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Profit margins to fall

- Profit margins, proxied by the share of profits in GDP, have risen steadily to **record highs** during the past 25 years across most developed economies, boosted by a **secular fall in the relative price of capital, the cost to financing the acquisition of capital, and the taxation of capital**.
- The relative price of capital goods has fallen due to **technological progress, as well as, increased capital mobility, competition and offshoring**.
- Capital funding via debt and stock became cheaper as **real yields fell** in response to greater economic stability and a large EM savings surplus.
- Corporate taxes have fallen as **multinationals were able to arbitrage tax differences** across countries and thus gained better bargaining positions.
- **These long term drivers have broadly peaked in recent years**. EM currencies are moving up and their economies are now pushing up global resource costs, real yields across the world are starting to rise, and tax authorities are unwilling to raise the relative tax burden on consumers. As a result, **the rise of the corporate profit share has come to an end**.
- This peaking of the secular drivers of profitability are being joined by negative cyclical forces, culminating in a decline in **profit margins down over the next 4 years**.
- For the US, the after-taxes profit share of GDP is projected to **decline to 8.8% by 2011, from 10.1% in Q4 07**.
- Using consensus estimates for nominal GDP growth, US corporate earnings are projected to rise just **1% annualized over the next 4 years**.
- These estimates suggest the S&P500 operating EPS will fall to $78 by Q4 08 and then rise very slowly to $86 by Q4 11.
- **This rather weak earnings profile is set to constrain equity market returns going forward**.

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The rise and fall of the corporate profit share

Global corporate profitability maintained its three decade secular trend upward in 2007, interrupted only by a few short-lived setbacks. As measured by the ratio of profits to nominal GDP, the profits share among the major developed economies bottomed in the mid-1970s and slipped in the early 1980s but since then has moved from roughly 6% to over 9% last year. In the US, profit growth has outpaced nominal GDP growth over the past 25 years by a striking margin of 4% per annum.

Over recent quarters however, corporate profitability, measured by either profit shares or other proxies, has faltered. Profits, based on either national accounts data or earnings reports from listed companies, appear to have peaked in Q2 of last year. The recent decline in profits and corporate profitability raises important questions about both equity valuations and the future course of the global economy.

The share of profits to GDP, a proxy for profit margins, have been trending up over the past 25 years

Equities are often valued by the discounted present value of future dividends, so current and future profits are important inputs to equity valuations. **Whether profit shares continue their upward trend, stay flat close to their recent peak or revert to their long term averages makes a huge difference in terms of future earnings growth and equity valuations** (Chart 1). In particular, in a pessimistic scenario of reversion of profit shares towards historical averages, we calculate that equity markets could fall by a further 10%-20%.

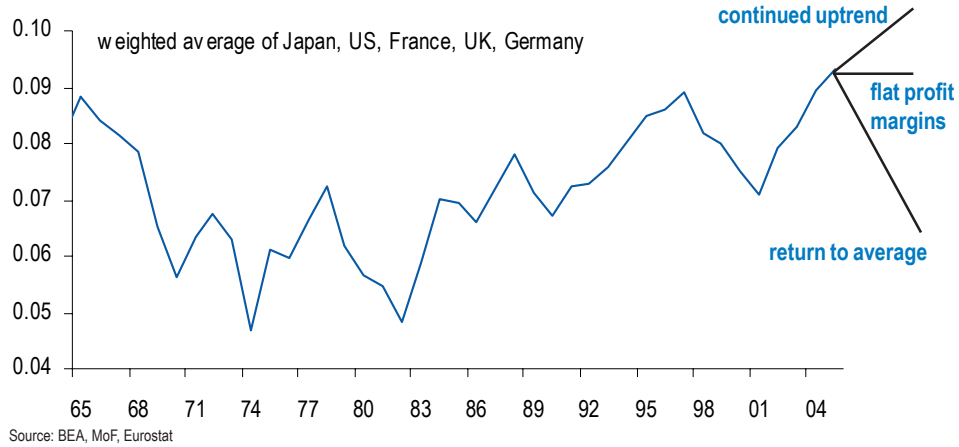
The recent decline in profits raises questions about the sustainability of this trend and its impact on equity valuations

But the impact of profits is not only confined to equity markets. The future course of corporate profitability and equity prices is important for **credit markets**. The sharp rise in corporate profitability since 2003, which was manifested itself into higher corporate saving and lower corporate leverage, also supported credit markets. To the extent that corporate profitability declines in coming years, corporate debt servicing ratios and thus credit spreads could come under more pressure.

The **economic implications** are also very important. Higher profits and lower cost of capital as a result of rising equity prices and falling credit spreads, boosted corporate spending, which has been the driver of the global economic expansion since 2003. Further declines in the profit share in coming years are likely to have a negative impact on corporate spending and hiring, constraining the strength of an economic recovery and even limiting the potential, or trend, growth path of future output.

Chart 1: Profits as % of GDP

profits are after interest and depreciation but before taxes, non-financial corporates apart from the US which includes financials, data for France are since 1978, data for the UK are since 1984, data for Germany are since 1991



Source: BEA, MoF, Eurostat

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In this research note, **we examine the underlying fundamentals of corporate profitability, estimate the relationship between these fundamentals and the profit share, and project the path of future profits**. We begin this analysis by first addressing the myriad of problems relating to the measurement of profit shares. We then identify the long-run determinants of corporate profitability by first establishing a strong relationship among the major developed countries between the corporate profit share and the ratio of the real capital stock to real GDP, a relationship well-grounded in economic theory. Noting that the determinants of the capital stock are therefore also the long-run determinants of the profit share, we then show that the secular trend up in the profit share is largely explained by the downward trend in the relative price of capital goods, the cost of finance, and the effective tax rate. Because these long-run determinants have likely reached their lows, the trend in corporate profit shares is set to end. We next examine the short-term drivers of corporate profitability (the deviation from the long-term trend and the cyclical position of the economy), and show that these short-drivers are pointing to a sizable decline in the US profit share over the coming years. The implications of this rather bearish outlook for corporate profitability are assessed in the final section, where we project a S&P500 range of between 1300-1500 for the next four years.

The rise of corporate profit's share of economic output looks to have reached its highs. In the coming few years, the capital income share will move down while the labor income share moves up. To be sure, while **the capital income share (along with the corporate profit share) is expected to fall, it will not return to its historical average**. The global economy has become much more capital intensive and the returns to capital remain relatively high.

Measuring profit shares

There are two main sources of data on corporate profits. The first source comes from **earnings reported by publicly listed companies**. Dividing the PE ratio by prices and multiplying by the number of outstanding shares produces an estimate of total earnings for a particular equity index. These data are available as far back as the early 1970s. The second source comes from **national accounts data**, which are broader in scope as they include both publicly listed and private companies.

