apart from its assets is worthless. Intangible assets may have some value, but only when paired with tangible assets. Buyers should be cautioned that buying a practice and its assets separately is essentially double dipping on behalf of the seller. Earnings do not occur without the assets generating those earnings. Buyers can consider paying book value for assets or earnings capitalization, but never both; the earnings capitalization is contingent upon the existing asset base.

This inflation of practice value makes it increasingly difficult for associate and new veterinarians to purchase practices. Large earnings multipliers are being driven by competition of

equity companies who are willing to pay up to ten times earnings to purchase practices. While this large value is certainly disconcerting for new veterinarians and attractive to retiring veterinarians, we caution that equity companies are only willing to purchase certain, not all, practices at this inflated figure. Equity companies use the acquisition of practices to achieve some competitive advantage through the acquisition of a certain location or labor skill. For the most part, the rest of the industry will have to come up with an alternative solution to the buying and selling of practices. Owners are encouraged to invest in real assets as these will always have and produce value when employed.

Section 6.4.2 Accounting of Intangible Assets

The current method of buying and selling practices with an earnings capitalization is problematic because it is based on the assumption that future earnings will occur in the same way the past earnings have occurred. This ignores the tangible and intangible assets, which generate those earnings. Tangible assets are easily characterized by their useful life and purchase price. However, intangible assets are more difficult to characterize. The problem with intangible assets is that they do not create returns by themselves. For example, having a radiologist is worthless without radiology equipment. On the other hand, the performance and return of radiology equipment is greatly increased by employing a radiologist. Our point here is that intangible assets do not exist because of past earnings. Past earnings, and future earnings for that matter, occur because of the employment of productive assets. The direction of causality is important here. Furthermore, the accounting of intangible assets is important. Human and organizational capital are important in service-based industries like veterinary medicine, and can certainly increase value.

The question then becomes what are intangible assets are made up of? To this point in veterinary practice, the good will is typically called a client list. Clients are one form of

intangible assets. Another type of intangible assets is the human capital employed by the business including an existing staff as well as the skill level of employees. The business culture of quality care, growth, maximizing returns for the business, and more, are other types of intangible assets. Leadership, whether from owners or managers, is another intangible asset. In short, intangible assets can be described as some form of human, organizational, or information capital.

Because intangible assets do not create value alone, it may not be possible to entirely attribute earnings to separate intangible assets. However, there are proxies that can be used. For example, human capital can be characterized by salary. The important thing for buyers to understand is that in negotiation, it is not as important to assign values to intangible assets so much as it is to discuss what intangible assets will be included in the sale. Going back to our human capital example, if the owner veterinarian in a small practices leaves, then a large portion of expected return will likely leave with him. In large practices, the departure of the owner will likely result in a smaller departure of human capital. Business schools teach this way of thinking in what is called a balanced scorecard approach (Kaplan 2004). In negotiation, buyers and sellers should understand that the book value of tangible assets should be the minimum value of the practice and intangible assets can be negotiated through earnings capitalization based past earnings paired with an accounting of what intangible assets were employed to generate those past earnings.

Section 6.4.3 Existing Intangible Assets and Business Transfer

Much of this study has pointed out that intangible assets put stress on the business because they cannot be resold and eat into future profits. However, this provides little instruction for those who have intangible assets existing on their balance sheets. First, practices should know where they stand. A quick test of the value being received from the practice is to divide the

intangible assets by three or four, the most common earning multipliers. For example, if a practice was purchase for \$2 Million and we divide by 4, then the practice should earn at least \$500,000 annually in profit plus owner compensation to meet expectations. If profits exceed this value, then returns are higher for the buyer than the seller expected. If profits are lower, then the buyer probably paid too much for the practice. Buyers who overpaid should consider new revenue streams and efficiency improvements to make up the difference. Furthermore, veterinarians looking to purchase practices should make a case for discounting, understand they will pay more than the purchase price in interest, understand the accounting of intangible assets, and calculate an expected return on investment of their own.

