



David A. Levy, Chairman
Srinivas Thiruvadhanthai, Research Director
Douglas F. C. Williams, Economist

Mean Reversion and other Misconceptions about Profit Margins

Aggregate Profit Margins Are the Product of Complex Economic Processes; Their Behavior Is Neither Random nor “Mean-Reverting”; Nor Are They the Outcome of a Class Struggle

* From a January 2016 client memo

Myths, Misstatements, and Misunderstandings

From 2012 through 2014, the widest U.S. corporate profit margins in many years caught the attention of everyone from investment strategists to religious leaders. Unfortunately, the abundant public attention did not lead to enlightenment but to the spread of misguided conventional wisdom—both empirical and conceptual—concerning aggregate profit margins. In this case, what investors don’t know can hurt them.

One common myth is that corporate profit margins have achieved record girth during the present business cycle expansion. This belief has its origins in a popular but seriously flawed statistical hodge-podge purported to represent a profit margin for the entire corporate sector. A much sounder measure indicates that margins are indeed above their postwar average but not exceedingly so, and they have remained below their highest levels of the post-World War II era.

Misconceptions about profit margins arise not only because people look at the wrong measures, but also because most people harbor fallacious notions about what determines aggregate margins and what changes in margins imply. Five of these flawed notions appear in box 1.

None of the statements in box 1 is true. Even when data may seem to back up these assertions, the thinking behind these statements is at odds with the processes actually at work.

Few people understand the behavior and implications of aggregate profit margins because few understand the determinants of aggregate profits, which for over 100 years have been at the center of the economic analysis conducted by the Jerome

Box 1: Common Misconceptions about Profit Margins

1. The aggregate profit margin determines the level of aggregate profits.
2. The aggregate profit margin reverts to its mean.
3. Competition will drive down aggregate profit margins.
4. The aggregate profit margin necessarily widens in response to corporate cost-cutting.
5. The aggregate profit margin is the outcome of a class struggle between labor and the owners of capital.

Levy Forecasting Center LLC and its predecessors in the Levy family. Although the equation for the sources of profits has captured the attention of a number of economists, bloggers, and investors during the past few years, be aware that these individuals tend to struggle to reconcile the implications of the profits equation with long- and closely-held fallacious beliefs about profits. We address some of these fallacious beliefs in this memorandum.

Aggregate profit margins (as well as other aggregate profits ratios, such as the ratio of profits to the market value of corporate equities) are important metrics that help observers understand and evaluate the corporate sector’s profits, but they are not determined in the same textbook way as in a single product market. In the real world, an aggregate profit margin is a derivative of two interacting but in important ways independent variables: aggregate profits and aggregate sales. The

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numerator and denominator each have complex determinants. Market mechanisms *distribute* profits among firms and industries, but other, more profound dynamics—the profit sources—determine the magnitude of aggregate profits.

A narrowing or widening of aggregate profit margins signals changes in business conditions, but only through examining the *profit sources* can one determine what is causing a given change. The profit sources are specific activities or transactions with associated flows of funds that account for the difference between the aggregate corporate sector's revenue and expenses. (See *Where Profits Come From*, a complimentary publication available at www.levyforecast.com.)

Measuring the Corporate Sector Profit Margin

Calculating the profit margins of individual firms is a simple exercise, of course, just profits divided by sales (or revenue). One can easily calculate various margins according to one's purpose—before-tax, after-tax, EBITDA, and so forth. However, calculating comparable profit margins for the entire corporate sector is not so straightforward. In fact, it is possible to calculate only a proxy for an aggregate corporate profit margin from the available data. Moreover, this proxy is distinctly different from the average margin for all corporations in the economy using generally accepted accounting principles (GAAP), which would be calculable if every firm's data were available. Calculating the aggregate corporate profit margin requires avoiding a number of common methodological pitfalls along the way, pitfalls we discuss below.

The *aggregate corporate profit margin* is merely the sum of all corporate profits over the sum of all corporate revenue, but one runs into serious practical problems when calculating both the numerator and the denominator. Calculating the denominator is problematic because the data simply do not exist. One would need a total of the sales of every corporation, both publicly and privately held. Unfortunately, there is no suitable historical data series on the total sales or revenue of all U.S. corporations. The best available alternative is to use the corporate sector's gross value added, which is the corporate sector's contribution to GDP (see box 2). The data in the national income and product accounts (NIPA) *do* provide the total value added by the corporate sector.

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Box 2: Using Corporate Value Added as a Proxy for Sales

Unfortunately, the federal government's statistical agencies do not have a measure of total corporate sales including all intermediate sales. The Bureau of Economic Analysis's NIPA do provide some total sales data, but they (1) pertain to the entire business sector not just the corporate sector (whereas profits are reported only for the corporate sector) and (2) have little historical data, dating only back to 1987 for annual data and 2005 for quarterly data. Another sales measure, the monthly "manufacturing and trade" figure for total sales from the Census Bureau, has a longer history, but it lacks comparable sales figures for total services (including intermediate services) and for the mining and utility sectors' output, and it also does not distinguish between corporate and noncorporate business revenue. Thus, at present, we cannot calculate margins with total corporate revenue and must instead use corporate value added.