Profit shares based on earnings of publicly listed companies are distorted by the public listing of companies that were private before and by the privatization of public ones

The advantage of using earnings reports is that they are available in real time and across different sectors, regions, and countries. The disadvantage is that earnings growth is very much **affected by the listing and delisting of companies**. Indeed, total earnings among global equities have risen by a factor of 20 since 1980 compared to a rise in global nominal GDP by a factor of just 3.5, a rise in the profit share of over 600% since 1980. By contrast, as measured by national accounts data, the profit share of GDP among the developed economies has risen by less than 200%.

One way to circumvent the listing and delisting problem is to use earnings of equity indices with a fixed number of companies, such as the S&P500. Indeed, the total earnings to GDP ratio for the S&P500 index has exhibited a similar pattern to the profit share based on national accounts. However, these indices are biased towards sectors with large multinational companies that receive most of their profits from abroad. Moreover, where available, they usually span shorter historical periods (usually since the mid 1980s) than their all-share counterparts. Because of these shortcomings, we focus our analysis on national account profit measures.

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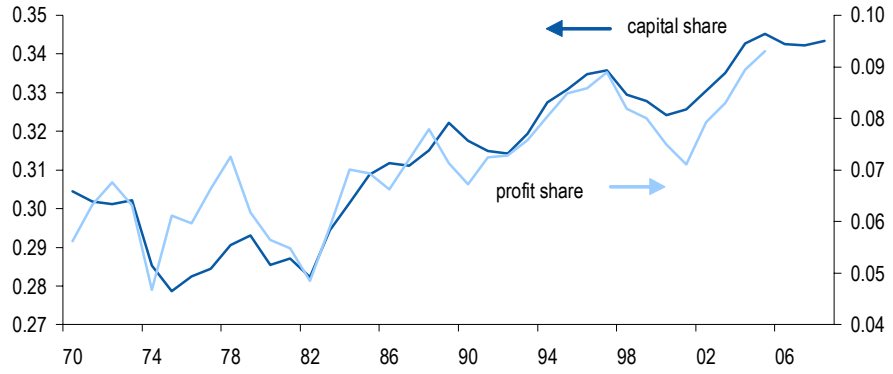
Capital shares are correlated with profit shares, are more broadly available, and include financials

Unfortunately, a long history of profit data is not available for countries outside the US, and where available, does not include financials. Indeed, the data shown in Chart 1 should be treated with some caution as only US profits include financials, and the data for France, UK and Germany start in 1978, 1984 and 1991 respectively. As an alternative to the profit share, **capital shares** can be used as a reasonable proxy. Data on capital shares are more readily available for a broad range of countries and over a longer history.

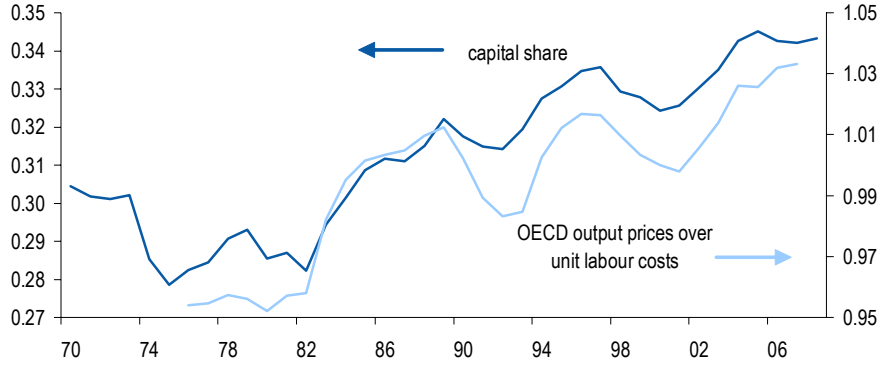
Although there are important differences between the capital and profit share, the relationship is reasonably tight. The capital share measures the return from all sources of capital including rental income from housing and proprietors income that are separate from corporate profits. However, as shown in Chart 2, the capital share has tracked the profit share quite closely among the major developed countries over the past 40 years. Another proxy for profit margins, the ratio of output prices (GDP Deflator) over unit labor costs also shows a rising trend since the early 1980's (Chart 3).

Chart 2: Capital shares vs. profit shares
capital share is equal to 1-labour share [1,2], the capital share is a GDP weighted average across Australia, Canada, France, Germany, Japan, Sweden, Italy, UK, US



Source: OECD

Chart 3: Capital shares and output prices over labour costs in OECD countries
capital share is equal to 1-labour share [1,2], the capital share is a GDP weighted average across Australia, Canada, France, Germany, Japan, Sweden, Italy, UK, US



Source: OECD and JPMorgan

1. The labour share is constructed using data from 2006 OECD Economic Outlook. The labour share is the Compensation of Employees multiplied by the ratio of Total Employment to Total Dependent Employment divided by Nominal GDP less Indirect Taxes. The multiplication with the ratio of Total Employment to Total Dependent Employment reflects an imputed labour remuneration for the self employed.
2. We make an adjustment for the self-employed by including an imputed labour remuneration when constructing the labour share.

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Capital and profit shares rise with capital stock-to-GDP ratio

Capital shares have been rising in line with capital stock-to-GDP ratios

Capital's share of total income has risen almost directly in line with the rise in the real stock of capital relative to real GDP. As indicated in Chart 4, this relationship has been remarkably robust with deviations tending to reflect business cycle fluctuations. This relationship is by no means a definitional artifact. Indeed, economic theory suggests the relationship is entirely an empirical matter relating to the technology an economy uses to combine capital and labor to produce output. Letting P be nominal capital income, Y be real output, q be the GDP deflator, and K be the real capital stock, then by definition, the capital income share of nominal output (K-share = P/qY) is the product of the real rate of return to capital (RRK = (P/K)/q) and the ratio of the real capital stock to real GDP (K/Y). That is, K-share = RRK*(K/Y). Thus, **a rise in the capital stock to GDP ratio raises the capital income share** assuming the rate of return to capital remains unchanged. The return to capital is however not necessarily constant. Over long periods of time, the return to capital reflects its marginal productivity. Consequently, the law of diminishing returns requires the rate of return to capital to fall as the capital stock rises relative to output. Thus, whether a fall in the rate of return only partly offsets, completely offsets, or more than offsets, the rise in the capital stock determines whether the capital share of income rises, stays constant, or falls, respectively.[3]

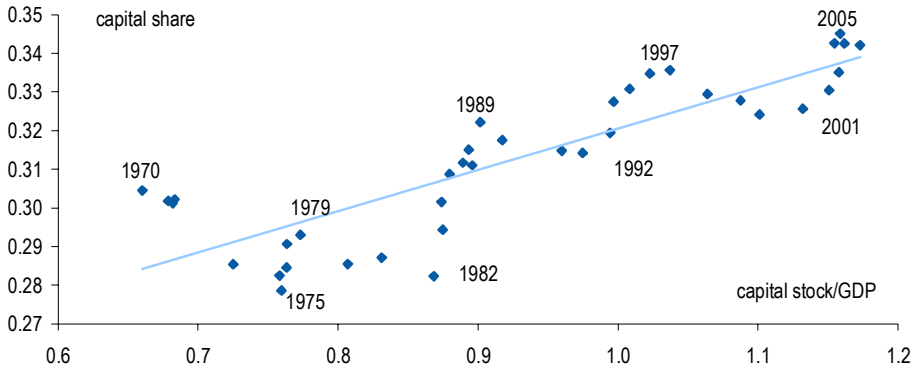
The capital share of income largely depends on the underlying long-run determinants of the capital stock

While economic theory provides little guidance, Chart 4 implies that the change in the rate of return to capital has been relatively modest as a whole.[4] As a result, the capital share of income has risen by roughly five percentage points from 1970 to 2007 in response to a near doubling in the capital stock to GDP ratio. Whether the capital share of income, and consequently the corporate profit share, waxes or wanes in the coming years largely depends on the underlying long term determinants of the capital stock.