Finally, buyers and sellers should look to alternative options for the transfer of practices. Literature review has suggested that partnership could be an alternative method of business transfer. A partnership model similar to that of law firms, dentists, and other professional services may be a viable option. Partnership helps encourage reinvestment, incentivizes practice owners to identify talent and business acumen that will help earn them returns over time and at retirement, and creates a path to ownership that would not otherwise exist for new veterinarians. The buy-in and structure of partnership will vary between practices, but the important message here is that partnership allows for tangible and intangible assets to be tied together and removes the transitory nature of buying and selling practices that reduces value. As a final word on this issue, we expect the inflated values of practices caused by competition from equity investors to continue only for a period of time. In the long-run, practice values are expected to be smaller and partnership may provide a more secure retirement.

6.5 Concluding Comments and Future Work

Future data collection could greatly improve the robustness of the results found here to draw broader, industry-wide conclusions. Besides financial statements, characteristics and attributes of practices would allow for analysis of the factors that drive financial returns. Levels of production, including the number of veterinarians and invoices are useful. Additionally, business age is another important factor in determining returns. Depreciation schedules for assets and liability information would allow for returns on investment to be calculated and recommendations about the most useful assets to be made. Our financial statement data has allowed us to compare differences between practices. Future research should also seek to follow individual practices through time. This would allow us to gain increased understanding of how practices respond to changing market conditions and risk. We still have much to learn and this research serves as a starting point to guide future data collection and work.

The DuPont Model has allowed us to demonstrate that there is much more to practice management and running a business than simply earning a profit. Management should focus on a whole business system approach to include all operation, investment, and financing activities. The dynamic relationships of each activity will affect the overall financial health of the practice. In order to understand this financial position, an accurate and relevant balance sheet is a necessary business tool. The results found here have simply touched the tip of the iceberg on the financial management of veterinary practices. The conclusions drawn are limited by the data and practices included in this sample. However, what we have learned from this research should be used as an educational tool for veterinary practices to create useful financial statements and serve as a reference point to frame their individual decision-making. Management is less about following rules of thumb and more about understanding the dynamic relationships between each business process and applying this understanding to inform decision-making. We have provided

a model for managers to measure their own performance and a guide for the creation of useful financial statements. Individual practice managers can employ the DuPont Model and implement findings without being constrained by the data limitations we faced in research.

REFERENCES

- Barth, Mary E., William H. Beaver, and Wayne R. Landsman. 1998. "Relative valuation roles of equity book value and net income as a function of financial health." *Journal of Accounting and Economics*. 25: 1-34.
- Boehlje, Michael D. and T. Kelley White. 1969. "A Production-Investment Model of Farm Firm Growth." *American Journal of Agricultural Economics*. 51(3): 546-553.
- Burge, Gary D. 2003. "Six Barriers to Veterinary Career Success." *Journal of Veterinary Medical Education*. 30(1): 1-4.
- Burgstahler, David C. and Ilia D. Dichev. 1997. "Earnings, Adaptation and Equity Value." *The Accounting Review*. 72(2):187-215.
- Chisholm, Anthony H. 1974. "Effects of Tax Depreciation Policy and Investment Incentives on Optimal Equipment Replacement Decisions." *American Journal of Agricultural Economics*. 56(4): 776-783.
- Collins, Daniel and Edward Maydew. 1997. "Changes in the value-relevance of earnings and book values over the past forty years." *Journal of Accounting & Economics*. 24(1):39-67.
- Cron, William L., John V. Slocum Jr., David B. Goodnight, and John O. Volk. 2000. "Executive summary of the Brakke management and behavior study." *Journal of the American Veterinary Medical Association*. 217(3): 332-338.
- Gabriel, Stephen C. and C.B. Baker. 1980. "Concepts of Business and Financial Risk." *American Journal of Agricultural Economics*. 62(3): 560-564.