Profit margins using value added as the denominator are good indicators of what is happening to the margins reported by individual firms with four important qualifications. First, margins using value added as a denominator are larger than they would be if total sales data were available, since value added is only a portion of total sales. Second, margins with value added in the denominator have different dynamics than margins calculated with total sales would have if the data were available. The reason is that total sales are more cyclically variable than value added. Third, total sales will fluctuate along with changes in business-to-business sales brought about by vertical integration, while value added is unaffected by the degree of vertical integration. Fourth, value added is a measure of the product of domestic operations. Therefore, it cannot be used against measures of profits that include profits on foreign operations.

Measuring the numerator, aggregate profits, involves problems of its own. At least the government does publish figures for total corporate sector profits in the NIPA. These are the only quarterly measures of profits with both coverage of the entire corporate sector and long histories. Unfortunately, there are a number of conceptual differences between NIPA profits and the profits that corporations report to shareholders. The closest NIPA measure to an aggregate corporate profit margin is domestic after-tax corporate profits, without the Bureau of Economic Analysis's inventory valuation and current-cost depreciation adjustments, as a percentage of corporate gross value added (chart 1). By this measure, the aggregate margin made a striking recovery in recent years from extreme lows in 2001, but it has remained below its peak in the late 1940s, when the economy was booming after World War II.

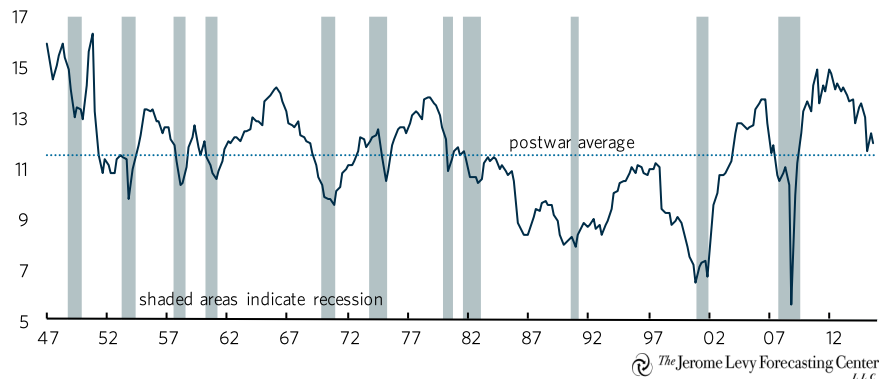
The Aggregate Profit Margin vs. What Firms Report

If the goal is to compare an aggregate profit margin to profit margins for individual firms constructed from their reported operating income, one further adjustment should be made. Chart 2 shows our preferred profit margin for the aggregated *nonfinancial* corporate sector, which is the NIPA profits measure with concepts most similar to operating income reported by corporations as a percentage of the value added by the non-financial corporate sector. This is the best NIPA profit margin measure to use as an indicator of corporate margins as seen by managers and investors. Like chart 1, it shows profits above their long-term average, but below their postwar peaks.

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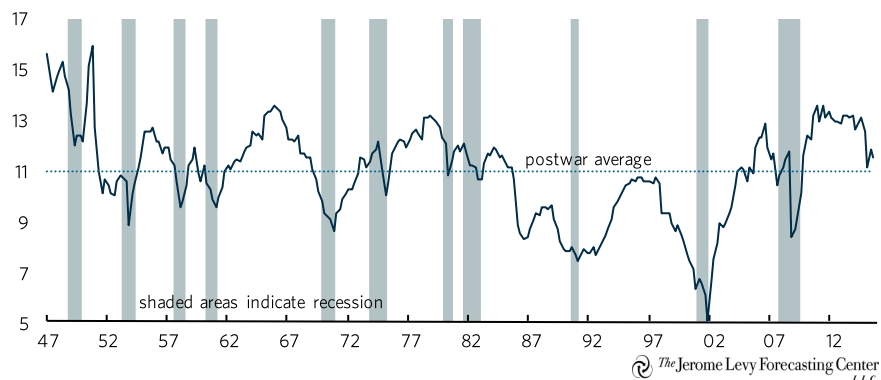
Aggregate Corporate Profit Margin CHART 1

Domestic Corporate Profits after Tax (without IVA, using Historical Cost Depreciation) as % of Corporate Gross Value Added, seasonally adjusted, annual rate, last data point Q3 2015



Profit Margin for Aggregated Nonfinancial Corporate Sector CHART 2

Domestic Nonfinancial Corporate Profits after Tax (without IVA, using Historical Cost Depreciation) as % of Corporate Gross Value Added, seasonally adjusted, annual rate, last data point Q3 2015