In theory, investment in the capital stock increases with the gap between the expected return to an additional unit of installed capital and the cost of that capital. There are two main factors underlying a firm's cost to investing. The first factor is the acquisi-

Chart 4: OECD capital share against capital stock

capital share is equal to 1-labour share[1,2], both the labour share and the capital to output ratio are averages for Australia, Canada, France, Germany, Japan, Netherlands, Sweden, Italy, UK, US.



Source: OECD and JPMorgan

3. A fall in the rate of return to capital that exactly offsets the rise in the real capital stock to GDP ratio is implied by the well-known Cobb-Douglas production function. However, empirical estimates point to a production function for the G8 countries that is statistically different from Cobb-Douglas, and more consistent with a rising capital income share in response to the trend up in the real capital stock to GDP ratio.
4. Indeed, a more careful estimation of this relationship suggests that the upward slope shown in Chart 4 is statistically significant. The average relationship across all G8 countries points to an elasticity of 0.2. That is, a one percent rise in the real capital stock to real GDP ratio in a given G8 country implies a 0.2% rise in the capital share of GDP in that country. By definition, the remaining 0.8% is reflected by a decline in the percentage rate of return to capital. This relationship holds for each of the G8 members even when estimated by country.

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The trend up in the stock of capital relative to GDP has been driven by the fall in the relative price of capital goods and the cost of finance

tion cost of capital (i.e. **relative price of capital**). A decrease in the relative price of capital induces firms to use more capital in the production process. The second factor is the interest foregone by not investing the required funds elsewhere, i.e. **the cost of finance**. As indicated in Charts 5, 6 and 7, both factors have been declining over the past 30 years making it more attractive for firms to accumulate capital faster than output.

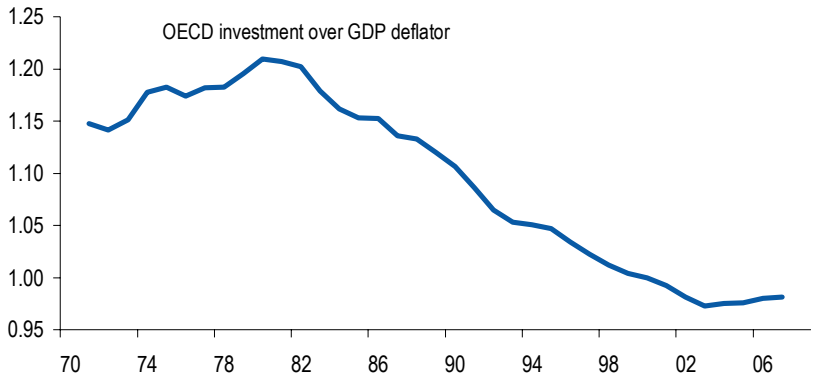
The fall in the relative price of capital goods has been broadly attributed to technological progress and globalization

The fall in the relative price of capital goods has been broadly attributed to the higher rate of **technological progress** in the production of investment goods, especially in information technology equipment and software, but also **globalization**. The reduction of barriers and costs to trade and capital flows as well as the integration of global labour markets has exerted downward pressure on capital goods prices by increasing competition and allowing companies in advanced economies to reduce production costs through offshoring.

More generally, the increased mobility of physical, financial and human capital not only boosted competition and lowered prices, but also increased the bargaining power of businesses against both labor and government. According to a recent report by the IMF (see *Globalization of Labor*, Chapter 5, IMF World Economic Outlook, April 2007), the forces of immigration and offshoring have been significant in reducing labour shares in advanced economies, although the impact of technological progress, has been found to be larger.

Chart 5: Relative price of capital

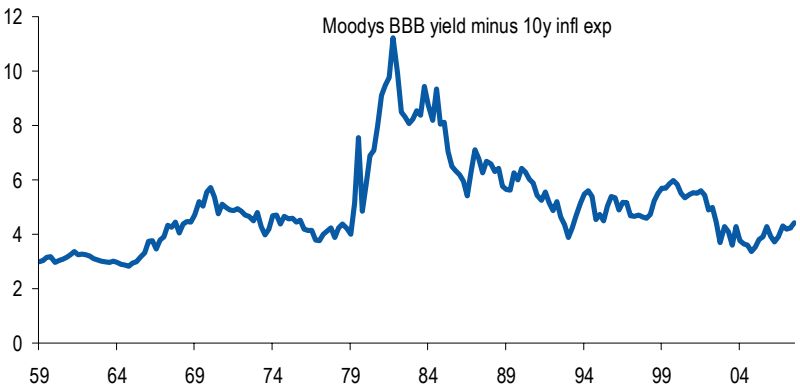
The relative price of investment goods is proxied by the ratio of the OECD fixed investment deflator over GDP deflator



Source: OECD and JPMorgan

Chart 6: Cost of finance

y-axis in %. The marginal cost measure proxied by Moody's BBB corporate yield deflated by Philly Fed inflation expectations



Source: Federal Reserve and JPMorgan

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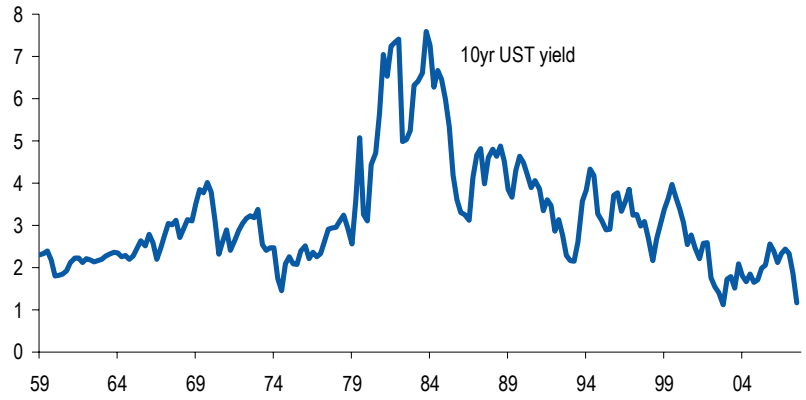
The fall in the cost of finance reflects a reduction in macroeconomic volatility and higher saving by emerging markets

Recent movements in the relative price of capital suggest that **the impact of technological progress and globalization has run their course**, at least for the time being. As indicated in Chart 5, the relative price of investment goods has leveled off. As economic growth in the emerging market economies has accelerated following the fallout from the 1997 Asian financial crises and 1998 Russian default, prices of all goods including capital have been coming under increased upward pressure.