- Gilson, Ronald J. and Robert H. Mnookin. 1985. "Sharing among the Human Capitalists: An Economic Inquiry into Corporate Law Firm and How Partners Split Profits." *Stanford Law Review*. 37(2): 313-392.
- Gloy, Brent A., Jeffrey Hyde, and Eddy L. LaDue. 2002. "Dairy Farm Management and Long-Term Farm Financial Performance." *Agricultural and Resource Economics Review*. 31(2): 233-247.
- Hanson, Gregory D., and Diane R. Bertelsen. 1987. "Tax Reform Impact on Agricultural Production and Investment Decisions." *American Journal of Agricultural Economics*. 69(5): 1013-1020.
- Harris, J. Michael, Ashok K. Mirsha, and R.P. Williams. 2012. "The impact of farm succession decisions on the financial performance of the farm." Paper presented at Agricultural and Applied Economics Association Annual Meeting, Seattle, WA, 12-14 August.
- Helfert, Erich A. 2000. *Techniques of Financial Analysis: A Guide to Value Creation*. 10th ed. New York: Irwin McGraw-Hill.
- Ibendahl, Gregg and Michael R. Langemeier. 2014. "Characteristics That Help a Farm Achieve Long-Term Viability." *Journal of the ASFMRA*. 240-250.
- Ibendahl, Gregory. 2014. "Characteristics That Make a Farm Consistently Profitable." Paper presented at Southern Agricultural Economics Association Annual Meeting, Dallas, TX 2-4 February.
- Internal Revenue Service. 2016. *Publication 535, Chapter 8*. Washington DC.
- Internal Revenue Service. 2016. *Publication 946, Chapter 4*. Washington DC.
- Kaplan, Robert S. and David P. Norton. 2004. "Measuring the Strategic Readiness of Intangible Assets." *Harvard Business Review*. February.

- Knippenberg, Ross, Michael R. Dicks, Bridgette Bain, and Michael Dow. 2014. "Estimating the financial return on a veterinary education" *JAVMA* 246(4): 422-424.
- Livio, Susan K. 2013. "Obamacare side effect: More hospitals expected to merge under Affordable Healthcare Act." *Newark Star Ledger*.
- Mand, Jeremy. 2014. "Hospital Consolidations and Conversions: A Review of the Literature." *Universal Health Care Foundation of Connecticut*.
- Marcinko, David E. "American Medical News Interview Regarding: Medical Practice Value and Goodwill. Interviewer: Karen Caffarini." Transcript. *American Medical News*.
- Mirsha, Ashok K, J. Michael Harris, Kenneth W. Erickson, Charlie Hallahan, and Joshua D. Detre. 2012. "Drivers of agricultural profitability in the USA.: An application of the DuPont expansion method." *Agricultural Finance Review*. 72(3): 325-340.
- Mirsha, Ashok K., Hisham S. El-Osta, and James D. Johnson. 1999. "Factors Contributing to Earnings Success of Cash Grain Farms." *Journal of Agricultural and Applied Economics*. 31(3): 623-637.
- Morrison, Alan D. and William J. Wilhelm Jr. 2003. "Partnership Firms, Reputation, and Human Capital." Working paper. University of Oxford. Said Business School.
- Moss, Charles B., Stephen A. Ford, and William G. Boggess. 1989. "Capital Gains, Optimal Leverage, and the Probability of Equity Loss: A Theoretical Model." *Agricultural Finance Review*. 49: 127-134.
- Nehring, Richard, Jeffrey Gillespie, Ani L. Katchova, Charlie Hallahan, J. Michael Harris, and Ken Erickson. "What's Driving U.S. Broiler Farm Profitability?" 2015. *International Food and Agribusiness Management Review*. 18 (Special Issue A): 59-78.

- Nehring, Richard, Jeffrey Gillespie, Charles Hallahan, James Michael Harris, and Ken Erickson. 2013. "What is driving economic and financial success of US cow-calf operations?" *Agricultural Finance Review*. 74(3):311-325.
- O'Neil, Terry. 2017. Personal Interview. June 30.
- Purdy, Barry M., Michael R. Langemeier, and Allen M. Featherstone. 1997. "Financial Performance, Risk, and Specialization." *Journal of Agricultural and Applied Economics*. 29(1): 149-161.
- Sanford, Jeff. 2017. Ongoing personal communication. Georgia Small Business Development Center, University of Georgia College of Veterinary Medicine Practice Management Rotations. Athens, GA.
- Teece, David J. 1996. "Expert talent and the design of (professional services) firms." *Industrial and Corporate Change*. 12(4): 895-916.
- Willis, C.E. and R.D. Perlack. 1980. "A Comparison of Generating Techniques and Goal Programming for Public Investment Multiple Objective Decision Making." *American Journal of Agricultural Economics*. 62(1):-74.
- Volk, John O., Karen E. Felsted, Roger F. Cummings, John W. Slocum, William L. Cron, Kevin G. Ryan, and Mary C. Moosbrugger. 2005. "Executive summary of the AVMA-Pfizer business practices study." *Journal of the American Veterinary Medical Association*. 226(2): 212-218.
- von Nordenflycht, Andrew. 2010. "What is a Professional Service Firm? toward a Theory and Taxonomy of Knowledge Intensive Firms." *The Academy of Management Review*. 35 (1): 155-174.