Most of the differences between NIPA profits and profits that businesses report are manageable in one way or another, but not the vast differences in *financial sector* profits between the NIPA definition and the GAAP that govern how managers and investors calculate financial sector profits. Simply put, NIPA financial sector profits often look nothing like GAAP profits; they are fundamentally different measures. The NIPA were designed to measure economic activity and income flows related to that activity but not to reflect changing values of assets, capital gains or losses, or write-downs for unusual charges (such as restructuring). Thus, the Bureau of Economic Analysis expunges capital gains and losses when calculating profits in the NIPA. However, many financial institutions report trading gains or losses as a major component of their profits. Another sometimes sizable item on bank income statements is adjustments to loan loss provisions, which are treated differently in the NIPA measure of financial sector profits.

Gross value added is also a particularly poor proxy for sales in the case of financial corporations. First of all, the NIPA include the activities of the Federal Reserve in financial corporate value added data. Second, value added includes a number of imputations for financial services furnished *without payment* to depositors and borrowers, which are obviously not contributing to corporate revenue on financial statements.

The incompatibilities between the NIPA and financial reporting concepts of financial corporations' profits and sales are too great to ignore and too difficult to correct. The best way to cope

with this problem is to leave the financial sector—as important as it is—out of aggregate profits and to calculate an aggregated profit margin only for the nonfinancial corporate sector.

Keep in mind that while the measure in chart 2 arrives closest to what nonfinancial firms actually report in their financial statements, it is an aggregate for only the *nonfinancial* corporate sector. Thus, it can be affected by the distribution of profits between financial and nonfinancial firms. For example, reduced interest expenses paid to banks will not directly impact the aggregate corporate profit margin in chart 1, as the reduced costs for the nonfinancial sector represent reduced income for the financial sector. However, once the financial sector is removed, it is no longer a fallacy of composition to claim that reduced interest expenses can boost the profit margin of the nonfinancial sector. In practice, changes in interest rates and other interactions between the financial and nonfinancial corporate sectors usually do not change the picture much, as can be seen by the fact that the margins in charts 1 and 2 are on the same scale and generally exhibit similar trends.

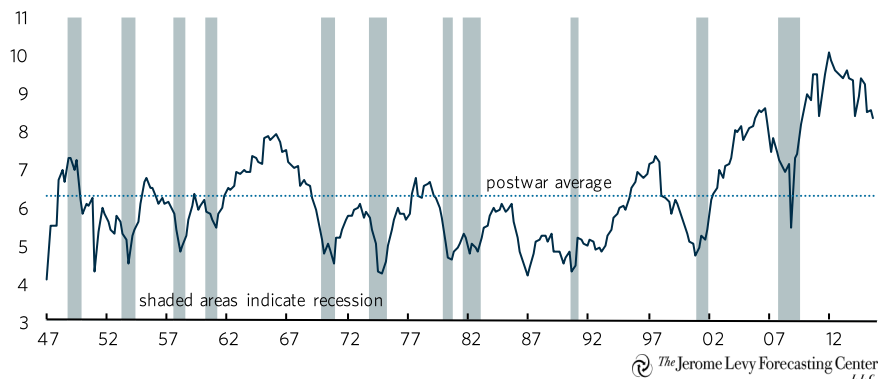
The Fallacy of the Record Profit Margin

Chart 3, purported by many to be the profit margin of the U.S. corporate sector, has appeared widely over the past few years as evidence of record profit margins. Actually, this "margin" is a Frankenstein's monster construct: *NIPA profits of U.S. corporations after tax, with inventory valuation and capital consumption adjustments, as a percentage of GDP.*

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Record "Profit Margin" According to Flawed Measure CHART 3

Corporate Profits after Tax with IVA and Capital Consumption Adjustment as % of GDP
seasonally adjusted, annual rate, last data point Q3 2015



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Here are some of the problems with this “profit margin.”