The secular decline in the cost of financing capital investment has been largely a reflection of the reduction in **macroeconomic volatility and higher saving by emerging markets**. According to our fair value model (see *A Fair Value Model for US Bonds, Equities and Credit*, Jan 05), a large part of the fall in the real 10-year UST yield since 1980 can be explained by increased emerging market saving (100bp) and lower inflation volatility (70bp). Admittedly, the cost of debt also includes a credit spread, but credit spreads have been more mean reverting and have exhibited no secular trend. More recently (Chart 6), the cost of finance has started to rise suggesting the three decade long fall has been arrested.

Chart 7: 10-year real UST yield
y-axis in %. The 10-year UST yield is proxied by 10y nominal yield minus 10y Philly Fed inflation expectations



Source: Federal Reserve, Standard and Poor's and JPMorgan

Box 1: Equation of US profit share (after interest and taxes)

US profit share	=	24.4
		(4.2)
	-	5.27 × relative price of investment goods
		(2.8)
	-	0.48 × real cost of finance
		(0.05)
	-	0.22 × leverage
		(0.05)
	-	0.15 × effective tax rate
		(0.03)
Sample period		1Q70 to 3Q07
adj-R^2		78%
Standard Error		0.73

(profit share in percent, the relative price of investment goods is proxied by the ratio of OECD total fixed investment deflator over GDP deflator, the WACC for US corporates is a 10-year trailing average of the weighted average of the weighted average of Moody's BBB corporate real yield and the S&P500 EDR proxied by the inverse of the PE ratio, where the weights reflect leverage. Leverage is proxied by the ratio of net debt to net debt + net worth ratio for the US non-financial corporate sector, standard errors in parenthesis)

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Declining tax rates have also been important in boosting corporate profitability

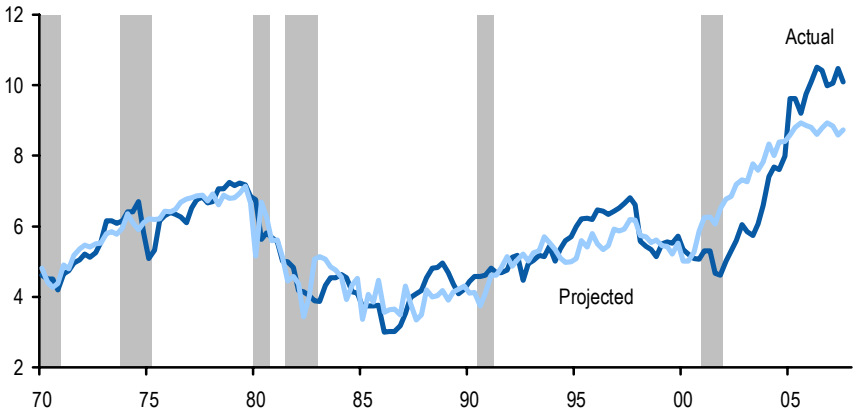
The substitution into **cheaper inputs**, i.e. capital, combined with the fall in the cost of financing those cheaper inputs have boosted corporate profit margin. Indeed, the trends in the relative price of investment goods and the cost of finance explains the 30-year rise in the US profit share remarkably well, as shown in the regression model detailed in Box 1. In addition to the relative price of investment goods and the cost of finance, the model also includes the degree of financial leverage and the effective tax rate. The inclusion of financial leverage provides an adjustment for **interest costs**, which are returns to debt holders. That is, the capital share reflects the return to total corporate capital (both debt and equity) while profit share reflects the return to equity only. As such, an adjustment for the relative shares of debt and equity must be made. The inclusion of the tax rate accounts for the impact that lower **tax costs** had on profit margins over time (Chart 8). Corporate taxes have fallen over the past two decades as multinationals were able to arbitrage tax differences across countries and thus gained a better bargaining position against governments.

As indicated by the parameter estimates in the equation in Box 1, all four drivers of corporate profits (the relative price of capital goods, the cost of finance, leverage and the tax rate) are economically and statistically significant. In terms of their relative impact on the profit share, a 1% rise in the relative price of investment reduces

Chart 8: US corporate effective tax rate
y-axis in the ratio of tax payments over unadjusted profits before taxes

Source: Lehmans and JPMorgan

Chart 9: US corporate profit, after interest and taxes
% of GDP



Source: BEA, US Flow of Funds and JPMorgan. NBER recession dates shown in grey.

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The current episode stands out as a period in which corporate profit shares appear somewhat rich relative to their long term drivers

corporate profits by roughly 0.05% of GDP, a one percentage point increase in the cost of finance reduces corporate profits by 0.48% of GDP, a one percentage point increase in debt relative to gross wealth (i.e. net debt over net debt plus net worth) reduces profits by 0.22% of GDP, and one percentage point increase in the tax rate reduces profits by 0.15% of GDP.

Although the fundamental determinants of the cost of capital accumulation, combined with leverage and the tax rate, correctly identify the secular move down in the profit share from the 1970s to the mid 1980s as well as the steep trend up since then, the last 10 years stand out as a period in which **corporate profits appear to diverge significantly from the estimated trend** (Chart 9). For example, as of Q4 07, after-tax corporate profits appear to be a sizable 1-1/4% of GDP above their projected value.

Long-run drivers of corporate profits signal end to the trend

The long-term drivers of profit shares have likely bottomed out and as a result the upward trend in capital and profit shares has likely ended:

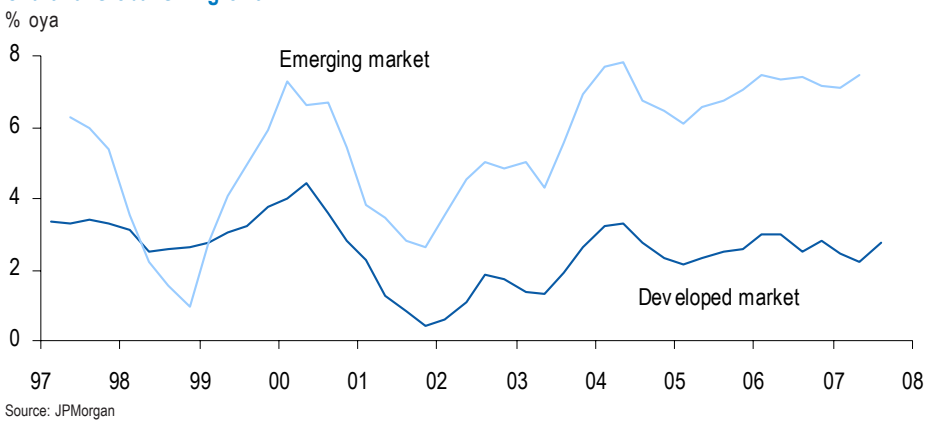
The relative price of capital relates to a large extent to the dynamics underway between developed and emerging markets

1. The first long-term driver, the secular trend down in the **relative price of capital** relates to largely to the dynamics between developed and emerging markets. In particular, the turmoil in emerging market countries over the previous decade had a powerful disinflationary impact on global goods prices. **Cheaper EM currencies**, combined with the severe negative demand shock unleashed by **EM crises**, the Asian financial crisis and the Russian debt default, pushed relative goods prices lower. **China's 2001 entry into the World Trade Organization** depressed goods prices further.