VPI®. 2014. “The VPI®-Veterinary Economics Financial Health Study.” *Veterinary Pet Insurance Company*. pp. 1-8.

APPENDIX A

Example Balance Sheet (ending December 21, 2015)

Current Assets		
Cash	\$35,178	
Accounts Receivable	\$12,122	
Inventory	\$16,799	
Supplies	\$2,008	
Other	\$301	
Total Current Assets		\$66,408
Fixed Assets		
Buildings	\$0	
Leasehold Improvements	\$0	
FFE	\$237,866	
Other	\$0	
Less Accumulated Depreciation	(\$192,844)	
Total Fixed Assets		\$45,022
Other Assets		
Intangible Assets	\$675,000	
Less Accumulated Amortization	(\$450,000)	
Total Other Assets		\$225,000
Total Assets		<u>\$336,430</u>
Current Liabilities		
Accounts Payable	\$6,782	
Credit Card Payable	\$3,276	
Taxes Payable	\$821	
Lease Expense	\$22,400	
Current Portion of Long-Term Debt	\$18,634	
Other Current Liabilities	\$0	
Total Current Liabilities		\$51,913
Long-Term Liabilities		
Notes Payable	\$178,192	
Total Long-Term Liabilities		\$178,192
Total Liabilities		<u>\$230,105</u>
Equity		<u>\$106,325</u>
Total Liabilities and Equity		<u>\$336,430</u>

APPENDIX B

Example Income Statement (for the period January 1, 2015-December 31, 2015)

Revenue		<u>\$1,281,465</u>
Cost of Goods Sold		\$320,367
Payroll Expenses		
Staff Wages	\$230,663	
Associate Wages	\$116,589	
Contract Labor	\$0	
Owner's Compensation	\$90,000	
Payroll Tax	\$36,792	
Employee Benefits	\$45,246	
Total Payroll		\$519,290
Operating Expenses		
Advertising	\$11,076	
Bad Debts	\$92	
Bank Fees	\$14,367	
Car & Truck Expense	\$0	
Charitable Contributions	\$500	
Computer Maintenance	\$17,433	
Dues & Subscriptions	\$2,850	
Education/ Seminars	\$3,769	
Equipment/Tools	\$5,841	
Insurance	\$20,753	
Maintenance/Repairs	\$18,364	
Miscellaneous	\$309	
Office Supplies	\$12,814	
Outside Services	\$0	
Professional Fees	\$56,825	
Postage	\$2,029	
Rent	\$22,400	
Security	\$12,000	
Supplies	\$15,921	
Taxes & Licenses	\$16,009	
Travel & Entertainment	\$854	
Utilities & Phone	\$22,388	
Uniforms	\$5,694	
Total Operating Expenses		\$262,288
Total Operating and Overhead Expenses		\$1,101,945
Operating Profit		\$179,520
Other Expenses		
Depreciation	\$27,962	
Interest Expense	\$12,544	
Total Other Expenses		\$40,506
Total Expenses		<u>\$1,142,451</u>
Net Income (BT)		<u>\$139,014</u>

APPENDIX C

Table C.1 Calculated Example DuPont Ratios from Example Financial Statements

Calculated Example DuPont Ratios			
Ratio		Reported	Adjusted
	OPM	0.1401	0.1401
	ATO	3.8090	1.7057
	ROA	0.5336	0.2670
Leverage Multiplier		2.6136	9.6519
	ROE	1.3946	2.5770