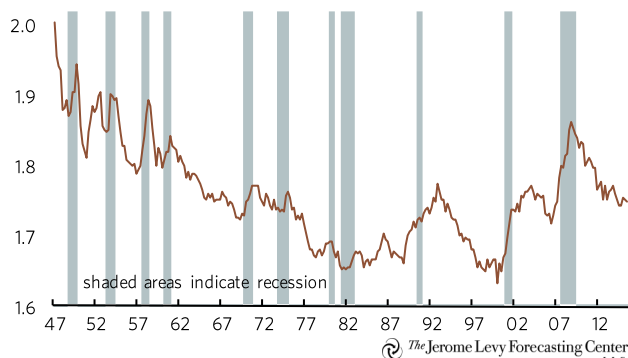
1. GDP includes much beyond corporate value added. It includes the output from *all* domestic sectors—including unincorporated businesses, not-for-profit organizations, and governments. Thus GDP is currently 1.75 times corporate value added, large enough to produce a much smaller corporate sector “profit margin” than when dividing corporate profits by corporate value added. Moreover, during postwar history, the ratio of GDP to corporate value added has changed considerably, ranging from as high as 2 to as low as 1.65 (chart 4). This changing proportion severely affected the behavior of the profits-to-GDP measure over the years for reasons having nothing to do with profitability.
2. Even if one eliminated all those parts of the denominator that are not related to the corporate sector, there would still be a mismatch between the corporations included in the tabulation of profits and those from which value added is counted. The profits measure in the numerator includes the profits of *corporations based in the United States* earned *either* from their domestic or their foreign operations. The profits of foreign-owned operations in the United States are *not* counted. By contrast, both GDP and value added by the corporate sector are measures of the product of *domestic operations*, regardless of the nationality of the parent company.
3. The profits measure used in the numerator includes the inventory valuation and capital consumption adjustments, which remove certain inflation effects from profits that businesses do in fact experience.

Our preferred measures of the aggregate profit margin shown in charts 1 and 2 have none of these problems, and removing them does change the historical picture significantly. However, while our preferred measures are probably the best that can be constructed from available data, using value added instead of sales means that they are still only a proxy for the “true” aggregate profit margin. They are necessarily larger, because value added is less than sales; they are seasonally adjusted; and they are based on accounting practices that are not the same as GAAP practices. They should move similarly to the unmeasurable aggregate GAAP profit margin, and they usually serve as a pretty good indicator of whether margins are relatively fat or lean, widening or contracting, and gratifying or disappointing; however, one should never think that they quantify the true share of business sales that is profit.

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GDP Larger than Corporate Gross Value Added CHART 4

Ratio of Gross Domestic Product to Corporate Gross Value Added
seasonally adjusted, last data point Q3 2015



The Fallacy of Margins Determining Profits, and What Determines Aggregate Profit Margins

Faulty measurement of profit margins is only the beginning of the common errors in the analysis of aggregate margins. Margins are not independent variables that determine profits; rather, margins depend on the composition and interaction of the aggregate profit sources, as defined by the profits equation in box 3. The profit sources reflect the behavior of households, businesses, governments, and foreign trading partners, and these behaviors are influenced and constrained by financial circumstances, technological developments, attitudes, expectations, and other variables. (See box 3 for some quick insights into the profits generation process.)

As go the profit sources, so go profits, and as go profits, so (to a large extent) go margins, since profits can, proportionately, change much more abruptly than either sales or value added.

Fallacies of Mean Reversion and Competition

Treating profit margins as an independent random variable, many people blithely assert, “Historically, margins tend to revert to the mean.” A casual perusal of the historical record shows that margins fluctuate along with the business cycle and that the average margin in any decade can deviate substantially from the postwar average (chart 5). Moreover, margins once remained consistently lower than their post-World War II average for nearly 20 years. This is not the behavior of a simple random variable.

Chart 5 also defies the theory, “Margins cannot remain abnormally wide for long because the excess will be competed away.”

Although competition can compress fat profit margins in a given industry by increasing supply and driving down prices, competition does not directly affect aggregate profit margins. The reason is that if increasing competition in one industry reduces prices, profits, and profit margins in that industry, profits will necessarily rise in other industries unless the profit sources change.

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Box 3: Macroeconomic Process of Profits Generation

The Aggregate Corporate Profits Equation

$$\begin{aligned} \text{Profits after tax} &= + \text{investment net of depreciation} \\ &\quad - \text{personal saving (household saving)} \\ &\quad - \text{foreign saving (inverse of current} \\ &\quad \quad \quad \text{account balance)} \\ &\quad - \text{government saving (inverse of} \\ &\quad \quad \quad \text{government deficit)} \\ &\quad + \text{dividends} \end{aligned}$$

A few observations may be helpful in thinking about the economy’s generation of profits as a macroeconomic process, a process driven by decisions made throughout the economy that shape the profit sources.

1. Profits are wealth accumulated by business during a given period of time, which depends on two things: (a) how much wealth (assets that carry value into the future) is created in the economy and (b) how much of that wealth is diverted away from business to governments, households, and the foreign sector.
2. This new wealth is investment net of depreciation, and it includes new buildings, equipment, and intellectual capital less all the wealth lost as these assets depreciate. It also includes additions to inventories.
3. Saving by other sectors—households, government, and the rest of the world—is their accumulation of new wealth.
4. Profits after tax are business’s share of that new wealth before some of it is distributed as dividends.

Investment determines the amount of wealth created in the economy, and the less of this new wealth that is saved by households, governments, and the foreign sector, the more that flows to business as profits.

