

Evaluating Financial and Economic Factors Contributing to the Sustainability of Beginning Farms: Evidence from Five Farms in Tennessee and Virginia

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Introduction

Starting a farm business shares similar uncertainties as starting any type of business. In the U.S., newly entering farms have lower survival rates than more experienced ones (Ahearn & Newton, 2009).

However, understanding the factors that make some beginning farmers more likely to survive than others may help reduce uncertainty when making the decision whether or not to start a farm business. Although the survival of a farm business may be influenced by various factors, financial and management factors are of critical importance when determining the survival of new farms.

Between 2014 and 2015, we collected information from five beginning farmers: three in Virginia and two in Tennessee. We used the same methodology to obtain information from these farms, but levels of information obtained across participants varied due to differences in the way financial records are kept and openness in sharing farm financial records. Given data limitations, the information presented only partially describes economic and financial characteristics of each farm. We present some measures associated with farm size, cost structure, margins and market outlets used for those farms that provided sufficient information.

Although every farm is unique, our economic and financial analysis of beginning farms may provide helpful insights regarding necessary resources to start a farm business that is economically sustainable over time.

Farm Descriptions

Farm Business Size

Measures of farm size include 1) sales volume, 2) revenue, 3) value of farm production, 4) total farm assets, 5) total acres controlled, 6) livestock numbers, and 7) total labor used.

Some farm size measures are associated with production, while others are associated with the quantity of resources used. We could assume that those farmers with the most resources are going to reach the highest total production; however, a manager's ability to *efficiently* use resources determines whether a farm business is reaching its production goals.

Farm size measures are presented in **Table 1**. A consistent farm size measure obtained from all farms was *acres controlled*. This measure includes both acres owned and rented. Size based on acres controlled was very different for each farm: Farm A rented 51 acres from a non-relative since 2012; Farm B purchased 73 acres from a non-relative in 2008; Farm C purchased 6 acres from a non-relative in 2012; Farm D rented 9 acres from a relative in 2013; and Farm E rented 10 acres from a non-relative since 2013. It is important to note that Farms B, C and D were located in rural areas, while Farms A and E were located on the edge of a municipality. Acres controlled, as a farm size measure, are only useful when comparing the same type of crop farms with similar soil resources and production practices.

Similarly, *livestock numbers* are useful to compare farms with similar types of livestock. Farm A has 1,300 head of poultry; Farm B has 20 beef cows, six dairy cows, one hog and 100 head of poultry; Farm C has two hogs and 12 head of poultry; and Farm E has eight hogs and 150 head of poultry.

Finally, *revenue* is another measure of farm business size. Farms A, B, C, D and E reported \$90,000, \$32,000, \$60,000,

\$90,000 and \$30,000 in annual revenue, respectively.

Table 1. Farm Size Measures

Farm	A	B	C	D	E
Location	Virginia	Virginia	Virginia	Tennessee	Tennessee
Revenue	\$90,000	\$32,000	\$60,000	\$90,000	\$30,000
Acres Controlled (acres)	51	73	6	9	10
Livestock Numbers	1,300 head of poultry	20 beef cows, 6 dairy cows, 1 hog, 100 head of poultry	2 hogs and 12 head of poultry	None	8 hogs and 150 head of poultry

Farm Specialization and Diversification

Farms A, B, C, D and E specialized in vegetable production with 80 percent, 95 percent, 100 percent, 100 percent and 55 percent of revenue derived from vegetable crop sales, respectively. Farms A, B and E diversified their farm operations by adding livestock after the first year, while Farms C and D maintained vegetable crops as their only source of income over time.

Margins and Access to Financial Resources

Margin measures include gross margin, operating margin, net income margin and EBITDA margin, defined as gross profit divided by revenue, operating income divided by revenue, net income divided by revenue, and EBITDA divided by revenue, respectively.¹ While some Extension and research publications tend to classify margin measures as profitability measures (Kantrovich, 2011; Langemeier, 2016), it is important to note that profitability can be measured as net income divided by any measurement of investment and not net income divided by revenues. Examples of profitability ratios are return on farm assets and return on farm equity (see Appendix 1).