This dynamic began to unwind at the start of the most recent US expansion. **EM growth has strengthened** smartly since the Asian financial crisis and has outpaced developed market GDP by an increasing amount over the past five years (Chart 10). More importantly, the scale of the EM economy has reached a point where surging demand for raw inputs has led to soaring commodities prices. Because the EM are primarily exporters of commodities, the region's terms of trade with developed markets has improved considerably. Combined with a shift to higher-value added production, **EM export prices have boomed** this decade.

More broadly, the 30-year trend in **economic integration has slowed** in recent years. Although globalization has many different dimensions and is difficult to summarize,

Chart 10: Global GDP growth



Source: JPMorgan

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Resource competition from EM and a slowdown in globalization forces is putting pressure on the price of capital goods

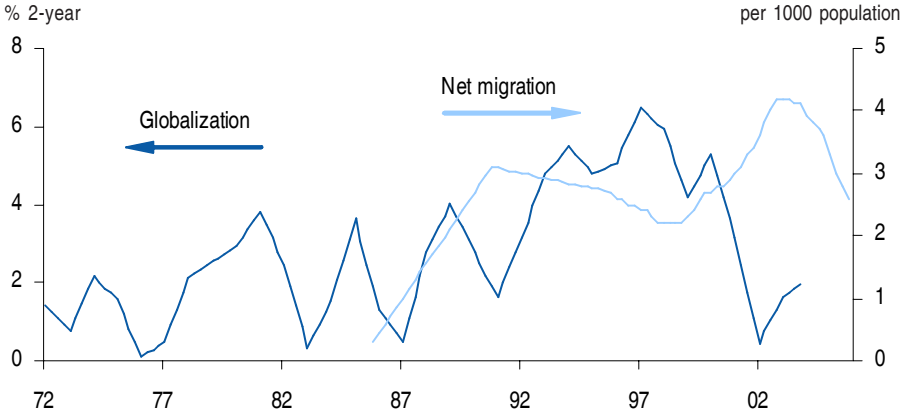
the KOF globalization index developed by the Swiss Federal Institute of Technology attempts to capture the main components of economic integration. This measure is derived as a weighted average of trade, FDI and portfolio flows as well as proxies for reduced restrictions in trade and capital accounts. As shown in Chart 11, globalization picked up rapidly between 1985 and 1997. Since 2000, however, the pace has fallen sharply. Moreover, immigration — which has put downward pressure on labour shares, a mirror image of profit shares — has in fact declined in recent years after peaking in 2002.

The combined effect of increased **resource competition from EM** countries and a **slowdown in globalization forces** has led to a rise in the price of capital goods (Chart 12). Although the rise has been modest, the trend points to further acceleration, a sharp contrast to the previous 20 year secular deceleration. As such, a best guess is that the relative price of capital maintains its current level. While advances in **technology** will continue to lower capital goods prices, these improvements will likely be offset by the recent deceleration in globalization along with the growing strength of emerging market countries.

The three-decade long fall in the cost of finance has also been arrested

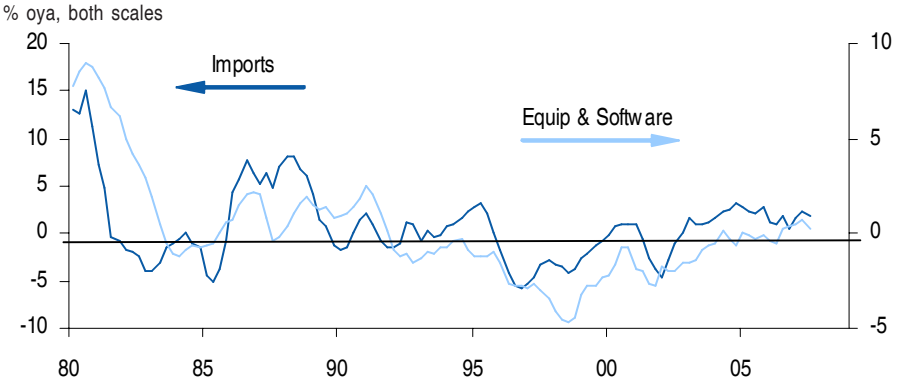
2. Recent trends also point to a flattening or even partial reversal of the forces that caused the secular decline in the **cost of financing** capital investment over the past 30

Chart 11: Globalization trends
Globalization index constructed as a weighted average of trade, foreign direct investment stock and flow, portfolio investment, income payments to foreign nationals, hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions. 1972-2005.



Source: JPMorgan

Chart 12: Price of imports (goods excl. petrol) and equipment & software, US
% oya, both scales



Source: JPMorgan

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years (Charts 6 and 7). In particular, macroeconomic volatility, i.e. volatility of both global growth and inflation, appears to be bottoming out. Savings by EM peaked in 2006 and are expected to gradually fall in coming years according to IMF estimates. Corporate savings act more like an amplification mechanism on profit shares, boosting profit shares during booms by depressing bond yields and the cost of finance and weighing down on profit shares during downturns. With the global expansion slowing, the result will be a deceleration in corporate saving and, hence, the removal of a downward force on global interest rates.

Corporate leverage has recently stabilised, but a drift up is likely over coming years

3. Corporate **capital leverage** has tended to trend up or down over long periods of time with only a **small linkage to the business cycle**. This is because corporate leverage is mostly a function of two sources — retained earnings and new debt versus equity issuance — each of which is cyclical, but has an offsetting impact on leverage. This pattern is consistent a medium target for corporate capital leverage, which likely reflects tax arbitrage considerations, bankruptcy costs, uncertainty and the relative cost of equity and debt. As shown in Chart 13, US corporate leverage increased during the 1980s as companies tried to take advantage of very high equity risk premia. The 1990s and early 2000s saw a reversal of this trend. During the past two years capital leverage has been relatively stable and close to its historical average, but slowing profit growth and still solid debt minus equity issuance point to a likely drift up in capital leverage over the coming years.