To illustrate, let's consider a closed economy (for simplicity). Suppose profits in the small electric motor industry are high enough to encourage expansion of output, either among current industry firms or new entrants, leading to lower prices, lower profits, and narrower margins in that industry. Now, their customers—such as small appliance manufacturers whose products have electric motors in them—enjoy a cost reduction, higher profits, and wider margins. In this case, competition does indeed reduce margins in the electric motor industry, but it does not necessarily widen or narrow margins in the business sector overall.

Increasing competition can redistribute profits from one industry to another but **aggregate profits will change only if and to the extent that the profit sources change**. In the above example, consider what would happen if price declines are passed on to end users, such as consumers of small appliances. Consumers may spend more on other products, bidding margins wider in those industries, or they may pocket the savings, in which case aggregate profits will fall by the amount that personal saving rises. On the other hand, business fixed investment could rise as small appliance manufacturers, encouraged by the drop in electric motor costs and the improved profitability it implies, pull the trigger on some contemplated equipment purchases, in which case the increase in investment would add directly to aggregate profits. The effects of a redistribution of profits on the various profit sources are largely uncertain and often countervailing, so the net effect may be to raise, lower, or do nothing to aggregate profits and, by extension, margins.

Jerome Levy (1882-1967), the first person to derive the aggregate profits identity, devised an analogy to illustrate how competition, *micro* profitability, and *macro* profitability all interrelate. Imagine a class for school children in which prizes are periodically awarded to students who perform best on various tests and assignments. The best competitors—the smartest, hardest-working, and quickest kids—will undoubtedly win the most prizes, but the total number of prizes is beyond any student's control. Similarly, firms and industries compete for the profits available in the economy, and the best competitors will profit the most. However, no firm or industry has any control over whether aggregate profits will be high, as during a strong expansion, or low, as during a recession.

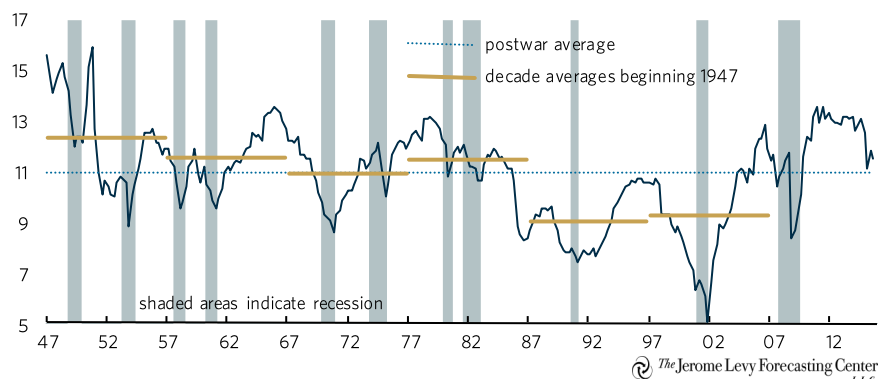
The Fallacy of Corporate Cost-Cutting and the Class War That Isn't

Everybody knows that reducing labor costs directly augments a firm's profit margins and that rising labor costs take a bite out of margins. After all, people see these effects all the time in their own businesses. Labor costs go down, and, all else equal, the savings from this cost reduction go right to their bottom line. So, when labor costs are falling throughout the economy, most people assume that for the entire corporate sector, aggregate margins are widening and aggregate profits are benefiting accordingly. But they are generally wrong. Indeed, **most of the time aggregate labor costs and aggregate profits move in the same direction**; when they do diverge, the reason is far different from that on the micro level.

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Profit Margin for Aggregated Nonfinancial Corporate Sector CHART 5

Domestic Nonfinancial Corporate Profits after Tax (without IVA, using Historical Cost Depreciation) as % of Corporate Gross Value Added, seasonally adjusted, annual rate, last data point Q3 2015



Attributing increasing aggregate business profits and widening corporate sector margins to falling labor costs is a classic example of the fallacy of composition. Certainly, one firm enjoys higher profits if it reduces its own labor costs because its revenue continues to flow in unaffected. However, if *all firms in the business sector* cut their labor costs, their revenue would fall as well as their expenses. Less worker pay means less personal income and, most likely, less consumer spending on the goods and services sold by businesses. The extent to which households are willing to adjust their saving—a term in the profits equation—will determine whether aggregate profits and profit margins expand, contract, or change little. (Further explanation and examples of the possibilities are in the appendix on page 11.)