The information provided by the farms allowed us to estimate EBITDA margins

(e.g., EBITDA divided by revenue). EBITDA is defined as total farm revenue minus cost of goods sold (COGS) and operating expenses excluding depreciation and amortization, and it is used in this study as a proxy for each farm’s margin. Parties interested in understanding the financial health of a business, such as lenders and investors, tend to use EBITDA as a measure of financial health, a component of business valuation and/or cash flow proxy (Calabrese and Rafferty, 2003). Although a controversial measure, EBITDA is one of the most-used financial metrics by practitioners (Trejo-Pech, Noguera and White, 2015), and it may be the only proxy of profitability available when interest, taxes, depreciation and amortization values are not available, as is the case for this study. Additionally, in this study, EBITDA is a good proxy of profitability for those farms reporting no assets, renting both land and equipment, and using direct-to-consumer market outlets where earnings and cash from operations tend to be close to each other, if not the same. Nonetheless, EBITDA may not be a good proxy of profitability for farms where working capital and capital expenditures (e.g., investments) are significant.

In **Table 2** we present EBITDA margins for all farms. Farm A’s EBITDA margin,

¹ Appendix 1 at the end of this document contains a glossary of the financial terms referred to in this publication.

presented in the first row of **Table 2**, suggests that about 28 percent of the farm’s revenue, after subtracting COGS

and operating expenses, is available to cover interest, taxes, depreciation and amortization.

Table 2. EBITDA Margins

Farm	A	B	C	D	E
EBITDA margin – Whole Farm	27.78%	4.53%	72.50%	50.76%	6.2%
Gross EBITDA margin – Vegetable Crops	32.36%	29.68%	72.50%	50.76%	16.08%
Gross EBITDA margin - Poultry	9.44%				
Gross EBITDA margin - Eggs					3.18%
Gross EBITDA margin - Hogs					-56.14%
Gross EBITDA margin - Beef		-439.21%			

Farm C’s EBITDA margin is inflated as they did not report repairs, maintenance and gas expenses. These expenses can be significant given that this farm owned two small tractors, a tiller, a bush hog and a field cultivator. During the first year of operation, this farm built four high tunnels and a green house. Only one of the high tunnels was built using U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) financial assistance.² All other investments were funded through savings, money borrowed from relatives, and farm profits.

In **Table 2**, we also present EBITDA margins by product line or enterprise (e.g., vegetable crops, livestock). More than the estimated margins, we are interested in the margin values’ sign (i.e., positive or negative). This measure could help identify the causes of a whole-farm profitability problem. For example, Farms B and E may need to evaluate beef and hog profitability individually as they may be the cause of the low whole-farm EBITDA margins. Farm B’s EBITDA margin associated with beef suggests COGS and operating expenses are five times higher than the revenue generated by this enterprise in 2013. It is important to note that revenue and expenses are presented as reported by the

producer for a specific year and do not take into consideration inventory adjustments.³ The EBITDA margin values’ sign may also be the result of the methodology used in this study to estimate specific enterprise costs such as gas, labor, repairs and maintenance. As some costs were estimated for the whole farm and not by enterprise, we allocated expenses based on percentage of sales by product line. For example, for Farm A, 20 percent of sales were poultry sales, so 20 percent of total labor was allocated to this enterprise. Ideally, we should allocate the exact value of expenses associated with each product line. Enterprise profit margins can be misleading if costs are not attributed to the correct source (i.e., what percent of a tractor’s time is attributed to livestock vs. vegetables).

One characteristic shared by all farms considered in this study is the reliance on savings and family loans to start the operation. None of the five farms borrowed money from banks or other financial lenders. Some of the producers believed loans available through the banking system or other financial institutions are not designed for new and beginning farms. Some of these beliefs are based on previous

² <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/>

³ For more information about inventory adjustments and accounting methods go to <http://classes.ses.wsu.edu/EconS450/Spring2011/docs/Cash%20vs%20Accrual%20Accounting.pdf>, and https://www.irs.gov/publications/p225/ch02.html#en_US_2016_publink1000217681

experience or lack of information regarding programs dedicated to help beginning farmers start a business.⁴

Finally, it is important to note that four out of the five farms in this study have access to off-farm income through a part-time job or their partners' off-farm job.