The effective tax rate has also stabilised over the past few years to a historically low level

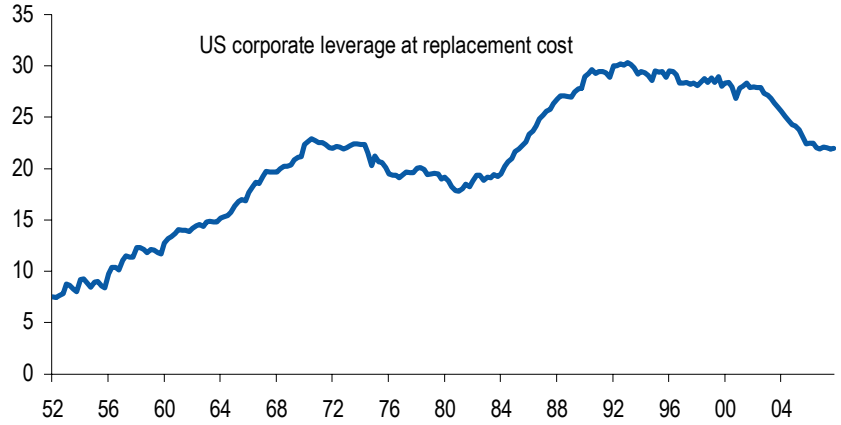
4. The effective **tax rate** paid by US corporates has remained relatively constant since 2003 (Chart 8), after a dramatic fall in the period around the 2001 recession. Given its current **historically low level**, it is unlikely that the effective tax rate will be reduced further in the future, especially as US government's attention is currently focused on helping troubled consumers rather than the relatively healthier corporate sector.

A flattening or reversal in the long term drivers suggests that the three decade long rise in profit shares has likely ended

The bottoming out in the long-term drivers suggests that **the uptrend in profit shares has come to an end**. The impact of these developments on corporate profits is not trivial. Even if the US after-tax profit share maintains its current elevated level of 10.1%, profits would grow no faster than nominal GDP, which has a potential growth rate of roughly 4 to 5%. This contrasts with the experience of the past 22 years where after-tax US profits grew by 11% in nominal terms in the US, 6%-points above the average rate of growth of nominal GDP.

Chart 13: US corporate leverage

%, ratio of net debt to net debt plus net worth for non-financials corporates



Source: US Flow of Funds

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Near-term drivers of the profit share signal correction down

Near-term movements in corporate profits relates to the relative pricing power of firms and of labor

While long-term trends are important for equity valuations, these low frequency movements miss much of the near-term dynamics, which are also important to the evolution of profit shares and equity valuations. In this section we explore the **link between long-term trends and near-term dynamics** in profit shares. In particular we show how the deviation from the long-term trend is an important driver of the evolution of the profit share over the next 1 to 5 years. Because of the availability of deep historical data, we continue to focus on the US profit share.

The NAIB pricing power proxy does little on its own in explaining future changes in the profit share

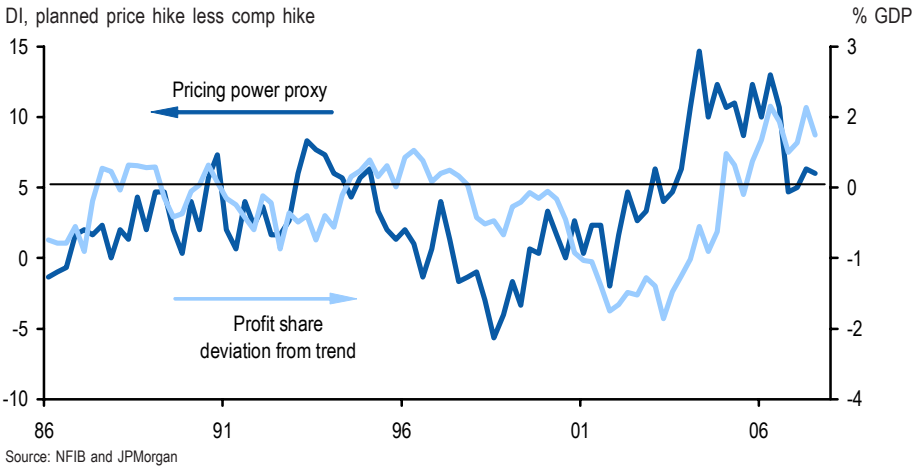
Perhaps the two major factors affecting near-term movements in corporate profits relates to the pricing power of firms and of labor in their respective market place. A survey-based proxy of the relative pricing power of firms and of labour is given by the **National Association of Independent Businesses** (NAIB). The NAIB reports diffusion indices on firms' plans to raise prices in the coming three months and their plans to increase compensation over this period. As shown in Chart 14, the difference in these indices (the "**pricing power proxy**") lines up well with the profits share's deviation from our estimated trend. Indeed, the proxy tends to lead the profit share deviation, and presently points to a return in the profit share to its long-term trend within the next one to two years.

In addition to pricing power, near-term profits are incrementally affected by the long-run trend. By definition, the profit share moves toward this trend over time. Quantifying the speed of this dynamic provides a useful guide for projecting the profit share forward.

In contrast, the trend deviation aids in explaining the change in the profit share rather well over both 4 and 8 quarters

To quantify the impact of these factors, we run a **regression** of the change in the US profit share on its **lag** (to capture mean reversion dynamics), the **NAIB pricing power proxy**, and the **deviation in the profit share from its estimated long-run trend** (based on the model in Box 1). Table 1 reports results from regressing the 4, 8, and 16 quarter ahead changes in the US profit share on these factors. The **pricing power proxy does little on its own** in explaining the change in the profit share at 4 and 8 quarters and it is insignificant at longer horizons. In contrast, the trend deviation aids in explaining the change in the profit share rather well over both 4 and 8 quarters, and suggests a

Chart 14: Corporate pricing power and profit share
The pricing power of the firm is computed as the NFIB diffusion index of corporate plans to raise prices in the subsequent 3 months less the diffusion index of plans to raise wages. The after-tax corporate profit share of GDP is reported as a deviation from the share projected by the model of its long run trend.



Source: NFIB and JPMorgan

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deviation from trend profits equal to 1% of GDP damps profit growth by anywhere from 0.48% to 0.64% of GDP over the subsequent 8 quarters. Not surprisingly, including the trend deviation improves the significance of the pricing power proxy, consistent with the evidence in Chart 14 of a strong relationship between the pricing power proxy and the deviation in the corporate profit share from its estimated long-term trend. On balance, the pricing power proxy and trend deviation combined explain roughly 25% of the variation of the change in the US after-tax profit share over 4 and 8 quarters but aid little in explaining changes over 16 quarters.

An alternative method to projecting US profits is to use an error correction model that better captures high frequency movements

An alternative method to projecting US profits makes more explicit the mechanism that closes the trend deviation. This method assumes that the after-tax US profit share is best described by an **error-correction model** (Box 2). The advantage of the error-correction model over a model based simply on the trend, such as that shown in Table 1, is that it **better captures high frequency movements**. Compared to the regressions fitting the 4-, 8-, and 16-quarter ahead change in the profit share (Table 1), the error-correction model performs better over all horizons and yet does not require a forecast of the pricing power proxy. For these reasons, this model is preferred in the analysis below.

According to the results in Box 2, a 1%-point gap between the actual profit share and its trend reduces the change in the profit share by just 0.14% of GDP per quarter. At that pace, the implied half-life of a gap is about 1 year (4.6 quarters), a value that appears roughly consistent with the fluctuations in the deviation shown in Chart 9.