APPENDIX D

Table D.1 Sensivity Analysis of Calculated DuPont Ratios for Building Value

DuPont Ratios calculated with adjustments, 3-year average					
Sensitivity Analysis where Building=Rent x 15					
	OPM	ATO	ROA	Leverage	ROE
<i>Low</i>					
Mean	0.1177	0.7639	0.0730	-108.5515	-0.7201
Median	0.1124	0.7193	0.0779	-3.5549	-0.3823
Min	-0.0406	0.5292	-0.0513	-828.4764	-2.8989
Max	0.2800	1.1003	0.2052	-0.4643	-0.0160
SD	0.1061	0.1704	0.0794	290.9723	0.9799
<i>Low-Mid</i>					
Mean	0.0448	0.6728	0.0280	2.6522	0.0648
Median	0.0494	0.5987	0.0257	2.4051	0.0652
Min	-0.0112	0.3472	-0.0060	1.4195	0.0192
Max	0.0872	1.0486	0.0740	5.8957	0.1267
SD	0.0313	0.2182	0.0225	1.2290	0.0352
<i>Mid-High</i>					
Mean	0.1233	1.1750	0.1311	1.6416	0.2050
Median	0.1216	1.1027	0.1319	1.5258	0.1956
Min	0.0639	0.5923	0.0772	1.1231	0.1499
Max	0.1952	2.2417	0.1793	2.2834	0.2796
SD	0.0349	0.4813	0.0357	0.3995	0.0454
<i>High</i>					
Mean	0.1673	1.3810	0.2516	4.3679	0.5412
Median	0.1593	1.3249	0.2367	1.7810	0.5837
Min	0.0430	0.7167	0.0325	1.0218	0.3407
Max	0.3477	2.5055	0.6045	14.0271	0.8574
SD	0.0870	0.5603	0.1806	4.5948	0.1522

APPENDIX E

Note: Units of change are represented in group levels. Decreases in performance indicated by negative sign (-) followed by unit change while increases indicated by positive sign (+) followed by unit change. No change is indicated with (.).

Table E.1. Summary of Performance Group Changes

Practice	Reported	Adjusted	Change
1	1	1	.
2	2	2	.
3	2	2	.
4	1	2	+1
5	1	2	+1
6	4	2	-2
7	4	1	-3
8	2	2	.
9	3	4	+1
10	2	2	.
11	2	2	.
12	2	2	.
13	2	3	+1
14	4	1	-3
15	2	1	-1
16	4	4	.
17	1	4	+3
19	4	4	.
20	1	1	.
21	2	4	+2
22	4	3	-1
23	1	1	.
24	3	1	-2

Practice	Reported	Adjusted	Change
25	4	4	.
26	4	4	.
27	3	2	-1
28	3	3	.
29	1	4	+3
30	4	4	.
31	3	3	.
32	1	2	+1
33	4	3	-1
34	1	1	.
35	2	3	+1
36	3	3	.
37	3	3	.
38	3	3	.
39	4	2	-2
40	1	4	+3
41	3	3	.
42	3	3	.
43	3	3	.
44	3	4	+1
45	2	2	.
46	4	4	.

APPENDIX F

Table F.1 Division of K-Median Cluster Groups defined by ROE

Cluster	Frequency	Percent	Cumulative
1	17	37.78	37.78
2	9	20.00	57.78
3	14	31.11	88.89
4	5	11.11	100.00
Total	45	100.00	

Table F.2 Average DuPont Ratios by K-Median Cluster Group

Cluster	n	OPM	ATO	Leverage	ROE
1	17	0.1231	1.6264	1.8627	0.3082
2	9	0.1692	1.9568	5.1148	0.8809
3	14	0.0446	0.9959	1.7939	0.0441
4	5	0.1542	1.0842	-172.9270	-1.4882
Total	45	0.1113	1.4361	-16.9294	0.1410

APPENDIX G

Table G.1 Division of Performance Groups

Performance Level	Division of Performance Groups			
	Adjusted ROE	OPM	ATO	Leverage
1	ROE < 0	-0.0 < OPM < 0.04	0.5 < ATO < 1	A/E < 0
2	0 < ROE < 0.2	0.05 < OPM < 0.1	1 < ATO < 1.2	0 < A/E < 1.5
3	0.2 < ROE < 0.4	0.1 < OPM < 0.15	1.2 < ATO < 1.7	1.5 < A/E < 2.3
4	ROE > 0.4	0.15 < OPM < 0.35	1.7 < ATO < 3.2	2.3 < A/E < 15