Cost Structure

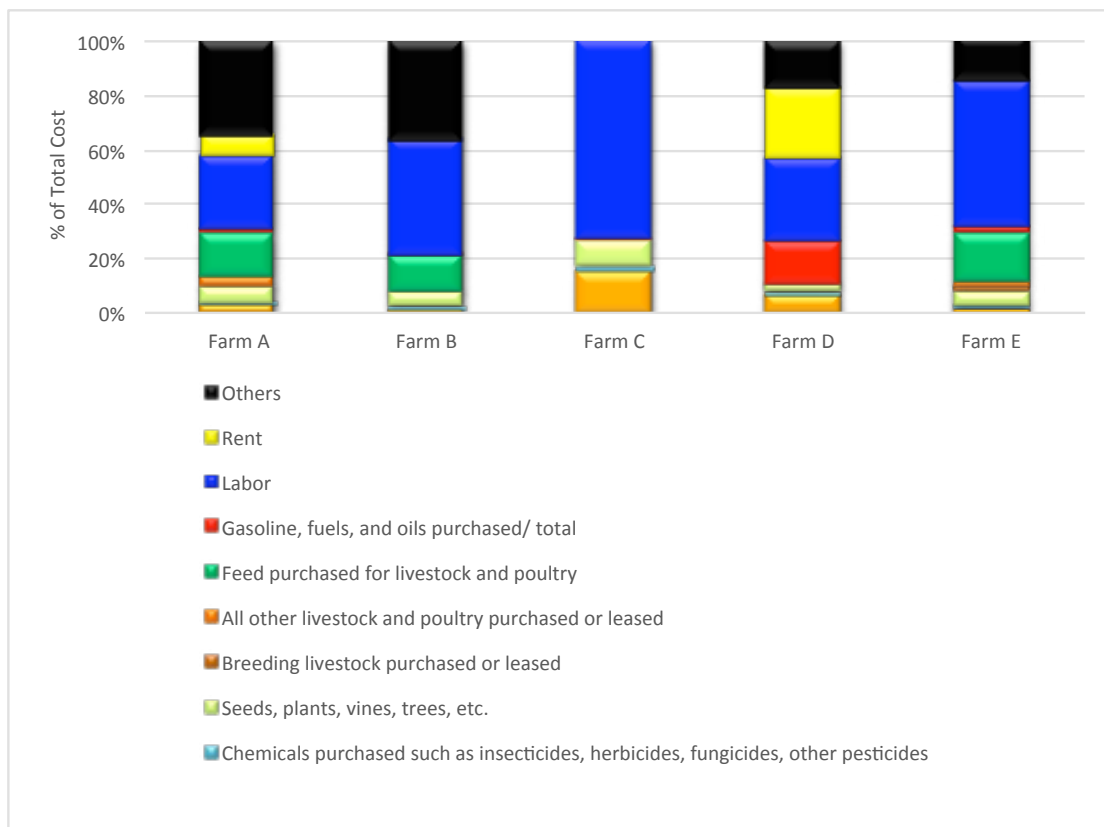
Understanding the cost structure of a farm could help us understand the resources needed to start a farming operation. For example, it is expected that a farm with a higher percentage of labor-intensive crops

will have a larger percentage of variable expenses associated with labor.

Figure 1 presents the expenses associated with various types of variable costs as a percentage of total cost. Farms A and B specialize in vegetable production, so their largest expense is labor. The second largest expense for these farms is feed purchased for livestock and poultry.

Farms B and E indicated labor costs were zero because they either relied on their own labor or family labor. Nonetheless, it is important to estimate the value of this labor for a more accurate estimation

Figure 1. Cost by Category as a Percentage of Total Cost.



⁴ An example of these kind of programs is Farm Credit Services of America, Young & Beginning Farmers and Ranchers <https://www.fcsamerica.com/products/young-beginning>

of the EBITDA margins and a better representation of variable cost structure. Additionally, assigning a value to unpaid labor may help farm operators to plan for future scenarios where the principal operator is no longer able to work or family members are not around to help. Farm E's owner, for example, estimated a total of about 2,382 hours used in 2015 to operate his farm. This is equivalent to about a 50-hour work week for 12 months. This is more than what a full-time employee will work in a year. It is important to note that Farm E's owner is the only labor available for this operation. About 26 percent of the owner's time is spent in marketing activities; 24 percent is spent in harvesting, washing and packing activities; 21 percent in animal care activities; and the rest of the hours are used for planning, record keeping and additional farm chores.