Cyclical proxies, such as the unemployment rate, can be added to the error correction model

Because the error-correction model is estimated using changes in the profit share at a quarterly frequency, higher frequency business cycle indicators can also be used. In particular, as shown in Box 2, a 1%-point increase in the **unemployment rate** reduces the corporate profit share by 0.34% of GDP. Although a rise in the unemployment rate could signal a fall in labor pricing power and thereby boost profitability, it is also a proxy for economic weakness. Indeed, this latter effect appears to dominate.

As shown in the table in Box 2, the error-correction model performs as well as an autoregressive model at a 1-quarter horizon and as well as the trend-only model at 8 to 32 quarter horizons. Importantly, the root mean squared errors are based on a forecasting exercise in which changes in the profit share are dynamically projected (not based on actual future changes) and the trend is held constant at its time-t level

Table 1: Explaining near-term changes in the after-tax US profit share

Table reports results from regressing the 4, 8, and 16 quarter ahead change in the US profit share on its lag change (non-overlapping), the pricing power proxy defined above, and the deviation in the profit share from its long-run trend. Standard errors are in parentheses.

	4 quarters ahead, t+4				8 quarters ahead, t+8				16 quarters ahead, t+16			
Constant	0.11	-0.05	0.10	0.03	0.23	-0.10	0.22	0.03	0.40	0.51	0.35	0.38
	0.10	(0.15)	(0.09)	(0.12)	0.21	(0.23)	(0.19)	(0.25)	0.37	(0.43)	(0.37)	(0.43)
Lag change in profit share, t	0.27				0.17				-0.26			
	0.14				0.15				0.26			
Pricing power proxy, t		0.06		0.02		0.13		0.06		-0.01		-0.01
		(0.04)		(0.02)		(0.05)		(0.05)		(0.10)		(0.09)
Deviation from trend, t			-0.58	-0.55			-0.64	-0.48			0.70	0.70
			(0.14)	(0.14)			(0.29)	(0.30)			(0.47)	(0.47)
Adj R-sq	0.06	0.05	0.25	0.26	0.02	0.08	0.11	0.12	0.02	-0.01	0.03	0.02
RMSE	0.73	0.73	0.65	0.65	1.21	1.15	1.15	1.15	1.87	1.80	1.86	1.87

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(again, not based on actual future values). Changes in the unemployment rate are consistent with current JPMorgan US economic forecasts over the respective horizon. As such, the simulations approximate real-time forecasting.

Our preferred error correction model projects that the US profit share will fall to 9% by the end of 2011

According to the projections based on the error-correction model, **US after-tax corporate profits are expected to fall from 10.1% of GDP in 2007Q4 to an equilibrium estimate of 8.7% of GDP by the end of 2015** (Chart 15). Based on a half-life of around one year, the projected level for the profit share is 9% by Q4 2009 and 8.8% by

Box 2:
Equation of changes in US profit share (after interest and taxes)

Change in US profit share =
- 0.12 × change in profit share, lagged (0.06)
- 0.14 × level deviation from trend, lagged (0.036)
- 0.34 × change in unemployment rate (0.08)

Sample period	3Q70 to 3Q07
adj-R^2	22%
Standard Error	0.30

(change in profit share in quarterly percentage point difference, deviation from trend defined as the difference between the actual level of the profit share and the level projected by the long-run trend (Box 1), change in the unemployment rate is in percentage points, standard errors in parenthesis)

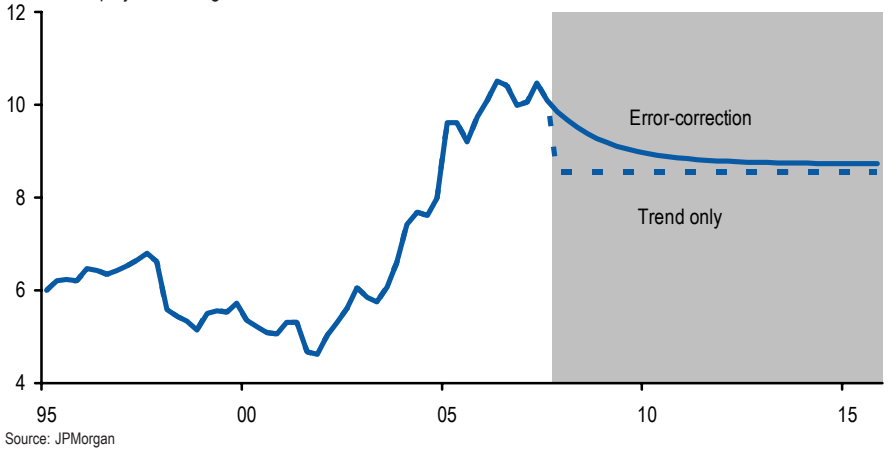
Root mean squared error

(Standard deviation of error in dynamically projecting the level of the US corporate profit share 1, 4, 8, 16, and 32 quarters ahead based on three models. The AR(1) model is a simple autoregressive model of the change in the profit share. The trend only model is discussed in Box 1. The error correction model "near-term" is defined above).

Model projections for the trend only and error-correction models assume the WACC, relative price of investment, and leverage are equal to their time-t values. For example, the 8-quarter ahead projection in 1Q80 is comuted using the 1Q80 trend level of the profit share for all quarters from 1Q80 through 4Q81. In this sense, aside from being based on models estimated over the full sample, the forecasts are dynamic as well as real-time.

Quarters ahead	AR(1)	Trend only	Error-correction
1	0.5	0.7	0.5
4	0.9	0.8	0.7
8	1.3	1.0	1.1
16	1.8	1.5	1.6
32	2.1	2.2	2.2

Chart 15: US after-tax corporate profits
% of GDP; projections begin in 4Q07



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Q4 of 2011. The implications of these projections for equity valuations are analyzed in the next section.

Projected profit share keeps equity markets range bound

The above profit share projections imply 1% nominal profit growth over the next 4 years

Applying consensus nominal GDP forecasts to the projected path of the corporate profit share, we forecast that **NIPA after tax profits** will fall by 5% this year (Q4 08 over Q4 07) and then rise only gradually over the next 4 years. The forecast is for 1% annualized growth by 2011 (Q4 11 over Q4 07).

Historical evidence shows that although NIPA profits growth and S&P500 EPS growth diverge significantly at higher frequencies, the growth patterns and sizes are very similar over 4-year periods, as shown in Chart 16. Admittedly, after 1990 the two series have diverged a fair bit, with the gap between the two series at times as large as 5%-points, but the patterns have tracked each other rather well nevertheless.

Profit growth is projected to decelerate further in coming years, similar to the patterns seen during the past two recessions

Applying the above NIPA profit growth forecasts to the **S&P500 EPS** yields a projection schedule that points to further deceleration in EPS growth over the next 4 years. The dotted line in Chart 16 denotes this projection and shows that the size of the **EPS growth deceleration is similar** in magnitude to that experienced during the **past two recessions**.