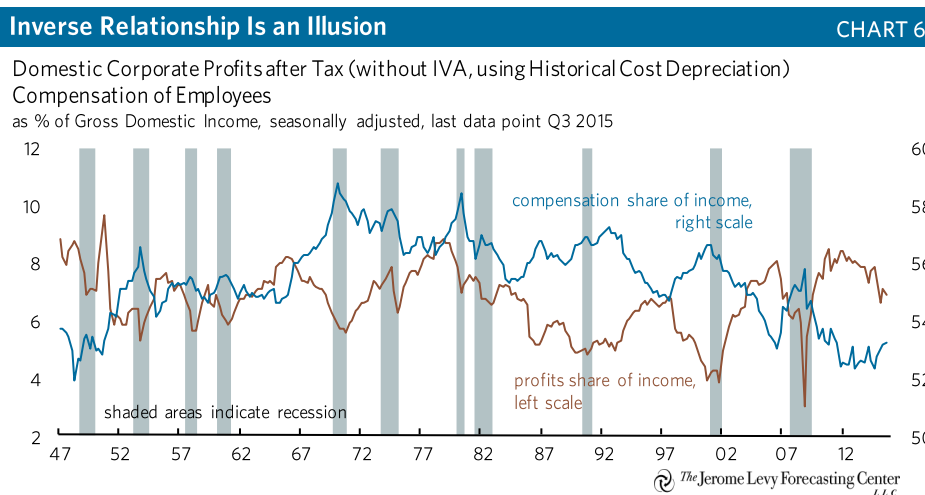
If we consider government's role, business cuts in worker compensation often do increase aggregate profits somewhat, because part of the reduction in worker compensation reduces government tax revenue rather than households' spendable income. Thus, a dollar in payroll expenses cut by business reduces household income by the amount of that dollar after tax, say 80 cents, while reducing government saving by the remainder, 20 cents. Even if we assume that personal saving remains unchanged, business revenue falls by only 80 cents for every dollar of expenses cut. Thus profits increase, but only by the amount that government saving declines (20 cents). Again, the key is that profits will only change if and to the extent that the profit sources change.

When business cuts its payroll expense, there can be myriad secondary and tertiary consequences that affect the aggregate profits (and thus profit margins) of American corporations. Thus, while many people believe that slashed labor compensation expenses go right to profits, the actual result may be higher or lower aggregate profits than would have occurred without the pay cuts, depending on how the profit sources change.

Yet, if cutting labor costs does not widen margins, what about the strong inverse relationship visible in chart 6 between profits and employee compensation as shares of gross domestic income? Many see it as clear evidence that lower wages cause higher aggregate profits and vice versa. However, that inference from the chart is primarily a mathematical illusion.

To illustrate, suppose two series have zero correlation. Consider a newsstand in a commuter train station that sells only two items: newspapers and umbrellas. Suppose newspaper sales are pretty stable but vary somewhat according to the day of the week, since there are more shoppers midweek and more commuters taking days off on Monday or Friday. Umbrella sales vary almost entirely according to the weather. The correlation between umbrella sales and newspaper sales would be close to zero. However, suppose we calculate umbrellas' share of unit sales and newspapers' share. Lo and behold, the two shares have a perfect negative correlation. (The correlation of two variables of the form $A/(B+A)$ and $B/(B+A)$ will always be -1 as long as $B + A$ does not equal 0.)

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Similarly, even if there were no correlation between profits and employee compensation, there would tend to be a strong negative correlation between their shares of gross income since the two together comprise roughly 60% of domestic income. Notice that chart 6 shows a cyclical pattern of inverse correlation; the profits share often rises during expansions and falls during recessions while the labor compensation share behaves antithetically. *Actually, both profits and compensation (measured in dollars) accelerate during expansions and decelerate during recessions.* The big difference is that the cyclical swings in profits are proportionately greater (and tend to begin somewhat earlier in the cycle) than those in compensation. Thus, profits' behavior dominates the behavior of both *its* share and labor's share of income.

If we look at the data for profits and labor compensation in dollars rather than as shares of income, there is a strong *positive* correlation because they both grow roughly proportionally over the long term. There is also a positive correlation between the four-quarter percentage changes in profits and compensation (chart 7). There are still plenty of potential issues affecting even this finding (e.g., both profits and compensation reflect inflation), but the fact that profits and labor compensation are positively correlated suggests that the interests of the working class and the capitalist class may be more aligned than is commonly thought. The important point is that one can safely dismiss the popular conclusion that aggregate labor compensation directly influences aggregate profits and margins.

So What Do Aggregate Margins Tell Us?

We have seen that profit margins in the aggregate case (1) do not behave like an independent random variable; (2) do not determine but rather reflect profits, which are determined by the profit sources; (3) are not dictated by competition; and (4) are not a reflection of corporate success in controlling costs. So what *do* margins tell us?