We estimated a value for unpaid labor by multiplying total labor hours dedicated to various farm chores (excluding management and as estimated by owner) by average prevailing wage rates for farm labor as reported by the U.S. Department of Labor.⁵ When adding the estimated labor value to the total variable cost, labor became the largest expense for Farms B and E. Farm A reported both paid and unpaid

labor, so we did the same exercise to estimate the value of unpaid labor for this farm.

The "Others" category includes repairs, maintenance and utilities as well as other specific categories such as meat processing, veterinary, breeding and medicine expenses.

Market Outlets

Identifying best marketing strategies and market outlets for farm products are very important components of a successful farm enterprise (Dunn, Harper and Kime, 2009). Direct-to-consumer market outlets such as farmers markets may be good entry-level venues when a farmer has no experience marketing agricultural products. Market outlets such as farmers markets tend to have a low cost of entry, do not require high production volumes in advance, and allow farmers to have direct contact with final consumers (Alcorta, Dufour and Hinman, 2012). Nonetheless, depending on products grown and farm goals, other market outlets may be explored to maximize profits.

Table 3 presents percentage of sales by market outlet for the first and last year of reported sales for all farms. Farms A, B and E relied heavily on farmers markets during the first year, comprising about 77 percent, 100 percent and 75 percent of the sales through this market outlet, respectively.

⁵ http://www.bls.gov/oes/current/oes_tn.htm#45-0000

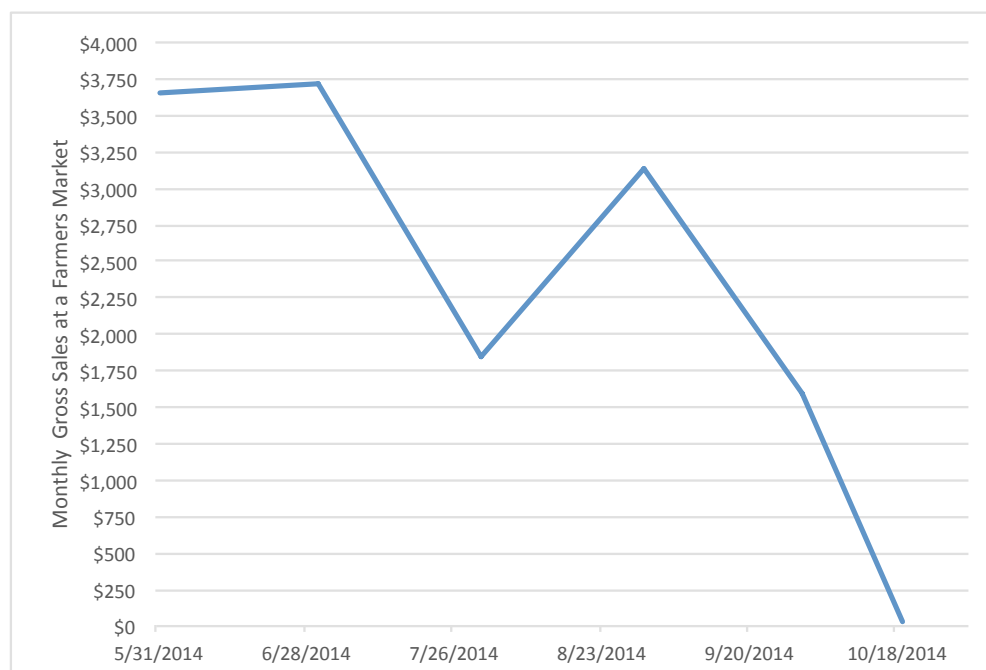
Table 3. Market Outlet Distribution

Farm	Year	On-farm sales	Farmers Markets	CSA	Roadside Stand	Other Direct	Grocery / Convenience Stores	Restaurants	Other Intermediate
A	1	5%	77%	10%	1%	6%		1%	
	4	5%	46%	30%	5%	13%		1%	
B	1	1%	99%						
	7	1%	66%			3%			30%
C	1			10%					90%
	4			10%					90%
D	1	4.3%	17.4%			7.3%	47.3%	5.1%	18%
E	1		75%	20%				5%	
	3		25%	60%			8%	7%	