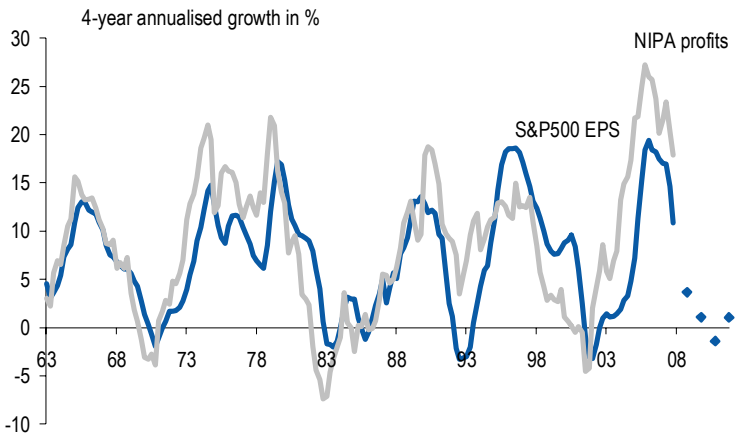
The S&P500 operating EPS level is expected to initially fall to $78 by Q4 08 and then rise very slowly to $86 by Q4 11

These projections compare reasonably well with the trend in real EPS, as shown in Chart 17. The projected real EPS series, denoted by the dotted line, implies only a partial reversion to the 50-year trend, with the real EPS set to remain well above that trend. In particular, the **S&P500 operating EPS level is expected to initially fall to $78 by Q4 08 and then rise very slowly to $86 by Q4 11**. A level of $78 for the S&P500 by the end of this year is 15% below the peak of $91.5 seen in Q4 07 and is consistent with the peak-to-trough declines seen during past US recessions.

Applying a 'fair' **PE ratio** to the EPS forecasts suggests equity prices will remain relatively range bound in the coming few years. The average PE ratio of the S&P500 index over the past 50 years has been close to 15. Over the past 15 years, and excluding the bubble period, the PE ratio has averaged at a higher level of around 17, likely a reflection of greater macroeconomic stability and lower transactions costs. Applying

Chart 16: Comparing NIPA after-tax profit growth with S&P500 EPS growth

dotted line denotes projections through 2011



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a PE ratio of 17 to the above EPS forecasts **produces an S&P500 index in the range of 1300-1500 over the next few years**.

Applying a PE ratio of 17 to EPS forecasts, produces a range of 1300-1500 for the S&P500 index over the next few years

Another approach to assess the implications of the above earnings projections for equity valuations is to use an **equity valuation model.** This approach is more structural and less ad hoc than simply applying a PE ratio to earnings forecasts, but comes with more assumptions. To illustrate the implications of such an approach we use below a dividend discount model to derive a fair value estimate for the S&P500 index.

Equities are usually analyzed in a present value model in which the equity price is equal to the expected future cash flows (i.e. dividends) discounted to the present using an equity discount rate (EDR). The equation below illustrates the discounted cash flow model:

$$P = \sum_i \frac{k \cdot E_0 (1+g)^i}{(1+EDR)^i} \qquad (1)$$

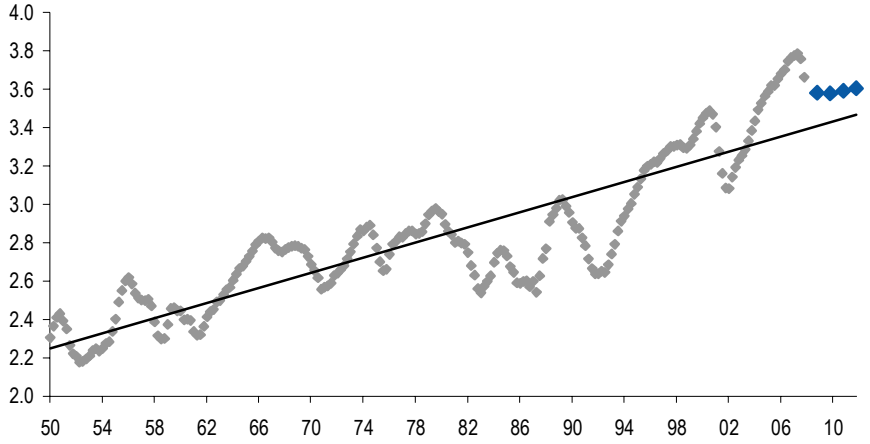
where P denotes the equity price, E_0 is current earnings, k is the payout ratio, g is the growth rate of dividends and EDR is the equity discount rate. The three main components that determine the price are:

1) The first is **current earnings** E_0, which is observable (albeit with a reporting lag), and the payout ratio k, that is, the proportion of earnings paid as dividends, which for simplicity we assume to be constant.

2) The second component is **expectations of future earnings** which are captured by the growth parameter g. Equity investors or analysts usually forecast earnings up to a specified point in the future, i.e. 3-5 years, and then make assumptions about earnings growth beyond that point. That is, they implicitly use two or more stages in their valuation framework. We also follow this approach by employing a two-stage dividend discount model, where for the first stage, i.e. first 4 years, the profit growth projection discussed above is used. In the second stage, we assume that real earnings growth reverts to an equilibrium level equal to $g_{LT} = ROE \cdot (1-b)$ where the

Chart 17: Real S&P500 EPS projections vs. trend

log of the real S&P500 EPS (deflated by US CPI) in y axis, dotted line denotes projections through 2011



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return of equity *ROE* is assumed to be equal to the cost of equity $ROE = EDR = ERP + r$. That is, it is assumed that a company cannot earn abnormal returns in its maturity stage.

Using the above assumptions, the *two-stage equity valuation* equation can be simplified (see Fuller and Hsia 1984) as follows:

$$P_t = \frac{D_t}{(ERP + r) - g_{LT}}\left[(1+g) + 4 \cdot (g_{4\,yr\_projected} - g_{LT})\right] \quad (2)$$

where $g_{4yr\_projected}$ is the 4-year real profit growth expectation.

Using a two-stage DDM model produces a current fair value for the S&P500 index of 1175

3) The third component is the **equity discount rate** (EDR), the internal rate of return for investing in equities. By definition, the EDR is the sum of the real bond yield and the ERP. In our previous research (see *A Fair Value Model for US Bonds, Equities and Credit*, Jan 05) we found that we cannot treat equities as a spread model to bonds as we do with credit. In particular, we found that the real bond yield is highly negatively correlated with the ERP, such that a rise in bond yields does not have much impact on EDR. Therefore, the assumption of a constant for the EDR is better than assuming a constant ERP. We assume a value of 5.8% for the EDR. This is consistent with the 'fair' value of 17 for the PE ratio as mentioned above. It can be decomposed to a real bond yield of 3%, which is close to the historical average since 1950s, plus an equity risk premium of 2.8%, which is the historical average since mid 1980s excluding the bubble period of the late 1990s.

Plugging a forecast of $g_{4yr\_projected}$ = -1.5% annualized real profit growth over the next 4 years (1% nominal minus 2.5% inflation) into the above equity valuation equation for the S&P500, and assuming dividends per share of $28.1 and earnings per share of $82.5, produces **a current fair value estimate for the S&P500 index of 1175**, significantly below its current market level.

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JPMorgan Research
Profit margins to fall
April 21, 2008

JPMorgan

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