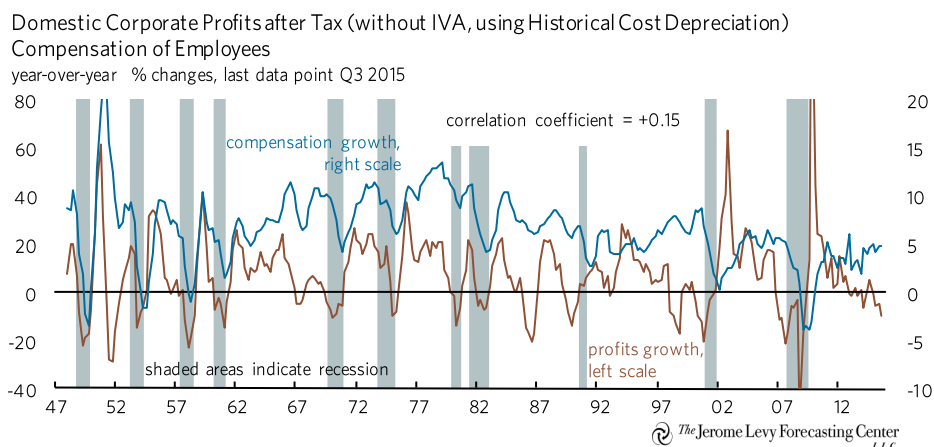
The answer is: independently, not much. The appropriate interpretation of a given level of, or change in, aggregate profit margins depends a great deal on context—in particular, what profit sources have changed. Judging where margins are headed depends almost entirely on the outlook for the profit sources.

Margin movements often reflect the business cycle, chiefly because profits themselves are intensely cyclical. Profits are useful indicators of changing economic conditions in part because they tend to lead the cycle. Thus, margin expansion can signal that an economy is turning up as profits begin growing faster than revenue. Similarly, margin erosion can signal that an expansion is becoming tired, because profits are likely to turn down well before other measures of the economy. *In all cases, changes in the profit sources are what drive the changes in profits, and analyzing the profit sources helps determine whether a change in margins is likely to continue, end, or reverse.*

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Profits and Compensation Most Often Grow Together

CHART 7



If measured correctly, the performance of the aggregate corporate profit margin reflects fairly well the behavior of the average margin for all individual corporations, and thus it is worth monitoring as a key part of business cycle analysis. In the corporate sector as a whole—as in the case of the individual firm—margins in one period influence business decisions for subsequent periods, thus affecting some of the profit sources and, consequently, future profits.

Conclusions

When it comes to conventional wisdom about macroeconomic profit margins, investors beware.

First of all, do not expect margins to “revert to the mean.” A profit margin is not a random variable. Its behavior is complex and sometimes hard to predict, but that does not make it random. Throughout history, when the aggregate profit margin has been unusually far from its historical mean, it would have been unwise to expect it to revert. One would often have ended up waiting for many years, and sometimes for decades.

Second, looking to the future, each step of the way profit margins will depend on profits, which will depend on the profit sources. *Global structural financial issues, public policy, business trends, technology, demographics, sociology, and other influences on the profit sources—and not a simple probability distribution—will determine what happens to profits and profit margins.*

Third, interpreting profit margins depends a great deal on context. For example, recent years’ wide margins have been accompanied by a low ratio of profits-to-equity, which is what ultimately matters to shareholders.

Fourth, remember that the influences on aggregate profit margins are different from the influences on the margins of individual firms. Competition can certainly compress margins within a firm or industry, but aggregate profit margins are not “competed away” in the business sector as a whole. Rather, changes in the profit sources are what increase or decrease aggregate profit margins.

Fifth, in the event of a new wave of corporate wage and salary cutting, do not assume the cuts will be bullish for business.

Wage deflation can mean general deflation, which most certainly is not good for business revenue, profits, asset prices, or debt quality. *While wages are an important factor in determining the profits of a given firm, aggregate wages are not a direct determinant of aggregate profits. Labor-cost-cutting throughout the business sector may be associated with either widening or narrowing profit margins, depending once again on the behavior of the profit sources.*

Sixth, be wary of misconceptions about aggregate profit margins in the realm of public policy. For example, the flawed notion that wider profit margins in the aggregate come at the expense of wages often infects debates on taxes, transfer payments, and regulatory policies. Generally, the owners of capital and workers experience more or less together the improving or worsening of conditions that come with the business cycle. (Incidentally, much of the increase in income disparity reflects differing compensation rates and income gains tied to asset inflation—as opposed to relatively more profits and less worker compensation.)

Understanding aggregate profits and profit margins provides critical insights into the economic outlook. For example, the profits recovery that powered the 2009-2015 business cycle expansion in the United States was not a reflection of corporate cost cutting, as widely believed, but the direct result of vast government deficit spending, which reversed the profits decline in the first quarter of 2009 when the private profit sources were still falling. Although the government deficit eventually shrank as the recovery continued, it has remained historically large and a critical support to corporate profits and, therefore, to the economy.

The many influences on—and interactions among—the profit sources along with the many factors that affect household income growth *simultaneously determine profits, revenue, and margins*. Moreover, since profits are more volatile than revenue, profits are virtually always involved—indeed, dominant—in any major short-term widening or narrowing of aggregate margins. In short, the profit sources determine profits, and profits are the most critical determinant of profit margins.