Over time, Farms A and E reduced dependency on farmers markets and increased sales through community supported agriculture (CSA) arrangements. As explained above, farmers markets tend to be a good entry-level market outlet, but there is a great variation in sales volume depending on weather and number of vendors in the market (see **Figure 2**). Farmers markets allow beginning farmers to recruit CSA shareholders. Selling produce through CSAs not only allows producers

to receive cash before the season starts, increasing farm business liquidity, but also to share production risk with consumers (Bruch and Ernst, 2010). However, CSAs require a tremendous amount of planning and coordination, and therefore management labor, to guarantee enough harvested produce each week for all shareholders. Additionally, harvests need to be predictable over a set number of weeks, and this makes a crop plan and production experience with multiple crops critical to

Figure 2. Example of Farmers Markets Monthly Sales Variability for Farm D in 2014.



meet harvest goals. Always plan to produce more than you think you will need. Excess produce can be sold at a farmers market, and it is better to have extra produce than not enough to fill the boxes of your CSA shareholders.

In contrast, Farm B reduced dependency on farmers markets by securing certified organic seed sales to seed companies. Additionally, Farm B made beef sales directly to consumers. Although growing farm products for sale is Farm B's primary goal, this goal is complemented with the family's secondary goal of consuming products raised on the farm either raw or processed.

Farm C maintained the same market outlet structure over time. This farm made the largest percentage of sales through wholesale buyers (90 percent), while the remaining 10 percent of the sales were made through a CSA. Farm D's main market outlet was grocery stores, accounting for nearly 47 percent of sales. The second and third most important outlets in terms of sales were other farms and farmers markets, respectively. Farm D sells produce to other farms that will resell it through market outlets such as farmers markets, CSAs or wholesale buyers.

Discussion

A summary of farm characteristics is presented in **Table 4**. Although each farm described is unique, they share the commonality of being in business for less than 10 years. All farm operations presented in this study specialized in vegetable production; therefore, labor tends to be the largest expense. Labor as a percentage of total expenses can be between 15 percent and 73 percent, depending on farm size and commodity mix. At the planning stages, beginning farmers wishing to specialize in vegetable and/or fruit production must consider the availability of and access to labor. Often, a farm operator and his/her partner alone cannot provide sufficient labor for production, marketing and record keeping activities.

Two of the five farms described in this study made gradual investments in equipment and other structures. They mostly owned all equipment they used on the farm. Only one farm undertook all major investments in the first two years and used a NRCS grant for one of the four high tunnel structures built on the farm. The rest of the farms borrowed or rented all equipment from relatives or neighbors at a very low cost.

We observed an overall trend in market outlets used: Farms described above include a direct-to-consumer component to their market outlet mix. Three of the five farms started with a larger percentage of sales made through farmers markets and later began diversifying their portfolio of market outlets by increasing the percentage of sales made through other, more profitable, market outlets such as CSAs.

Access to capital through savings or other low-cost sources, as well as access to off-farm income, was advantageous to start a farm business and make it economically

viable, at least for the first years, for the farms described in **Table 4**.

A characteristic of Farm C that differentiates it from the other farms is its reliance on wholesalers for sales. This market outlet usually offers lower prices than direct-to-consumer outlets, and delivery to this type of outlet requires product packing, adding farm labor needs. Additionally, a farm will need to cultivate a relationship with the produce manager or store manager to guarantee consistency of

purchases over time (Ernst and Woods, 2012).

Finally, it is important to note that adjustments in production mix and market outlets were only possible because all of these farms kept good records of their farm businesses. The long-term sustainability of farm businesses relies on managers keeping good records that lead to more informed decisions and, hopefully, higher returns (Kime, 2016).