APPENDIX: Examples of Economic Changes and Their Effects on Aggregate Profit Margins

To demonstrate some of the processes that determine aggregate profits and, therefore, profit margins, consider a rudimentary economy, leaving out the government sector and the rest of the world.

For starters, let's assume that in this economy,

- The household sector receives \$100 in wages (W), spends \$90 (C), and saves \$10 (S).
- Business produces consumer goods and capital goods. Firms that make capital goods sell them to other firms—gross investment (I)—for \$35 in total, but businesses have \$15 of depreciation expense (D) for existing capital goods.

Thus, business revenue (R) is made up of household consumption and business investment:

$$R = C + I = \$90 + \$35 = \$125$$

$$\text{Profits} = (I - D) - S = (\$35 - \$15) - \$10 = \$10$$

$$\text{Profit margin} = \text{profits/revenue} = \$10/\$125 = 8.0\%$$

Case 1. What happens to aggregate profits and margins when wages are slashed?

We asserted earlier that wage cuts do not increase profits unless consumers maintain their spending and take the pay cuts entirely out of their saving. To illustrate, first suppose business cuts wages by 3%, so household income falls from \$100 to \$97. Further, suppose households still spend \$90 and reduce their saving. The effects on profits, margins, and revenue are as follows:

$$R = C + I = \$125, \text{ unchanged from before.}$$

However, since personal saving is now lower,

$$\text{Profits} = (I - D) - S = (\$35 - \$15) - \$7 = \$13.$$

Finally, the profit margin = $\$13/\$125 = 10.4\%$. Both profits and margins improved.

Case 2. But what happens with that same wage cut if households maintain their saving and cut spending?

Suppose that, as before, business cuts aggregate wages by \$3, but this time households continue to save \$10 and cut spending by \$3.

Now consumption declines:

$$C = W - S = \$97 - \$10 = \$87$$

$$R = C + I = \$87 + \$35 = \$122, \text{ so revenues are down.}$$

Personal saving stays at \$10.

Profits = $(I - D) - S = (\$35 - \$15) - \$10 = \10 , so profits are unchanged from our starting point (which is in marked contrast to their rise in the previous example when personal saving fell rather than spending). Aggregate margins go up, but only slightly, since revenue fell but not profits:

$$\text{Profit margin} = \$10/\$122 = 8.2\%$$

Case 3. What happens if business cuts aggregate wages, but then the household sector (perhaps fearing further wage cuts to come) eliminates a lot of discretionary outlays and actually increases its saving?

Let's assume the same \$3 cut in wages, but this time households increase their saving from \$10 to \$13.

Now consumption and revenue decline by a greater amount, \$6:

$$C = W - S = \$97 - \$13 = \$84$$

$$R = C + I = \$84 + \$35 = \$119$$

$$\text{Profits} = (I - D) - S = (\$35 - \$15) - \$13 = \$7$$

Profit margins in this case went down, as revenue declined but profits declined proportionally more.

$$\text{Profit margin} = \$7/\$119 = 5.9\%.$$

The last three examples have shown profits rising, remaining unchanged, and falling, *all depending on household saving decisions*. Indeed, wages and the wage cut were the same in all three cases, but only if personal saving fell did profits rise. In all three cases, the change in profits equaled the change in personal saving. Now, one last example:

(appendix continued on the next page...)

Case 4. What happens if business slashes wages but we have a government that replaces some of the household sector's lost income with transfer payments?

Again, let's say that wages are cut from \$100 to \$97, but this time we add a government sector that does nothing but transfer \$2 (P) to the household sector, causing a government deficit (Df) of \$2. Let's assume no change in personal saving at \$10. Thus income is now wages plus transfer payments, so

$$C = (W + P) - S = (\$97 + \$2) - \$10 = \$89$$

$$R = C + I = \$89 + \$35 = \$124$$

The government deficit adds to profits, so

$$\text{Profits} = (I - D) - S + \text{Df} = (\$35 - \$15) - \$10 + \$2 = \$12.$$

$$\text{And margins} = \$12/\$124 = 9.7\%$$

Once again, the change in profits equaled the change in the profit source, this time the government deficit.

What emerges from all of these examples is that for an entire economy, wage cuts do not independently have any specific effects on profits the way they do in the case of a single firm or single industry. For wage cuts to have any positive effect on profits, the profit sources must change—either reduced household saving as in Case 1, or an increased government deficit as in Case 4. And if the profit sources move in the other direction, as in Case 3, so do profits. ***In all three cases, profits change by the exact amount of the change in the profit source.*** Although margins can rise if profits remain the same while revenue declines, as in Case 2, the effect is relatively insignificant compared to the examples in which profits changed. In all of these examples, as would still be the case if we had included more complex examples, aggregate profit margins depend chiefly on the behavior of the profit sources, including household saving and the government deficit as we saw above, and also net exports of goods and services, residential investment, inventory changes, and others.



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