Table 4. Farm Characteristics Summary

Farm	A	B	C	D	E
Location	Virginia	Virginia	Virginia	Tennessee	Tennessee
Acres Controlled	51	73	6	9	10
Livestock Numbers	1,300 head of poultry	20 beef cows, 6 dairy cows, 1 hog, 100 head of poultry	2 hogs and 12 head of poultry	None	8 hogs and 150 head of poultry
Crop Diversification	pasture, fruits and vegetables	row crops, vegetables, forage, pasture and forest	vegetables, pasture and forest	vegetables	corn and vegetables
EBITDA Margin	38.89%	4.53%	72.50%	50.76%	1.29%
Market Outlets	on-farm sales, farmers markets, CSA, roadside stand, restaurants, catering	farmers markets, seed companies, direct sales to consumers	wholesale, CSA	wholesale, grocery stores, farmers markets, on-farm sales, restaurants, convenience stores, other farms	farmers markets, CSA, small grocery store, restaurants
Land Ownership	rented	owned	owned	rented	rented
Off-farm Income	no	part-time job	part-time job	partner off-farm job	partner off-farm job
Sources of Funding	savings and farm profits	savings and farm profits	savings, off-farm income, borrowed money from relatives, NRCS grant	savings, farm profits	savings, farm profits, NRCS grant

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Appendix 1 – Definitions of Selected Financial Measures

I. Income Statement Items

1. Net income:⁶ Revenue minus total expenses.

Revenue is defined as “inflows or enhancement of assets of an entity or settlements of its liabilities (or a combination of both) during a period from delivering or producing goods, rendering services, or other activities that constitute the entity’s ongoing major or central operations” (Hawkins and Cohen, 2001, p.1), and total expenses are defined as “outflows or other use of assets or incurrence of liabilities (or combination of both) from delivering or producing goods, rendering services, or carrying out the activities that constitute the entity’s ongoing major or central operations during a period” (Hawkins and Cohen, 2001, p. 1).

This definition of expenses includes cost of goods sold, operating expenses, and other expenses (e.g., interest, taxes, non-operating expenses and extraordinary expenses).

2. Gross income: Revenues minus cost of goods sold (or cost of sales).

Where cost of goods sold refer to “the costs the company incurred to purchase and convert materials into the finished products sold to customers” (Hawkins and Cohen, 2001, p. 2).

3. Operating income: Revenue minus cost of goods sold minus operating expenses.

Where operating expenses are “expenses of an operating nature, such as general, selling and administrative expenses incurred in the generation of revenue” (Hawkins and Cohen, 2001, p. 2).

Operating income is also referred to as EBIT (earnings before interest and taxes).

4. Earnings before interest, taxes, depreciation and amortization (EBITDA): Revenue minus cost of goods sold minus operating expenses, excluding depreciation and amortization. Equivalently, EBITDA could be estimated as EBIT plus depreciation and amortization.

Depreciation and amortization are expenses that, unlike the rest of expenses in the income statement, are non-cash based in nature. The total cash paid for an investment (e.g., fixed asset) is not considered an expense in accounting terms; hence, it is not reported in the income statement but rather is reported in the statement of cash flow only. Depreciation is the portion of the fixed asset that is “spent” or allocated during an accounting period and reported in the income statement but is not paid as an expense (e.g., there is not a payment in the accounting records for item “Depreciation”), so it is referred to as a non-cash expense. Similarly, amortization has the same nature of depreciation, but it is related to investments in intangible assets (e.g., software).

⁶ Also known as net profit or net earnings.

II. Margins

Margin is defined as any item of the income statement divided by total revenues. Gross margin (gross income/revenues), operating or EBIT margin (EBIT/revenues), EBITDA margin (EBITDA/revenues) and net income margin (net income/revenues) are the most-used margins.

In this study, we use the EBITDA margin.

III. Profitability ratios

Profitability ratios refer to net income divided by any measurement of investment taken from the balance sheet. Proxies for investment include total assets, total equity or total capital invested. Common profitability ratios include the following:

Return on Assets (ROA): $\text{net income} / \text{total assets}$

Return on Equity (ROE): $\text{net income} / \text{equity}$

Return on Investment (ROI): $\text{net operating profit after taxes (NOPAT)} / \text{capital invested}$ where capital invested is defined as equity plus total debt.

IV. Other financial metrics

Working capital is a measure commonly used as a proxy for the short-term investment needed to operate a business. It is estimated as current assets minus current liabilities.

Recognizing that accounts receivable and inventories (and probably a portion of cash held by the firm—operating cash) are the most relevant current assets related to the central operation of a business, and that the most important current liability is suppliers or accounts payable, some analysts prefer to estimate working capital as accounts receivables plus inventories plus operating cash minus accounts payable.



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